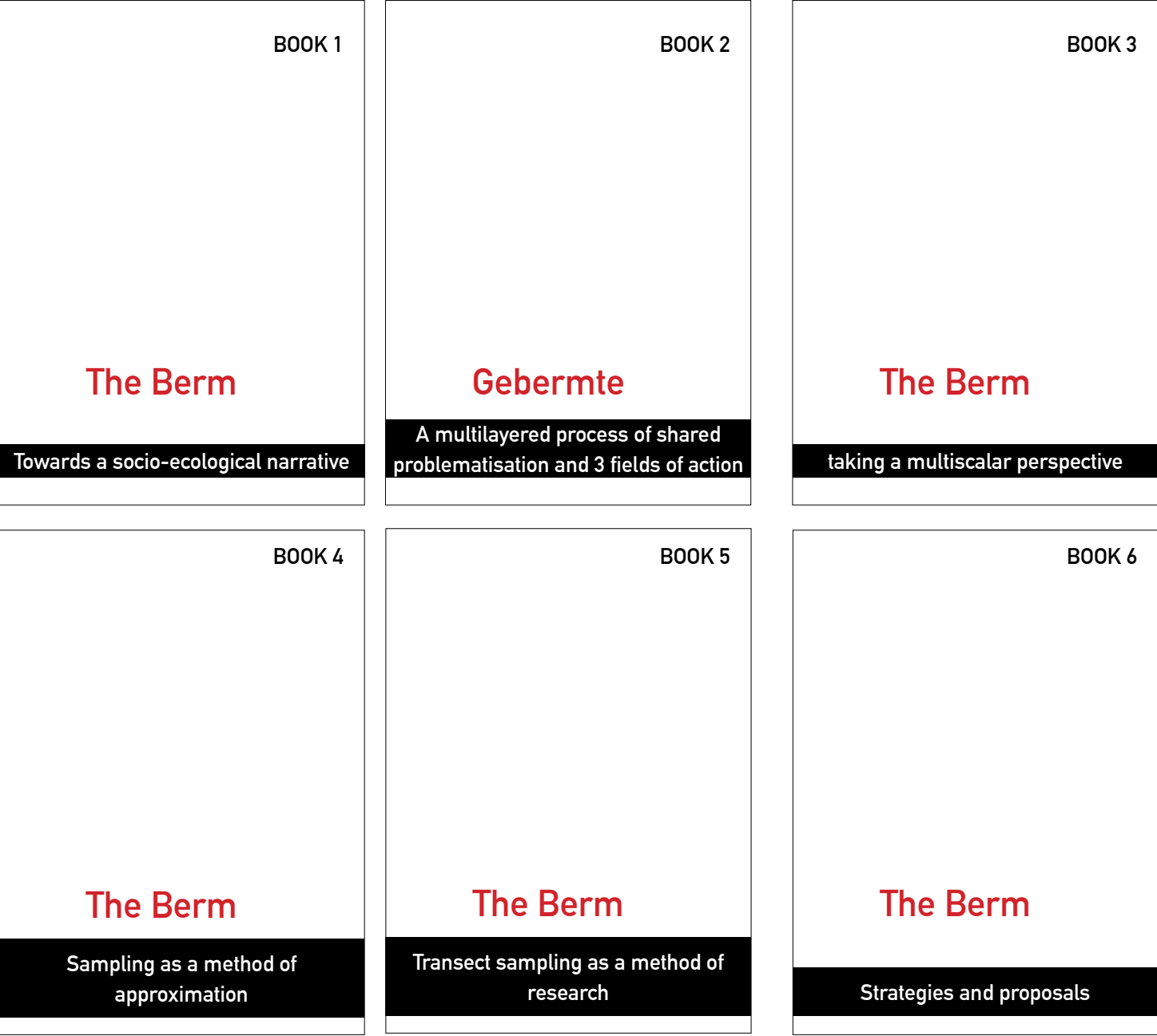




The Berm NATURE TISSUE PLAN



The Berm

Towards a socio-ecological narrative

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WHY WE NEED A NATURE TISSUE PLAN? HOW TO MAKE IT?

1. Making a nature tissue plan for the Berm in Mortsel-Wilrijk

1.1 Why we need a nature tissue plan for the Berm?

The continued pressure on nature, reinforced by climate change and the corona crisis, puts the livability of cities, climate adaptation and socio-environmental justice on the agenda. Due to the **ongoing urbanization** of Flanders, it is important to let cities grow more 'naturally' and therefore to let them play a role in the solution. The Berm in Mortsel-Wilrijk can play a role in that. This is why this draft nature tissue plan (NWP) was made.

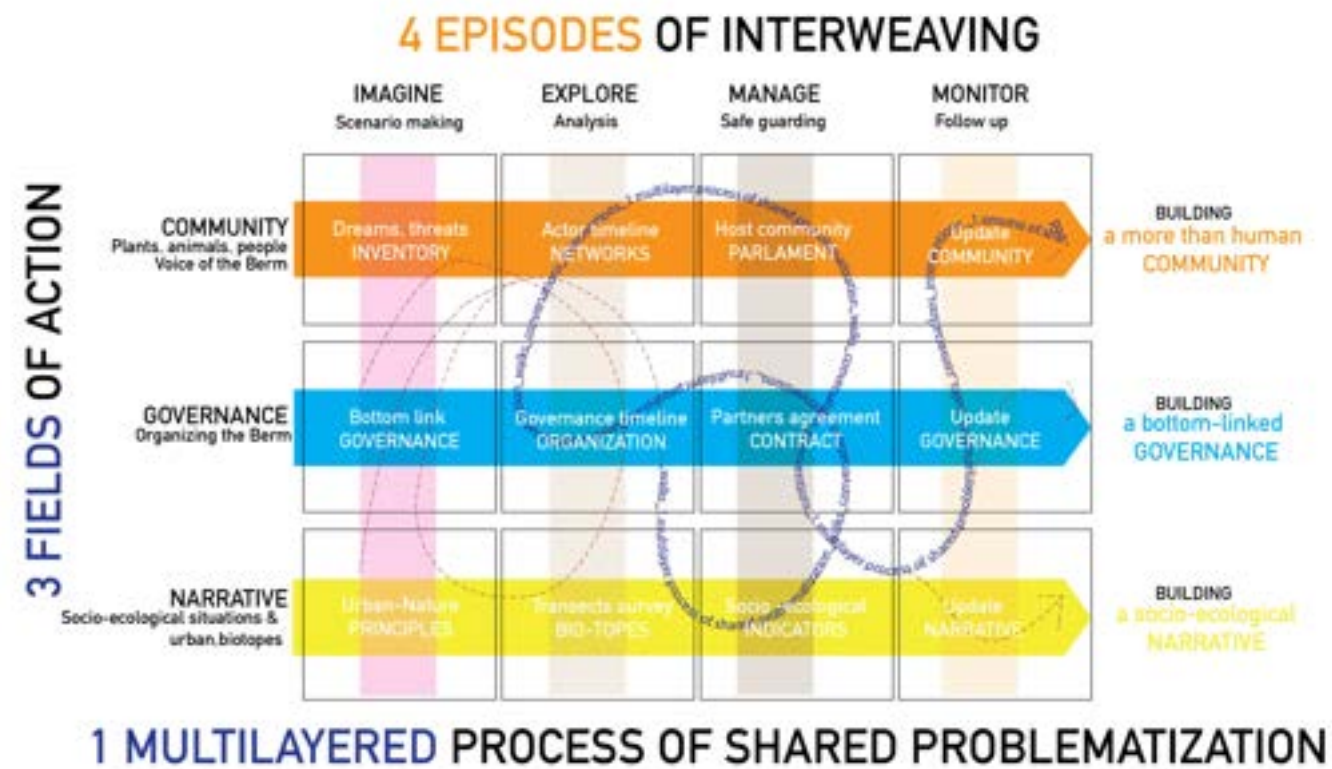
But to support more nature in cities, it is important to note how the **governance situation has changed**. There is a need for co-creative strategies of local and supra-local partners to achieve a consistent and robust nature tissue plan addressing multiscale objectives. We see in the current situation of the Berm a clear fragmentation between the supralocal and the local scale. This is exemplified by the fragmentation of the management of the Berm but also by the wish of local stakeholders to synchronize agendas with supra level actors.

1.2. How to make a nature tissue plan?

How to make a nature tissue plan is explained in the **draft manual for making NWPs**, serving as a reading guide for this NWP. A Nature Tissue Plan qualitatively interweaves multiple relationships between socio-ecological, spatial and thematic policy approaches (Top Down+) with a biopsychosocial ecological neighborhood and place-driven approach view (Bottom Up+).
¹

(Top Down+) x (Bottom Up+) = NWP

The ongoing trajectory at the Berm already makes it clear that the creation of a nature tissue plan for the area is **seen as a process** in which objectives, definitions, nature valuations, etc. co-evolve with all the actors involved in it. The figure below structures that process as (1) a multi-layered process of shared problematization, through (2) three action fields, and (4) four episodes of interweaving.



Scheme of the process to make a Nature Tissue Plan for the Berm

The main **building blocks** of this process are as follows. They are further elaborated in the draft manual for making NWP. ²

Drawing up a nature tissue plan is, as mentioned, a **multi-layered learning process**, where involved actors (humans and non-humans) try to set up a common trajectory to better relate and intertwine humans and non-humans, local and supra local priorities. The aim is to build a situated understanding of the interweaving of nature in the city, to critically question existing actions from this understanding and to set up new actions that develop and strengthen the interweaving (human, city-and urban periphery biotopes), making the urban biotope and the people in it more resilient, pleasant and healthier. This learning process is not linear, as the figure also shows, but has steps forward and backward, all kinds of parallel tracks, side tracks, inputs and outcomes. It takes place at different policy scales and spatial scales, and through different time perspectives. Therefore, it is clearly multi-layered. It can be seen as creating a shared problem/opportunity statement (how the situation is seen and appreciated) with various actors involved, which will then guide the actions of its actors. All kinds of analytic, performative, pedagogical, artistic, design, ethnographic, playful, etc. interventions contribute to this process. Examples are making and discussing analytical schemes, walks, artistic interventions, game formats, questions, festivities, interviews, informal conversations, etc. Interventions are both investigative and future-building. They form community, governance and narrative at the same time.

THE CASE STUDY OF THE BERM

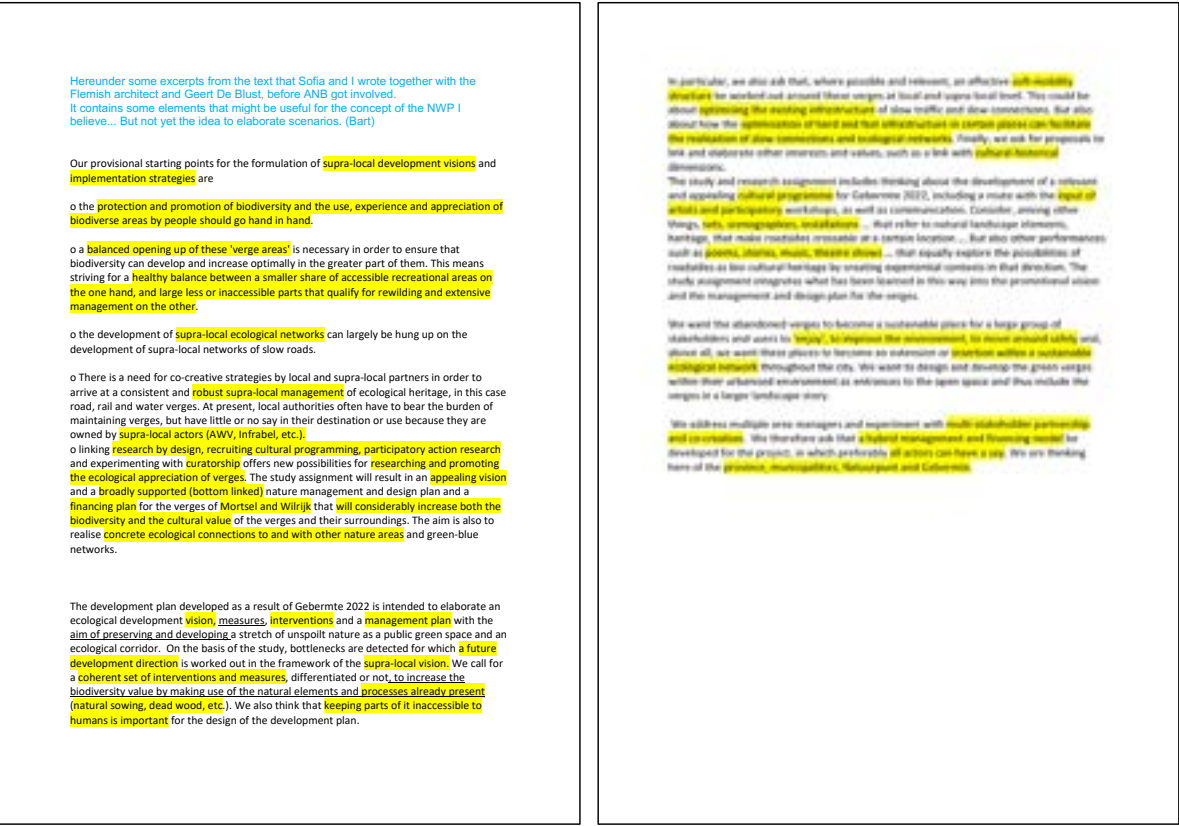
The multi-layered learning process comprises **three fields of action**, as three parallel sub-processes. (1) Working on urban nature presupposes those actors build a more-than-human nature tissue community that collectively dreams, thinks, makes, manages, cares for urban nature in togetherness. This can be due to a shortage, a dream, a fear or a necessity, but always reinforcing social ties and willingness to work together on urban nature. Both are expressions and demands of local inputs in the process. The question of who is part of the local coalition must be constantly asked and the coalition should be able to adjust to changes of circumstances. (2) Community can only arise or continue to exist if it also arrives at shared values, norms, agreements, projects, criteria. In other words, there is a need for some form of governance, organizing the social relationships in the community. This governance is rooted locally (bottom-up) but must also be linked to democratic forms of governance (bottom-linked) on various scales. This governance is also hybrid and mixes different types of organization. (3) The organized community develops a more or less shared socio-ecological narrative about the urban nature for which it advocates. This requires a sufficient understanding of the ecological and social mechanisms that make up the urban nature in question and reassures the commitments to continue working together on it.

The multi-layered learning process also runs through **four stages of interweaving**. It concerns various types of activities that crosscut the action fields and also takes place in parallel and in various sequences: imagining (scenario making), exploring (analysis), managing (safe guarding), monitoring (follow up). So, there are no predefined phases that are completed consecutively.

1.3 The case of the Berm in Mortsel

The learning process is conceived as **transdisciplinary action research**, which builds on the preparations for the bio-cultural event Gebermte 2022-24 as a case study. This led to an NWP initiative for a breeding project intended to generate, test, exchange and enrich ideas, which fed into a manual for making nature tissue plans. In the future, other case studies will feed the manual and lead to its adaptation. The preparation and supervision of two master's theses, one at KU Leuven (De Rop, 2022) and one at Wageningen University (Van den Broeck, 2022) are also part of the process and the results.

Gebermte 2022-24 is a citizen led bio-cultural event on 'de Berm' in Mortsel and Wilrijk. Gebermte (see also <https://www.gebermte.be/>) is a citizens' initiative that is building on past experiences of activism and nature conservation. Gebermte as a process started in 2017 and aims to enrich the old railway embankment with appreciation of spontaneously emerged nature combined with cultural-historical elements in order to preserve the area for the future. This is made clear with this quote from a recent (Gebermte, November 2021) discussion text by Gebermte.



Letter of intent of Gebermte

'The railway verges of Mortsel and Wilrijk can grow into a robust ecological body that makes slow connections between communities (people, animals, plants, insects...) in the southern outskirts of Antwerp. Gebermte is a community initiative that is committed to this vision of the future. We bring residents of Mortsel, Wilrijk and surroundings together, enter into collaborations with associations and governments and look for ways to intertwine culture, nature and the Berm. Since the last edition of Gebermte in 2019, the Berm is in a new phase. A partnership is in the making between Mortsel, Wilrijk, the Province of Antwerp, KU Leuven and the Flemish government to draw up a future plan for the Berm. Gebermte wants to further fuel this collaboration by serving as a catalyst for a broad participatory vision-forming process. For three consecutive years (2022 - 2024) we want to set up culturally and artistically inspired actions that investigate how the Berm are and/or can become ecological heritage. For this and to celebrate the centenary of the Berm, we want to work together with artists and cultural makers from different disciplines to make creations with residents and associations from Mortsel and Wilrijk. How can we touch (hear, feel, smell, see, taste ...) that which lives and makes life possible on, around and in the body of the centenary roadside in order to learn to view, understand, appreciate and approach the verges in new ways? is the central research question here.'

1.4 A multi-layered process

To see more detailed information on the shared problematization process for the Berm and some of its main activities (walks, labs, interviews, conversations, etc.) please refer to **book 2**.

A MULTILAYERED PROCESS OF SHARED PROBLEMATIZATION

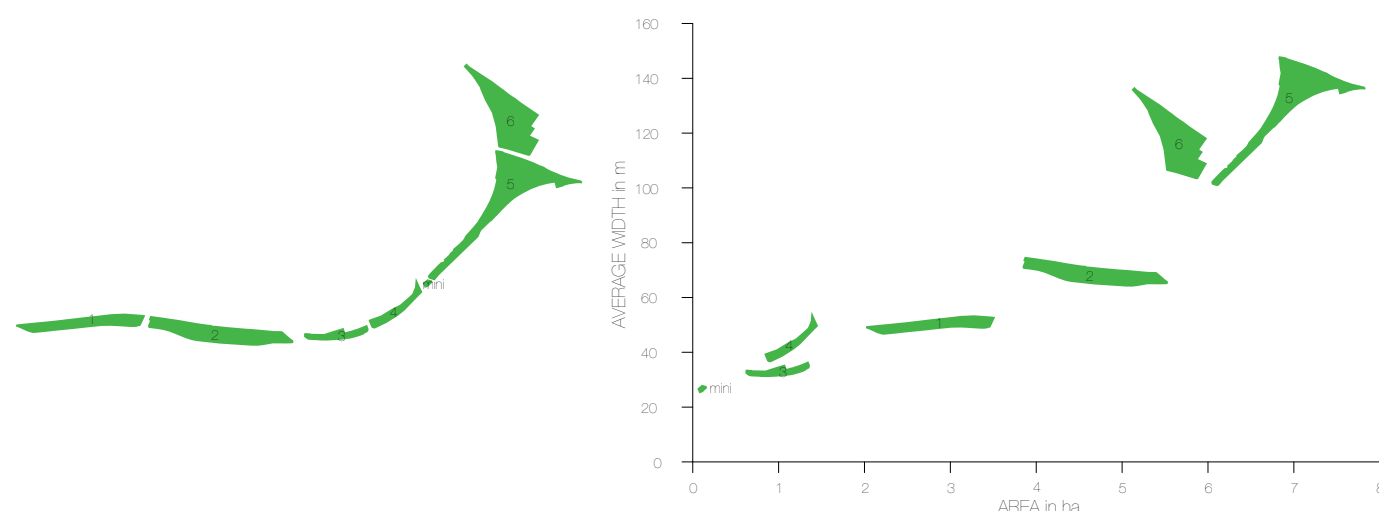


Scheme of the process of finding common ground for a Nature Tissue Plan for the Berm

2. Analyzing the Berm

2.1 The Berm threatened by infrastructural plans

The Berm as we know it now has a long history of physical transformation. The area was drastically transformed from agricultural fields into an industrial-military area but especially by the introduction of the railway lines in 1870 and their embankment in 1922. After the creation of the ring railway the line got out of use and the rail infrastructure was finally dismantled in 1973. Since then, the Berm has been constantly seen as a potential place to accommodate a 2x2 expressway that would expand the traffic capacity of the R-11 from 2 lanes to 4. 'Time and again, these plans collided with fierce resistance from residents, associations and municipal authorities with protests taken place in 1976, 2011, and in 2014.³'. Nevertheless, the threat is still present as the current plans that follow up on the masterplan for Antwerp 2020 still include the construction of the R-11 and A102: 'The Flemish Government reaffirms the "Master Plan 2020" and the objectives included therein and the coherent set of infrastructure works and policy measures. All current procedures and initiatives that are part of the Masterplan 2020 will be continued in full, including the planning procedure for A102/R11bis.'⁴ (The Flemish Government decided on 14/02/2014. See also below masterplan 2020). In that sense the Berm remains in a vulnerable position as it currently lacks legal protection as urban nature area.



The Berm as an archipelago

2.2 Supralocal importance

The Berm seen from afar plays a critical role in several aspects that improve the living habitat of human and non-human species in the Antwerp metropolitan region. Being in the top 10 places in tree canopy, the Berm plays a crucial role in contributing to carbon sequestration but also reducing the heat island effect ever more present in cities around the world. Since the Berm is linked to unbuilt and thus cooler areas the degree of cooling might even be higher, as *evapo-transpiration* by vegetation cools the air stream entering the city⁵. With an area of more than 22ha, complex micro-topography and dense and mature tree coverage, the Berm also contributes as a vital space for water retention in moments of storm and water infiltration into the soil⁶.

Due to its topographic specificity (convex shape), the high density of trees⁷ and the continuity of a solid brick wall in the SME's cluster close to Klein Zwitserland, the Berm also functions as a noise barrier with different levels of effectiveness along its length. Primarily the Berm shields for almost 2km the densely built housing areas in its northern side (e.g. houses along Hendrik Conscienelaan and Spoorweglaan and backyard gardens behind Ridder van Ranstlei) from a car traffic noise registered at the R11 that varies from 75dB to 55dB.⁸ This is not an insignificant contribution since it is worth reminding that the R11 already has a noise level peak of 75dB and permanent exposure to noise levels of 85dB and above could lead to permeant hearing loss



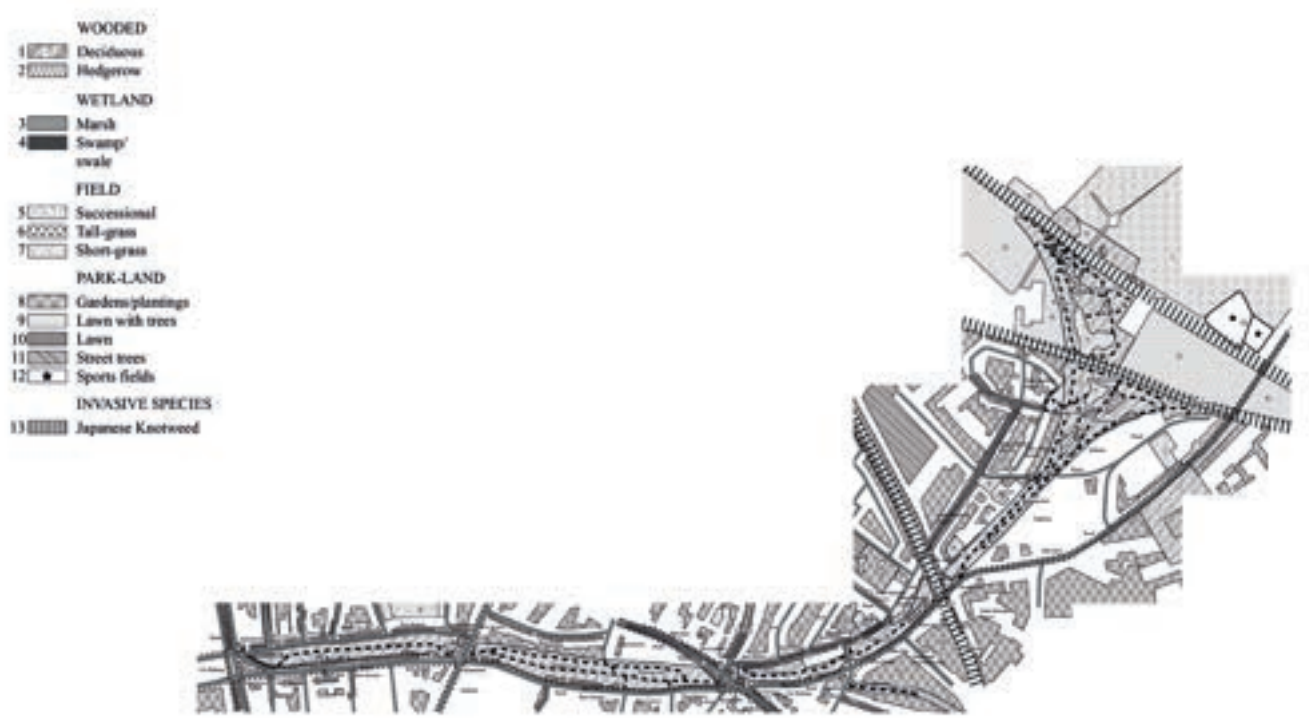
Antwerp Masterplan 2020 and its impact on the Berm

capacity⁹ and permanent stress. But not only humans benefit from the noise barrier the Berm provides. Birds and other species that have difficulty adapting to noise levels might find better areas to settle or forage in the northern side or in the area adjacent to Klein Zwitserland (see book 3 The Berm as sound filter and The Berm as car noise barrier). The filtering effect of its mature forestry also reduces the polluting effects of the road at several intervals: tire chemicals (above 6m), road salt damage to vegetation (above 15m), heavy metals + nitrogen (above 25m), presence of wood land birds (above 60m)¹⁰.

Being an ecological corridor, the Berm plays a central role as barrier or filter in more than one direction and as a sink (or trap), source (spreader) and a place for mostly edge or general habitat species¹¹. The main attributes to consider when analyzing a corridor are internal and external factors. For the interior the key characteristics are: width, connectivity and habitat while the exterior factors are adjacencies such as land uses, roads and green patches, to mention some basic ones¹².

The Berm is chiefly an urban ecological corridor, but due to its specific conditions following its origin in a human intervention, it starts to resemble a complex ecological corridor. For example, its human made shape is not rectilinear but curvilinear allowing variations in sun and wind orientation. Its width also varies from 25m up to 150m. The width of the corridor plays an important role as narrow (line corridors) segments have only edge species while corridors of a certain width (strip corridors) are able to potentially provide habitat for core species.¹³ In our survey we cannot conclude if the Berm indeed has segments that could be classified as core or interior, since this can only be done through complete sample analysis using accurate calculations to determine if other species are indeed finding a different habitat quality.

Although the Berm is an ecological corridor in many ways it is also an *archipelago*, a set of aligned islands of different areas, widths, orientations and adjacency differences. (See book 3 The Berm as *archipelago*). The close proximity between the islands allows the *colonization* and *repopulation* of several species as well as the access and availability to *resources*. While this continuity works for some species it does not work for others due to the constant fragmentation of the corridor by the presence of street intersections. The cuts are heterogeneous and some are more likely to inhibit the crossing of certain species than others leading to harsh conditions for certain species and *possible extinction*. (See book 3 Gaps along the Berm).



The Berm as a collection of biotopes

Each island has a specific *area*, *shape*, *orientation* and *adjacency* attributes. Some islands are strongly affected mainly at their edges by *disturbances* when their adjacent uses are busy roads (islands 1, 2, 3 and 4), backyard gardens (islands 2,4, 5, 6) while polluted underground water can influence the complete island (islands 5 and 6). (See book 3 The Berm as a collection of Biotopes). Interior disturbances also include the multiple human users present in the Berm ranging from archers and mountain bikes (Klein Zwitserland North), to dog owners (present in all islands), introduction of heavy vehicles (island 2, 5, and Klein Zwitserland North). There is not much recorded presence of crowds or littering, and mainly localized in island 2. (See book 3 Human(s) interaction with the Berm)

The Berm in principle also provides a *wind breaker* function¹⁴. The reduction of speed is increased by the average height of trees along the windshield and since the Berm topography

adds an extra 4-5m of elevation in combination with a high and dense tree population we speculate the effect is significant yet further studies on this should be conducted in the future. Reducing wind speed (the possibility of a quiet zone) brings human comfort, but effects for other species such as butterflies or reduction of erosion must also be considered¹⁵. A key function of the Berm is its role as reducing streamline wind speed. Additionally reducing wind speed contributes to the reduction of heating consumption in the neighboring buildings, an indirect but not negligible contribution to reduce climate change.¹⁶ Another filtering effect is the role of the corridor as a buffer that intercepts dust and light weight pollutants¹⁷.

The Berm in part could be considered both a *forest climatope* and a *park climatope*. Forest areas have ‘tempered temperature fluctuations and fairly constant relative air humidity’. *Park climatopes* are ‘important producers of lower air temperatures. This is important since the Berm is surrounded by highly dense neighborhoods (*city centre climatope*) in Mortsels and Wilrijk and the presence of industrial areas (*industrial estate climatope*) such as Agfa or the previous location of Minerva Motors (see soil coverage map in this report) that greatly contribute to the heat island effect¹⁸. In fact, ‘results indicate that the urban heat island of Antwerp exacerbates the impact of climate change on the urban population as the amount of heatwave days in the city raises twice as fast as in the rural surroundings.’¹⁹ We don’t have data for the Berm specifically but Dirk Lauwaet from VITO shows the differences of temperature in the south of Antwerp where the built fabric reaches 28 degrees (heat stress) while Wolvenberg park is between 22 and 23 degrees.²⁰

Significant green corridors greatly contribute in a city for ventilation purposes and ‘thus reduce buildup of hot air and pollution’. Nevertheless, due to its relatively small size (compared for example to the 212 ha of Tiergarten in Berlin) the cooling effect power in cooling degrees and distance might not reach further than 200 m from the Berm.

It’s worth remembering that Antwerp occupies the second place in premature mortality due to NO² pollution in a survey of 959 European cities²¹. According to the authors this is mainly caused by high traffic volumes in highly dense neighborhoods in which exhaustions are rich in fossil fuel sources which lead to respiratory and several body systems failures. The effects go beyond humans and the impacts on the environment due to the smog are multiple.²²

The Berm as a filter also plays a role in species composition as ‘individuals of a population interbreed more on one side than between sides.’²³ In that sense the Berm as filter contributes to higher total diversity and differentiation at each side of the corridor.²⁴

Although the Berm is mainly considered as an ecological corridor, it is actually part of an ecological network connecting species in nearby areas such as Saffierstraat²⁵ and Wolvenberg adjacent to the Antwerp ring R1. The nearby forts and some areas surrounding the airport also become critical ‘stepping stones’ for multiple species. The Berm as part of an ecological networks provides also more opportunities for biodiversity and habitat variation than isolated corridors²⁶.



The Berm as a forest biotope. Photos: Juan Acosta

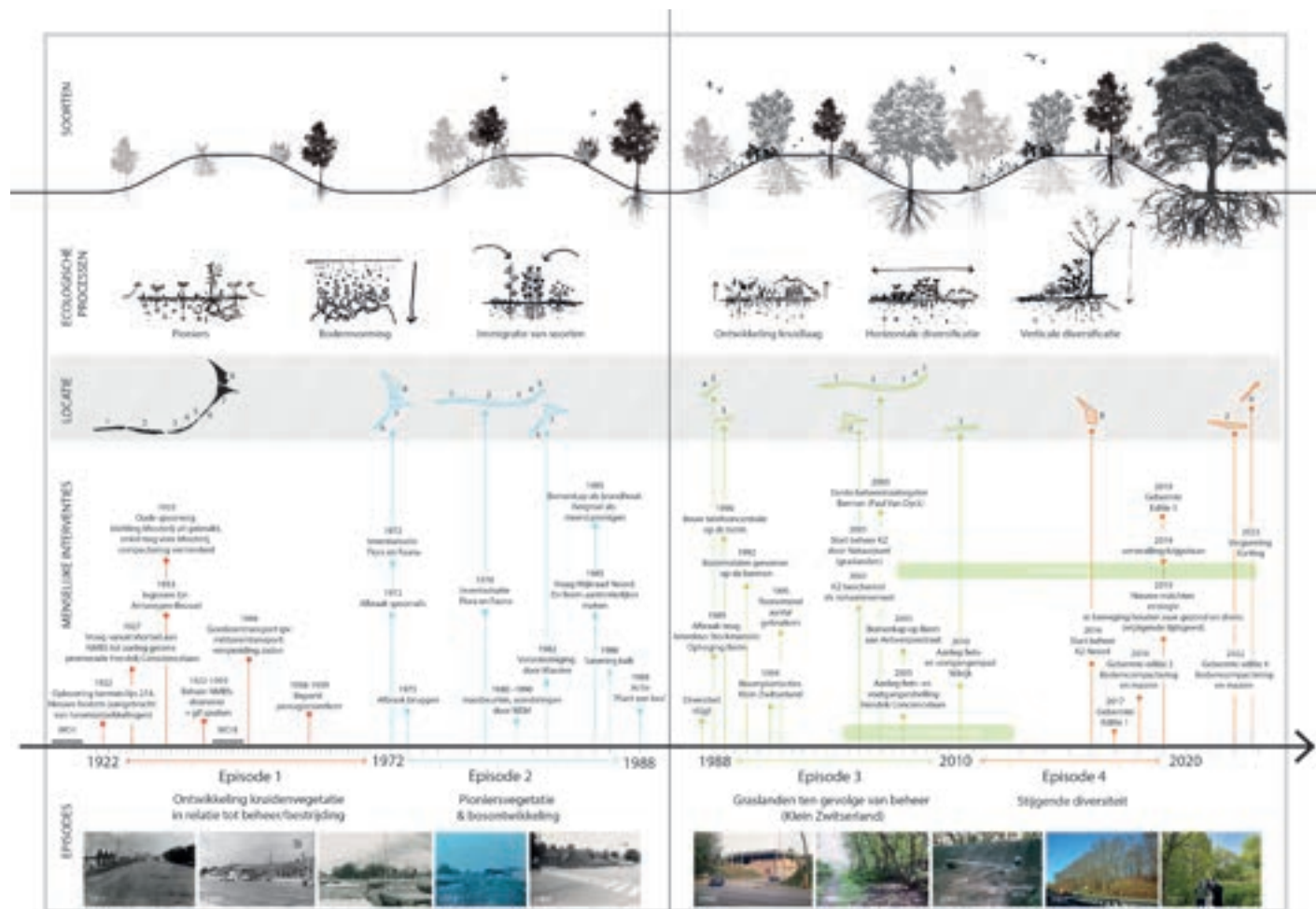


Action radius of the Berm

2.3 Local importance

The role of the Berm for humans is multiple. Already the mere possibility of visiting the Berm can contribute to the health of its citizens. Being positioned in one of the densest places of Belgium, the Berm provides access to public green within a distance of less than 1000m to circa 30000 children and adults of Mortsel²⁷ and Wilrijk. This is special as most of the area north of the Berm (in both Mortsel and Wilrijk) lacks publicly accessible green spaces. At a 'district level' Vienna recommends to have 7-8m² per resident. Considering the combined population of Mortsel and Wilrijk of 62.447, there should be a green area of 47ha. The Berm in that sense supplies almost half of that need²⁸. But even at a more local level the Berm provides access (or radius of action) to public green within a distance of access points in less than 400m to several children from 4-12 years, families and senior citizens with reduced or decreasing mobility²⁹ (see book 3 Action radius of the Berm).

At a local level the influence also goes in the opposite direction. Adjacent green patches (mostly private green backyards) in various segments (see in book 3 the Berm as a collection of biotopes specifically park-land biotopes and book 4 transects 2a, 2b, 4b, 5b, 5c, 5d) also affect the ecological condition of the Berm³⁰. The influence of backyard and front yard habitat in the Berm is already seen in the presence of bamboo on the Berm (see transect 5a) and in gardens along Amadeus Stockmanslei but also on the presence of wild and honey bees (See book 4 The Berm's fauna what we know so far). In a follow up study the habitats of private adjacent gardens could be studied to determine how these patches interrelate to the Berm³¹. But if *backyard gardens* can function as *stepping stones* for many species, they are also the place where cats can be abundant, which in the case of the Berm could mean that the likelihood of mammals is small. Even more important than cats is the continuous presence of dogs. Dog owners are always present, making the area alive to these citizens and their pets. However, the several impacts on the ecosystem due to their presence cannot be ignored. Dogs' excrement contributes to the nitrification of the soil which leads to the predominance of species tolerant



Non-human timeline. Author: Hannah Van der Broeck 2022

to these levels of nitrate. Furthermore several mammals avoid with a distance of 50m the smell of dog urine. This could explain the poor presence of mammals, fortunately partially compensated by the presence of birds. Another rather unstudied aspect is that some persons also avoid walks at the Berm since they are afraid of big dogs. ('Unleashed dogs keep me from coming here to exercise, I was once jumped by a dog here'. See book 3 Walk #2 In search of the voice of the Berm). A further social survey on the impact of dogs could help understand who is able and who is not able to enjoy this essential nature area.

It is also important to notice that the Berm provides not just more green space, but a sort of public green where rules and expected behavior normally seen and closely monitored in public parks in Antwerp are not strictly followed. It is a place where a certain degree of real or imagined danger are present. This somehow follows the logics of the concept of *terrain vague* exposed by the Catalan urban theorist Ignasi Sola Morales³². Here the hyper efficient planned city leaves discarded spaces to decline or neglect, allowing new and alternative uses to take place, including humans but also non-humans³³.

2.4 A multilayered timeline of the non-human

The section summarizes and interprets a lot of the information gathered from existing data bases, documents, interviews, informal conversations, historical information, maps, ground level and drone photographs, plant and tree inventories in selected transects etc. See also booklets 4 and 5 and master thesis of Hannah Van den Broeck (2022)³⁴ for further backgrounds.

Dynamics

The Berm timeline of transformation more or less starts with the arrival of the train in the 1870s, in an area of family farms, a few bigger landowners, agriculture, orchards, gardens, hamlets and a few castles of the rich. (See Book 3 The Berm through time and Transects along time).

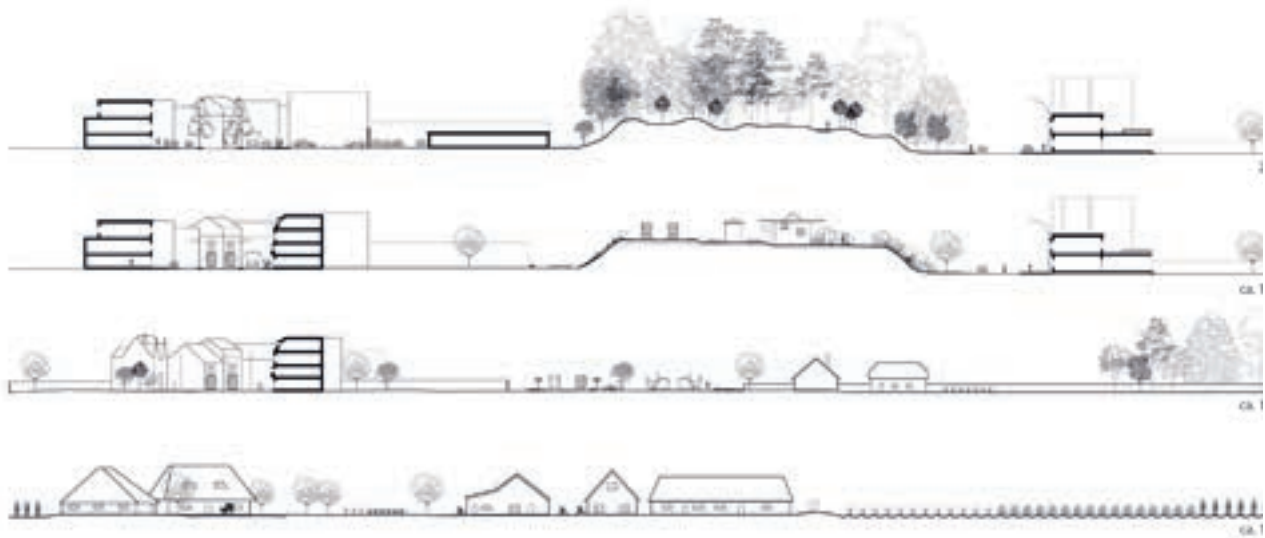
After the arrival of the elevated train tracks in 1922 the Berm evolved from a non-living infrastructure composed mainly of mineral materials, military rail tracks, bridges and stations. The human made convex morphology of the embankment to support rail infrastructure was designed to secure the safe traffic of trains, with a profile that secures quick drainage to the verges in order to keep the tracks dry. This begins with the area of the rails made of ballast (crushed rock). Ballasts are used on purpose for three reasons: quick drainage, strong support for the loads and delaying the growth of native species. Keeping the ballast free of humus development leads to moving the organic material on the verge ‘where they influence plant growth’^{35 36}. This suggests the rails were not entirely mineral, but some trees, shrubs and grassland occurred at the verges. After the abandonment of the 51/1 rail use in 1973 and the following demolition of the bridges and stations in 1974 the Berm accelerated its non-human evolution giving a new preponderance to distinct living beings. This process entailed the slow emergence of soil stratum, bacteria, archaebacteria, fungi, insects, trees, shrubs, understory, birds, reptiles, mammals, but the place also started to play a role as a wasteland to be explored by curious citizens of Mortsel and Wilrijk.

The harsh condition of dry floor (ballast), mechanical removal of humus and herbicides affected the spontaneous growth of plants on the sides, allowing only specific species to survive. Yet after the dismantlement of the tracks slowly but irreversibly an organic process emerged with the *spontaneous growth* of trees and shrubs leading to the slow process of soil formation³⁷.The formation of soil loosened up the Berm, allowing water to infiltrate easier, adding humus, suppressing diseases, pests and neutralizing contaminants. This emerging healthy soil started contributing to carbon dioxide (CO₂) storage³⁸.

The use of the Berm for transportation by rail meant that several materials from the Antwerp port could end up at the location, including pollutants but also organic material from food products, manure or organic waste, which added to the diversity of the emerging vegetation. Further, adding to the spontaneous vegetation ‘colonizing’ the Berm, trees were planted, e.g., for the purpose of stabilization of the embankment, especially Robinia pseudoacacia. More recently trees have been planted in the southern part of the Berm in Mortsel at the occasion of

of child births³⁹. This is a reminder that not all nature growth is spontaneous .

Fifty years have passed since the removal of most of the train infrastructure in 1972. Since then, various species developed gradually, increasing tree density, with acer pseudoplatanus, crateugus monogyna, robinia pseudoacacia and betula pendula as the most dominant tree species, but including an increasing number of other species (See Book 4 in this report inventories of tree species per transect and book 5 transect tree diversity). It is worth mentioning that from the very beginning of the Berm, spontaneous growth was highly affected by various human interventions having all kinds of policy and management decisions in the background. For example, in Klein Zwitserland the conservation goal emerged to balance forest and grassland in the area⁴⁰. This human influencehas led to a grassier area attracting other non-human species but also human activities like playing children, or an archery club. The Berm in that sense is far from achieving a non-human ecological succession . Without humans the Berm would not have been there and with humans come certain conditions, conflicts, effects, transformations, all affecting the habitats, species and their diversity on the Berm, not necessarily in negative ways⁴¹.



Transects along time

Current species

Today, the heterogeneity of the Berm has led to quite a rich presence of species. Although a detailed inventory of the species of the Berm (including Klein Zwitserland North and South) was beyond the scope of this project, from available data in waarnemingen.be, interviews and detailed observations of understory and trees in selected transects we must conclude that the Berm in its entirety is a species rich area. The data of the Berm on waarnemingen.be are divided into two datasets, namely 'Wilrijk/ Mortsel – Oude spoorwegberm' and 'Klein Zwitserland'. The first dataset stretches from the Osylei in Mortsel to the Prins Boudewijnlaan in Wilrijk. A total number of 3870 observational records have been stored with respect to this area. The recorded number of animal species is 419 of which 403 are indigenous. There are only 5 records of animals dating from before 2003. The dataset 'Klein Zwitserland' consists of a total number of 11.795 observational records. Both cases clearly illustrate the poor degree of inventory of the section 'Wilrijk/ Mortsel – Oude spoorwegberm'.

The Wilrijk/ Mortsel – Oude spoorwegberm' section has different habitats in comparison with Klein Zwitserland, e.g. a large stretch consists of mature spontaneous forest. The fauna of the two sections is therefore expected to be different. We must stress that the absence of a species or a low species number is more likely to represent its status of inventory than its actual state in the field. Overall, the faunal diversity of the Berm is high and further research is expected to reveal much more interesting species.

The Berm has a fully developed *community* of forest and garden birds. When the trees start to grow older the forest species will become more abundant. The recreational pressure can have a negative impact on the presence and breeding success of several species of birds. However, the role as a corridor linking different green areas must be emphasised.

The most common species of mammals are Eurasian Red Squirrel, European Rabbit, Hedgehog, European Mole, two species of Shrew, Wood mouse and Common Vole. Fox, Stone Marten, Weasel are recorded from the surrounding areas and will go and forage in the area. The lack of safe passages between the different parts of the Berm, has most likely resulted in small fragmented populations that have gone extinct with the exception of Klein Zwitserland. For this species to recover, safe passages between the different stretches of the Berm are essential.

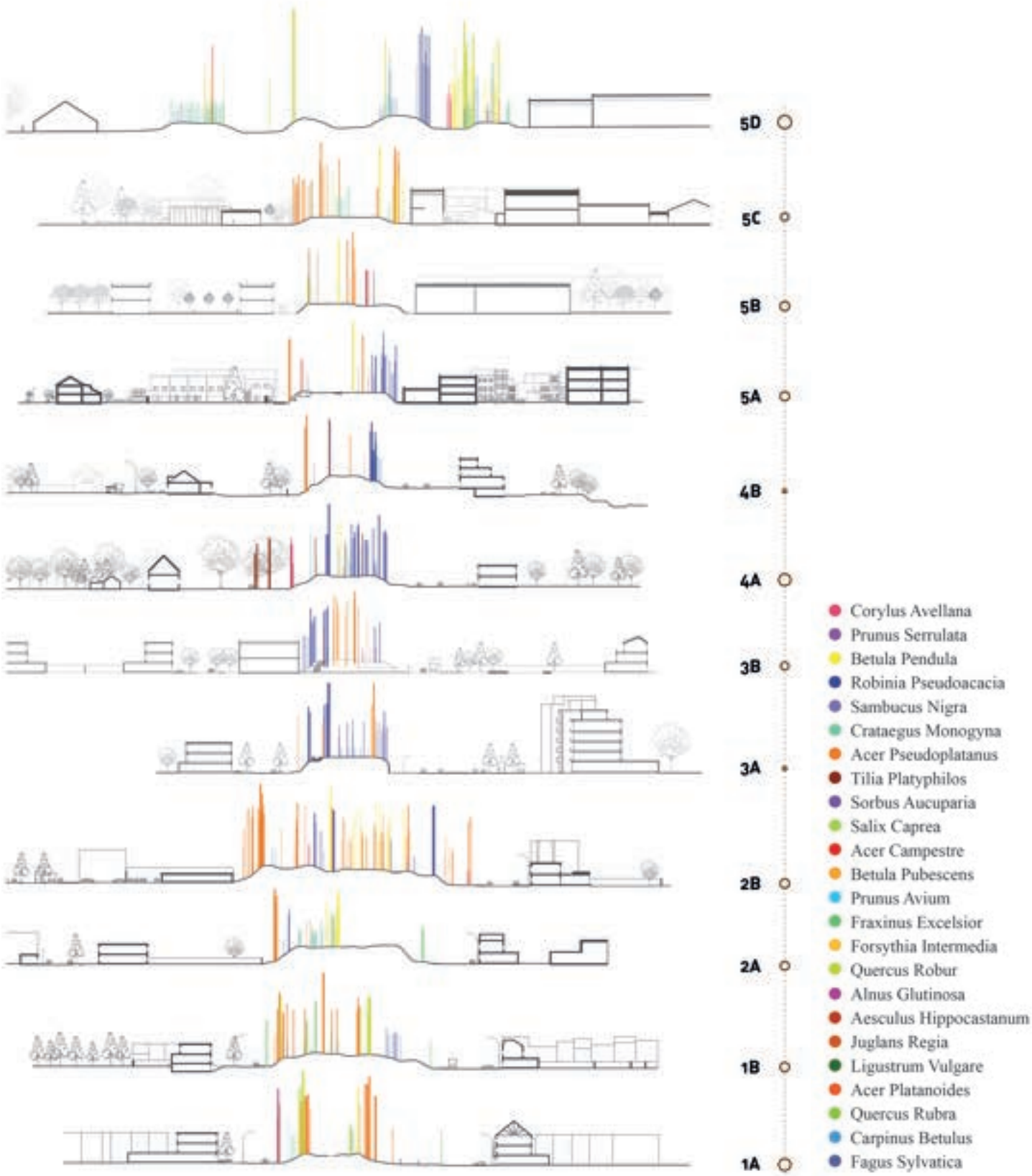
Four species of Amphibians have been recorded: the Common Toad, the Common Frog, the Alpine and the Smooth Newt. The Berm is especially rich in invertebrate species. 23 species of butterfly have been recorded recently, which is nearly a quarter of all species in Belgium and half of the species diversity of the Flanders region. Different kinds of mushrooms are being found, ranging from mycorrhizal (e.g. *Amanita muscari*), saprophytes (*Trametes versicolor*) and plant parasites (*Puccinia phragmites*) to fungi predating on insects (*Entomophthora grylli*). A diverse fungal community is essential for a functioning ecosystem. For a more detailed report see Book 4 The Berm's fauna what we know so far).

For this project, an inventory of the understory was done at the end of April and the beginning of May 2022. Conclusions are thus based on plants that were present at that time, and cannot take changes throughout the year into account.

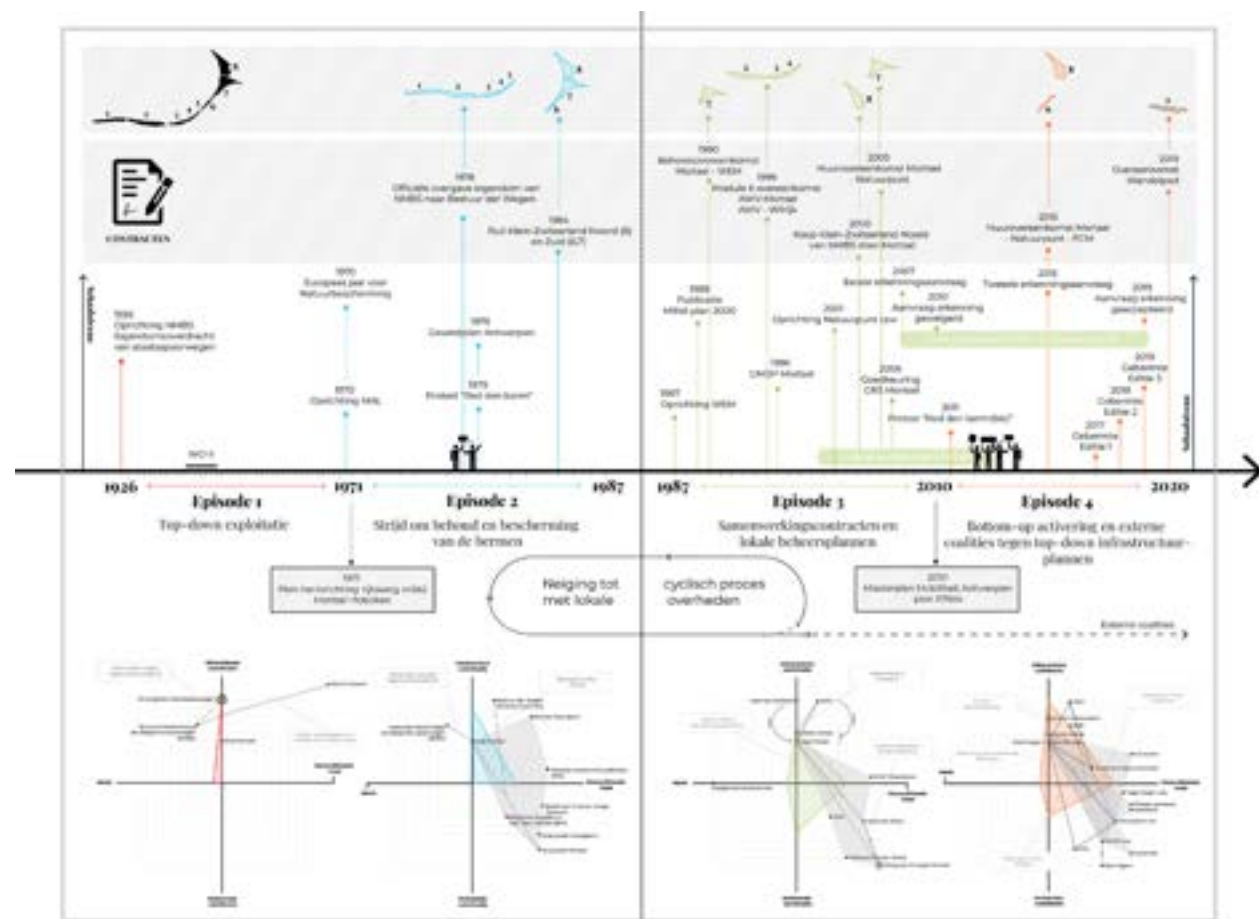
In general, the understory of the Berm is characterized by a forest edge community that is naturally found in open areas, forest edges and grasslands in which the nutrient-richness is sustained by occasional floodings. Because of human interference these communities started to develop in urban areas such as the edges of park forests, shaded field edges, ruins and verges, like de Berm, in which fertilization takes place through pets, litter and waste. Although the species that are part of this community do not have a long lifespan, the community is stable and can coexist for a long time. At the Berm many of the characteristic species that prefer nutrient-rich soils occur, e.g., *Urtica dioica* (Stinging nettle), which are often growing next to Nitrogen-fixating trees such as *Robinia pseudoacacia* (false acacia). *This indicates* the presence of a Nitrogen and nutrient-rich soil. The following characteristic species for these communities occur in significant concentrations at the Berm and dominate the view in spring/early summer: *Aegopodium podagraria* (Ground elder), *Alliaria petiolata* (garlic mustard), *Anthriscus sylvestris* (Cow parsley), *Chelidonium majus* (great celandine), *Galium aparine* (cleavers), *Geum urbanum* (wood avens), *Hedera helix* (English ivy) *Rubus caesius* (European dewberry), *Rubus idaeus* (raspberry), and *Urtica dioica* (Stinging nettle). Characteristic grass species present are: *Arrhenaterum elatus* (bulbous oat grass), *Dactylis glomerata* (orchard grass).

On almost every segment, a clear difference between the South and the North edge (slope) is visible because of the orientation of the sun, the pollution by traffic, the type of management and the influence of the surroundings. The Northern edges/slopes are mostly populated with forest edge species that prefer more shade such as *Hedera helix* and *Rubus caesius* and with domesticated species or species that are often planted in gardens such as *Ribes rubrum* (Aalbes) and *Hyacinthoides hispanica* (Spanish hyacinth). These slopes are less managed, steeper and less accessible than the Southern slopes which are mown regularly because of the adjacent traffic. The Southern edges/slopes show more species characteristic to grasslands next to the forest edge such as *Dactylis glomerata*, and species that occur next to large roads or verges that are managed. Additionally, the exotic species *Fallopia japonica* (Japanese knotweed) is thriving on the Southern slopes because of the higher mowing routines and the high sun intensity. Although exotic, this species is also characteristic for a forest edge community. On top of the Berm, large patches of combinations between *Galium aparine*, *Alliaria petiolata*, *Anthriscus sylvestris*, *Urtica dioica* and others are present. (See Book 4 several transects understories legend.)

On some segments, species were found that only occurred on one or two islands more towards the East. These are species that could indicate a combination of forest edge communities with species more linked to forest communities: *Geum urbanum* (wood avens) and *Dryopteris filix-mas* (Male fern). On one segment, *Allium ursinum* (wild garlic) and *Allium vineale* (onion grass), also characteristic to forest-edge communities combined with forest communities were found. These species are rarer, protected in the Netherlands and indicate a more developed soil compared to the previous pioneer stage. Remarkable is the absence of species characteristic and adapted to disturbed and compacted soils with unfavorable air and water conditions, such as *Plantago major* (Broadleaf plantain) which could indicate that the soil conditions at the Berm have developed into a richer and healthier soil than they were 50 years ago.



Transect tree diversity



Human timeline. Author: Laurine de Rop 2022

Conclusion

The Berm is the result of an evolving process that reveals physically the consequences of human decisions, designs and uses but also how nature was able to adapt and even thrive within these circumstances. The current Berm is in its entirety a very species rich area. It plays a role as a habitat but it also as a vital ecological corridor that goes even beyond its boundaries enabling plants and animals to venture from one island to another and connect to other ecological valuable areas.

Some groups such as trees and understory are now more studied during this process but there is still need for further investigation. Other groups such as birds, mammals, soil life still need urgent attention while monitoring on the presence of exotic species should be done regularly. Although the Berm's diversity is largely confined to the less visible species; the high number of bird and butterfly species make it an attractive area for nature enthusiasts and people who want to experience nature close to their door. However, the lack of connections between the different parts of the Berm causes a lot of animals to be killed by traffic. (See book 3 Gaps along the Berm).

Noteworthy is the fact that the apparent diversity of organisms is not only the result of non-human interactions and succession but also of human interventions and its interconnectedness with the surrounding green areas, parks and gardens. From a nature point of view the ecosystem of the Berm does not stop at its borders. The Berm represents an urban ecosystem, which in general is poorly studied. In order to assess its value and the possible implications of management decisions, additional research is necessary. (See book 3 The Berm as a collection of Biotopes and book 4 transects).

2.5 A multilayered timeline of the human

See booklet 2, 3 and 4 and master thesis of Laurine De Rop (2022)⁴² for further backgrounds.

The Berm is evolving through mutual interactions between non-humans, between humans, and between humans and non-humans, and is rather intensively used by humans, both in an *extractivist* way (taking), but also a caring one (giving). In general, the Berm is used by: walkers, joggers, dog walkers, nature lovers, bikers, mountain bikers, kids going to school, children playing at playgrounds or climbing trees, parents strolling with babies (mostly in the eastern part), artists and poets organizing cultural events such as grave yard for poets, organized youth for playing and exploring, unorganized youth for no surveillance playing and hanging, archery club members, plant foragers, residents in their back gardens and many more. These are users that experience the Berm directly. Car drivers and cyclists but also home owners enjoy the view of the Berm visually. (See book 3 Human(s) interaction with the Berm). Finally, the Berm is also being used by developers for marketing of their projects. Other less compatible uses include the use of the Berm as parking lot and a telecom center (see book 3 Adjacent land uses and Ownership management cadaster map, especially in islands 3 and 5). Through time the Berm has been protected by: activist groups (red den berm, bermtijgers, R11 mis), ecologist groups (from *werkgroep ecologie* Mortsel to Natuurpunt), individuals planting plants and volunteers

from Gebermte through events and education from a more cultural perspective. The Berm is further managed in various ways: via municipality nature management teams; private contractors hired for certain management tasks; nature conservationists like Natuurpunt that manage the nature reserve area of Klein Zwitserland. This brings us to the various levels of government that are involved with the Berm: the municipality of Mortsel, the Antwerp district of Wilrijk, the province of Antwerp and various agencies of the Flemish government (see book 3 Ownership management and governance charts by Laurine de Rop).

Based on semi-structured interviews, document analysis, participant observation in conversations, workshops and conversations, informal conversations, presentations and feedback moments, and especially Laurine De Rop's master thesis, this section summarizes the (governance) interactions of the actors that are involved in the berm. The timeline above shows a significant shift in the governance of the Berm through time.

From the 1920s to the 1960s the Berm' governance is characterized by a top-down exploitation by the NMBS, also including a share of market-oriented governance. The NMBS unilaterally decided on what happened with the Berm and how it should be managed. From the 1970s, resistance against top-down plans by the Flemish government challenged the top-down governance and bottom-up initiatives caring for the Berm started to emerge, helped by a growing ecological awareness. The local authority and residents succeeded in organizing themselves, mobilizing local support for maintaining and protecting the Berm. However, the lack of interactive relationships and missing connections with the vision of the supralocal government were a hindrance in creating an inclusive and horizontally coordinated governance at the local level.

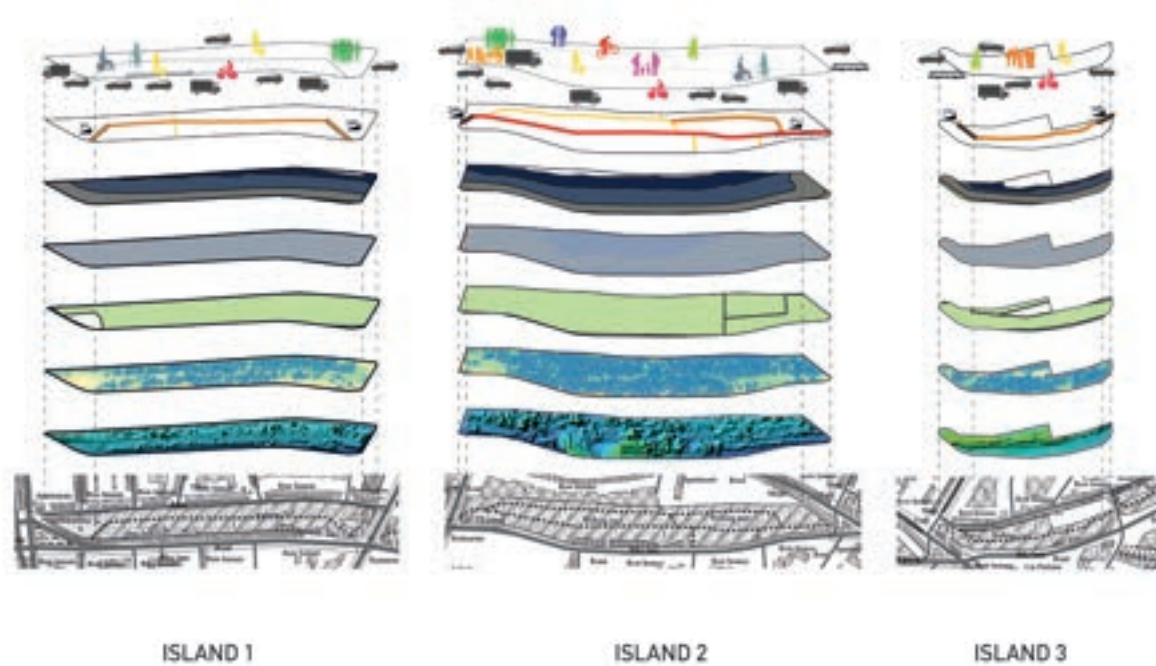
From the end of the 1980s, bottom-up initiatives aiming to protect the Berm were helped by a supportive context for nature conservation through, among others, the supralocal MINA plan 2000⁴³ that it needed external coalitions in its fight against supralocal interference. This challenge became clear in the attempts of Gebermte to valorize the Berm by refining external coalitions and connecting them with the supralocal level⁴⁴. From 2019 also new actors, such as KU Leuven, ANB and the province of Antwerp helped Gebermte in its networking and supralocal anchoring.

This overview shows that bottom-linked governance for the Berm needs a tissue of active, local organisations, a supportive and facilitating local government, a context of supralocal supportive mechanisms and maybe also academics helping with various analyses changing the discourse about the place. Recently, ANB, under the new Flemish minister of environment, has been developing various policies that could support local nature development initiatives, e.g. de 'Maai-mei-niet' campagne, de projectoproep 'Natuur in je Buurt', de onthardingsbeweging, bosuitbreidingsplannen etc.), which provides a potentially supportive background for the protection of the Berm. The idea to introduce nature tissue planning for urban nature is part of this tendency.⁴⁵

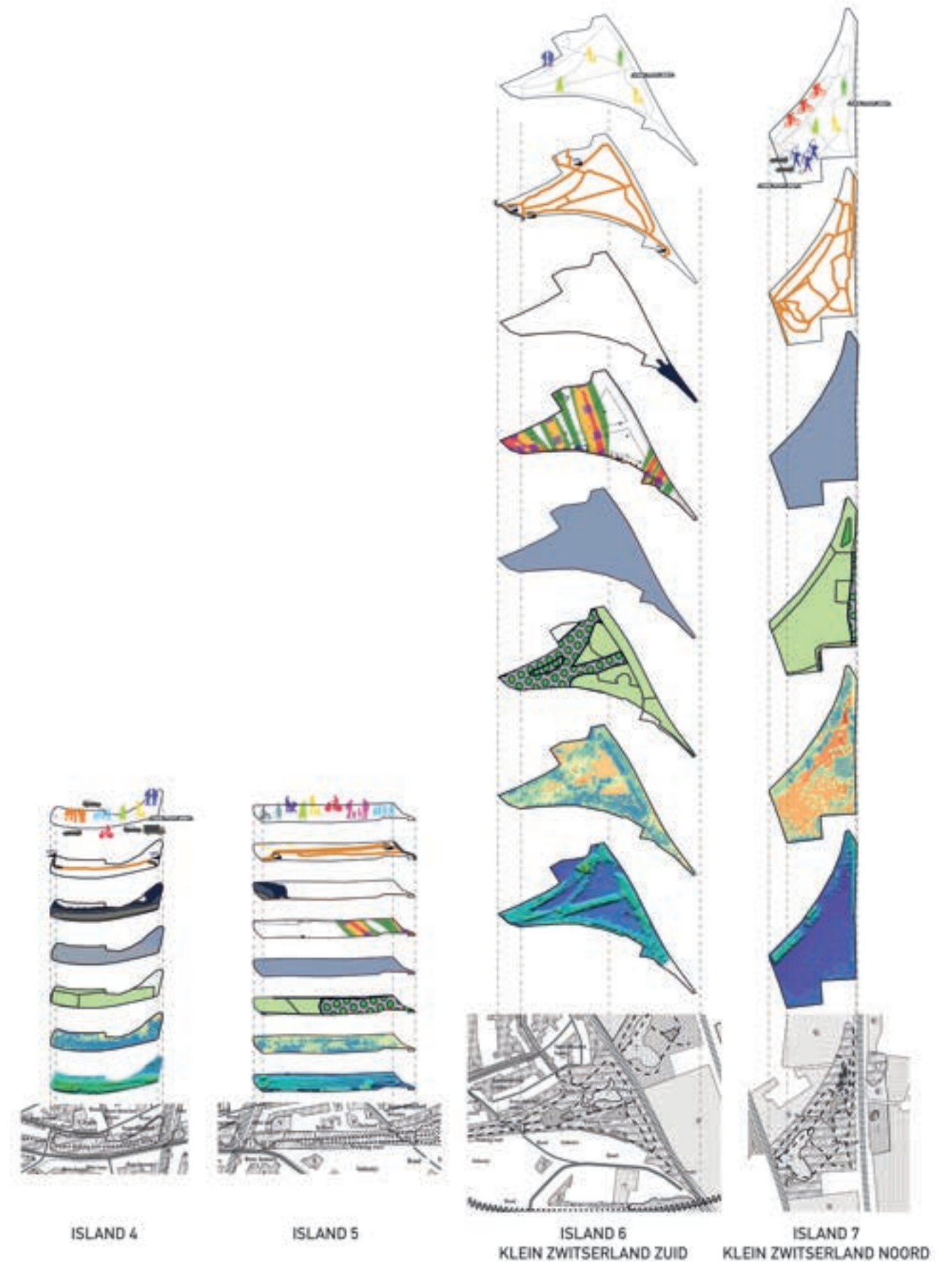
3. Diversifying the Berm

The Berm as an ecological corridor is composed of what we have called in this report islands that together form an archipelago (see book 3 The Berm as archipelago). There are at least 8 of them, though in this study we only studied in more detail the islands 1 until 7. Book 4 includes a characterization of the different islands through general descriptions, maps, species diversity, a socio-ecological layering, an inventory of key observations regarding warning issues, dangerous threats, values and opportunities, and a summary of the most important values for both humans and non-humans.

What follows below is a short summary of the findings of each island micro system.



Non linear socio-ecological layering



ISLAND #1 / Wilrijk

This island is special as it is the only island that falls within the maintenance department of Wilrijk. It is also an island that faces one of the most pressing challenges as a new intersection planned for the west side will severely impact its ecological value. It is worth noting that of the 12 transects surveyed this island has the highest stem density in terms of basal area, which means it contains several old trees which are now threatened by infrastructure driven agendas.

ISLAND #2 / Mortsel

This island together with island #4 is strongly affected by residential backyard gardens. It is also an island with the second widest dimension (60m) after Klein Zwitserland. The island is intensively used by Gebermte as it has one clear open field. Yet the clearance due to its sunny south facing condition and mowing has become one of the places where *fallopia japonica* has grown with vigour. We speculate that its larger than usual width also contributes to the presence of *betula pendula* in what we called the interior. The island also has two pedestrian paths, one more open and wider (also used by trucks for events) and the other more sinuous and discrete, making a walk here for users quite attractive. The island is also located in one of the soundest and most likely air polluted areas of the Berm.

ISLAND #3 / Mortsel

This island is surrounded by car traffic in all directions, its width is relatively small and a part of it is being occupied by a telecom company. Surprisingly despite these harsh conditions the island presents one of the highest stem density of trees of all transects. We speculate that this is also due to the minimised presence of humans beyond its central path, for example there are contention walls at its edges where few humans or dogs venture to explore. Nevertheless up to 85% of the species are edge species such as *Robinia Pseudoacacia* and *Acer Pseudoplatanus*.

ISLAND #4 / Mortsel

Similar to island #2 this island is conditioned by the presence of backyard gardens. The island has a rich understory and its path is narrow not allowing cars to enter. The island presents a more varied diversity of tree species not seen so regularly at other islands. This includes *Ligustrum vulgare*, *Juglans regia*, *aesculus hippocastanum* and *tilia platyphilos*. The southern edge is affected by sound and air pollution but its concrete contention wall also discourages presence of humans at this edge. There is a small playground where small children are regularly seen.

ISLAND #5/ Mortsel

This island stands out from the previous one as there is no road presence at its adjacent areas. South of the island there is a cluster of several small / medium enterprises. This cluster is a rather solid and continuous envelope protecting the area from harsh winds and sound pollution. On the northern side civic uses such as Chiro youth organisation or schools GTI Mortsel and Jenaplanschool Lieven Gevaert create potential for new interpretations of how these actors could be more linked to the Berm. Perhaps due to the sound protection and the less polluted air conditions, other species have been able to appear here such as *Sorbus aucuaria*, *betula pubescens*, *prunus avium*, *prunus serrulata*, *tilia platyphilos*, *sambucus nigra*, *salix caprea*. *Robinia* was only spotted in transect 5a. There is a redundancy of paths and it is an area specially used by dog owners, therefore understory seems to have been affected by this level of disturbance. Bamboo and rabbits are also present in the northern side close to Chiro open grass field.

ISLAND #6/ Klein Zwitserland South

The island has a very different form than all previous islands, in this case it resembles a triangular polygon rather than a narrow strip. Similar to island 5, the place is affected or benefited by the sound barrier of the industrial cluster. Nevertheless the area is heavily polluted as revealed in recent underground surveys. The area most likely due to its careful management and special attributes has become host of several species that are not necessarily edge species. The area attracts nature lovers and scientists who also report on its rich biodiversity. Its biotopes are also rich compared to other islands with presence of deciduous, marsh, short and tall grass fields and gardens. Its paths are varied but Natuurpunt has kept a gradient of accessibility allowing human presence while minimising their impact.

ISLAND #7/ Klein Zwitserland North

The island shares similarities with island #6. It is also rich in the variety of biotopes including a swamp, tall and short grass, lawn with trees. The island's north and south edges are adjacent to the train tracks while its west side neighbours a psychiatric hospital. The island stands out with the presence of potentially conflicting users: nature lovers, archers using heavy vehicles and mountain bikers. Although this island was not part of the transect study of this report, we can derive from Natuurpunt that a large part of the present woodland is young, with emerging oak woodland and an understory of common white fern, broad-stemmed white fern and greater stinging nettle. There is also few American oaks. The eastern side contains softwood and Italian poplar.

4. Towards a more than human interpretation of the dynamics on the Berm

Based on the various explorations, analyses and interpretations, we build an overall interpretation of the dynamics of the Berm, using five principles for the analysis of urban nature, which combine the human and the non-human into a more-than-human narrative. These principles emerged during the making of the NWP for the Berm, based on literature and discussions between practitioners and academics, social scientists and ecologists, citizens and policy makers. More information can be found in the manual for making nature tissue plans. The interpretation in this section bridges the analyses in previous sections and the outlook to the future in the following.

Starting point of this interpretation are the timelines for the non-human and the human as explained in previous sections and the evolution of actors summarized in the figure below (see more detail information in book 3 Transects along the Berm in time) , showing how the original railroad was built in an originally agricultural environment, the Berm was constructed as embankment, and the Berm evolved as urban nature in a more and more urban environment.

4.1 Soils live and connect

That soils are essential to the survival of species has long been known, if only by farmers, erosion officials and entomologists. Recent literature highlights the importance of soils even more. It emphasizes that soil is full of life and focuses in particular on mycorrhizal fungi in soil and their role in the exchanges between various species that take place in the soil but are expressed at the surface, but equally highlights the interactions between bacteria, fungi, plants, invertebrates, lichen, mushrooms and inorganic matter. It is obvious that the protection of a living soil must be an important starting point for natural tissue processes.

The Berm's prime component to achieve a nature rich environment is its soil. The Berm's origin as described before was designed to function as a safe and dry train infrastructure linking the city port to the industrial areas in the South of Antwerp. The substrate therefore was made of compacted earth and rubble. On top of this, a subsequent profile was formed to secure the quick water drainage towards the verges in order to keep the tracks from developing humidity and humus. This goal of keeping plants away from the tracks was reinforced by the addition of ballast and constant use of herbicides. Unsurprisingly this led to a rather sterile condition for spontaneous plant growing in its central section but showed a beginning of plant growth on its sides. After the abandonment of the train in 1973, spontaneous tree and shrubs growth development and soil formation accelerated after the train use. Consequently, spontaneous growth happened during the last 50 years.

A few soil samples have been carried out for this report and report the presence of consolidated horizons with a consistent presence of humus. This healthy biological aspect of the upper soil layer (topsoil) is mainly due to the human tolerance or 'neglect' of leaf litter⁴⁶. The samples for the Berm show a close to natural soil layering process with litter, humus and layers with nutrients above the Berm's old compacted layer. Another observation is that the flat parts of the Berm where the train tracks were placed presented a rather consistent increase of percentage of organic material (average 13%), more than the northern and southern slopes (average 7%).

Finally, as stated earlier healthy soils not only benefit non-human species. A soil containing organic matter allows water to filter slowly, contributing to stormwater infiltration, which benefits the neighborhood⁴⁷. It is therefore of prime importance to preserve and safeguard this soil formation process that mainly emerges from leaving litter and dead wood on the Berm and avoiding or minimizing the presence of heavy vehicles such as cars, trucks or tractors that compact the soil and hinder soil processes to take place⁴⁸. Fills should also not be allowed as they bury the topsoil organic component. The constant use of the area as a dog urine place leads to nitrogen excess affecting soil quality. It would be needed to sample the same spots to observe changes and confirm the accumulation of nutrients or excess of nitrogen below the top soil⁴⁹.

4.2 Species also collaborate (in a range between competition and collaboration)

All exchanges in the soil, at the surface and between soil and surface are extremely complex. Various fungal species can exchange with some or more trees, and vice versa. Complex networks are active in the soil, in which raw materials are transported and exchanged, decisions are made about where and when to extend or stop networks, and electrical and chemical signals are sent. Fungi can decide to save, withhold or preferentially allocate resources to a specific partner. As such, species evolve not only to compete but also to cooperate, form and maintain communities, sustain and regenerate themselves through these communities, pass on knowledge, make intergenerational connections. The stronger and more diverse the interactions, the more adaptive and resilient the more-than-human community can become. All this also applies to people, as part of more-than-human communities. People can develop competitive, extractive and destructive practices, as well as collaborative and regenerative ones. Natural tissue planning is primarily concerned with the latter.

As we have seen from the transects tree analysis (see book 5), we can conclude that the species composition is dominated by species that have been able to thrive in a rather air polluted environment, with strong wind presence and previously compacted earth. These species are mostly indigenous and of spontaneous growth but there also non-native ones like the human planted *Robinia Pseudoacacia*. In any case thanks to these pioneering edge species there is also now the condition for other and often more vulnerable species to exist. You can call it collaboration, team work or mere adaptation but the mostly spontaneous growth in the Berm has led to a much healthier environment. The presence of leaf litter as mentioned earlier but also the allowance and presence of dead trees allows fungi such as Hymenochaetaceae to ‘collaborate’ in the decaying process of trees. In a further study it would be necessary to observe the growth of what some consider dangerous pests⁵⁰.

In the future the nature tissue process could assess whether it could enhance the growing collaboration, complexity and diversity on the Berm, also in the face of the ongoing urbanisation and climate change. Maybe new species could be actively but carefully added to support the further development of the Berm into a diverse, climate-robust corridor of urban nature.

4.3 Humans are and make nature

Like plants, animals, bacteria, fungi etc., people as well as all their material and non-material practices and constructions, are also nature. So, people also make nature. Nature tissue planning does not see people merely as a stress factor (human disturbance), a common image in nature conservation discourses, but acknowledges that over the millennia people have created a great diversity of landscapes, in addition to monocultures, and have therefore even contributed to biodiversity, specially so in cities.

On the berm this shows in the many interactions between humans and non-humans, beginning with the creation of the Berm embankment as a human construction. Since then, humans have interfered in many ways, in the beginning stopping urban nature from developing itself, but later by pruning, changing access, adding both indigenous and exotic species, etc. Local human actors have thus both decreased and increased biodiversity. Pruning for example has both stopped and added to vertical layering of the emerging forest. Taking away bridges has created isolated segments, which may both hinder and support biodiversity. The embankment has created a north and a south side and concomitant diversity of conditions, species and responses within species.

The nature tissue process for the Berm then should address the local community's concerns and identify local capacities to deal with urban nature. This involves, for example, de-sealing, spreading seeds, adding edible and/or medicinal plants, decontaminating the soil, creating connections with adjacent urban nature elements, etc. Human interventions so far have been abundant but, in the end, remain rather modest. In the future a similar subtle governance is appropriate, seeking to keep as many actors on board as possible, as caretakers of the Berm. Intensified ecological education is a point of attention, which could help in stimulating caring behaviour by all types of Berm users. This also requires a thorough understanding of human, (psycho)social, political, economic, cultural, cognitive, discursive, etc., mechanisms and how they interact with non-humans.

4.4 Humans and non-humans evolve

The preceding principles are not static. Urban nature is part of evolutionary processes. In cities, evolutionary adaptation takes place at a pace that would surprise Darwin (Schilthuizen, 2019). Plant and animal species adapt to changing conditions at different levels. They use urban conditions similar to those in more rural and natural areas where they originally lived, for example, cooling towers as cliffs, landfills as nutrient-rich places or underground tunnels as caves. They adapt their behavior by favoring specific characteristics over others. Think of birds singing at higher pitches in cities. On a real evolutionary level, genetic adaptation also takes place, with, for example, short wings to fly faster, adapted ways to absorb poison or heavier seeds in sealed environments.

Whether there has been genetic evolution on the Berm is unknown. That ecological succession and changed human behaviour have taken place, is however obvious, as shown in the timelines in previous sections. Soil formation has occurred, a large amount of species has settled, biodiversity has increased, some of the pioneer vegetation is already disappearing, other species have taken over and new ones are appearing today, the amount of animal species has increased. Also non-native and invasive species, introduced by humans, have entered the scene. Human users have changed and activities have evolved, the nature of human interventions has changed and the social, political, economic, cultural and governance meaning of the Berm is continuously being redefined.

For the future of the Berm this implies that the nature tissue process can respond to this and enable the Berm to keep on evolving. Non-native species and perhaps even exotic ones should be considered as part of urban ecologies, the urban environment can be considered as a place of exchange of species from other regions and sometimes far away sources. No islands of the Berm should be disregarded since isolated natural sites play their role as stepping stones or reserve in creating biodiversity alongside corridors. The Berm as a site of spontaneous urban nature should be protected as an evolving biodiversity reservoir from which species can recolonize the environment. To achieve this, it is important to think in the long term and not in terms of fixed end images.



Presence of hymenochaetaceae at the Berm



Birds species diversity in Klein Zwitserland South

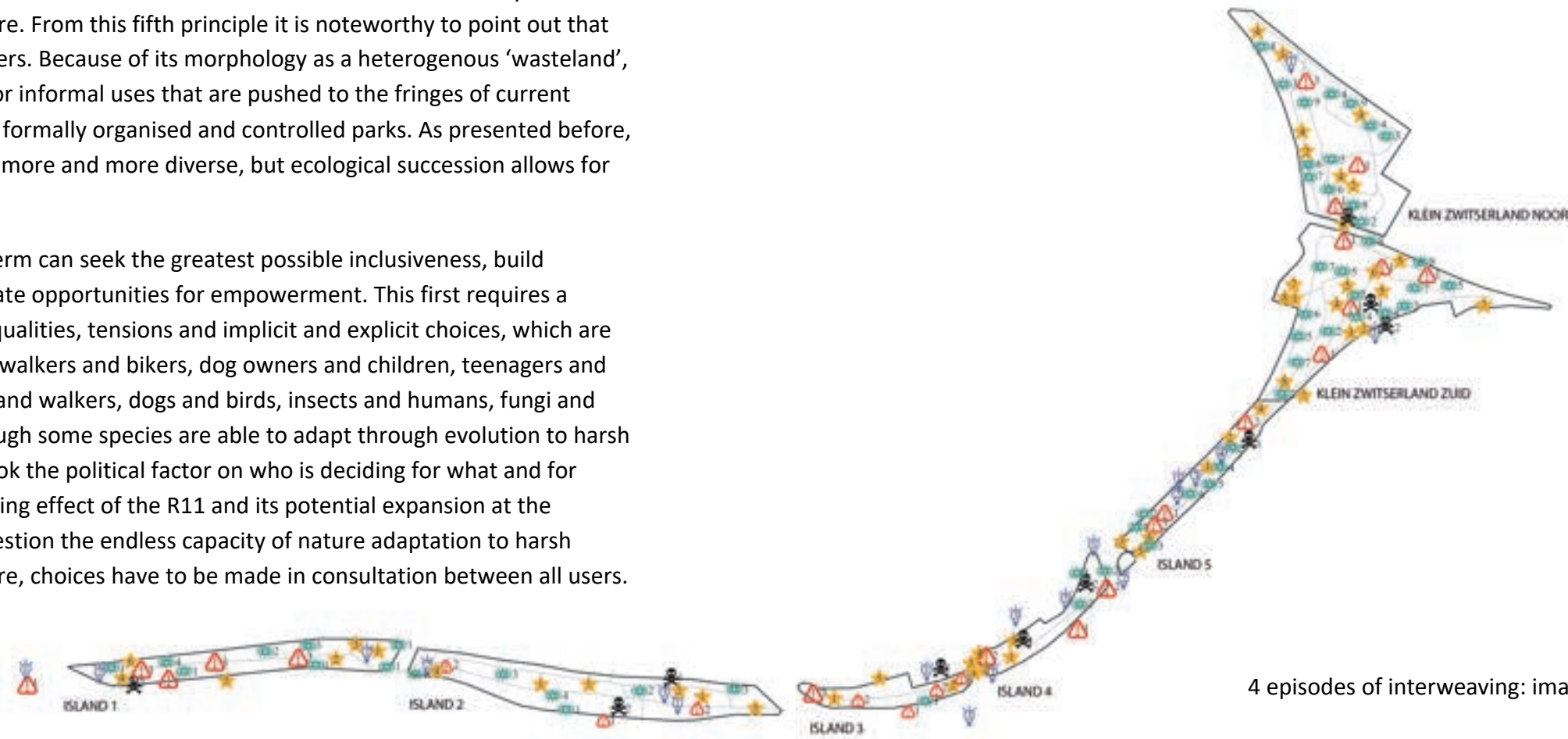
4.5 Human and non-human nature has politics

Socio-ecological relationships are selective, resulting in the inclusion of some and the exclusion of others. Human and non-human practices always involve choices that benefit some individuals and species and disadvantage others.

On the Berm the diversity of human and non-human users is considerable. The many human users have been mentioned before. From this fifth principle it is noteworthy to point out that the Berm is used by 'ordinary' users. Because of its morphology as a heterogenous 'wasteland', the Berm is not elitist, allowing for informal uses that are pushed to the fringes of current society, and excluded from more formally organised and controlled parks. As presented before, non-human 'users' have become more and more diverse, but ecological succession allows for further diversification.

Natural tissue planning for the Berm can seek the greatest possible inclusiveness, build solidarity between users and create opportunities for empowerment. This first requires a thorough analysis of existing inequalities, tensions and implicit and explicit choices, which are definitely present, e.g., between walkers and bikers, dog owners and children, teenagers and nature conservationists, archers and walkers, dogs and birds, insects and humans, fungi and humans, etc. Furthermore, although some species are able to adapt through evolution to harsh conditions, we should not overlook the political factor on who is deciding for what and for whose benefit, the current polluting effect of the R11 and its potential expansion at the expense of the Berm put into question the endless capacity of nature adaptation to harsh circumstances. Thus, for the future, choices have to be made in consultation between all users.

A few additional governance agreements are needed, but to be successful these should be fed by bottom-up initiatives, rather than being imposed from supra level organizations.



4 episodes of interweaving: imagine, explore, manage, monitor



5. Strategies and proposals

5.1 Continued knowledge production

As we have described the Berm is an urban nature ecology including more-than-human relationships. These ever changing relationships are constantly reshaping the Berm's form, governance, levels of use, and ultimately reflect the constant balances and contradictions of all actors (humans and non-humans) involved.

This study adds to a series of previous studies carried out on site by several organizations. It is therefore just a stepping stone in developing a framework of research and action that should continue in subsequent stages. It is for example important to revisit the transects in different year intervals to detect transitions and ecological successions but also to enrich them with further studies on soil, pollutants, fauna, insects etc.

This means that ecological analysis is not complete either. A proper study on soil across the whole Berm would for example be logical. This is important in order to understand the evolution or degradation of soil formation. The soil research should also include pollutant detection, especially in areas where children playgrounds are located.

As we have explained before there is huge lack of knowledge regarding the fauna of most of the Berm, Klein Zwitserland South being an exception. The survey should be conducted to properly assess the presence of birds, mammals, insects, but the same holds for herbs, shrubs, trees, fungi, mushrooms, etc. This initiative should rely on both the support of Gebermte collaborating with supra level organizations such as ANB and the province of Antwerp, experts and volunteers. Ideally Natuurpunt should also be part of this research as the area under their custodianship is part of the Berm already.

A key recommendation for the future of the Berm is maintaining and strengthening the role and leadership of Gebermte for a much longer period, with an ideal 5 year commitment regarding both expertise and financial support from supra local organizations. During these years and confirmed during this study, we can state that the role of Gebermte in continuing cultural, artistic and ecological actions is one of the most critical elements of a sound nature tissue plan. Without their constant support and feedback many parts of this study would not have been possible.

Furthermore, Gebermte should continue working on the short and long term taking direct actions and artistic interventions that reflect on the future of the area. Research and communication could investigate further ecological, historical, cultural, anthropological themes and subthemes. Gebermte could continue organizing debates and conversations through the tested format of the walks or other formats regarding how the Berm should be used, protected, enriched, maintaining a direct communication with its main users.

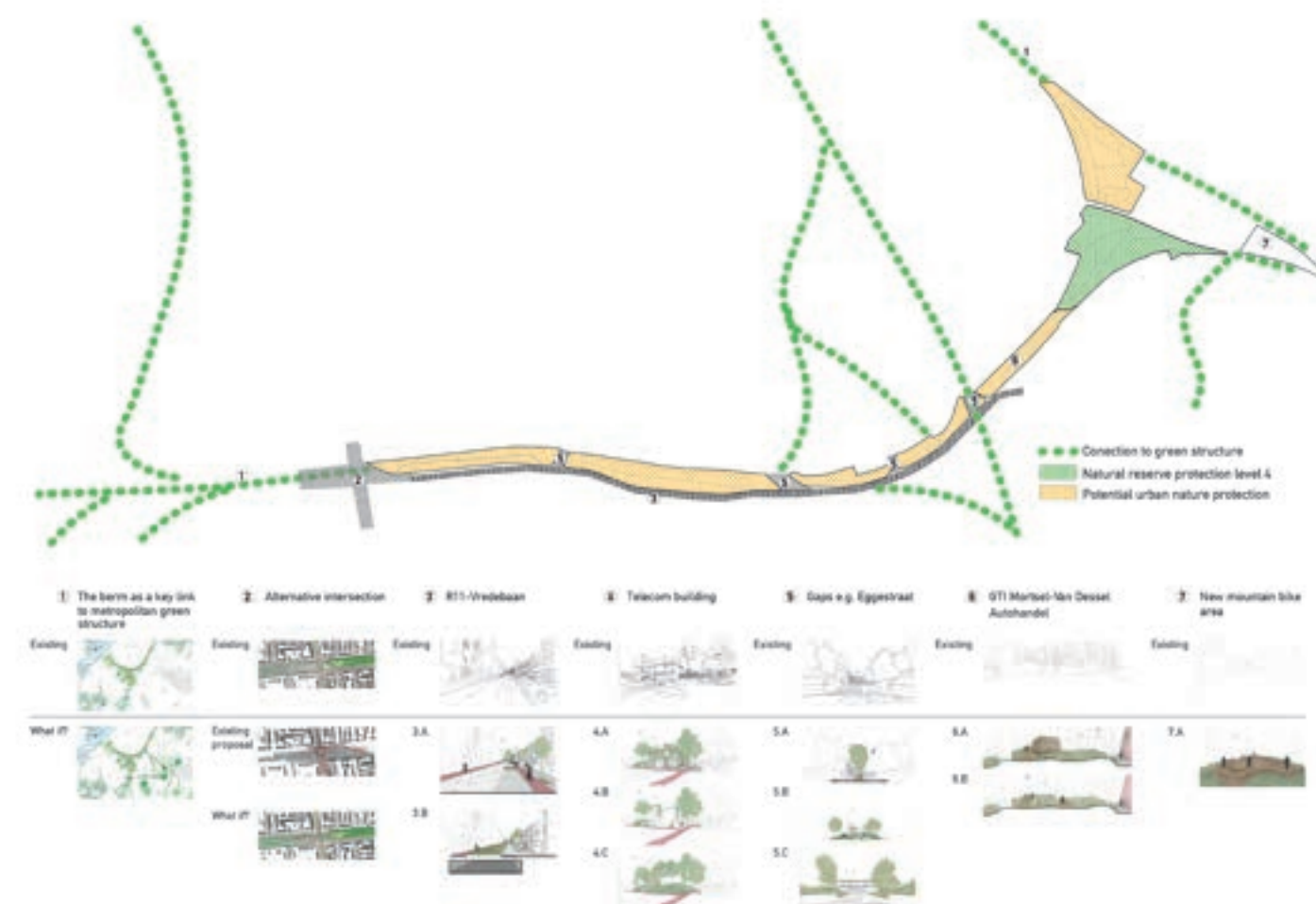
To maintain a strong supra local relationship between Gebermte, supralocal organizations/governments and independent experts a training framework should be elaborated. This framework should allow knowledge transfer from supralocal organizations to Gebermte but also the other way around, where supralocal organizations are able to distinguish how every part of the territory and its specific actors require detailed and careful attention, beyond overall goals.

5.2. Strategies regarding the non-human

The Berm has witnessed the transformation of an artificial rail embankment into an urban nature area with the dominance of spontaneous forest growth that was accompanied by a process of soil formation. Did this non-human change take place mainly because of the hesitance of humans to intervene with this spontaneity? Or did human actions and decisions such as protesting against the construction of the planned R11bis create a window of opportunity for spontaneous growth. The answer is a bit of both. The non-human components have been species that were able to thrive in the harsh and specific conditions of the Berm, including the influence of adjacent uses and its effects (such as wind, pollution and orientation, backyard garden biodiversity), topography, depth of the corridor and the level of disturbance of humans according to their activities (dogs, cats, archers, mountain bikers, cars, trucks, etc.). These are physical attributes, but they are also process related. Human and non-human actors are in constant dynamics with each other reshaping the environment in multiple ways. In that sense the Berm can never be exclusively understood as a catalogue of static biotopes even if these biotopes are custom made for the city. Understanding the non-human - human relationships is essential to arrive at a proper reading of the area.

In this sense the current mapping of biotopes should not be considered as fixed, or as the only form of correct use of the area. Rather is an observant eye needed that keeps track of the slow or sudden changes, keeping in mind not to read the Berm as a pristine nature reserve but an urban nature area that is affected constantly by interactions with humans. The appearance of exotic species such as bamboo (see book 4 transect 5a) are thus a normal occurrence of urban nature processes. In this case the species most likely originated from the backyard gardens and their biological waste disposal near/on the Berm. Another case is the apparently growing presence of the exotic species such as *fallopia japonica* (japanese knotweed) that took hold in open patches of sun oriented areas of the Berm (see book 4 transect 2a). Again, this was to a large extent due to human management and mowing the area until the species took hold of it. It is important not to ignore nor minimize these aspects but we argue there is no need for urgent action of eradication as this would entail almost limitless resources and commitment. The allowance of spontaneous growth with minimal human interference led to species normally absent in urban parks. For example, we see the constant presence of *hymenochaetaceae* that by some experts is considered a pest⁵¹. Yet in the Berm it is only seen active in few sick or dead trees. Almost no fungus species are able to kill a sound tree living in symbiosis with mycorrhizae and bacteria. However, trees that face partial destruction of their root system, loss of 50% of their bark or competition from a stronger neighbor are likely to fall victim to a fungal disease or a bacteria. In that sense the tree's health needs to first be jeopardized by another environmental factor. In overall this means that co-existence of humans and non-humans species leads to the hybrid presence of native, non-native and exotic species, but also to acknowledging and observing without necessarily intervening when we see competition and struggle as the presence of *hymenochaetaceae*. This should be not only regarded as normal but as a paradigm of urban nature.

The Berm should aim at achieving richer levels of biodiversity by a balancing act of allowing humans to enjoy a prime green component of their urban life without jeopardizing the ecological values. There should be a balance of using the Berm by humans but not abusing on its intensity and roughness. This should be reflected in a sound management plan that monitors and protects soil formation (keeping leaf litter, no excavations or soil removals, no rubble dumping), limits or reduces human disturbance (no heavy vehicles, dogs and cats should be kept in check), cleaning and monitoring of pollutants in soil and water.



Strategies and proposals for the Berm

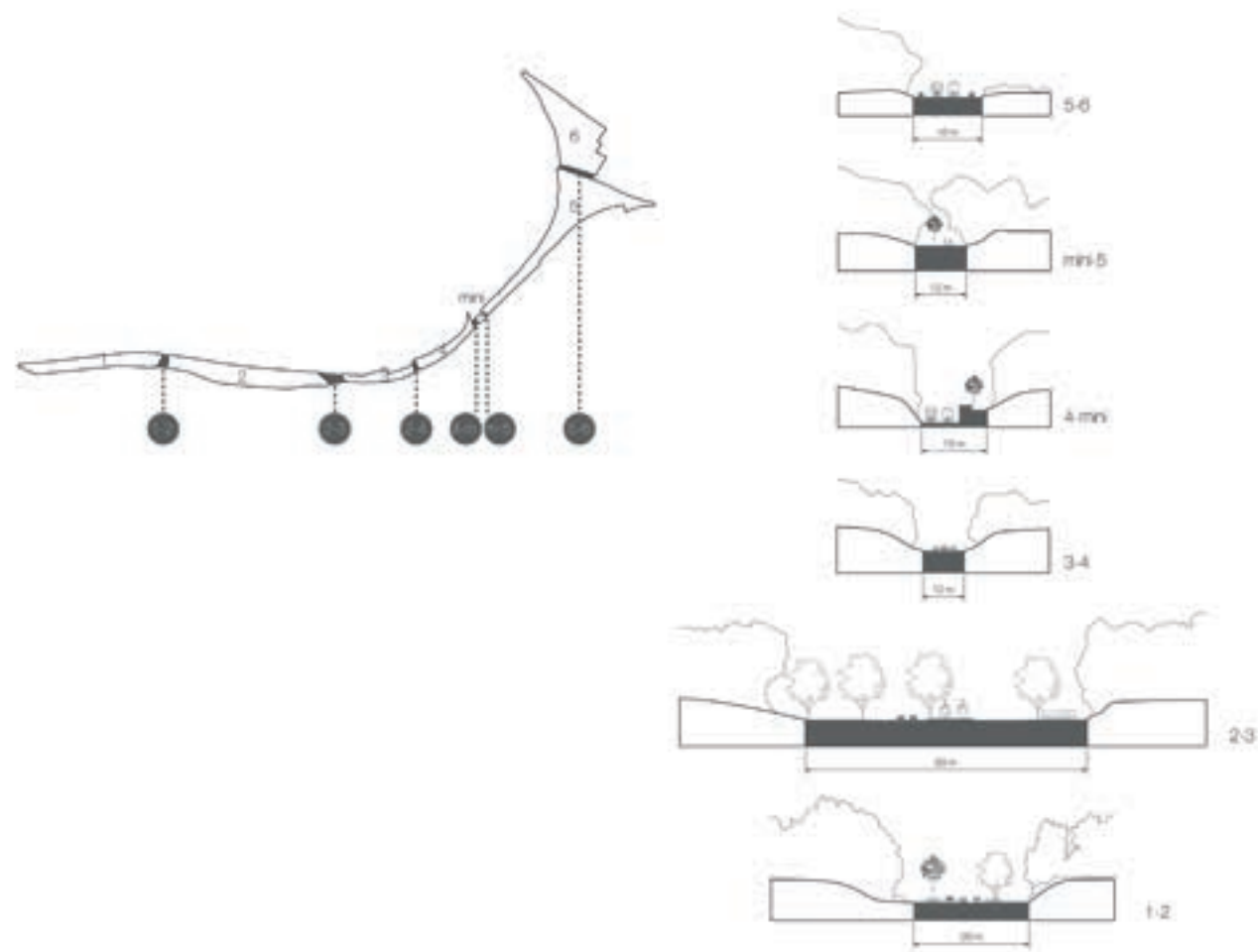
A way to secure a careful approach for minimum human disturbance is the avoidance of heavy machinery for maintenance purposes , this so called gentle approach is being successfully applied by Natuurpunt in Klein Zwitserland. The gentle approach should also be considered in regards to tolerance for non-native or invasive species. Indeed, a new vocabulary for this species that names them new arrivals or neophytes⁵² instead would be helpful in keeping the priorities clear. Again, the Berm is not a pristine nature area but an urban nature area of multiple ecological and human values.

Aiming for achieving a resilient and biodiverse future, the Berm could use some of the intuitive disadvantages of its fragmented morphology (a set of islands and not a continuous cohesive corridor) as points of strength and opportunity. Diversity of maintenance regimes and differentiated adjacency conditions don't necessarily lead to a failed management plan. Instead, if each island is able to evolve through the care of its most intimate users, we might find advantages in empowering the micro social fabric, which in turn could deliver more custom made decisions based on their observations and needs. Needless to say, the coordination between the different island micromanagement decisions should be discussed by a higher level platform where Gebermte and supra level organizations reflect on the decisions that could affect the health of the ecological corridor as a whole. Simultaneously communication and softer transition between islands and also between islands and their surroundings could improve ecological relationships. Tree canopy extensions at intersections, fauna tunnels, reduction of traffic and air pollutants should be part of the overall policy of a healthy biological corridor made of islands.

The physical fragmentation of islands and their differentiated maintenance dynamics should be evaluated and discussed through a regular interval period for at least 2 times per year. This calendar should include a longer time framework that highlights milestones of the Berm in 5, 10, 25 years. The open communication between the different management teams should lead to a reinforced awareness of emerging threats, but also the possibility of joining forces to act upon opportunities that enrich and secure a more biodiverse and inclusive Berm. Regular exchange of knowledge, materials, tools between them would normally also strengthen the social fabric that keeps the Berm protected against plans of its destruction or area reduction.

The Berm must take a step towards empowered microlevel local management and discontinue the current format of maintenance by AWW that outsources to companies that have no connection with the human and hon-human users of the Berm. Yet, as explained before, experts and supra level organizations must commit themselves to make this policy viable through the provision of expertise, tools and financial resources.

An urban nature is not a park but neither a nature reserve area. A minimal charter de route could be agreed by all managers (AWV, Antwerp/Wilrijk, Mortsel, Natuurpunt in consultation with Gebermte and supra level organizations like ANB or INBO) to mainly acknowledge the value and challenges of urban nature made up spontaneous growth with minimal human intervention.



Gaps along the Berm

5.3. Strategies regarding the human

Managing user diversity

Starting point for further actions is to acknowledge, preserve and ensure the co-existence of several types of users that are currently using or affecting the Berm, from dog walkers, nature lovers, mountain bikers, archers, exploring children, commuting citizens, cyclists, artists, poets, backyard owners. The humans affecting the Berm directly are also present in cars, trucks, trains, buses and trams. The list is incomplete but also reflects on certain aspects of exclusion. For example, there is no place for disabled users along the Berm while dog owners seem to be the dominant user type. Each of these users is more predominant in some areas than others while others are most likely seen by themselves (nature lovers and dog walkers). Sometimes these users are not easily compatible with each other (e.g., mountain bikers are rejected by both nature lovers and Natuurpunt and overlap with archers, dog walkers are feared by leisure oriented citizens and parents of small children, archers' vehicles are not welcomed by nature lovers). And yet the complete constellation of users, or its rich variety despite inner contradictions makes the Berm more resilient. In case of a common threat (such as its conversion to a motorway) it is likely that differences between the users would be placed in the background and a more united voice will be raised against such threats.

Differences between different users' wishes and needs will always entail a certain level of friction. The challenge is to find a format to discuss those policy decisions that affect the activities of the users. Negotiations or compromises must be reached always in consultation with all users involved or affected.

The ecological value of the Berm is not entirely understood by all users. Therefore, activities curated by Gebermte and Natuurpunt underpinning the ecological contribution of the Berm could help advance an agenda that gradually expands and considers the non-humans.

Policies should be focused and fact based. They should aim to be inclusive rather than ecologically immaculate. Rather than forbidding certain activities, policies should aim at reducing their impact and footprint. Archers for example should not be allowed to enter with heavy vehicles (gentle approach) and mowing for their activities should be controlled.

Mountain bikers maybe should not be banned but managers could find a place where they cause less harm to fragile species. Dog owners must specially be aware of the impacts that dog excrements and urine cause to the ecosystem, but also that having an unleashed dog means the decrease of several species that detect dog odor and avoid it. Furthermore, as we have seen in the walks, not all users feel comfortable to share a narrow path with a dog walker and therefore they avoid the area altogether, depriving certain citizens of a basic right to access nature. Yet a smart and inclusive plan should also find a place where dog owners are able to unleash their dogs which is also a non-human species that deserves equal attention. Private owners having a backyard should also know how they can contribute to the Berm's biodiversity.

This could be by helping compost processing but also by enriching the Berm. For example, solitary bees currently use their gardens for forage. Backyard owners should also avoid fences to the ground allowing small mammals to move more freely, their roofs and facades could become more biodiverse if they would allow greenery, but also, they could positively contribute to the improvement of the Berm by avoiding dumping any waste at the Berm. Other users affecting the Berm such as car owners are less likely to feel any sentiment for the Berm, but it should not rule out the possibility of educating them. Pollution by fossil fuel cars should be gradually faded out and at some point forbidden. Less sound and air polluted streets will also contribute to a healthier Berm allowing other species to thrive that are for now not able to survive in current polluted circumstances.



Car noise pollution at the Berm

Maintaining a host community

From 2017, Gebermte as an emerging Host Community started to actively engage with the problematic of the Berm, claiming a more active use and protection of the space to safeguard and push back the imminent threat of land consumption through infrastructure development. The editions of this socio-cultural and artistic event in 2017, 2018 and 2019 marked the beginning of reformulating the meaning of the bio cultural heritage for the Mortsel community (see also Saavedra Bruno et al 2022.) Gebermte supporters and volunteers—some of whom have backyards adjacent to the Berm—began trying to change the perception of the place and the imagination of the local inhabitants and other actors, using art as a tool. Putting the relationship between nature and art/culture at the heart of the Gebermte event proved to be instrumental in creating links with the local community . With Gebermte 2019, the emerging host community expanded—a community which is also expected to play a significant role in the establishment of a nature tissue plan for the Berm. Throughout the preparations and implementation of Gebermte 2019, a large number of actors became gradually involved. Meeting, discussing, negotiating, collaborating, disagreeing, cooking, building, sleeping, singing, presenting, painting, teaching, inquiring, etc., embodied the commoning process and the emergence of the Berm as a Commons, thus creating a community expressing care for the Berm. The host community gradually grew to encompass Gebermte, Natuurpunt, R11 Mis, the city of Mortsel, the district of Wilrijk, action researchers, the Province of Antwerp, a regional association, local companies and later on ANB, Departement Omgeving and INBO.

Hybrid governance

A way forward for the Berm regarding a governance strategy is to assure the connection or linkage of this self-organized actors (gebermte, walkers, foragers, youth, natuurpunt volunteers, etc. etc.) with local authorities (Mortsel, Wilrijk, Antwerp, Edegem) and supra-local support (province, ANB streekvereniging, AWV, bouwmeester). This includes establishing a hybrid governance relationship, combining hierarchical relations (state, corporate structure), market regulation, self-organization through networks and associations, and fine-grained affective relations, the latter being key for success.⁵³

A format to secure this governance strategy is to have 2 meetings every 6 months between all actors involved to discuss the evolution of the nature tissue plan. The discussions should cover the 4 episodes of interweaving (explore, imagine, monitor, manage), actualize on the new emerging challenges through new shared problematization discussions, and continue building a more than human community, a bottom linked governance and a socio-ecological narrative⁵⁴.



Towards a new alliance of actors

The meetings should cover an overall view of the Berm to then focus on the challenges or findings for the different islands. An agenda for the next steps should be part of the meetings objectives. Two key components from these meetings are the supra/local presence while there is also a balance between public servants, experts and volunteers. Volunteers also play a key role in building up a linkage to the local community⁵⁵.

Managing the Berm(s) should clearly distinguish between management decisions and actions and those of monitoring and enforcement. In this sense the actors should arrive to set of responsibilities that equally involve all types of actors. Hybrid collaborations would be ideal again between supra and local organizations, but also between public servants, NGO members and volunteers. Enforcing rules as part of the package of management guidelines remains difficult to implement for volunteers or NGO's. Assistance from local authorities remains essential.

A recommended governance policy should aim at accommodating different users' needs and wishes while acknowledging that certain uses are more disturbing to other users than others. We think that the management guidelines should arrive to a temporary common agreement per year as what is the 'right' accessibility. What are the territorial boundaries of this access regimes and how compatible they are with the overall goal of maintaining this valuable ecological corridor as a right of all citizens? As mentioned earlier conflicting users overlap and a proper governance should not ignore this but neither become police. Rather it should encourage dialogue and aim for compromises while leaving other instances of monitoring to experts and enforcement to local authorities.

Finally, we think that rather than straightjacket rules an understanding of all users is needed on the way we humans affect the non-human. Education, or as Gebermte calls it, open school here could play an essential role and could be explored through the already tested formats of walks organized by Gebermte, but it could be expanded to include new partners such as the neighboring schools in Mortsel (Jenaplan school Lieven Gevaert & GTI Mortsel), the scouts youth organization Chiro Stam. Natuurpunt and independent ecologists, experts from ANB or INBO should also be considered as part of this educational component. Through these educational programs in urban nature, citizens would be able to contribute to the safeguarding of the Berm by appreciating its beauty, understanding its value and becoming sensitive to its threats.

A new public-civil organization managing the Berm

In addition to, for example, the cooperation contracts and management plans between the Mortsel Ecology Working Group and the city of Mortsel in the early 1990s, it will be necessary to facilitate supra-local embedding in the NWP's and to mobilize the right subsidy mechanisms and coordinate with the local needs. However, it is essential that supralocal actors are aware of, and should allow and support the importance and vulnerability of the extremely sophisticated micro-network associated with unconditional engagement on the ground. To this end, it is important that governments show restraint, allow the extremely refined bottom-up network to enter the domain of governments, and deal delicately with the different dynamics they pursue. In order to allow this, the government, against its socio-institutional logic, has to start thinking in other roles, flexibly adapting its efforts to the situation at hand. In addition, it is also important that the bottom-up movement can continue to do what it does, but should not be institutionally lazy. It has to come out of its cocoon and start thinking about necessary transformations on higher levels. Only when bottom-linked governance changes existing roles and approaches, challenges power relations and emancipates local groups, it is transformative and represents a potential path to the democratization of the state and state-community relations.

To make this more concrete we suggest setting up a hybrid consortium of owners and managers that includes NGOs and local authorities. This new hybrid organization would have a common purpose of safeguarding the Berm from purely infrastructure driven agendas.

Transfer of land title

A key stone piece of this new governance scheme involves the transfer of land title from AWV to Wilrijk and Mortsel and/or to a new association or public-civil organization. It is important to remember that the Flemish infrastructure department AWV owns parts of the Berm that Mortsel and Wilrijk merely administer (See book 3 Ownership / management). The only exception is the natural reserve area Klein Zwitserland Zuid as well as Klein Zwitserland North that are owned by Mortsel and currently managed by Natuurpunt.



Aerial photo with indication of railway tracks (black), indication of verges (shaded), included parts of individual inhabitants (thick green lines) situation 2003. Laurine de Rop 2022.

Currently the way the Berm is managed goes back to the municipal nature management plans (1996) which aimed to enhance the richness of structure and recreational value of the railway site as well as allowing railway fauna and flora to develop further. From here a so-called *module 6 model* agreement was drawn up in 1999 between the Flemish Region (by the Flemish Minister of Public Works, Transport and Spatial Planning) and the municipality of Morsel concerning 'promoting cleanliness on the roads', including the old railway verge falls⁵⁶. In these agreements, tasks are laid down that were originally meant to be done by the road authority (Agency for Roads and Traffic, former Road Administration) and which are then outsourced to Morsel municipality or the district of Wilrijk. Since this results in a minimal cost for the Agency for Roads and Traffic (AWV), an amount is paid to the municipality for this under the subsidized covenant. Just like Morsel, the district of Wilrijk has the module 6 agreement with AWV about the verge section on their territory⁵⁷. These types of agreements can be terminated at any time by either party, so do not guarantee any long term protection. Because AWV owns the Berm, they also keep the option open for possible infrastructure works⁵⁸. (See boom 6 Island #1 new proposed intersection).

Moreover, as the governmental infrastructure agency Lantis (the governmental management company for infrastructural works around Antwerp) and the governmental agency for roads and traffic (Agentschap Wegen en Verkeer AWV) have considered the R11 bis as a strategic tangential connection to solve traffic jams in the Antwerp region there is always a risk that a continuation of the tangential connections of the A102 till the E19 and A12 might be seen as the solution to solve the overload of through traffic⁵⁹. As mentioned earlier the R11 connection is part of the approved masterplan of Antwerp 2020. Therefore one key strategy to safeguard the socio-ecological value of the Berm for its users would be to secure a prompt transfer of land title from AWV to Wilrijk and Morsel. We consider this is an urgency.

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Transfer of land title might entail going beyond public and private land ownership and giving land title of the Berm to the public-civil cooperation.

To reinforce the land transfer rights we also propose to secure and transfer of the land rights of the telecom plot Connectimmo Currently it is catalogued as private property, yet it is hardly used and the benefits for enriching the ecological and social value of the Berm remain high.(see book 3 Ownership / management, book 4 maps Island 3 & transect 3b and book 6 scenarios island #3).

Listing the Berm

The transfer of land rights should ideally be paralleled by a new protection status of the area. (See book 6 How the Berm could improve, secure, adapt to future challenges.) Two directions could converge in this strategic scenario. With the exception of a fragment of Klein Zwitserland North reserved as areas for day recreation the rest of the Berm is considered merely a park in the land use plan (see book 3 adjacent land uses around the Berm). This means that without land use change a new park could replace the existing Berm while destroying all of its accumulated biological richness through the years. One option currently not existing as land use (Flemish land use plans/ RUP) is to create a new land use called Urban Nature that aims at protecting areas of the city where valuable spontaneous nature exists. An alternative is to aim to achieve a protection of the Berm and Klein Zwitserland as a nature reserve area. This level of protection should be studied by experts but type IV or even type I should be considered. In addition to these strategies that focus on the ecological value the Berm could explore the possibility of listing as a heritage landscape. After all the Berm's human component has been essential. The idea of binding the Berm as a critical link heritage that belongs to the network of forts should be studied further.

5.4. Experimenting with/through physical interventions

In the context of the research, especially in what we have called shared problematization, explore and imagine episodes we became aware of several dreams, wishes, needs from users, experts and key stakeholders. They range from the overall protection of the Berm to specific threats and opportunities for improving the current situation (see book 2 for shared problematization and book 6 for sample scenarios per island).

Some are focused on improving the conditions for the benefit of non-human species. Others focus on reducing the human impacts on the Berm such as finding an alternative solution to the proposed new intersection of the Frans Van Dunlaan and Prins Boudewijnlaan (Wilrijk) or imagining a much friendlier, greener and cleaner R-11 at Vredebaan. Others focus on micro interventions of design to improve the accessibility for disabled persons to some islands. Imagining also includes rethinking how the current building of Proximus located in Hendrik Conscienceaan could host a program that is more compatible with the vision of the Berm. Some interventions could be almost invisible, how to make one island friendly to small children and people afraid of dogs by making an alternative path of dog owners but also locating a place



Examples of physical interventions realized at the Berm

or defining a time where dog owners could unleash their dogs. The list is potentially endless, but it does help giving some index of what could be done.

We propose to move forward with these imaginary scenarios by actually making them happen physically. In what is now considered tactical urbanism⁶⁰ or direct architecture⁶¹ a method involving students, volunteers and a low budget for materials could bring to life (albeit temporally) the ‘what if’ potential of these changes.

The scenarios should be the result of brainstorm sessions with students and volunteers and could be curated to include various themes: inclusive accessibility, nature inclusiveness, reduced human impacts on path movement, ways of securing and promoting soil formation, ways to education, cleaner Berm and so on.

For example, in the theme of reducing human impacts on path movements one could explore what are the most suitable paths for each particular island, ranging from testing ideal width, materials, form but also including the possibility of adding resting or info places along the path. The same could be explored regarding inclusive accessibility guaranteeing that all users have a place in the Berm including the physically impaired or the mountain bikers who are now singled out as problematic.

NOTES

¹ See De Keyser, G. (2021b) Discussion paper: "Blueprint methodology Natural Tissue Plan NWP", 24/04/2021.

² For reference to the manual, see e.g. on p1 of book 1: De Keyser, G., Van den Broeck, P., Saavedra Bruno, S., De Blust, G., De Rop, L., Van den Broeck, H., Madrazo, F. (2022). Innovatietraject stedelijke natuur 'Cities and Villages Thinking like a Forest'. Aanzet van handleiding voor natuurweefselplanning.

³ Gebermt 2022-2024. Een kleine parade van cultuur, kunst en natuur, 2021

⁴ See https://www.antwerpen.be/docs/Stad/Stadsvernieuwing/Bestemmingsplannen/RUP_02000_212_00378_00001/RUP_02000_212_00378_00001_0000Document_tn.html

⁵ Garland, L. Heat Islands: Understanding and mitigating Heat in Urban Areas. London: Earthscan. 2008

⁶ Forman, Richard T.T. Urban Ecology. Cambridge University Press 2014. PP 365, Forman, Richard T.T. Urban Ecology. Cambridge University Press 2014 PP 365

⁷ Forman, Richard T.T. Urban Ecology. Cambridge University Press 2014 PP 365

⁸ The gaps along the Berm are a proof of the sound barrier effectiveness as crossings dilute the noise barrier effect in those points. See for example the intersection in Eggestraat and R-11.

⁹ See <https://decibelpro.app/blog/how-loud-is-85-decibels/>

¹⁰ Forman, Richard T.T. et al. Road ecology’s promise. What’s around the bend? Environment, 46, 8-21

¹¹ Forman, Richard T.T. Land mosaics. The ecology of landscapes and regions. Cambridge University Press 1995

¹² Forman, Richard T.T. Urban Ecology. Cambridge University Press 2014. PP 365

¹³ Road corridors in Australia of 93-143 m have found small mammal diversity as that of a matrix. See Forman, Richard T.T. Land mosaics. The ecology of landscapes and regions. Cambridge University Press 1995. (pp 150, 160)

¹⁴ In the cases cited ground speed velocity could be reduced by perhaps 15%. See Jensen, M. Shelter effect: Investigations into the Aerodynamics of Shelter and its effects on Climate and Crops. The Danish Technical Press. 1954

¹⁵ The maps available for this study cannot draw a conclusion as a wind specialist should be involved in further studies. Direction, obliqueness, porous coefficient etc. are needed for a precise conclusion. See more on effects of wind of a corridor in See Forman, Richard T.T. Land mosaics. The ecology of landscapes and regions. Cambridge University Press 1995. (pp 186)

¹⁶ See Infrared Maps Give Belgian Homeowners a Bird’s-Eye View of Their Houses’ Energy Efficiency. <https://www.popsci.com/science/article/2010-07/infrared-maps-let-belgian-homeowners-see-energy-efficiency/>

¹⁷ Rodney van der Ree, Daniel J. Smith and Clara Grilo. Handbook of Road Ecology. Willey 2015

¹⁹ See : https://climate-adapt.eea.europa.eu/metadata/case-studies/adapting-to-heat-stress-in-antwerp-belgium-based-on-detailed-thermal-mapping/antwerp_picture-2.png/view

²⁰ Lauwaet, Dirk (VITO). The maximum WBGT [°C] during a hot summer day for a quarter in the city centre of Antwerp. The map shows the results of VITO’s urban climate UrbClim model for a neighbourhood in the Southern part of Antwerp. The basis data are hourly 2m Wet Bulb Globe Temperature values for a specific warm summer day (24 July 2012). The map shows the maximum WBGT values during this day, which should stay below 25°C to avoid heat stress. Locations with trees and/or water surfaces are coolest, whereas the highest heat stress values are found over paved squares and streets where there is no shading.). Source: https://www.ruimtelijkeordening.be/Portals/108/Eindrapport_actualisatie_kaartmateriaal_ruimtelijk_beleid_v1_0.pdf. Accessed June 28, 2022

²¹ Sasha Khomenko, Marta Cirach, Evelise Pereira-Barboza, Natalie Mueller, Jose Barrera-Gómez, David Rojas-Rueda, Kees de Hoogh, Gerard Hoek, Mark Nieuwenhuijsen. Premature mortality due to air pollution in European cities: a health impact assessment. Lancet Planet Health 2021. January 19, 2021 [https://doi.org/10.1016/S2542-5196\(20\)30272-2](https://doi.org/10.1016/S2542-5196(20)30272-2) accessed June 28, 2022. See table 4. Preventable number of deaths and preventable age-standardized annual mortality in the ten European cities with the highest (top) and lowest (bottom) NO2 mortality burden.

²² These include effects on trees, soil, water, birds, pollination, insects, biodiversity, phenology, urban heat island, climate change etc. See Forman, Richard T.T. Urban Ecology. Cambridge University Press 2014. PP 144

²³ This might lead to genetic differentiation of subpopulations. See Forman, Richard T.T. Land mosaics. The ecology of landscapes and regions. Cambridge University Press 1995. (pp 152)

²⁴ This observation has not been tested in this study as the area of study did not map the diversity of the patches that are neighboring to the Berm.

²⁵ van Overveld, Thijs. Samenvatting inventarisatie flora en fauna groenstrook Saffierstraat 2021

²⁶ Forman, Richard T.T. Land mosaics. The ecology of landscapes and regions. Cambridge University Press 1995

²⁷ Mortsel has a population density of 3138inh/km². This is 20% higher in density than Antwerp itself. See <https://latitude.to/map/be/belgium/cities/mortsel>

²⁸ Gälzer, Ralph (2001): Grünplanung für Städte. Planung, Entwurf, Bau und Erhaltung. Stuttgart: Ulmer

²⁹ Zimmermann, Astrid. Planning Landscape. Dimensions, elements, typologies. Birkhäuser, 2015. PP 24

³⁰ Rudd, H. Vala, J. & Schaefer, V. Importance of backyard habitat in a comprehensive biodiversity conservation strategy: a connectivity analysis of urban green spaces. Restoration Ecology, 10, PP 368-375

³¹ See the project BUGS; Biodiversity of Urban Gardens in Sheffield. Schilthuizen, Menno. How the urban jungle drives evolution. PP 68

³² See Sola Morales, Ignasi. Anyplace. Cambridge, MA. MIT Press 1995 PP-118-123)

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³⁴ Van den Broeck, H. (te verschijnen, 2022). Lifescapes. Designing with/for landscapes of spontaneous urban nature as living communities. Master thesis. Wageningen University and Research.

³⁵ In this study there has not been a survey of previous herbicides used by railway managers but it is recommended that a study is done since some of these chemicals might still be present and thus potentially are a threat to both human and non-human species. Special soil surveys should be done at the location of children’s playgrounds.
7

³⁶ Charles Flink, Kristine Olka, Robert Searns, Robert Rails to Trails Conservancy. “Trails for the Twenty-First Century”. 2001. Island Press. Apple Books. PP 218

³⁷ See in this report drilling and measuring of organic material and horizons. For example, Ph levels is around 7 and considered good for many plant species.

³⁸ Joyce van der Berg, Hans van der Made, Ingrid Oosterheerd, Alessandra Riccetti . BiodiverCITY. A Matter of Vital Soil!nai010 publishers. PP32

³⁹ Interview with Leen Wouters, May 6, 2022

⁴⁰ Interview & walk with Frederik Van de Perre, Natuur Punt manager nature reserve Klein Zwitserland. May 18, 2022

⁴¹ Beavers also reshape their environment by creating dams and ponds but also by constantly cutting trees. They contribute to a ‘striking habitat heterogeneity’. (Forman, Richard T.T. Land mosaics. The ecology of landscapes and regions. Cambridge University Press 1995. PP 223)

⁴² De Rop, L. (2022) Evolutie in de multilevel en hybride governance van stedelijke natuur. De oude spoorwegbermen en het ‘Gebermtte’ proces in Mortsels en Wilrijk, Antwerpen. Master thesis. KU Leuven.

⁴³ Kelchtermans, T. (1989). *MINA-plan 2000: analyse en voorstellen voor een vernieuwd Vlaams milieu- en natuurbeleid*. Gemeenschapsminister van Leefmilieu, Natuurbehoud en Landinrichting.

⁴⁴ Saavedra Bruno, S., Isan, L., Balcha, W. G., & Van den Broeck, P. (2022). “Making Slow Path”. The Arts-Based Event “Gebermtte” as an Act of Commoning. *Frontiers in sustainable cities*, 4(Year: 2022).

⁴⁵ For the vision concerning 'Cities Thinking like a Forest' as a basis for a new 'vision urban nature ANB' , introduction CTLF, see De Keyser (2019) Visienota: Nature and Forest in The City 28 May 2019_ 'Cities That Think like a Forest', September 2019, Gert De Keyser

⁴⁶ Forman 2014, PP91

⁴⁷ Forman 2014, PP 93

⁴⁸ Joyce van der Berg, Hans van der Made, Ingrid Oosterheerd, Alessandra Riccetti . BiodiverCITY. A Matter of Vital Soil!nai010 publishers. PP32

⁴⁹ Forman 2014, PP 21, PP95

⁵⁰ Global review of forest pests and diseases. FAO. Food and agriculture organisation of the United Nations. 2009

⁵¹ See Global review of forest pests and diseases. FAO Forestry Paper 156. Food and agriculture organization of United Nations, Rome 2009.

⁵² See examples of Berlin importance of language in documentary Natura Urbana. The Brachen of Berlin directed by Matthew Gandy. Berlin, June 2017

⁵³ For the role of emotional bonds see: “Making Slow Path”. The Arts-Based Event “Gebermtte” as an Act of Commoning Sofia Saavedra Bruno, Lavinia Isan, Wossen Gebreyohannes Balcha and Pieter Van den Broeck PP 6

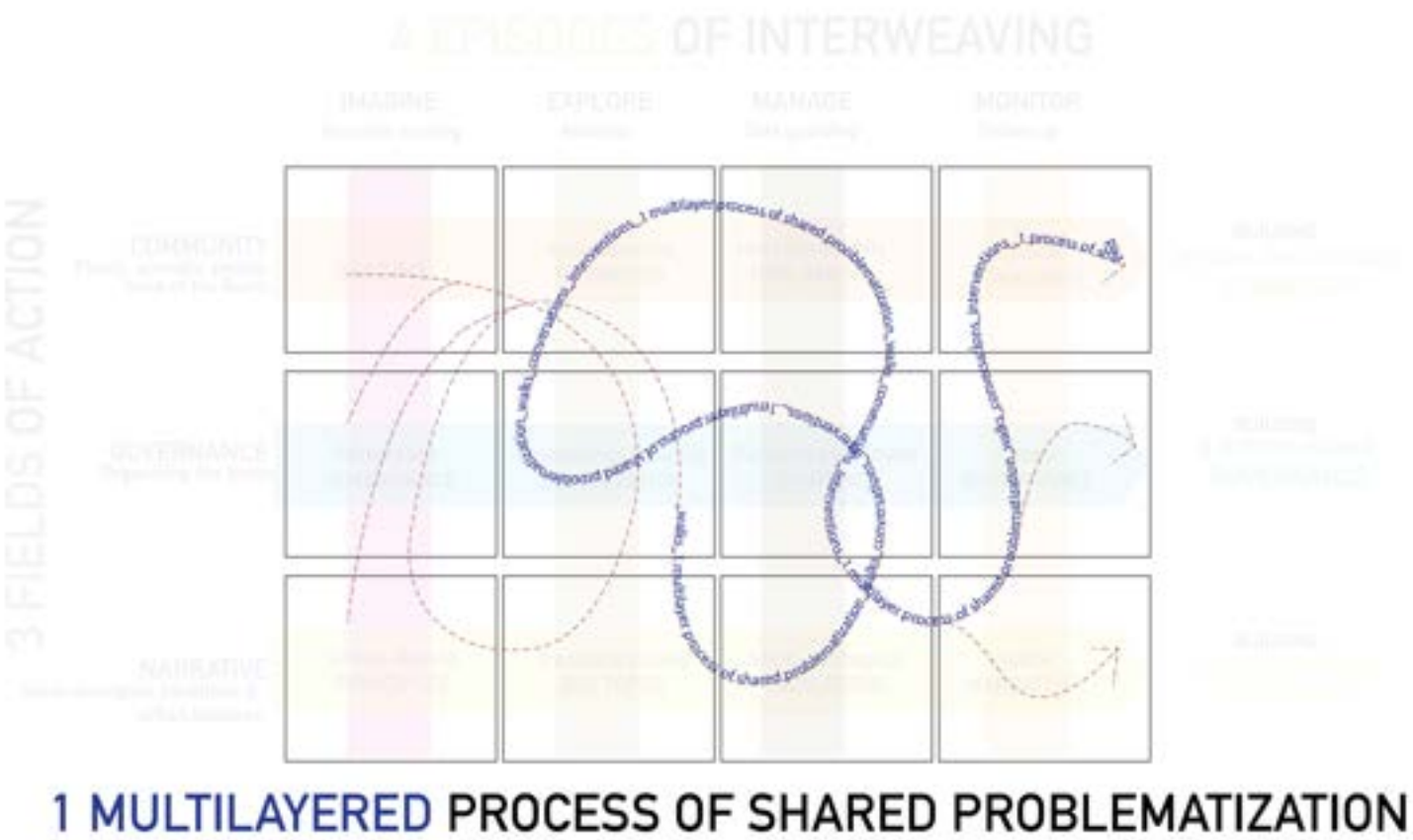
⁵⁴ See the manual for making nature tissue plans for more information on the latter 3 processes.

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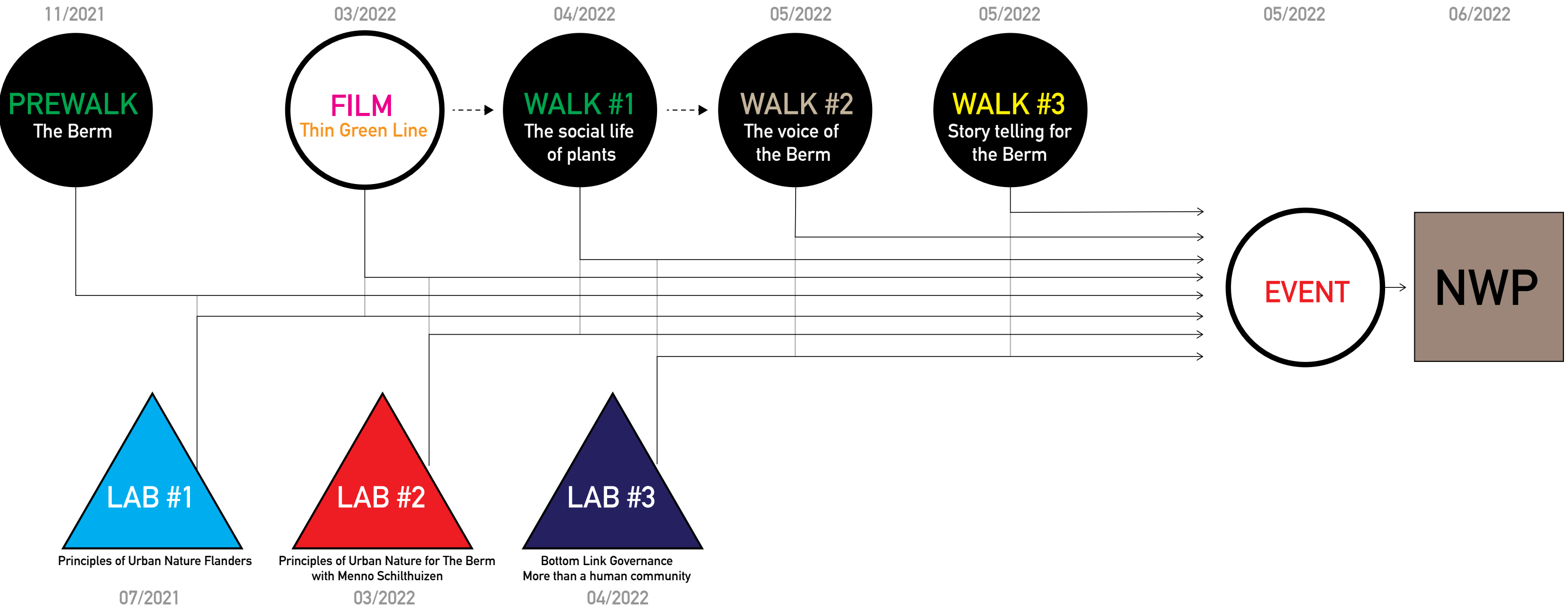
Gebermte

A multilayered process of shared
problematization & 3 fields of action

MULTILAYERED
PROCESS
OF SHARED
PROBLEMATIZATION



SUPRA/LOCAL PROCESS OF SHARED PROBLEMATIZATION

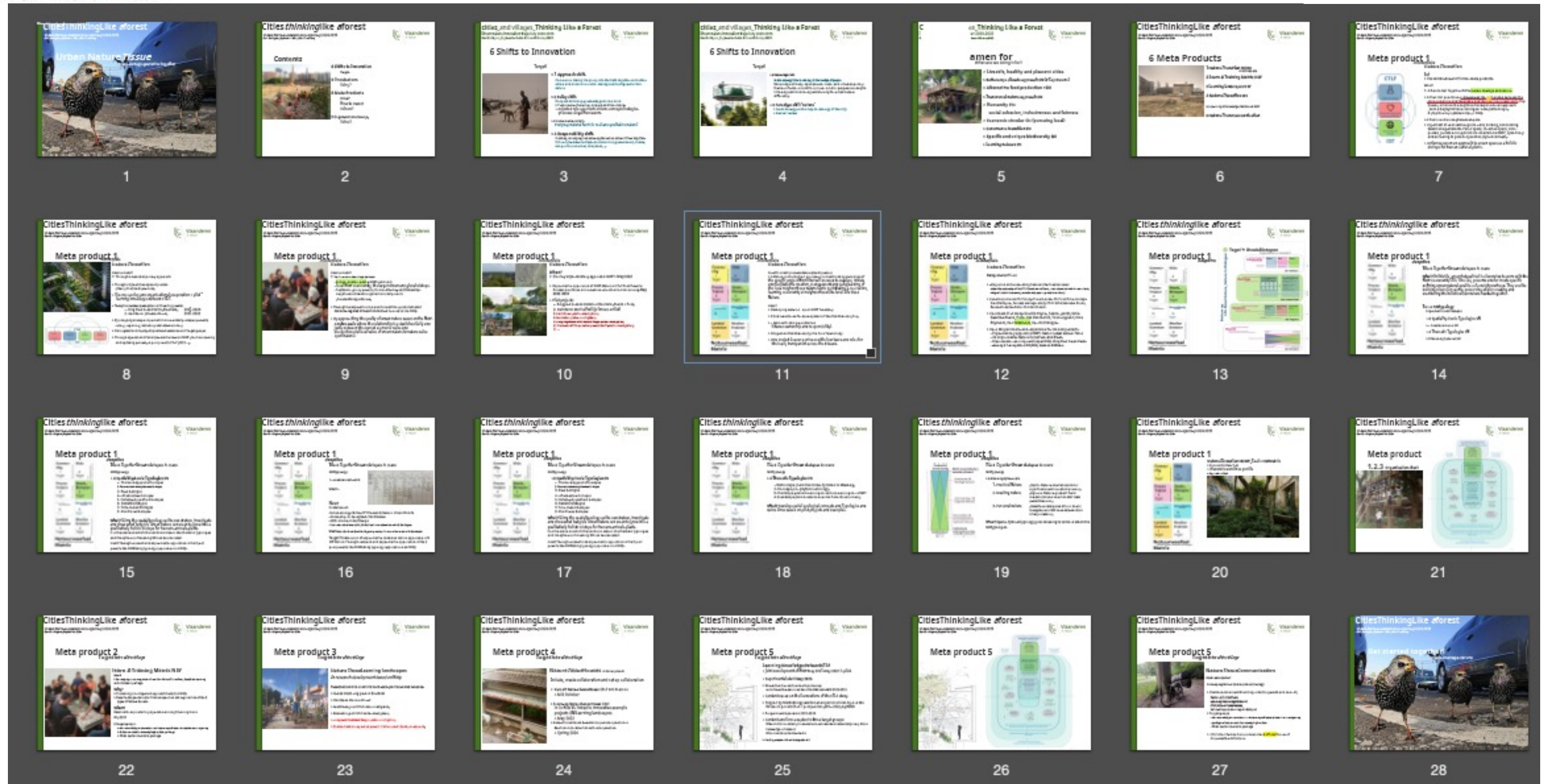


AGENTSCHAP NATUUR & BOS

CitiesThinkingLike aforest

Urban Nature innovation trajectory 2020-2025

Gert De Keyser, September 2021



AGENTSCHAP NATUUR & BOS

-> Need for applied tools, instruments and processes to achieve better cooperation.

(from nature management plan to nature fabric plan?).

-> Urban nature responds to the social and ecological 'sense of urgency'.

Continuing pressure on nature: loss of biodiversity

Climate change: doing our bit locally and globally to meet climate targets

Impact of corona crisis: accessibility and exclusivity of collective ne public space

Quality of life of cities and villages.

> Make cities and villages grow more 'naturally' by creating a sustainable natural fabric.

-> Dare to take a chance as a government - as urban nature developers - with other urban developers (infrastructure, sewerage, public space, project development, neighbourhood initiatives, citizens...)

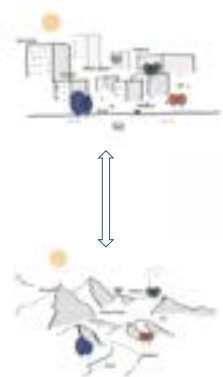
> Need for an open and horizontal network on urban nature to share knowledge and build community from practice, science and policy.

Cities_and Villages_Thinking Like a Forest

SWO toegepast onderzoek: ANB_dOMG_Kul_Provincie Antwerpen_INBO
Broedprojecten: RingPark Groene Vesten en Gebermt
Labo 1: 2 juli 2021



-> nood aan integratie de 'traditionele' ecologische benadering in de stedelijke context



GEBERMTE TRAJECTORY



a different way to research, "design" and "develop" a place



the lived environment (De Berm) as an influential actor



a long-abandoned railway embankment with a relative open potential.



the creation of societal value(s): changing the experience, discourse and practices related to a place (De Berm)



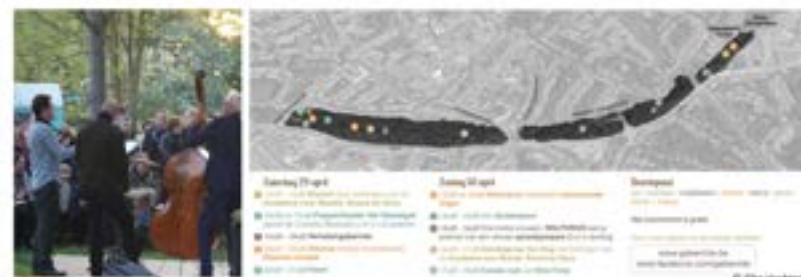
institutionalization: involving different actors in the process of valuation



getting actively involved in effectuating change



*29-30 April 2017
a little parade of
culture, art and nature - a participative experiment*



*29 April – 1 May 2018
sculptural park*



GEBERMTE TRAJECTORY

Hereunder some excerpts from the text that Sofia and I wrote together with the Flemish architect and Geert De Blust, before ANB got involved. It contains some elements that might be useful for the concept of the NWP I believe... But not yet the idea to elaborate scenarios. (Bart)

Our provisional starting points for the formulation of supra-local development visions and implementation strategies are

- o the protection and promotion of biodiversity and the use, experience and appreciation of biodiverse areas by people should go hand in hand.

- o a balanced opening up of these 'verge areas' is necessary in order to ensure that biodiversity can develop and increase optimally in the greater part of them. This means striving for a healthy balance between a smaller share of accessible recreational areas on the one hand, and large less or inaccessible parts that qualify for rewilding and extensive management on the other.

- o the development of supra-local ecological networks can largely be hung up on the development of supra-local networks of slow roads.

- o There is a need for co-creative strategies by local and supra-local partners in order to arrive at a consistent and robust supra-local management of ecological heritage, in this case road, rail and water verges. At present, local authorities often have to bear the burden of maintaining verges, but have little or no say in their destination or use because they are owned by supra-local actors (AWV, Infrabel, etc.).

- o linking research by design, recruiting cultural programming, participatory action research and experimenting with curatorship offers new possibilities for researching and promoting the ecological appreciation of verges. The study assignment will result in an appealing vision and a broadly supported (bottom linked) nature management and design plan and a financing plan for the verges of Mortsel and Wilrijk that will considerably increase both the biodiversity and the cultural value of the verges and their surroundings. The aim is also to realise concrete ecological connections to and with other nature areas and green-blue networks.

The development plan developed as a result of Gebermte 2022 is intended to elaborate an ecological development vision, measures, interventions and a management plan with the aim of preserving and developing a stretch of unspoilt nature as a public green space and an ecological corridor. On the basis of the study, bottlenecks are detected for which a future development direction is worked out in the framework of the supra-local vision. We call for a coherent set of interventions and measures, differentiated or not, to increase the biodiversity value by making use of the natural elements and processes already present (natural sowing, dead wood, etc.). We also think that keeping parts of it inaccessible to humans is important for the design of the development plan.

In particular, we also ask that, where possible and relevant, an effective soft-mobility structure be worked out around these verges at local and supra-local level. This could be about optimising the existing infrastructure of slow traffic and slow connections. But also about how the optimisation of hard and fast infrastructure in certain places can facilitate the realisation of slow connections and ecological networks. Finally, we ask for proposals to link and elaborate other interests and values, such as a link with cultural-historical dimensions.

The study and research assignment includes thinking about the development of a relevant and appealing cultural programme for Gebermte 2022, including a route with the input of artists and participatory workshops, as well as communication. Consider, among other things, sets, scenographies, installations ... that refer to natural landscape elements, heritage, that make roadsides crossable at a certain location ... But also other performances such as poems, stories, music, theatre shows ... that equally explore the possibilities of roadsides as bio-cultural heritage by creating experiential contexts in that direction. The study assignment integrates what has been learned in this way into the promotional vision and the management and design plan for the verges.

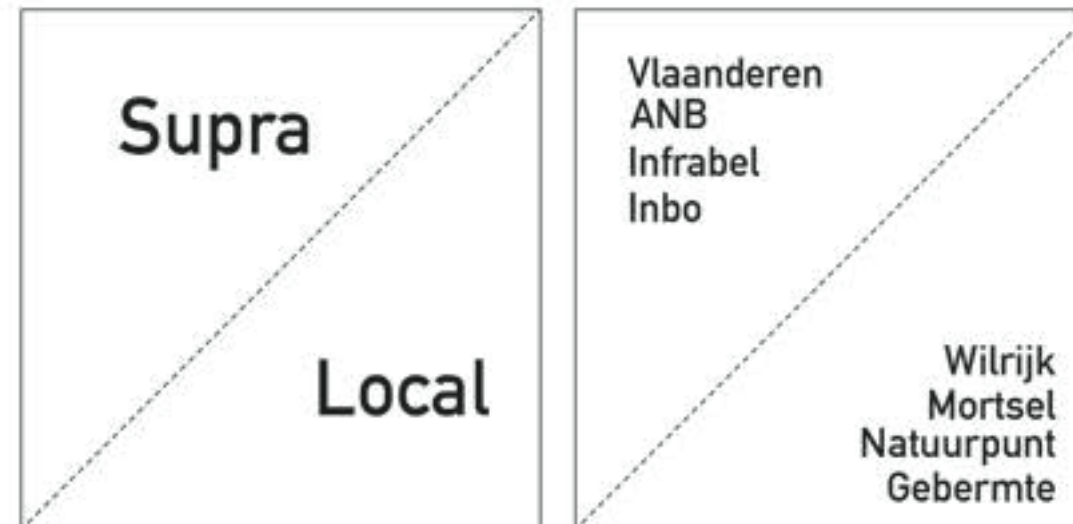
We want the abandoned verges to become a sustainable place for a large group of stakeholders and users to 'enjoy', to improve the environment, to move around safely and, above all, we want these places to become an extension or insertion within a sustainable ecological network throughout the city. We want to design and develop the green verges within their urbanised environment as entrances to the open space and thus include the verges in a larger landscape story.

We address multiple area managers and experiment with multi-stakeholder partnership and co-creation. We therefore ask that a hybrid management and financing model be developed for the project, in which preferably all actors can have a say. We are thinking here of the province, municipalities, Natuurpunt and Gebermte.

GEBERMTE TRAJECTORY



Development visions



FINDING COMMON GROUND



PREMIERE THIN GREEN LINE

An aerial, top-down view of a city street. On the left is a grey asphalt road with white painted lines. To the right of the road is a concrete curb, followed by a strip of green grass and a rectangular patch of green lawn. Further right is a wide sidewalk paved with reddish-brown bricks. To the right of the sidewalk is a dense, lush green hedge or row of bushes. The overall scene is captured from a high angle, looking down at the street.

A FILM BY
SOFIA SAAVEDRA BRUNO AND ANDRES LUBBERT

[MORE VIDEOS](#)



Premiere of the film Thin Green Line



Conversation between evolutionary biologist Menno Schilthuis & radio maker Jan Hautekiet



Conversation between film director Sofia Saavedra & writer and radio maker Jan Hautekiet



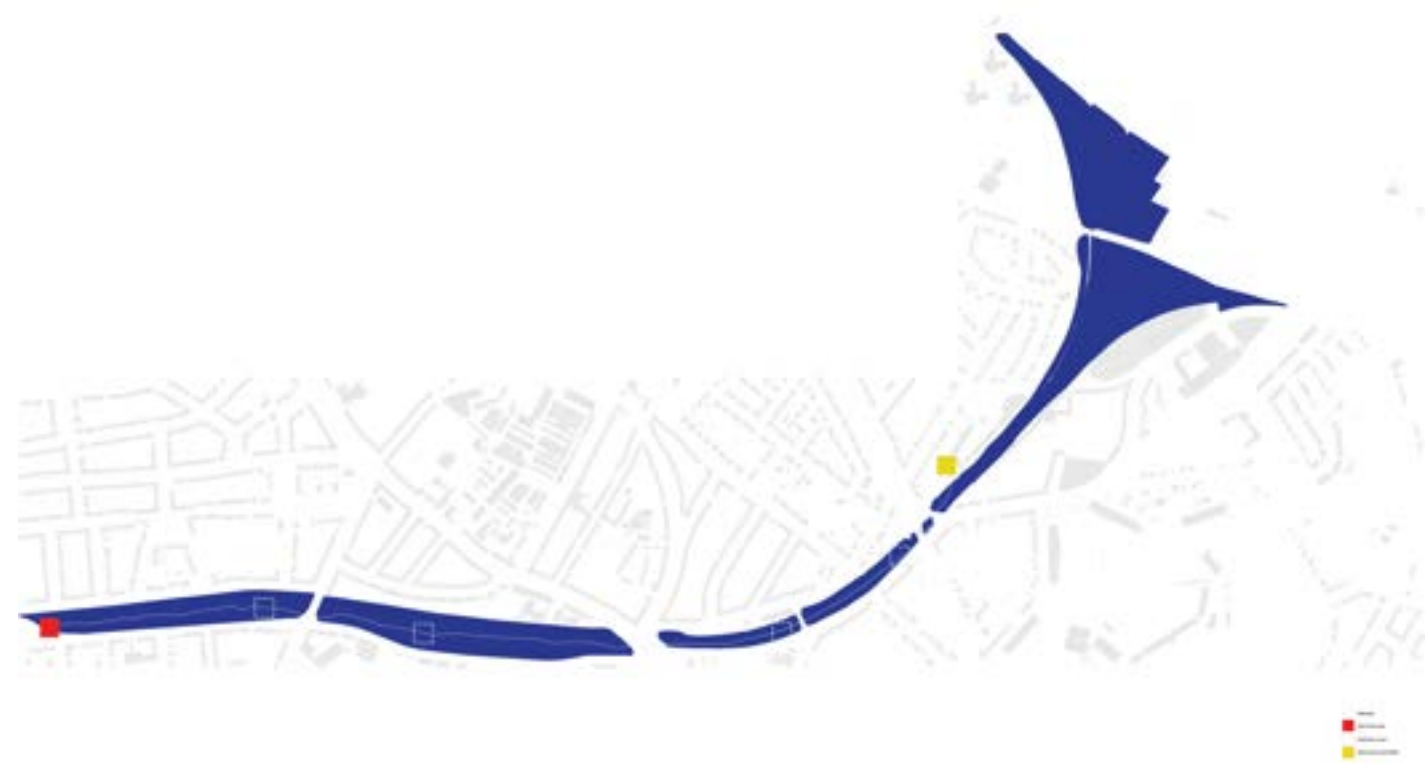
Conversation between Menno Schilthuis, Willy Thomas & Jan Hautekiet

WALKS



PRE.WALK #2

When: 22.09.2021
Theme:
Partners:
Lead by:





Je moet een manier vinden om homogene groepen van verschillende soorten te vinden, dus homogene heterogene groepen. Die moet je dan in tijd en ruimte, in het nu zetten. De groepen die je dan vindt geven de plek weer.

You have to find a way to find homogeneous groups of different species, so homogeneous heterogeneous groups. You then have to put these in time and space, in the now. The groups you find then represent the place



De biologisch gevormden zijn veel te weinig bewust van het belang van successie en spontane ontwikkeling. Zij proberen te veel om situaties te blokkeren of te bevriezen, te creëren en te tuinieren, in plaats van mee te surfen op de natuurlijke dynamiek en de spontaniteit die er altijd gaat zijn.

The biologically trained are insufficiently aware of the importance of succession and spontaneous development. They try too much to block or freeze situations, to create and garden, instead of surfing on the natural dynamics and the spontaneity that is always going to be there.



Die sence of urgency, dat is iets dat komt doordat in onze streken heel veel soorten nog maar in zo'n kleine aantallen, op zo'n beperkte plaatsen voorkomen dat je hen moet assisteren. En daar komt dit van, we moeten het hier vergroten en we hebben niet zoveel tijd. Op plaatsen waar geen verdrogin, verzuring en andere problemen optreden, daar kan je spontaniteit zijn gang laten.

That sense of urgency, that's something that comes from the fact that in our regions a lot of species are now only found in such small numbers, in such limited places that you have to assist them. And that's where this comes from, we have to increase it here and we don't have that much time. In places where there is no drought, acidification and other problems, you can let spontaneity take its



De strategie is ervoor zorgen dat die drukfactoren opgelost worden. Niet door nog meer te maaien en af te voeren, maar door onze manier van leven aan te passen

I would like to be an owl here to enjoy the silence of the night.

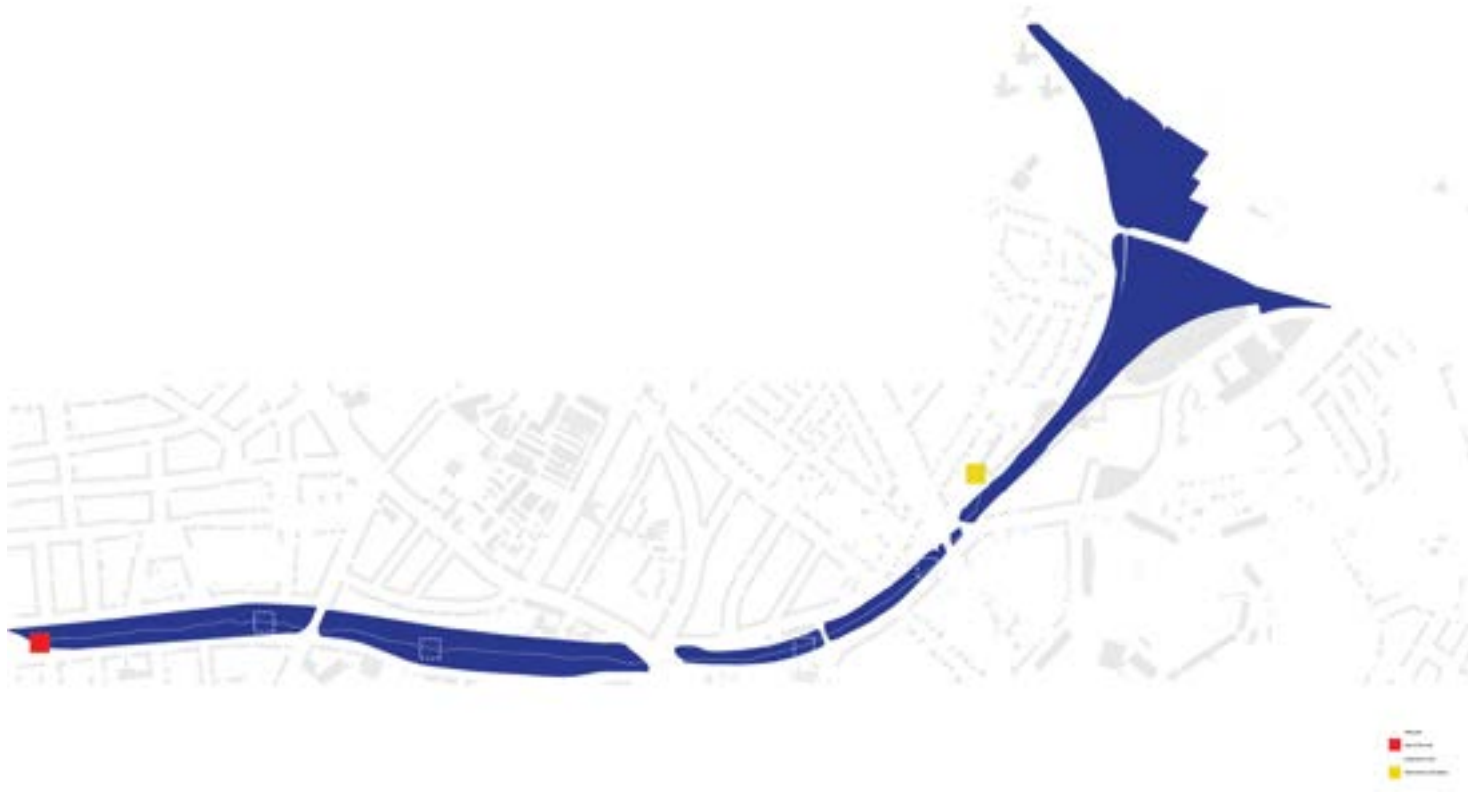
PREPARATION WALK

VOICE OF THE BERM

When: 11.09.2021

Partners:

Lead by:



WALK #1

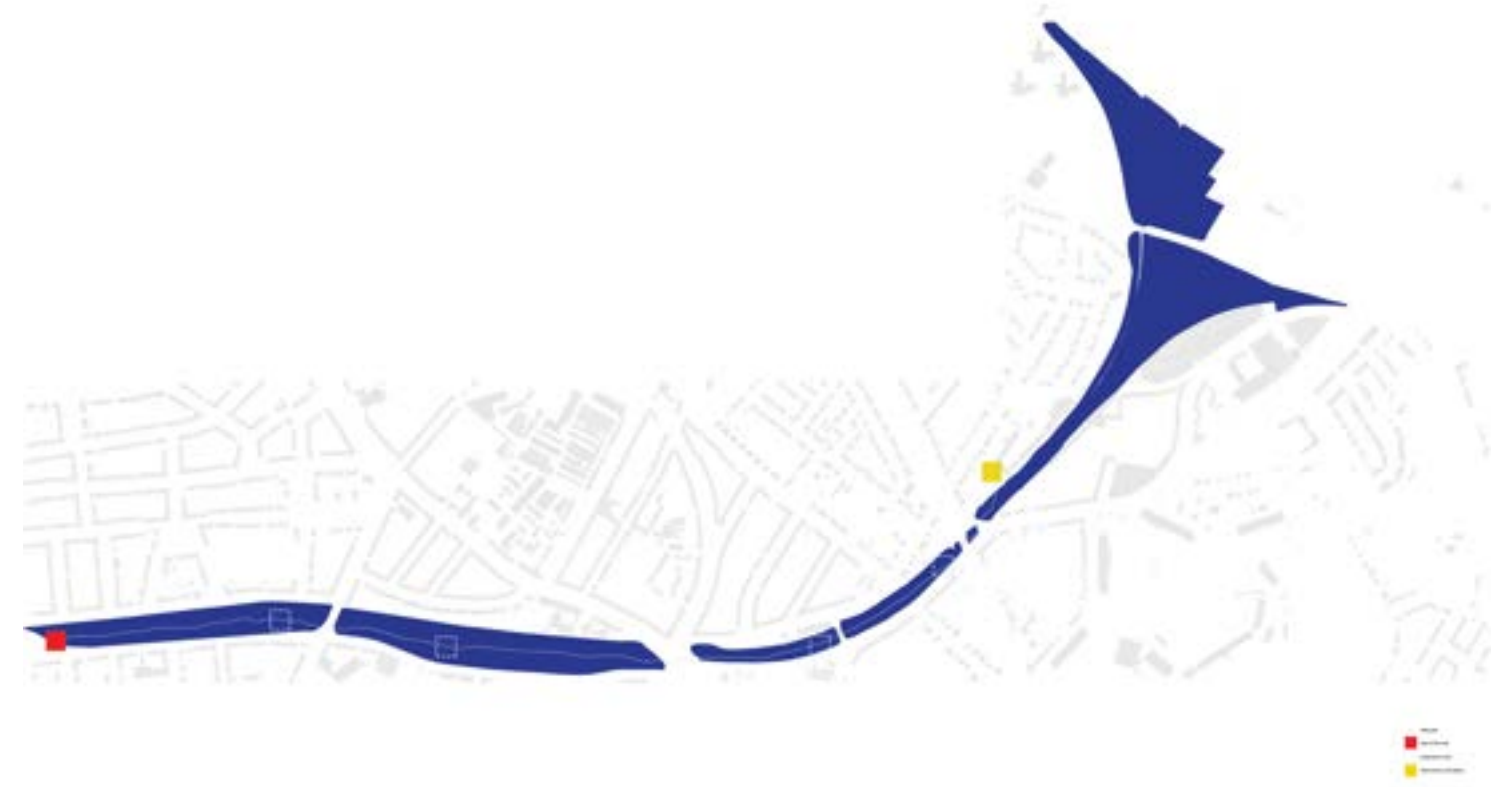
THE SOCIAL LIFE OF PLANTS

When: 23.04.2022

Partners: KU Leuven, Wageningen University, Supersudaca

Lead by: Pieter Van der Broeck, Hannah Van der Broeck, Felix Madrazo

Organise around 5 principles and sections. Then we do 7 stops, including start and finish. Each time at a section. Walk 3,5 km, 45 minutes, 10 minutes per stop, 30 minutes reserve e.g. for closing reactions. In the future, please include an ecologist, e.g. Wim Jacobs, Geert De Blust, Frederik Van de Perre. To take with you- tote bag- script- folder with photos- print sections in tube- auger- paper tape- books biodiversity, Sheldrake, darwin in the city, Simard, Wohlleben- prepare google photo album, so participants can upload- key chiro toilets in advance- plant recognition app on smartphone (Picture this)



WALK #2

IN SEARCH OF THE VOICE OF THE BERM

When: 01.05.2022

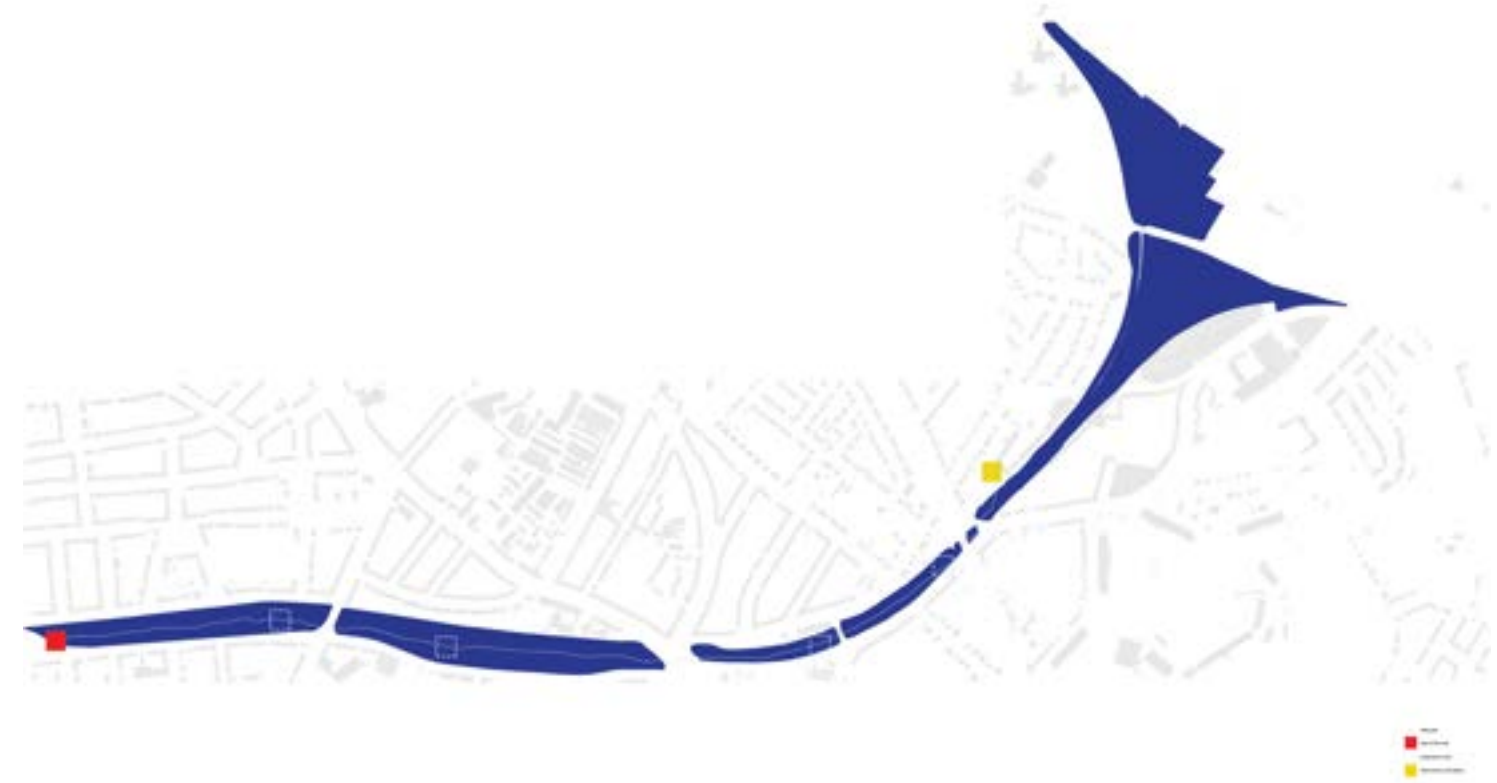
Partners: Gebermte & Supersudaca

Lead by: Geert Lemahieu, Christophe Batens, Lies Van Gasse, Stefan Heulot, Marie Darah, Johanna Pas en Sara Eelen, Bart Pluym

A motley crew of verge poets brings and makes, in cooperation with the Klimaatdichters and walkers, poetic creations in search of De Stem(men) van Den Berm: Geert Lemahieu, Christophe Batens, Lies Van Gasse, Stefan Heulot, Marie Darah, Johanna Pas and Sara Eelen.

The walks start at the Jozef Hermanslei on the Wilrijk side (see also [this link](#)) and take about 1 hour.

Registration is not obligatory, but it helps in the organisation.





Misschien moeten we naast een brug ook eens nadenken over verbindingen naar de omgeving, bijvoorbeeld naar Fort 5. Zebrapaden voor eekhoorns. Zebrapaden in de lucht.

Maybe we should, apart from a bridge, also start thinking about connections towards the surroundings, for example towards Fort 5. Crosswalks for squirrels. Crosswalks in the air.



Loslopende honden houden me tegen om hier te komen sporten, ik ben hier eens besprongen door een hond

Unleashed dogs keep me from coming here to exercise, I was once jumped by a dog here.



Ik wil graag traag kunnen bewegen over de bermen om naar de natuur te kijken. Slow is good.

106 would like to be able to move slowly on the berms to look at nature. Slow is good.



Ik zou hier graag een uil willen zijn om te kunnen genieten van de stilte in de nacht.

I would like to be an owl here to enjoy the silence of the night.

WALK #3

STORY TELLING OF THE BERM

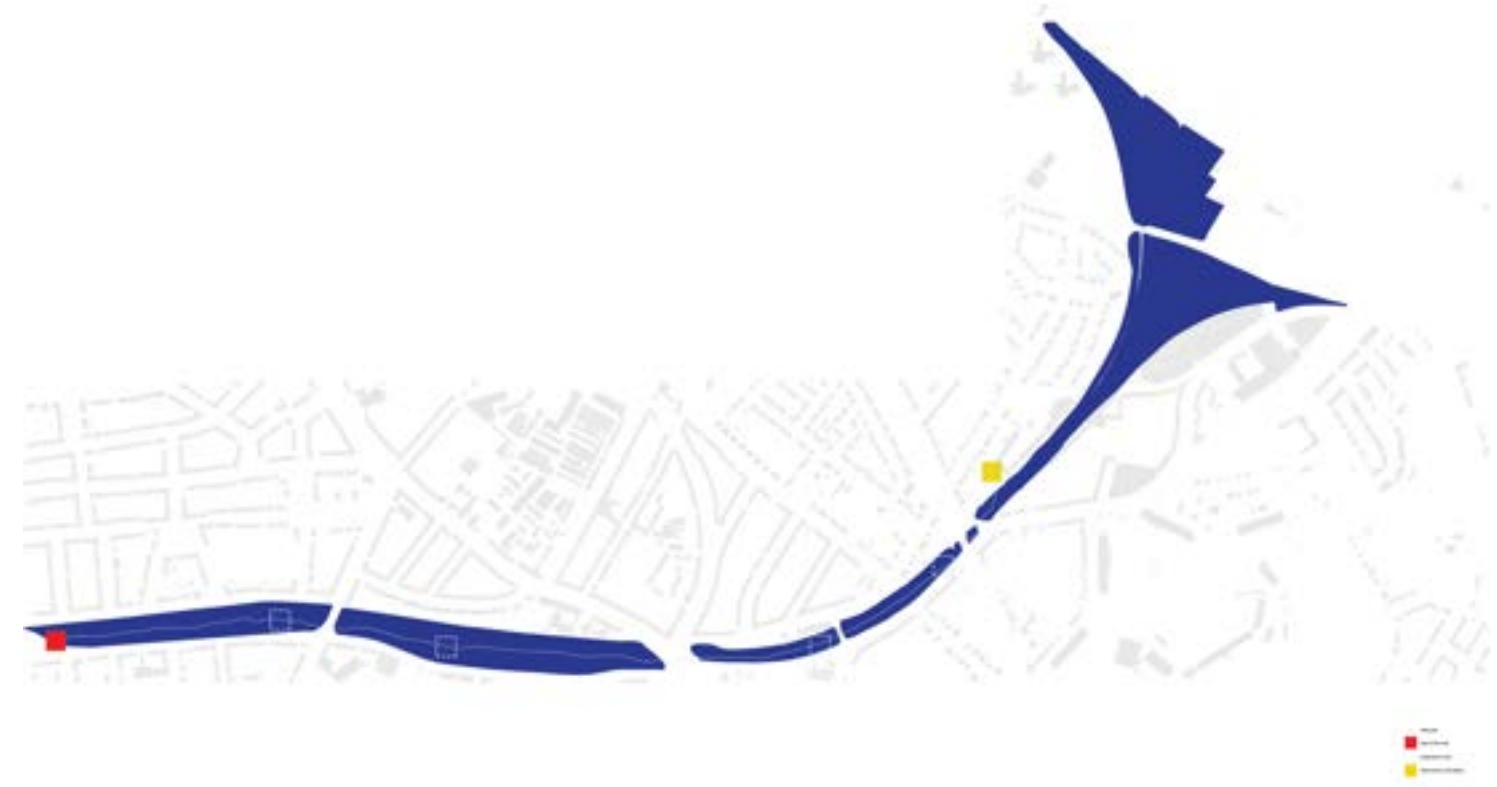
When: 01.05.2022

Partners: Gebermte

Lead by: Patrick Lahouss, Marc Peeters, Bart Pluym

Musician, teacher, Mortsel resident and storyteller Patrick Lahousse and Marc Peeters tell stories from and about Den Berm.

The walk starts at the Diesgehemhoeve (see also this link) in Mortsel and takes about 2,5 hours.



LABS & CORE MEETINGS



CORE TEAM MEETING #7

Creating Urban Biotopes together

When: 28.10.2021

Partners: ANB, KU Leuven

Lead by: Geert de Blust

Explanation of the four proposed components of the tile:

- 1) Spatial/Systemic Urban Nature Typologies
- 2) Condition matrix urban nature
- 3) Thematic typologies of urban nature
- 4) Meaning spheres of urban nature

Elements and rationale for the elaboration of a typology of 'urban nature'.

The urban nature typology we want to work on has the following goals

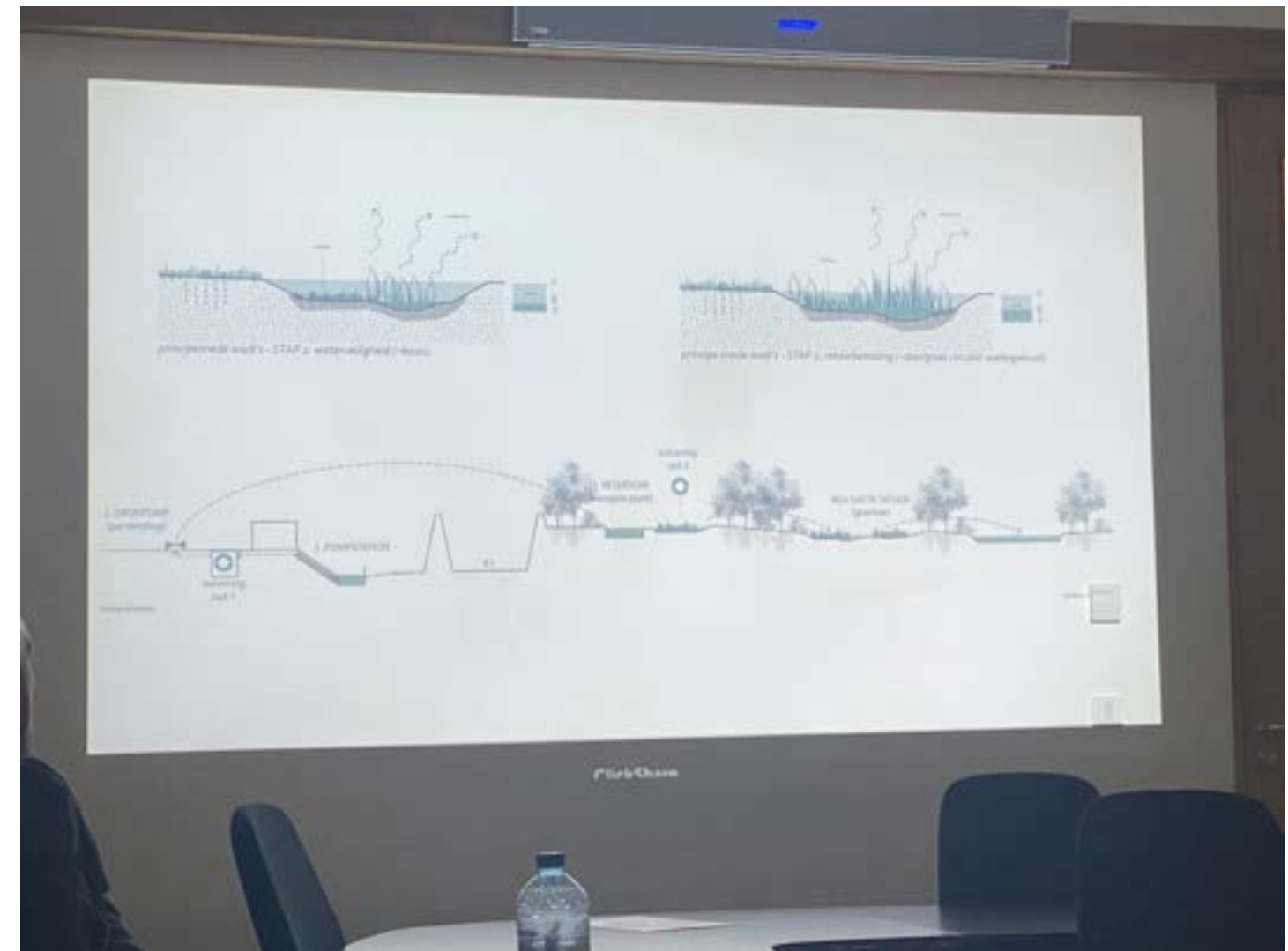
- 1) Create a classification tool that can be used to classify forms of urban nature so that they can be recognised as shared types, thus enabling a dialogue about them;
- 2) to have a conceptual framework on urban nature available to which qualities, social expectations and goals can be linked; in other words, which makes a normative approach to urban nature possible;
- 3) To create a framework that allows forms of urban nature to be analysed and described in a systematic and comprehensive way in order to clarify the conditions for their development and functioning in a dynamic urban context.

All these goals are addressed in a **Nature Tissue Plan** for urban nature.

The first two applications are inventories and mappings, formulation of ambitions and goals. The third is to know the important ecological conditions for drawing up integrated management plans and nature-inclusive urban development plans and projects, etc.

A **typology** is always a human construct. This implies that the result is (partly) dependent on the person who draws up the typology or is actively involved in it and the purpose of the typology. The vision and objective of a natural tissue plan imply an effective direct or indirect embedding in the social urban fabric and therefore a definition of the typology which corresponds to and is open to the (local) stakeholders. This means that a classification, a type, must always be (able to be) interpreted contextually. Social embedding and context relatedness do not mean that one cannot start from a generic typology of urban nature. There must be openings to different 'dimensions' (instrumental meanings, cultural-ethical-aesthetic meanings, etc.) which make recognition and involvement possible.

There are various possibilities for **making a typology of urban nature**. In the first place, we would like to integrate the urban context in the typology. This can be done in a direct and indirect way.



CTLF vision-mission iteration

When: 23.09.2021

Partners: INBO, ANB, KU Leuven, Supersudaca

Lead by: Sander Jacobs

As INBO is 'jumping in', and upon discussions/decision at the last meeting, we (INBO) will set up a short, informal 'motivation/mission/vision' morning to get into the groove, understand better each others positions and 'restate our assumptions' as a group.

We'll be in touch on preparations needed (if any)

It would be best if all can be there in person to get all personal voices - this is quite a diverse cocktail we have!



LAB #1

When: 02.07.2021

Theme: Principles of Urban Nature Flanders

Partners:

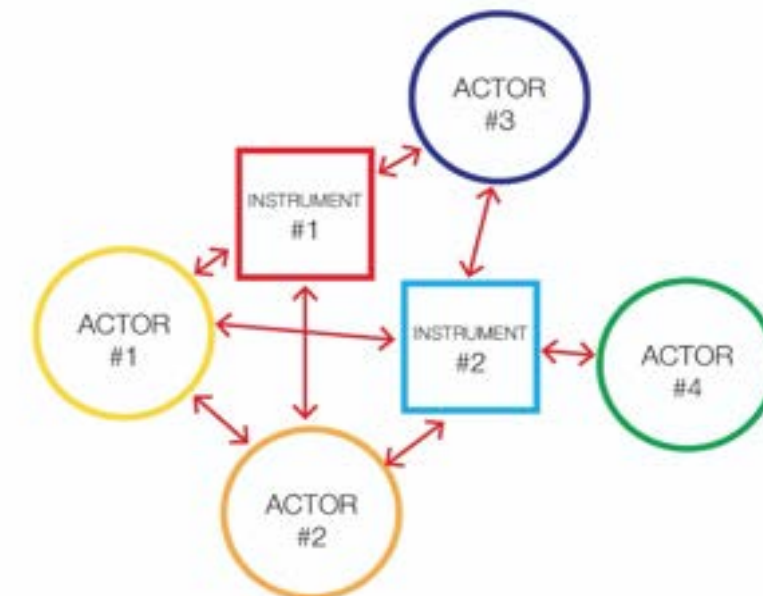
Lead by: Kernteam CvTLF

You may have heard in the press that ANB is setting up a knowledge network on urban nature with partners, with several workrooms in Flanders over the next two years and the realisation of a nature house in Brialmont in 2023 as one of the anchor points of this network. The innovation project on urban nature that has been launched in 2019 builds a basis for the operation of the knowledge network with 'Cities and Villages Thinking like a Forest' as a research metaphor.

The Nature and Forest Agency (ANB) acts within the Flemish government as director of urban nature with the objective of proactive development and co-creative management of urban nature. Together with its partners, ANB wants to develop a working and training framework for 'directors of urban nature'. It wants to develop well-founded methodologies and frameworks and apply them in innovative pilot projects in order to arrive at a well thought-out, supported, pragmatic, dynamic and clear working framework. In addition to the Ringpark Groene Vesten, Gebermte is one of these pilot projects.

Based on the principles of this working framework, a new policy instrument, the Nature Tissue Plan, will also be developed. ANB will take the lead in this for a starting period of at least 5 years, but will cooperate with the Department of Environment, the Province of Antwerp and KU Leuven, INBO, BWMSTR and other relevant partners. The aim is to develop an extensive ecosystem of partners that together can create impact and ambience around urban nature development and management.

3. Instrumenten



LAB #2

When: 15.04.2022

Where: De Blauwe zaal - Mark Liebrecht Schouwburg - Mortsel

Theme: Principles of urban nature with Menno Schilthuizen

Coordination: CTLF team Sofia Saavedra Bruno, Gert de Keyser, Pieter Van den Broeck

Lead by: Sofia Saavedra Bruno, Pieter Van der Broeck, Felix Madrazo

We would like to encourage you to participate in a second LAB in order to use your knowledge to develop principles of urban nature. Within the framework of the Cities Thinking Like A Forest project, a workable framework for urban nature is being developed in which co-creation from various perspectives is an added value. We want to test this out at a concrete location, namely the roadsides of Mortsel to Wilrijk, which is why input from all invitees is very valuable. There will be an interactive part where participants will get to work themselves and will be immersed in the world of roadsides with the participation of Menno Schilthuizen, author of the book DARWIN IN THE CITY.

Agenda:

14:30 tot 14:45 Inloop en koffie

14:45 tot 15:00 Verwelkoming door ANB; Gert De Keyser (ANB) en stavaza Cities Thinking Like a Forest (CTLF)

15:00 tot 15:30 Ontwerp CTLF aanpak, socio-ecologische benadering en achtergronden, uitgangspunten en visie als kadering opdracht van de dag, intro tot de bermen en Natuur Weefsel Plan; Pieter van den Broeck (KU Leuven) en Felix Madrazo (Supersudaca)

15:30 tot 16:00 Voordracht Menno Schilthuizen

16:00 tot 16:15 Pauze, installeren voor werksessie

16:15 tot 17:15 Werksessie in twee rondes, volgens 5 principes (consequenties voor de bermen?) en volgens beleidsconsequenties olv van Felix Madrazo (Supersudaca) en Pieter Van den Broeck

17:15 tot 17:30 Hoe verder? Sofia Saavedra Bruno (KU Leuven) en Gert De Keyser (ANB)

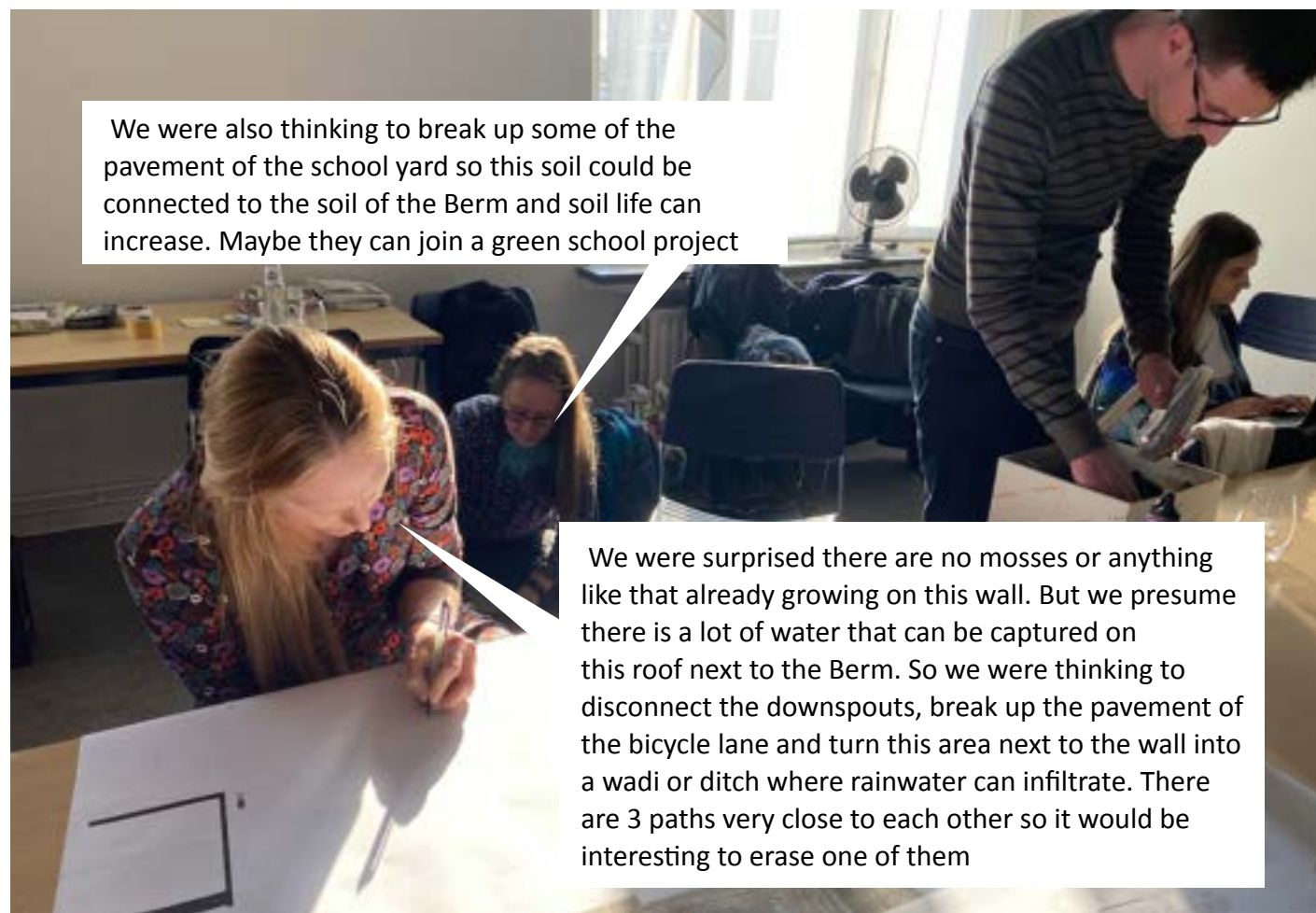




We thought we would take down the fences next to the school (GTI) and support the dynamics that have made the Berm in what it is now and facilitate them in a way so they can be integrated in the school in a spontaneous and ad hoc way without having a preformatted plan.

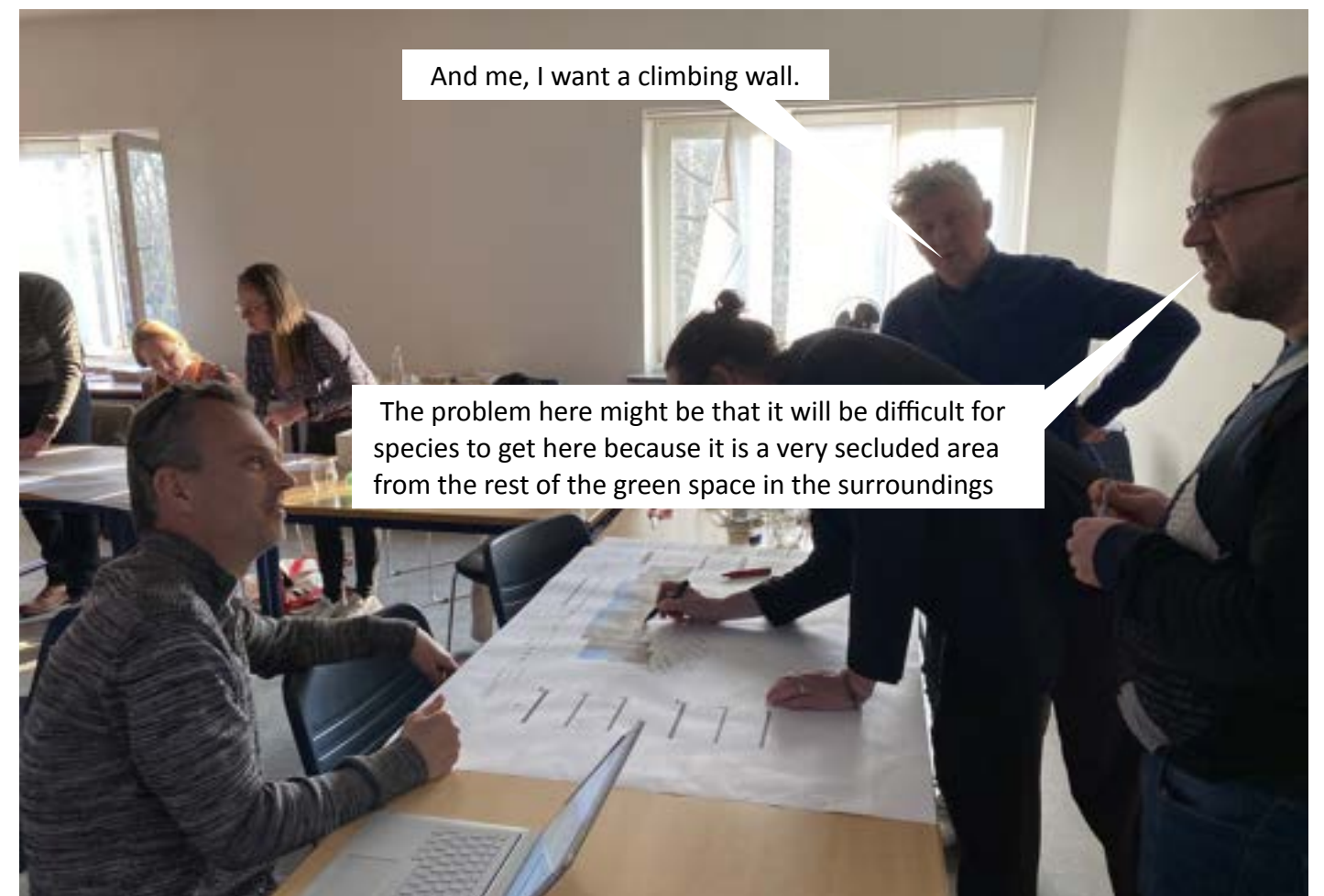


Often, we don't really look into whether exotic species have local predators. We just assume they don't have them, because we don't look at the insects living on them. For example the *Prunus serotina*, was always seen as dangerous, whereas now we know that there are insects that adapted and even insects that before only ate local species now specialised into eating this exotic *Prunus serotina*



We were also thinking to break up some of the pavement of the school yard so this soil could be connected to the soil of the Berm and soil life can increase. Maybe they can join a green school project

We were surprised there are no mosses or anything like that already growing on this wall. But we presume there is a lot of water that can be captured on this roof next to the Berm. So we were thinking to disconnect the downspouts, break up the pavement of the bicycle lane and turn this area next to the wall into a wadi or ditch where rainwater can infiltrate. There are 3 paths very close to each other so it would be interesting to erase one of them



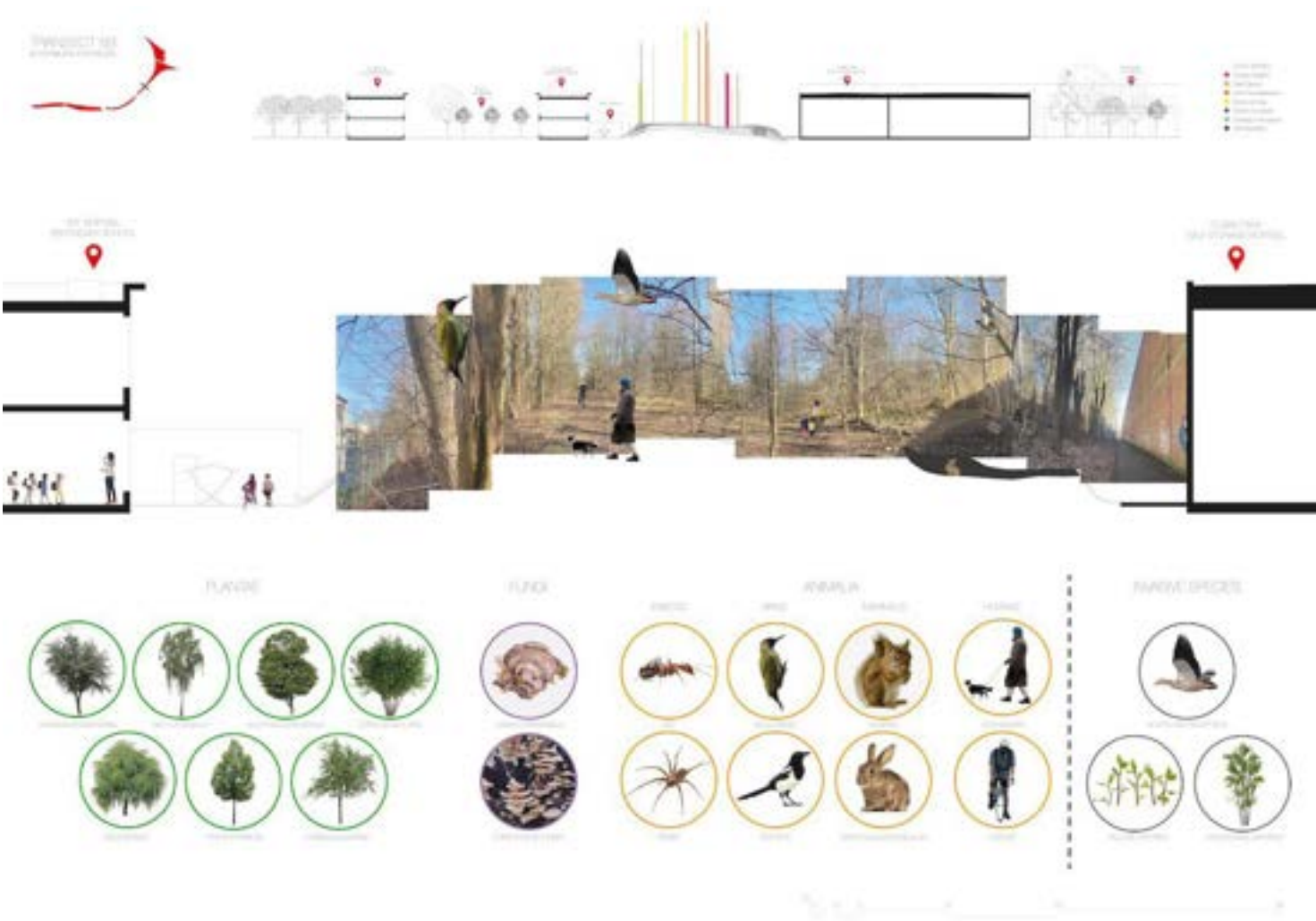
And me, I want a climbing wall.

The problem here might be that it will be difficult for species to get here because it is a very secluded area from the rest of the green space in the surroundings

LAB #3

When: 15.04.2022
Theme: Bottom linked governance
Coordination: CTLF team Sofia Saavedra Bruno, Gert de Keyser, Pieter Van den Broeck
Lead by: Sofia Saavedra Bruno, Laurine de Rop, Felix Madrazo

Dear member of the core team and/or steering committee CTLF and interested parties, Within the framework of the innovation trajectory Cities Thinking Like a Forest (CTLF) we would like to invite you to a third LAB to use your knowledge and be inspired by the case of the roadsides in Mortsels and Wilrijk and the process of roadside management from 2017 until now to come to new insights on community building and bottom linked governance. CTLF assumes that urban nature is not developed, realised, managed, etc., top-down, but in cooperation with various actors, in particular local actors. Urban nature therefore requires the building of a community that connects these actors. It is important to start from local needs (healthy soil, clean air, living nature, biodiversity, meeting places, etc.) and dynamics (local associations working for urban nature, local activism drawing attention to threats, etc.). Community, however, does not only refer to people, but of course also to flora and fauna. Plants and animals also form communities, and especially in cities, but actually everywhere on the planet, they are actually human-nonhuman communities. This follows from the socio-ecological approach used by CTLF. Using the case of the Verge, in this lab with a focus on process, we will illustrate how community can be built and how bottom-linked governance can play a role in this. Social innovation as used in urban studies to address community building from the bottom up and its scaling up, emphasises the importance of bottom-linked governance. It is about democratising state and market governance through transformative governance practices of socially innovative initiatives, organisations and networks (Moulaert, Garcia, Prades, ...). This calls for initiatives that aim to satisfy different types of human needs, develop innovative forms of self-governance, and bring about socio-political change.



CONVERSATIONS



CONVERSATION #1

Who: Bart Pluym (Gebermt)

When: 15.10.2021

Theme: The aims of Gebermt

Coordination: Felix Madrazo , Laurine de Rop, Hannah Van der Broeck



CONVERSATION #2

Who: Wim Jacobs

When: 15.10.2021

Where: Rotterdam

Theme: Transects feedback

Coordination: Felix Madrazo, Hannah van der Broeck, Pilar del Amo



CONVERSATION #3

When: 15.10.2021

Who: Frederik van de Perre

Where: Klein Zwitserland

Theme: Natuur Punt and management challenges

Coordination: Felix Madrazo, Hannah van den Broeck, Pilar del Amo



CONVERSATION #4

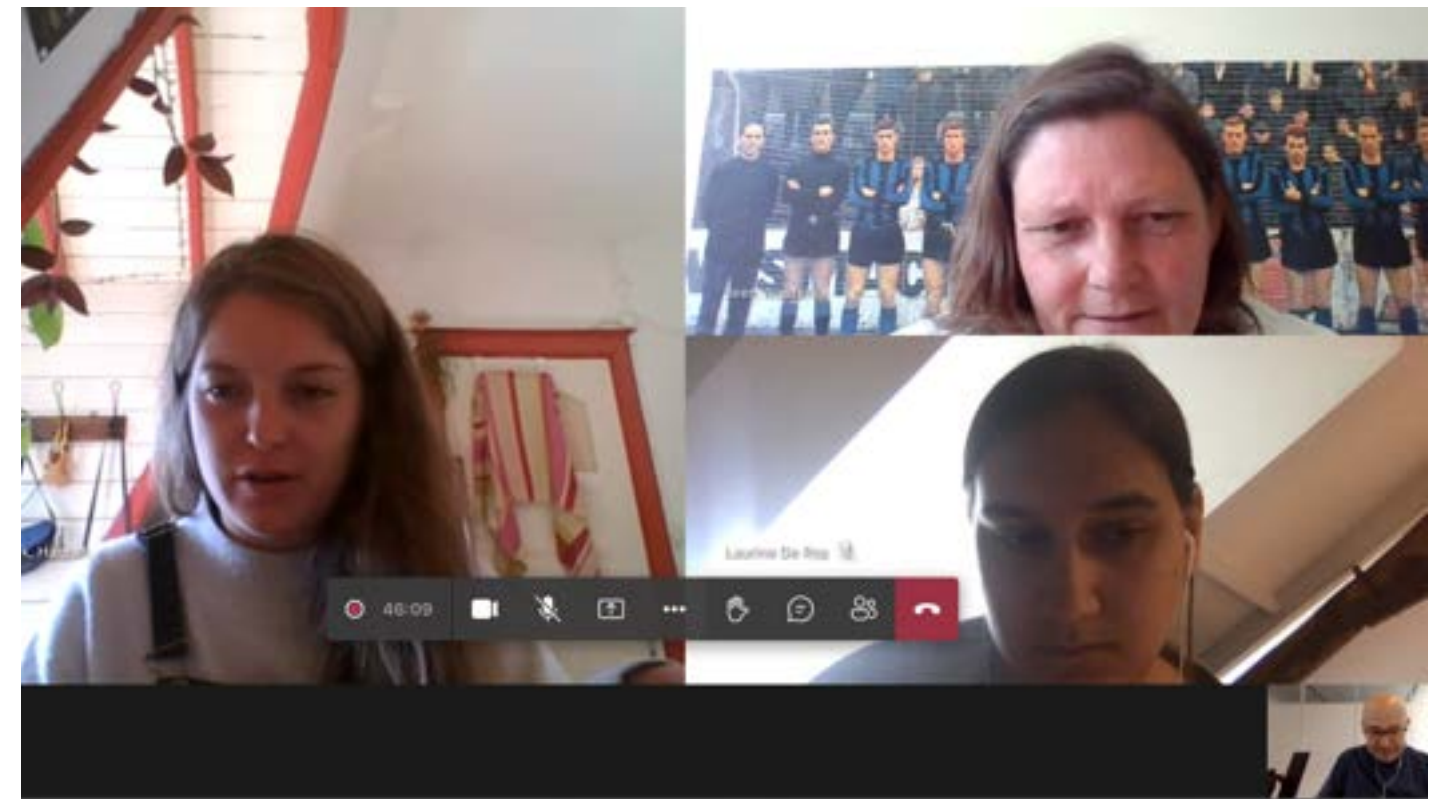
When: 06.05.2022

Who: Leen Wouters, nature management Mortsel

Where: Online

Theme: Mortsel management challenges

Coordination: Laurine de Rop, Hannah van den Broeck, Felix Madrazo



CONVERSATION #5

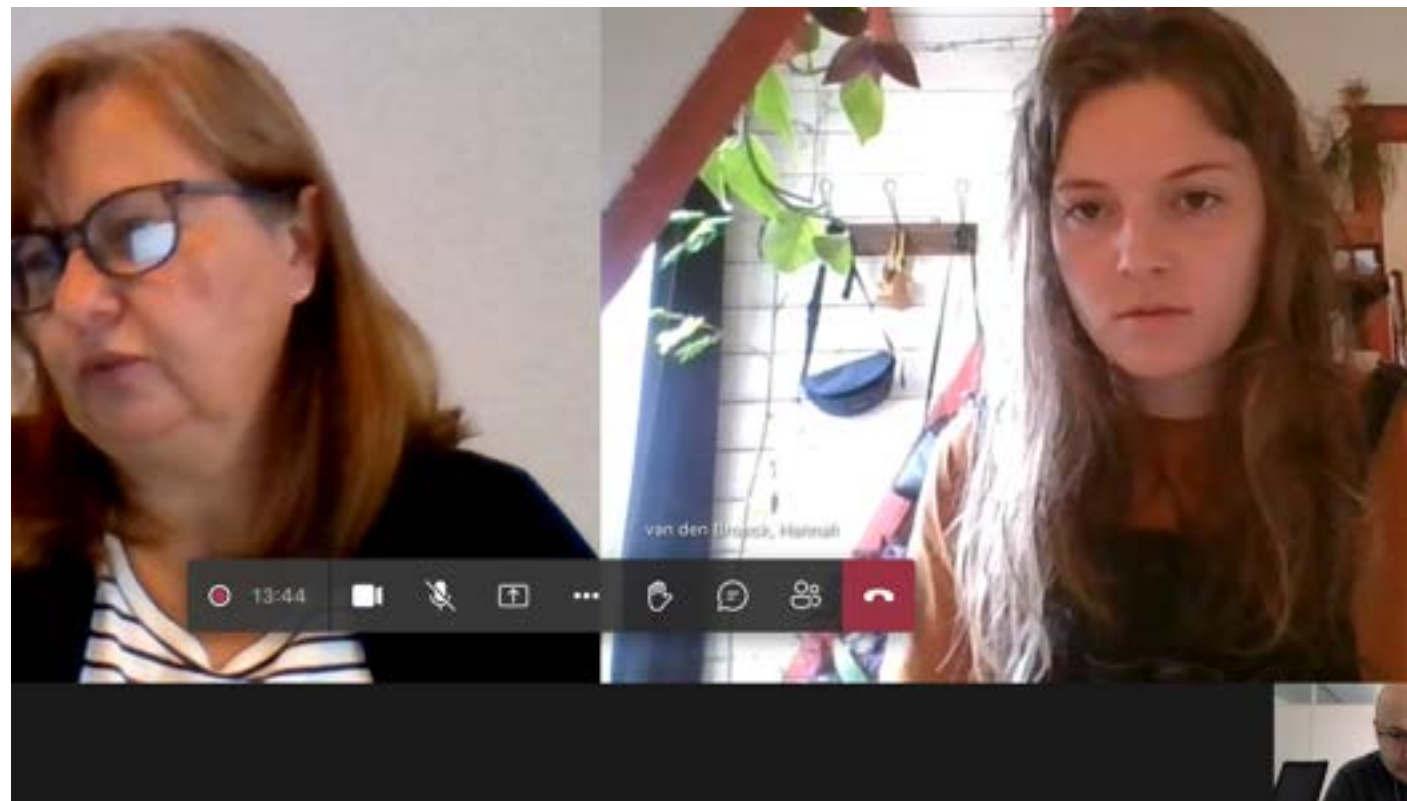
When: 06.05.2022

Who: Inge Lathouwers

Where: Online

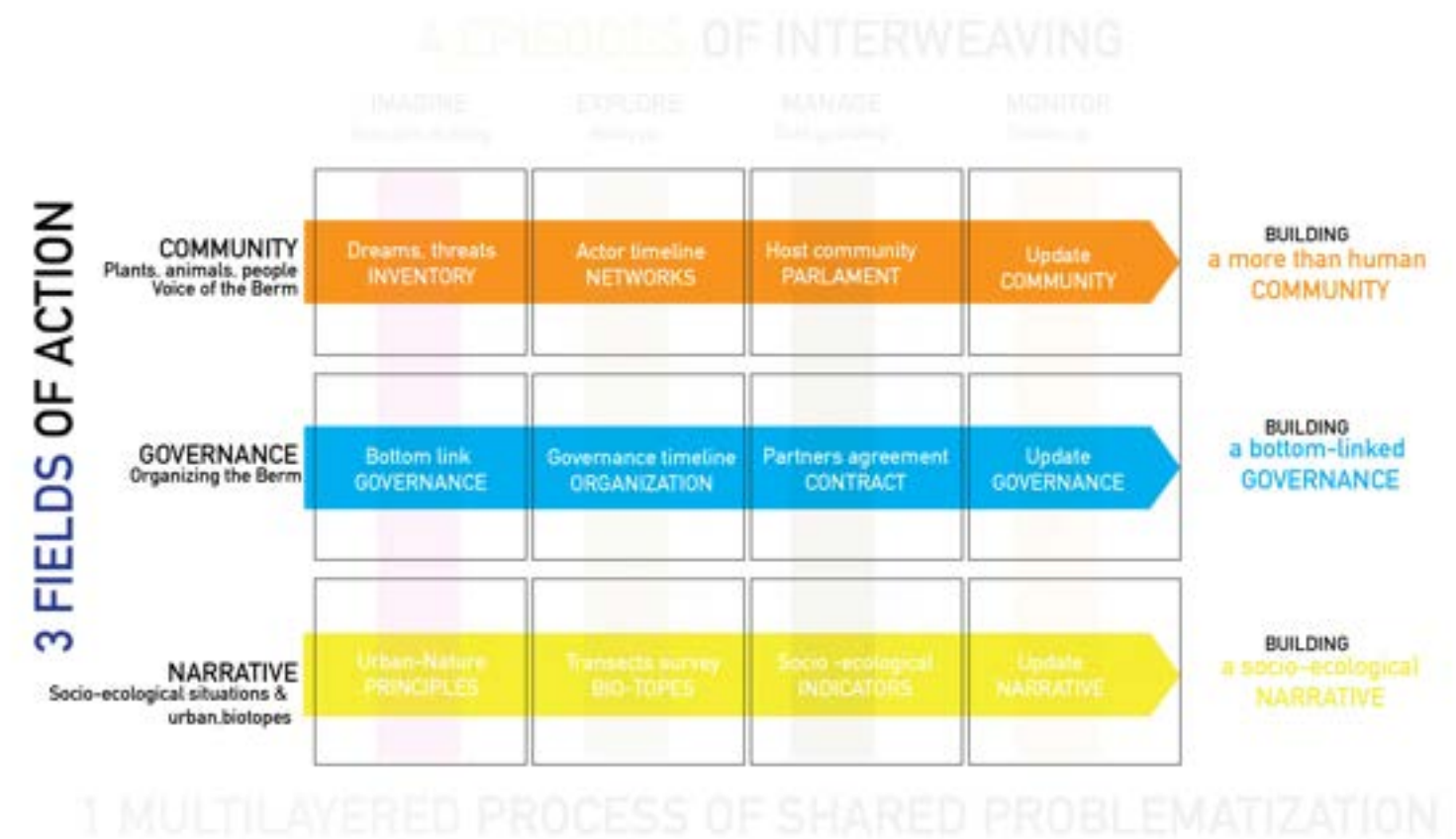
Theme: Wilrijk management challenges

Coordination: Hannah van den Broeck, Felix Madrazo



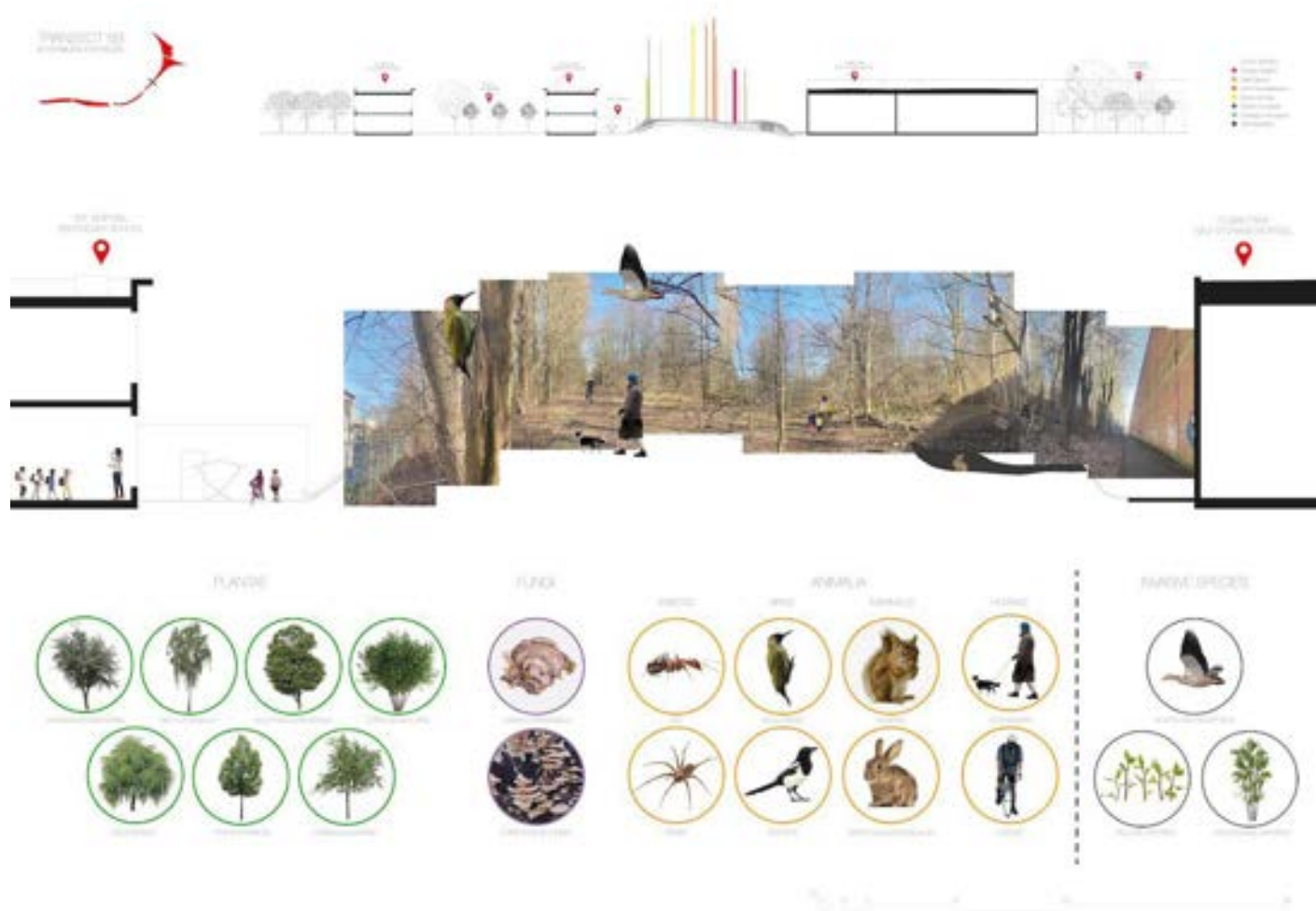
3

FIELDS OF ACTION



Field of Action 1

Building a more than a human community



Building community : Urban nature is not developed, realised, managed in a top-down way, but in collaboration with various actors, especially local actors.

Urban nature therefore requires the building of a community that connects these actors. It is important to start from local needs (healthy soil, clean air, living nature, biodiversity, meeting places, etc.) and dynamics (local associations working for urban nature, local activism drawing attention to threats, etc.).

Community, however, does not only refer to people, but of course also to flora and fauna. Plants and animals also form communities, and especially in cities, but actually everywhere on the planet, it is about human-not-human communities. The NWP Berm gives examples of ways in which community can be built

The interaction moments (scharnierpunten) are representing intermediate turning points or co-produced achievements. We put attention to how actors justify their actions in a series of interaction moments from which objects of consensus emerge.

Field of Action 2

Building up a bottom linked governance



Relationships actors are supported by structural interventions that take into account the needs and changing social relationships. We work on community through governance. We work on governance also by building community.

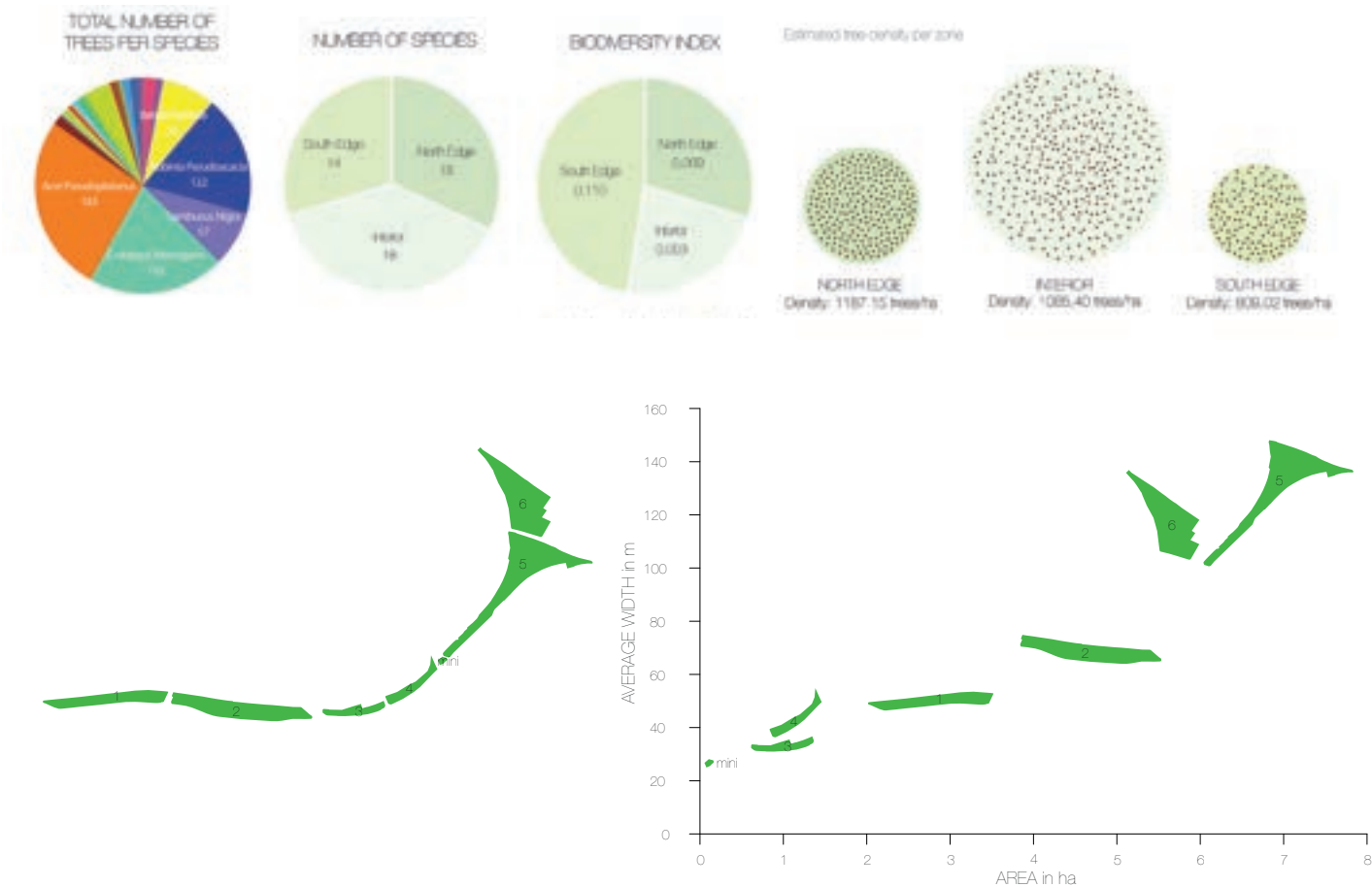
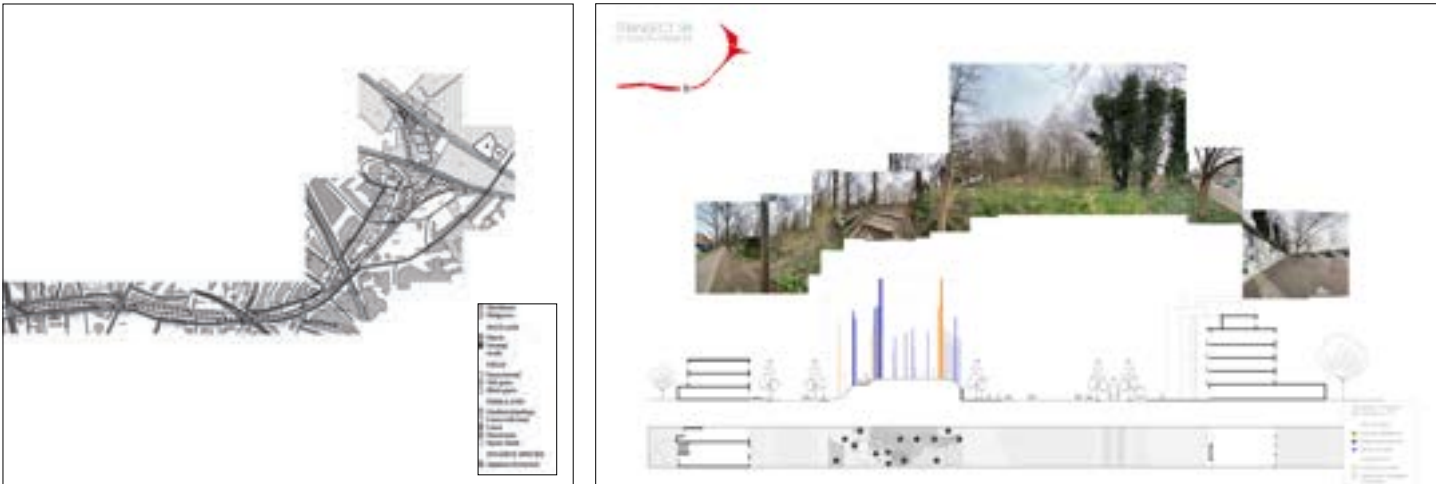
From building host communities (to bottom –linked governance) and shifting ownership together with other dynamics can turn a former railway embankment into “geborgen” urban nature. It illustrates how a wide array of sometimes more inclusive ownerships regimes between public and private can be defined by mixed legal arrangements and institutional diversity and how the socio-political system and a subregional governance system evolved to facilitate hybrid governance relationships.

Empirical research already indicates that multi-level governance dynamics with a successful outcome cannot be characterised as predominantly ‘top-down’ or ‘bottom-up’, but rather across scales and over time and is shaped by hybrid, dynamic forms of cooperation, as well as conflict.

BOTTOM-LINKED GOVERNANCE stands for “New forms of democratic governance that are co-created between SI initiatives and activists, their scalar dynamic networks and government institutions and agencies. This concept focuses on the fact that new socially innovative initiatives are enormously needed but also that their governance, as well as the relevant re-democratisation of state institutions, should be developed interactively.

Field of Action 3

Building a socio-ecological narrative



Natural and social processes are part of the same socioecological dynamics : humans and cities = nature, nature = socially constructed/ mediated, human and non-human actants with their own strategic actions, human and non-human processes and mechanisms (i.e. institutions)

Which biophysical processes are mobilised by whom? What socio-ecological configurations embody and express diverse and often conflicting-practices and visions regarding nature-culture relations?

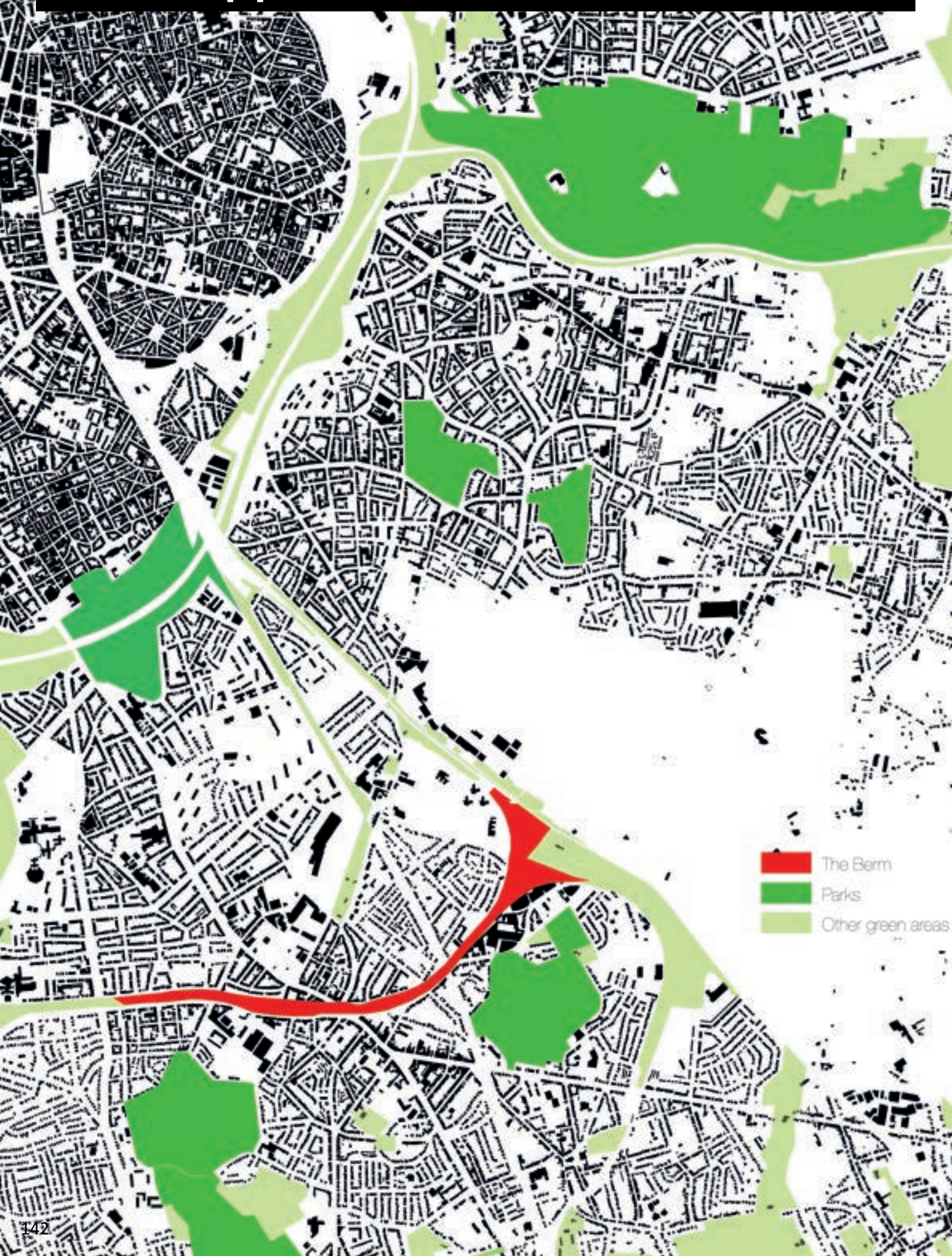
To allow plants, animals and actors to reveal their reasonings, valorisations and emotions during the construction of urban nature, artistic interventions can facilitate the construction of alternative conceptions and ideas to solve important problems and open the space for new values and symbolisations. But to go beyond the hit-and-run tactics of artists or designers, (unsolicited) direct actions must be part of a long-term participatory process.

(Unsolicited) performative (direct) action can ‘influence larger systems’ (Supersudaca 2007, Hamers et al. 2017) and specific socio-institutional settings ‘can provoke (social) change / socially innovative solution’ (Moulaert 2013) . Pedagogical experiments and artistic interventions as part of participatory processes can be instrumental in strengthening social groups, helping to overcome conflicts and promote cooperation.

The Berm

taking a multiscalar perspective

A first approach to the Berm



With an area covering 22.4 ha and a length of 3247m the Berm is one of the key green corridors of the district of Wilrijk and Mortsels. But also it is a key component of the green structure of Antwerp metropolitan region.

The Berm is located in two municipalities, most of its area is in the municipality of Mortsels with a coverage of 19.5 ha. A minor but important part of the Berm is in the district of Wilrijk, that belongs to the City of Antwerp covering an area of 2.8 ha. This means that the Berm offers its citizens of both areas a surface of 3,58m² of public green per person.

Population Mortsels: 24,227

Density: 3138 inhabitants / km² *

Population Wilrijk: 38.220

Density: 2808 inhabitants / Km²

The Berm and its surroundings have seen an evolution from a grassland, to agriculture and castles, to military complex with a rail embankment to a vibrant industrial area of the city with a current phase of intense urbanization and densification of the area. The old passenger train line stop being operational in 1959. The line was dismantled in 1968.**

* This is the highest population density of any municipality in the Flemish Region (Flanders), and second-highest (to Saint-Nicolas) outside the Brussels-Capital Region.

** <http://www.garesbelges.be/luithagen.htm#CARTE>

The Berm through time



Ferraris (1777,VL)



Ngi base map (1873)



Ngi base map (1939)



1942



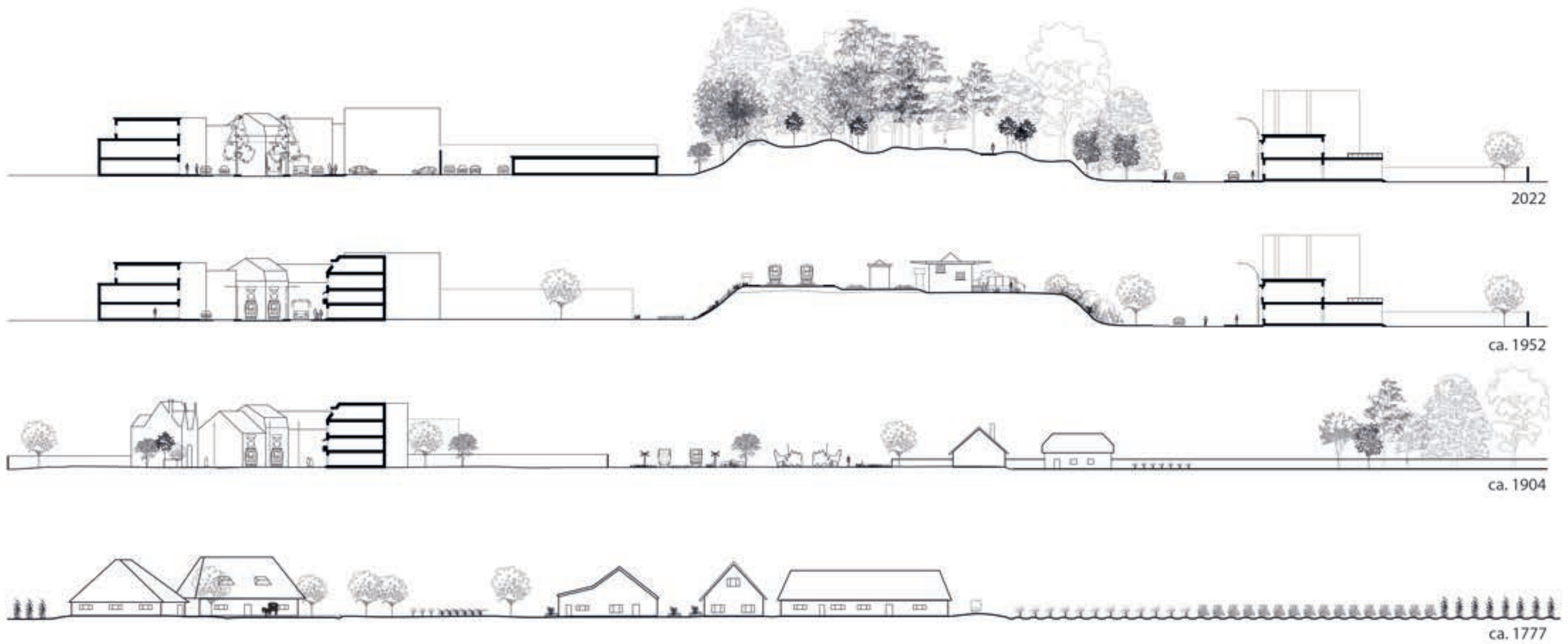
1995



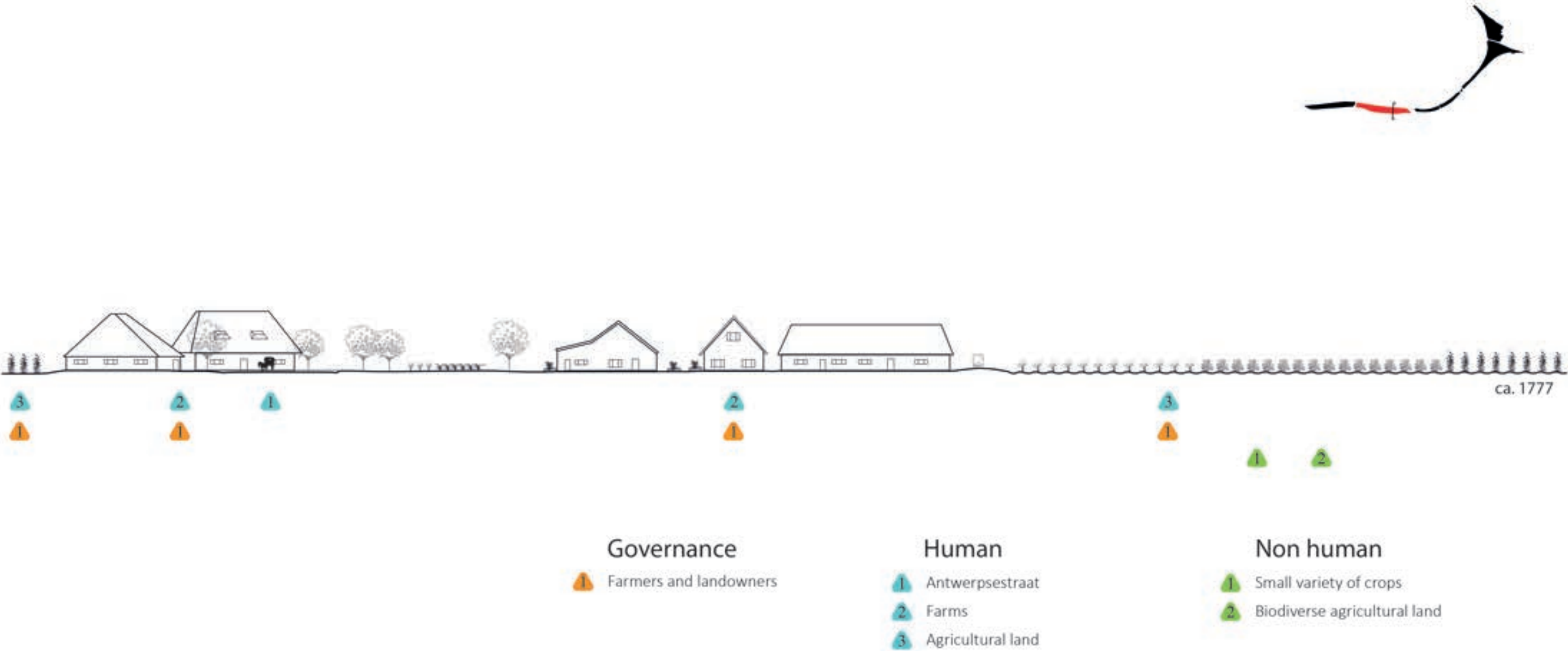
2022



Transects along the Berm in time



Transects along time @1777



Transects along time @1904



- Governance**
- 1 Farmers and landowners
 - 2 Military
 - 3 Private homeowners

- Human**
- 1 Antwerpsestraat
 - 2 Farms
 - 3 Agricultural land
 - 4 Antwerpsestraat tram
 - 5 Krygs baan
 - 6 Krygs spoorweg
 - 7 De Luythaagsche booschen
 - 8 Housing

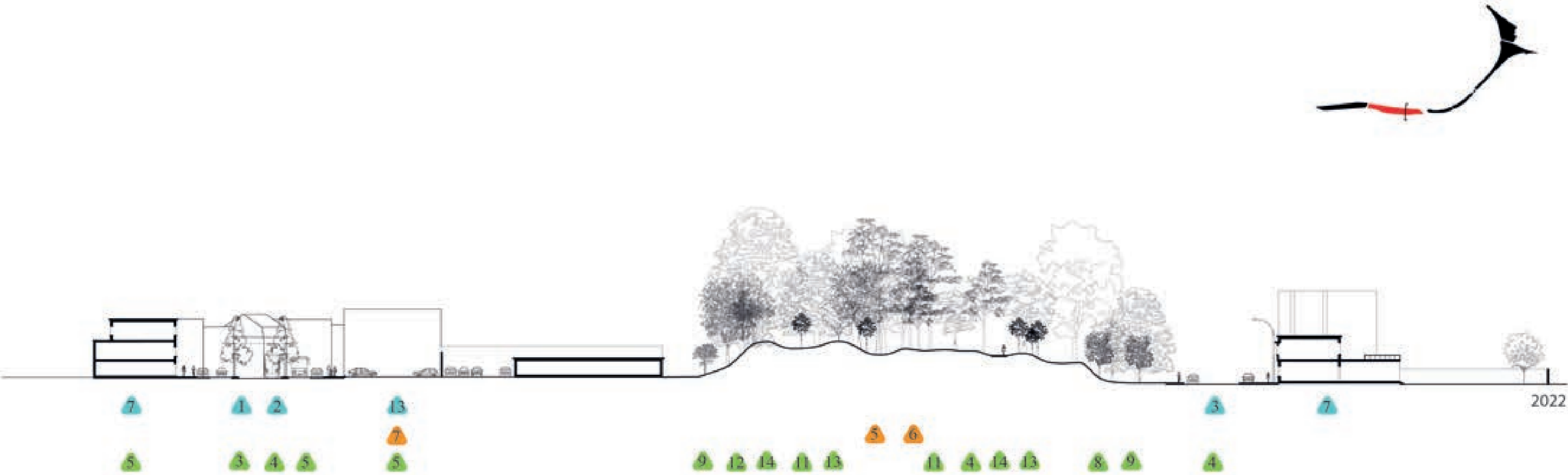
- Non human**
- 1 Small variety of crops
 - 2 Biodiverse agricultural land
 - 3 Biodiversity decline
 - 4 Soil compaction
 - 5 Impermeable pavement

Transects along time @1952



Governance	Human	Non human
<div><div></div>1 Farmers and landowners</div>	<div><div></div>1 Antwerpsestraat</div>	<div><div></div>1 Small variety of crops</div>
<div><div></div>2 Military</div>	<div><div></div>2 Farms</div>	<div><div></div>2 Biodiverse agricultural land</div>
<div><div></div>3 Private homeowners</div>	<div><div></div>3 Agricultural land</div>	<div><div></div>3 Biodiversity decline</div>
<div><div></div>4 NMBS</div>	<div><div></div>4 Antwerpse tram</div>	<div><div></div>4 Soil compaction</div>
	<div><div></div>5 Krygs baan</div>	<div><div></div>5 Impermeable pavement</div>
	<div><div></div>6 Krygs spoorweg</div>	<div><div></div>6 Drainage to the verges</div>
	<div><div></div>7 De Luythaagsche booschen</div>	<div><div></div>7 Limited plantspecies due to herbicides</div>
	<div><div></div>8 Housing</div>	<div><div></div>8 Exotic species (cargo trains, people, etc.)</div>
	<div><div></div>9 Vredebaan</div>	<div><div></div>9 Pioneer species</div>
	<div><div></div>10 Spoorweg 27A</div>	<div><div></div>10 Soil pollution with metals</div>
	<div><div></div>11 Station Luithagen</div>	
	<div><div></div>12 Luithagen spoorwegbrug</div>	

Transects along time @2022



Governance

- Farmers and landowners
- Military
- Private homeowners
- NMBS
- + Mortsel Municipality
- + Gebermte
- + Private company
- + AWV

Human

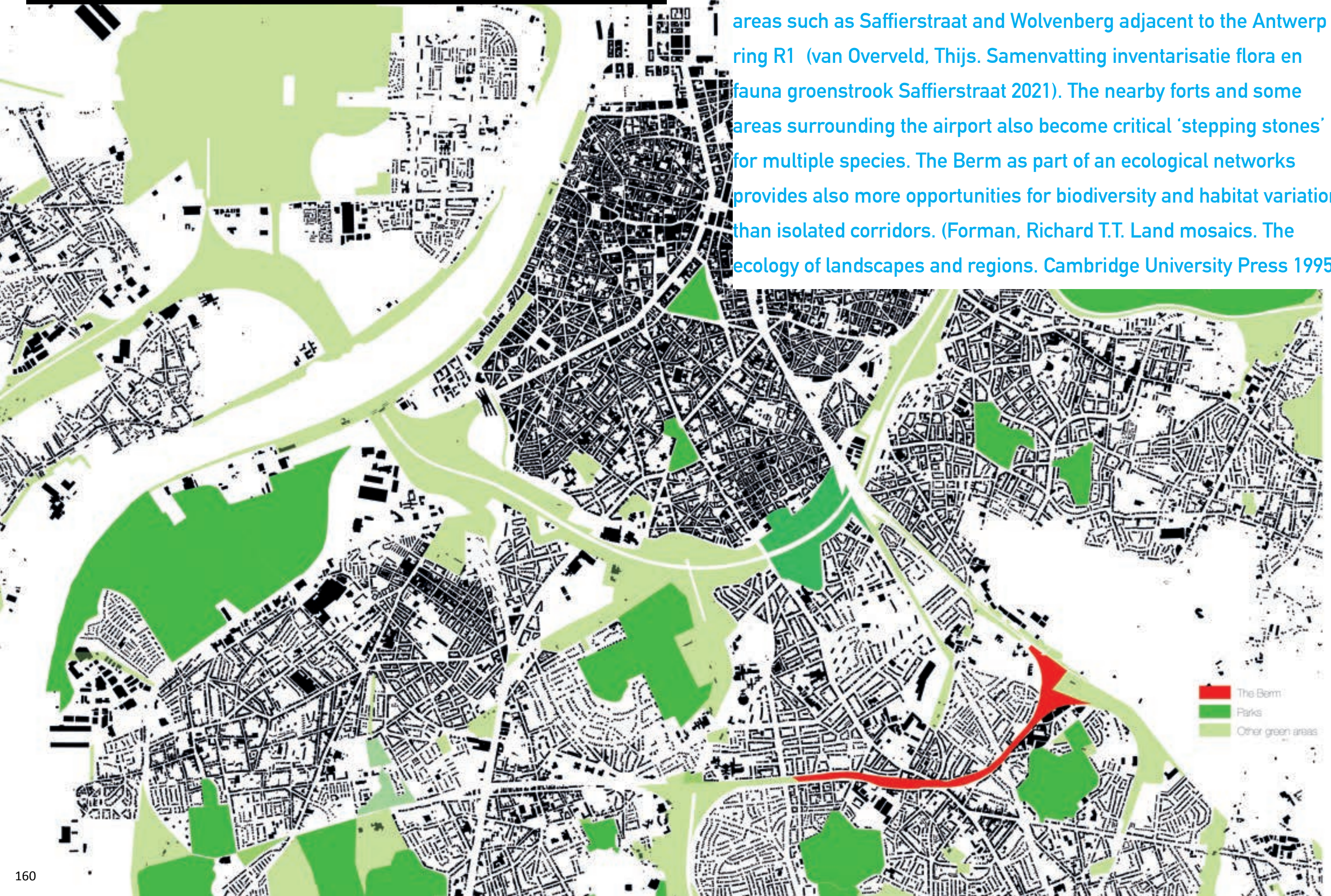
- Antwerpsestraat
- Farms
- Agricultural land
- Antwerpse tram
- Krygs baan
- Krygs spoorweg
- De Luythaagsche booschen
- Housing
- Vredebaan
- Spoorweg 27A
- Station Luithagen
- Luithagen spoorwegbrug
- + Private parking Mortsel

Non human

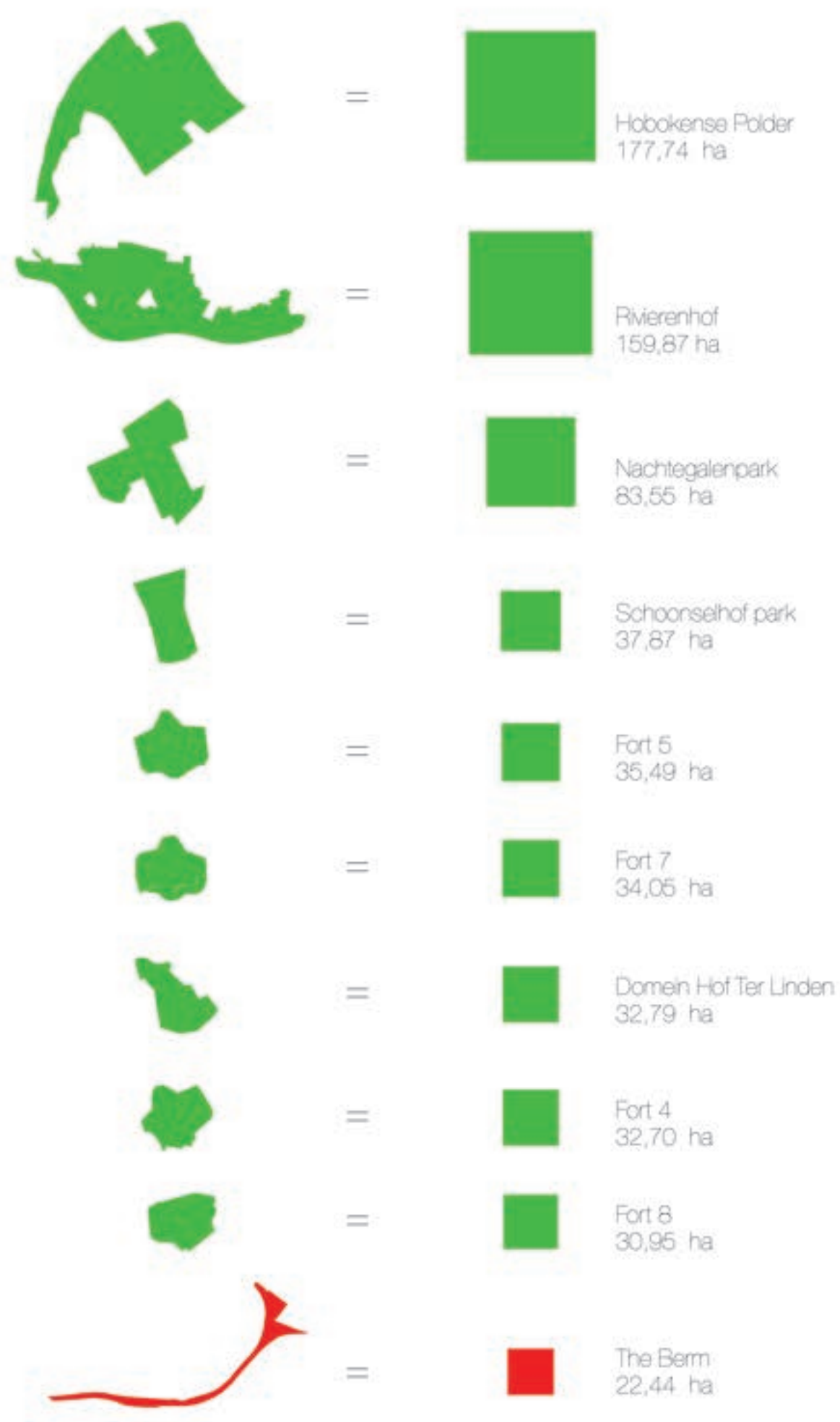
- Small variety of crops
- Biodiverse agricultural land
- Biodiversity decline
- Soil compaction
- Impermeable pavement
- Drainage to the verges
- Limited plantspecies due to herbicides
- Exotic species (cargo trains, people, etc.)
- Pioneer species
- Soil pollution with metals
- + Forest edge development
- + Standing dead wood
- + Soil development
- + Mycorrhizal networks

An essential link of green structure

Although the Berm is mainly considered as an ecological corridor, it is actually part of an ecological network connecting species in nearby areas such as Saffierstraat and Wolvenberg adjacent to the Antwerp ring R1 (van Overveld, Thijs. Samenvatting inventarisatie flora en fauna groenstrook Saffierstraat 2021). The nearby forts and some areas surrounding the airport also become critical 'stepping stones' for multiple species. The Berm as part of an ecological networks provides also more opportunities for biodiversity and habitat variation than isolated corridors. (Forman, Richard T.T. Land mosaics. The ecology of landscapes and regions. Cambridge University Press 1995).

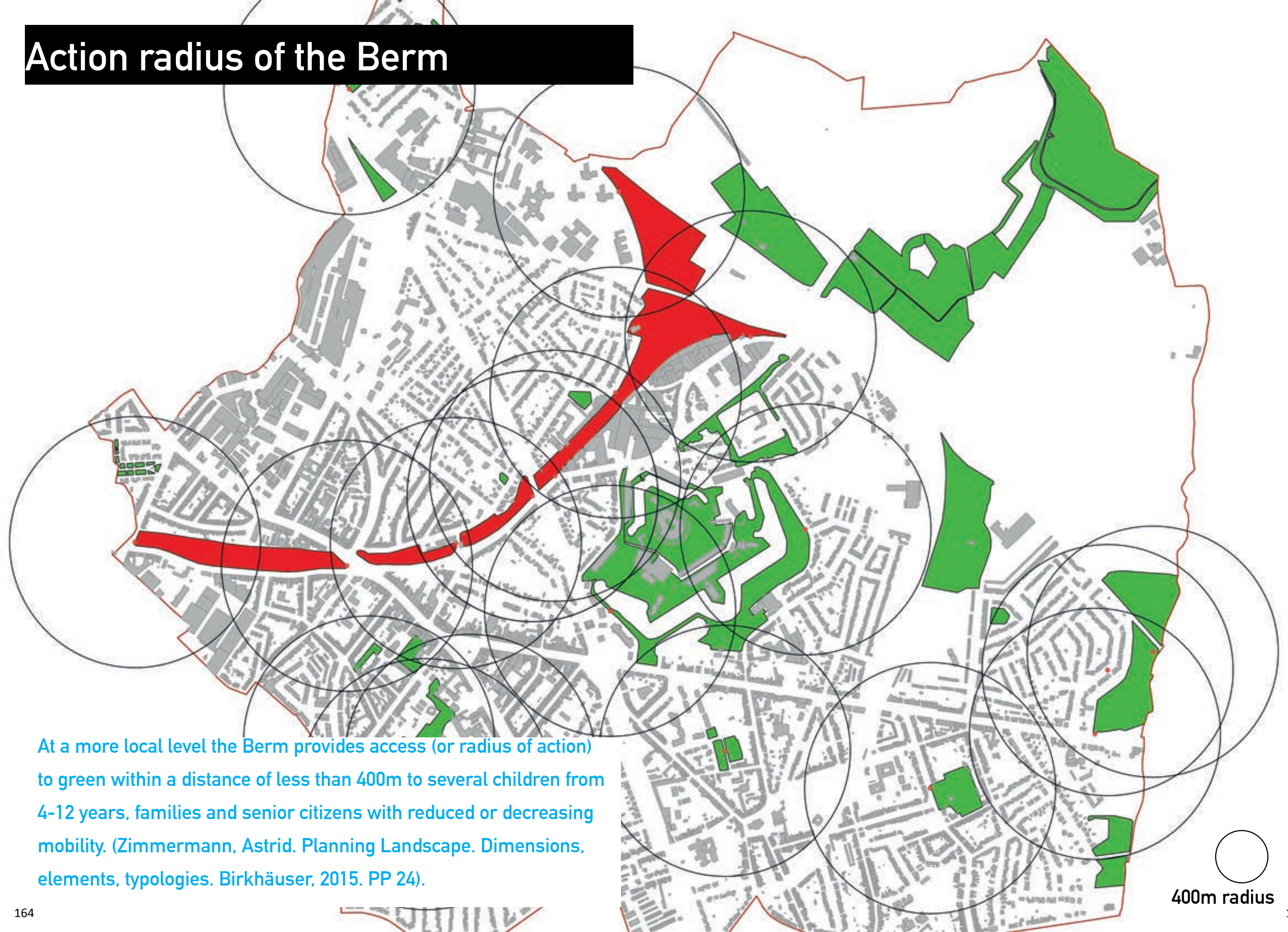


The scale of the Berm



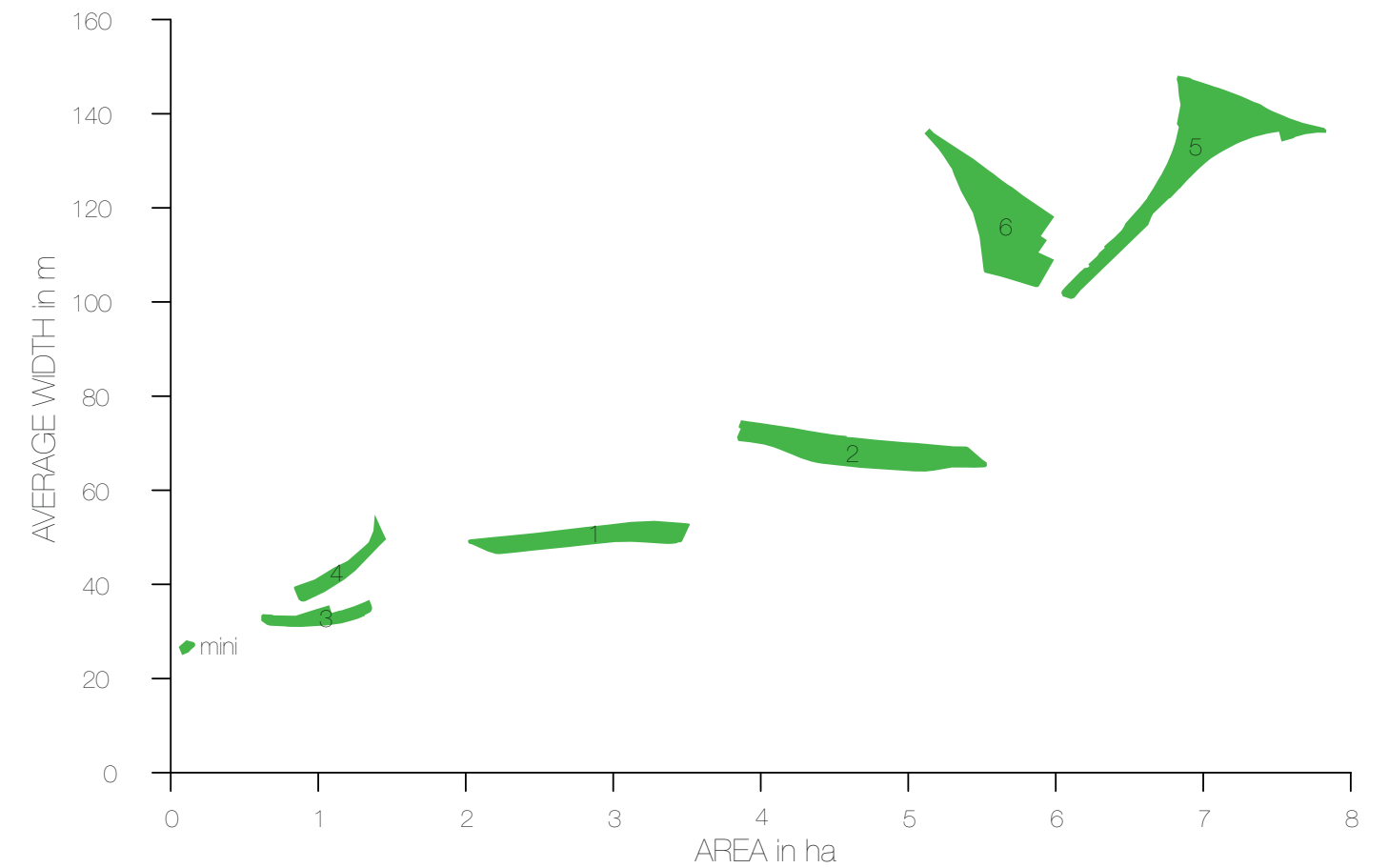
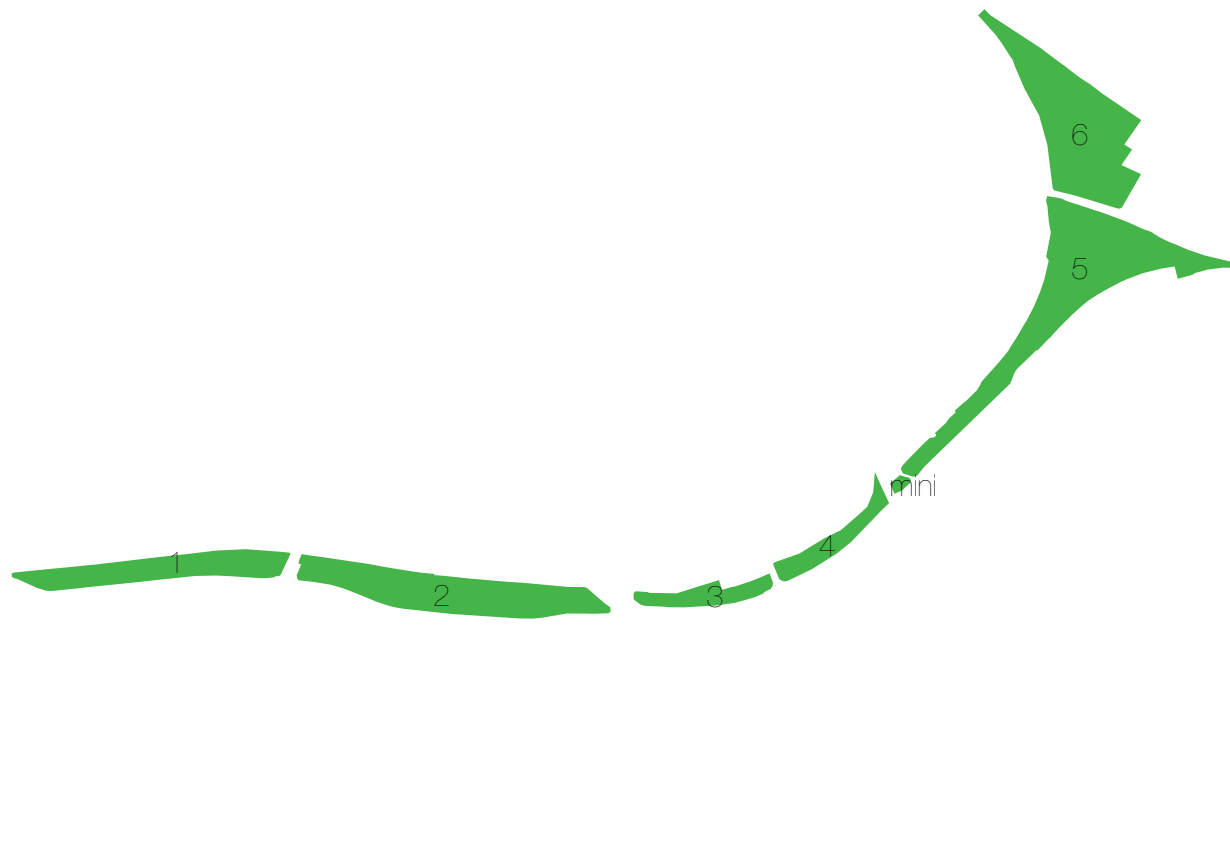
The Berm seen from afar plays a critical role in several aspects that improve the living habitat of human and non-human species in the Antwerp metropolitan region. Being in the top 10 places in tree canopy, the Berm plays a crucial role in contributing to carbon sequestration but also reducing the heat island effect.

Action radius of the Berm



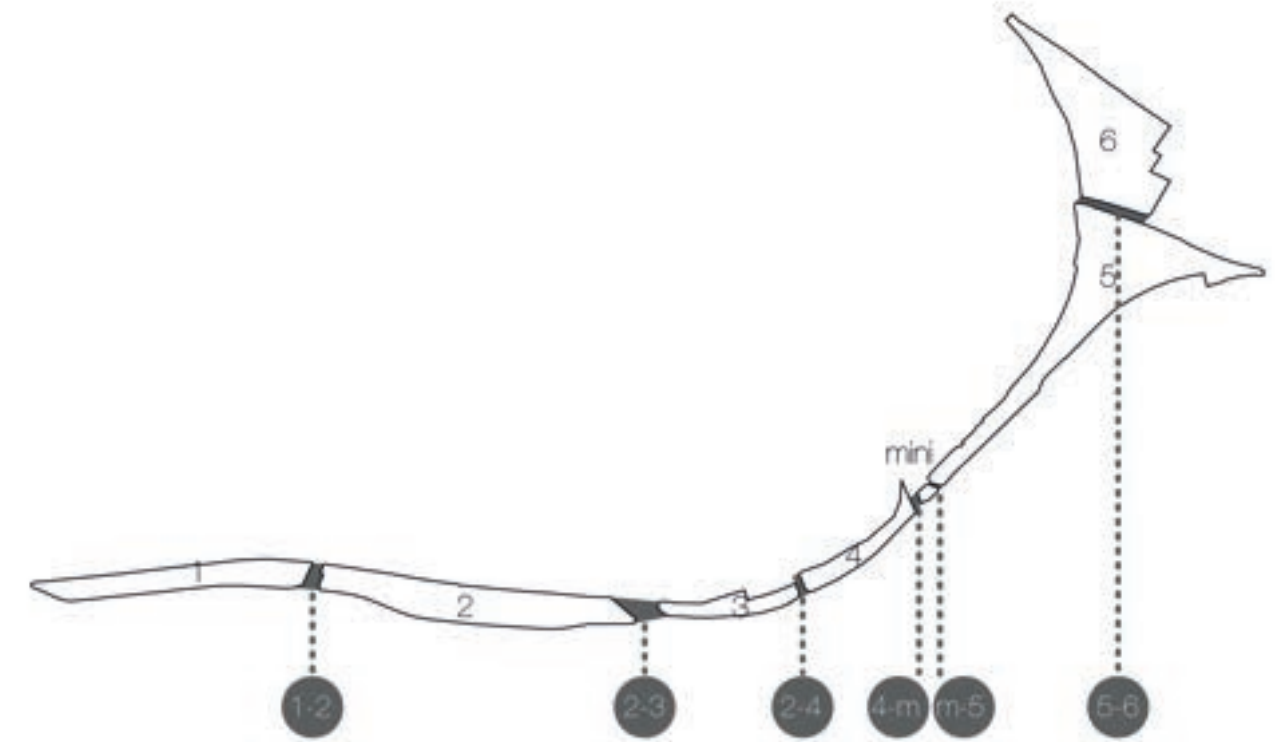
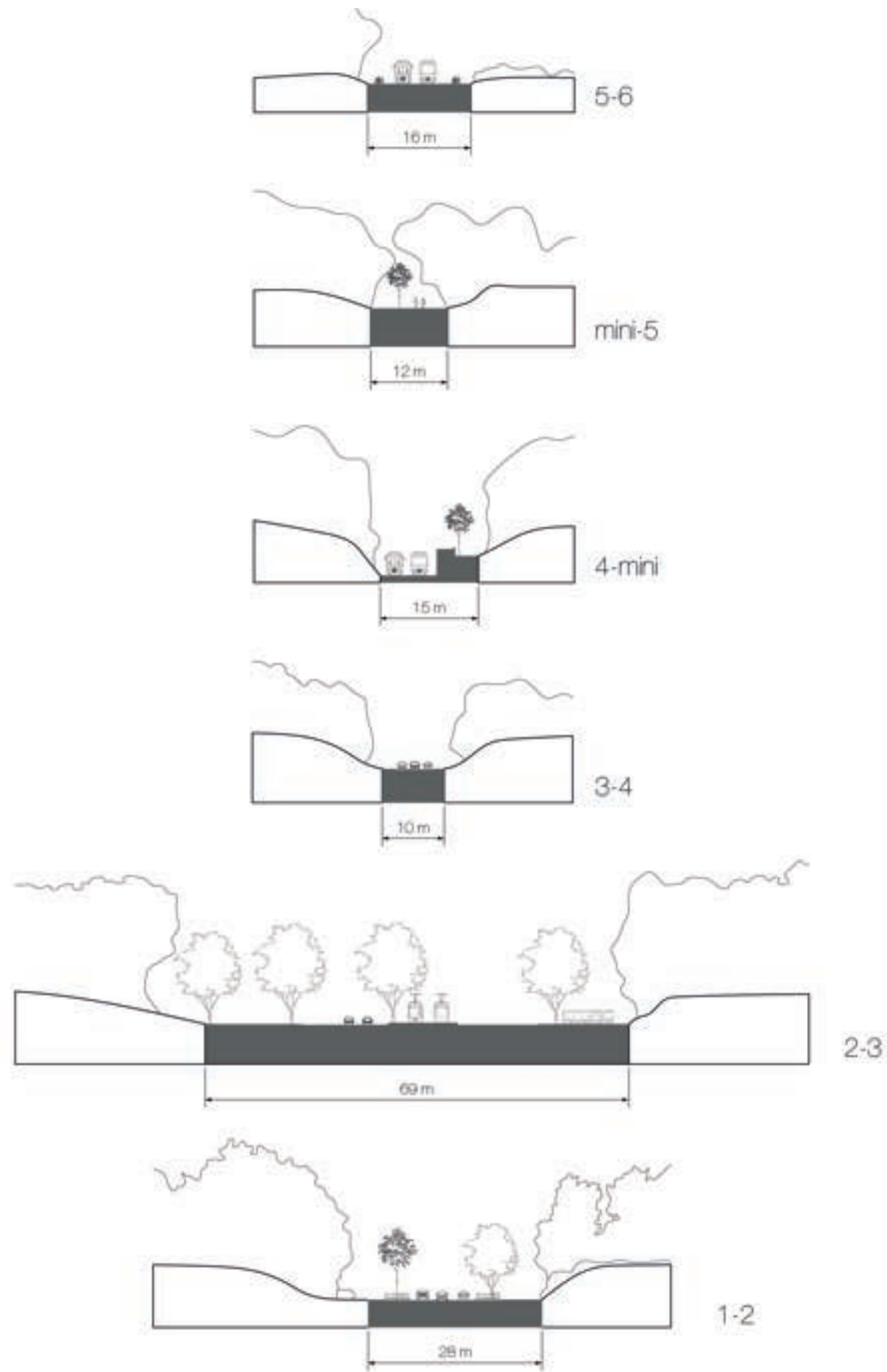
At a more local level the Berm provides access (or radius of action) to green within a distance of less than 400m to several children from 4-12 years, families and senior citizens with reduced or decreasing mobility. (Zimmermann, Astrid. Planning Landscape. Dimensions, elements, typologies. Birkhäuser, 2015. PP 24).

The Berm as an archipelago



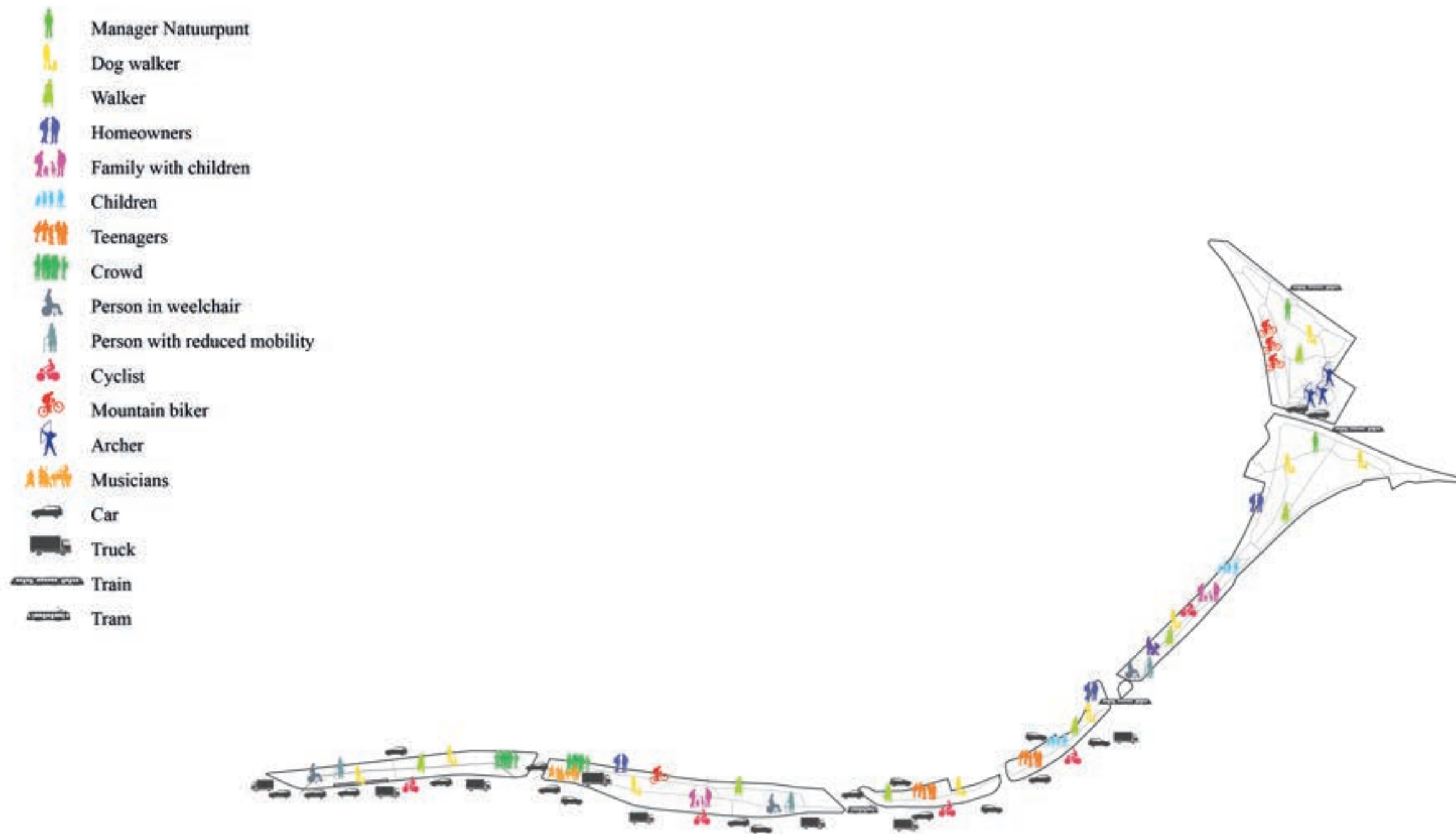
Although the Berm is an ecological corridor in many ways it is also an archipelago, a set of islands or stepping stones of different areas, widths, orientations and adjacency differences. The close proximity between the islands allows the colonization and repopulation of several species as well as the access and availability to resources .

Gaps along the Berm

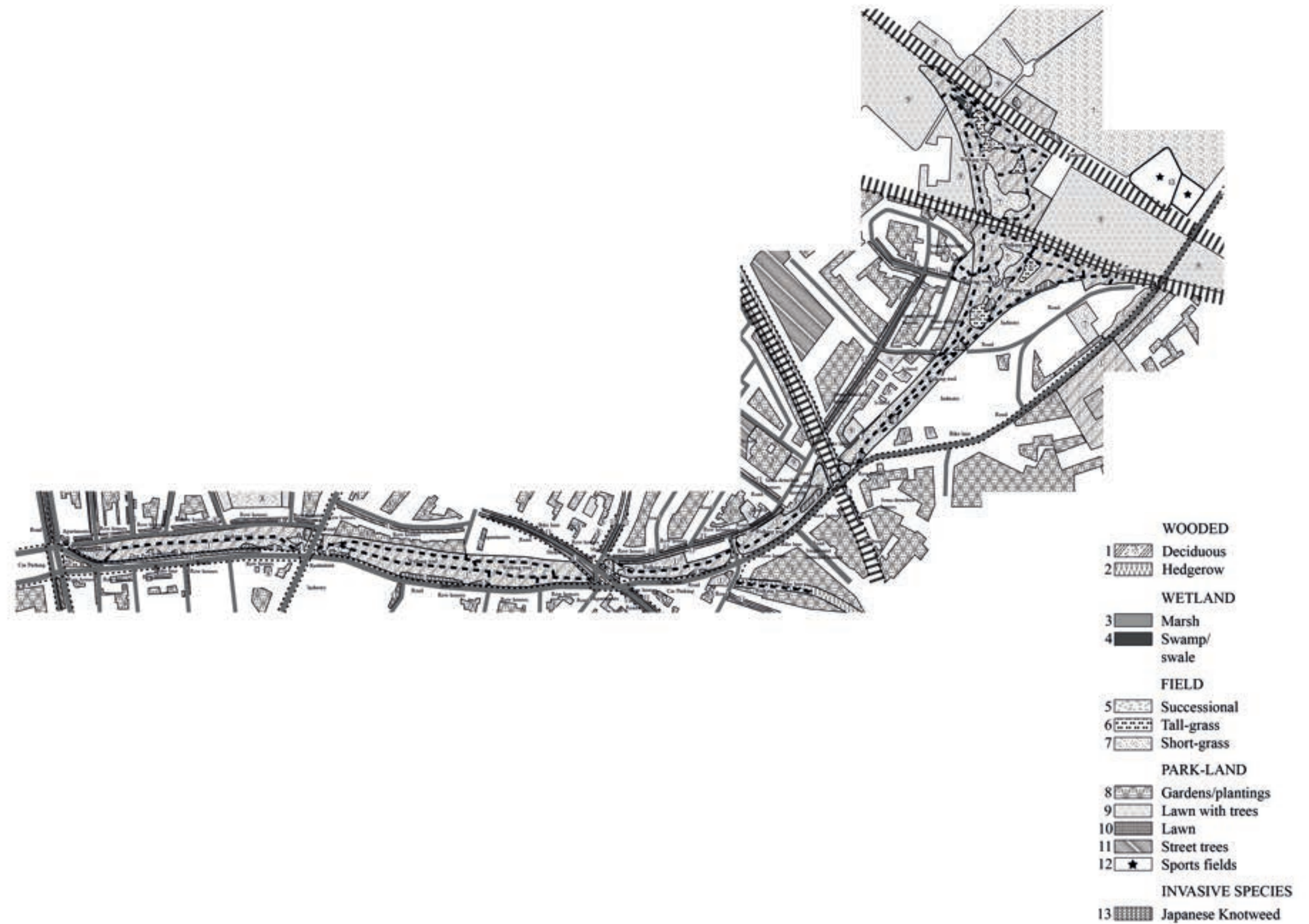


While this continuity works for some species it does not work for others due to the constant fragmentation of the corridor by the presence of street intersections. The gaps are heterogenous and some are more likely to inhibit the crossing of certain species than others leading to harsh conditions for certain species and possible extinction

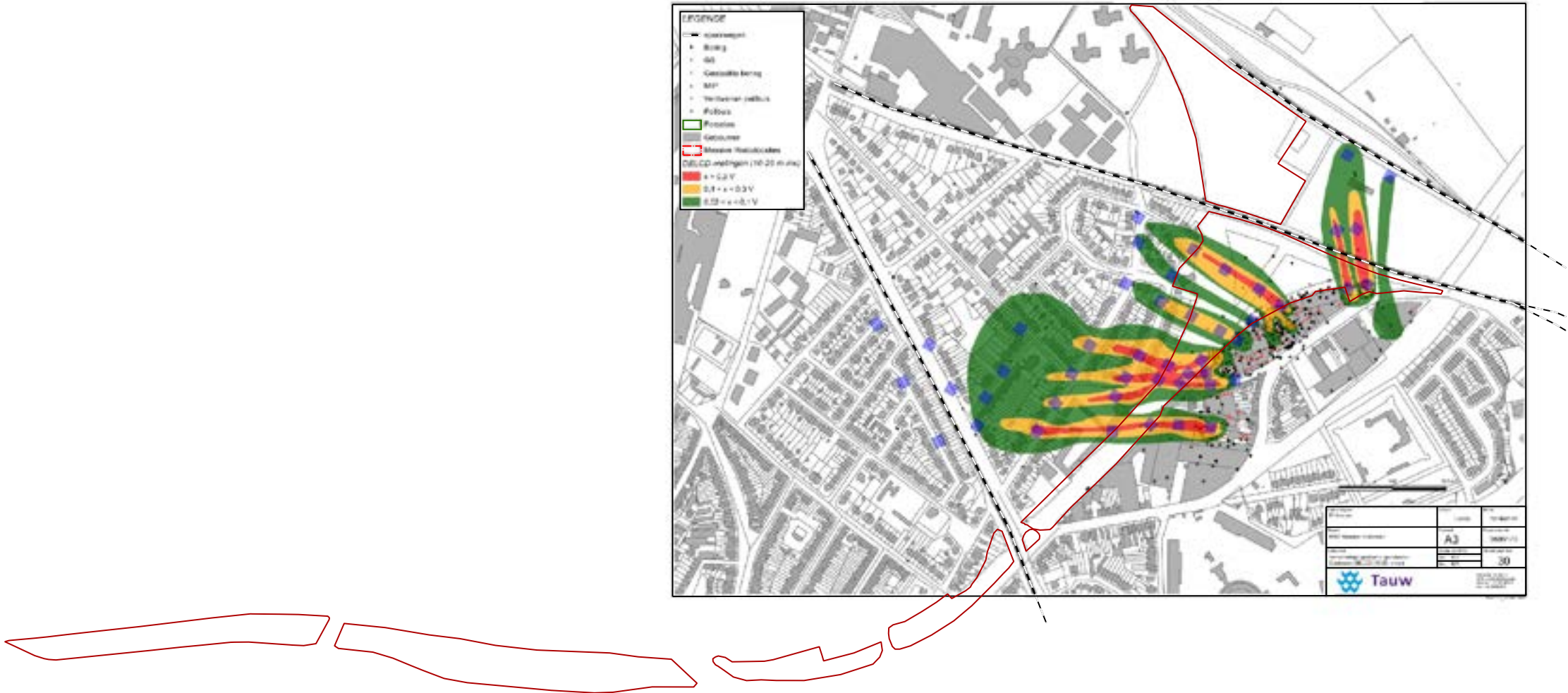
Human(s) interaction with the Berm



The Berm as a collection of biotopes

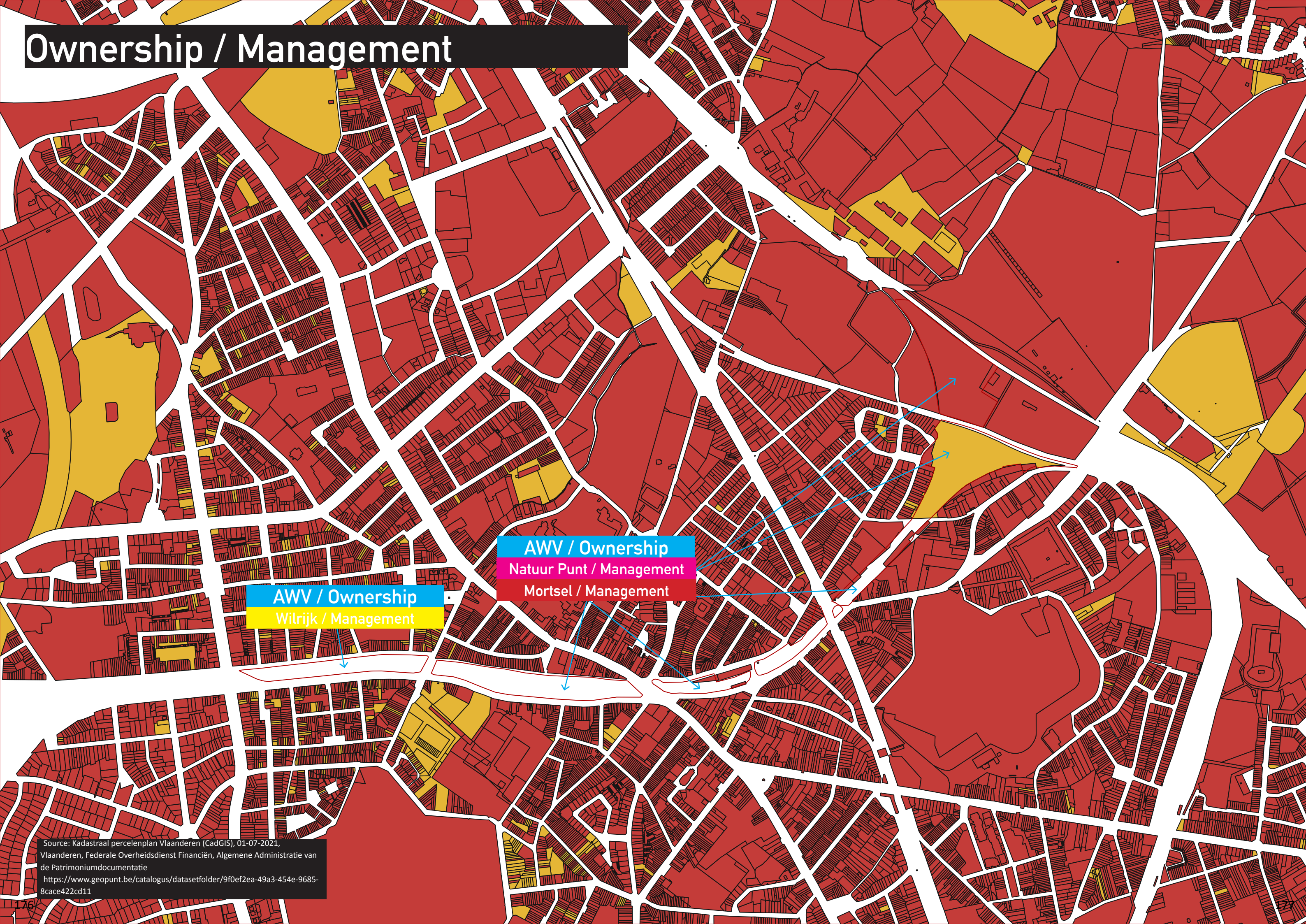


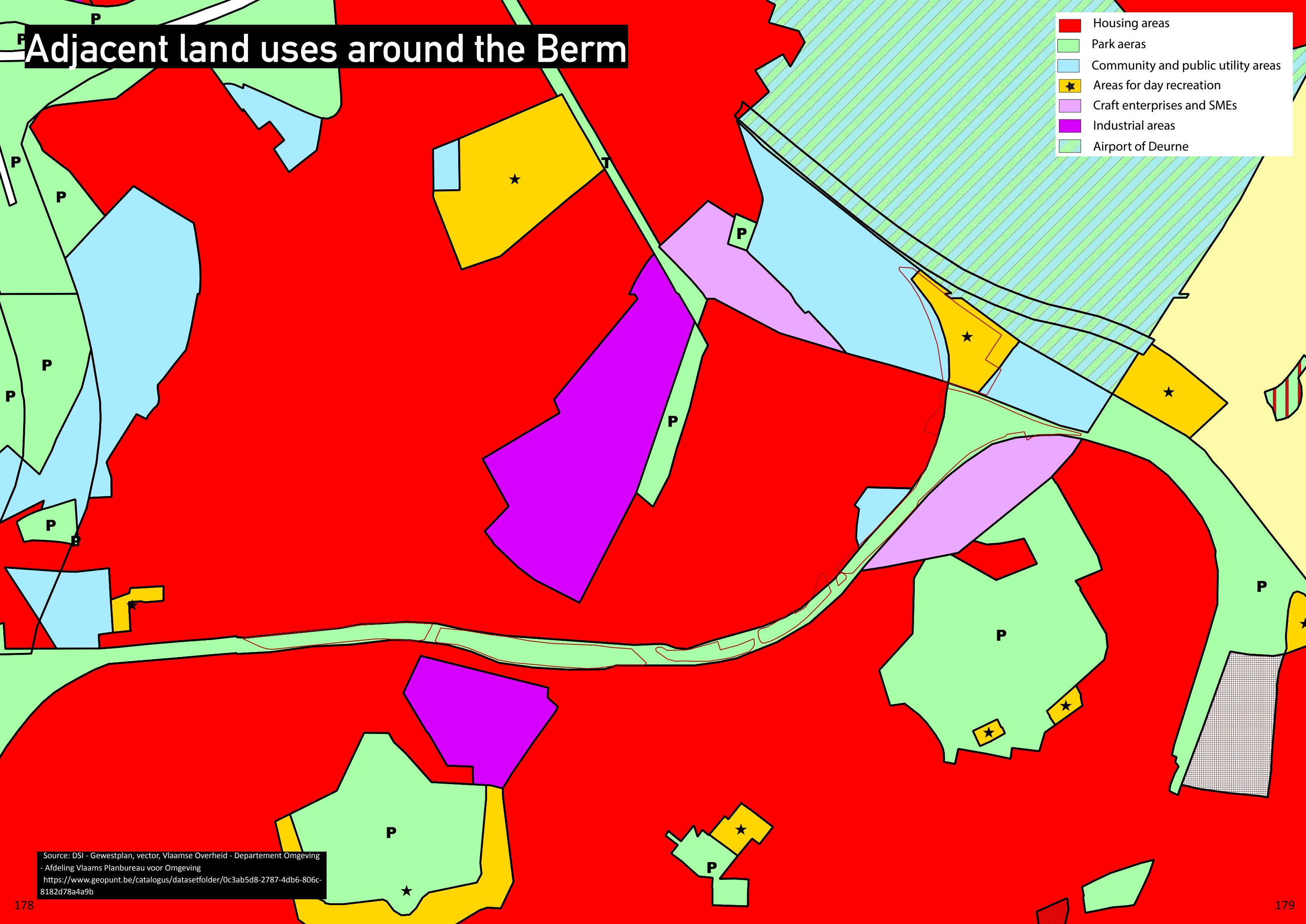
Underground water pollution



Source: Tauw. BBO Massive te Mortsel. Verontreinigingssituatie grondwater
Contouren DELCD (10-20 m-mv). 2016

Ownership / Management



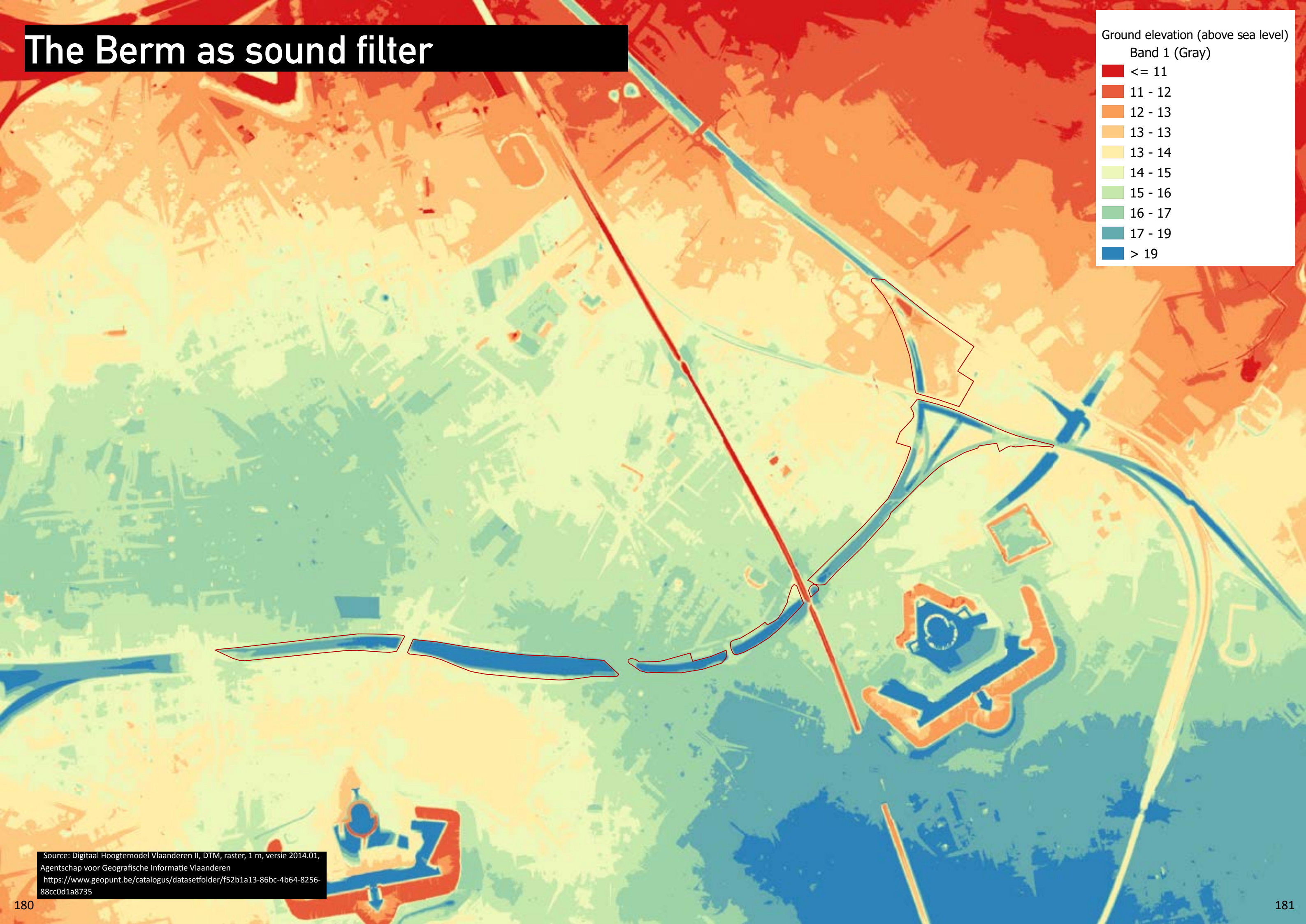


Adjacent land uses around the Berm

- Housing areas
- Park aeras
- Community and public utility areas
- Areas for day recreation
- Craft enterprises and SMEs
- Industrial areas
- Airport of Deurne

Source: DSI - Gewestplan, vector, Vlaamse Overheid - Departement Omgeving
- Afdeling Vlaams Planbureau voor Omgeving
<https://www.geopunt.be/catalogus/datasetfolder/0c3ab5d8-2787-4db6-806c-8182d78a4a9b>

The Berm as sound filter

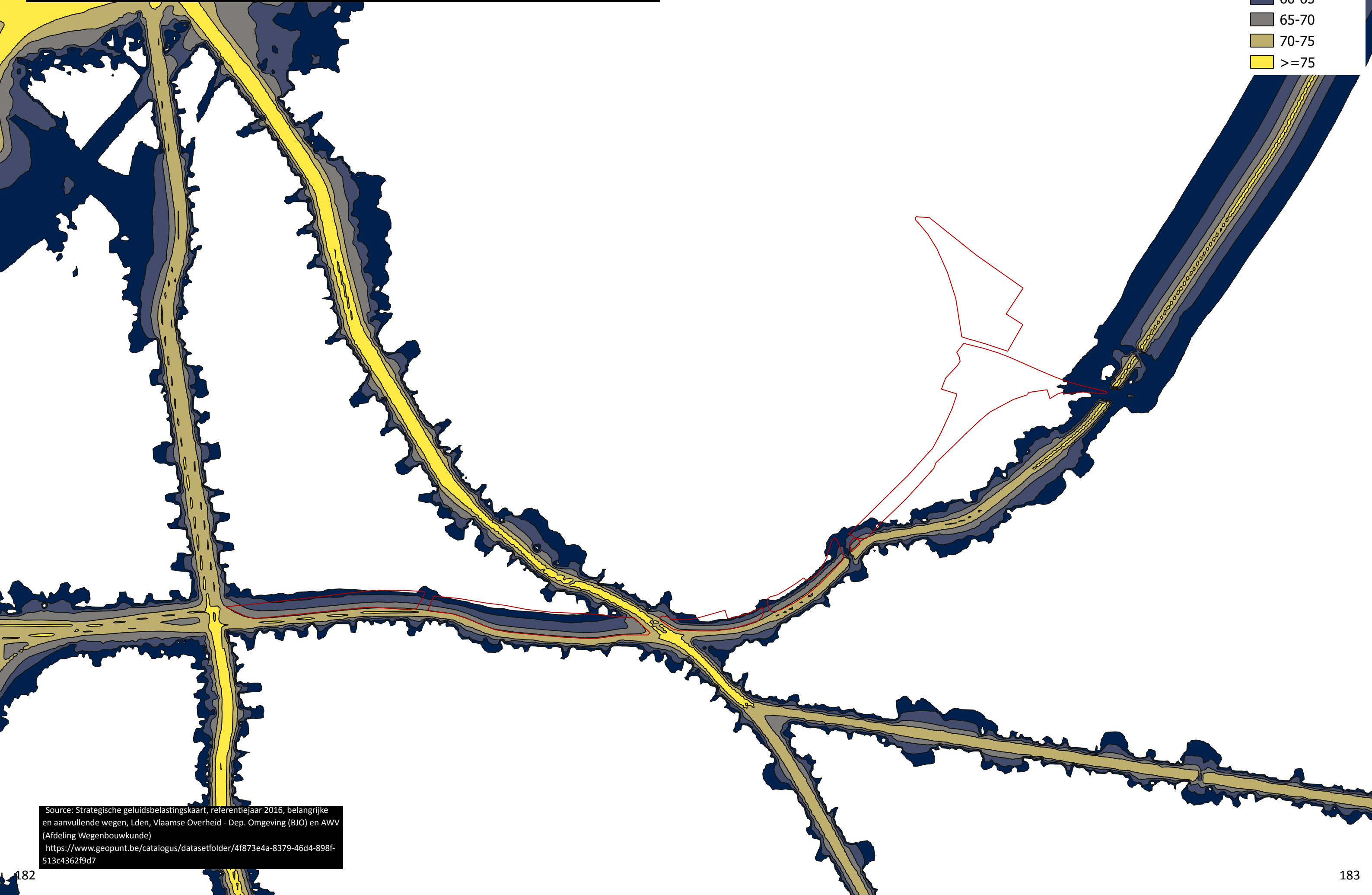


Source: Digitaal Hoogtemodel Vlaanderen II, DTM, raster, 1 m, versie 2014.01, Agentschap voor Geografische Informatie Vlaanderen
<https://www.geopunt.be/catalogus/datasetfolder/f52b1a13-86bc-4b64-8256-88cc0d1a8735>

The Berm as car noise barrier

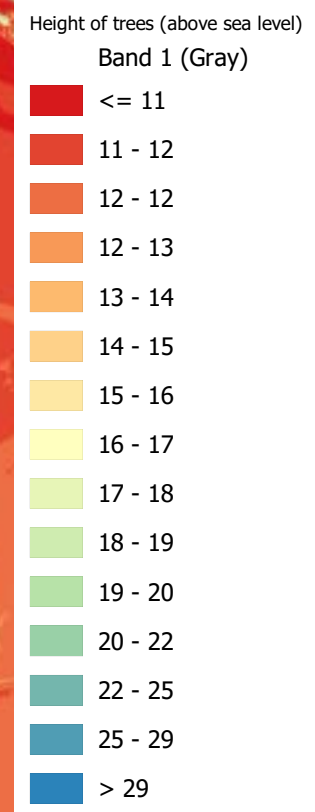
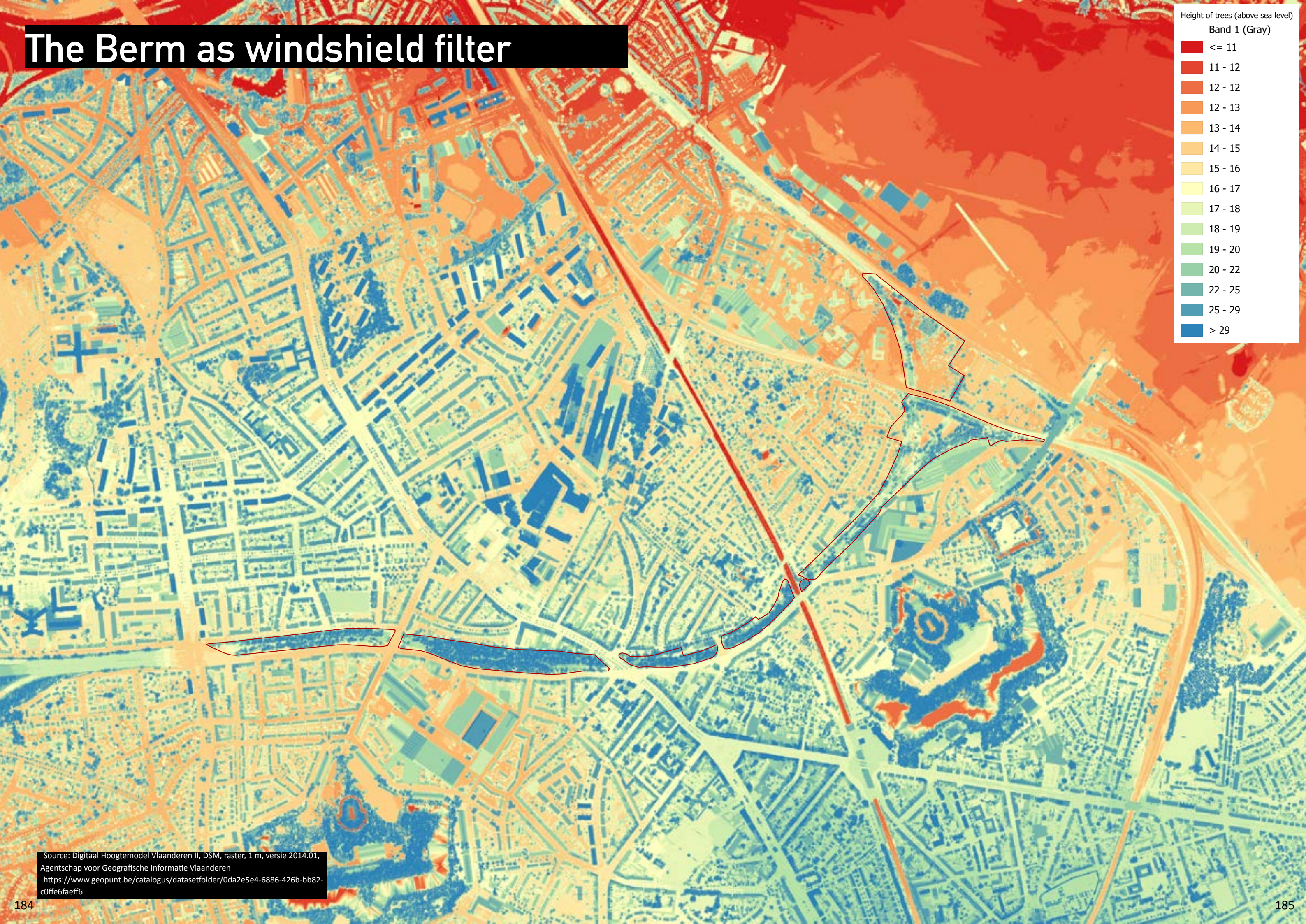
major roads noise

- 55-60
- 60-65
- 65-70
- 70-75
- ≥ 75



Source: Strategische geluidsbelastingskaart, referentiejaar 2016, belangrijke en aanvullende wegen, Lden, Vlaamse Overheid - Dep. Omgeving (BJO) en AWW (Afdeling Wegenbouwkunde)
<https://www.geopunt.be/catalogus/datasetfolder/4f873e4a-8379-46d4-898f-513c4362f9d7>

The Berm as windshield filter



Source: Digitaal Hoogtemodel Vlaanderen II, DSM, raster, 1 m, versie 2014.01,
Agentschap voor Geografische Informatie Vlaanderen
<https://www.geopunt.be/catalogus/datasetfolder/Oda2e5e4-6886-426b-bb82-c0ffe6faeff6>

Non permeable surfaces

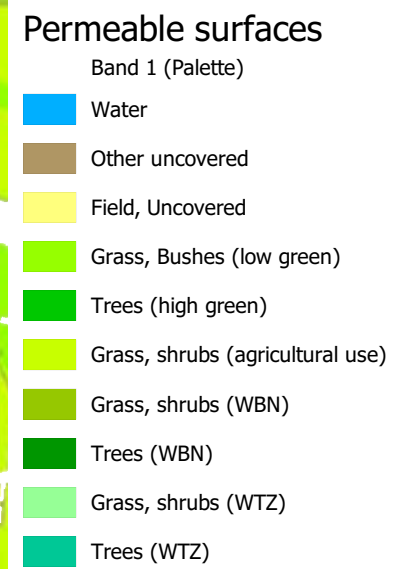
Non permeable surfaces
Band 1 (Palette)

- Buildings
- Highways
- Other Hedged
- Railways



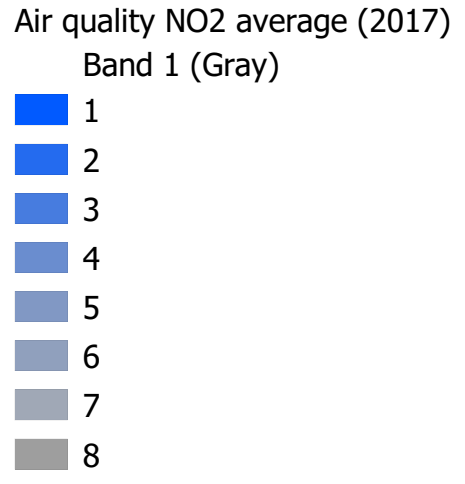
Source: Bodembedekkingskaart (BBK), 1m resolutie, opname 2018,
Agentschap Informatie Vlaanderen
<https://www.geopunt.be/catalogus/datasetfolder/7e89f7df-8cca-4fd6-a954-735bcc6e7930>

The Berm as a water retention



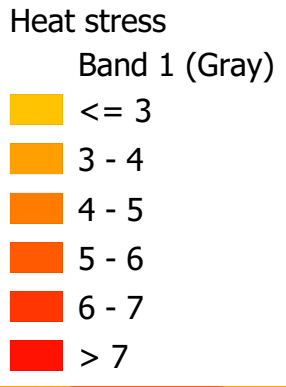
Source: Bodembedekkingskaart (BBK), 1m resolutie, opname 2018,
Agentschap Informatie Vlaanderen
<https://www.geopunt.be/catalogus/datasetfolder/7e89f7df-8cca-4fd6-a954-735bcc6e7930>

The Berm as air filter



Source: GES-kaart luchtkwaliteit - toestand 2017, Vlaamse Overheid -
Departement Omgeving - Afdeling Vlaams Planbureau voor Omgeving
<https://www.geopunt.be/catalogus/datasetfolder/bf72834f-d326-4ca6-b3c3-80f133ce3cbb>








The Berm as a vital cooler

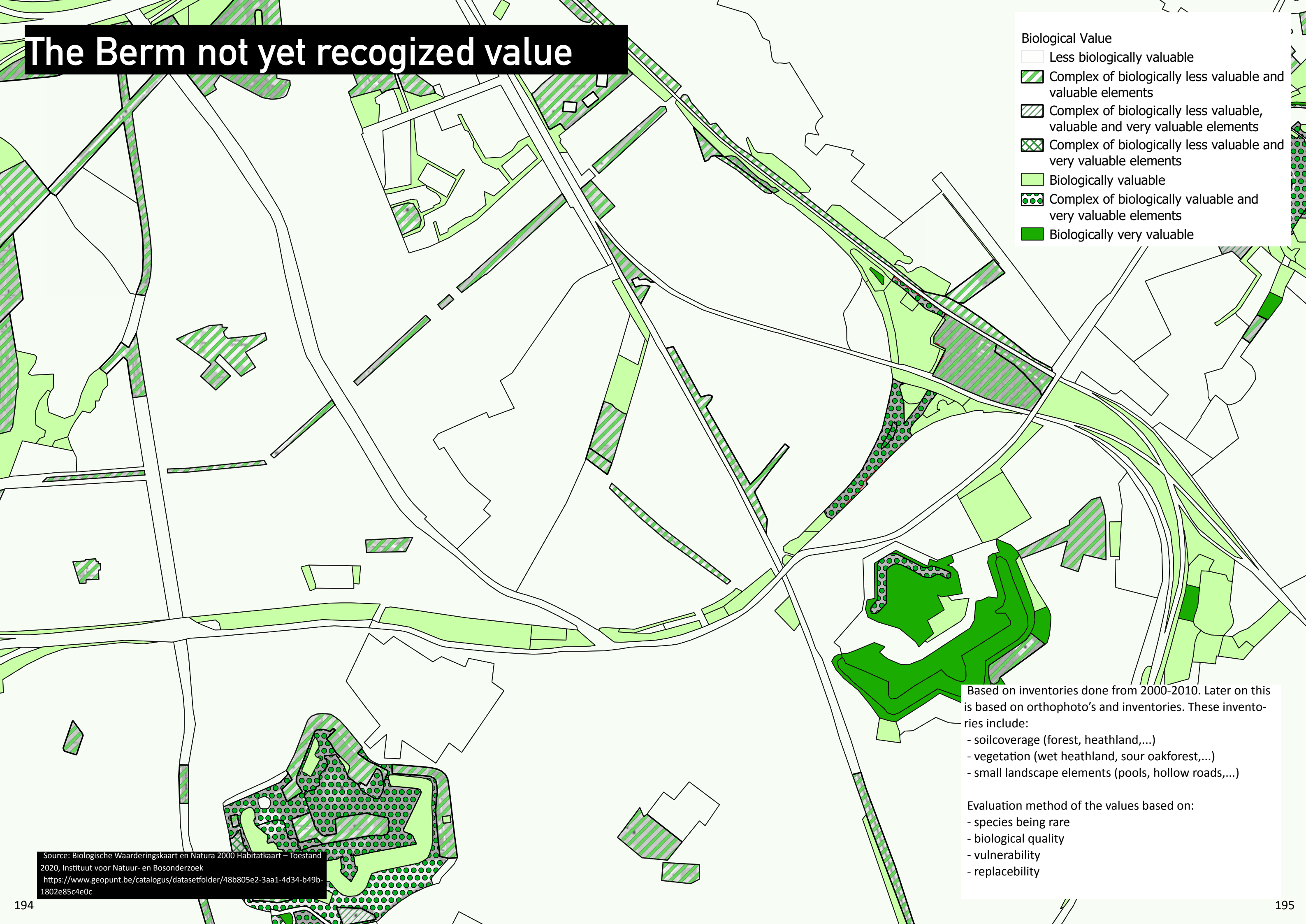


Source: GES-kaart hittestress - toestand 2018, Vlaamse Overheid -
Departement Omgeving - Afdeling Vlaams Planbureau voor Omgeving
<https://www.geopunt.be/catalogus/datasetfolder/ae39da68-d65d-4a86-8c1c-4a8e10ab0b34>

The Berm not yet recognized value

Biological Value

-  Less biologically valuable
-  Complex of biologically less valuable and valuable elements
-  Complex of biologically less valuable, valuable and very valuable elements
-  Complex of biologically less valuable and very valuable elements
-  Biologically valuable
-  Complex of biologically valuable and very valuable elements
-  Biologically very valuable



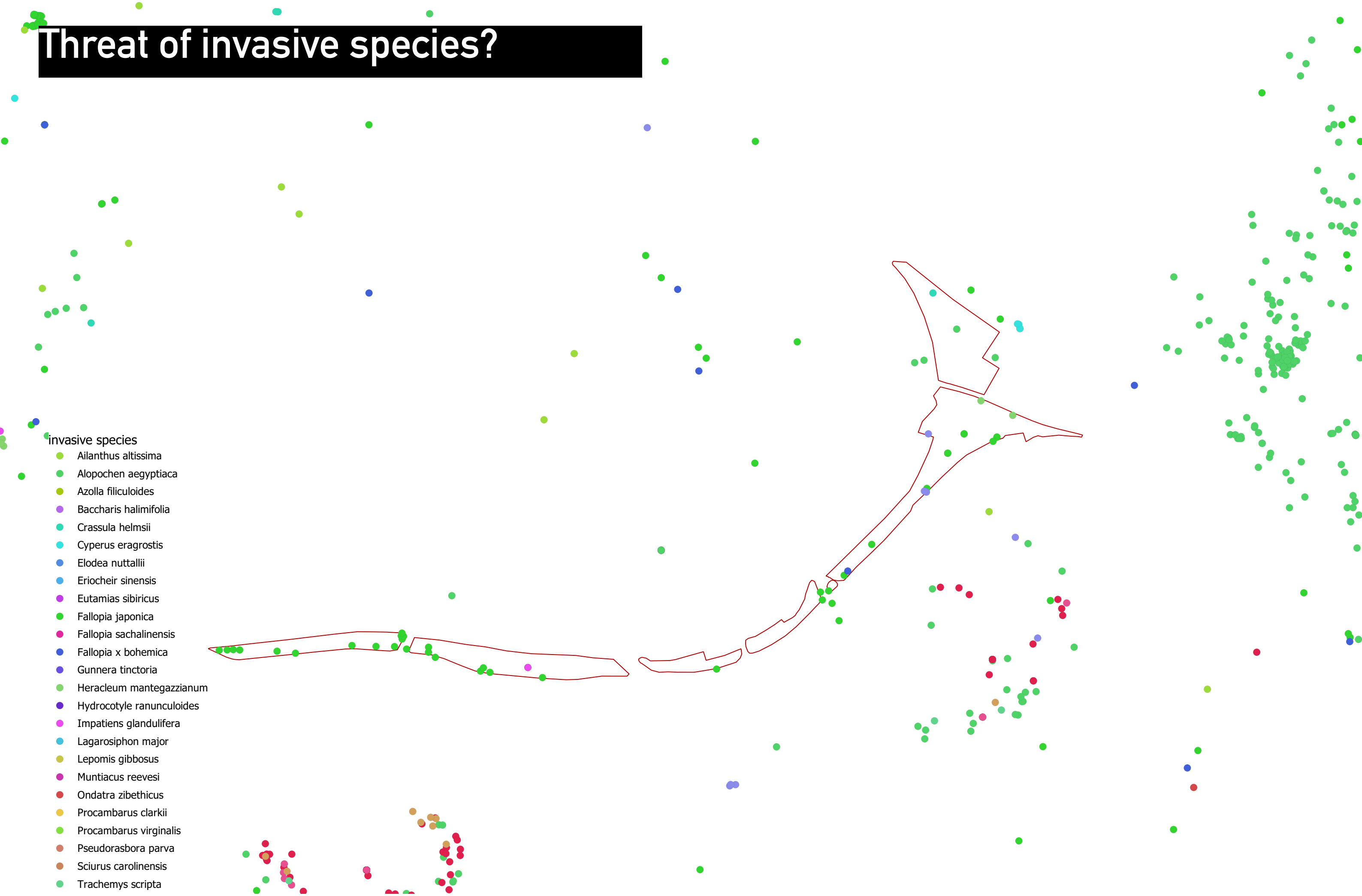
Based on inventories done from 2000-2010. Later on this is based on orthophoto's and inventories. These inventories include:

- soilcoverage (forest, heathland,...)
- vegetation (wet heathland, sour oakforest,...)
- small landscape elements (pools, hollow roads,...)

Evaluation method of the values based on:

- species being rare
- biological quality
- vulnerability
- replaceability

Threat of invasive species?

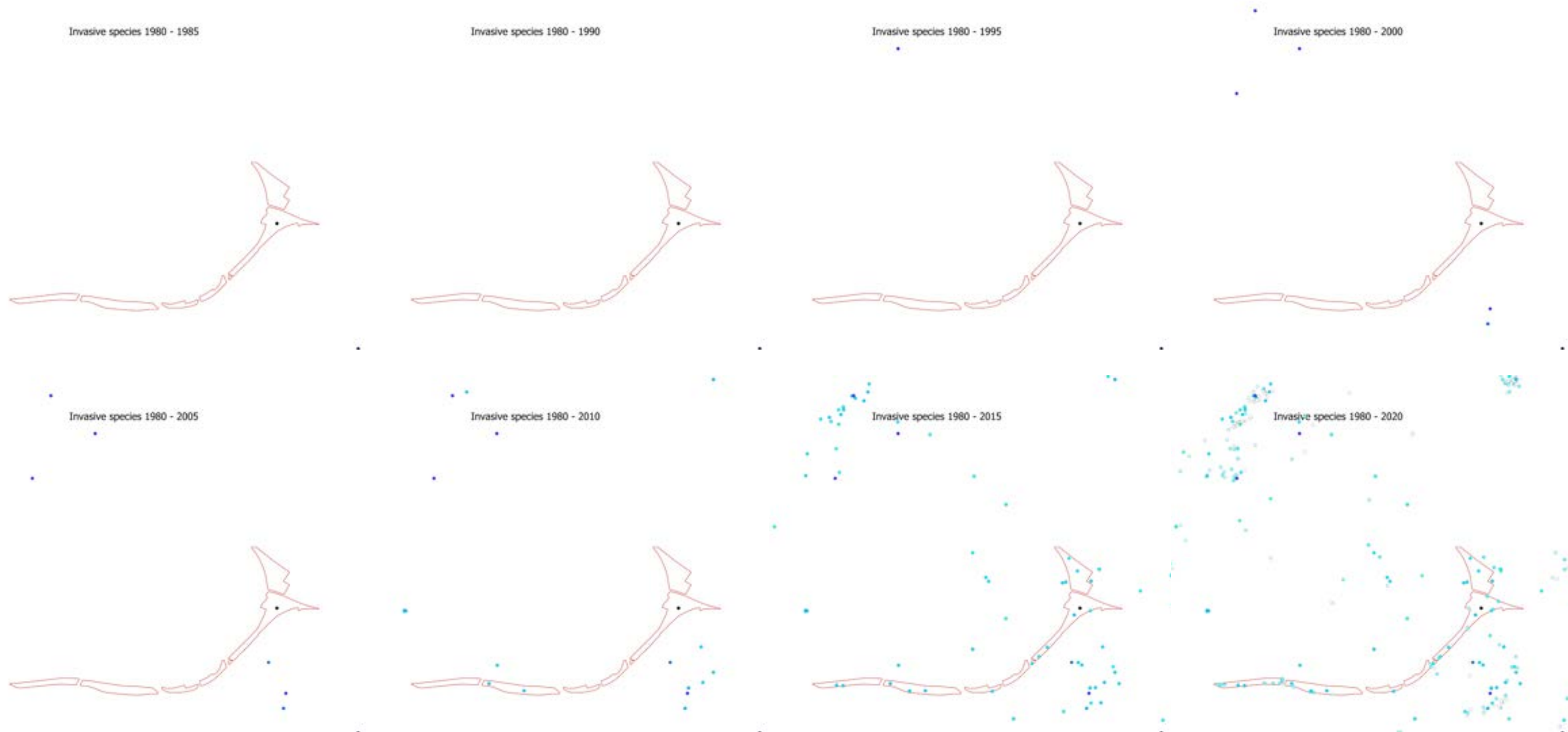


invasive species

- Ailanthus altissima
- Alopochen aegyptiaca
- Azolla filiculoides
- Baccharis halimifolia
- Crassula helmsii
- Cyperus eragrostis
- Elodea nuttallii
- Eriocher sinensis
- Eutamias sibiricus
- Fallopia japonica
- Fallopia sachalinensis
- Fallopia x bohemica
- Gunnera tinctoria
- Heracleum mantegazzianum
- Hydrocotyle ranunculoides
- Impatiens glandulifera
- Lagarosiphon major
- Lepomis gibbosus
- Muntiacus reevesi
- Ondatra zibethicus
- Procamburus clarkii
- Procamburus virginalis
- Pseudorasbora parva
- Sciurus carolinensis
- Trachemys scripta

Source: Invasive exotic species, waarnemingen.be
<https://waarnemingen.be/species/invasieve-exoten/>
Access: geopunt.be

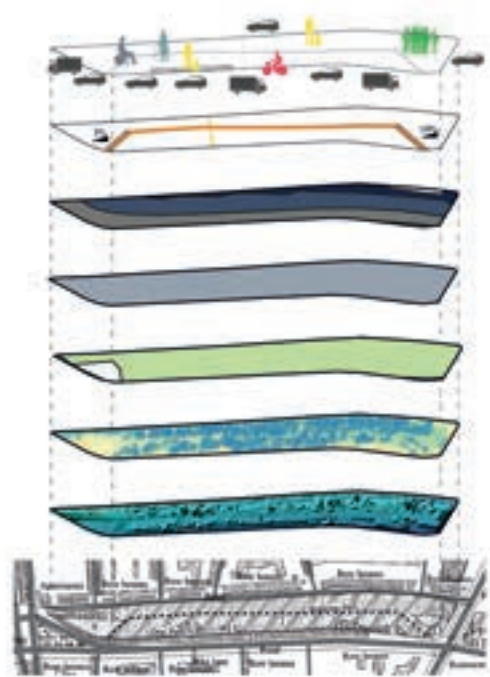
Invasive species. Growth or interest?



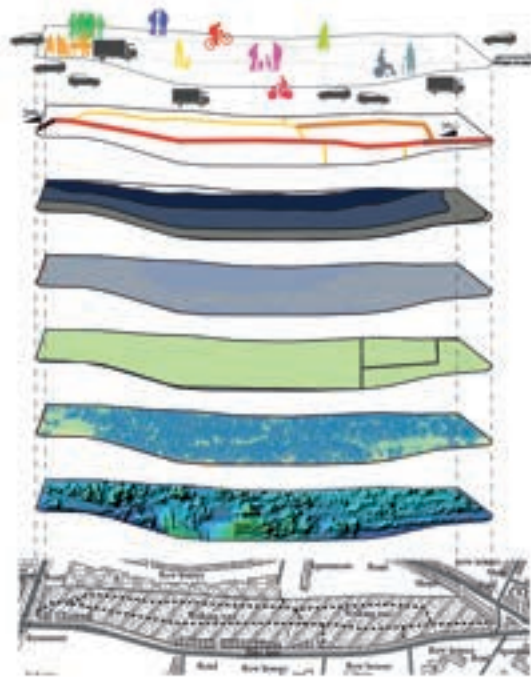
The Berm

Sampling as a method of
approximation

The Berm as an archipelago of socio ecological relationships



ISLAND 1



ISLAND 2



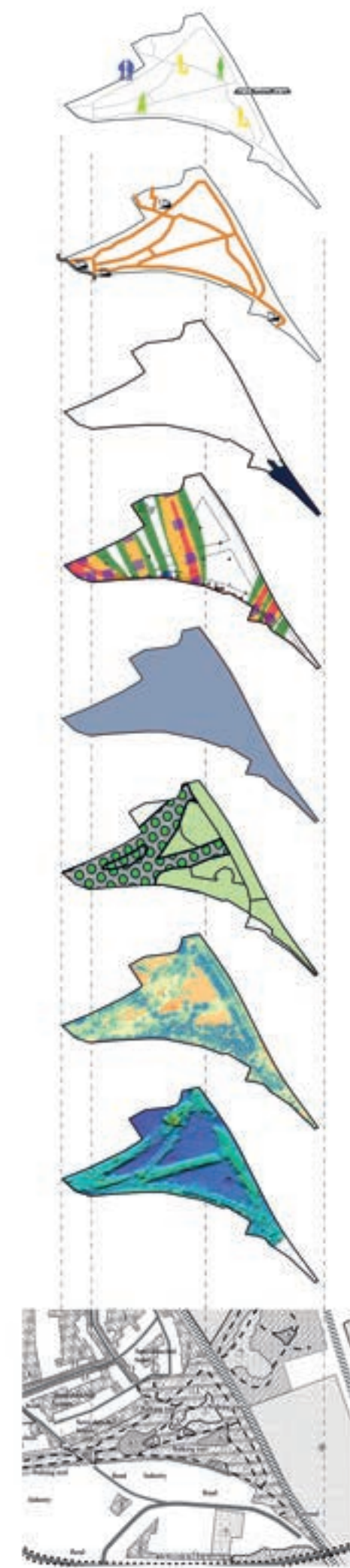
ISLAND 3



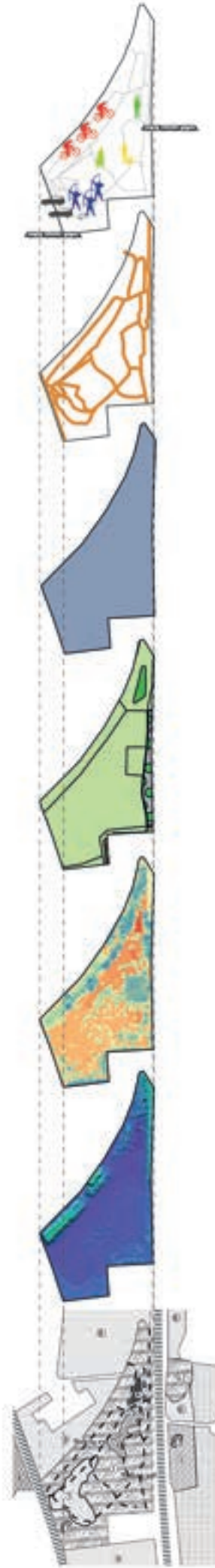
ISLAND 4



ISLAND 5

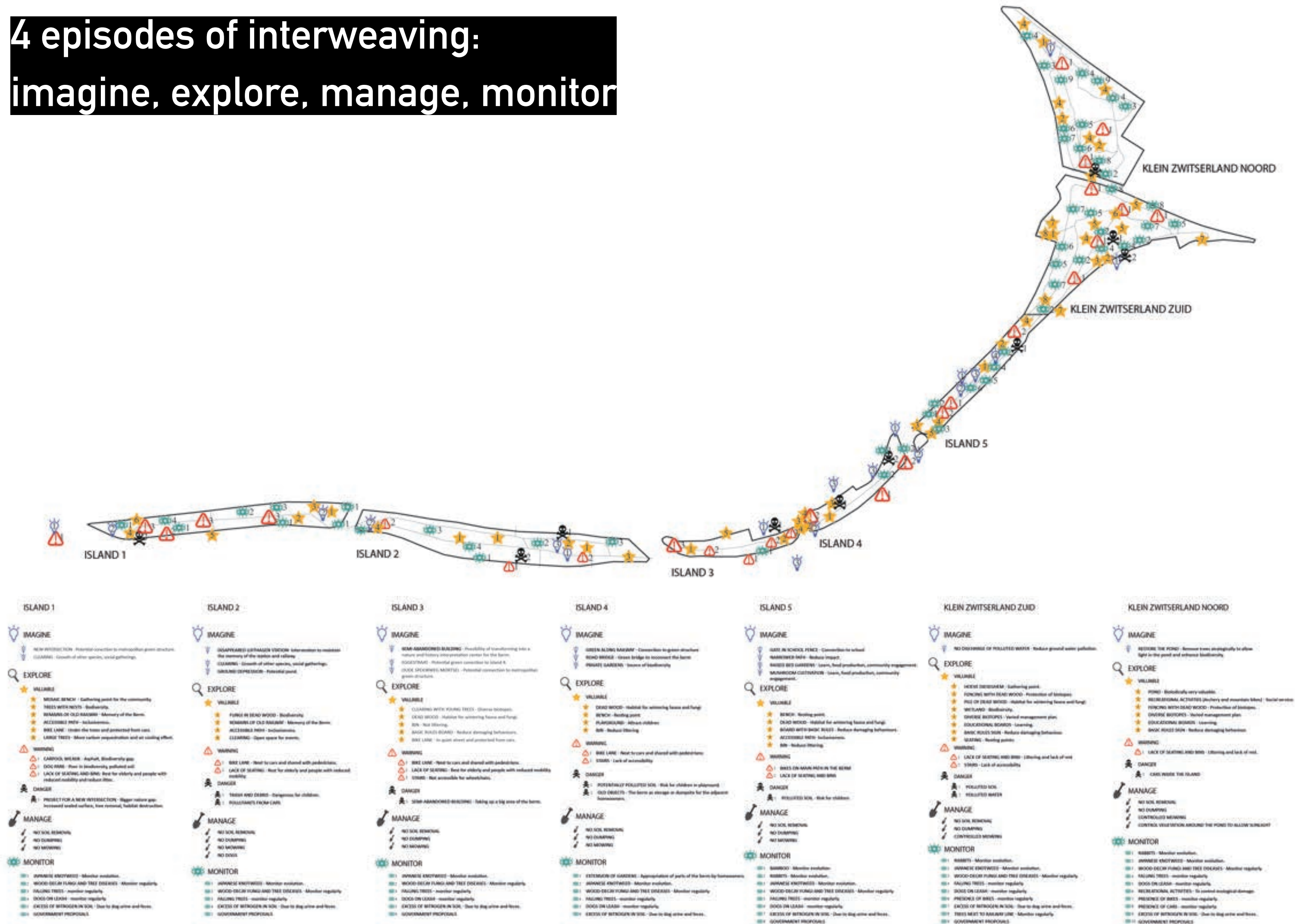


ISLAND 6
KLEIN ZWITZERLAND ZUID



ISLAND 7
KLEIN ZWITZERLAND NOORD

4 episodes of interweaving: imagine, explore, manage, monitor



ISLAND #1 / Wilrijk

DESCRIPTION

Island 1 of the Berm archipelago is located in a residential area of Wilrijk in Antwerpen. The island is limited to the north by Spoorweglaan, a local dead end street and to the south by the street Frans van Dunlaan which is part of R11 and carries a lot of traffic. To the west there is a major road intersection and parking lot and to the east there is a three-lane street Jozef Hermanslei.

REGULATIONS

This segment is owned by AWV and is the only island located in the municipality of Antwerpen and managed by Wilrijk. The regulations for this segment differ from the other segments. The management done by Wilrijk focusses on safety, extensive mowing and preserving the current vegetation. It includes a dog park adjacent to Frans van Dunlaan with its own regulations.

PATHS AND ACCESSIBILITY

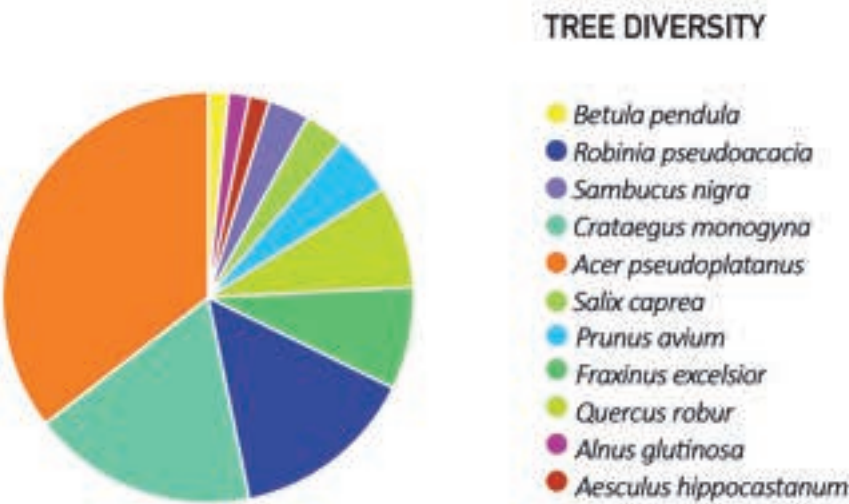
There is one constructed path out of porphyry of around 2m wide running along the entire length of the island. The topography is not too pronounced towards the west access, where there is a ramp of approximately 5% slope, making it accessible for people with reduced mobility. On the east side the terrain is higher and the slope of the ramp is around 10%, which is dangerous for wheelchairs. There is only one bench present, which does not have a back or arm rest. Perpendicular to the central path is a smaller path that appeared spontaneously due to people crossing the Berm in the most convenient spot. There is a bike lane at street level separated from the road by a row of planted trees (*Fraxinus excelsior* (Es)).

TREE ANALYSIS According to transects 1A and 1B

Island 1 is characterised by a relatively low stem density and a high density in terms of basal area, due to the number of large trees. In fact, from the 12 transects surveyed, transect 1A has the highest proportion of large trees with 35% of all trees having a basal area over 0.1m². Transect 1B has the second highest proportion with 19% of large trees. Like most of the islands, the dominant species is *Acer pseudoplatanus*, followed by *Crataegus monogyna* and *Robinia pseudoacacia*. The *Betula pendula* appeared only once in the surveyed transects. Other common trees of the Berm like *Quercus robur*, *Fraxinus excelsior*, *Salix caprea*, *Sambucus nigra* and *Prunus avium* are also present in this island. Individuals of less dominant species were found in the transects of island 1 such as *Alnus glutinosa* and *Aesculus hippocastanum*.

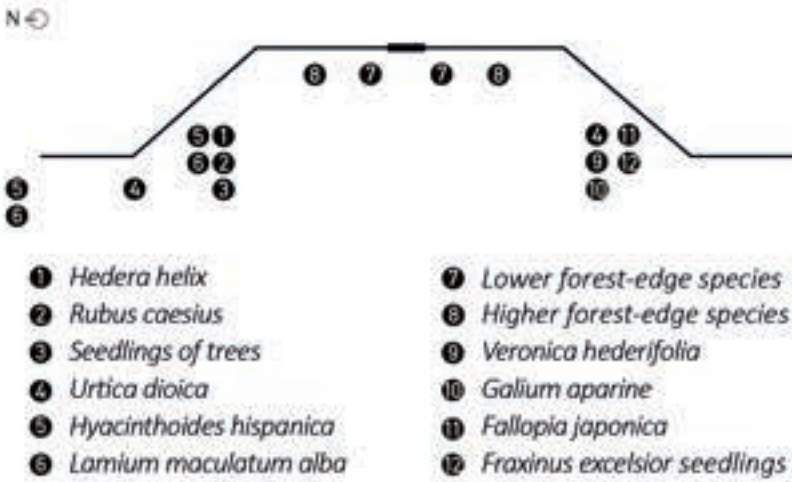
UNDERSTORY ANALYSIS According to transects 1A and 1B

Characterised by its spatial orientation and by the influence of its rather designed surroundings. The Northern slope is mostly covered with semi-shade-loving plants (e.g. 1,2) and seedlings of the trees growing there (3). At the bottom of this slope, a variety of Nitrogen-loving species (e.g. 4) were found. Additionally, due to the influence of neighbouring front yards cultivated plants (e.g. 5,6) are growing here. At the bottom of the slope bordering Jozef Hermanslei some hedges were planted to continue the design of the street. The lack of maintenance of these hedges resulted in an overgrowth with more dominant species and spontaneous development at the Bermen. On top of the Bermen, a variety of forest-edge species is growing, with lower species next to the path and higher species behind them. Because of the high nutrient and nitrogen levels caused by the emissions of the road and the dog area, the Southern side is partly dominated by Nutrient-rich and Nitrogen-loving species (e.g. 4,9,10). More to the East, the Southern slope is dominated by *Fallopia japonica* (Japanese duizendknoop). Additionally, seedlings from the *Fraxinus excelsior* (Es) planted along the bicycle lane next to the Frans van Dunlaan, spread onto the Southern slope, showing the influence of surrounding species on the Bermen.



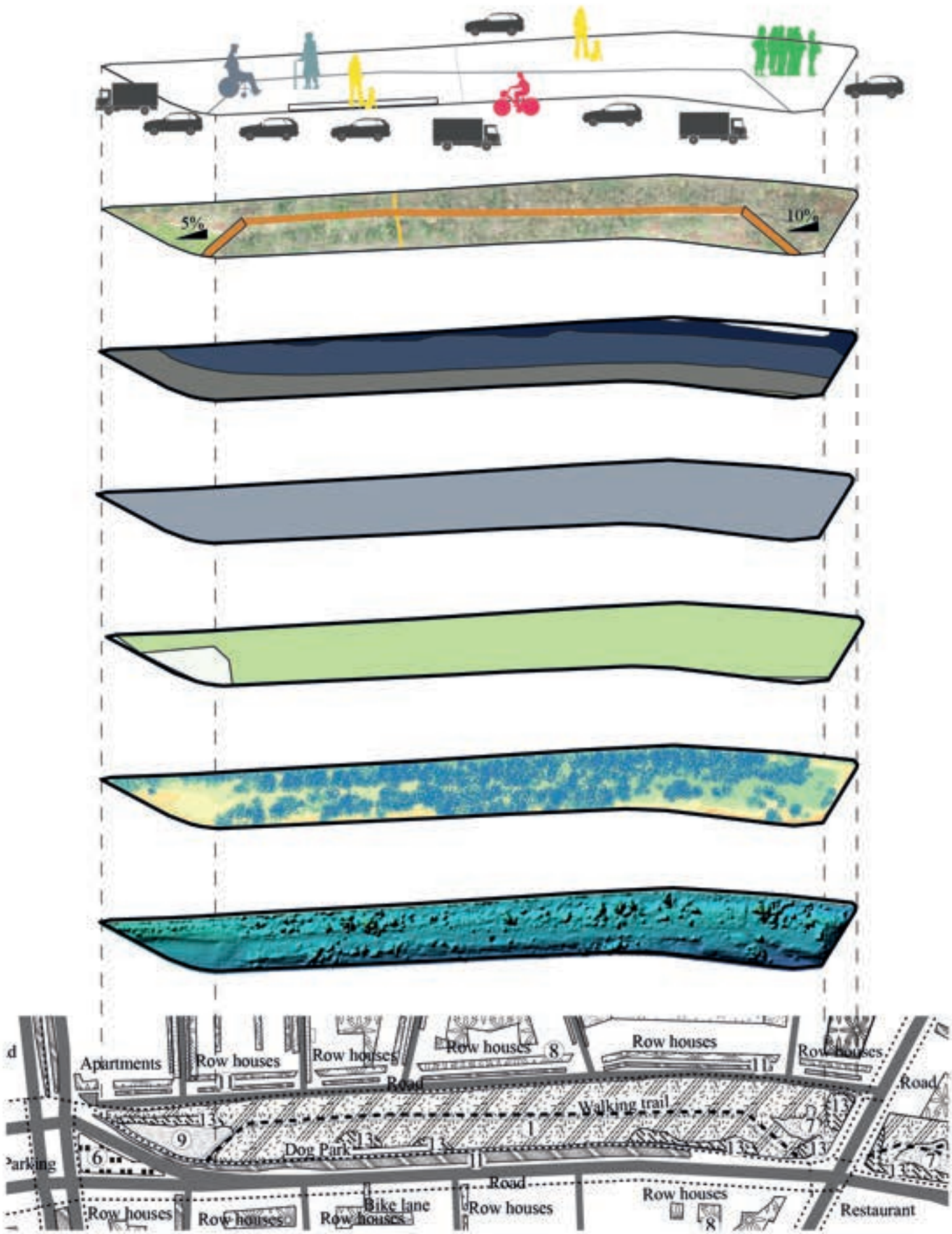
Large multi-stem trees

UNDERSTORY



Young planted tree

Socio-ecological layering



HUMANS



PATHS

Compacted soil path Spontaneous path Access ramp

ROAD NOISE in dB

70-75 70-75 65-70 60-65 55-60

AIR QUALITY NO₂ average (2017)

8 7 6 5 4 3 2 1
Low High

BIOLOGICAL VALUE

Less valuable C. of less valuable and very valuable
Complex of less valuable and valuable Biologically valuable
C. of less valuable, valuable and very valuable C. of valuable and very valuable
Very valuable

TREES HEIGHT HEIGHT ABOVE SEA LEVEL (m)

>29 22-25 19-20 17-18 15-16
25-29 20-22 18-19 16-17 14-15

TOPOGRAPHY ELEVATION ABOVE SEA LEVEL (m)

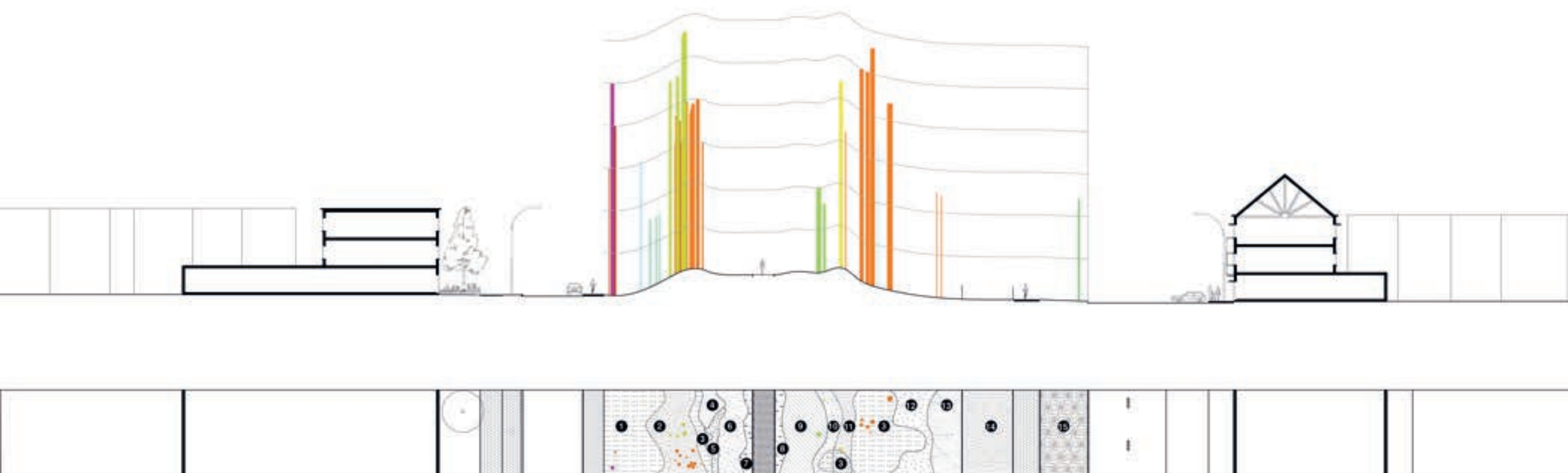
4.99 33.76

URBAN BIOTOPES

WOODED WETLAND FIELD PARK-LAND
1 Deciduous 3 Marsh 5 Successional 8 Gardens/plantings
2 Hedgerow 4 Swamp/swale 6 Tall-grass 9 Lawn with trees
7 Short-grass 10 Lawn
INVASIVE SPECIES 11 Street trees
13 Japanese Knotweed 12 Sports fields

TRANSECT 1A
51°10'25.0"N 4°25'44.2"E



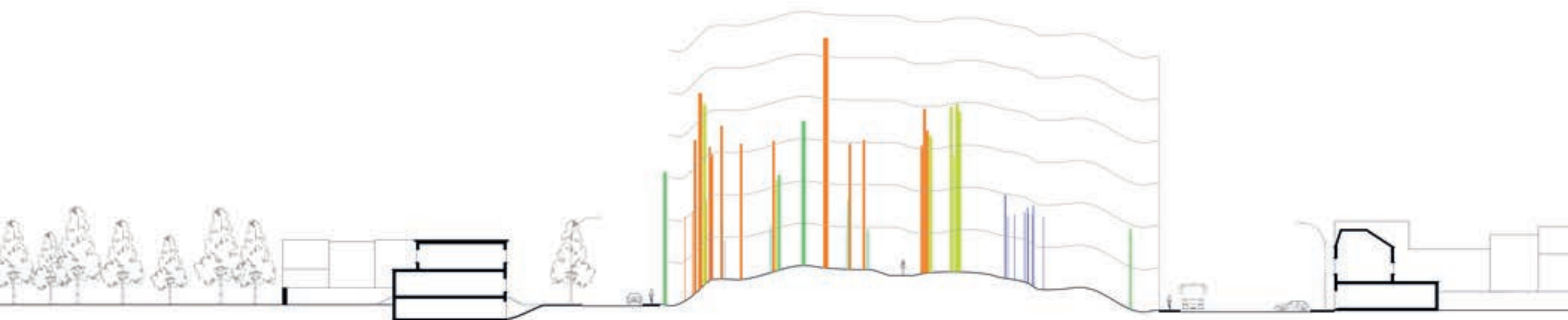


- Tree density: 65 trees/ha
Stem density: 743
- TREE SPECIES:**
- Betula pendula
 - Quercus robur
 - Acer pseudoplatanus
 - Prunus avium
 - Salix caprea
 - Populus alba
 - Crataegus monogyna
 - Arhus glutinosa
 - Aesculus hippocastanum
- UNDERSTORY:**
- ① Hedera helix
Galium aparine
 - ② Bare soil with young Acer ps. and Robinia ps.
 - ③ Hedera helix
 - ④ Urtica dioica
 - ⑤ Galium aparine
Rubus ulmaria
 - ⑥ Urtica dioica
Veronica hederifolia
 - ⑦ Eriophora arvensis
 - ⑧ Anthriscus sylvestris
Eriophora arvensis
 - ⑨ Agrostis podagracea
Anthriscus sylvestris
Galium aparine
Urtica dioica
 - ⑩ Aleria petiolata
Agrostis podagracea
 - ⑪ Bare soil, young Acer ps.
 - ⑫ Galium aparine
Veronica hederifolia
 - ⑬ Aleria petiolata
Galium aparine
Veronica hederifolia
 - ⑭ Bare soil (compacted)
 - ⑮ Grass species



TRANSECT 1B
51°10'25.7"N 4°26'00.5"E





Tree density: 34 trees/ha
Semi density: 808

TREE SPECIES

- *Picea canadensis*
- *Quercus robur*
- *Acer pseudoplatanus*
- *Prunus avium*
- *Fagus sylvatica*
- *Corylus monogyne*
- *Sambucus nigra*

UNDERSTORY

- ① *Alliaria petiolata*
Anthriscus sylvestris
Glechoma hederacea
- ② *Symphoricarpos albus*
- ③ *Galium aparine*
- ④ *Rubus caesius*
Young *Acer* sp.
- ⑤ *Galium aparine*
Rubus caesius
- ⑥ *Veronica hederifolia*
Alliaria petiolata
Rubus caesius
- ⑦ *Alliaria petiolata*
Galium aparine
Taraxacum vulgare
- ⑧ *Lolium perenne*
- ⑨ *Lamium alba*
- ⑩ *Chelidonium majus*
- ⑪ *Heracleum sphondylium*
Rubus caesius
- ⑫ *Alliaria petiolata*
Anthriscus sylvestris
Galium aparine
Veronica hederifolia
- ⑬ *Aegopodium podagraria*
Galium aparine
Urtica dioica
Veronica hederifolia
- ⑭ *Heracleum sphondylium*
Rubus caesius
Urtica dioica
Veronica hederifolia
- ⑮ *Aegopodium podagraria*
Anthriscus sylvestris
Fallopia japonica
Galium aparine
- ⑯ *Chelidonium majus*
Fallopia japonica
Heracleum sphondylium
Urtica dioica
Veronica hederifolia
- ⑰ *Fallopia japonica*
- ⑱ Grass species

ISLAND #2 / Mortsel

DESCRIPTION

Island 2 of the Berm archipelago is located in the municipality of Mortsel and surrounded by residential buildings. It is the widest island after Klein Zwitserland with an average width of around 69m.

The island is limited to the north by housing, private gardens and storage buildings, and to the south by the Vredebaan which is part of Rthe 11 and carries a lot of traffic. To the west there is a three-lane street Jozef Hermanslei and to the east Antwerpsestraat creates a wide gap from island 3. This gap includes pedestrian and bike areas, 4 car lanes, two tram tracks and 4 to 6 lines of street trees.

REGULATIONS

This section of the berm, together with islands 3, 4 and 5, is managed by the municipality of Mortsel.

PATHS AND ACCESSIBILITY

This island has a gravel path of around 2m wide running along the length of the island, and a parallel dust path with a similar width. Some narrower, spontaneously generated paths join the two main ones. At the east end of the island, a ramp with a very low slope (<3%) allows access for wheelchairs, while the west end can only be accessed through stairs. There is one bench, which is not adapted for elderly or people with reduced mobility.

The bike lane at street level is shared with pedestrians and next to cars.

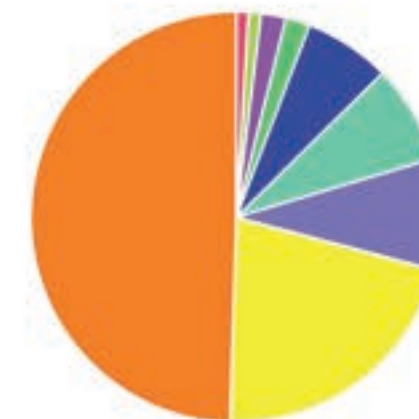
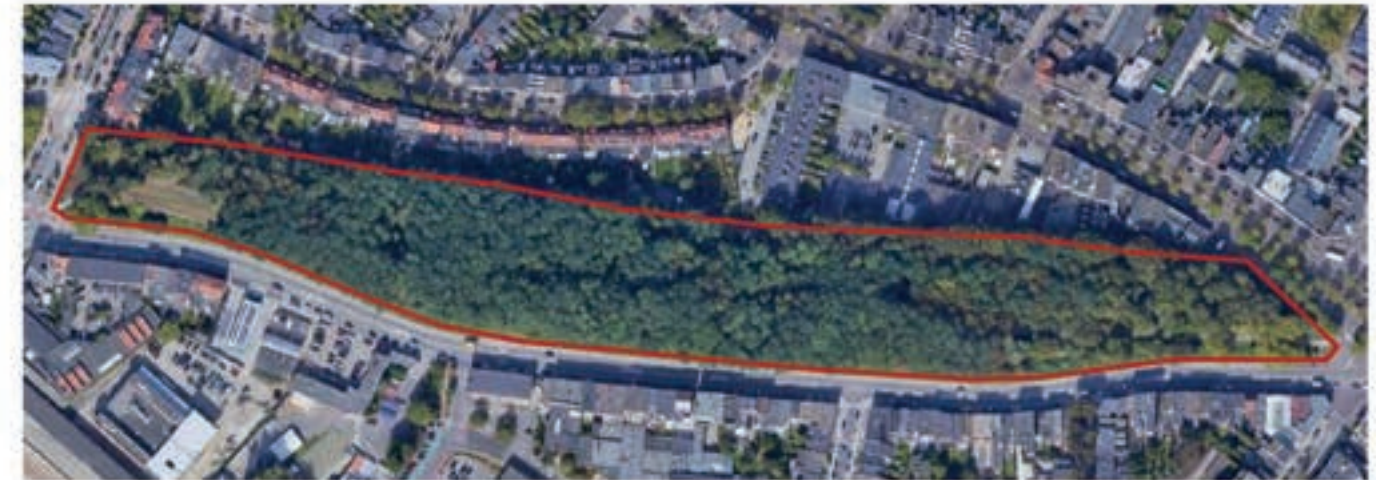
TREE ANALYSIS According to transects 2A and 2B

Island 2 has an average density, both regarding number of stems and basal area. There is a significant clearing towards the west end covered by grass. In transect 2A there is a proportion of large trees of 18%, while in 2B it is only 7% due to the big amount of young trees, especially in the interior area, between the paths.

Despite the number of trees, the tree diversity is relatively low. Like most of the islands, the dominant species is *Acer pseudoplatanus*, followed by *Betula pendula*. These two species represent 70% of the total trees in the surveyed transects. The high number of *Betula pendula* may be explained because the trainstation of Luithagen used to be here and since this was demolished pioneer species have been competing for light, hence the large amount of thinner trees. Additionally, the wider section of this island allows for a larger "interior" where *Betula* tends to appear.

UNDERSTORY ANALYSIS According to transects 2A and 2B

The transects taken at segment 2 show much less species than segment 1. The understory of segment 2 is characterised by large patches of the same species. At the Northern slopes this is mainly *Rubus caesius*, *Rubus ursinus*, *Hedera helix* and bare soil whereas *Rubus ursinus*, *Urtica dioica*, *Anthriscus sylvestris* and *Fallopia japonica* dominate the Southern slope. A wall at the bottom of the Northern slope prevents species from hopping over from the site situated in the North of this segment. Although this part rather inaccessible, not many species grow here. This is the only island with a large open space, next to the Jozef Hermanslei on the middle/South of the Berm segment (transect 2A), that is yearly mowed for events, which is now dominated with grass species and *Fallopia japonica*. The area where the former train station Luithagen was built (transect 2B), is dominated by seedlings and young trees and does not show a rich understory yet.



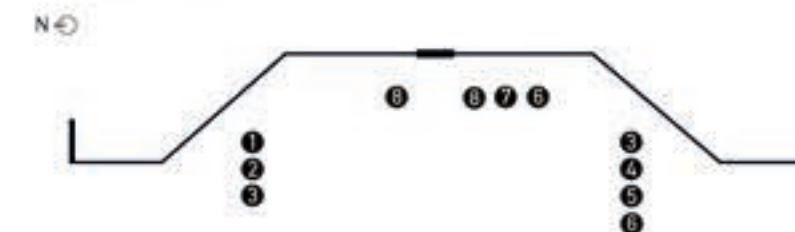
TREE DIVERSITY

- *Corylus avellana*
- *Prunus serrulata*
- *Betula pendula*
- *Robinia pseudoacacia*
- *Sambucus nigra*
- *Crataegus monogyna*
- *Acer pseudoplatanus*
- *Salix caprea*
- *Fraxinus excelsior*



Constructed turmac path

UNDERSTORY



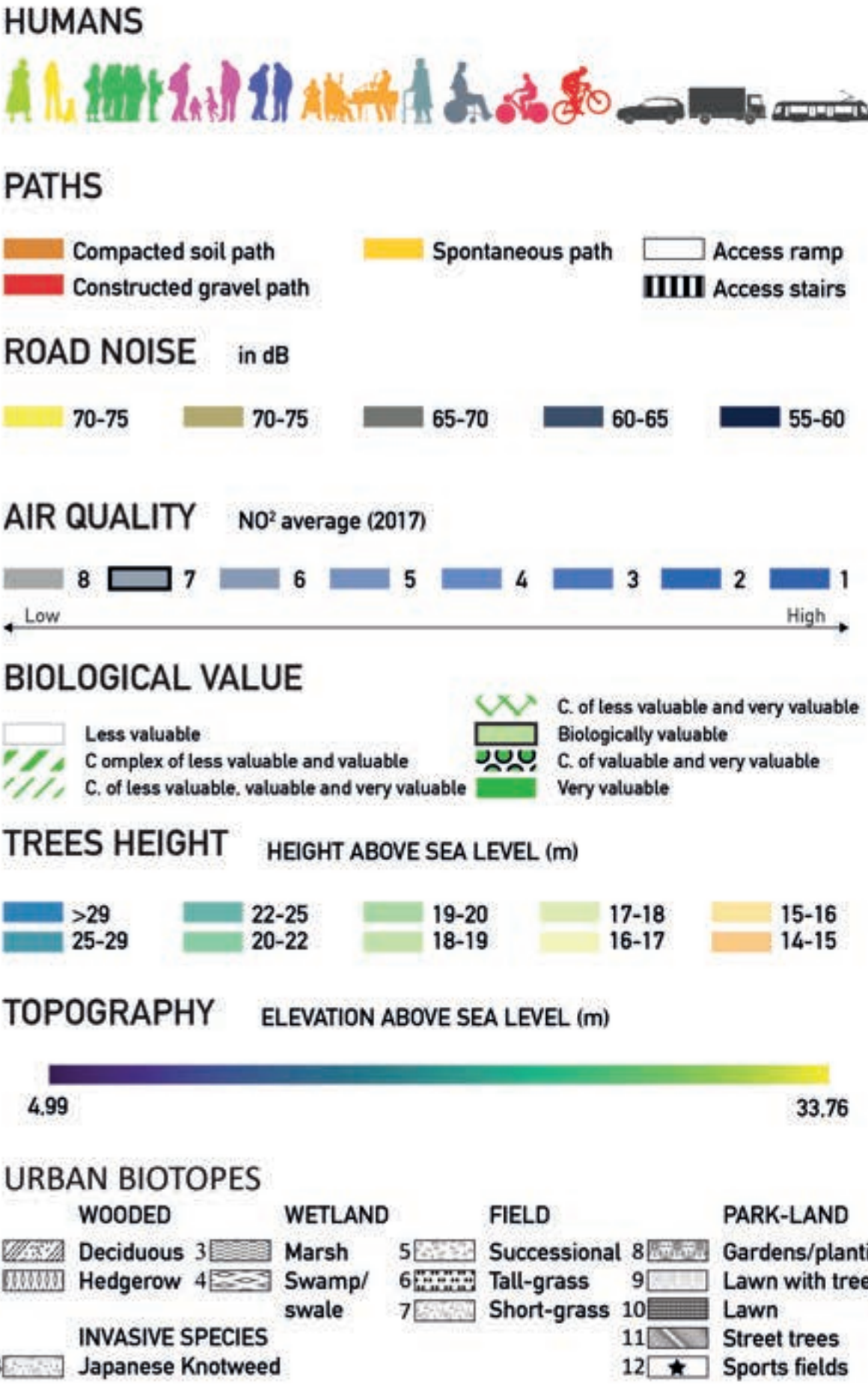
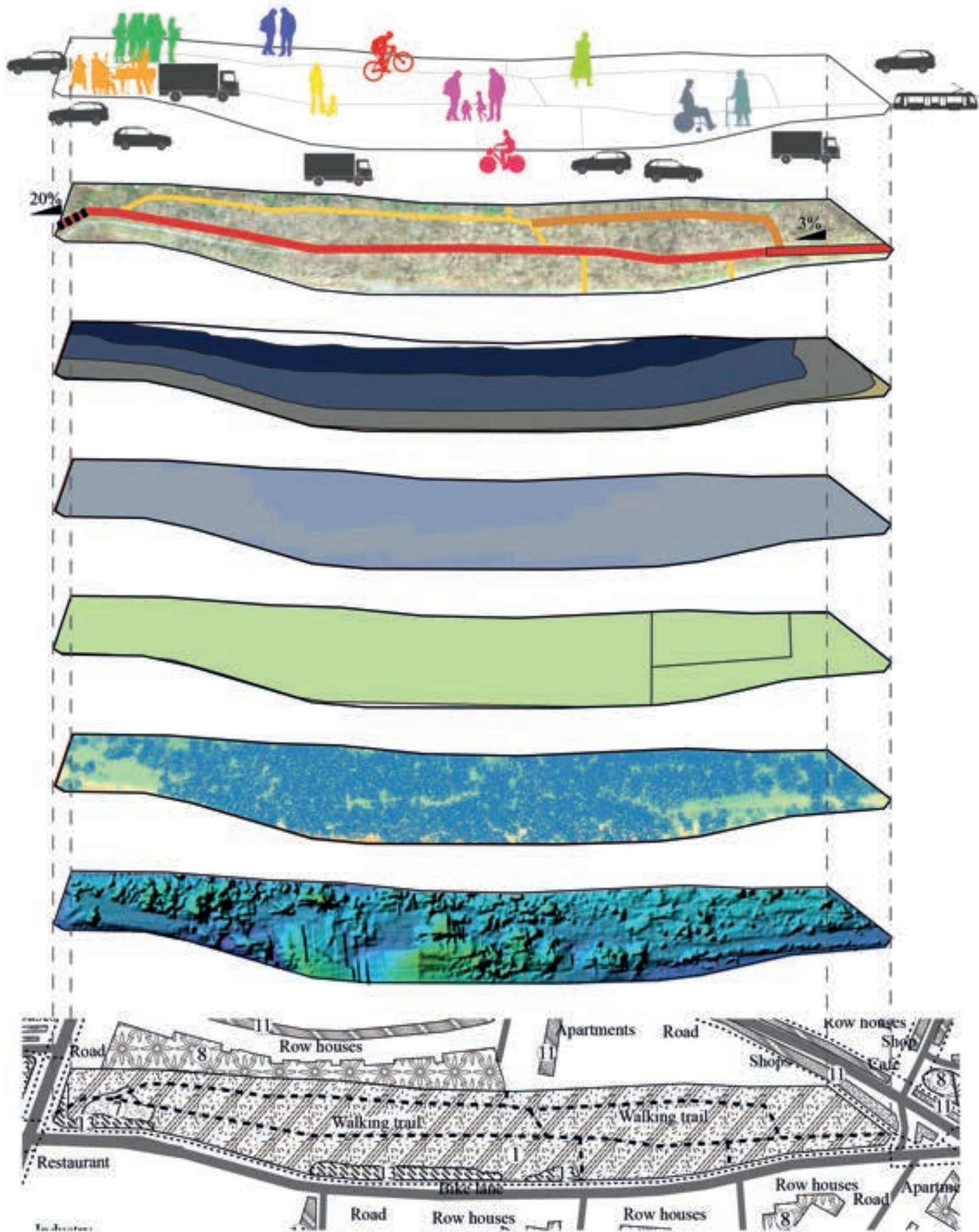
- 1 *Hedera helix*
- 2 *Rubus caesius*
- 3 *Rubus ursinus*
- 4 *Urtica dioica*

- 5 *Anthriscus sylvestris*
- 6 *Fallopia japonica*
- 7 Grass species
- 8 Seedlings and young trees



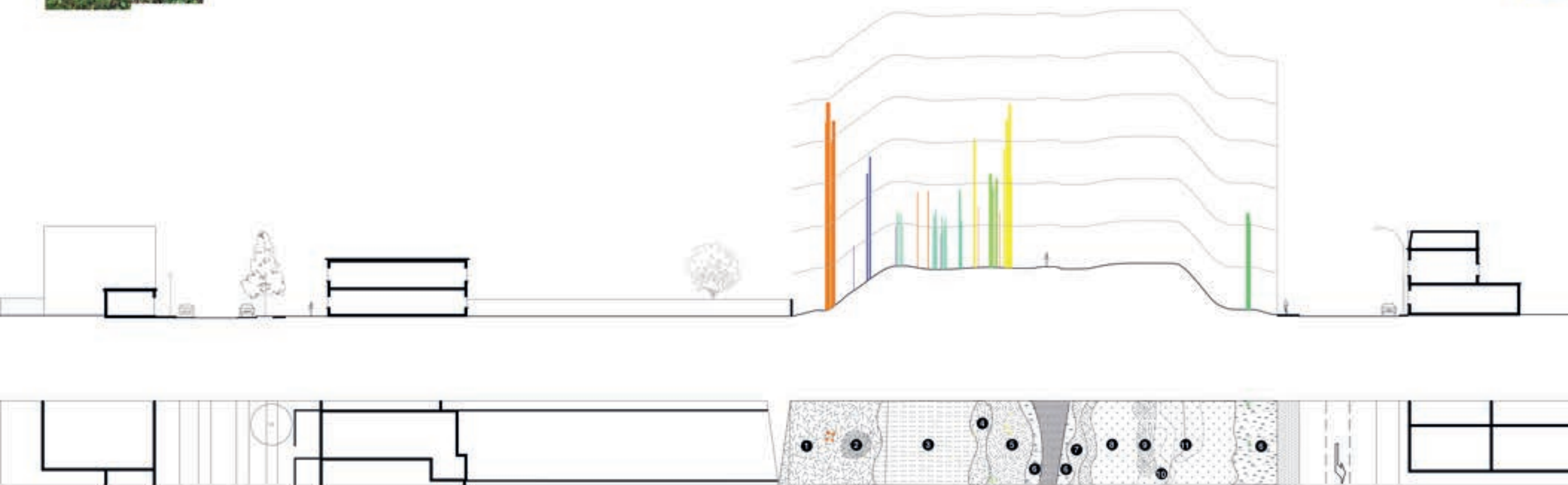
Compacted soil path

Socio-ecological layering



TRANSECT 2A
51°10'25.3"N 4°26'08.5"E





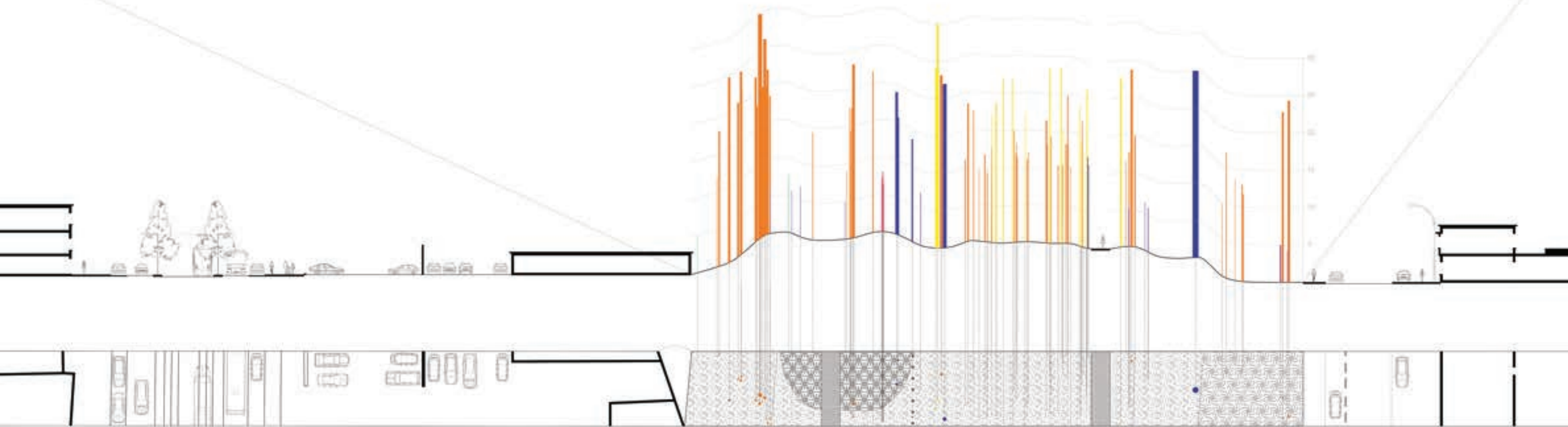
Tree density: 27 trees/ha
Stem density: 672

TREE SPECIES

- *Robinia pseudacacia*
- *Betula pendula*
- *Acer pseudoplatanus*
- *Salix caprea*
- *Fraxinus excelsior*
- *Quercus monagyna*
- *Sambucus nigra*

UNDERSTORY

- ① *Hedera helix*
- ② *Rubus caesius*
- ③ *Filix rubrum*
- ④ *Hedera helix*
- ⑤ *Rubus uliginosus*
- ⑥ *Anemone hepatica*
- ⑦ *Anthriscus sylvestris*
- ⑧ *Hyssopus perforatus*
- ⑨ *Lamium alba*
- ⑩ *Grass species*
- ⑪ *Bare soil*
- ⑫ *Lolium perenne*
- ⑬ *Plantago lanceolata*
- ⑭ *Taraxacum vulgare*
- ⑮ *Taraxacum officinale*
- ⑯ *Fallopia japonica*
- ⑰ *Anthriscus sylvestris*
- ⑱ *Urtica dioica*
- ⑲ *Lamium alba*
- ⑳ *Urtica dioica*



FLOOR DETAILS



- PLANT SPECIES
- Robinia Pseudacacia
 - Betula Pendula
 - Acer Pseudoplatanus
 - Corylus Avellana
 - Prunus Serotina
 - Crataegus Monogyna
 - Sambucus Nigra



ISLAND #3 / Mortsel



DESCRIPTION

Island 3 is located in Mortsel and is mainly surrounded by residential buildings. The north-east corner of the island is occupied by a building owned by an electricity company. The berm is rather narrow here, with an average width of 33m.

The island is limited to the north by a local street, and to the south by the street Krijgsbaan. On the other side of Krijgsbaan there is a parking lot and a garden in the corner. This garden leads to Oude Spoorweg, the footprint of the former railway line connecting the stations of Luithagen and Oude God, now a garden with a path for pedestrians and cyclists. To the west there is Antwerpsestraat and to the east, a small three-lane street with light traffic.

REGULATIONS

This section of the berm, together with islands 2, 4 and 5, is managed by the municipality of Mortsel.

PATHS AND ACCESSIBILITY

There is only one path here made of compacted soil, with stairs on both ends, making this section of the berm not accessible for people in wheelchairs. Again, no sitting areas were found.

The bike lane at street level is shared with pedestrians and next to cars.

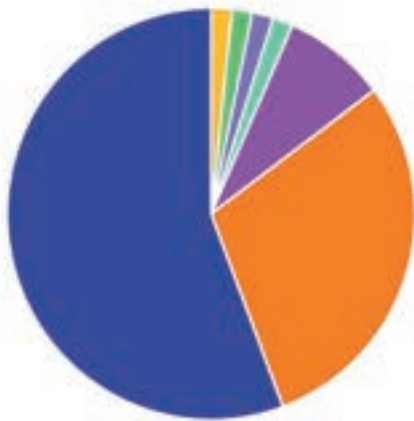
TREE ANALYSIS According to transects 3A and 3B

Island 3 has a low density regarding basal area but one of the highest stem densities. There is a small clearing towards the west with some very young *Robinia pseudoacacia* growing there. It has the lowest proportion of large trees in the whole berm, with just 8% in transect 3A and 3% in transect 3B.

The tree diversity is low, with only 7 species. The dominant species is *Robinia pseudoacacia*, followed by *Acer pseudoplatanus*. These two species represent more than 85% of the total trees in the surveyed transects.

UNDERSTORY ANALYSIS According to transects 3A and 3B

Segment 3 is on both sides surrounded by a motorway and a cycle path, which means that the herb layer at the edges is kept relatively short for safety and passage. Like the previous islands, the North side is shaded but less steep than segment 1&2, which allows for a greater variety of species on the Northern side than the previous islands. The North side is characterised by: *Aegopodium prostratum*, *Anthriscus sylvestris*, *Galium aparine*, *Lamium alba*, *Veronica hederifolia*. The south side becomes grassier from this island on to the east and species characteristic of grasslands next to forest edges start to appear here: *Arrhenatherum elatius*, *Bromus diandrus*, *Vicia sativa*.



TREE DIVERSITY

- *Robinia pseudoacacia*
- *Acer pseudoplatanus*
- *Prunus serrulata*
- *Crataegus monogyna*
- *Sambucus nigra*
- *Fraxinus excelsior*
- *Forsythia x intermedia*



Clearing with young *Robinia pseudoacacia* trees

UNDERSTORY

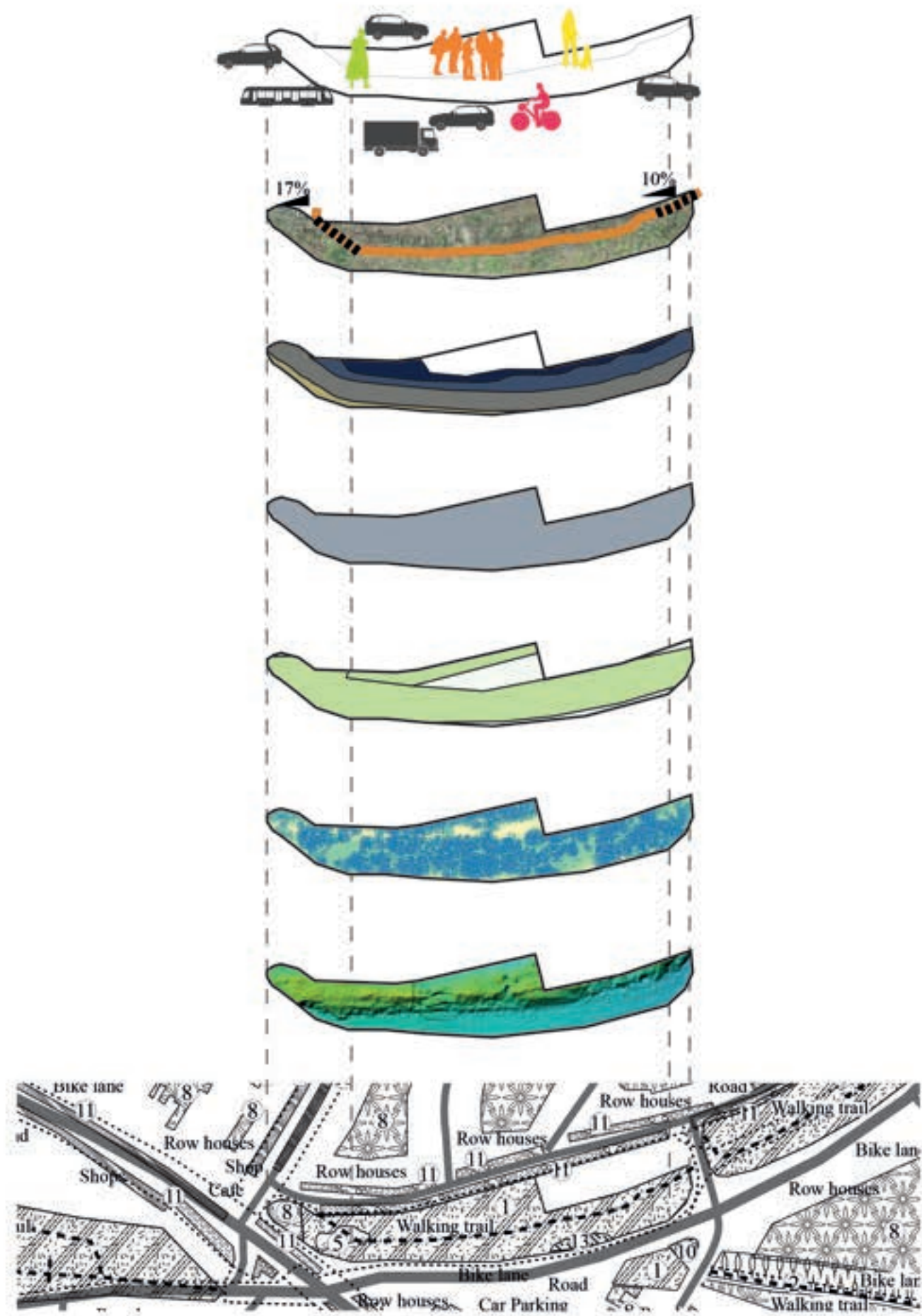


- | | |
|--------------------------------|--------------------------------|
| 1 <i>Aegopodium prostratum</i> | 5 <i>Veronica hederifolia</i> |
| 2 <i>Anthriscus sylvestris</i> | 6 <i>Arrhenatherum elatius</i> |
| 3 <i>Galium aparine</i> | 7 <i>Bromus diandrus</i> |
| 4 <i>Lamium alba</i> | 8 <i>Vicia sativa</i> |



Stairs on the east end of island

Socio-ecological layering



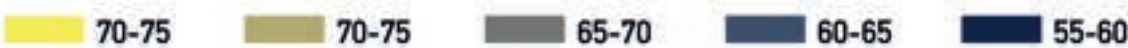
HUMANS



PATHS



ROAD NOISE in dB



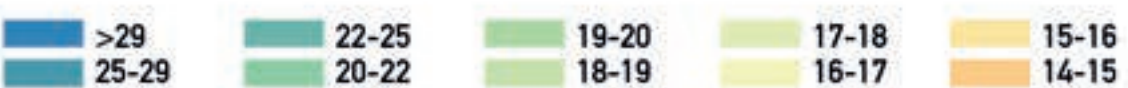
AIR QUALITY NO₂ average (2017)



BIOLOGICAL VALUE



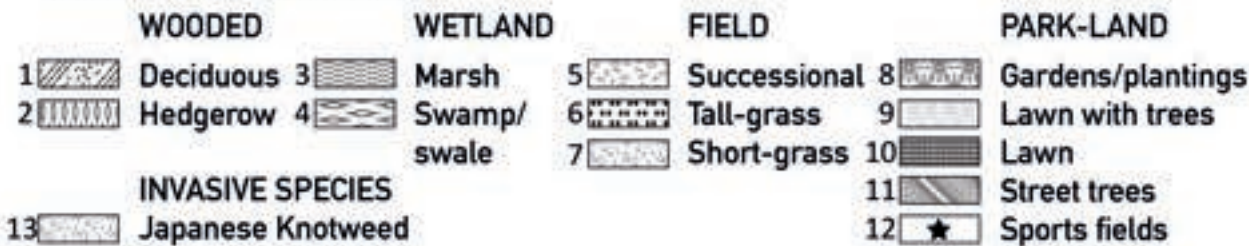
TREES HEIGHT HEIGHT ABOVE SEA LEVEL (m)

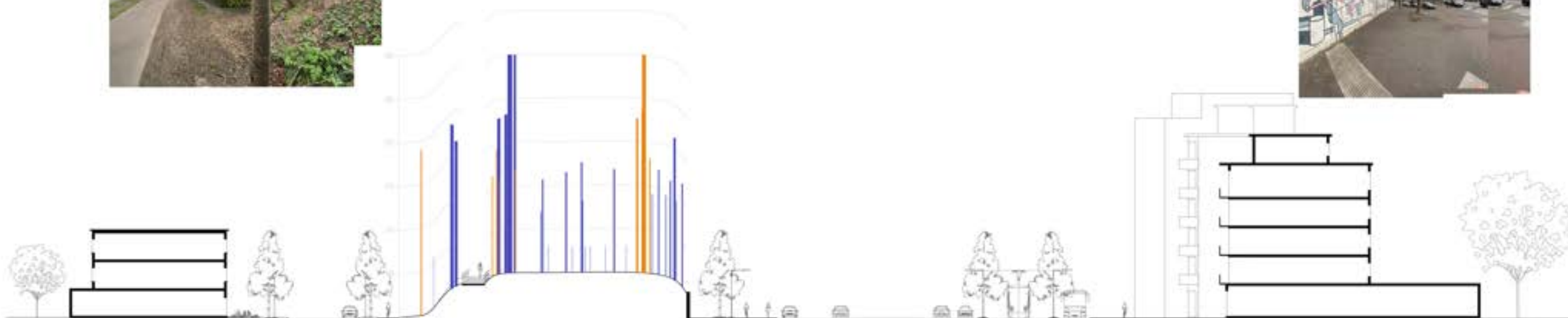


TOPOGRAPHY ELEVATION ABOVE SEA LEVEL (m)



URBAN BIOTOPES





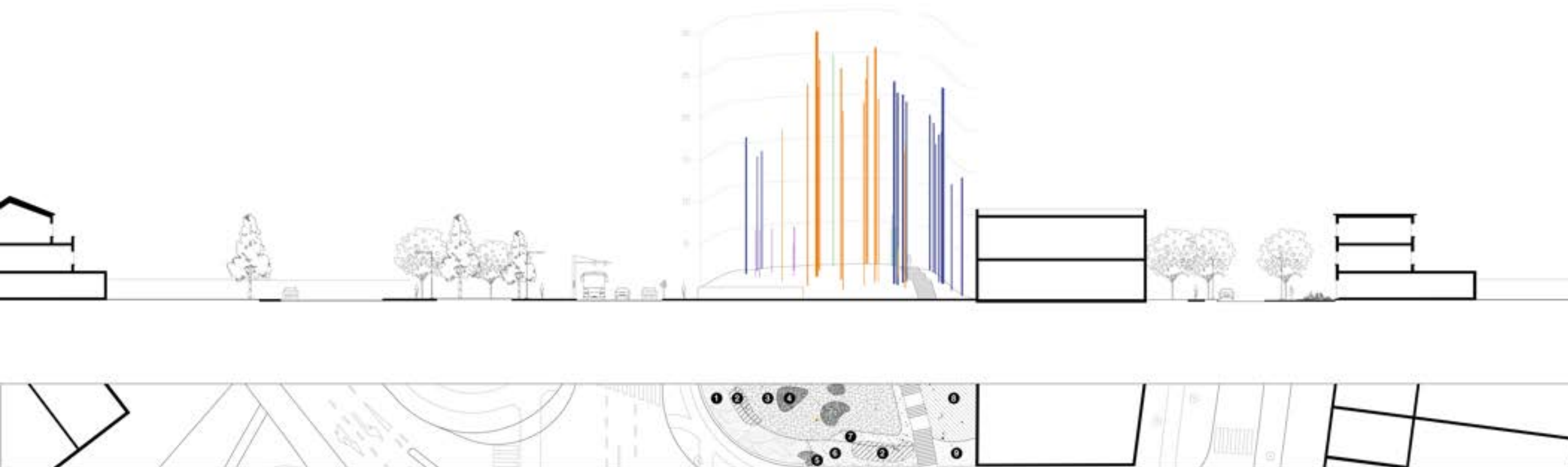
FLOOR DETAILS



- Tree density: 27 trees/ha
Stern density: 1211
- TREE SPECIES**
- *Acer pseudoplatanus*
 - *Populus pseudocarpus*
 - *Sambucus nigra*
- UNDERSTORY**
- ① *Anthriscus sylvestris*
 - ② *Aegopodium podagraria*
 - ③ *Urtica dioica*
 - ④ *Veronica hederifolia*
 - ⑤ *Chelidonium majus*
 - ⑥ *Ribes rubrum*
 - ⑦ *Hedera helix*
 - ⑧ *Dactylis glomerata*
 - ⑨ *Lamium alba*
 - ⑩ *Lolium perenne*
 - ⑪ *Hedera helix*
 - ⑫ *Rubus cuneatus*
 - ⑬ *Anthriscus sylvestris*
 - ⑭ *Urtica dioica*

TRANSECT 3B
51°10'24.6"N 4°26'58.2"E





Tree density: 25 trees/ha Shrub density: 1640	
TREE SPECIES	
●	<i>Robinia pseudacacia</i>
●	<i>Forsythia intermedia</i>
●	<i>Acer pseudoblanckii</i>
●	<i>Fraxinus excelsior</i>
●	<i>Prunus serotina</i>
●	<i>Castalegus monogyna</i>
UNDERSTORY	
①	<i>Asteranthus albus</i> <i>Bignonia diandra</i> <i>Lolium perenne</i> <i>Vicia sativa</i>
②	<i>Chelidonium majus</i>
③	<i>Rubus caesius</i>
④	<i>Ligustrum vulgare</i>
⑤	<i>Dactylis glomerata</i> <i>Lamium alba</i>
⑥	<i>Dactylis glomerata</i> <i>Galium aparine</i> <i>Taraxacum officinale</i> <i>Veronica hederifolia</i>
⑦	<i>Agropodium podagraria</i> <i>Anthriscus sylvestris</i> <i>Hieracium sphondylium</i> <i>Rubus caesius</i>
⑧	<i>Agropodium pigrum</i> <i>Anthriscus sylvestris</i> <i>Galium aparine</i> <i>Lamium alba</i>
⑨	<i>Lamium alba</i> <i>Taraxacum officinale</i> <i>Urtica dioica</i>

ISLAND #4 / Mortsel



DESCRIPTION

Island 4 is located in Mortsel and is similar in size and width to island 3. The island is bounded on the south by Krijgsbaan on the east by the railway line at a lower level and on the west divided from island 3 by the small street of Eggestraat. To the north, the western half of the island limits with Hendrik Consciencelaan and the eastern half with the gardens of private semi-detached houses. On the other side of Hendrik Consciencelaan there is a church with a garden as well, while to the south, on the other side of Krijgsbaan there is a line of row housing with gardens at the back.

REGULATIONS

This section of the berm is owned by AWV and managed by the municipality of Mortsel.

PATHS AND ACCESSIBILITY

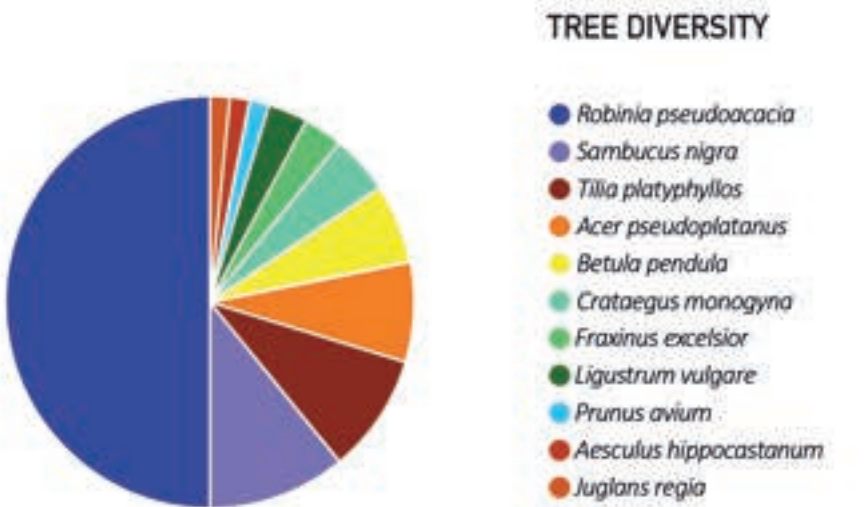
This island has only one path, made of compressed soil, which can only be accessed by stairs on both ends making it not accessible for people in wheelchairs. There is one bench located in the western end of the island overlooking Eggestraat and island 3. The bike lane at street level is shared with pedestrians and next to cars.

TREE ANALYSIS According to transects 4A and 4B

Island 4 has similar characteristics as island 3. Robinia pseudoacacia is also the dominant tree, that is located mostly on the south slope. However, the tree diversity and tree density are higher on island 4, with some large trees and species that aren't so common in other parts of the berm like Juglans regia, Ligustrum vulgare, Aesculus hippocastanum, and a smaller amount of Acer pseudoplatanus. Additionally there are some Tilia platyphyllos trees growing on the northern slope of this part of the berm in the area close to Hendrik Consciencelaan, where a double lane of Tilia platyphyllos has been planted on both sides of the street. This shows how the surroundings influence the species growing on the Bermen.

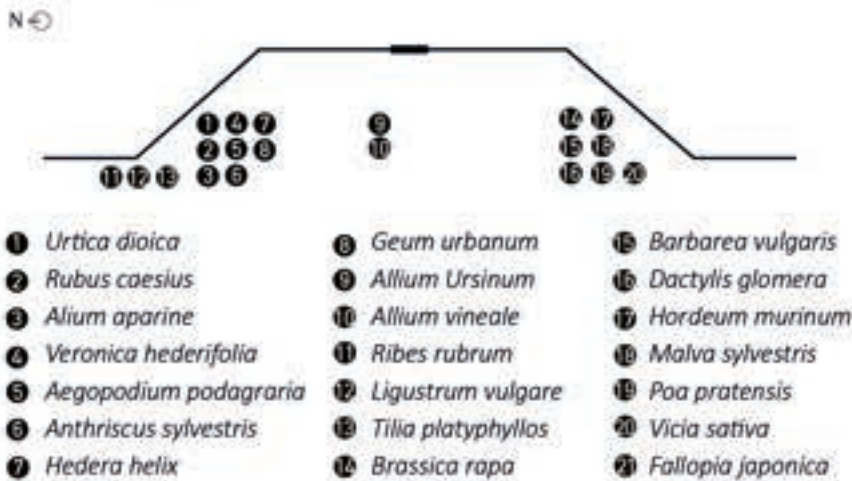
UNDERSTORY ANALYSIS According to transects 4A and 4B

Segment 4 has a rich and more varied understory than the other segments, with a clear difference between the north and south sides of the Bermen. Although transect 4B was taken at a location where the ground was raised in 1989 with soil from the demolished bridge next to it, there is a high species richness present. Especially the south side which is more grassy contains many different species that did not occur on the other segments. Due to the two-yearly mowing, the longer hours of sunshine and the nitrogen deposition of the adjacent road, a diverse grass situation is present here. Species such as: Brassica rapa, Barbarea vulgaris, Dactylis glomera, Hordeum murinum, Malva sylvestris, Poa pratensis and Vicia sativa occur here. As in all the segments, Fallopia japonica is growing here on the Southern side and mostly next to the existing railway. The Northern species are more similar to the other segments where there is more foliage development: Urtica dioica, Rubus caesius, Allium aparine, Veronica hederifolia, Aegopodium podagraria, Anthriscus sylvestris and Hedera helix. A species not found in the previous segments that grows here and to the segments to the East is Geum urbanum (Geel Nagelkruid). In addition, in the middle of this segment, rare species can be found, such as Allium ursinum (Daslook) and Allium vineale (Kraailook). These species indicate a better-developed soil that is moving more towards a forest and evolving from the previous pioneer vegetation. There are also clear influences from the environment, such as Ribes rubrum and Ligustrum vulgare coming from the neighbouring gardens, seedlings of Tilia platyphyllos planted in an avenue on the north side of this segment, etc.



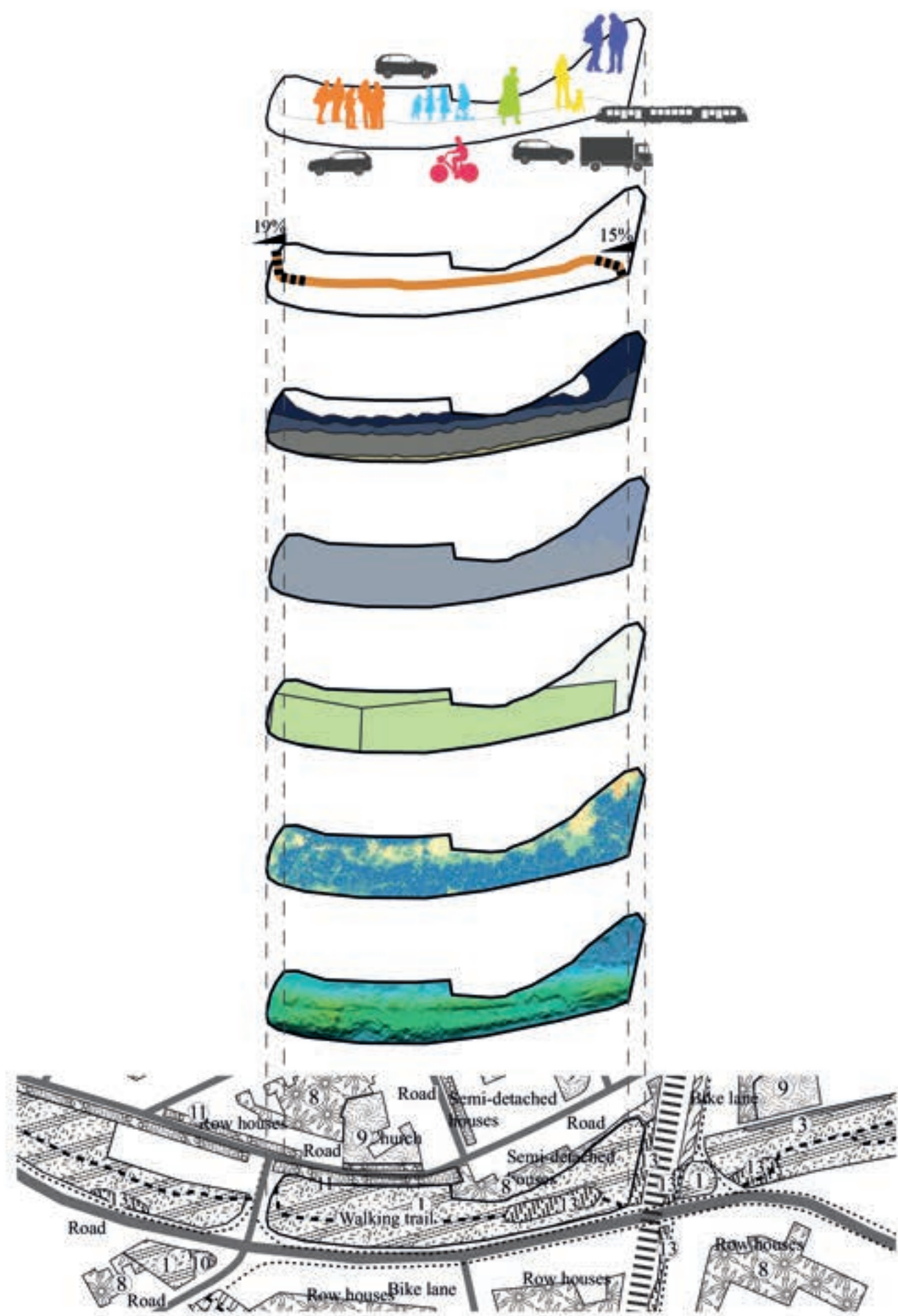
Compacted soil path

UNDERSTORY



Garden of the church

Socio-ecological layering



HUMANS

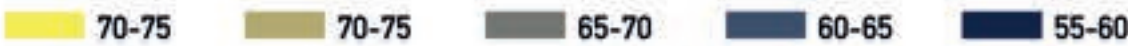


PATHS



ROAD NOISE

in dB

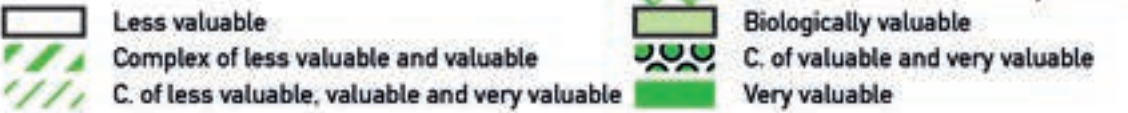


AIR QUALITY

NO₂ average (2017)

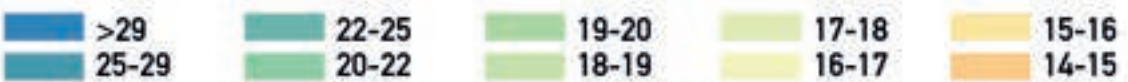


BIOLOGICAL VALUE



TREES HEIGHT

HEIGHT ABOVE SEA LEVEL (m)



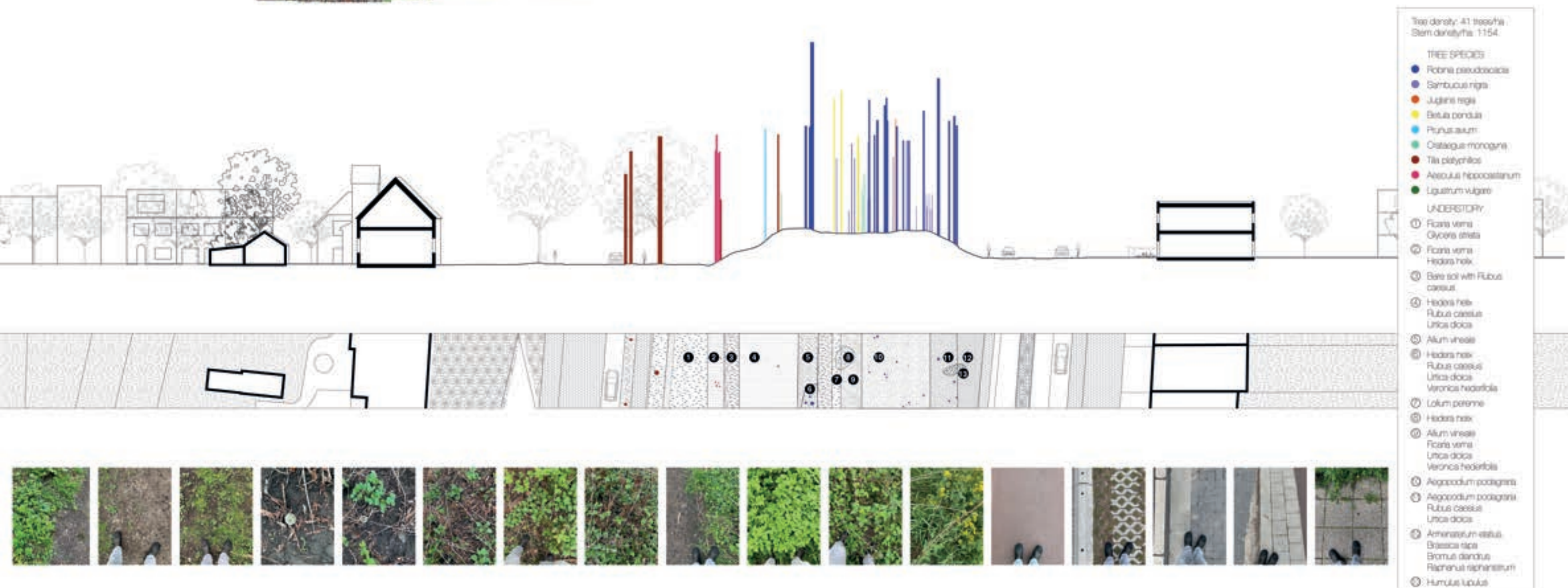
TOPOGRAPHY

ELEVATION ABOVE SEA LEVEL (m)



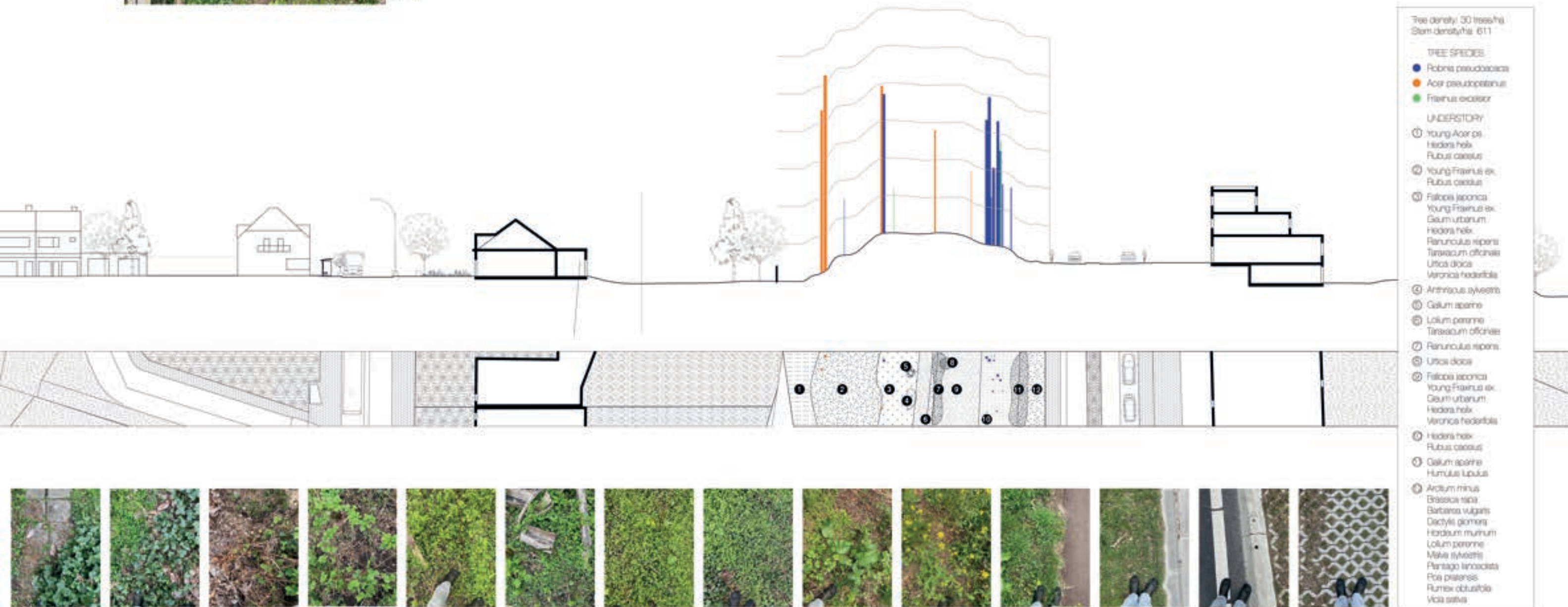
URBAN BIOTOPES





TRANSECT 4B
51°10'29.8"N 4°27'10.2"E





ISLAND #5 / Mortsel



DESCRIPTION

Island 5 is located in Mortsel and connected to Klein Zwitserland Zuid. The island is limited by an industrial estate in the south, by a mini island and the railway line at a lower level in the west and is divided from Klein Zwitserland Zuid by a small path in the east. To the north, the western half of the island has its borders with two schools and a youthmovement: Jenaplanschool Lieven Gevaert and GTI Mortsel, and the Chiro Stam and Satori Kwai buildings.

REGULATIONS

This section of the berm, is owned and managed by Mortsel. In the near future, Natuurpunt will take over the management of this area as it is officially recognized as a nature reserve.

PATHS AND ACCESSIBILITY

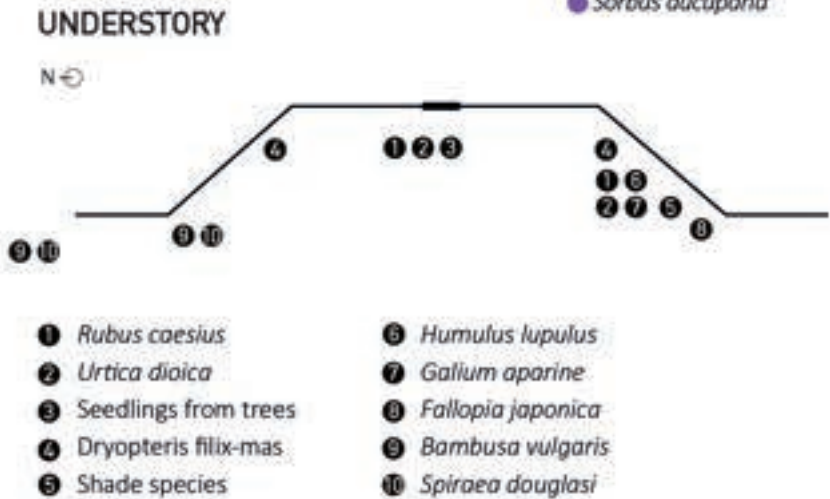
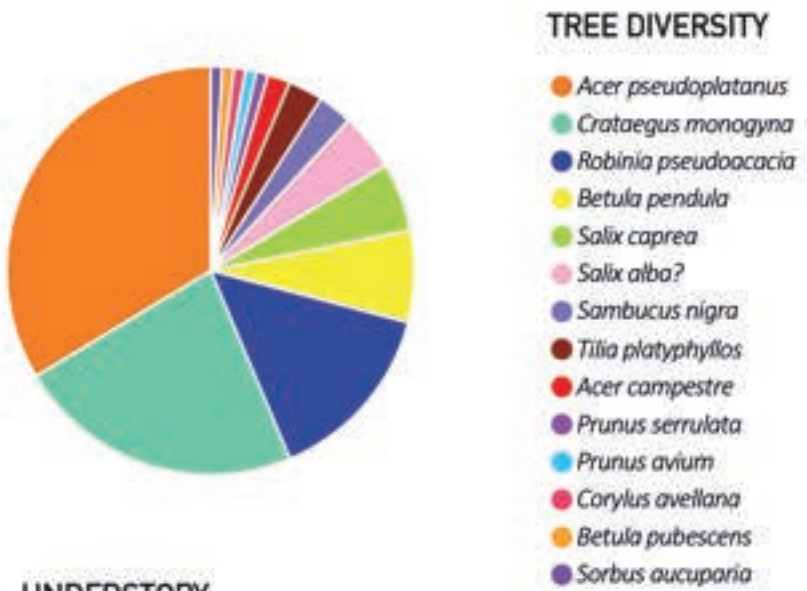
This island has two paths of which one is the widest of all the segments. The main path is around 3 metres wide and made of compacted crushed stones which is delimited by curbstones. It can be accessed on both ends by ramps paved in concret, making it accessible for people in wheelchairs. An alternative and less travelled path of compacted soil runs parallel to the main path. Some spontaneous paths have appeared that connect strategic points between the above mentioned paths. There is one concrete bench along the main path which does not have back or arm rests.

TREE ANALYSIS According to transects 5A, 5B and 5C

Island 5 has some particular characteristics that differentiate it from the first four islands of the berm. Although it still has a linear character, it is more protected from wind-, air-, and noise-pollution because it is surrounded by buildings and gardens and not by roads. This could be one of the triggers that lead to a larger diversity of tree species on this island resulting in a lower presence of *Robinia pseudoacacia*, which is a tree resistant to unfavourable conditions, and more room for other species (13 species). In fact, *Robinia pseudoacacia* was only found in transect 5A, close to Krijksbaan. Additionally, the tree diversity might also respond to the direct proximity of gardens, in this case those of the Chiro and the two schools on the north, from where some species might have migrated.

UNDERSTORY ANALYSIS According to transects 5A, 5B and 5C

Within segment 5, three different transects were taken, each with different characteristics and species. More towards the east larger and older trees were found, under which the understory is becoming less diverse and more bare soil is present. A few species such as *Rubus caesius*, *Urtica dioica* and especially many seedlings from surrounding trees make up the understory here. However, species such as *Dryopteris filix-mas*, which are an indicator of moist soils and richer forest floors, do occur here in the northern and southern parts. The southern part is restricted by a wall, which allows for many shade species to grow there. On the southern parts that do get more sun, *Humulus lupulus*, *Gallium aparine*, *Urtica dioica*, *Rubus caesius* and *Fallopia japonica* grow in abundance. Another exotic species found here is *Bambusa vulgaris*, which started to grow on this segment from gardens in the area. Another species abundant in transect 5A that came from gardens and has arrived on the Bermen is *Spiraea douglasii*.

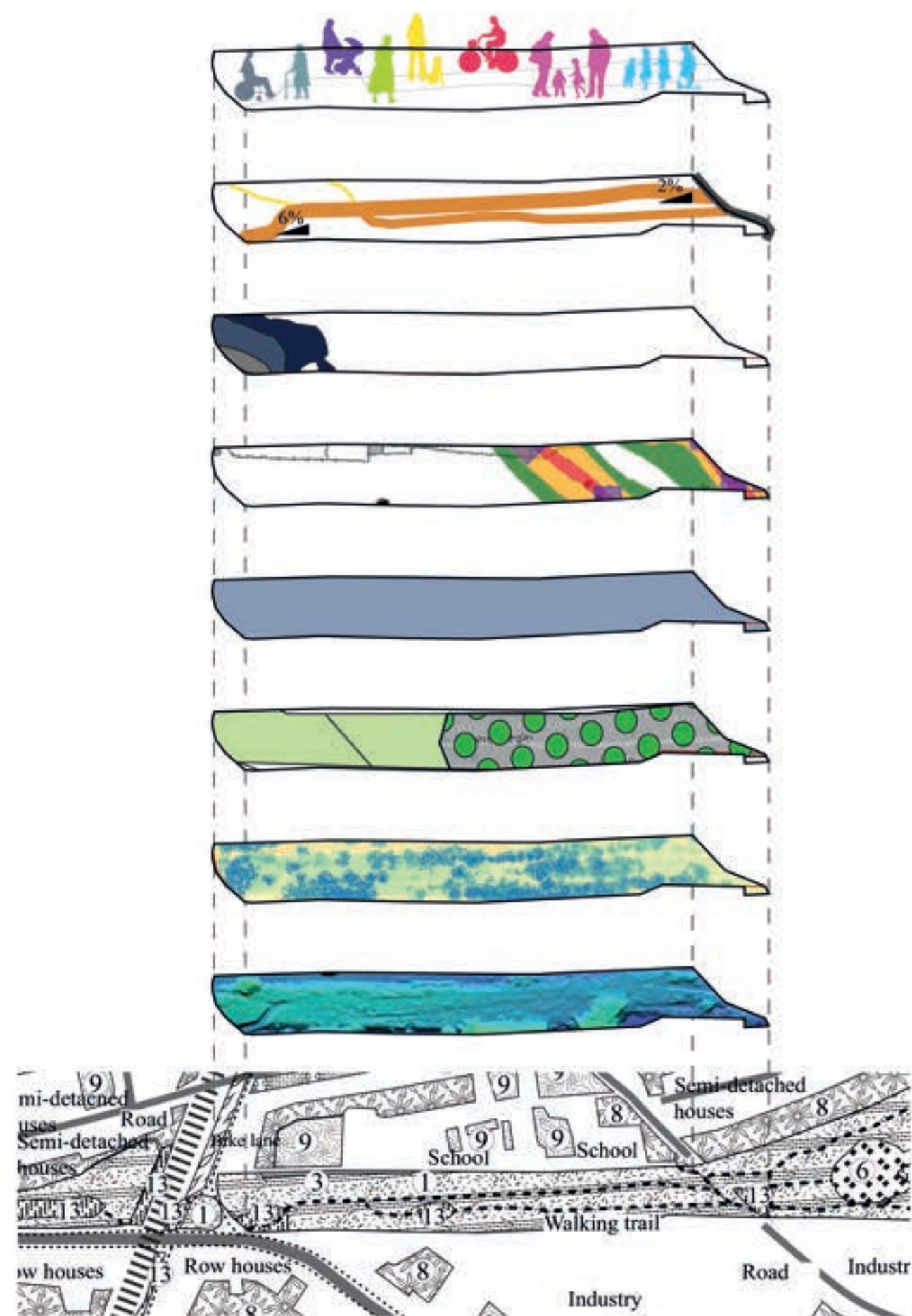


Main path



Spontaneous path connecting with the Chiro

Socio-ecological layering



HUMANS



PATHS



ROAD NOISE



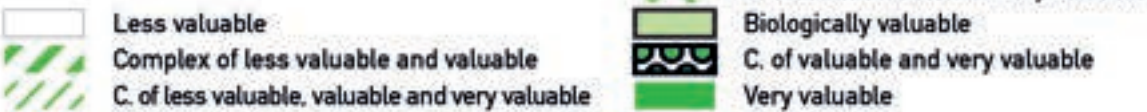
GROUND WATER POLLUTION



AIR QUALITY



BIOLOGICAL VALUE



TREES HEIGHT



TOPOGRAPHY



URBAN BIOTOPES



TRANSECT 5A
51°10'33.3 N 4°27'15.8 E





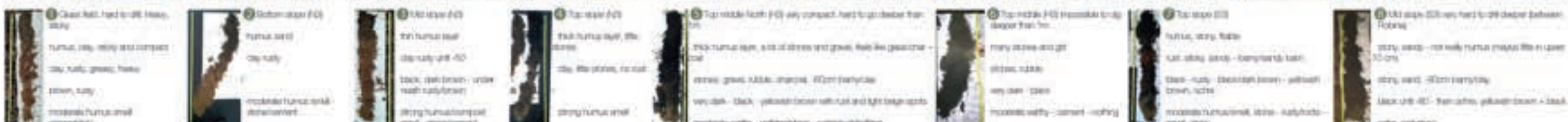
Tree density: 22 trees/ha
Bam density: 752

TREE SPECIES
● <i>Acer campestre</i>
● <i>Acer pseudoplatanus</i>
● <i>Betula pendula</i>
● <i>Crataegus monogyna</i>
● <i>Prunus serotina</i>
● <i>Robinia pseudacacia</i>
● <i>Sambucus nigra</i>
UNDERSTORY
① <i>Poa trivialis</i>
② <i>Glechoma hederacea</i>
③ <i>Equisetum telmateia</i>
④ <i>Geum urbanum</i>
⑤ Young <i>Acer ps.</i> <i>Rubus caesius</i> <i>Rubus ulmifolius</i> <i>Sorbus douglasii</i> <i>Urtica dioica</i>
⑥ Young <i>Acer ps.</i> <i>Rubus caesius</i> <i>Sorbus douglasii</i>
⑦ <i>Sorbus douglasii</i>
⑧ <i>Urtica dioica</i>
⑨ <i>Fallopia japonica</i>
⑩ Bare soil <i>Dactylis glomerata</i> <i>Fallopia japonica</i>
⑪ <i>Anthriscus sylvestris</i> <i>Geum urbanum</i> <i>Taraxacum officinale</i>
⑫ <i>Rubus caesius</i> <i>Urtica dioica</i>
⑬ <i>Galium aparine</i> <i>Humulus lupulus</i> <i>Rubus caesius</i> <i>Urtica dioica</i>

GROUND COVER

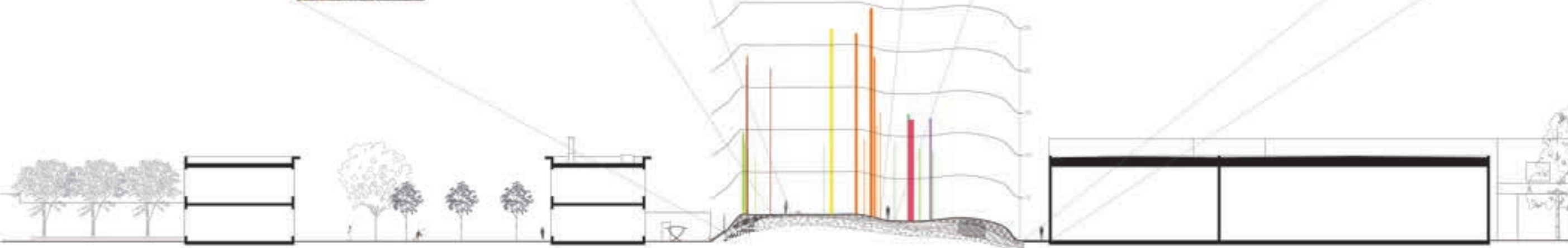


SOIL SAMPLES



TRANSECT 5B
51°10'36.3"N 4°27'20.2"E





GROUND COVER

PROFILE
TEXT 0-20
TEXT 30-100
COLOUR
SUELL



Tree density: 25 trees/ha
Stem density: 152

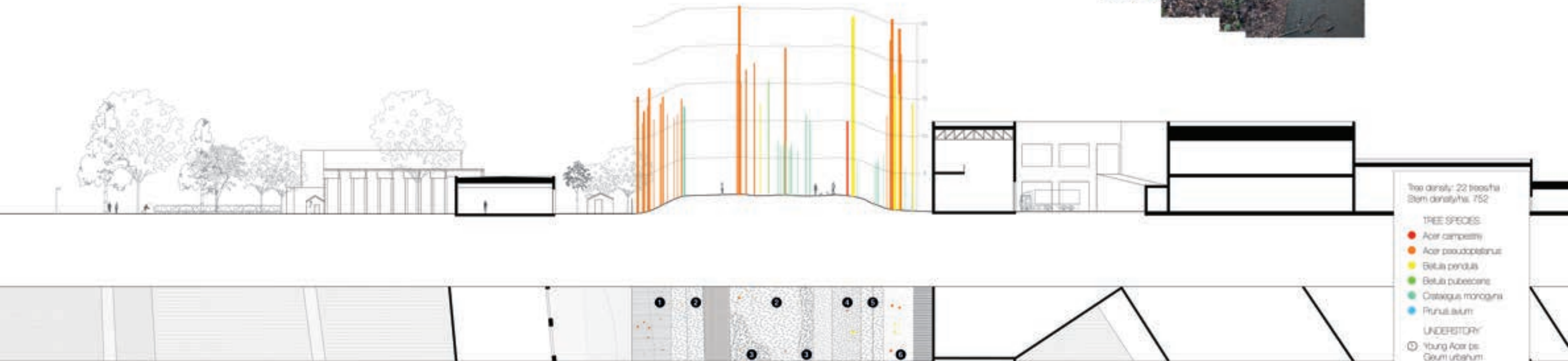
TREE SPECIES

- Corylus avellana
- Salix caprea
- Acer pseudoplatanus
- Betula pendula
- Sorbus aucuparia
- Crataegus monogyna
- Tilia platyphyllos

UNDERSTORY

- 1 Bare soil
- 2 Young Acer ps.
Young Crataegus mo.
Agrostis podagracea
Asterionema elaeagnifolium
Dryopteris filix-mas
Ilex aquifolium
Lysimachia vulgaris
- 3 Lysimachia vulgaris
Rubus ulmifolius
Rumex obtusifolius
- 4 Lysimachia vulgaris
- 5 Young Acer ps.
Galium aparine
Rubus cuneatus
Urtica dioica
Veronica hederifolia
- 6 Galium aparine
Young Acer ps.
Galium aparine
Rubus cuneatus
Urtica dioica
- 7 Urtica dioica





Tree density: 22 trees/ha
Stem density/ha: 752

TREE SPECIES

- *Acer camppestre*
- *Acer pseudoplatanus*
- *Betula pendula*
- *Betula pubescens*
- *Corylus monogyna*
- *Prunus avium*

UNDERSTORY

- ① Young *Acer ps.*
Quercus robur
Hedera helix
Rubus caesius
Veronica hederifolia
- ② Bare soil
- ③ *Rubus caesius*
- ④ Young *Acer ps.*
Corylus monogyna
Rubus caesius
- ⑤ Bare soil
Rubus caesius
- ⑥ Young *Acer ps.*
Hydrangea paniculata
Rubus caesius
Urtica dioica

GROUND COVER

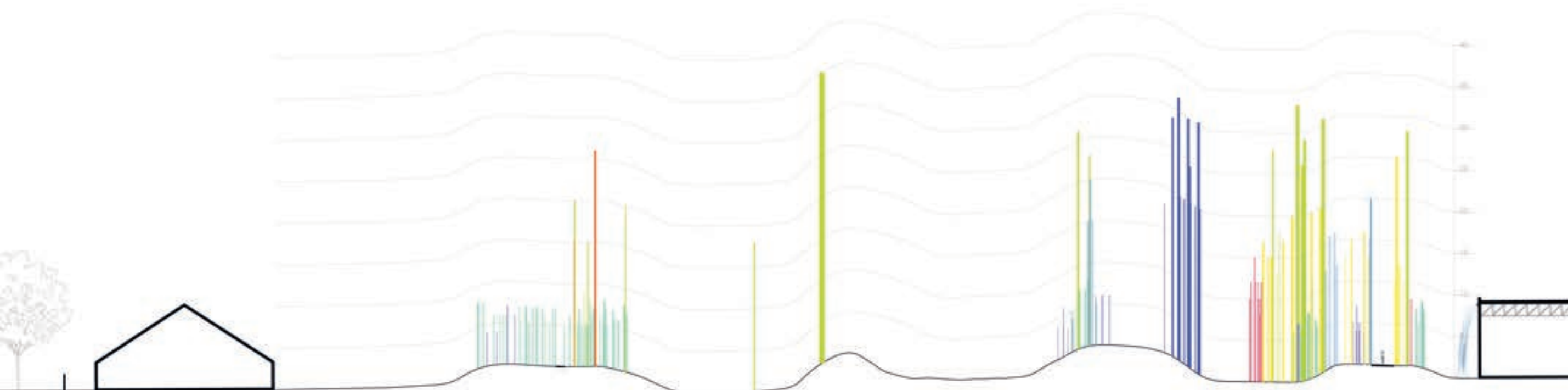


SOIL SAMPLES



TRANSECT 5D
51°10'45.5"N 4°27'33.7"E





- Tree density: 21 trees/ha
Sap density/ha: 1377
- TREE SPECIES**
- *Acer platanoides*
 - *Sambucus nigra*
 - *Salix alba*
 - *Betula pendula*
 - *Fagus sylvatica*
 - *Distylium monogynum*
 - *Corylus avellana*
 - *Quercus robur*
 - *Quercus robur*
 - *Carpinus betulus*
- UNDERSTORY**
- ① Grass species
 - ② *Adiantum minus*
Lamium album
Poa trivialis
Potentilla indica
Ranunculus repens
Urtica dioica
 - ③ *Galium aparine*
Myosotis sylvatica
Trisetum campyodes
 - ④ *Galium aparine*
Urtica dioica
 - ⑤ *Rubus caesius*
 - ⑥ Bare soil
 - ⑦ *Rubus caesius*
Urtica dioica
 - ⑧ *Phlebotomus aeneus*
Rubus caesius
Urtica dioica
 - ⑨ *Dryopteris filix-mas*
Urtica dioica
 - ⑩ *Phlebotomus aeneus*
Urtica dioica
 - ⑪ *Phragmites australis*
 - ⑫ Young *Quercus*
Bare soil
 - ⑬ *Dactylis glomerata*
Galium aparine
Phragmites australis
Rubus caesius
Urtica dioica
 - ⑭ *Rumex obtusifolius*
 - ⑮ *Phragmites* sp.
 - ⑯ Grass sp.
 - ⑰ *Equisetum pratense*
Humulus lupulus
Urtica dioica
 - ⑱ *Galium aparine*
Galium aparine
Humulus lupulus
Urtica dioica
 - ⑲ *Humulus lupulus*
Rubus ulmifolius
Young *Sambucus nigra*
 - ⑳ *Dactylis glomerata*
Lolium perenne
 - ㉑ Bare soil
Dryopteris filix-mas
Rubus ulmifolius
 - ㉒ *Humulus lupulus*
Rubus ulmifolius
 - ㉓ *Dryopteris filix-mas*
Rubus ulmifolius
Urtica dioica
 - ㉔ Bare soil
Dryopteris filix-mas
Rubus ulmifolius

ISLAND #6 / Klein Zwitserland

South



DESCRIPTION

Klein Zwitserland Zuid limits to the north with the railway line, to the west with private gardens and to the east with an industrial area. This area is officially acknowledged as a nature reserve by the Flemish government. The size and width of Klein Zwitserland and the more "intensive/guided" management done by Natuurpunt allow for more varied situations and biotopes to appear. This island has much steeper slopes and a variable topography, including (man-made) wetlands. Like Island 5, it is protected from car pollution and noise. However it is affected by the groundwater- and soilpollution from the industries next to it.

REGULATIONS

This section of the berm, is owned by Mortsels and is managed by Natuurpunt.

PATHS AND ACCESSIBILITY

Klein Zwitserland has a more complex network of paths than the other islands of the berm and it allows you to visit the different areas of the island. All the paths are formed because of people walking there and consist of compacted soil. They are delimited in strategic areas by fences made with dead wood to protect certain biotopes. The island can be accessed in four spots, one with stairs and the other three with compressed soil ramps.

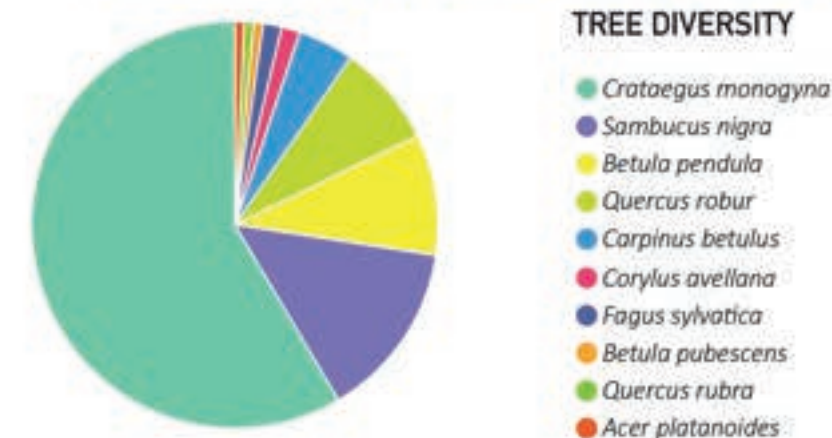
TREE ANALYSIS According to transect 5D

The pattern of dominant species in the other islands is not present here, with no specimens of *Acer pseudoplatanus* or *Robinia pseudoacacia* found in the surveyed transect. The species with the highest number of individuals in this transect is the *Crataegus monogyna*, with a very dense stand of young shrubs but also some mature trees next to the old barn. There is also a significant presence of *Betula pendula* and *Sambucus nigra* and some large specimens of *Quercus robur* and *Fagus sylvatica*. The last two species do not occur on the other islands and are part of a more mature forest vegetation that is developing.

UNDERSTORY ANALYSIS According to transect 5D

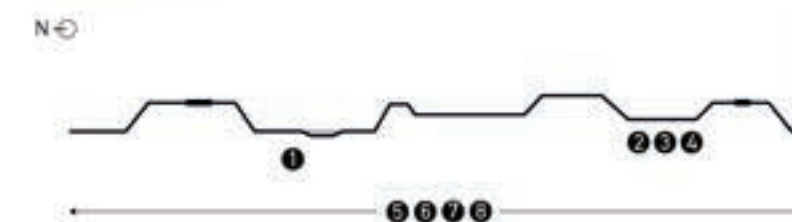
Segment 7 is an acknowledged nature reserve in which a larger amount of species was found than on the other segments. However, the diversity and the kind of species growing here is quite similar to many of the species found at the other segments. Additionally, this area is managed more intensely, focussing on the presence of specific species whereas the other segments are managed rather sporadically.

Species that grow here that don't appear on the other segments concern species that correlate with biotopes that do not appear on the other segments. Around the pond dug in *Klein Zwitserland Zuid*, species such as *Phragmites sp.* were found. Additionally there are some areas that are rather foresty with older trees (like *Fagus sylvatica*) that can be found in climax vegetations in Belgium that didn't have a large understory. Species found here that indicate a rather moist and nutrient-rich soil are: *Dryopteris filix-mas*, *Myosotis sylvatica*, and *Geum urbanum*. Throughout the entire transect many patches of *Rubus caesius*, *Urtica dioica*, *Humulus lupulus* and *Galium aparine* are present.



Example of a path

UNDERSTORY

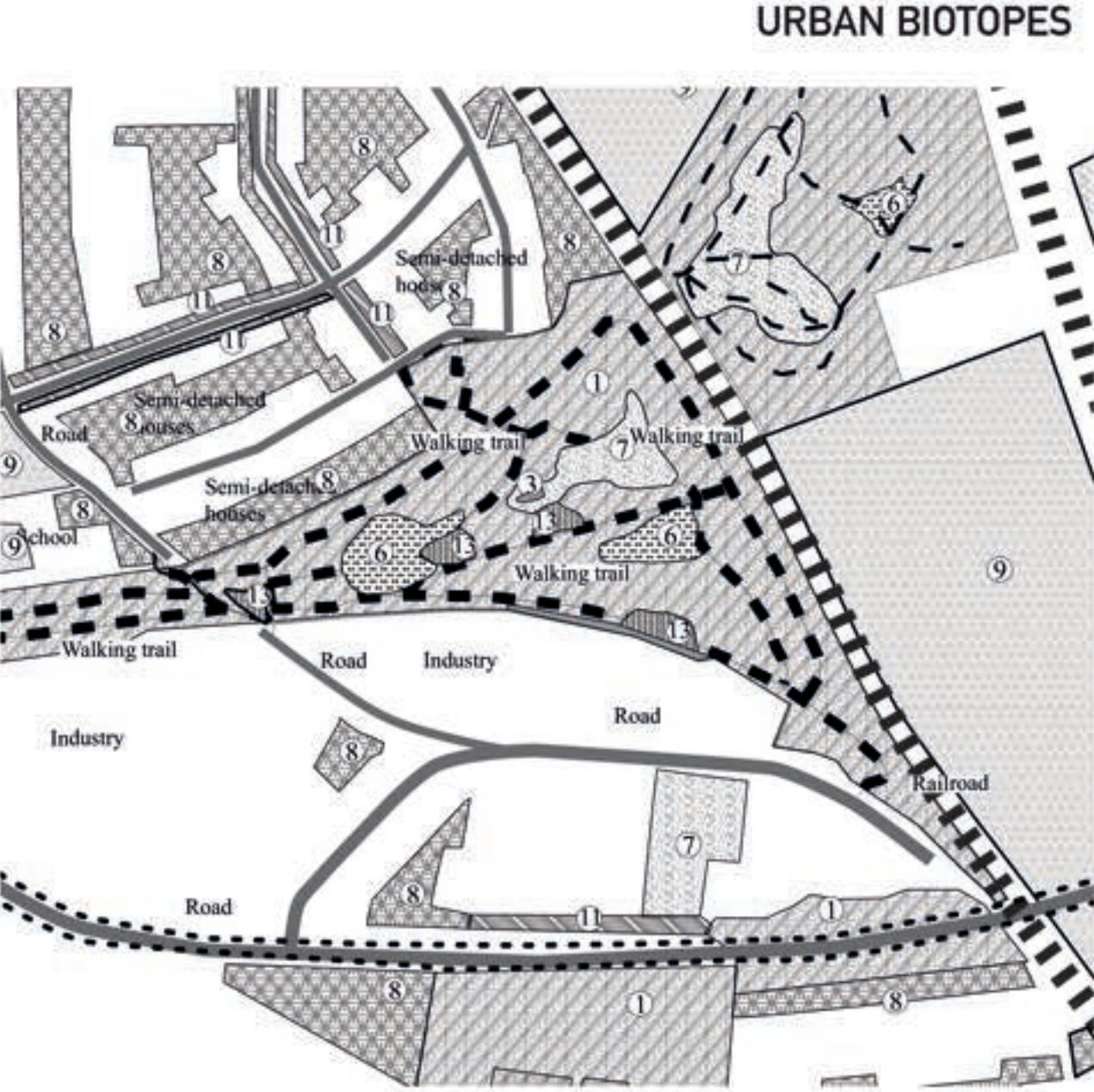


- | | |
|-------------------------------|--------------------------|
| 1 <i>Phragmites sp.</i> | 5 <i>Rubus caesius</i> |
| 2 <i>Dryopteris filix-mas</i> | 6 <i>Urtica dioica</i> |
| 3 <i>Myosotis sylvatica</i> | 7 <i>Humulus lupulus</i> |
| 4 <i>Geum urbanum</i> | 8 <i>Galium aparine</i> |



Information board

Socio-ecological layering



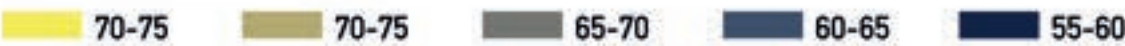
HUMANS



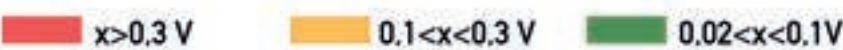
PATHS



ROAD NOISE in dB



GROUND WATER POLLUTION (10-20 m-mv)



AIR QUALITY NO₂ average (2017)



BIOLOGICAL VALUE



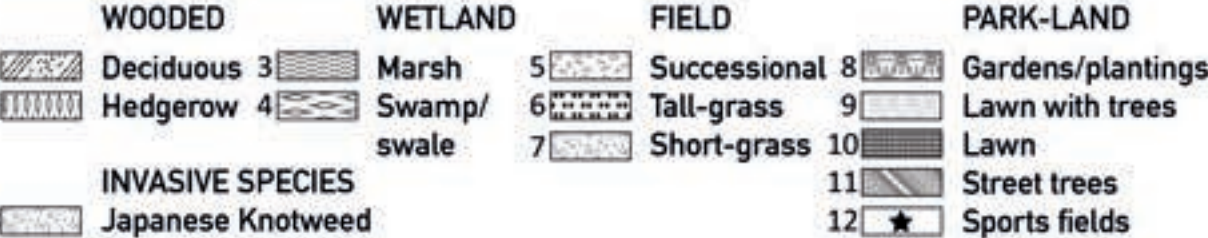
TREES HEIGHT HEIGHT ABOVE SEA LEVEL (m)



TOPOGRAPHY ELEVATION ABOVE SEA LEVEL (m)



URBAN BIOTOPES

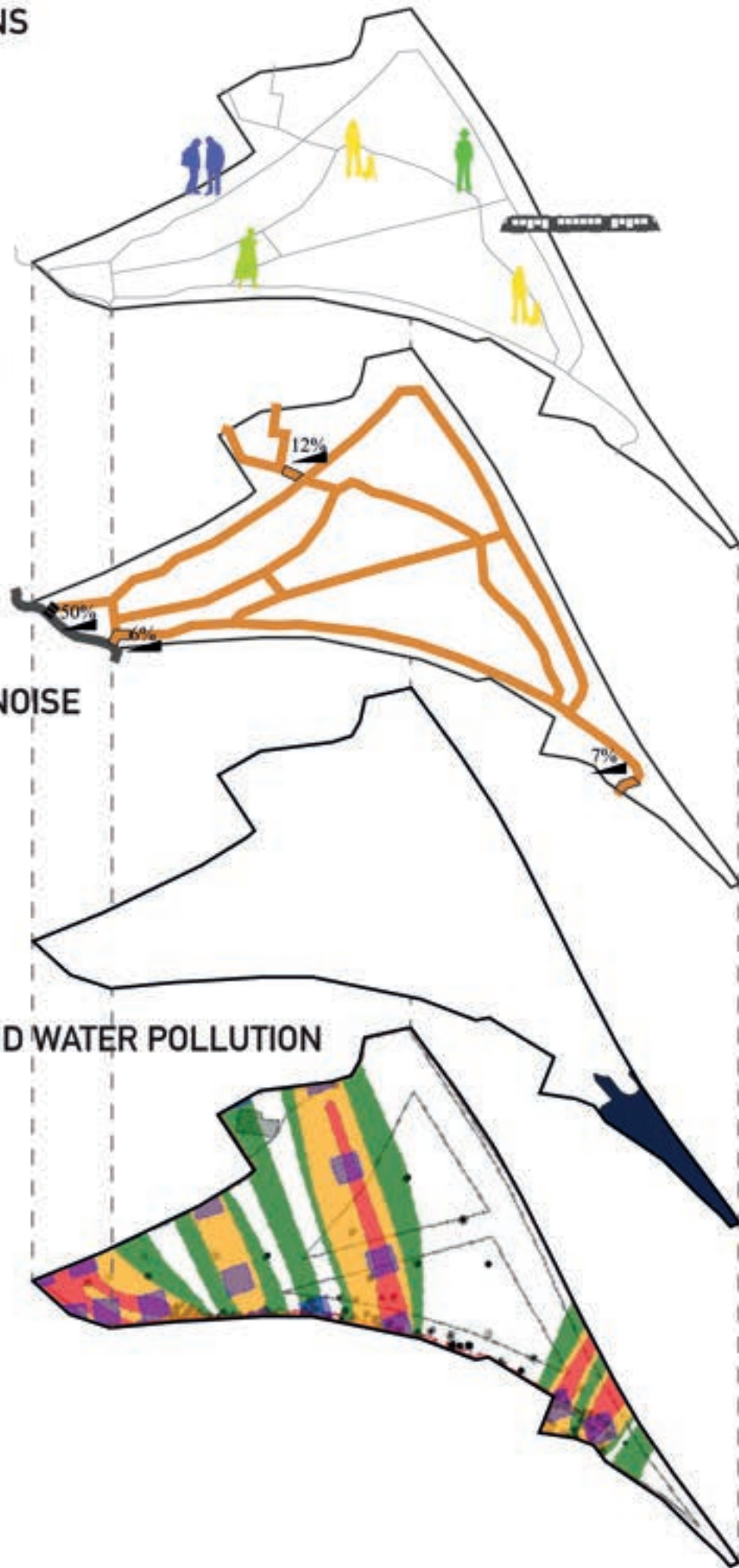


HUMANS

PATHS

ROAD NOISE

GROUND WATER POLLUTION

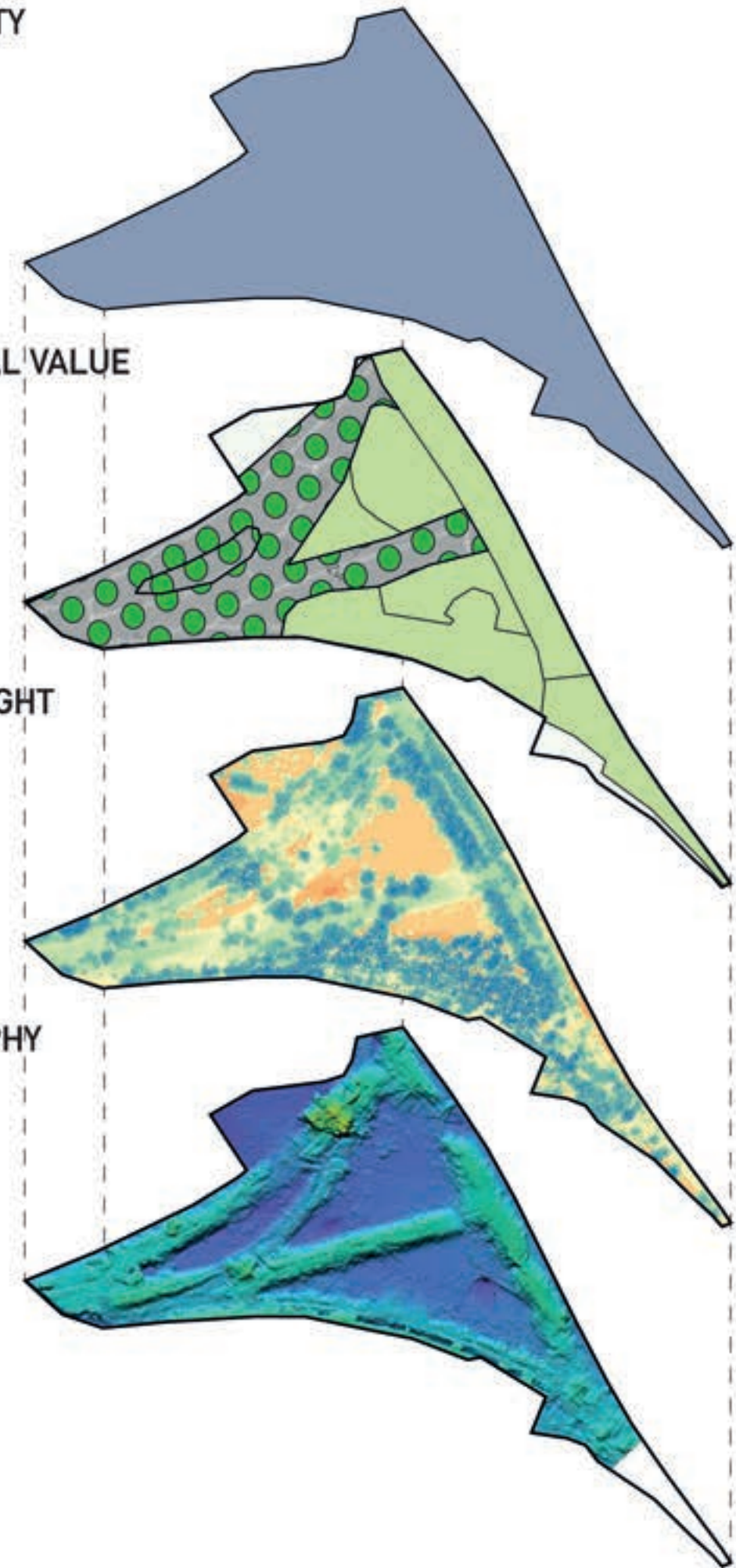


AIR QUALITY

BIOLOGICAL VALUE

TREES HEIGHT

TOPOGRAPHY



ISLAND #7 / Klein Zwitserland North

DESCRIPTION

Klein Zwitserland Noord is bounded by two railway lines, with a psychiatric hospital on the west and a cemetery on the east.

This island has a variety of biotopes, with foresty areas of different ages, shrubbery, dense shrubs, open grasslands and a wetland.

A group of archers uses the area to train and compete. In return for them to occupy the area and park their cars here, they have made an agreement with Natuurpunt for a shared management. However, this is not always done properly. Some mountain bikers also come quite often and use the topography of part of the island in their advantage for their activities. Natuurpunt is trying to reduce their presence in order to protect biodiversity.

REGULATIONS

Klein Zwitserland Noord is also owned by Mortsel but managed by Natuurpunt.

PATHS AND ACCESSIBILITY

Both Klein Zwitserland Noord and Zuid have a more complex network of paths than the other islands, allowing visitors to explore the different areas of the island. All the paths occurred because of people walking there and thus consist of compacted soil. They are delimited by fences made with dead wood to protect certain biotopes. The island is mostly flat (except for the embankment used by mountain bikers and a few other areas) and can therefore be easily accessed, even by car which causes an excessive compacting of the soil.

TREE ANALYSIS According to direct observation and Natuurpunt's management plan.

Different forest types can be distinguished on the island.

On the northern side there is a spontaneous pioneer forest with Silver birch on the former tennis court of the NMBS with specimens of Harblage alder (exotic), limited undergrowth and several specimens of Broad-leaved Helleborine.

A large part of the present woodland is young, emerging oak woodland with Pedunculate Oak and an undergrowth of Common White Fern, Broad-stemmed White Fern and Greater Stinging Nettle. On the east side of the area there are a few American oaks. In certain zones, there is a gradual transition from forest to open grassland.

At the borders of the area, planting of deciduous or coniferous trees took place historically. For example, a row of Robinia and Hartleaf Alder was planted on the north-western side. The east side is bordered by a planting of softwood and Italian poplar.

There are several areas with thicket growth, the most important being thorny woodland with Hawthorn, Blackthorn, Dog rose, Common dogwood, etc.

Other parts contain tree and shrub thickets of all kinds, such as Hazel, Sycamore maple, Elder, ... On the south-eastern side, there are several specimens of Walnut, which are slowly expanding. Oriental Dogwood and American Elder are also observed in considerable numbers and are expanding further.



UNDERSTORY ANALYSIS According to direct observation and Natuurpunt's management plan.

This segment is not acknowledged as a nature reserve (yet) but is managed similarly to Klein Zwitserland Zuid. The aim of this management is to improve diversity and reserve species that are present nowadays. No transect was taken here. Plant communities found here based on some visits and information provided by Natuurpunt are: young pioneer vegetations with a limited understory, young forests with *Dryopteris filix-mas* (Mannetjesvaren), *Dryopteris dilatata* (Brede stekelvaren) and *Urtica dioica* (Grote Brandnetel), forest edges with *Epipactis helleborine* (Breedbladige wespenorchis), *Geum urbanum* (Geel nagelkruid), *Scrophularia nodosa* (Knopig Helmkruid), *Silene dioica* (Dagkoekoeksbloem) and *Torilis japonica* (Heggedoornzaad), grasslands with *Alopecurus pratensis* (Grote vossenstaart), *Arrhenatherum elatius* (Glanshaver), *Anthoxanthum odoratum* (Gewoon reukgras), *Daucus carota* (Peen), etc., a part of the old railway verge where the same species occurring at the other segments grow: *Anthriscus sylvestris*, *Urtica dioica*, *Galium aparine*, etc. and vegetation connected to the pond.

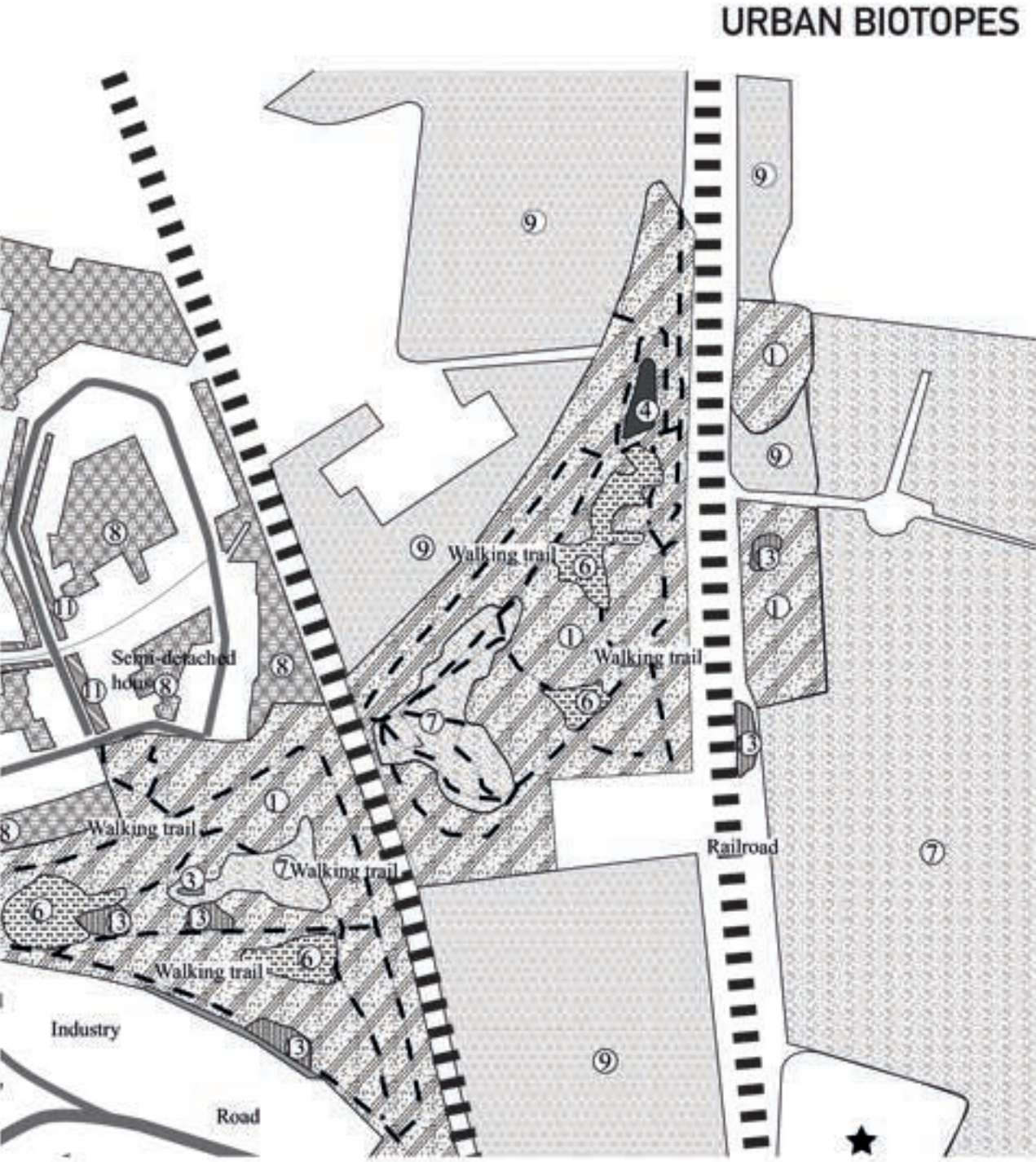


Access path next to railway line



Archery club in Klein Zwitserland Noord

Socio-ecological layering



HUMANS



PATHS

Compacted soil path

ROAD NOISE in dB

70-75 70-75 65-70 60-65 55-60

GROUND WATER POLLUTION (10-20 m-mv)

$x > 0.3 V$ $0.1 < x < 0.3 V$ $0.02 < x < 0.1 V$

AIR QUALITY NO₂ average (2017)

8 7 6 5 4 3 2 1
Low High

BIOLOGICAL VALUE

Less valuable
Complex of less valuable and valuable
C. of less valuable, valuable and very valuable
C. of less valuable and very valuable
Biologically valuable
C. of valuable and very valuable
Very valuable

TREES HEIGHT HEIGHT ABOVE SEA LEVEL (m)

>29 22-25 19-20 17-18 15-16
25-29 20-22 18-19 16-17 14-15

TOPOGRAPHY ELEVATION ABOVE SEA LEVEL (m)

6.78 20.81

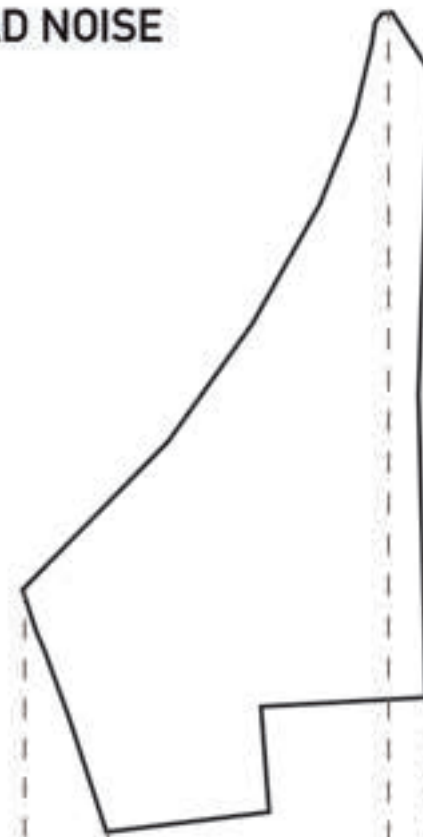
URBAN BIOTOPES

WOODED	WETLAND	FIELD	PARK-LAND
1 Deciduous	3 Marsh	5 Successional	8 Gardens/plantings
2 Hedgerow	4 Swamp/swale	6 Tall-grass	9 Lawn with trees
		7 Short-grass	10 Lawn
INVASIVE SPECIES			11 Street trees
13 Japanese Knotweed			12 Sports fields

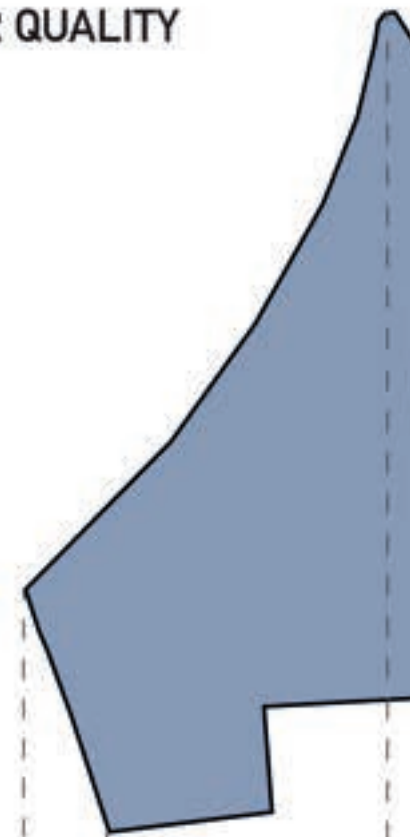
HUMANS



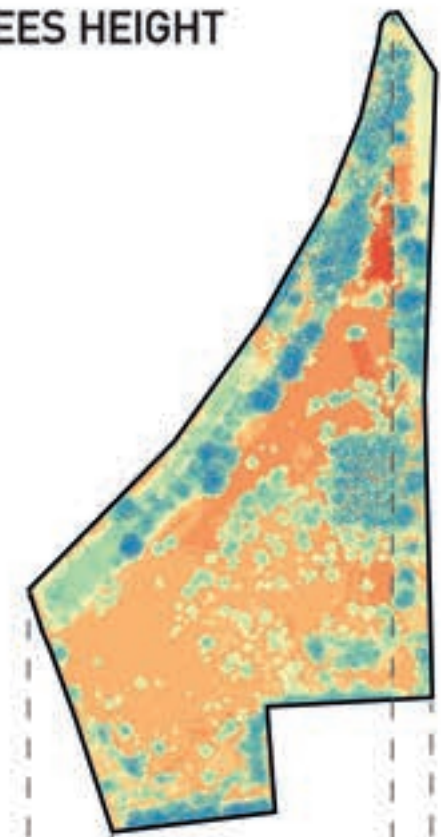
ROAD NOISE



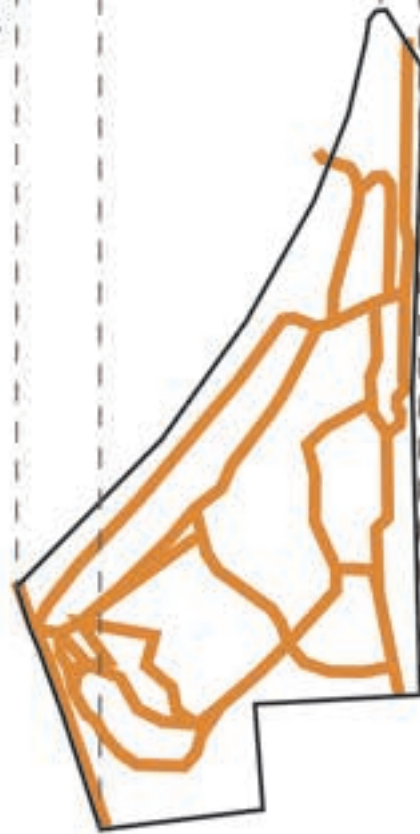
AIR QUALITY



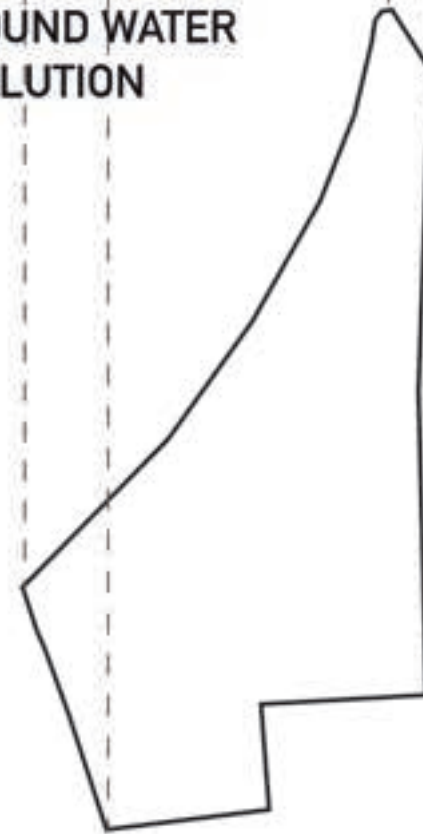
TREES HEIGHT



PATHS



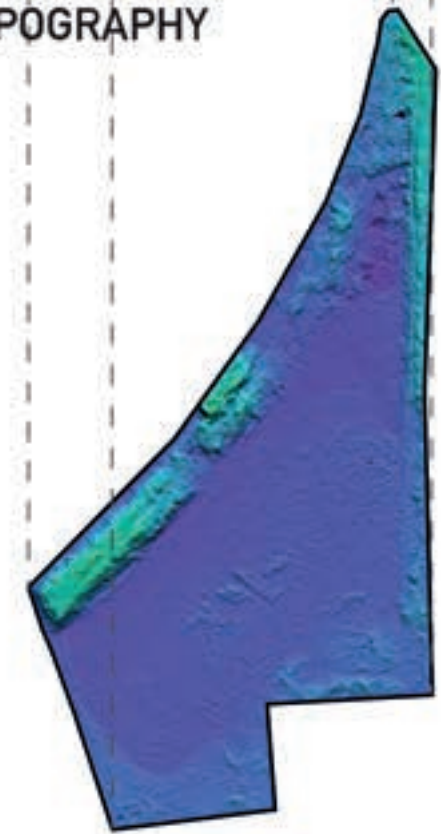
GROUND WATER POLLUTION



BIOLOGICAL VALUE



TOPOGRAPHY



The Berm

Transect sampling as a method of
research

Transects builds community



Transects location view

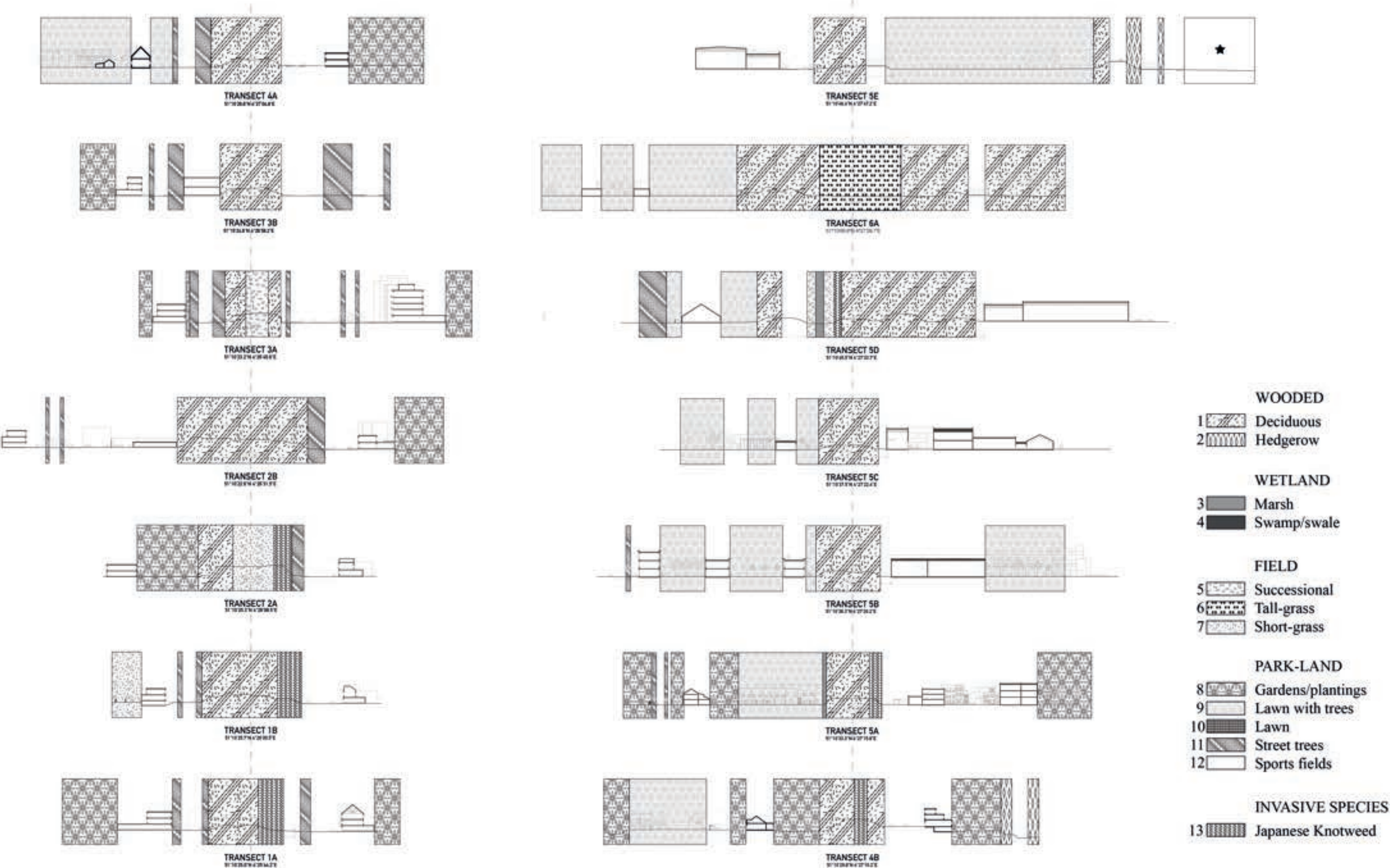


Urban Biotopes @ the Berm



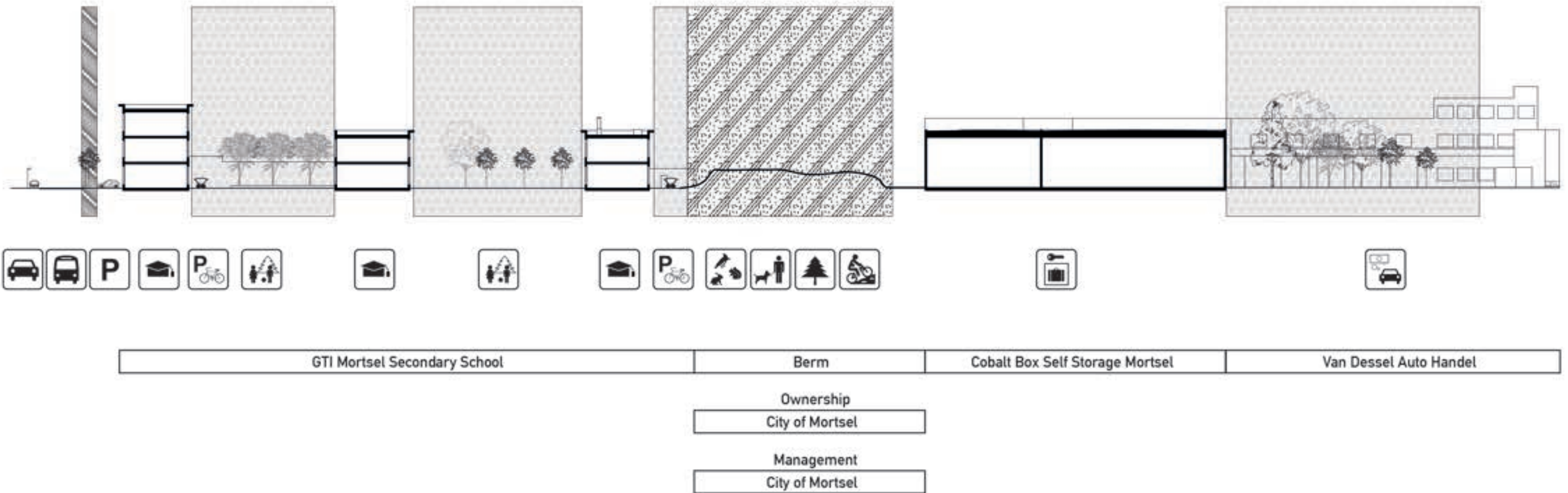
Urban Biotores per transect

URBAN BIOTOPE SECTIONS

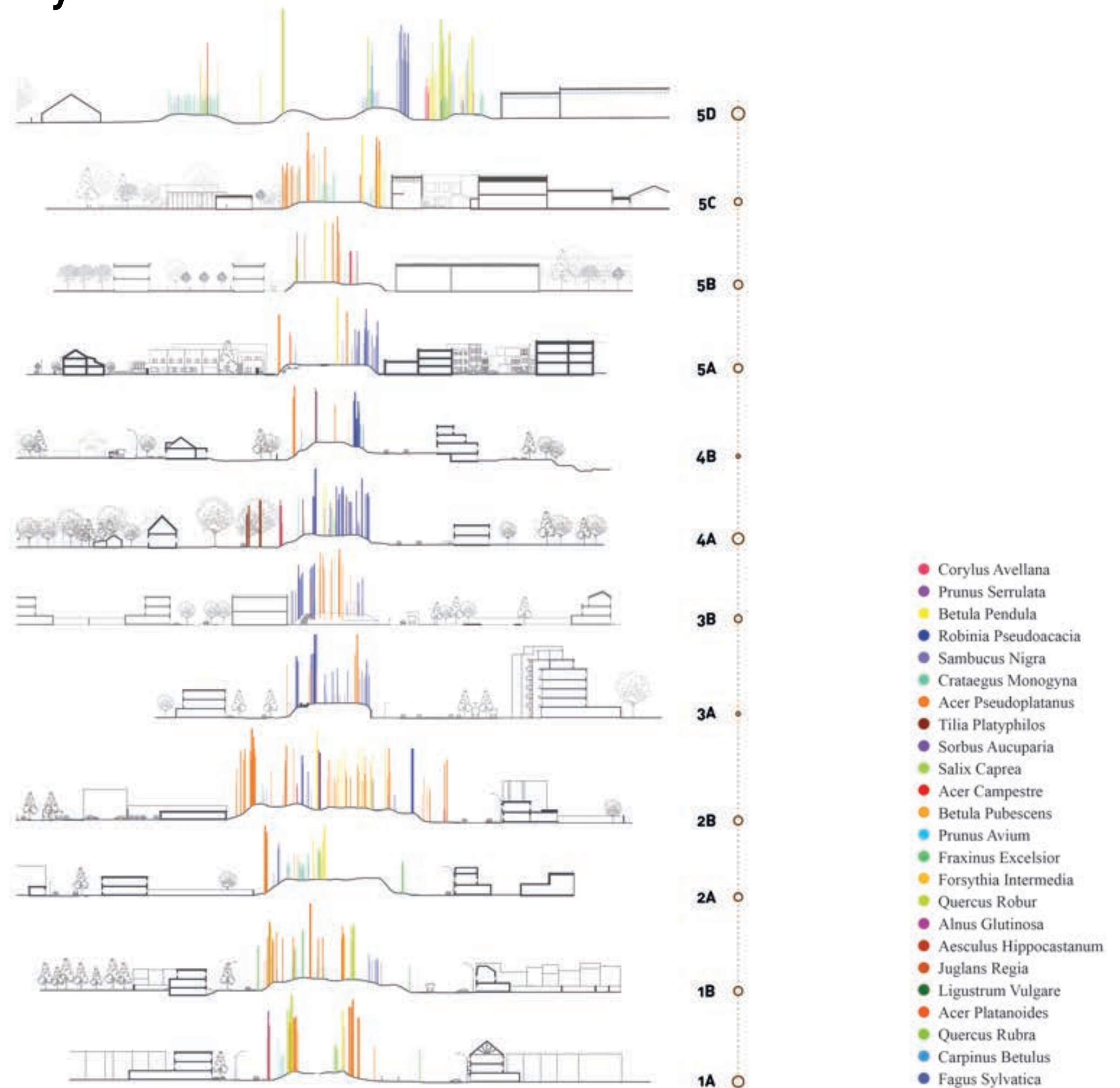


Urban Biotopes per transect

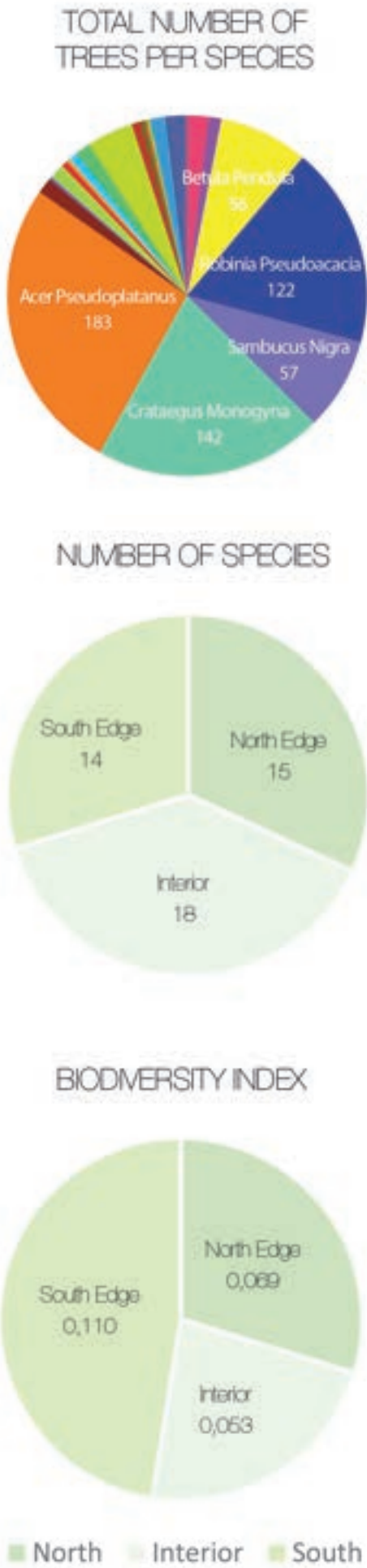
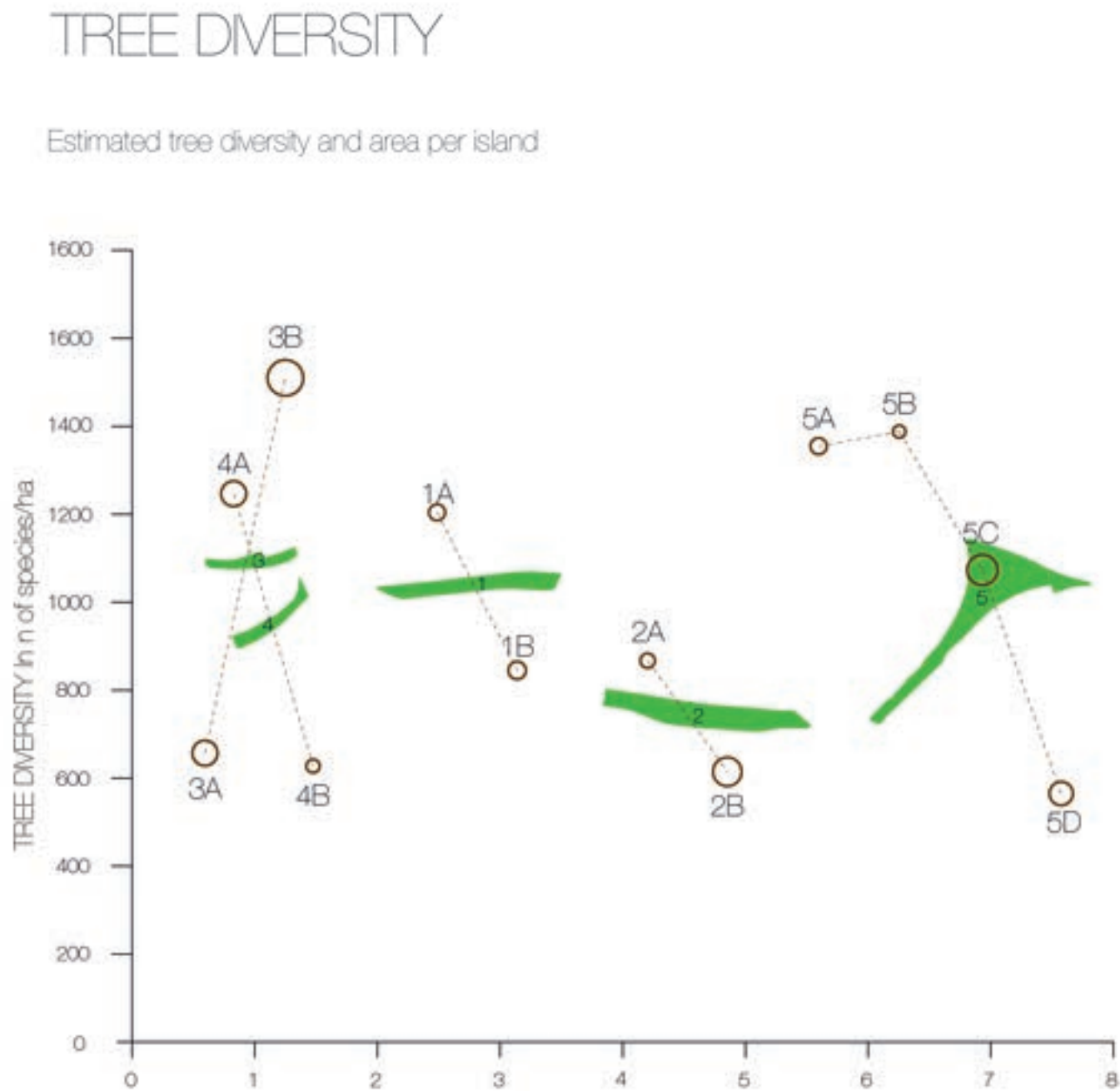
TRANSECT 5B
51°10'36.3"N 4°27'20.2"E



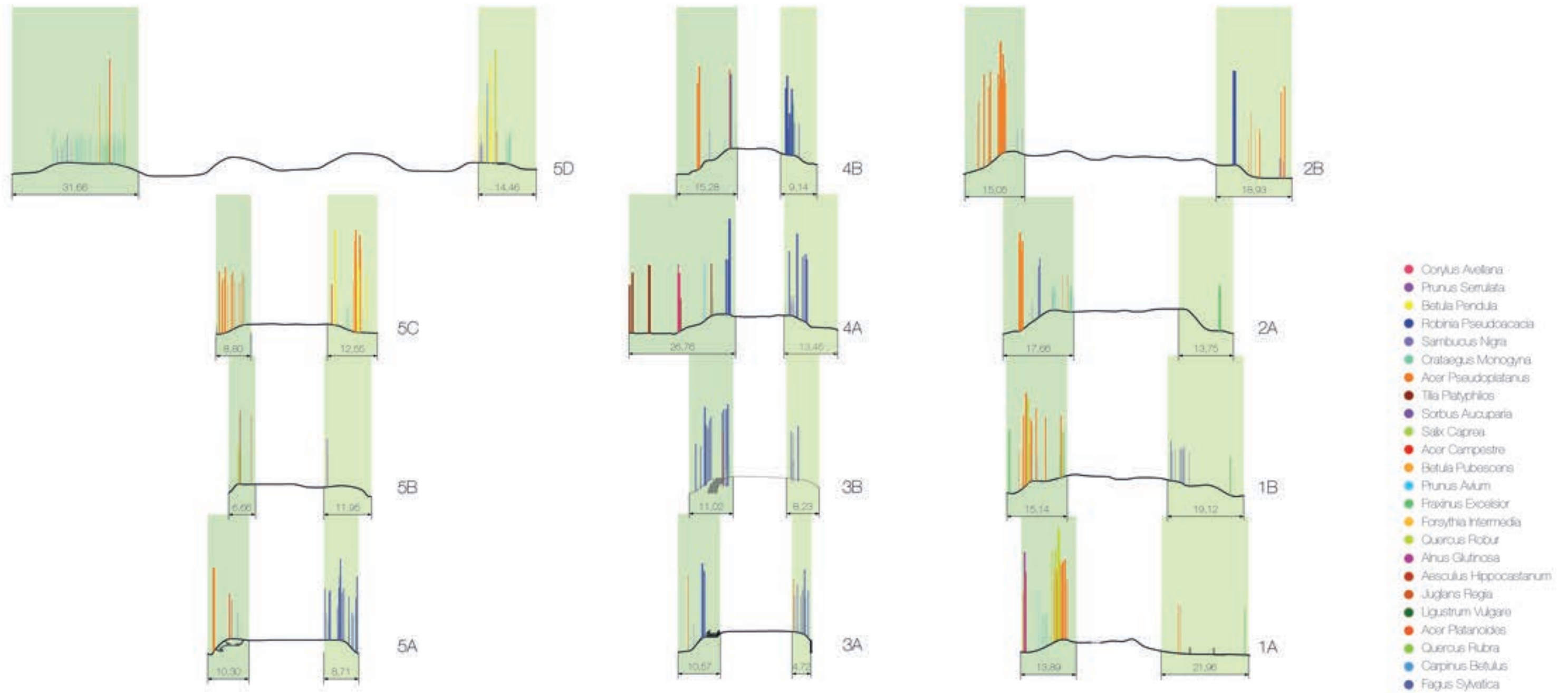
Transects tree diversity



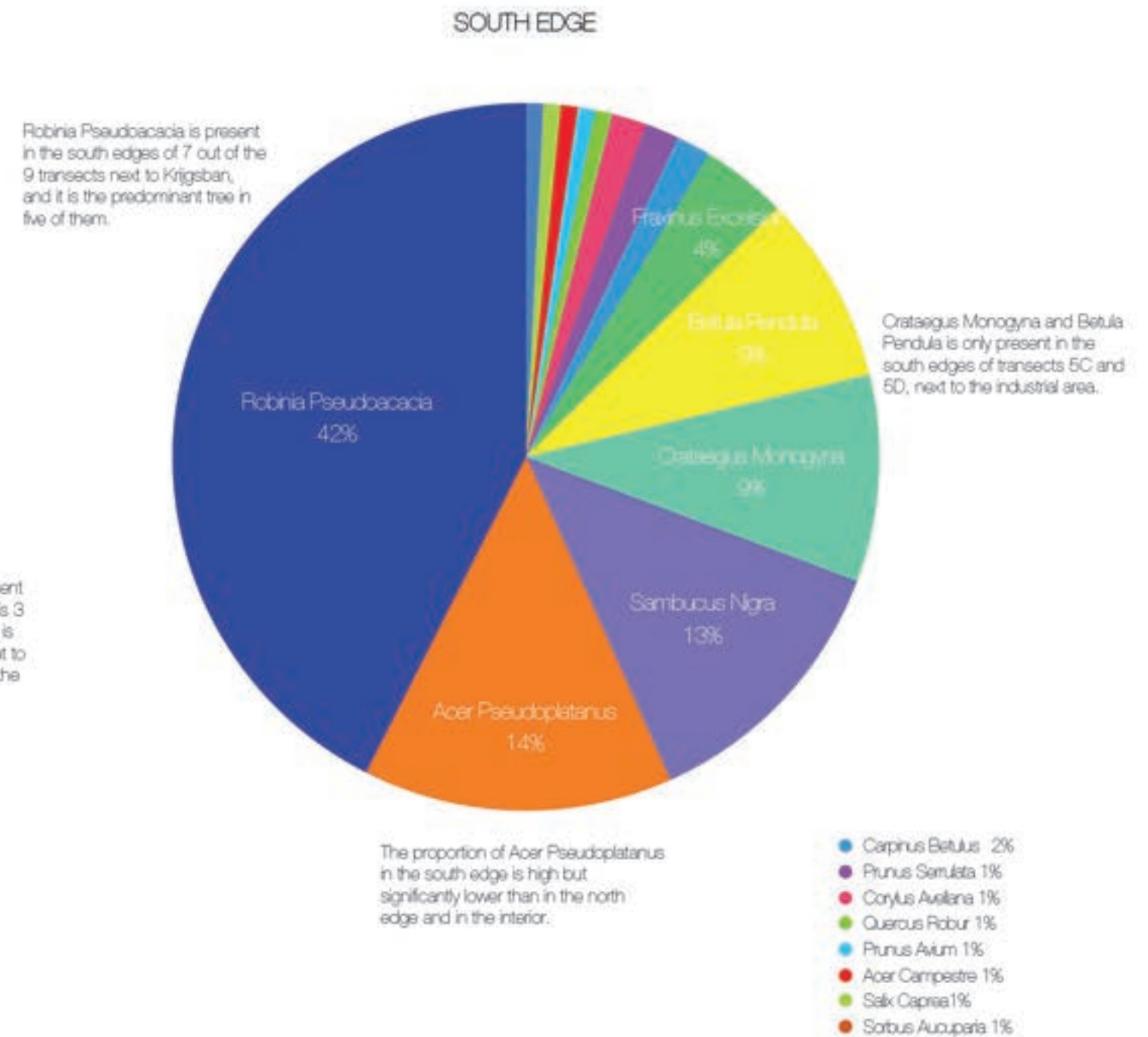
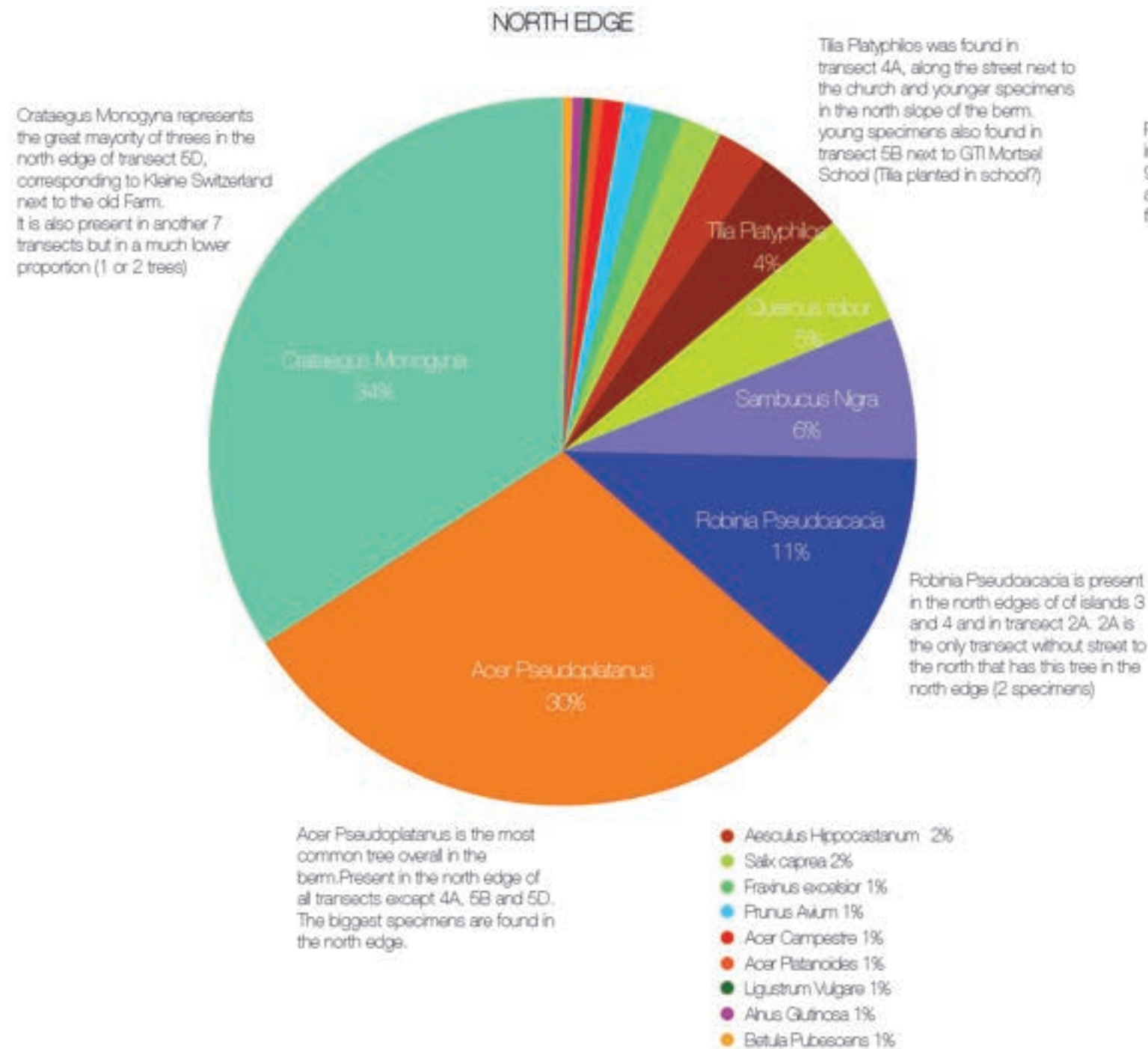
Transects tree diversity



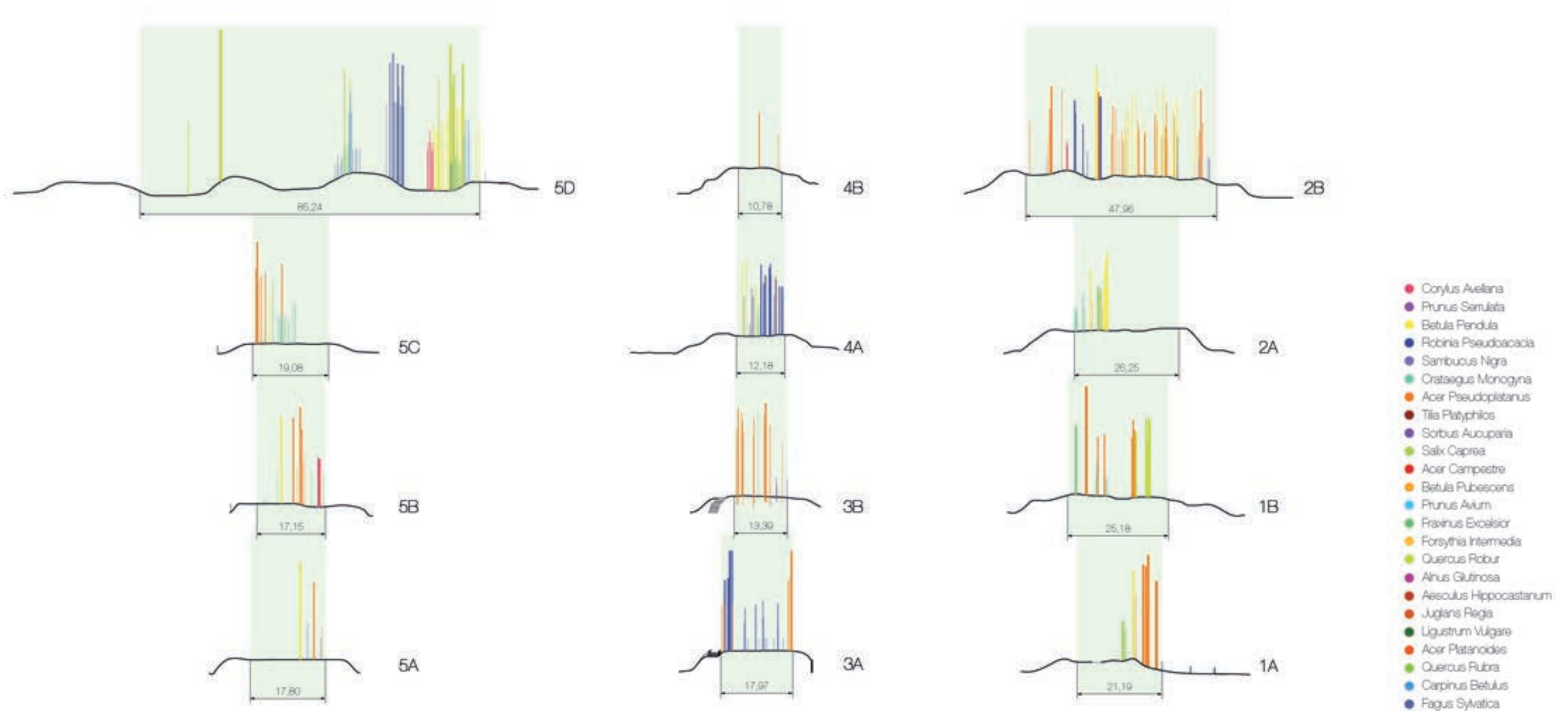
Edges tree diversity



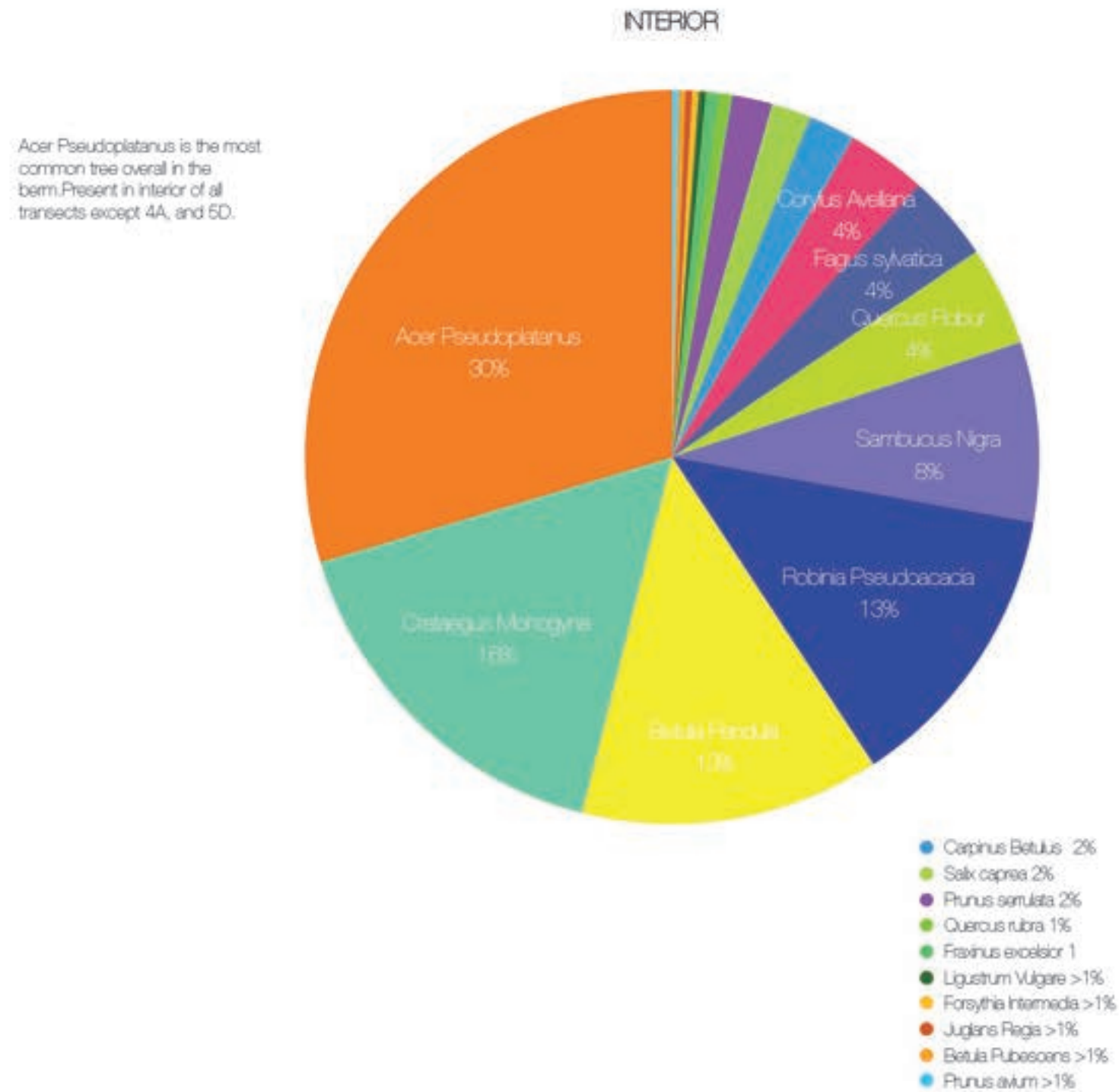
Edges tree diversity



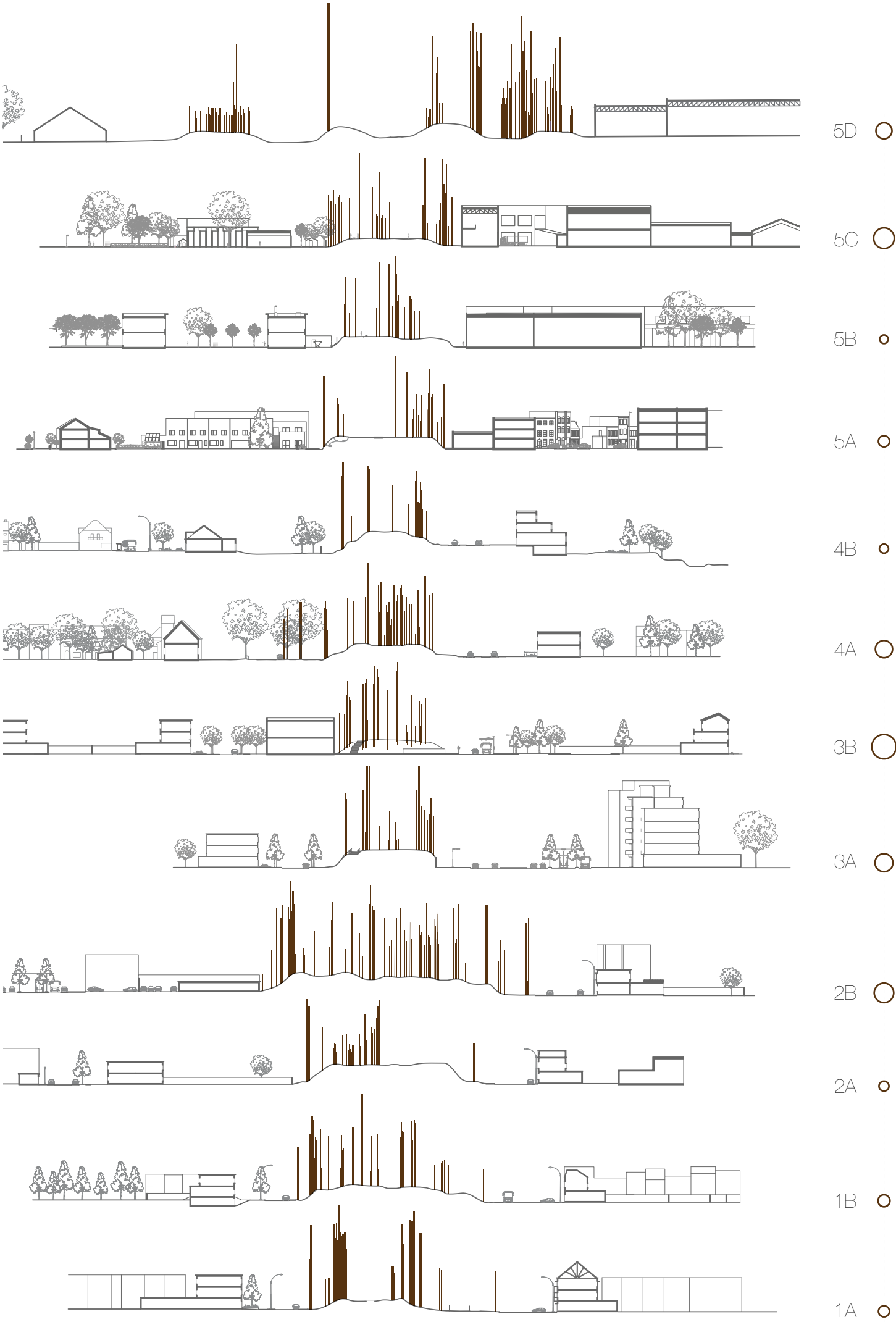
Interior tree diversity



Interior tree diversity

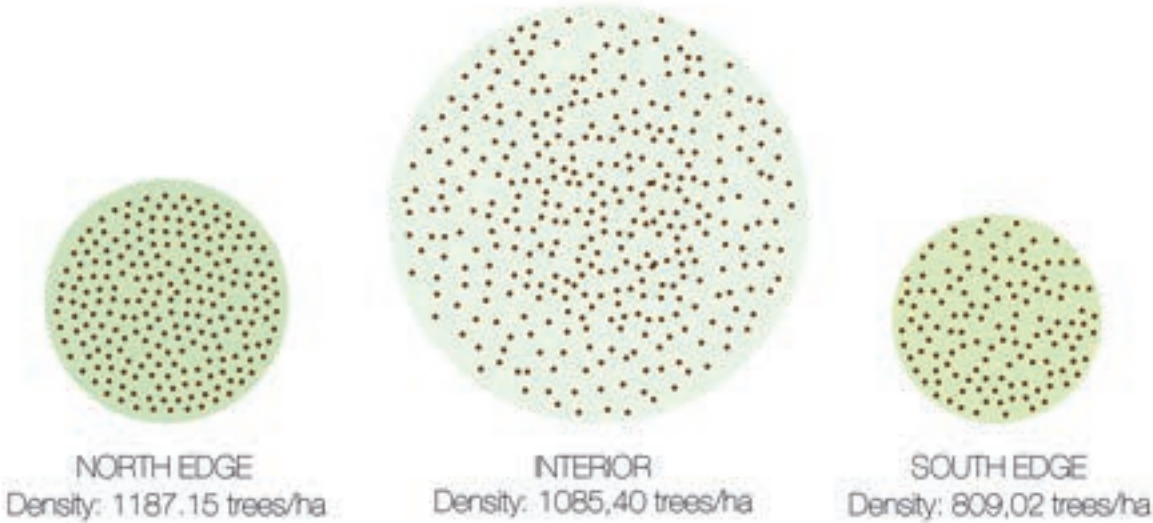


Transects stem tree density



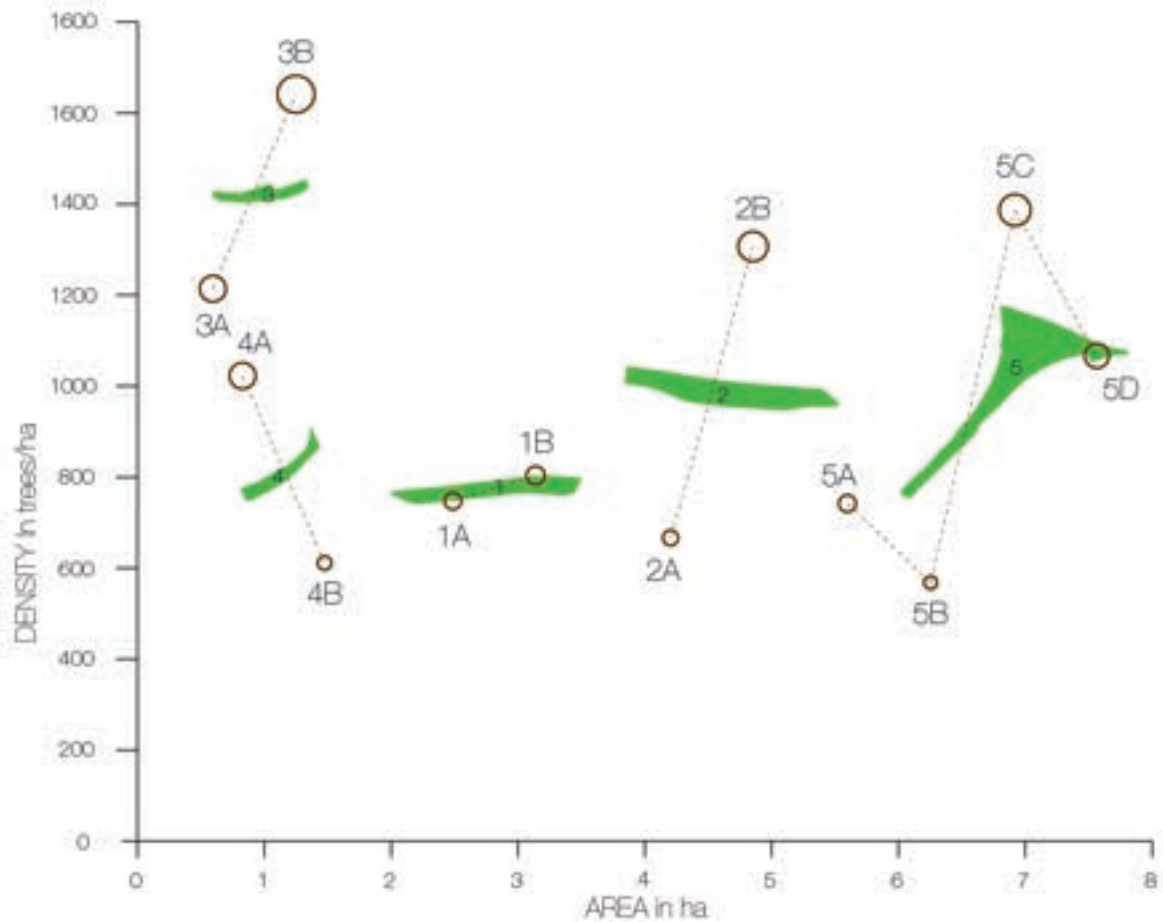
Tree density per transect

Estimated tree density per zone



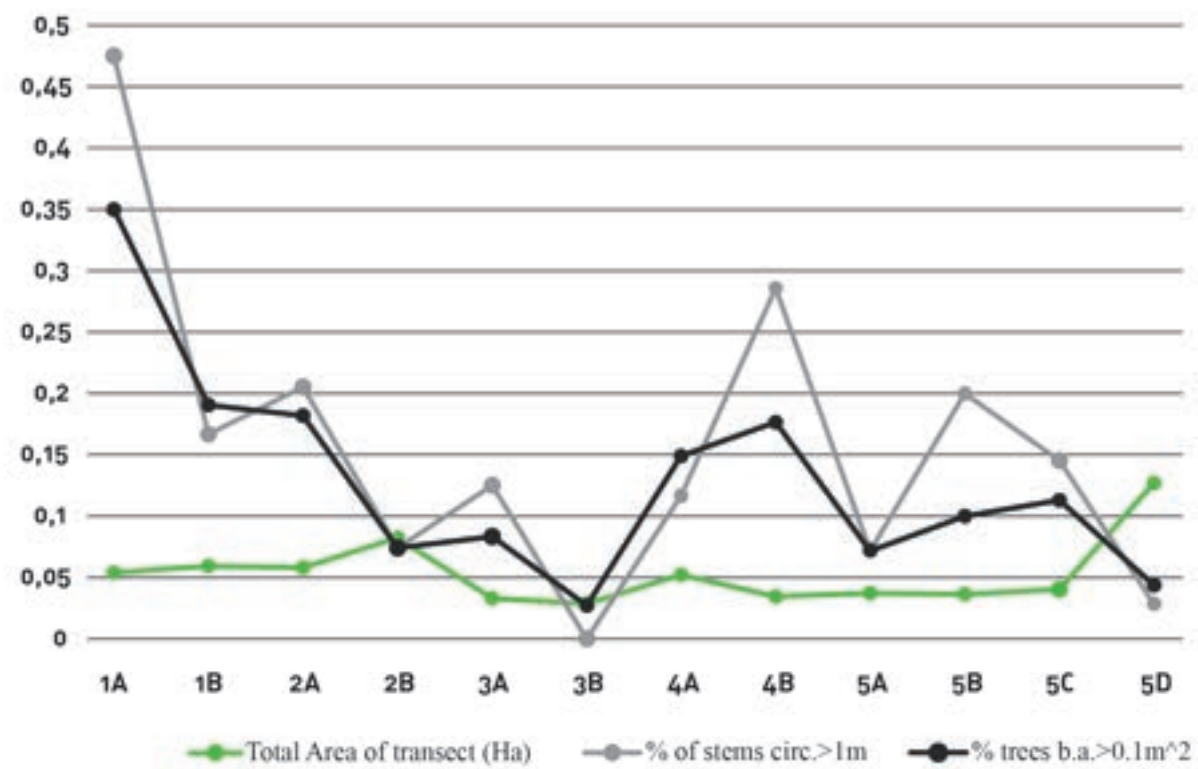
TREE DENSITY

Estimated tree density and area per island

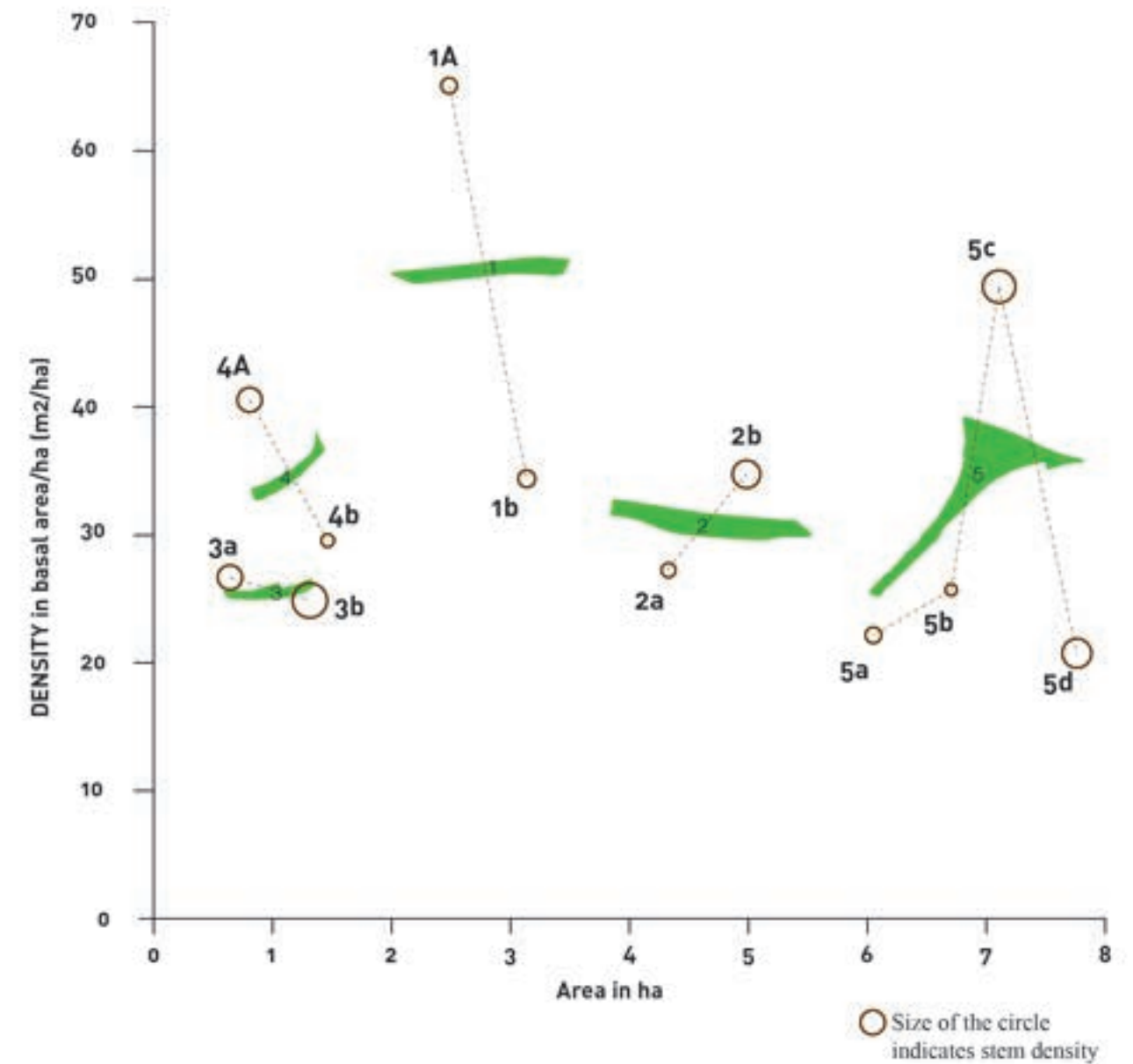


Tree density in basal area/ha

Percentage of thick stems and trees from total stems

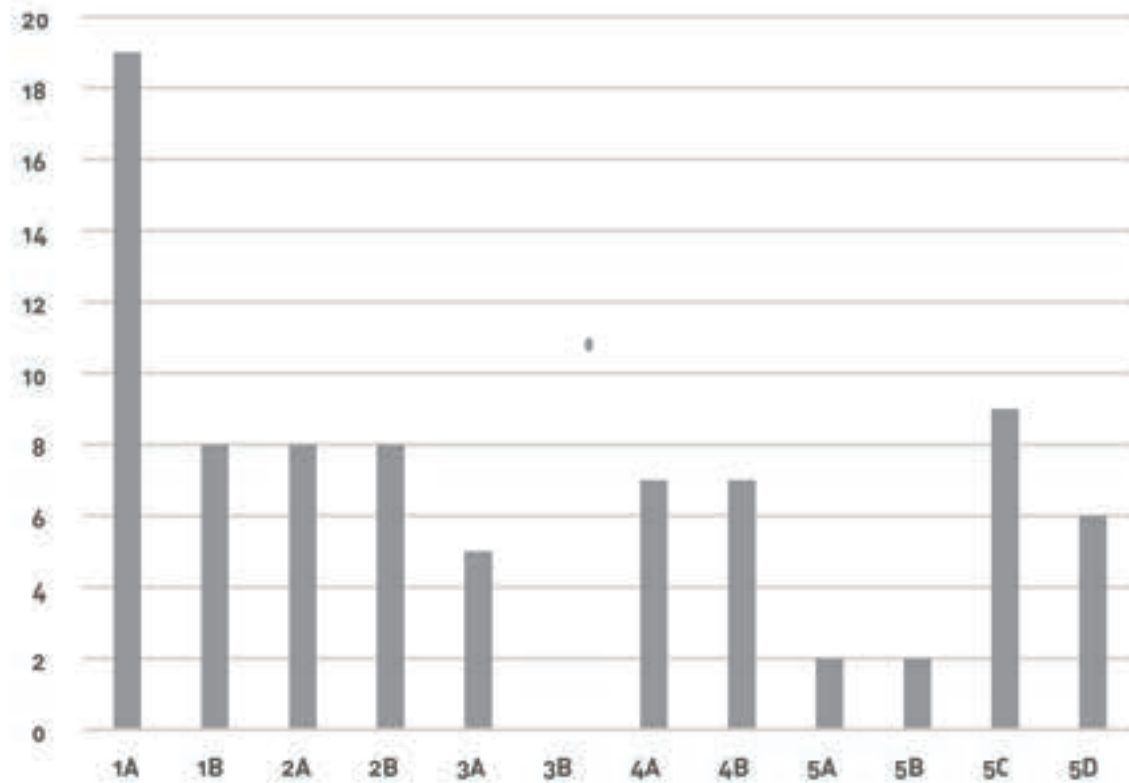


Estimated tree density (in basal area/ha) and area per island

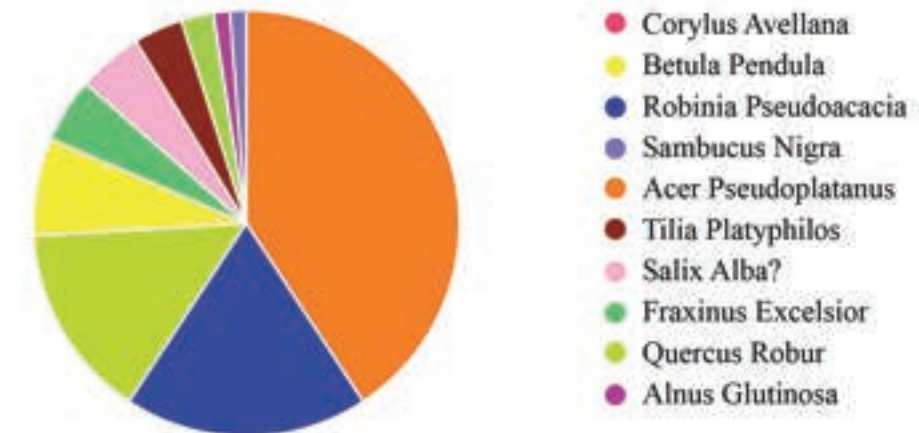


Stem dimensions per transect

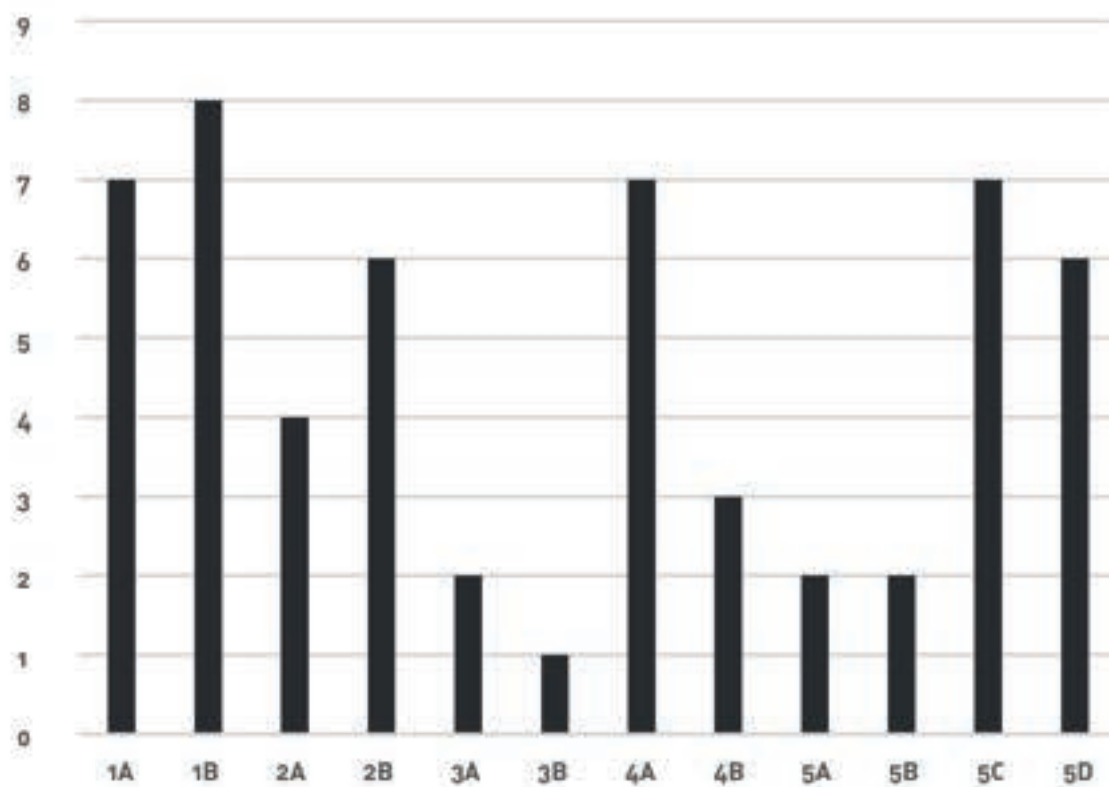
Total stems circ. above 1m per transect



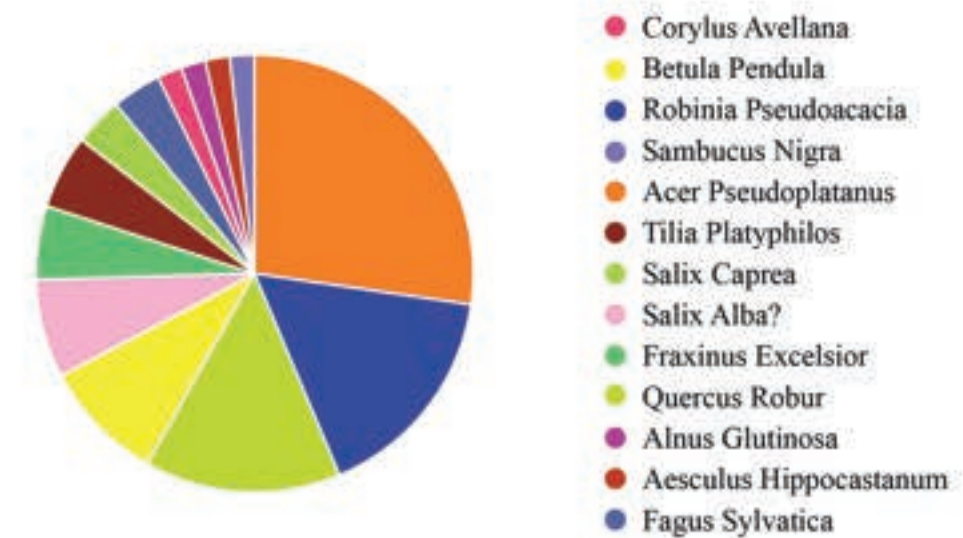
Stems with circ. above 1m per tree species



Total trees b.a. above 0,1m² per transect

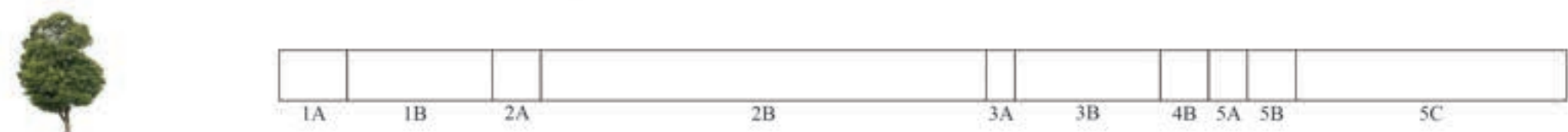


Trees with b.a. above 0,1m² per tree species

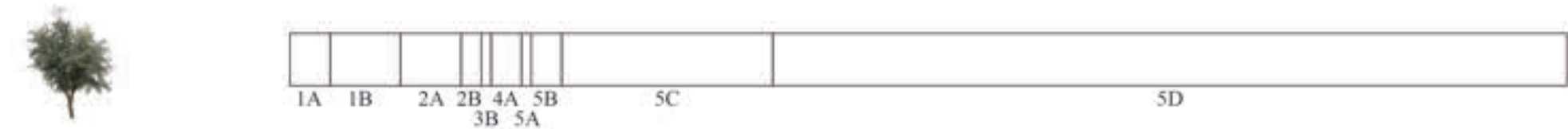


Overall and per transect tree species

ACER PSEUDOPLATANUS_Sycamore Maple



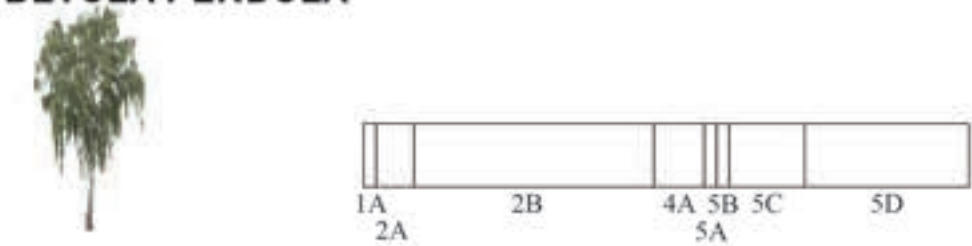
CRATAEGUS MONOGYNA



ROBINIA PSEUDOACACIA



BETULA PENDULA



SAMBUCUS NIGRA



QUERCUS ROBUR

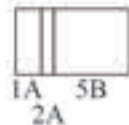


Overall and per transect tree species

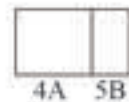
FRAXINUS EXCELSIOR



SALIX CAPREA



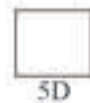
TILIA PLATYPHILOS



PRUNUS SERRULATA



CARPINUS BETULUS



PRUNUS AVIUM



CORYLUS AVELLANA



ACER CAMPESTRE



BETULA PUBESCENS



LIGUSTRUM VULGARE



AESCULUS HIPPOCASTANUM



FAGUS SYLVATICA



QUERCUS RUBRA



SORBUS AUCUPARIA



JUGLANS REGIA



FORSYTHIA INTERMEDIA



ALNUS GLUTINOSA

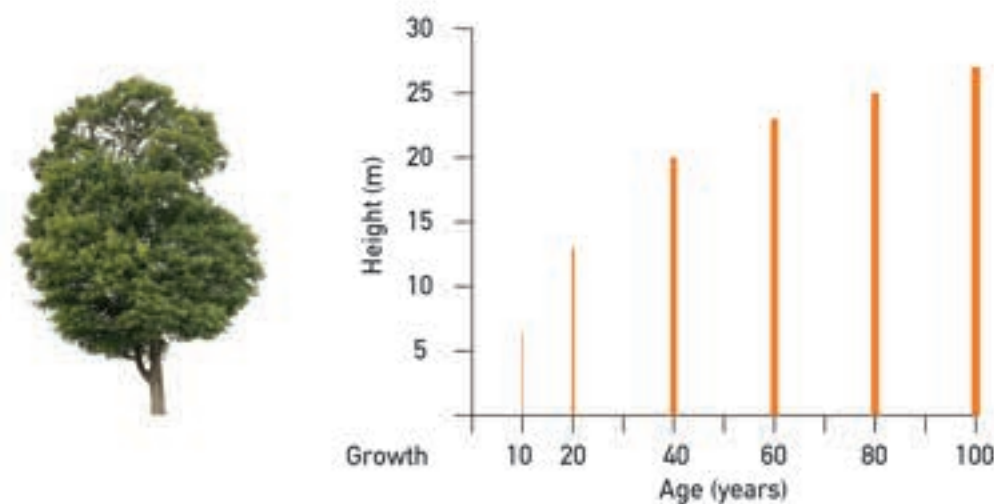


ACER PLATANOIDES



Ecological value of key species

ACER PSEUDOPLATANUS Sycamore maple



OBSERVATIONS FROM THE BERM

PRESENCE	Dominant in the Berm. Represents more than 33% of the trees in the berm (excluding Klein Zwitserland). Present in all islands except Klein Zwitserland.
ORIENTATION	In north slope represents 30% of total trees. We find the most mature trees here. In the interior represents 30% of total trees. In the south slope represents only 14% of total trees.
SIZE (Basal Area)	Acer Pseudoplatanus represents 27% of all trees with a basal area above 0.1m2.

INTERACTION WITH OTHER SPECIES

MAMMALS



Squirrel

BIRDS



Eurasian magpie



European green woodpecker

INSECTS



Aphids



Ladybugs



Bees



Sycamore moth caterpillar



Maple prominent caterpillar



Plummed prominent caterpillar

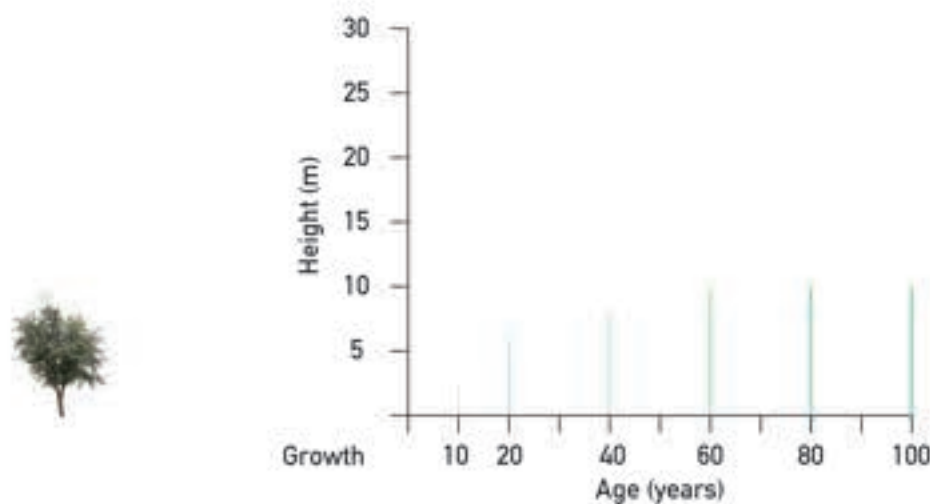
FACTSHEET

SOIL	Nutrient-rich soils
LOCATION	Shady microclimates. Usually dominates cooler and more humid environments.
ROOT STRUCTURE	Deep strong adventitious roots. Good to stabilise slopes and prevent erosion.
TOLERANCE TO POLLUTION	Mature trees are extremely tolerant to pollution. Common in streets in urban areas.
TOLERANCE TO WIND	Mature trees are extremely tolerant to wind and salty wind. Common in coastal areas.
TOLERANCE TO FROST	Relatively tolerant to late frosts.
TOLERANCE TO DROUGHT	Not able to thrive in drought-prone areas.
THREATS AND DISEASES	Highly vulnerable to the Asian longhorn beetle. Bark striping by grey squirrels. Leaves may be highly affected by ascomycete fungi. Several bark diseases are caused by fungi, some triggered by high summer temperatures and drought.

Note: The animal and insect species per tree are general and do not refer specifically to the Berm as this survey does not include animal or insect inventories.

Ecological value of key species

CRATAEGUS MONOGYNA Common hawthorne



OBSERVATIONS FROM THE BERM

- PRESENCE** Present in all islands, with big stands of trees in transects 5C and 5D in Klein Zwitterland.
- ORIENTATION** Everywhere but more present in north slope.
- SIZE (Basal Area)** Shrubs or small trees with basal area always below 0,1²m.

INTERACTION WITH OTHER SPECIES

MAMMALS



BIRDS



INSECTS



FACTSHEET

SOIL	Undemanding. Average , well draining soil
LOCATION	Sun to half-shade.
ROOT STRUCTURE	Deep rooting.
TOLERANCE TO POLLUTION	Relatively tolerant to pollution.
TOLERANCE TO WIND	
TOLERANCE TO FROST	Tolerant to late frosts.
TOLERANCE TO DROUGHT	Relatively resistant to drought.
THREATS AND DISEASES	Fire blight, apple scab, powdery mildew, and leaf blight. Lace bugs, aphids, and mites.

Note: The animal and insect species per tree are general and do not refer specifically to the Berm as this survey does not include animal or insect inventories.

Ecological value of key species

ROBINIA PSEUDOACACIA Black locust



OBSERVATIONS FROM THE BERM

PRESENCE	Present in all islands except Klein Zwitserland Noord and Klein Zwitserland Zuid. In island 5 it was only found in transect 5A, the closest to the road.
ORIENTATION	In slopes, especially in southern slope along R11 where it represents 43% of total trees.
SIZE (Basal Area)	Single or multi-stemmed tree. Robinia pseudoacacia represents 16% of all trees with a basal area above 0.1m2

INTERACTION WITH OTHER SPECIES

MAMMALS



Rabbit



Squirrel

BIRDS



Northern goshawk



European green woodpecker

INSECTS



Honey bee



Parectopa robinella

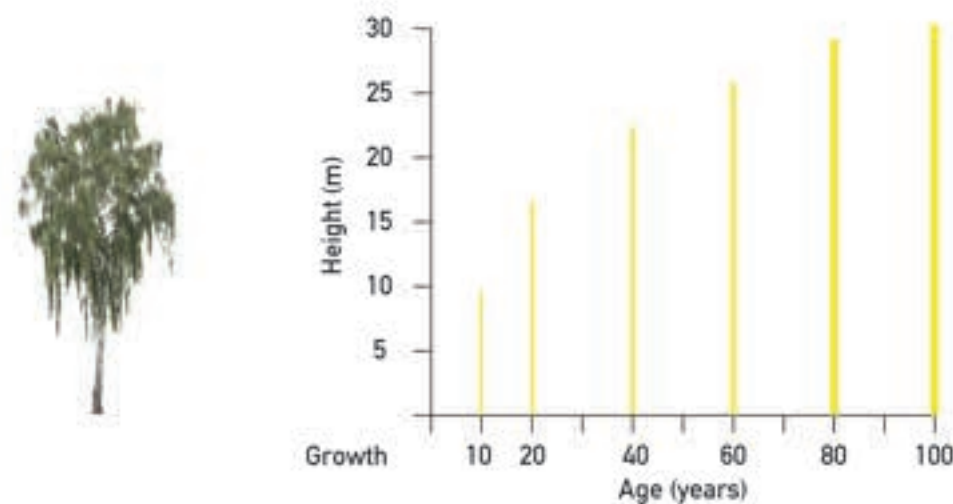
FACTSHEET

SOIL	Grows in poor, moderately moist soils, only limited by low soil aeration. Pioneering species.
LOCATION	Requires full or partial sunlight. Native to North America, was introduced in Europe around 1600. Used to stabilise slopes. Common in early succession habitats. Invasive, high adaptability, transforms ecosystems causing impact on biodiversity.
ROOT STRUCTURE	Substantial soil alterations, increases nitrogen, litter and organic carbon and reduces phosphorus. Capacity for clonal growth through horizontal root elongation
TOLERANCE TO POLLUTION	Tolerates air pollution and water with salts and other pollutants.
TOLERANCE TO WIND	
TOLERANCE TO FROST	Easily damaged by frosts in winter.
TOLERANCE TO DROUGHT	Low adaptability to arid conditions.
THREATS AND DISEASES	One gall midge(Obolodiplosis robiniae) and two moths (Phyl- lonorycter robinella and Parectopa robinella)Many lignicolous fungal species, 11 mildews and leaf-spot diseases.

Note: The animal and insect species per tree are general and do not refer specifically to the Berm as this survey does not include animal or insect inventories.

Ecological value of key species

BETULA PENDULA Silver birch



OBSERVATIONS FROM THE BERM

- PRESENCE** Present in all islands except 3, with some dead but standing specimens, in general with birch polypore.
- ORIENTATION** More present in inner areas of the islands. Not so present on slopes.
- SIZE (Basal Area)** Relatively small basal area with only 1% of specimens above 0,1 m².

INTERACTION WITH OTHER SPECIES

MAMMALS



Squirrel

BIRDS



European green woodpecker

INSECTS



Drepana falcata



Endromis versicolora

FUNGI



Taphrina betulina



Birch polypore

FACTSHEET

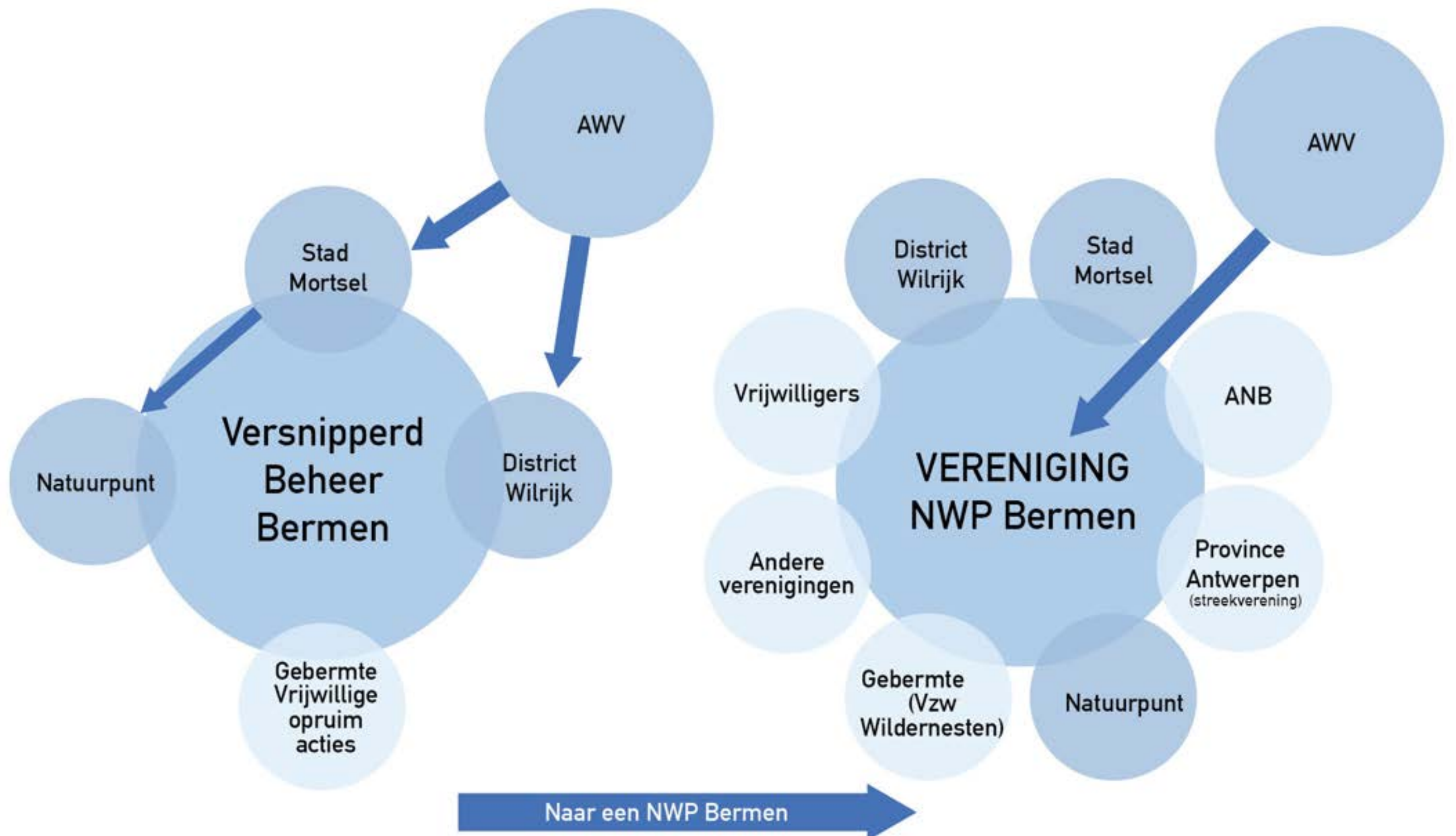
SOIL	Low demands on soil quality. Better in fertile, light, well drained and acidic soils.
LOCATION	Intolerance of shade. valuable in natural or anthropogenic regeneration of woodlands. Pioneers in early secondary vegetation succession.
ROOT STRUCTURE	Large number of ectomycorrhizal fungi. Improves soil so other species can be planted later. Effective in erosion control and soil stabilisation.
TOLERANCE TO POLLUTION	Tolerant to industrial pollution. Capable of absorbing up to 3100 kilos of CO2 to clean the air.
TOLERANCE TO WIND	Tolerant to wind.
TOLERANCE TO FROST	Tolerant to frost.
TOLERANCE TO DROUGHT	Intolerant to prolonged summer drought.
THREATS AND DISEASES	Bronze birch borer, short-snouted weevils, moths, leaf-miner larvae, fungal diseases caused by Melampsorium botulinum, Taphrina betulina and Taphrina nana. Birch polypore causes wood rot and eventually kills the tree.

Note: The animal and insect species per tree are general and do not refer specifically to the Berm as this survey does not include animal or insect inventories.

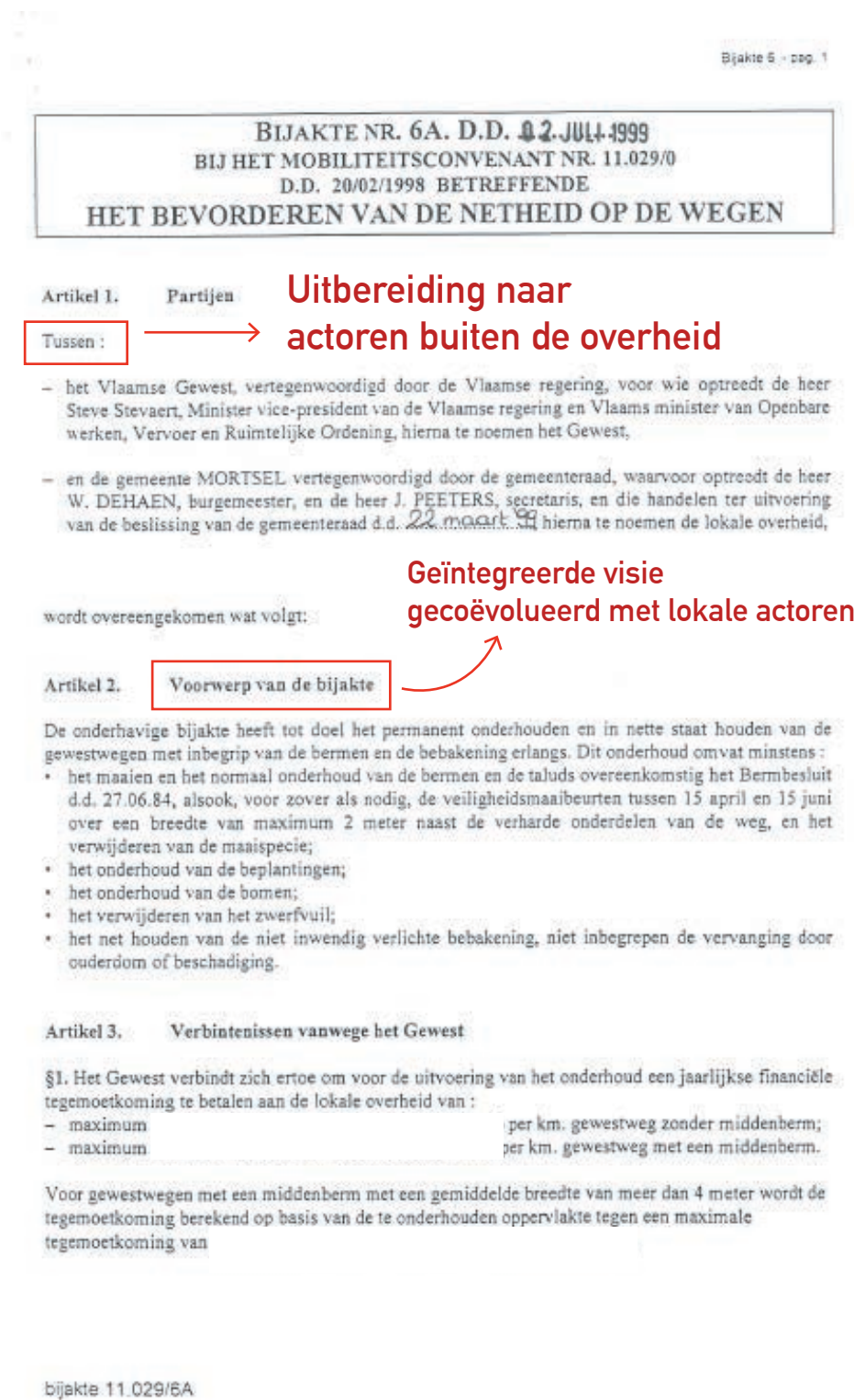
The Berm

Strategies and proposals

How the Berm evolve towards a new alliance of actors?

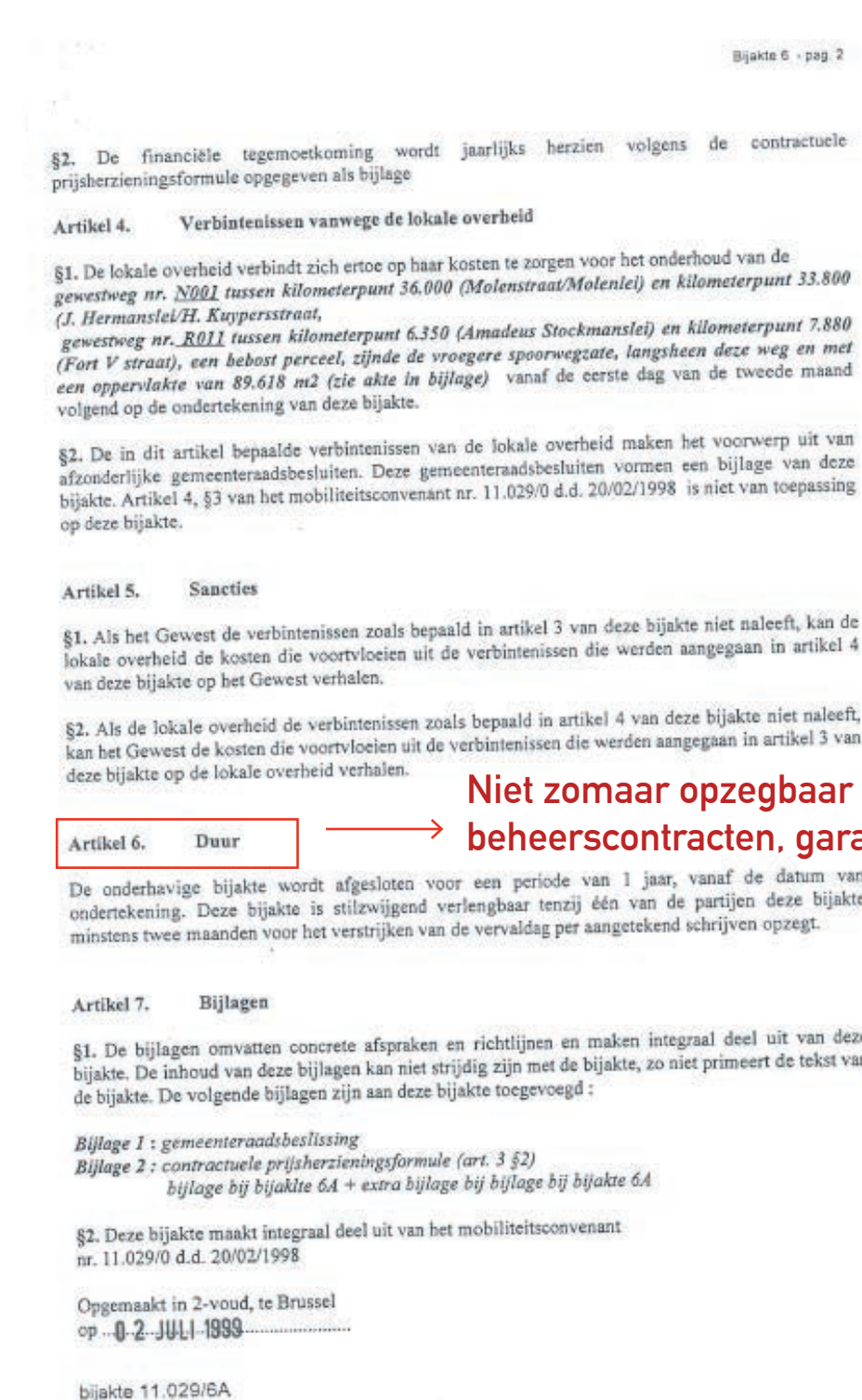


Towards a partnership contract



Uitbereiding naar
actoren buiten de overheid

Geïntegreerde visie
gecoëvolueerd met lokale actoren

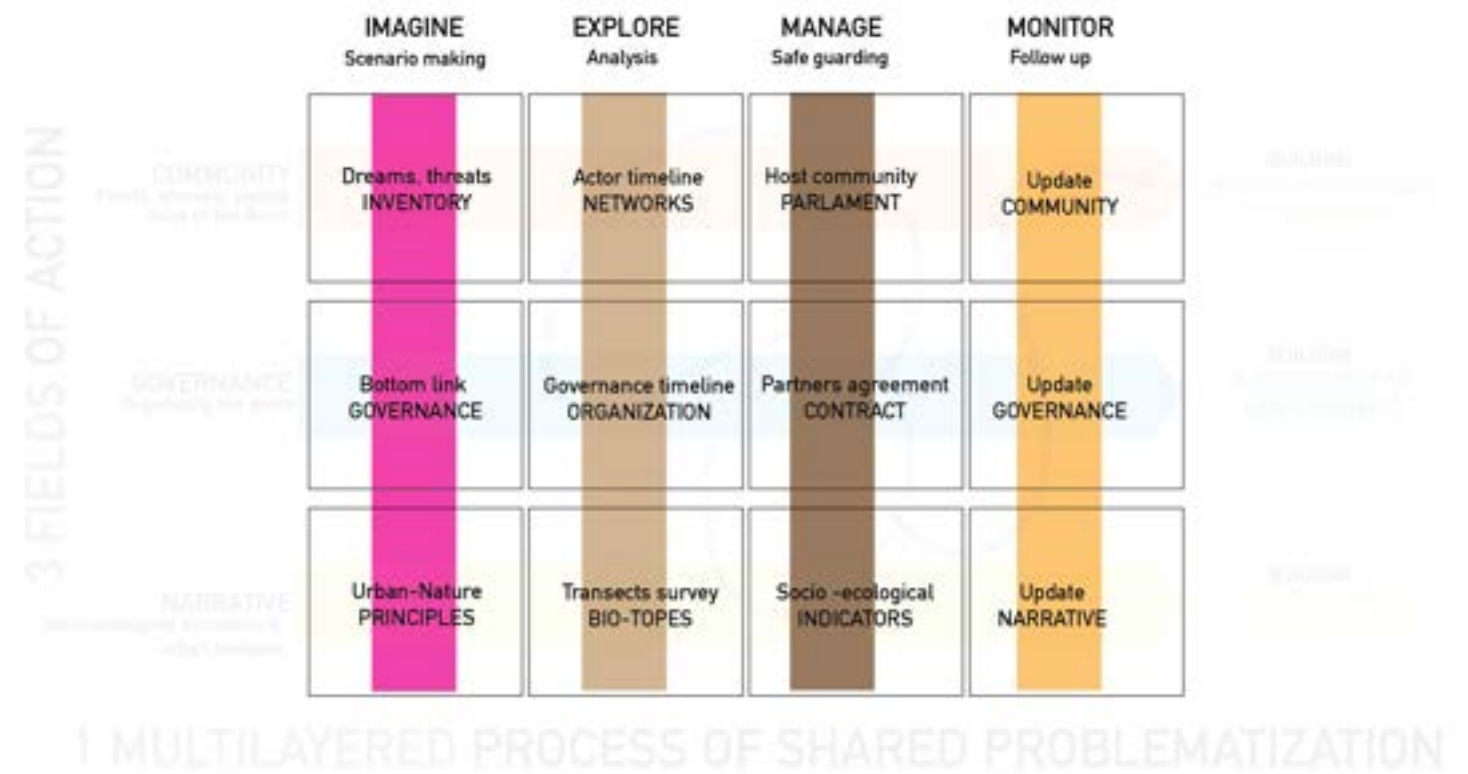


Niet zomaar opzegbaar zijn van
beheerscontracten, garantie bieden voor behoud

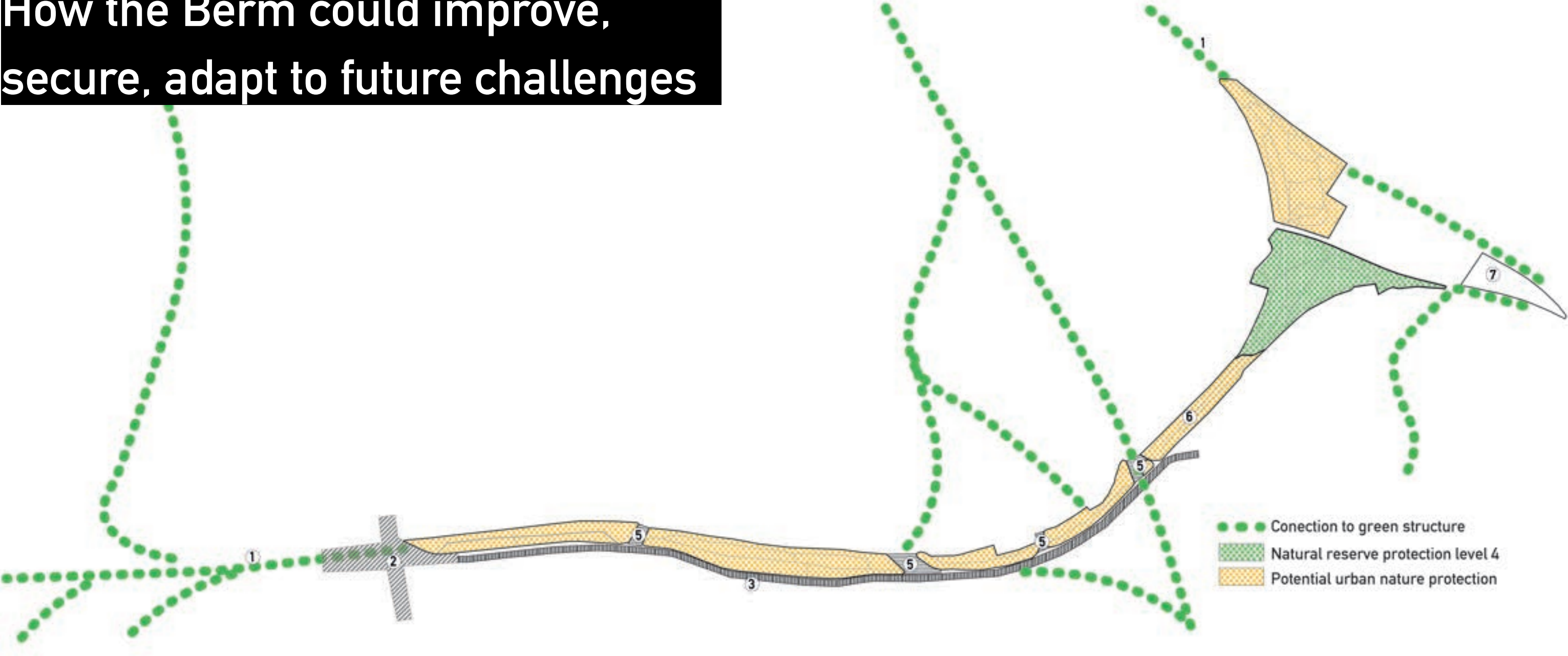
4

EPISODES OF INTERWEAVING

4 EPISODES OF INTERWEAVING



How the Berm could improve, secure, adapt to future challenges

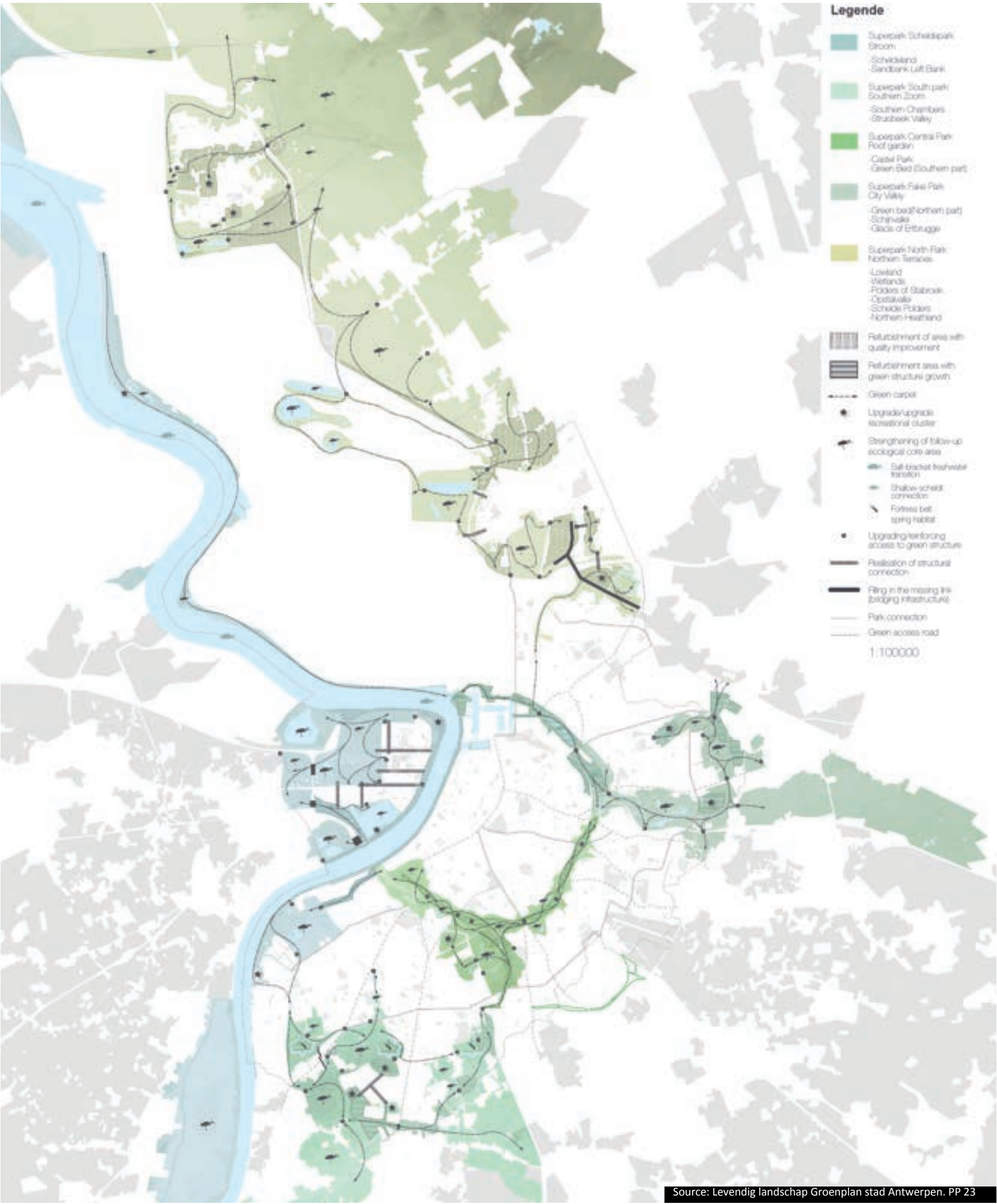


	① The berm as a key link to metropolitan green structure	② Alternative intersection	③ R11-Vredebaan	④ Telecom building	⑤ Gaps e.g. Eggestraat	⑥ GTI Mortsel-Van Dessel Autohandel	⑦ New mountain bike area
Existing							
What if?		<div>Existing proposal </div> <div>What if? </div>	<div>3.A </div> <div>3.B </div>	<div>4.A </div> <div>4.B </div> <div>4.C </div>	<div>5.A </div> <div>5.B </div> <div>5.C </div>	<div>6.A </div> <div>6.B </div>	<div>7.A </div>

Current situation

The Berm as a missing link to metropolitan green structure

In its Lively Landscape, Greenplan City of Antwerp the value of an ecological network is clearly highlighted. Several new connections (8) are proposed in the new plan to improve the quality of the ecosystems and increase biodiversity. Yet when looking in the visionary map the Berm is absent from this vital ecological network. This might be due to political boundaries, yet this hypothesis is not entirely clear as the Berm that is in Wilrijk district (City of Antwerp) is also ignored. This leads us to speculate that the Berm is not considered part of the ecological network perhaps due to the conflicting interests that still see the area as a potential expansion of the R11.



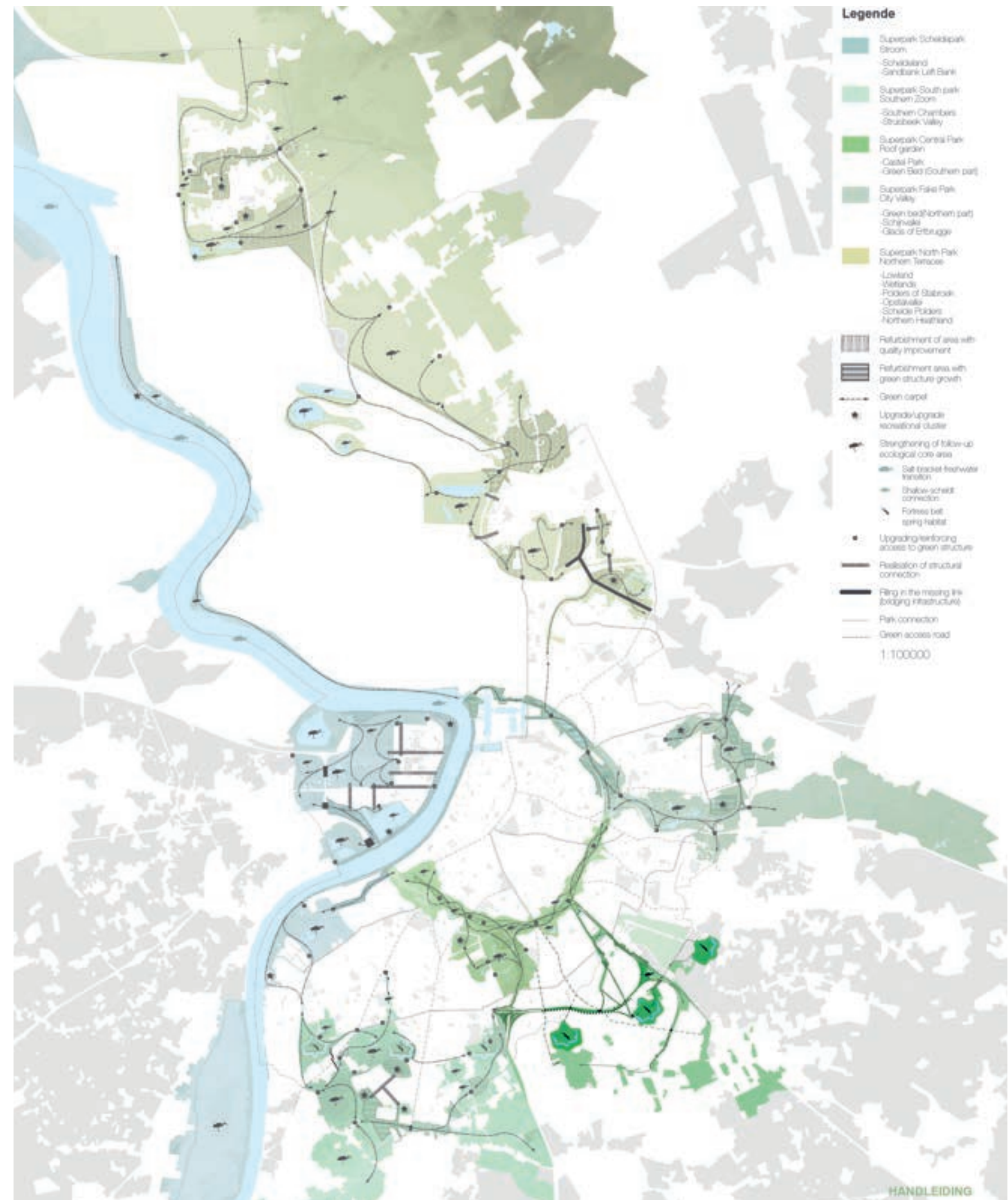
Scenario exploration

What if?

The Berm as a key link to metropolitan green structure

What if (1) explores the possibility of making the Berm an essential part of the ecological network. The ecological network will secure the resilience of the Berm as an isolated ecological corridor, increasing the chances of several species to thrive in multiple areas surrounding the Berm. The Berm as part of the ecological network will link the area with the forts 4 & 5. In this scenario it can also strengthen its connections to the west ecological corridor adjacent to the A1 highway while securing a bonding with the ecological corridor of Saffiestraat & Leemputtelarbaan adjacent to the train tracks east of the Berm. Additional connections could also be explored linking the private but biodiversity rich located in Deurnestraat.

What if (1)



Scenario exploration

What if?

The Berm as a key link to district green structure



What if (1)

ISLAND #1 / Wilrijk

Evaluation of assets & threats



1 Project for new intersection



Clearing



Mosaic Bench



Trees with nests



Remains of the old railway



Bike lane



Large trees



1 Carpool Wilrijk



2 Dog Park



1 Japanese Knotweed



2 Fungi



3 Falling tree



IMAGINE



NEW INTERSECTION - Potential connection to metropolitan green structure.

CLEARING - Growth of other species, social gatherings.



EXPLORE



VALUABLE



MOSAIC BENCH - Gathering point for the community.



TREES WITH NESTS - Biodiversity.



REMAINS OF OLD RAILWAY - Memory of the Berm.



ACCESSIBLE PATH - Inclusiveness.



BIKE LANE - Under the trees and protected from cars.



LARGE TREES - More carbon sequestration and air cooling effect.



WARNING



1 CARPOOL WILRIJK - Asphalt, Biodiversity gap.



2 DOG PARK - Poor in biodiversity, polluted soil.



3 LACK OF SEATING AND BINS - Rest for elderly and people with reduced mobility and reduce litter.



DANGER



1 PROJECT FOR A NEW INTERSECTION - Bigger nature gap: increased sealed surface, tree removal, habitat destruction.



MANAGE



NO SOIL REMOVAL



NO DUMPING



NO MOWING



MONITOR



1 JAPANESE KNOTWEED - Monitor evolution.



2 WOOD-DECAY FUNGI AND TREE DISEASES - Monitor regularly.



3 FALLING TREES - monitor regularly.



4 DOGS ON LEASH - monitor regularly.



5 EXCESS OF NITROGEN IN SOIL - Due to dog urine and feces.

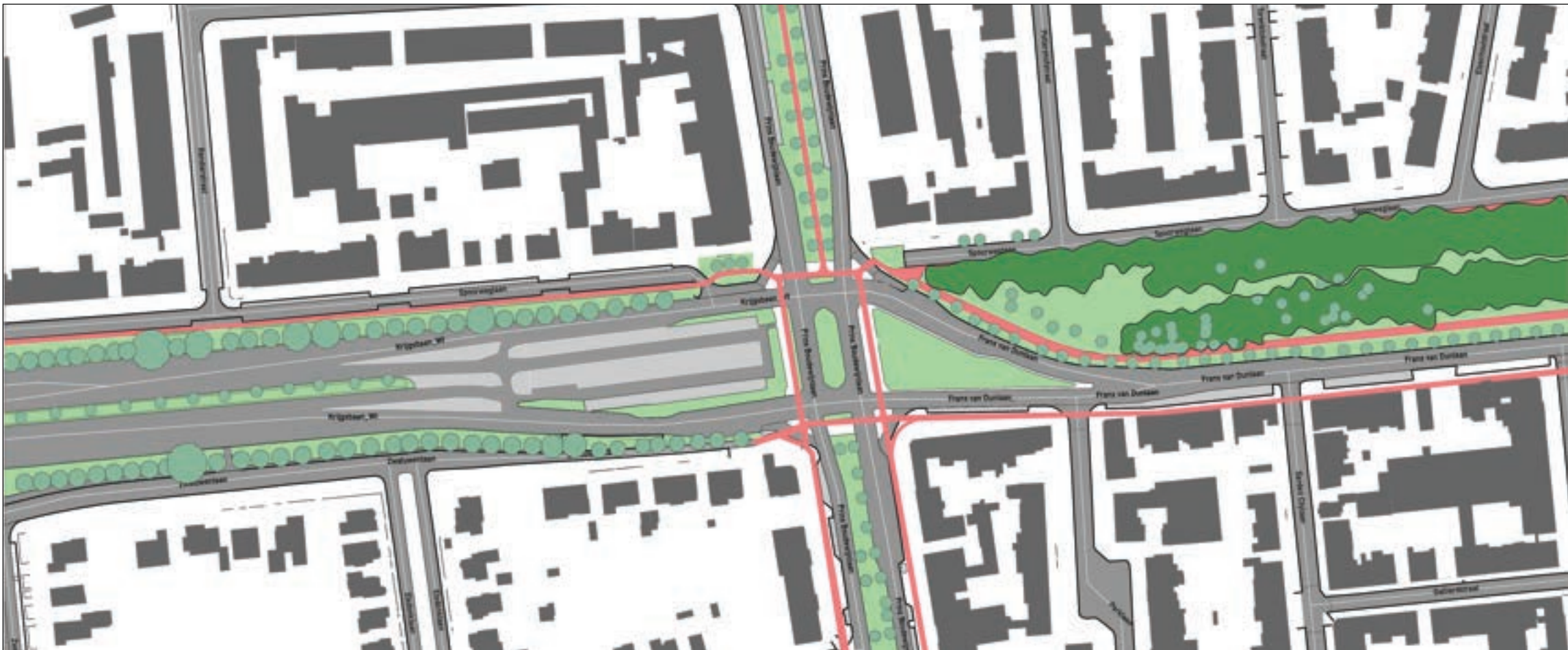


6 GOVERNMENT PROPOSALS

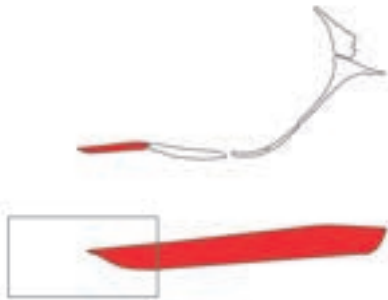
Current situation

Herinrichting kruispunt Frans Van Dunlaan - Prins Boudewijnlaan, Wilrijk

The current intersection between the R11 and Prins Boudewijnlaan could be improved to reduce traffic jams and improve the safety of both pedestrians and cyclists.



Existing situation



Current proposal

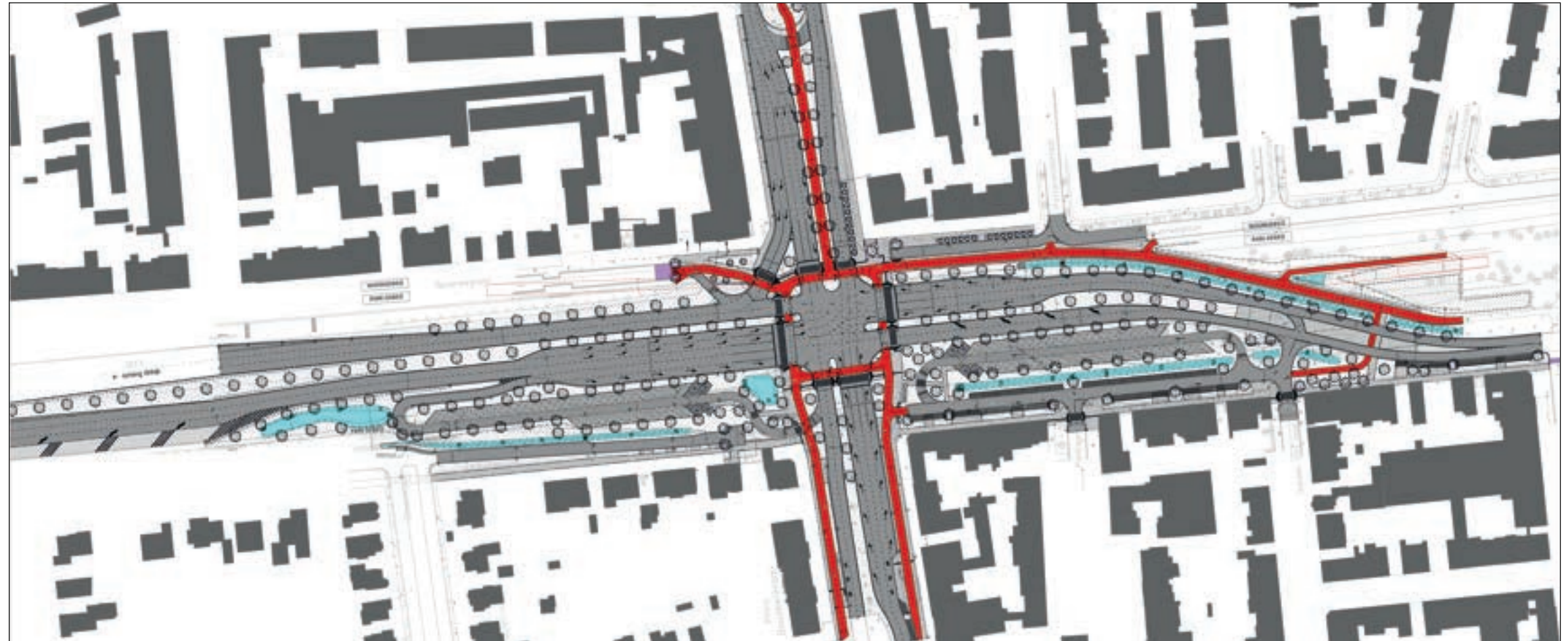
Herinrichting kruispunt Frans Van Dunlaan - Prins

Boudewijnlaan, Wilrijk

The proposed alternative indeed makes improvements regarding traffic waiting times at the traffic lights by increasing the single turning lane of 50m length to double turning lanes of 100m, a four fold increase. Bike lanes also increase in width from 2 to 3.5m.

Yet due to the design of the new intersection the urban nature of the Berm will take a big blow. In the proposed solution a big chunk of the Berm will be permanently lost, this is around 10,000m² in surface, but also in one of the areas of the Berm where the trees are older (see book 4 transects 1a). This means the loss of more than 120 trees.

Additionally as we have explained in this report the Berm functions as a sound and pollution barrier to the density built environment to the north. By removing a big piece of the Berm the houses will be exposed to noise and air pollution decreasing their quality of life standards. (see book 3: The Berm as sound filter and The Berm as car noise barrier).



Proposal Agentschap Wegen and Verkeer

Scenario exploration

What if?

Herinrichting kruispunt Frans Van Dunlaan - Prins

Boudewijnlaan, Wilrijk

In our what if scenario we began to explore the possibilities of making a new alternative for the intersection by keeping in mind the objectives of the car and bike traffic improvement, keeping the same parking space capacity and specially maintaining the Berm urban nature intact (11420m2). In our scenario we also keep the trees in Prins Boudewijnlaan intact as they also contribute to a small but important ecological corridor.



What if..... (1)

- Preserved area 11420m2
- Preserved trees
- New trees

ISLAND #2 / Mortsel

Evaluation of assets & threats



Disappeared Luithagen Station



Clearing



Ground depression



Fungi in dead wood



Remains of the old railway



Accessible path



Clearing for events



Bike lane



Trash and debris



Japanese knotweed



Fungi in dead trees



IMAGINE



DISAPPEARED LUTHAGEN STATION - Intervention to maintain the memory of the station and railway.



CLEARING - Growth of other species, social gatherings.



GROUND DEPRESSION - Potential pond.



EXPLORE



VALUABLE



FUNGI IN DEAD WOOD - Biodiversity.



REMAINS OF OLD RAILWAY - Memory of the Berm.



ACCESSIBLE PATH - Inclusiveness.



CLEARING - Open space for events.



WARNING



BIKE LANE - Next to cars and shared with pedestrians.



LACK OF SEATING - Rest for elderly and people with reduced mobility.



DANGER



TRASH AND DEBRIS - Dangerous for children.



POLLUTANTS FROM CARS



MANAGE



NO SOIL REMOVAL



NO DUMPING



NO MOWING



NO DOGS



MONITOR



JAPANESE KNOTWEED - Monitor evolution.



WOOD-DECAY FUNGI AND TREE DISEASES - Monitor regularly.



FALLING TREES - monitor regularly.



EXCESS OF NITROGEN IN SOIL - Due to dog urine and feces.



GOVERNMENT PROPOSALS

Current situation

R-11 Vredebaan

As we have seen in this report, sound and air pollution at the R11 are quite high (up 75dB) just below the threshold of hearing loss risk. Along the R11 Vredebaan we encounter a densely built fabric (workshops, apartment, shops) being exposed to this nuisance. Furthermore the sidewalk is rather unfriendly to pedestrians.

We have explored several scenarios that could improve this situation and incorporated the vision from Gebermte where the Berm is not an isolated urban nature area but part of a larger ecological network. Gebermte also points out in prioritising slow traffic above fast car connections.

Existing situation



Scenario exploration

What if?

R-11 Vredebaan

What if (1) explores the possibility of eliminating the middle lane currently reserved only for turning cars. With this new gained space we could make a more friendly environment where parking, bike lane and pedestrians are clearly defined. Furthermore we have added trees and increased the permeable surfaces to address urban heat island effect and flood management.

What if (2) speculates on an unlikely scenario where the R11 goes under the current street profile. Obviously is an expensive solution, yet long term benefits for the neighbourhood are worth considering. In this case the R11 resembles more like an expansion of the Berm with a bicycle highway and a slow road for local traffic access. There is also the risk of implementing this in a careless way for both humans and non-humans, waste disposal, dumping etc have to be done in a careful manner.

What if....? (1)

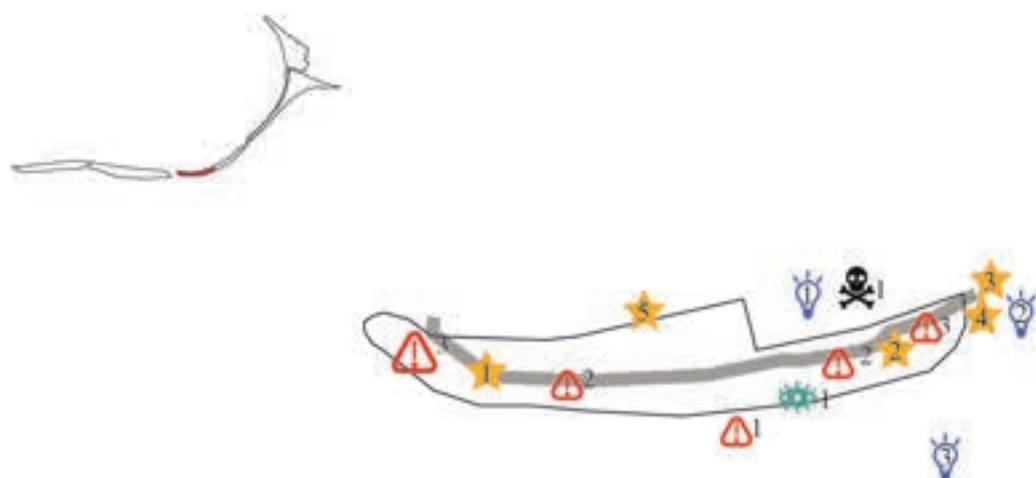


What if....? (2)



ISLAND #3 / Mortsel

Evaluation of assets & threats



Semi abandoned building



Eggestraat



Oude Spoorweg Mortsel



Clearing with young trees



Dead wood



Bin. rules



Bike lane in H.C.



Bike lane in K.



Stairs



IMAGINE



SEMI-ABANDONED BUILDING - Possibility of transforming into a nature and history interpretation center for the berm.



EGGESTRAAT - Potential green connection to island 4.



OUDE SPOORWEG MORTSEL - Potential connection to metropolitan green structure.



EXPLORE



VALUABLE



CLEARING WITH YOUNG TREES - Diverse biotopes.



DEAD WOOD - Habitat for wintering fauna and fungi.



BIN - Not littering.



BASIC RULES BOARD - Reduce damaging behaviours.



BIKE LANE - In quiet street and protected from cars.



WARNING



BIKE LANE - Next to cars and shared with pedestrians.



LACK OF SEATING - Rest for elderly and people with reduced mobility.



STAIRS - Not accessible for wheelchairs.



DANGER



SEMI-ABANDONED BUILDING - Taking up a big area of the berm.



MANAGE



NO SOIL REMOVAL



NO DUMPING



NO MOWING



MONITOR



JAPANESE KNOTWEED - Monitor evolution.



WOOD-DECAY FUNGI AND TREE DISEASES - Monitor regularly.



FALLING TREES - monitor regularly.



DOGS ON LEASH - monitor regularly.



EXCESS OF NITROGEN IN SOIL - Due to dog urine and feces.



GOVERNMENT PROPOSALS

Current situation

Telecom building

In a rather unusual situation for the Berm this island contains a bulky building reserved for telecommunication purposes. Although in this study we were not able to conclude its relevance for the owner, the building seems rarely used. Its current appearance and volume makes it unattractive to the area.

Existing situation



Scenario exploration

What if?

Telecom building

What if (1) we can imagine how the building could become friendlier and compatible to it's surroundings by hosting a greener roof and envelope. This scenario does not imply the displacement of the company but merely a redesign. Yet within the same idea, we could also imagine the Telecom company being replaced in another location and donating this building to the Berm for the purpose of Urban Nature House. Gebermte and Natuurpunt could use it for exhibitions, training courses and debates.

What if (2) considers the possibility of letting an artist work with a contemporary ruin. His/her take could vary obviously so here we merely present an idea borrowed from Gordon Matta Clark where there circular cuts through the building reveal new readings of the space. Finally the ruin could also host non-human actors as a place of refuge.

What if....? (1)



What if....? (2)



Scenario exploration

What if?

Telecom building

What if (3) imagines the unlikely yet highly appealing idea of getting rid of the structure. Its rubble rather than being dumped elsewhere serve as a basis for a new beginning where solid formation could eventually take place, where spontaneous growth could appear.

What if....? (3)



ISLAND #4 / Mortsel

Evaluation of assets & threats



Green along railway



Road bridge



Private garden



Dead wood



Bench



Playground for children



Bin



Bike lane along



Stairs



Old objects



J. Knotweed



IMAGINE



GREEN ALONG RAILWAY - Connection to green structure

ROAD BRIDGE - Green bridge to reconnect the berm

PRIVATE GARDENS - Source of biodiversity



EXPLORE



VALUABLE

DEAD WOOD - Habitat for wintering fauna and fungi

BENCH - Resting point

PLAYGROUND - Attract children

BIN - Reduce littering



WARNING

BIKE LANE - Next to cars and shared with pedestrians.

STAIRS - Lack of accessibility.



DANGER

POTENTIALLY POLLUTED SOIL - Risk for children in playground.

OLD OBJECTS - The berm as storage or dumpsite for the adjacent homeowners.



MANAGE



NO SOIL REMOVAL



NO DUMPING



NO MOWING



MONITOR

EXTENSION OF GARDENS - Appropriation of parts of the berm by homeowners.

JAPANESE KNOTWEED - Monitor evolution.

WOOD-DECAY FUNGI AND TREE DISEASES - Monitor regularly.

FALLING TREES - monitor regularly.

DOGS ON LEASH - monitor regularly.

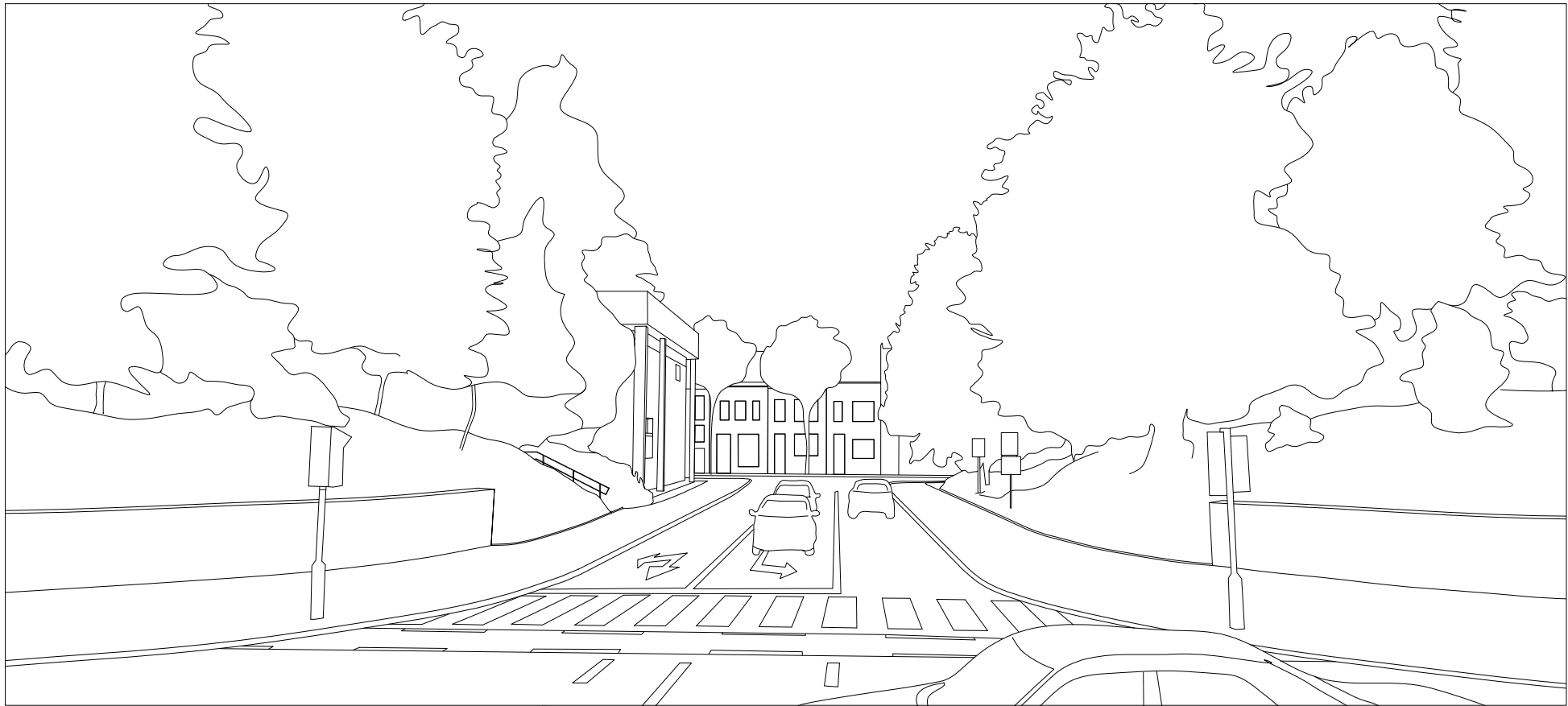
EXCESS OF NITROGEN IN SOIL - Due to dog urine and feces.

Current situation

Eggestraat

Several experts agree on the impacts of gaps for the performance of an ecological corridor. The least amount of gaps the better. Gaps width are also critical as many animals would dare to cross a small slow road but few will adventure into a place where car traffic could turn out deadly. The island has in effect a gap on its west side edge that discourages not only animals but also pedestrians. The scenarios explore the improvement conditions for both humans and non humans and aims at reducing car traffic and pollution from the neighbourhood.

Existing situation



Scenario exploration

what if? Eggestraat

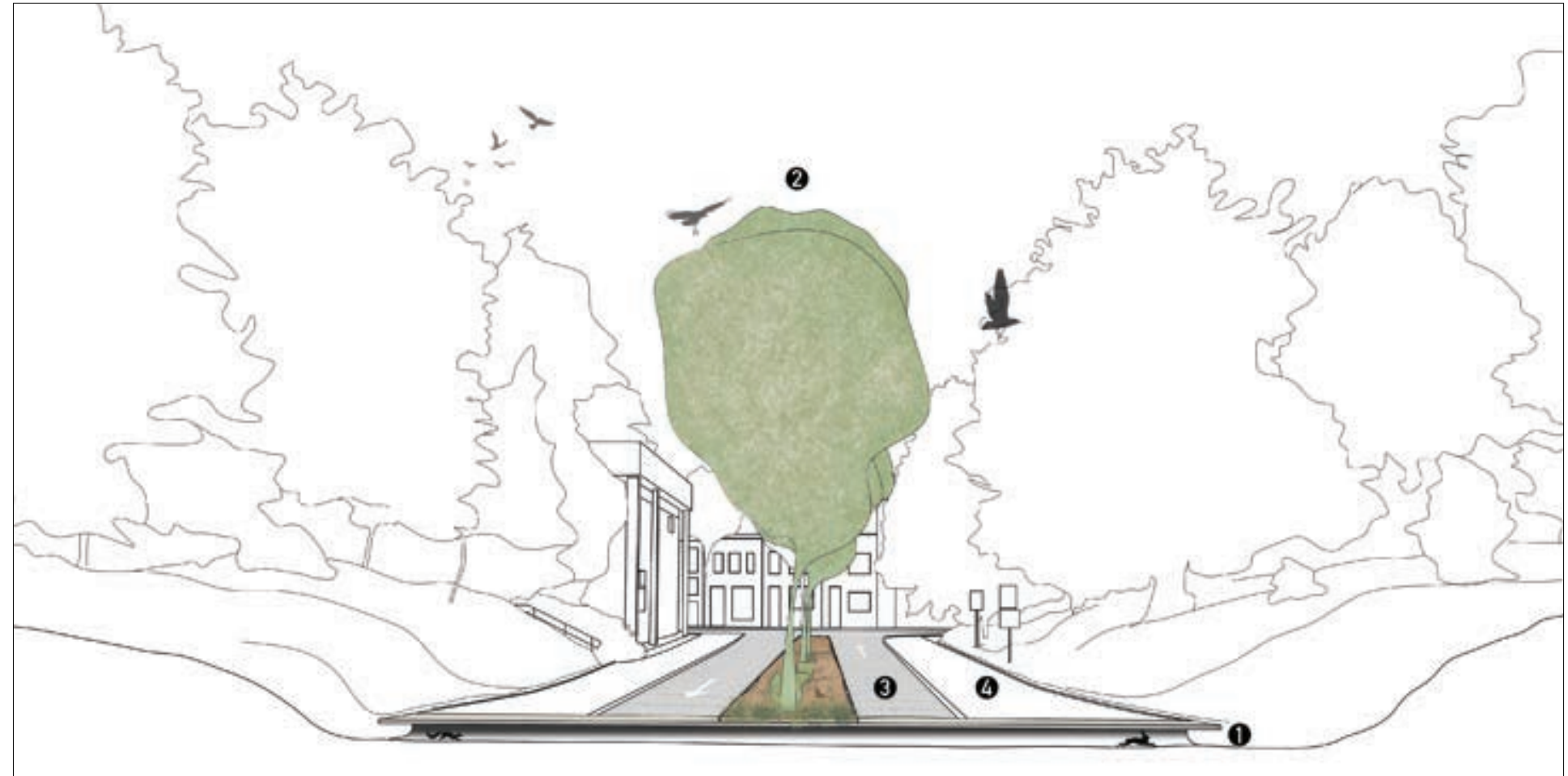
What if....? (1)

- ① Tunnel for fauna.
- ② Middle lane becomes tree lane.
- ③ Permeable pavement.
- ④ Wider sidewalks.

What if (1) is a simple solution where small mammals have (ideally more than 2) dedicated fauna tunnels. For birds and bats an additional stepping stone with a central tree canopy provides a softer transition between the Berm and its environment. Nevertheless this option keeps humans going down and up the stairs which could be annoying for several people.

What if (2) takes as point of departure the equal benefits for both humans and non humans through the addition of a pedestrian green bridge. This scenario could also incorporate fauna tunnels.

What if (3) explores a more daring approach, where the car traffic is cancelled in this crossing to give way to a civic space. Traffic wise this will mean cars will have to continue until Guido Gezellelaan to continue their journey west. Cars going east (e.g. going to fort 4) will have to divert to N1 and then N10.



What if....? (2)

- ① Car street becomes green area.
- ② New planted trees.
- ③ Spontaneous vegetation growth.
- ④ Permeable pedestrian path connecting islands.

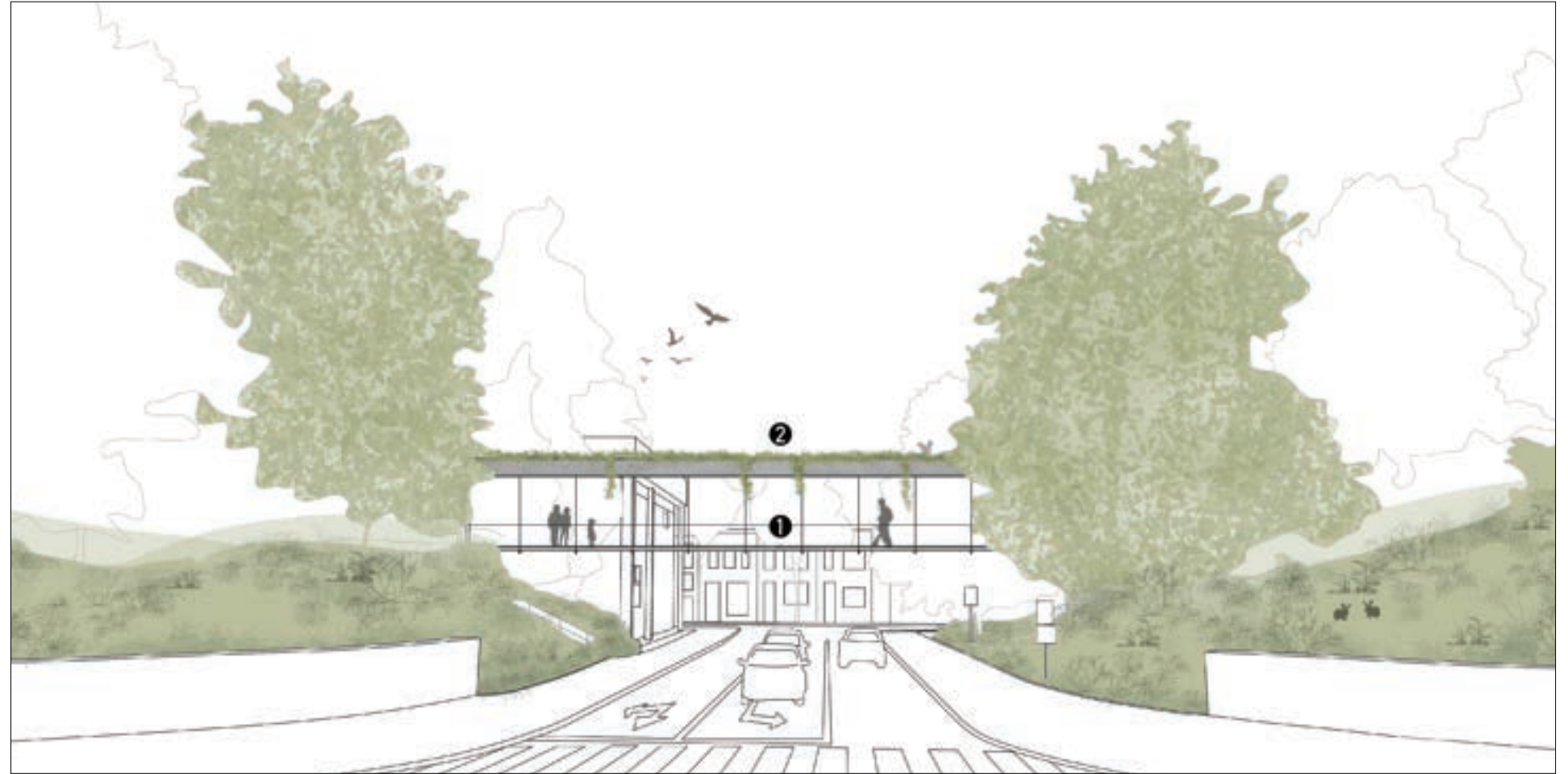


Scenario exploration

what if? Eggestraat

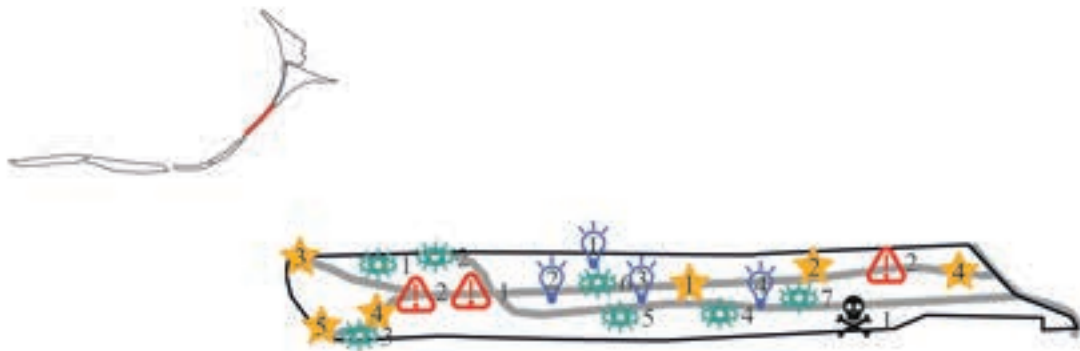
What if....? (3)

- ① Pedestrian bridge.
- ② Green connection for fauna.



ISLAND #5 / Mortsel

Evaluation of assets & threats



Gate in fence



N. path/Raised beds



Mushroom cult.



Bench



Dead wood



Rules board



Accessible path and bin



Bamboo



Japanese knotweed



Falling trees



IMAGINE



GATE IN SCHOOL FENCE - Connection to school

NARROWER PATH - Reduce impact.

RAISED BED GARDENS - Learn, food production, community engagement.

MUSHROOM CULTIVATION - Learn, food production, community engagement.



EXPLORE



VALUABLE

1 BENCH - Resting point.

2 DEAD WOOD - Habitat for wintering fauna and fungi.

3 BOARD WITH BASIC RULES - Reduce damaging behaviours.

4 ACCESSIBLE PATH- Inclusiveness.

5 BIN - Reduce littering.



WARNING

1 BIKES ON MAIN PATH IN THE BERM

2 LACK OF SEATING AND BINS



DANGER

1 POLLUTED SOIL - Risk for children.



MANAGE



NO SOIL REMOVAL



NO DUMPING



NO MOWING



MONITOR

1 BAMBOO - Monitor evolution.

2 RABBITS - Monitor evolution.

3 JAPANESE KNOTWEED - Monitor evolution.

4 WOOD-DECAY FUNGI AND TREE DISEASES - Monitor regularly.

5 FALLING TREES - monitor regularly.

6 DOGS ON LEASH - monitor regularly.

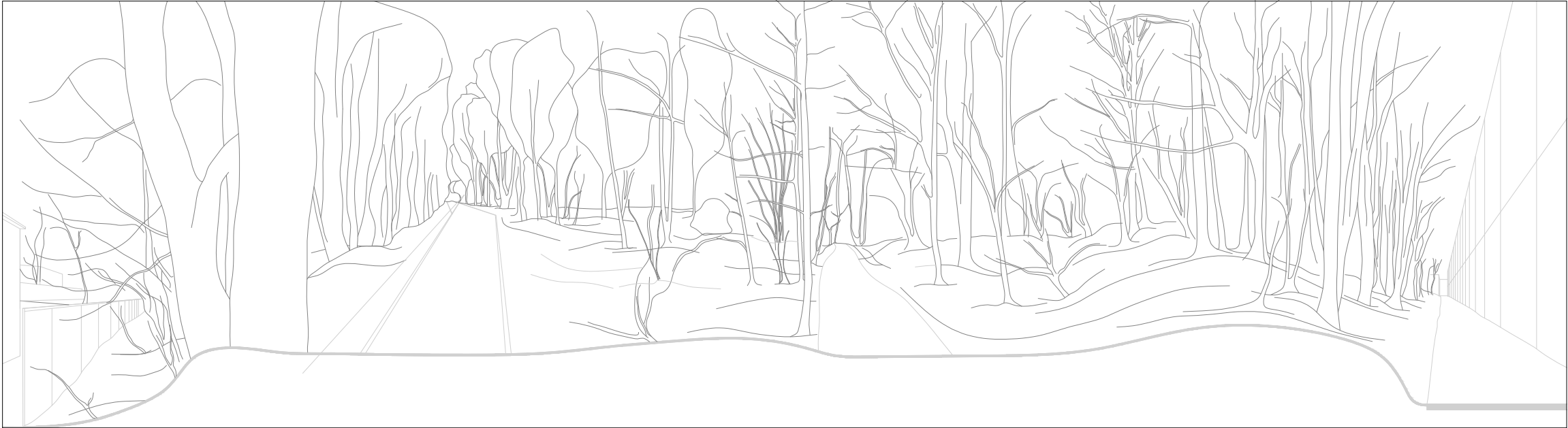
7 EXCESS OF NITROGEN IN SOIL - Due to dog urine and feces.

8 GOVERNMENT PROPOSALS

Current situation

GTI Mortsel / Van Dessel Autohandel

This island is frequently used by dog owners. It is one of the islands where the understory is quite undeveloped. The island has two parallel paths (one very regular and wide, the other more sinuous and narrow) that are quite close to each other. As opposed to island 2 this does not bring any pleasures of surprise since both are seen from each other. The connection between the two paths by dog owners seems to have contributed also to the near absence of understory. As seen in transects, the industrial blind wall brings sound and light pollution protection. On the opposite side, two school backyards seem to neglect the potential of a fruitful relation with the Berm.



Existing situation



Scenario exploration

what if?

GTI Mortsel / Van Dessel Autohandel

What if (1) aims to boost understory by limiting the presence of humans to only one path. The preserved path could be enriched by adding seating areas and assembling logs from fallen trees in a simple structure. The wall from the industry could also be greener and even providing habitat modules for birds.

What if (2) also aims to increase understory by reducing from two to one path. In this case the sinuous path is the one preserved with the addition of logs at its edges to suggest a limit to human activities. The other path is converted to urban farming which could be safeguarded and maintained by teachers and students of the adjacent schools. The scenario could go further by making a more direct connection between the backyard gardens and the Berm.



What if....? (1)

- 1 Cancelled path.
- 2 Raised beds for urban agriculture.
- 3 Alternative path becomes the only path.
- 4 Logs form fallen trees as perceived limit.
- 5 Direct connection to school.

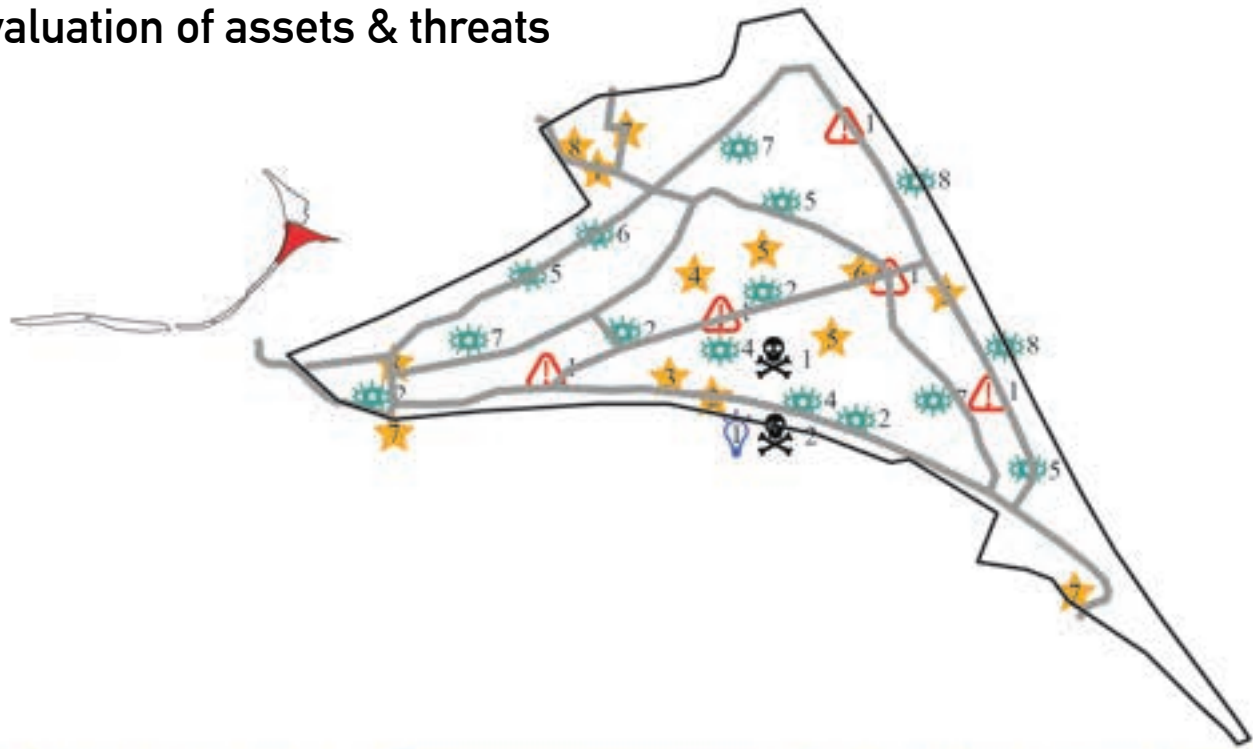


What if....? (2)

- 1 Narrower path.
- 2 Structure built with logs from fallen trees for mushroom cultivation.
- 3 Green façade over brick wall.

ISLAND #6 /Klein Zwitserland South

Evaluation of assets & threats



☠️ 2 Polluted water



★ Hoeve dieseghem



★ Fencing with dead wood



★ Pile of wood with mushrooms



★ Wetland



★ Diverse biotopes



★ Educational boards



★ Rules board



⚠️ 2 Stairs



⚙️ 5 Falling trees



IMAGINE



NO DISCHARGE OF POLLUTED WATER - Reduce ground water pollution.



EXPLORE



VALUABLE

- ★ 1 HOEVE DIESEGHEM - Gathering point.
- ★ 2 FENCING WITH DEAD WOOD - Protection of biotopes.
- ★ 3 PILE OF DEAD WOOD - Habitat for wintering fauna and fungi.
- ★ 4 WETLAND - Biodiversity.
- ★ 5 DIVERSE BIOTOPES - Varied management plan.
- ★ 6 EDUCATIONAL BOARDS - Learning.
- ★ 7 BASIC RULES SIGN - Reduce damaging behaviour.
- ★ 8 SEATING - Resting points.



WARNING

- ⚠️ 1 LACK OF SEATING AND BINS - Littering and lack of rest
- ⚠️ 2 STAIRS - Lack of accessibility



DANGER

- ☠️ 1 POLLUTED SOIL
- ☠️ 2 POLLUTED WATER



MANAGE



NO SOIL REMOVAL



NO DUMPING



CONTROLLED MOWING



MONITOR

- ⚙️ 1 RABBITS - Monitor evolution.
- ⚙️ 2 JAPANESE KNOTWEED - Monitor evolution.
- ⚙️ 3 WOOD-DECAY FUNGI AND TREE DISEASES - Monitor regularly.
- ⚙️ 4 FALLING TREES - monitor regularly.
- ⚙️ 5 DOGS ON LEASH - monitor regularly.
- ⚙️ 6 PRESENCE OF BIKES - monitor regularly
- ⚙️ 7 EXCESS OF NITROGEN IN SOIL - Due to dog urine and feces.
- ⚙️ 8 TREES NEXT TO RAILWAY LINE - Monitor regularly.
- ⚙️ 9 GOVERNMENT PROPOSALS

ISLAND #7 / Klein Zwitserland North

Evaluation of assets & threats



★ Pond



★ Archery Event



★ Berm (for targets and bikes)



★ Fenced access



★ Example of path



★ Shrubby



★ Partially mowed grassland



★ Japanese Knotweed



IMAGINE



RESTORE THE POND - Remove trees strategically to allow light in the pond and enhance biodiversity.



EXPLORE



VALUABLE

- ★ POND - Biologically very valuable.
- ★ RECREATIONAL ACTIVITIES (Archery and mountain bikes) - Social service.
- ★ FENCING WITH DEAD WOOD - Protection of biotopes.
- ★ DIVERSE BIOTOPES - Varied management plan.
- ★ EDUCATIONAL BOARDS - Learning.
- ★ BASIC RULES SIGN - Reduce damaging behaviour.



WARNING

- ⚠ LACK OF SEATING AND BINS - Littering and lack of rest.



DANGER

- ☠ CARS INSIDE THE ISLAND



MANAGE



- NO SOIL REMOVAL
- NO DUMPING
- CONTROLLED MOWING
- CONTROL VEGETATION AROUND THE POND TO ALLOW SUNLIGHT



MONITOR

- ★1 RABBITS - Monitor evolution.
- ★2 JAPANESE KNOTWEED - Monitor evolution.
- ★3 WOOD-DECAY FUNGI AND TREE DISEASES - Monitor regularly.
- ★4 FALLING TREES - monitor regularly.
- ★5 DOGS ON LEASH - monitor regularly.
- ★6 RECREATIONAL ACTIVITIES - To control ecological damage.
- ★7 PRESENCE OF BIKES - monitor regularly.
- ★8 PRESENCE OF CARS - monitor regularly.
- ★9 EXCESS OF NITROGEN IN SOIL - Due to dog urine and feces.
- ★10 GOVERNMENT PROPOSALS

Current situation

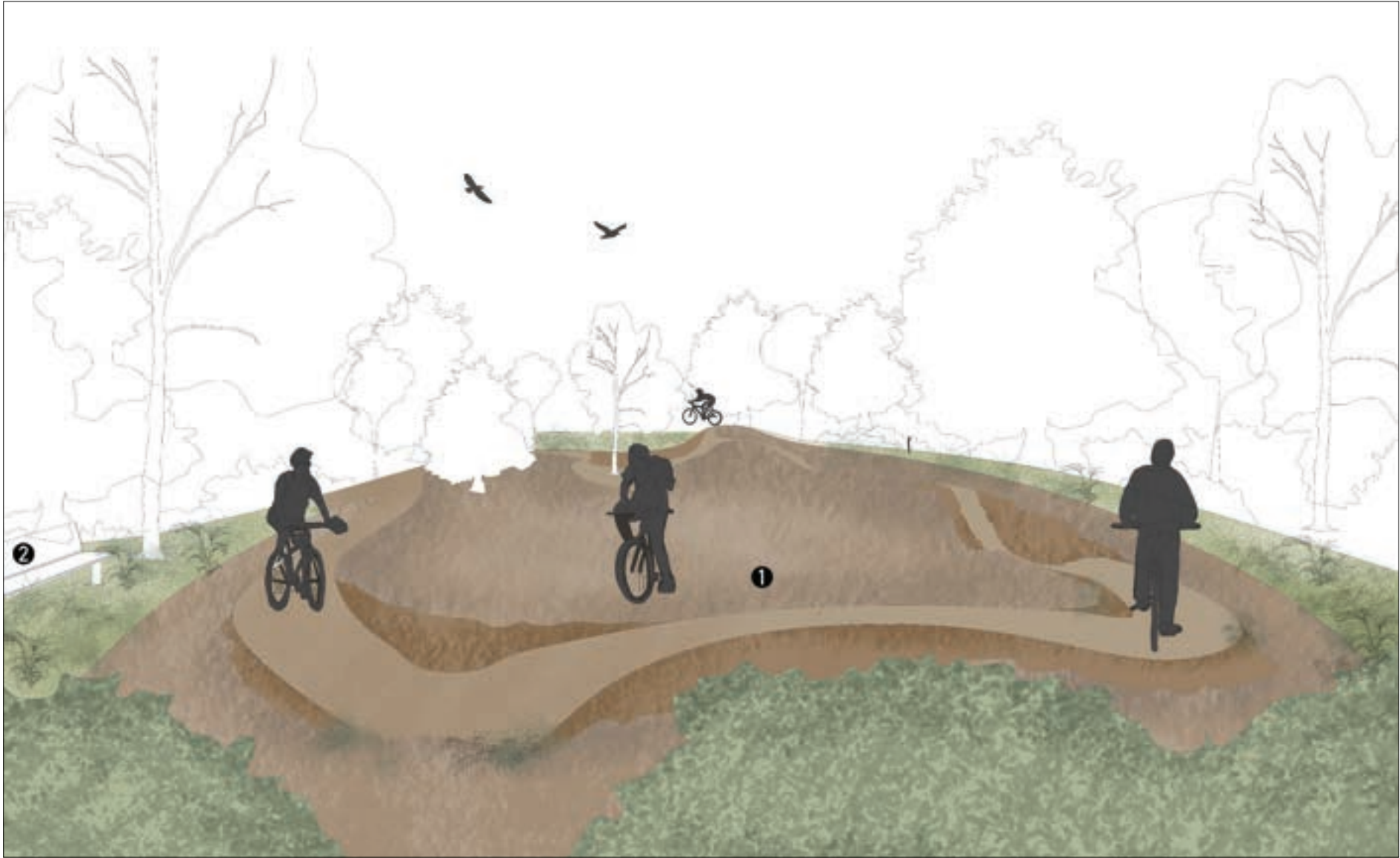
As mentioned in book 5, this island presents a rich biodiverse environment but also a potentially conflicting presence of users that are not entirely compatible with each other or the environment. Archers use the place intensively but their impact should be reduced as they currently enter with heavy vehicles which compact the earth and lead to the loss of soil formation. They also mow the area for their sport convenience. Mountain bikers are also present and keep the area alive with youngsters, yet nature lovers find their impact on the ecosystem also damaging, as small invertebrates are regularly killed by bikers. They also overlap with the limits of the fire range of the archers, so actual danger of this users should not be underestimated.

Existing situation



What if (1) proposes to find a more suitable place for them in the vicinity, a place not far away but also not rich in biodiversity. In this new place mountain bikers can have an even better condition and they would also benefit from the undercover space of the R11.

What if....? (1)



- ① New mountain bike circuit.
- ② Seating areas.

Colophon

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