Source: Heem, Ciran Nederland BV

The potential of informal urban green space to provide habitat and cultural ecosystem services

How design and management can enhance ecosystem services provided by IGS's that benefit both humans and non-human species

Name: **Roel P.E. Sipkema**

Student nr.: **1050540**

1st supervisor: **dr. ir. Sitong Luo**

2nd Supervisor: **dr. Jana Verboom**

TU Delft

WAGENINGEN UNIVERSITY & RESEARCH

AMS AMSTERDAM INSTITUTE FOR ADVANCED METROPOLITAN SOLUTIONS

Abstract

Informal urban green spaces are areas of greenery with a history of anthropogenic disturbance, dispersed throughout our cities, and covered with at least partly spontaneous vegetation. Often characterized by an overgrown nature, these informal green spaces provide ecosystem services to citizens, as well as urban flora and fauna. Due to their informal nature, these green spaces offer a unique opportunity to deliver both habitat and cultural ecosystem services simultaneously, especially since they are often found in populated areas with a shortage of green spaces. Research on synergies of cultural and habitat ecosystem services within informal urban green spaces is largely lacking, as these services often counteract each other. This thesis focuses on how these two types of ecosystem services can coexist within an informal urban green space in the culturally diverse K-buurt in Amsterdam; how synergies between these services are identified and how an informal green space can be designed for humans, animals, and plants alike. Through Research-through-Design, this thesis analyzes the current state of the informal green space and reveals its potential. By identifying and applying synergies between proposed design interventions, this design provides both habitat and cultural ecosystem services that not only coexist but benefit from each other's presence.

Table of contents

1. Introduction

Green spaces are becoming an increasingly important part of the urban landscape. They are not only pleasant for citizens to use, but also serve as crucial habitats for the diverse flora and fauna of the city. In the context of more frequent extreme weather events, green spaces mitigate the urban heat island effect, heavy rainfall and support the declining biodiversity (Semeraro et al., 2021). For many, “green space” may refer to any site within a city that presents plant life. However, there is a big difference in how people, animals and plants use green spaces. One way to categorize green spaces is into formal green spaces, such as parks and gardens, and informal green spaces. The former might be more well known, but the latter is the focus of this thesis and requires further defining.

An informal urban green space (IGS) often attracts people who prefer solitude and non-human species for whom a specific niche is available in the IGS. An IGS is defined by Rupprecht & Byrne (2014) as “any urban space with a history of anthropogenic disturbance that is covered at least partly with non-remnant, spontaneous vegetation” p. 2-3.

Although these IGS are often temporary, implementing small design interventions within these IGSs can improve experience for both visitors and inhabitants of the space. However, it should be noted that conflict may arise between animals that prefer peace and quiet and humans that want to use the space for cultural activities. The types of services that may clash are formally known as ecosystem services (ES). Ecosystem services, as defined by the Millennium Ecosystem Assessment (MA, 2005), are “the goods and services provided by ecosystems to humans.”, categorized in four subgroups: supporting, regulating, provisioning and cultural services. This definition was later refined by the Economics of Ecosystems and Biodiversity (TEEB) (Sukhdev et al., 2008), reclassifying “supporting services” to “habitat services” and “Ecosystem functions”. According to TEEB these are a “subset of the interactions between ecosystem structure and processes that underpin the capacity of an ecosystem to provide goods and services.”. This thesis focuses on the interplay between habitat ecosystem services (HES) and cultural ecosystem services (CES) and uses an IGS in Amsterdam as a case study.

1.1 Problem statement and Objectives

Current literature about ES suggests that trade-offs arise when the provision of an ES is reduced because of the increased use of another ES (Rodriguez et al., 2006). Rodriguez et al. (2006) suggest these trade-offs are experienced on a local level, which in this case means on the level of an IGS in Amsterdam. The increased use of CES within the space can lead to a decrease in the provision of the HES. A major topic in papers is

multifunctionality of urban green infrastructure (UGI), as multifunctionality provides solutions to social, economic and environmental challenges (Ahern, 2007; Wolf, 2003; Tzoulas *et al.,* 2007). This thesis focusses on environmental challenges, specifically biodiversity loss. Research by Kumar (2012), the Millennium Ecosystem Assessment (MEA) biodiversity synthesis report of 2005 and Amsterdam's Green Infrastructure report (2019) emphasize how the loss of biodiversity impacts psychological, physical and economic well-being of inhabitants of urban areas (Díaz et al., 2006).

Studies by Farahani and Maller (2019) and Németh and Langhorst (2014) show that people use IGSs for a plethora of activities they view very positively, believing it improves their overall well-being. However, it presents a challenge: the intensive use of IGSs by people disturbs plant and animal species in that area (Pautosso, 2007; Martínez et al., 2020), making it difficult to improve or maintain HES of the IGS while entertaining CES at the same time. So, a gap exists within the literature on when an IUG is to be turned into a haven for species and boost its HES, while also providing CES for the neighborhood. This gap is also noted by Luo & Patuano (2023), who note that while existing literature often examines individual ecosystem services, it rarely explores the trade-offs and synergies between different types of ES, such as HES and CES. Moreover, research on the potential for ES provided by IGSs is often focused on larger areas such as brownfields, rather than the smaller vacant lots and other IGSs (Rupprecht et al., 2015; Sikorski et al., 2021). This provides an opportunity to contribute to the existing knowledge on ES provided by IGSs.

1.2 Research question

To address the knowledge gap, the following research question has been formulated:

- ***How can design improve the habitat ecosystem services of informal urban green space while incorporating cultural ecosystem services?***

This question captures the essence of the knowledge gap by proposing a dual approach to addressing two interconnected challenges through purposeful and multifunctional design of public green space. To answer this research question, the following sub-questions have been developed.

1. *What is the current state of the IGS, its species, how is it currently managed, maintained and perceived?*
2. *What is the potential of cultural and habitat ecosystem services within the IGS?*
3. *How can the gap between the current state and the potential of the site be bridged through design?*
4. *Is the proposed design of the IGS realistic?*

Before explaining the methods used to answer these research questions, a brief introduction of the site that this thesis focuses on helps understand the problems in a more local context.

1.3 Introducing the site

On the now empty site once stood a multi-story multistorey car park with shops and apartments attached. This garage was used by inhabitants of the surrounding apartment blocks on the Krombekstraat and Kempering, as well as by visitors of the nearby shopping mall. In April 2015, the demolition of the site was started, which was completed later that year. By the time of its demolition, the garage had become an eyesore for the local population and deemed to be a safety hazard as well (Hermanides, 2014). This makes its demolition an opportunity to create a positive impact for the neighbourhood.

Figure 1: the case study site on the Kempering (Source: Google Maps)

2. Methodology

To address the main research question "*How can design improve the habitat ecosystem services of informal urban green space while incorporating cultural ecosystem services?*", four sub questions have been formulated. Each question correlates to a method explained in the following paragraphs. However, first a more detailed explanation of the case study site is given.

2.1 Case Study

The site where the case study for this thesis took place is the IGS in the K-buurt, in between the Kempering, Krombekstraat and Kantershofpad. Situated in a densely populated area of the Amsterdam Zuid-Oost region, the site is a part of citizens' daily routines. The site measures approximately 95x70 meters, or 6650 m^2. On the south end of the site exists a line of trees of different heights, ranging from five meters to close to 15 meters. These trees cover an area of around 1900 m^2 at the bottom of the site. The remaining 4750 m^2 is grassland. Strewn over this grassland area of the site are wildflowers and plants emerging, but the majority of the area is covered only by grass and herbs, which is mowed by the municipality to prevent overgrowth. Around the site are some benches, streetlights and trashcans, but within the site there are no public amenities or infrastructure present. This area is an IGS, which is used by people from the neighbourhood for activities. These aspects make it the ideal case study to find how HES and CES can be provided by an IGS, not just simultaneously, but actively improving each other. The IGS on the Kempering is an opportunity for the Municipality of Amsterdam to create a positive impact for both citizens and local species. The 'bestemmingsplan' for the area has already been developed and the site is destined to become high-rise housing. This thesis aims to go beyond the current plans and explore what else the municipality could do with similar spaces to benefit the community and local biodiversity. The site's position between larger green spaces such as the Gaasperplas and Bijlmerweide also makes it an ideal candidate for a steppingstone that facilitates movement throughout a fragmented habitat, amplifying positive ecological impact.

Within this space the research takes place that aims to answer the main research question and the four sub-questions.

2.2 Investigating the current state of the site

The first phase of research, the investigation into the current state of the site, applies to the first sub question "*What is the current state of the species present in and around the IGS, how is it currently managed and maintained?*". Methods used to answer this question are field research, NDFF database research and interviews.

Field research

The most direct method to assess the current state of the IGS is field research on site. This field research was carried out by a team of three, Dr. Luo, Dr. Verboom and myself. The primary objective was to identify species at the site, the state of the soil, surrounding urban context and green infrastructure. Similar methods of research into biodiversity were performed by Angold et al., (2008) and Godefroid et al., (2007).

On May 20, 2022, the team gathered at Amsterdam Central station to investigate two sites, Sixhaven and Kempering (site of this thesis' case study). At both locations Dr. Verboom led the identification of flora and fauna species. This identification was done to understand the types of species present at the site and therefore likely target species to be conserved or perhaps as prey species for other target species. Dr. Verboom identified species based on her expertise, while pictures were taken by Dr. Luo for documentation of species that could not be directly identified. In a notebook I noted down all the species names that were directly identified. Unidentified, but photographed species were later identified based on photos and online research. This collaborative effort resulted in a database of species present at the site.

NDFF database research

The second part of this method involved using the NDFF database to cross reference the findings of May 20, 2022, with observations made by both professional and amateur naturalists over the last 20 years. By placing a circle of r=250m centered on the Kempering site and increasing that circle to r=500m, r=750m and r=1000m, we were able to identify observations on or near the site. A simplified list is created that combines the sightings of the same species within each distance range. This creates a better overview of which species were found and in what proximity they are to the site.

Interviewing citizens

To gain a better understanding of the citizens' perception of the site, both in a natural and cultural sense, interviews were conducted on two separate on two dates. On Thursday 7-7-22 and Saturday 9-7-22 the team of Dr. Luo, Dr. Naghibi and I would conduct interviews on site with individuals using the site or passing by. To capture a diverse range of respondents, interviews were conducted during the morning, midday and afternoon, across both weekend and weekday.

The interviews were semi-structured, recognized for its effectiveness in qualitative research by Braun & Clarke (2006), and conducted in either Dutch or English, depending on the English proficiency of the interviewee. The interview structure, developed by Dr. Luo was divided into four sections ‘Usage’, ‘Perception’, ‘Recognition’ and ‘Participant Characteristics’, made to ensure the focus of the interview.

The interviews were recorded both on paper and using a voice recorder. The interviews were later transcribed and translated into English when necessary.

Gathering qualitative data through these interviews is important for capturing the complexity of the subjects (citizens) (Vaughn & Turner, 2016). Benefits of qualitative research are gaining specific user needs (Begay et al., 2004), identifying specific context that can lead to new services (Knapp, 2004), and supporting quantitative results with user perception (Friesen, 2008). However, it is also important to be able to interpret these qualitative results in a quantitative manner.

The final step for the interviews is the coding of the responses, to quantify qualitative answers and results. The coding method used in this thesis is adapted from Vaughn & Turner (2016) to identify patterns of meaning (Braun & Clarke, 2006). Within the interview itself, categories were included (see ‘interviewing citizens’ method). This pre categorization saves time during data analysis. Like Vaughn & Turner, the responses were analyzed, and common themes were extracted per category. Each answer was coded according to these themes, allowing for the quantification of the most prevalent themes. This quantification can help develop interventions that align with common responses by the citizens.

2.3 Identifying potential design strategies on HES and CES

The second sub question "*What is the potential of cultural and habitat ecosystem services within the IGS?*", is answered by doing literature research.

Literature review

To garner information on IGS and potential design interventions, key words and keyword combinations were used to search Scopus. This method was chosen to analyse as many case studies as possible within the research timeframe. Visiting locations that show the potential of IGSs would be costly, both financially and time wise. Because of the innovative nature of the thesis, most articles cited were published after 2000, although some older articles were included when relevant. The Scopus search results were sorted by 'most cited' and review paper were used to identify primary literature, to ensure accurate citations.

In addition to timeliness, three other criteria were used to narrow down the Scopus results and streamline the literature reviewing process.

- The presence of key words in the title
- The green space discussed is similar in scale to the K-buurt green space
- Research conducted within Europe

The final criterium of location is there to ensure the knowledge is applicable to situations within a similar climate as the K-buurt case study. Climate here refers to both the cultural climate as well as the meteorological climate.

Key words	Informal Urban Green space, Urban green infrastructure, habitat services, cultural ecosystem services, Nature inclusive design, Nature based design, IGS
Websites & Databases	Scopus

2.4 Bridging the gap between current state and potential

To answer the third sub question "*How can the gap between the current state and the potential of the site be bridged through design?*", first a synergy analysis followed by research through design (RtD) is applied.

Synergy analysis

Results from the interviews, field research, NDFF data base research and literature review are combined to formulate design interventions aimed at helping the site achieve its CES and HES potential. A synergy analysis is performed to find how different interventions work together or cause discord when implemented in the same space. The reasoning behind the synergy analysis is subjective but is evaluated by an expert in a (see 'Evaluating the Design'). Visualizing the relationships between proposed interventions aids in selecting those that are implemented in the final design. Though applied to Social ecological models of health by Lewis et al. (2017), synergy analysis is recognized as a useful method for identifying interventions that mutually reinforce one another.

Designing (RtD)

Incorporating the proposed interventions into a final design is the penultimate step of the thesis. The design indicates what happens within the site and at its fringes, making sure it works within the context of its surroundings. It includes a border around the actual site to demonstrate this context.

The design technique itself is a top-down view of the site, done with pencil on paper. Key features and interventions of the site are indicated by numbers and explained alongside the design itself.

This thesis employs RtD, where design activities play a formative role in knowledge development (Stappers and Giaccardi, 2017). It typically involves creating a prototype (design) that plays a part in knowledge generation. An example would be to create a design using factors that have not been combined before to stimulate a discussion and or further research.

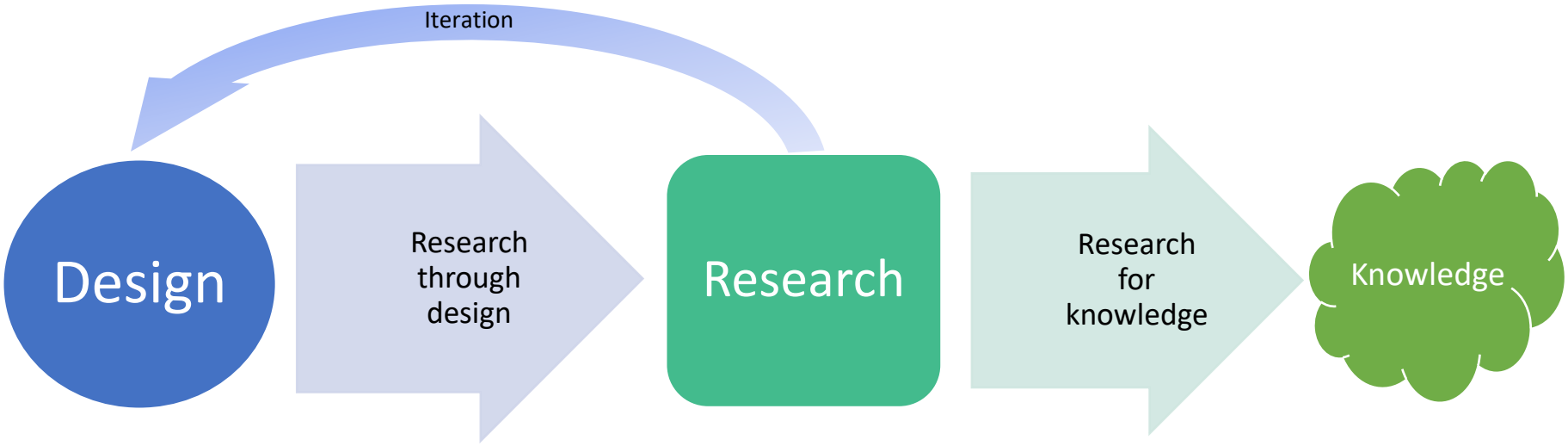


Figure 2: schematic of the process of RtD, adapted from Stappers and Giaccardi (2017)

In the context of this thesis, it can create interaction between people, flora, fauna and abiotic factors which in turn become observable and can contribute to knowledge. This research done at the hand of studying a design and its interactions can then be used iteratively to create an improved design, or it can contribute to the larger pool of knowledge on the topic. This process is illustrated in figure 2.

Although the end products differ significantly, the research process described by Wensveen (2005) shares similarities with this thesis. While Wensveen focused on generating knowledge for digital technologies in the domestic environment (designing the optimal alarm clock to be precise), this thesis generates knowledge and new understandings of flora, fauna and people's interaction with informal green space in an urban setting. And where Wensveen created several iterations of an alarm clock, the design for the Kempering site has gone through several iterations as well, showing a similarity in the creative research process.

Spatial science and scenarios

Though the field of spatial science is broad and ranges from using GIS techniques to spatial interactions between objects within a space. At its most basic level, spatial science is mapping (Gatrell et al., 2011). Spatial science is used in this thesis for the mapping of the design strategies

within the physical space of the site, but also to provide insight into the interaction between elements within the space. It is a method to combine the strategies, motivated through research and interviews and analysed for synergies.

This information is compiled in a spatial design scenario. Creating spatial design scenario attempts to take new developments into account, such as shifts in mobility patterns or demographic changes (PBL, 2024). Providing planners and policymakers with a tool to look through the fog of uncertainty.

2.5 Evaluating the Design (optimized design strategies)

After completing a design, it is important to evaluate it with the help of an expert to ensure its feasibility, validity and reasonability. This evaluation, done by interviewing after the expert has reviewed the design, synergy analysis and proposed interventions, is a critical iterative step. It leads to an optimized design and design strategy for the case study site and with that address the final sub-question: *"Is the proposed design of the IGS realistic?"*

Evaluation through interview

For this final method expert input is required. The expert reviews the design and proposed interventions and their synergies, incorporating a vital iterative step into this thesis. This is crucial for validating the final results and strengthening the design. This is part of the afore mentioned iterative nature of the research process.

The expert, Ms. Noordman of the Municipality of Amsterdam, studied the design and potential interventions and their synergies first. However, to be able to structure the feedback provided by the expert, a list of criteria for evaluating is developed and provided alongside the results of the thesis. These criteria are developed by studying relevant papers that measure CES and HES of IGS.

Based on these criteria a semi-structured interview is conducted with the expert. This qualitative method of data collection has the objective to gather information and feedback from the expert on the initial finalized design. This information is consequently used to optimize this initial design. Bogner et al. (2009) describe the use of the expert interview as effective when the expert can provide practical insider knowledge when the expert can be viewed as a crystallization point for this knowledge or when they can function as a spokesperson for a wider group of players. Ms. Noordman certainly can in her position at the engineering office of the Municipality of Amsterdam and distinct knowledge of the Zuid-Oost region of Amsterdam. Using the expert interview also serves to shorten time-consuming data collecting processes.

The interview is conducted in Dutch through Microsoft Teams, where it is recorded and then transcribed. It is later translated into English to be adopted into the thesis.

3. Theoretical background

Before the research itself commences, a foundation must be laid to define important concepts and frame the scope of the research going forward. By reviewing existing literature, key concepts and words are explained and linked to create a coherent framework for the research.

3.1 Informal Urban Green Space (IGS)

The most important key word of the thesis is Informal Urban Green Space or IGS for short. It has been defined by several scholars like Sikorska *et al.* (2020). However, the definition of IGS by Rupprecht & Byrne (2014), as "any urban space with a history of strong anthropogenic disturbance that is covered at least partly with non-remnant, spontaneous vegetation" (p.2-3), supported by Del Tredici (2010) and Kowarik (2011), is the definition this thesis adheres to. These IGS's can be found throughout the city of Amsterdam and often serve socio-ecological functions, providing HES for the city's flora and fauna, while simultaneously providing CES for its citizens (Pauleit *et al.,* 2017). These ecosystem services (ES) require further definition.

3.2 Ecosystem Services (ES)

The Millennium ecosystem assessment (2005) and later the alteration by the TEEB (Sukhdev et al., 2008), states that there are four categories of ecosystem services. These categories are Regulating services, Provisioning services, Ecosystem functions/Habitat services and Cultural services. These last two categories are central to this thesis and thus require further defining and reasoning for limiting the research to only two categories, which is further motivated later in this chapter. However, the concept of ecosystem services is explained first to understand the context in which the four categories are found better.

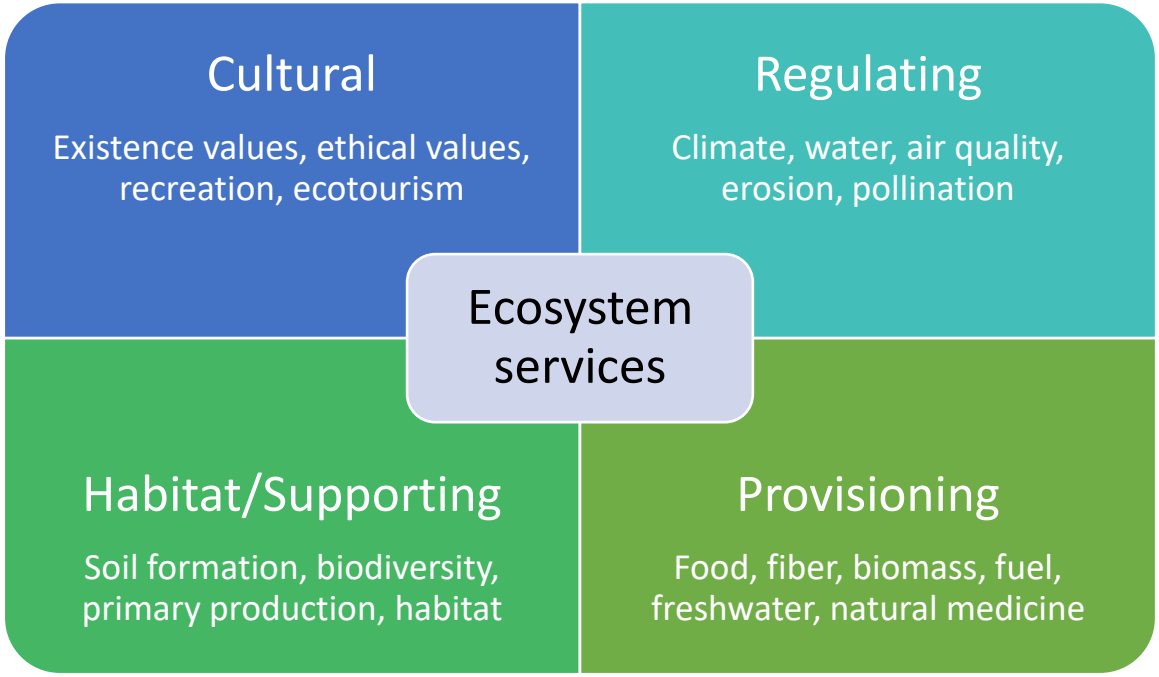


Figure 3: schematic of the four categories of ecosystem services adapted from the Millennium Ecosystem Assessment (2005)

Ecosystem services are an important model used to link the functioning of ecosystems to human welfare (Fisher et al., 2009). It is a term coined by Ehrlich and Ehrlich in 1981 adapted from the term 'nature's services' presented by Westman in 1977. These nature services were Westman's first attempt at naming the social value of the benefits society gained from ecosystems. This definition is very similar to the definition presented in the MEA (2005), possibly the most widely recognized definition at that time and first instance of the four separate types of ecosystem services being defined.

However, this consensus to name these social benefits ecosystem services was challenged in 2007 by Boyd and Banzhaf. In their definition, rather than ecosystem services equating to the benefits humans obtain, ecosystem services are the ecological components directly consumed

or enjoyed, producing human wellbeing (Boyd & Banzhaf, 2007). Costanza (2008) even suggested that there is a need for different definitions of the concept of ecosystem services.

Considering the different definitions of what ecosystem services are, Fisher et al. (2009) proposes a 'fit-for-purpose' approach when deciding on a definition. This approach should consider not only the parts of the ecological system, but also consider the political and social context of the situation in which the ecosystem services are researched or used. This fluid concept of ecosystem services comes with its own struggles of ambiguity and difficulty when trying to operationalize ecosystem services (Wong et al., 2015; Potschin & Haines-Young, 2016).

This thesis specifically focusses on the urban setting and IGS. Thus, the term 'urban ecosystem services' coined by Bolund and Hunhammar (1999) is of great interest. Used and further evaluated by Gómez-Baggethun et al. (2013), urban ecosystem services are the ecosystem services as defined prior within the MEA (2009), adapted to the urban context, like defined by Boyd and Banzhaf (2007). Gómez-Baggethun et al. (2013) speak on the four categories of ecosystem services defined by the MEA (2005) and name several of the services provided by green space in the urban context, also including IGS. Because of the list of 16 different services, it was deemed necessary to limit the research of this thesis to two categories.

3.3 Defining Habitat Ecosystem Services (HES) and Cultural Ecosystem Services (CES)

When it comes to the category of HES, Gómez-Baggethun et al. (2013) describe only the 'habitat for biodiversity' as a service specific to the urban context. Habitat or Supporting ecosystem services provide plants and animals with everything they need to survive. This includes shelter food and water. Many species depend on different types of habitats, especially migratory animals. For an ecosystem to provide multiple types of habitats is paramount to the level of biodiversity within the ecosystem.

CES are non-material benefits people can gain from interaction with an ecosystem. These benefits can be psychological, spiritual or aesthetic in nature. Types of interactions that can occur between people and ecosystems are tourism, recreation, aesthetic appreciation or spiritual connection with nature within the ecosystem.

It was decided to stick with these two categories of ES. The focus was not limited to CES and HES simply because the scope would be too broad. This is a limitation that was noticed upon doing literature research. The CES and HES are often seen as antagonists, since the presence of humans often interferes with the peace and quiet many animals and plants require for the space to be considered a suitable habitat. This antagonistic relationship is what has prevented further research on synergies between the two and is something that this thesis focusses on specifically. It is the earlier mentioned gap in the knowledge on ES in IGS.

In their current state, as previously defined by Rupprecht & Byrne (2014), IGS already provide ecosystem services, both CES (Németh & Langhorst, 2014) and HES (Kim *et al.,* 2016). However, the potential of IGS's to provide ES is considered by some to be even greater (Sikorski *et al.,* 2021). To bridge the gap between the current state and the potential of IGS's design interventions can play a critical role, even if the necessary interventions can change significantly depending on the unique characteristics of the space (Włodarczyk-Marciniak *et al.,* 2020). As an example, in the current state, overgrown IGS's can provide habitat for wildflowers by incorporating a design intervention that creates fenced off flower beds next an overgrown area, HES can be provided not only for wildflowers, but more vulnerable species of plant that require a level of maintenance and management as well. Numerous examples of the impact of design interventions are discussed further in this thesis.

3.4 How HES and CES are expressed in IGS and Formal Green Space

With the description of HES and CES, it is also important to note the difference between how these ES are expressed in the context of an IGS as opposed to a formal city park or other recreational area. While IGS are often considered to be low in biodiversity, often being overgrown by a small number of pioneering plants (Muratet et al., 2008), they are shown to be able to provide HES just as well as formal urban green space (Sikorski et al., 2021). More specifically, IGS can contribute to the broader Urban green infrastructure (UGI) by providing food, places to rest and the presence of enough cover by vegetation (trees, shrubs, tall grass). This goes especially for groups such as pollinators (Twerd & Banaszak-Cibicka, 2019) and bird species, which benefit from an increased number of green spaces for feeding, nesting and mobility in general (Villaseñor et al., 2020). However, it is important to note that nearly all species suffer from an increase in human presence within the area of refuge (Lowry et al., 2013) and that excessive recreational activities can lead to a loss of HES provided by the space (Sikorski et al., 2013). Specific research has been done for birds (Guo et al., 2019; Fernández-Juricic, 2002), pollinators (Fischer et al., 2016), insects in general (Gibb & Hochuli, 2002) and small mammals (Mahan & O'Connell, 2005). In other words, while IGS and formal urban green space provide similar levels of HES, the lack of human presence in IGS provides a necessary alternative to the HES provided by formal urban green space in the broader urban green infrastructure (UGI).

Figure 4: scenes of Informal urban green space in Amsterdam, the Netherlands (IGS) (left) and formal urban green space at Kupittaa Park in Turku, Finland (right) (sources: Wageningen University and Research, Luo (left) & 'Urban green space', Wikipedia (right))

Similar to HES, the CES provided by IGS and formal urban green space also have their differences. The biggest difference is in the infrastructure provided that allows for more specialized activities. Ruprecht et al. (2015) talk about how common activities like walking the dog, being in/enjoying nature and running exercise can be done in any UGS, formal or informal. However, when it comes to more specialized activities such as team sports/games, children's activities or skating, proper infrastructure is necessary and often only found in urban parks (formal urban green space) (Zwierzchowska et al., 2018). While it depends on the opinions of the person experiencing the CES, formal urban green space and IGS were viewed similarly, as found in the study by Sikorski et al. (2021). However, they also show that citizens who make daily visits to urban green spaces tend to be nature-oriented and prefer the wilder aspects of IGS, while more casual visitors tend to dislike the disorderly aspects of IGS, sometimes to the stage of feeling endangered. Treading the apparent fine line between management of the IGS and maintaining the informal aspect of the site is precisely what can be achieved through effective design.

3.5 How Design Impacts CES, HES and Informality

Design approaches for IGS can enhance the value of IGS while incorporating the informal, liminal aspects of the space. It is important to maintain the informality of the space and prevent it from turning into a formal park. This could happen by applying too many interventions or interventions that might negatively affect the informal status. Caspersen et al (2006) mention how urbanisation pressure contributes to UGI becoming more informal within residential green areas, instead of these spaces providing planned recreational use. Another aspect of design is improving the quality of ES within the IGS, this counts for both HES and CES. By using smart, efficient design, multiple ES functions can be provided within a small area or even stacked to make optimal use of the limited space (Lovell & Taylor, 2013).

Konijnendijk et al. (2013) speak on the ability of design to directly improve HES provided by the green space and how the provision of these HES is largely in the hands of the designer. However, a third aspect of design in an IGS is the ability of the designed features to develop with the space. Part of what makes an IGS different from a formal park is the spontaneity and room for natural development, of both the flora and fauna and activities within the space. This change also enables new functions within the space over time. Raxworthy (2013) states how the change creates novelty in designs of green space and how landscape architecture can produce designs that do not lose qualities but gain them over time. This is important to keep people involved with the space and allows the space to remain interesting for exploration and interaction. It also maintains the space's informality by maintaining the spontaneity created by plants growing in or water features developing over time. A good example of this ability of a design to change over time is the Ecocathedral by Le Roy (1973), where stone structures are created more as a foundation for new landforms and colonisation space for vegetation and fauna.

In turn, allowing the space to grow wild from the initial design can function as a deterrent for some people to interact with the space. Wilderness can seem scary to some people; they might feel unsafe in its vicinity. Vojvodíková et al (2022) show in their research that citizens can show concern over the mindless introduction of nature-based solutions or wilderness in the urban setting. Or the fear of people that the natural areas might be populated by homeless people (Cheesbrough et al., 2019). In the interviews conducted by Cheesbrough et al. people also expressed feeling angry and annoyed by witnessing incivilities (i.e. littering) in natural areas, quite the opposite of what those people came to the natural area to experience such as peace of mind and calmness. These stances by citizens appear to lay bare a paradox of wilderness in the urban context. On the one hand people enjoy witnessing nature and wilderness, but on the other hand it can make people feel unsafe. Design could aid in breaking this paradox. Unt & Bell (2014) use a term called 'urban acupuncture' to describe small design interventions and their effect on activities conducted within the green space. These small interventions such as the thinning of dense shrubs, or the placement of a rubbish bin or bench can improve the perceived safety of a space according to Unt & Bell. Adding attractive species to a wild area of nature can also improve perception of a broader public of the UGS (Fischer et al., 2013).

One must however be careful not to overextend the designed/managed or 'made' aspect of the space. This can lead to an increase in use by a broader public, but also the displacement of the public that was already using the space when it was entirely informal (Soga & Gaston, 2016). Specific management types exist that aim to maintain informality of a green space. An example of one of these management strategies is the trimming of vegetation along sightlines, described by Rall & Haasse (2011), which could improve citizen's valuation of the IGS and perceived safety. Another would be the periodical removing of litter within the IGS to improve citizen's perception of the IGS. This lack of 'hard management' by making small modifications or low impact activities would serve the function of the IGS and its users better than formalizing the space would (Hard, 2001; Campo, 2013; Wolch et al., 2014). To conclude, the value that design and management can add to the IGS is a maintaining of informality, while still improving the quality of the ES provided by the space though letting the design change over time through natural progression of the space.

4. Current state of the IGS at the Kempering

This chapter shows the results of the research regarding the current state of the IGS in the K-buurt. The chapter has been divided into four sub-chapters, each explaining a segment of the results gathered. Sub-chapters 4.1 and 4.2 go into the HES of the site, first the current state and then the potential. Sub-chapters 4.3 and 4.4 do the same for the CES of the site, first the current state and then the potential.

More specifically, section 4.1 is on the research done on the species present in the IGS general area and surrounding 2km area. To motivate improving HES in the IGS, it is important to understand which key species are present to which the interventions can be aimed. This chapter also goes into the specifics of the abiotic factors of the site and the context in which the site is placed.

4.2 concerns the literature research on the significance of HES in IGS, what the characteristics are of HES in IGS and to which aspects it is important to try and improve HES to define its potential when designed differently. Applying the literature review method explained on the methodology information was gathered to support the goal of the research.

In part 4.3 the characteristics of CES in IGS are explored. What do they contribute to the neighbourhood and its citizens and what can be done to improve them.

Finally, sub-chapter 4.4 shows the results of the semi-structured interviews that were conducted among inhabitants of the K-buurt and other citizens walking along, past or in the IGS. Through collecting information from these citizens, an idea can be formed of interventions that can improve CES in the IGS, that benefit the local community and would be most likely taken up by the local population, showing the potential of CES provided by the IGS.

4.1: The current state of species and habitat in and around the K-buurt IGS

To develop interventions that make a positive impact on the HES within the IGS, it is first important to know about the HES that the IGS currently provides and what species already inhabit the space. This is an important part of studying the current habitats present in the space, which can then be used to manipulate the space and amplify the effect of the existing habitats or using them as a backbone for new habitats.

Habitat parameters

First, field research was conducted at the site to identify species, but also to evaluate other parameters in and around the site that could determine HES or the potential for HES to be provided by the site. These parameters include temperature, infrastructure, soil type, presence of water, level of disturbance, littering etc. Assessing these conditions can only be done properly on site, thus making the fieldwork a necessary step in data collection.

Table 1: An overview of habitat characteristics of the site.

Temperature	~10.7C
Soil type	The soil has a sandy top layer with peat below it. Despite construction and demolition on the site, there should be no residual left.
Rainfall	844mm/y
Water retention	Short term: small pools of water. Long term: no visible retention of water
Level of disturbance	Surrounded by roads. Open to walk through. High level of disturbance overall
Littering	A lot of littering, mostly litter that is blown into the site from the street.
Amenities	Benches surrounding the site, no amenities within the site itself
Sources of food	Human trash and food scraps, greens to feed on, insects present for insectivores, berries on some of the shrubs
Shelter	Some tall grass, sandy soil for digging holes, 16 trees (5-15m), herbaceous fringe around tree base
Size	6650m^2

These parameters all contribute to the existing habitats of the space. Yarrow (2009) states that the four key factors of a habitat are shelter, water, food and space. Table 1 shows these four factors and other important abiotic factors for habitat establishment. While these observations are objective, the way different species interact with or behave due to these factors decides whether the site is a likely habitat for them. An

example would be that a *Bombus terrestris* (bumblebee) could live in the open, sparsely covered with wildflowers terrain of the current site. However, it could thrive if given more shelter and food options within the space (Goulson et al., 2002).

Another example would be a *Vanellus vanellus* (Northern lapwing) could thrive in the type of terrain the site has to offer, but would never make the site its habitat, because of the level of disturbance and lack of space (Henderson et al., 2002).

The factors mentioned in table 1 may also vary with the changing of the seasons and temperature and extreme weather events due to global warming.

Target species identification

Like mentioned before, the main goal of the field research was to identify the species present in and in the direct vicinity of the site. The full list of species that were identified on site can be found in appendix A.

After identifying species in person, the next step was to search through the NDFF data base to find whether the species identified in person were plausible to have been found in the area. Having gone through this process of verification, the data from the NDFF database, combined with the data collected through the fieldwork were combined to identify which species were already found at and around the site. However, this list is too long to include in the document, with well over a thousand species in total over the three different distances from the centre of the site.

From this list a smaller list was made indicating target species. By targeting specific species, the impact of the interventions can be focused and thus be more effective at creating HES. These species were not only chosen because of their current presence in the IGS, but also because of their presence in the proximity of the IGS and the way that their presence can contribute to attracting other species to the space, either as food or another symbiotic relationship. It could be stated some were chosen for their lack of presence in the target site, but for their presence in the direct circumference. Another motivation for choosing target species would be their commonality and the challenge of trying to bring rarer species to the Kempering site by applying the right interventions. This list of target species is shown in appendix B. This list is compiled of only the species found within the r=250m range, as this proved to provide a large enough pool of potential target species. Maintaining a smaller area also increases the chances of these species creating their habitat within the site.

It is quite clear that the largest group of target species are insects, arthropods, molluscs and other smaller animals. This group was prioritized because of their capability of attracting larger species by serving as a food source, their ability to shape ecosystems, role as detritivores and their limited needs to thrive within a designated area. This makes them a highly effective group of species to target, because the necessary

interventions can be low impact in terms of spatial presence, but still make a great impact when it comes to HES creation. Using woodchips as paving substance for the paths within the IGS is a good example of a low cost, low spatial uptake (limited space needed to implement) intervention that improves the HES for arthropod and mollusc species.

Another target group are the pollinators (indicated by the yellow cells), which are known to contribute a great deal to the biodiversity of ecosystems and benefit ecosystem services (Wratten et al., 2012). Some pollinator populations are under pressure from habitat loss due to non-sustainable urbanization, pollution and extreme weather events (Wenzel et al., 2020). While redesigning the IGS does not impact extreme weather events, a well-designed space can limit pollution (Pincetl & Gearin, 2005) and create habitat for these pollinators (Shwartz et al., 2014). Not only within the space itself but acting as a stepping stone within the larger context of green spaces in the area, can help more pollinators than just those currently present in the IGS. Figure 5 shows the connection of the site to other significant green spaces in Amsterdam Zuid-Oost.

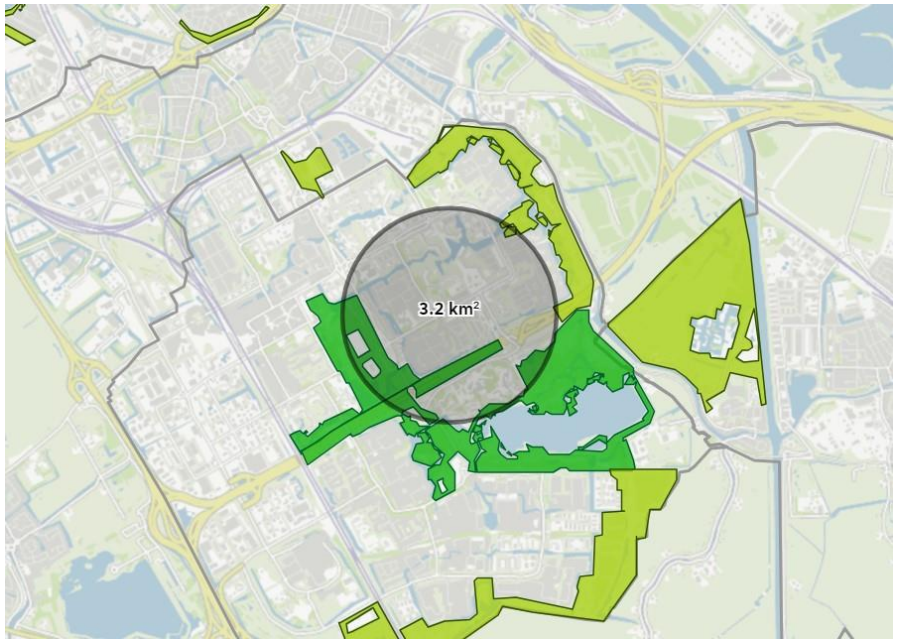


Figure 5: Map of green infrastructure in Amsterdam Zuid-Oost. A circle (r=1km) is superimposed over the map with the target site in the centre (source: maps.amsterdam.nl/stadsparken).

This stepping stone principle also concerns many of the identified bird target species. Because of the IGS's small size, it would be difficult to create habitat for multiple species at once, as birds need large habitats to be able to nest within a comfortable territory. For example, urban dwelling *Turdus merula* (blackbird) territory ranges from 2500 – 4100m^2 (Wysocki et al., 2004), which could fit one or two pairs of blackbirds within the space. *Accipiter nisus* however, in an urban setting was found prefer city parks of at least 50.000m^2 (Schütz & Schulte, 2018). However, by providing food and shelter within the target site, many distinct species of bird can still use the space as part of their territory and be attracted to the site, improving biodiversity.

Some of the target species are now highlighted to provide an example of the motivation for choosing these species, how the current IGS provides them in their habitat needs and what can be done to improve the likelihood of the species inhabiting the site in the future. This is also where it shows how evaluating the HES parameters was important, as they provide an insight in how HES are provided.

Birds

Apus apus

Not spotted in the site itself, **the common swift** is found in the area surrounding the site. Depending on airborne food (insects) and building materials for its nest, the common swift nestles in suitable hollows. Due to rapid deterioration of forest areas, the common swift has adapted to nesting in man-made sites. The nesting locations can be provided by the buildings around the site, but food can be provided by the site itself. Creating a water feature would increase flying insect numbers and provide food for several common swift nests.

Habitat needs: Nesting space, aerial prey

Currently present: Nesting space surrounding the site (buildings)

Still needed: Nesting space of site (boxes or other structures), water body to attract aerial prey

Already sighted on site: no

Turbus merula

The blackbird, possible the most well-known songbird in the Netherlands. A territorial bird known for its song (often heard in the evenings) is an omnivore, feeding on insects, fruits and seeds. With commonly only one pair of birds found nesting per km^2, the site can function as a feeding ground for multiple birds, but only as a nesting space for one pair. It prefers woodlands with dense undergrowth but has adapted to living in city gardens and parks as well. (This habitat and these needs are similar to that of the Luscinia megarhynchos, or nightingale)

Habitat needs: Nesting space (boxes), berry bushes, dense undergrowth, woodlands

Currently present: Berry bushes, some trees

Still needed: Woodlands with heavy undergrowth, nesting boxes

Already sighted on site: yes

Cyanistes caeruleas

The blue tit is a smaller songbird that is found in gardens and parks, but naturally inhabits woodlands. There it nests in tree holes, but it has adapted to living in nesting boxes in urban environments. It feeds on insects and seeds which it finds in hedges and shrubs. Hunted most notably by the sparrow hawk and similar small raptors, these hedges and shrubs are also a necessary hiding place. It is considered a common bird.

Habitat needs: Hedges and shrubs, woodland, nesting space (boxes)

Currently present: Some shrubs and trees

Still needed: Hedges, woodland, nesting boxes

Already sighted on site: no

Acrocephalus scirpaceus

The common reed warbler is another small songbird that feeds on insects and occasionally berries. This bird is heavily dependent on reed filled areas along bodies of water, for feeding, nesting and as cover. Though it is a common bird, due to its habitat it is not often sighted in urbanized areas. The site could function as a stronghold when a body of water is added with a bed of reed alongside it. This is however, an ambitious attempt of attracting such a species to a small area.

Habitat needs: body of water, bed of reed with some shrubs or bushes

Currently present: some shrubs

Still needed: body of water, bed of reed

Already sighted on site: no

Accipiter nisus

The sparrowhawk is a common predator of Eurasian songbirds, such as the blue tit and blackbird. Smaller in size, it is adapted to hunting in woodland areas. Due to growing urbanization, it has however also been spotted hunting in parks and gardens and nesting in urban areas. The preferred nesting area is a moderately dense woodland, with ample prey and enough open space to allow multiple flightpaths to and from the nest. With the site being too small for a nesting pair, the site could attract the sparrowhawk as a feeding ground.

Habitat needs: Woodlands, enough prey

Currently present: Some shrubs and small amount of prey birds

Still needed: woodland

Already sighted on site: no

Mammals

Eptesicus serotinus

The serotine bat is a larger bat found in the area around the site. Known for roosting in buildings, it feeds mostly on aerial prey. Making sure that the site is able to provide more food in the form of prey, increases the likelihood of the serotine bat frequenting the site at night. This airborne prey could be attracted using streetlights or a water feature and some open space to fly in. Being listed as vulnerable on the Red List, providing habitat would be an achievement for biodiversity in the greater Amsterdam Metropolitan area.

Habitat needs: Nesting space, open space

Currently present: open space

Still needed: nesting space on site or surrounding area, also a water feature to attract aerial insects

Already sighted on site: no

Erinaceus europaeus

The European hedgehog is one of the most common small mammals in the Netherlands and often found in parks and gardens. Feeding on insects such as earthworms, snails and ants and caterpillars, the hedgehog plays a crucial role in preventing overpopulation of these insect species. Being a nocturnal animal, the hedgehog prefers darkness and can be deterred by streetlighting. Providing a habitat for hedgehogs in an urbanized area would be a great achievement.

Habitat needs: woodlands, grassland, meadows or orchards, shrubs

Currently present: grassland

Still needed: woodland, shrubs

Already sighted on site: no

Pollinators

Bombus (*terrestris/lucorum/magnus/cryptarum*)

The buff-tailed bumblebee, and all of its subspecies, can be considered as one of the most important pollinators in the Netherlands. While already present at the site upon inspection, improving the site to fit habitat needs such as wildflowers, nesting boxes or grounds and shaded resting places can greatly increase the presence of these insects within the space. The site can in this case also serve as a steppingstone within the larger UGI of the neighbourhood.

Habitat needs: Flowering plants, open space, shrubs

Currently present: Open space and some flowering plants and shrubs

Still needed: Flowering plants

Already sighted on site: Yes

Venessa atalanta

The red admiral is a common species of butterfly that feeds on overripe fruits and flowering plants such as the *buddleia* and needs the *Urtica dioica* (stinging nettle) to lay their eggs. Known for its vibrant orange and white pattern on black wings, this butterfly is easily observed flying around. Their host plant requires moist woodlands to thrive. Due to climate change and increasing temperatures, the red admiral is making a push further North and is sighted in the Netherlands more often.

Habitat needs: Flowering plants (i.e., *Buddleia*), stinging nettle host plant, moist woodland

Currently present: Some stinging nettles

Still needed: Flowering plants, moist woodland to increase stinging nettle population

Already sighted on site: Yes

Noctua pronuba

The large yellow underwing is a species of moth that is present as a great food source for aerial mammals such as bats, because both are nocturnal. Their larvae provide food during the wintertime for birds and smaller mammals. A common type of moth found through Eurasia. It is attracted to light as well as flowers, such as ragwort.

Habitat needs: trees for daytime cover and flowering plants

Currently present: some trees

Still needed: more trees and flowering plants

Already sighted on site: no

Arthropods and molluscs

Araneus diadematus

The European garden spider might be known as one of the most common spider species in The Netherlands, so it is by no means endangered. It is however a great food source for many insectivore bird species and mammals. It also prevents insect populations from getting out of hand by preying on many of them. Needing little in means of habitat improvement, added shrubs and trees are plenty to make the spider thrive.

Habitat needs: shrubs and trees to make webs. A moist environment and plenty of insects to feed on

Currently present: some shrubs and trees, some insects

Still needed: more shrubs and trees, more moisture retention on site, increase prey

Already sighted on site: Yes

Chrysopilus asiliformis

The little snipe fly is a very common species that inhabits scrubs wetlands and regular gardens. Though not endangered, this species of fly is a great food source for arthropods and insectivore birds. The flies don't need specific host plants and are easy to provide habitat for. They prey on aphids and smaller insects, thus providing natural pest control for the plants in the space

Habitat needs shrubs or woodland edges or wetlands

Currently present: Shrubs

Still needed: More woodland and aphid attracting plants

Already sighted on site: yes

Ephemeroptera

The mayflies are a common species of flying insect found around bodies of water. Known for its shorter lifespan, the mayfly lives through three stages, one as an aquatic nymph and two as an aerial insect. They are a great food source for fish (both as nymphs and adult), birds and arthropods. Mayflies also contribute to the health of a body of water by redistributing nutrients and upcycling smaller nutrient particles to be consumed by larger organisms.

Habitat needs: Water, preferably a stream, shrubs

Currently present: shrubs

Still needed: Water, and a stream of water if possible

Already sighted on site: no

Cornu aspersum

The first mollusc on the list, **the garden snail** is an important member of any ecosystem for its detritivore behaviour. It breaks down rotting material (both plant and animal) and makes it easier for plants to reabsorb nutrients from its excretion. Can be considered a pest as well for eating flowering plants in gardens. A great food source for birds such as the blackbird and thrush and smaller mammals like the hedgehog, which can prevent them from becoming a pest.

Habitat needs: a shaded, moist environment, plenty of leafy greens to feed on

Currently present: Leafy greens and grass

Still needed: More shaded and shrub areas.

Already sighted on site: yes

4.2: The potential for habitat ecosystem services at the K-buurt site

The IGS of the case-study site in its current state, though lacking, does already provide HES for several species. The barren grassland provides a good habitat for several bumblebee and wild bee species, who like to burrow in sandy surfaces with little vegetation (Mallinger et al., 2016). Similarly, the line of trees and shrubs found at the South end of the site provide habitat for bird species, especially as a resting place or stepping stone within their larger habitat (Fernandez-Juricic & Jokimäki, 2001). The lack of human interaction with the space, partially due to lacking public amenities, also improves the quality of HES provide by the site. As stated prior, interaction of humans with nature tends to negatively affect the HES provided by the nature, due to noise disturbance, littering or active destruction of the habitat. The lack of public amenities is also a downside for HES though. With the site open to the public, without any barriers around the site, or paths within the site, guiding people who want to interact with it, there is the risk of people wandering into areas where they can do the most damage to the existing habitat.

This leads into the potential of HES provided by the site, which could be accomplished by the municipality using targeted interventions. Currently the site does not host a large variety of different habitats. By increasing the number of different habitats, the number of species that are likely to make the site their home also increases. By creating a body of water for example, the barren grassland could partially be transformed into a wetland ecosystem. Or by increasing the area occupied by trees and shrubs, there would be more space for varied species of bird and small mammals in the space. This diversification of types of ecosystems within the site goes a long way in reaching the HES potential of the site. Another example of interventions would be the clear separation of areas for human activities and areas for wilderness and floral and faunal habitat. This prevents unwanted disturbance of habitats occupied by target species. For arthropods and arachnids, it is even possible to combine interventions to be beneficial for HES and CES simultaneously.

However, to be able know which species to target within the site, it was necessary to do research on the species that are already present within the area and its direct vicinity. The most direct way of mapping these species was to go to the site and conduct field research alongside an experienced ecologist (Dr. Jana Verboom). The data collected was also combined with observations from the NDFF database and can be found in Appendix B.

4.3 The characteristics and current state of CES in the IGS

Having referred to the current state of the CES and their relation to HES and the proposed interventions within the target site in chapter 4.1, it is useful to go deeper into these CES, what they entail, how they are perceived and what the potential CES of the site could be.

The site is situated in a largely built-up environment with a majority of high-density living accommodations. These residential areas cover the North, East and West side of the space, while the South side is lined with commercial and office buildings, divided by a busy road. The neighborhood can be considered multicultural and diverse, with many residents having a migration background. Multiple age categories are represented, from young children to retirees. The area has one of the lowest personal incomes in Amsterdam, with a divide between Dutch residents (more affluential) and non-western residents (less affluential) within the same neighborhood (Source: *Kansenkaart*). The IGS is also close to the Taibah Mosque and the Bonte Kraai community center. Within the neighborhood several formal green areas can be found as well as IGS. These vary from grass fields, to playgrounds, paved sports areas to informal fringes along water, roads and walking paths. Other significant UGI in the neighborhood are the *'Mandela Park'*, '*Gaasperpark'* and '*Bijlmerweide'*. However, only the latter of the three is connected through ecological corridors, while the '*Gaasperpark'* and 'Mandela park' are separated by large highways.

In the current state, the IGS is already part of many citizens' lives and daily activities. These activities can be a passive use of the site, such as passing by and enjoying the sight of wild nature in the urban landscape. They can also be active, such as using the site as a place to have a picknick, BBQ or play around in (Holt et al., 2019). This active and passive use is not a case of either or, but can be partaken in simultaneously. One could argue that these CES are already plentiful, given that the site requires little to no upkeep or construction. However, as presented by Holt et al. (2019), people involved in active use of green spaces report higher quality of living, lower perceived stress and a better overall mood. This gives way to improving the opportunities for people to have more active interactions with the site. While the research by Holt et al. (2019) finds no direct correlation between passive interactions with green spaces and indicators of improved health, a study by Van den Berg et al. (2010) and Lee et al. (2015) show passive activities also reduce stress and improve quality of life.

This brings us to the potential for CES provided by the site. Considering that active interaction with nature appears to have a greater effect on a person's health, it is important to facilitate more active interactions/activities. This can in the first place be done by improving, or in the case of the case-study site, creating better public amenities and infrastructure. These could be exercising equipment, paths to walk along, lights to facilitate evening strolls and an improved sense of safety. Implementing these interventions can improve both active and passive interaction with the green space. It should also be considered that CES are highly related to the individual that partakes in them or experiences them and is thus hard to quantify. To find out more about the perception of the citizens currently interacting with the case-study site, interviews were

conducted. The structure and results of these interviews are further discussed in the next chapter. These interviews attempt to get an insight into this subjective experience of CES currently provided by the site and CES that interviewees might want to interact with in the future.

4.4: Perception of local citizens regarding the current state of the IGS and its potential

To assess the perception of the IGS by the local citizens, semi-structured interviews were conducted with citizens passing by or through or resting at the K-buurt site. Over two days of interviewing, a total of 28 citizens were willing to participate and have their input recorded and used in the research.

Participants were questioned about their perception of current CES provided by the IGS and what changes they would like to see in the space. The answers provided were gathered and coded to serve as motivation for the proposed interventions concerning CES improvement in the IGS. The interview was conducted in English whenever the participant was deemed fluent enough and felt comfortable enough responding in English. If this was not the case, the interview was conducted in Dutch and later translated. The exact questions asked during the interview can be found in appendix C.

Table 2 shows the coding of the answers given by the interviewees. The code was divided among “Usage”, “Perception”, “Accessibility” and “Potential CES” and took note of other public green spaces that were used by the interviewees. The “Usage” is concerned with the way the interviewees used the space, how long they used it for, how often and with what reason. The “Perception” coded responses were derived from part 2 of the semi-structured interview and shows what interviewees did and did not like about the IGS. “Accessibility” gives an insight into the time it took interviewees to get to the IGS and how, but also whether they considered their journey to the space to be easy or difficult. Lastly, the “Potential CES” code was taken from Part 3 of the semi-structured interview and shows which potential CES interviewees could see themselves participating in within the space, either currently, or in the future.

The answers provided by the interviewees are a sample of what citizens think of the IGS in its current state, and what they would like to see improved, what potential they could see being realised. Through the coding process, answers that were more or less common among interviewees are brought to light. Common characteristics found in the answers were for example the ‘not using’ of the space under usage, while only 5 participants answered that they actively use the space. Another finding is that the ‘Gaasperplas’ is clearly a well-liked alternative green space among people passing by the Kempering site.

Table 2: An overview of the coded answers from the semi-structured interviews

Code usage:	#	Code Perception:	#	Code Accessibility:	#	Potential CES:	#	Other public spaces used:	#
Not using	9	Not used	2	Passing by	3	Env. education	13	Gaasperplas	10
Use	5	Open	7	By bike	2	Inspired by nature	9	Bijlmerweide	2
Looking at it	3	Too open	2	Walking	8	Walking, strolling	9	Mandela park	2
Pass by	8	Green	5	Easy to reach	12	Meeting people	10	Bijlmerpark	4
Not alone	5	Nature (positive)	7	back to home	2	Gardening	11	Gasserpark	1
Alone	7	Like it	2	on way to shops	6	Enjoy beauty of nature	10	Diemerbos	1
Walk dog	1	Don't like it	1	Bus	2	Watching plants, animals	11	Greenspace by Kraaiennes	1
Daily	5	Trash	4	10-15 mins	5	Cultural heritage	9	Brasapark	1
Multiple times a week	4	Seating	6	1-2 mins	5	Walking dog	11		
Walk along	1	Wild	5	5 mins	4	Picnicking, BBQing	11		
Walk through	1	Not too wild	2	20-30 mins	2	Sports	5		
Short period (<30m)	2	Flowers	5	Live nearby	2	Permaculture	1		
Longer period (>30m)	2	Parking	2			Management	2		
Weekends	1	More appealing	2			Art/creativity	3		
		(more) trees	4			Exper. div. plants, animals	11		
		Lack of maintenance	6						
		Dirty	4						
		Road proximity	4						
		Dog (negative)	2						
		Grass	3						
		For kids	4						

This involvement of citizens in the preliminary stages of designing public space, before determining the final design of the IGS, can create a larger support among the citizens and increase the chances of positive uptake among them and decrease possible resistance against proposed interventions at a later stage. This limits the amount of effort going to waste in the lead-up to the final design implementation.

The most important revelations made clear through the coding process need to be extracted from table 2. These allude to the needs and wants of the interviewed users and are used to motivate the design interventions and strategies in chapter 5.

From the “usage” code, stand out codes are: ‘Not using’, ‘pass by’, ‘alone’. These outnumber their counterpart codes of ‘use’, ‘walk through’ and ‘not alone’. This means that most interviewees do not use the space actively, they do so alone more often than not and pass by rather than through the space. This provides an opportunity for using design interventions and strategies to motivate users to change their behaviour and promote engagement with the space.

From the perception column ‘green’, ‘flowers’, ‘nature’ and ‘wild’ may indicate how people do not necessarily have a negative perception of the space when it comes to the natural elements. However, the ‘lack of maintenance’, ‘trash’ and ‘dirty’ responses seem to contradict this perception slightly. Effective design strategies maintain the positive perception of the natural elements while eliminating some of the negative characteristics, which in turn can convince visitors to interact with the nature they perceive so positively.

Under “accessibility”, it becomes clear that a vast majority of interviewees believe the space is easy to reach. But from the “usage” column it was clear most people will still not actively use the space. An opportunity to improve the desire of people in the neighbourhood to interact with the space using design strategies.

Finally, looking at the potential for CES observed by interviewees, the services relating to experiencing nature and participating in social activities are often endorsed. A strong motivation for improving not just CES, but HES as well and combining functions within the space to make it possible for visitors to interact with nature within their local IGS.

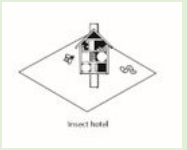
These insights are used to motivate the proposed design strategies in chapter 5. These strategies aim to improve the perceived safety, cleanliness, educational value and ecological value of the IGS.

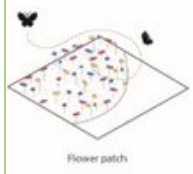
5. Design strategies for providing HES and CES

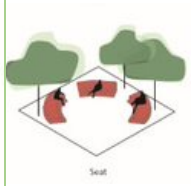
Based on the field work, literature research, responses to the interviews and identification of target species (Appendix B), a set of interventions is formulated that can work to improve both HES within the IGS and CES for the citizens of the K-buurt. Each Intervention is provided with a visualization, the ecological process that takes place when the intervention is introduced. How it can provide HES within the IGS, how it can provide CES for citizens, examples of the species of flora and fauna that are targeted by the interventions, how often the intervention was brought up during the interviews, the existing condition of the site and how it is influenced by the intervention and the urban context, which speaks on how the intervention functions within the context of an urban environment.

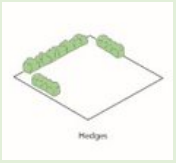
Table 3: proposed design interventions for the Kempering IGS, based on interviews, literature research and fieldwork (Illustration diagrams in the physical intervention column were drawn by S. Luo (2023))

#	Physical intervention	Ecological process	Habitat services	Cultural ecosystem service	Species data	CES from interview results	HES fieldwork results	Urban context
1	wild vegetation/nature 	**Spontaneous progression of nature**	A more densely overgrown patch provides HES for the bird species well as the hedgehog and numerous arthropods, moths and flies mentioned below	The wilderness provides visitors of the area with a sense of **true nature** in the park and gives them a level of **appreciation for nature** and the species that makes it their habitat	The overgrown canopy and ground cover provides habitat for hedgehog as well as most bird species listed below. Arthropods and molluscs also benefit	Interviews revealed the appreciation of wilderness (5), green (5) and nature (7)	Part of the current state of the site is maintained in that state	The wilderness provides a good **shelter** from the urban setting for animals and humans alike. It also provides **cleaner air** and dampen the UHE

2	Woodchip ground coverage (paths/space) 	Creates a **damp and dark environment**	habitat for **detritivores, arthropods**, which in turn are **a food source for several bird species**	Walking dog, strolling/walking,	*Salticus scenicus* (spider), *Annelida* (earthworm), *Turdus iliacus*, *Turdus merulus* (birds)	Walking dog (11), Strolling/walking (9)	Nothing of the sort exists on the current site. Interviewees often mentioned **wanting to be able to walk through the space**, but also to **keep it natural**. This can happen using woodchips as ground coverage.	Covering footpaths and frequently used areas with woodchips **boost rainwater permeability and retention**, which **prevents pools of water** which would **hinder accessibility**
3	Insect hotels 	Creates a place of **refuge for small animals**	Habitat for **detritivores, arthropods, bees, bumblebees**	**Artistic value created**	*Osmia bicornis* (bee), *Bombus pratorum* (bumblebee), Isopods, *Pisaura mirabilis* (spider)	Enjoy the beauty of nature (10), Watching plants, animals (11) Experience diverse plants, animals (11)	At the moment the **site is barren,** which provides **habitat for certain insects**, but this number can be **increased dramatically using insect hotels. Diversity of animals** is something interviewees believed was important as well	Insects in general are essential to a healthy ecosystem, both as **a food source, pollinators and clean-up crew** of dead organic material. With **little suitable habitat** in an urban context, **insect hotels are essential to maintain a population**
4	Patches of flowering plants	Creates a place of **refuge for**	Habitat for **pollinators (bees,**	People **enjoy the sight of flowers** and **perceive** the space more **positively.** It	*Venessa atalanta*, *Celastrina*	Enjoying the beauty of nature (10), watching	The site is quite **rich in flowering plants as it is**,	Like the insect hotels, **flowering plants are essential for maintaining**

	 Flower patch	**small animals, provides food for pollinators**	**bumblebees, butterflies) and other insects and flies**	also functions as a **natural barrier** to prevent people walking to parts of the space where they are not welcome.	*argeolis* (butterflies), *Osmia cornuta* (bee)	plants (11), experiencing diverse plants (11)	this is also an aspect of what interviewees mentioned they **appreciated about the site**. **Increasing** the number and **grouping** them provides an even **stronger image and habitat**	**insect and especially pollinator populations**. As a **food source** and place to **rest** in between flights.
5	Eco-cathedral type structure	Creates a **dark, damp and cool environment**	Habitat created for small mammals, arthropods, molluscs and a food source for foraging birds and mammals	Creates artistic value and shows people the natural progression of nature	Isopoda, *Bombus lapidarius* (bumblebee), *Philodromus* (spider), *Salticus scenicus* (spider), *Erinaceus europaeus* (hedgehog)	Art/creativity (3), Inspired by nature (9)	Currently the site is barren, open and there is nothing that could be considered habitat like a stone structure would create. People have mentioned the desire for some artistic expression as well	By showing people the way that nature can envelop and take over man-made structures provides insight into how man and nature are intertwined. This serves as environmental education as well as art and habitat
6	Permaculture  Permaculture garden	**A food forest** created for **human and animal use**	Habitat for birds (canopies, shrubs), small mammals and arthropods	Allows people to interact with nature, learn from it and be up close and personal with plants and animals	*Turdus philomelos* (bird), *Sylvia atricapilla* (bird), *Erinaceus europaeus* (hedgehog),	Enjoying the beauty of nature (10), watching plants and animals (11), experiencing diverse plants and animals (11),	While mentioned specifically by an interviewee, a permaculture can serve as an optimal cross over between	A permaculture can serve to teach people about growing food and making them more aware of what goes into food production. By connecting citizens with food production

					Venessa atalanta (butterfly)	gardening (11), Walking/strolling (9), environmental education (13), permaculture (1)	wilderness and human interaction.	consumption awareness can grow
7	Trashcans 	-	Prevents habitats from being filled with human trash	-	-	Trash (4), more appealing (2), Dirty (4)	The main point of criticism about the site was that there was too much trash lying around. Around the space was a distinct lack of trash cans	Increasing the amount of trash cans makes sure that the site provides for an increase in visitors and prevents the space from being littered, making it less attractive to visit
8	Seating (benches) 	-	-	Let's people enjoy nature while being able to meet other people	-	Enjoying the beauty of nature (10), watching plants and animals (11), experiencing diverse plants and animals (11), meeting people (10), inspired by nature (9) and seating (6)	The only benches at the site face towards the road and there are only two for the entire site	Providing people with a place to sit down and rest increases the likelihood of them staying int the site for longer periods, which in turn increases the chance of meeting other people, creating a community feeling
9	Central meeting area 	**Prevents** natural areas from being **downtrodden**	Habitat for humans to interact	Let's people enjoy nature while being able to meet other people from the neighbourhood or meet with friends	*Passer domesticus* (bird), *Garrulus glandarius* (bird), *Pica pica* (bird) (all birds that	Meeting people (10), Picnicking/BBQ (11), Enjoy beauty of nature (10), cultural heritage (9)	Similarly to the benches, there is no central meeting space within the site itself, though it is something the	A central meeting point is crucial in keeping visitors to the site for longer periods of time. Within the area a meeting place within nature for the neighbourhood to come together is missing

					feed on human food)		interviewees would like.	
10	Paths 	**Prevents** natural areas from being **downtrodden**	A barrier between sections of habitat	Let people enjoy nature by walking amongst it, but not disturbing it	-	Walking dog (11), strolling/walking (9),	Interviewees mentioned wanting to be able to go into the site to experience the plants and animals from closer by. They often walked by or around the space to go to other places due to a current lack of pathing. Created paths now lead them through a more attractive space	The cityscape surrounding the IUG is very grey and providing a natural/green alternative for daily walks, strolls and errands can increase citizen morale and general happiness (Berman et al., 2008),
11	Hedge/fence surrounding area 	**Prevents noise pollution** and creates a **dense shrubbed area**	Habitat for birds, small mammals, arthropods, molluscs, night butterflies and food for bats and birds	Breaks the line of sight for people within the space with outside the space	*Sylvia curruca* (bird), *Sylvia communis* (bird), *Anania hortulata*, *Noctua pronuba* (butterflies, night), *Pipistrellus sp.* (bat)	Enjoy the beauty of nature (10), Watching plants and animals (11), Walking dog (11), walking/strolling (9)	Also, currently the site is open and disturbed by the traffic	Hedging serves as a natural barrier between the surrounding city (sound and sight) and the natural area of the site. This creates a feeling of seclusion and safety from the busy city life of many citizens.
12	Grass field	An **open space/clearing** in a densely	Creates a habitat for certain bee and	A natural playground for adults and children alike to sit, play sports and hang out	*Apus apus* (swallow), *Pipistrellus Sp.* (bats),	Sports (5), Enjoy beauty of nature (10), Meeting people (10),	Being able to let children play and provide a place to do	Though there are plenty of grass fields in the surrounding area, having one at this space increases

		overgrown space	bumblebees and hunting grounds for bats and swallows		*Bombus terrestris* (bumblebee), *Adrena bicolor* (bee)		sports was often mentioned by interviewees. The current site is not suitable for exercise due to barren soil and random plant growth	the number of visitors looking to exercise, picknick or BBQ for example, activities that cannot take place in other section of the space
13	Dog park (fenced off) 	**Prevents dogs** from **disturbing** other **habitats and animals**	Habitat for dogs to interact with each other	A place for people to let their dog roam free and to interact with other dog owners from the neighbourhood	*Erinaceus europaeus* (hedgehog), *Natrix Helvetica* (snake), *Pica pica* (bird) (species that would be protected)	Walking dog (11), Meeting people (10)	Interviewees were seen walking their dog and expressed concern for letting the dog off the leash in fear of traffic or malicious individuals. A fenced off area for dogs prevents people that don't like dogs from interacting with them	A dog park draws dog owners to the park and give the dogs space to socialize freely with other dogs, something that is not easy within the built up environment
14	Signs explaining species in the area	-	-	Teaches people about the nature that they are partaking in while they are at the park	-	Environmental education (13), Watching plants and animals (11), Experience diverse plants and animals (11)	Environmental education was high on interviewees lists. By teaching people about the species found within the space they can	People in De Bijlmer see plenty of green but are rarely educated on the types of green and animals supported by maintaining green spaces. By educating them they acknowledge the need for green spaces and support wider

							also learn how to provide for such species in their private gardens/balconies and give more context to how and why species are supported in the space	implementation of urban green
15	Streetlights 	Causes **light pollution** during night-time. **Attracts nocturnal insects** to light source that can function as food source for nocturnal hunting species.	Too much light has a **repelling effect on (nocturnal) animals.** It is vital to limit unnatural light to attract a larger range of animals	The lights provide citizens with a **sense of security** during night hours and allow them to enjoy the site after dark	*Noctua pronuba* (moth), *Evergestis extimalis* (moth) (other insects attracted by light)	-	Currently there are only lighting poles on the edges of the site, not within the site itself	Light is important to make citizens feel safe in the city at night.
16	Natural water feature 	Once constructed, the pond starts to accumulate nutrients, **stimulating aquatic life.** This life can serve as a food source for non-aquatic life.	The water provides a **habitat for aquatic species** and animals that **forage, reproduce and nest near bodies of water**	Biodiversity increases because of the pond, thus increasing attraction of the site for people wanting to experience nature.	*Ephemeroptera* (mayflies), *Apus apus* (bird), *Pipistrellus pipistrellus* (bat), *Natrix helvetica* (snake)	Experiencing diverse plant life (11), Enjoying beauty of nature (10),	There is no body of water in the current site. It could be considered very **dry and arid** in places.	In the urban context, a well-positioned body of water can contribute to water management by acting as a basin for rainwater and UHE oppression.

Many of these interventions contribute to the green space on their own, but for the final design it is important to know how the interventions interact with each other. The following table 4 shows the synergies and discords between the interventions. These relations reveal how certain interventions can be combined to make a design feature multi-level or to prevent ineffective design measures by avoiding combining interventions that show discord. The interventions themselves have been given numbers to be able to provide space for all of them in table 4. To show synergy (+, ++), neutral interaction (+/-) and discord (-, --), symbols and colour coding have been used to improve readability. Each synergy is also accompanied by an (H), (C), or both. These symbols indicate which type of ES is impacted by the interventions, HES or CES or both. Synergies that benefit both HES and CES are ideal for this space, where an attempt is made to stimulate both types of ES simultaneously. These synergies have been motivated subjectively, based on prior knowledge and common sense. These synergies and the way the interventions are implemented within the space are assessed by an expert and iterated according to the feedback provided in chapter 7.

Table 4: synergies between proposed interventions

	name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Wild nature	x	+ (H)	+ (H)	+ (H)(C)	+ (H)	+/-	-	-	--	-	+/-	-	--	+/-	-	++ (H)
2	Wood chips		x	+/-	+/-	+/-	+ (H)(C)	+ (H)(C)	+ (H)(C)	+ (H)(C)	++ (H)(C)	+/-	+/-	+ (C)	+/-	+/-	+/-
3	Insect hotel			x	++ (H)	+ (H)	++ (H)	-	+ (H)	-	+/-	+ (H)	-	-	+ (C)	+/-	+/-
4	Flower patch				x	+/-	++ (H)	-	+/-	+ (H)(C)	+ (C)	++ (H)	+ (H)	+ (H)	+ (C)	+/-	+/-
5	Eco-Cath.					x	+ (H)(C)	-	+ (C)	+ (C)	+/-	+ (H)	-	+/-	++ (C)	+/-	+/-
6	Perma Cult.						x	+/-	+ (C)	+/-	++ (C)	+ (H)(C)	-	-	++ (C)	+/-	+/-
7	Trash							x	++ (C)	++ (C)	++ (C)	+/-	+/-	++ (C)	+/-	+/-	-
8	Seat								x	++ (C)	++ (C)	+/-	+	++ (C)	+ (C)	++ (C)	+/-
9	Meet									x	++ (C)	+/-	+/-	-	+ (C)	++ (C)	+/-
10	Path										x	+/-	+/-	+	++ (C)	++ (C)	+/-
11	Hedge											x	+	++ (C)	+/-	+/-	+/-
12	Field												x	+	+/-	+ (C)	-
13	Dog park													x	+/-	++ (C)	+ (H)
14	Sign														x	+ (C)	+ (H)(C)
15	Light															x	-
16	Water																x

As table 4 shows, many interventions have a neutral interaction. There are however plenty with ++ synergies, which can be combined in design features to stack functionality. This is important to consider for the spatial design scenario. Seeing the path **(10)** intervention, for example, interact so positively with many other proposed interventions motivates its integration in the spatial design scenario. But there are also proposed interventions that show significant discord, like the wild nature **(1)** and the central meeting area **(9)**. To ensure that both can still be implemented effectively in the space, a degree of separation is necessary. Another factor considered when carrying over strategies to the spatial design scenario is clear necessity for these strategies that has come forward in the interviews or target species research. The trash cans **(7)** for example show repeated discord with more HES focused strategies. However, during the interviews on the perception of the space by users it came forward that the amount of litter around the space negatively impacted their perception and willingness to use to space.

By taking these synergies into account, an insight is provided into how the spatial design takes shape, either by knowing to separate interventions to prevent discord or combine them to make optimal use of the synergy between them.

6. Spatial design scenario

The overarching goal of this research, formulation and analysis of proposed interventions, is to combine them within a final spatial design scenario of the IGS in the K-buurt. Though this final design remains a sketch, it does show how the proposed interventions interact within the space, not just on a theoretical level, but also visually and spatially. Most strategies show plenty of opportunity for synergies and will thus be placed in the spatial design scenario, some will not be taken along further in the design process. These include the eco-cathedral, permaculture and dog park. Though the permaculture and eco-cathedral synergize with several other strategies, the question of whether they fit into the small site area along with other, more impactful, strategies or tools is also important to take into account. A choice was made based on the strategy's impact on HES and CES relative to the spatial impact. However, some new strategies are introduced that function similarly to strategies that were not included after the synergy analysis. These are indicated later in this chapter. The dog park is deemed to fill too much space within the spatial design scenario, while also showing a high number of discords with other strategies and is thus left out of the spatial design scenario.

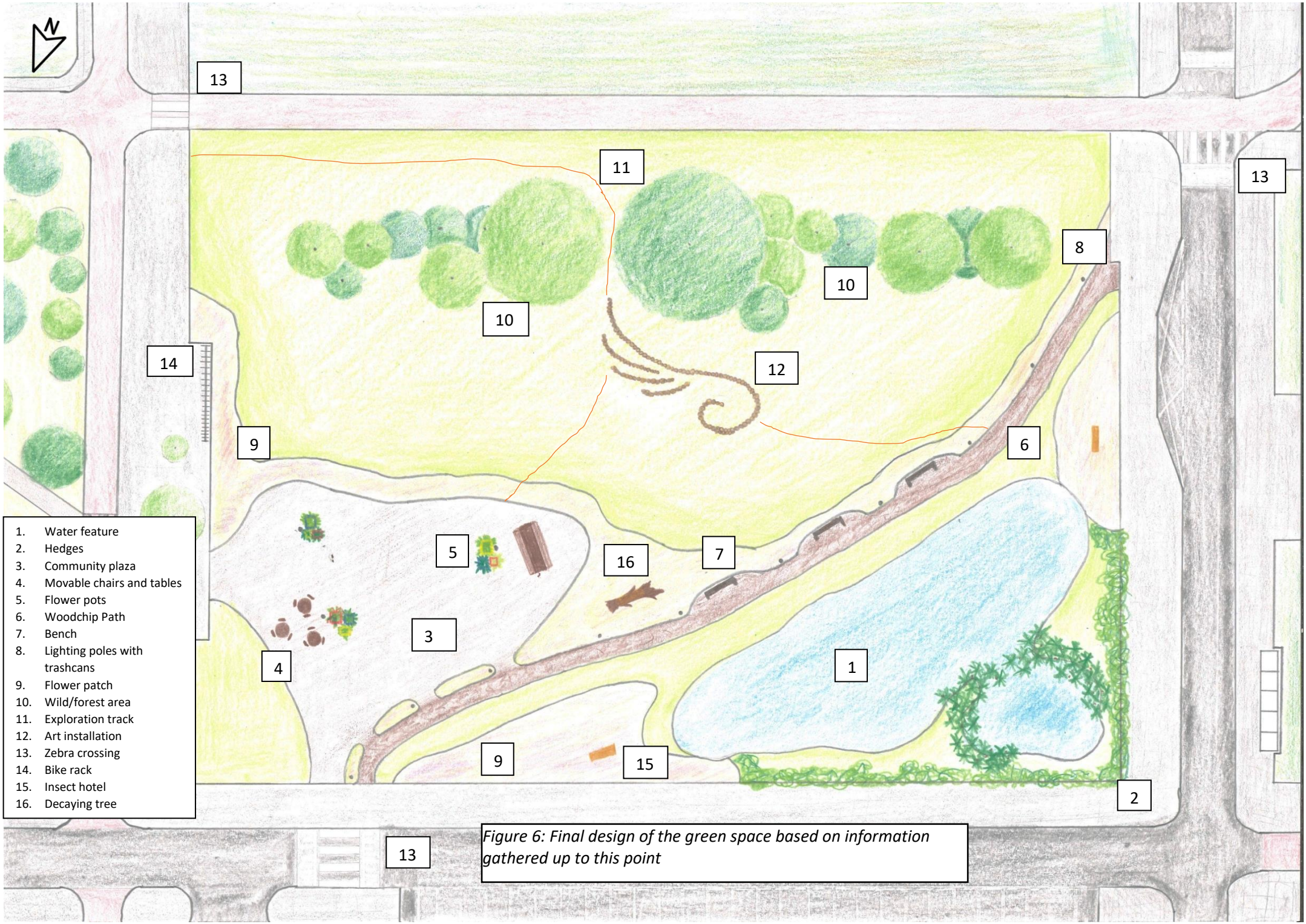


Figure 6: Final design of the green space based on information gathered up to this point

Possibly the biggest change to the landscape is the water feature in the bottom right corner of the design, marked by the number **1**. This pond, like many other interventions within the space, has multiple functions. It serves to create a unique new habitat in the area to increase biodiversity, improve rainwater retention and mitigate heat. Amsterdam Rainproof states that an effective rainwater retention pond should cover about 10-20% of the site it is used to retain rainfall for. Within the proposed design, the water feature covers ~11%. Water collected in the pond can slowly infiltrate back into the earth over time, preventing flooding. Water from the retention pond can also be used to irrigate the rest of the site during periods of draught. The maintained depth of the pond is set at 1,5m, which should be optimal to prevent overheating, which would reduce water quality and livability. This depth also prevents the pond from completely freezing over during winter, keeping it habitable for underwater flora and fauna. The pond is connected to the drainage system of the city of Amsterdam. Smart systems that the city has in place that predict weather events allow the pond to be drained ahead of such events for optimal water retention and to prevent the pond from overflowing. Another important aspect is safety around the pond. To make sure children or other visitors that cannot swim are able to exit the pond when they fall in, the banks of the pond should be sloped. Figure 7 shows an example of how this sloped embankment would look. It also shows the smart system that would measure the height of the water and signal for the pond to be drained when an extreme weather event approaches. It also functions as an overflow to prevent overflooding.

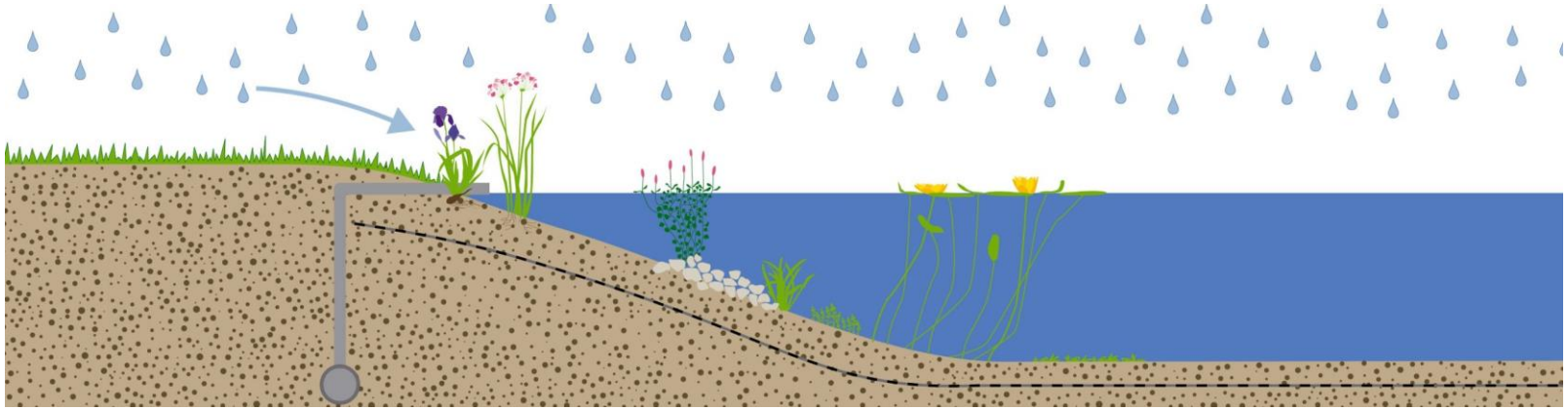


Figure 7: example of a sloped water retention pond (source: Amsterdam Rainproof, © atelier GROENBLAUW)

The water feature is lined on the North-West side by planted reed plants. These reeds serve to create a secluded water area for aquatic birds, fish and other wildlife to get away from humans that might be observing them from the paths and benches. This reed also provides habitat for several bird and arthropod species such as the species the common reed warbler and several species of bumblebee.

The light green corner (**2**) that also aids in secluding a section of the water feature from the public is thick shrubbery that acts as a hedge or barrier. Being close to two meters tall, this row of shrubs blocks noise coming from the streets on the North side of the space and prevent people from entering the space in places they are not supposed to and could disturb the wildlife. It also creates a visual barrier, obstructing the view of the streets behind for visitors viewing the water feature from within the park. By obstructing this view, visitors can experience a sense of being excluded from the busy and grey surroundings of the space.

Number **3** indicates the community square. A multi-purpose area designed to bring people from the community together for activities, social interaction or events. This square is the only part of the site that is paved, to improve functionality and create a space for people who might not be willing to spend time on the grass, woodchips or other natural elements. It is also important for people who might be impaired in their movability and are afraid of falling on uneven terrain. Using movable seats, tables and benches, indicated with number **4**, and movable planters (**5**), the square can house multiple activities or groups of people at once for different activities. These planters can be filled with fruit bearing trees or shrubs to partially emulate a permaculture. The movable attributes can contribute to the semi partitioning of sections of the square for more intimate occasions or do the very opposite and create a large open space in the middle of the square for larger events like concerts or parties. Both a central meeting area and seating places were highly requested, thus the community square contributes to attracting local citizens to the space.

Where the square and its adjacent entryways are paved, the main path (**6**) that crosses the site is covered in wood chips. This type of ground coverage adds to the sense of nature people feel when traversing the space, while also providing habitat for invertebrates, detritivores, arachnids and arthropods. As mentioned before, these creatures in turn attract multiple bird species and help with maintaining a healthy soil within the space. Immovable benches (**7**) are situated along the path on the south side, facing the water feature. These benches add to the seating possibilities for passersby and aim to prolong the stay of visitors in the space.

Number **8**, the lighting poles with trashcans ensure a sense of safety for visitors at night and provide places for people to leave their trash before leaving the park, and more importantly, prevent them from leaving their trash in the park.

Along the path indicated by number **9**, are patches of flowering plants. As with many features of the design, these patches serve multiple purposes. They act as a habitat for many types of invertebrates and as a source of food to attract pollinators to the space. They also serve as a natural barrier that prevents people from leaving the path and running free within the wild area at the south side of the space, indicated by number **10**. Within these patches you can find insect hotels (**15**) and decaying wood (**16**) as well. The hotels serve a habitat and educational function, while the decaying wood would serve as a habitat for detritivores and arthropods. They function similarly to how the eco-cathedral would have contributed to the space.

Throughout this design, there is a clear separation between nature and people. While visitors observe nature, nature itself needs a place to rest and not be disturbed by humans. There is, however, a slight deviation from this trend within the design. The exploration path, indicated by number **11**, is meant to bring visitors, especially children, closer to nature. By doing so, the hope is that children develop an interest in the goings on in the wilder areas of the space, that they learn from what they experience. The paths convene at the sculpture explained in the following paragraphs.

Figure 8: Example of the sculpture that will help to track the natural progression of the forest fringe into the grassy area (Source: Dals Långed Park Project)

Allowing the nature within the space to change is an important aspect of maintaining informality. The novelty that is created at the hand of change keeps the space engaging for citizens that visit often. However, it might be difficult for people that visit often to notice change that occurs as slowly as natural progression of nature does. Creating a clear visual element, such as the sculpture in figure 8, progression of nature is easily noticeable and makes it possible for visitors to engage with the natural processes taking place within the space it is marked with the number **12** in figure 6 The sculpture consists of modules such as the tree trunks in the example, to make it easy for visitors to notice the progression of nature, as if it were run along a ruler.

Visualizing the shift in habitat along the sculpture aside, it also functions as an interactive climbing structure for kids to use. It can be used to climb on and hide behind but can also function as a place for children to look for flora and fauna, especially smaller animals such as arthropods and Mollusca. The sculpture is placed along the ‘exploration paths’ to motivate visitors to interact with it.

Creating the sculpture from natural or even refurbished materials is important to create a natural appeal and convey the image of the site as being a place for nature to act as it wills. Its presence provokes visitors to think on the processes taking place within their urban green spaces and not take these for granted.

A final function would be as a recognizable landmark for the space, something people can remember the space by and be used to describe the space to other citizens. Having the structure be built by the local community would also increase the sense of ownership over the space, which in turn could decrease littering and vandalism of the elements of the space by local citizens. The design as shown in figure 6, is a wing, inspired by the name of the local community centre *De Bonte Kraai* and adjacent metro station *Kraaiennest*, named after the crow. This design element could create a connection between the site and the community.

Another important aspect of the final design is the integration of the direct environment into the design. To be able to place the design within the context of its surroundings as good as possible, it was deemed necessary to take some liberties outside of the designated site area. The most obvious example of this are the zebra crossings that are aligned with the pathing network within the site, marked by numbers **13** in figure 6. This alignment creates a more seamless transition in and out of the site, making it more accessible to passersby and visitors alike. This accessibility is also visible in the direction and placement of the paths within the space. The main path runs from the bottom left to the top right, which is the most traversed route along the current site. It leads from the shopping center to the residential area.

In the spirit of connecting the surroundings with the space, a bike rack (**14**) is available for people passing by on a bike. A safe place where the bike can be stored before entering the park. This prevents crowding or obstruction by people taking their bikes with them into the space and makes the space more attractive to visit for people passing by on their bikes along one of the many bike lanes passing along the space.

7. Optimizing Spatial Design Scenario

The main method used in this thesis is RtD. To complete this method, the design, which was created supported by research and other means of gathering knowledge, has to be reviewed and new knowledge should be gained. To do this, the help of Ms. Noordman, an expert in nature inclusivity, biodiversity management and climate adaptation, was employed. Working for the engineering bureau of the municipality of Amsterdam, Ms. Noordman was able to review the design, as well as the proposed interventions and synergy analysis and provide feedback though a semi-structured interview. The full interview transcription can be found in Appendix D, but throughout this chapter, translated excerpts from this interview are used to motivate changes within the design introduced in chapter 6. To maintain a good overview, feedback and changes have been organized into sections. First positive feedback is discussed. This includes statements made by Ms. Noordman that motivate parts of the design remaining the way they are. Second is the feedback on parts of the design that could be changed or altered from their original function or form. Third is a section on aspects of the design that could be eliminated entirely based on the feedback provided and finally a section on interventions proposed by Ms. Noordman that could be added to the final design. In front of each translated excerpt is a number that indicates the line which it was translated from in the full Dutch interview transcription in appendix D.

7.1 What needs to stay?

Ms. Noordman was very kind in her feedback, providing many insights into possible improvements, but also commenting on aspects of the design that would work well just the way they are.

The first of which is the introduction of the natural water feature. Ms. Noordman explains how this water aids in attracting target species:

- 54. *"But I think **it (swift**) will be there, especially to **eat insects. The water would really attract many insects**, as it does in other parts of Zuid-Oost as well."*
- 58. *"The same (attracted by **flying insects**) goes for the **bats**."*

Closely related to the water feature is the reed that is planted to create a secluded section. Ms. Noordman believes this secluded section and the reed itself does well to house bird species:

- 47. *"**It (great tit)** is also seen a lot around **reeds**, where it **forages for small insects in the fall**."*

- 49. *"The **spiders** will also find their place in **the reed**, which is great for the birds that eat them like the **great tit** and **blue tit**."*
- 63. *"I think **the reed is very good** for **the common reed warbler**, that is really only seen in **the reeds, in marshy areas**."*
- 65. *"Yes I believe **the hiding place created by the reed is really good**."*

Talking about separating people and the wild, Ms. Noordman was enthusiastic about the placement of the walking paths throughout the site and the materials used to pave the:

- 108. *"Well, I think it is good that you thought about where you place the walking paths, and that you **clearly separated recreation and nature quite well.** I think it is very **smart that you decided to put wood chips on the path instead of paving it**, to keep it a natural product and make it **possible to live with each other (people and nature)**.*

The target species also came up during the interview, specifically how the chosen target species would deal with the level of disturbance they would face on site. This goes with the expression that the site could work as a natural playground:

- 109. *"There are species like the grass snake that don't cope well with disturbance, but **the species that you have chosen, I think they can do well in a neighborhood and in a recreational area**. That they will be less disturbed and less sensitive to disturbance.*
- 111. *"Very nice, the fact that it **is a playground, in a natural way, and nature, I think that that can work really well together.**"*

The introduction of trashcans is another intervention that Ms. Noordman approved of in the design:

- 120-121. *"That's why I think **it is so powerful that you introduce trashcans**. Because more trashcans … means less trash that is harmful for species like the hedgehog."*

Having worked in Zuid-Oost on several projects, Ms. Noordman was happy to point out how well received a community plaza would be amongst the people living in the neighbourhood, in her opinion:

- 134. *"Yes I **think a community plaza, especially in Zuid-Oost which has quite a few target audiences that like to spend time outside with their families**. If you can make sure that everyone can have their seat or bench and have a picknick, that you **really make it a <u>community</u> plaza and a <u>neighbourhood</u> plaza, people will feel responsible for the place** and will try to maintain it in a proper state."*

A final point of interest regarding interventions that should be held on to, is the planters on the community plaza. Though she is not the biggest fan of the concept, in this context Ms. Noordman values what they can contribute:

- 172. *"Yes, I thought that was very powerful.* ***Usually, I am not a fan of planters, because they require a lot of maintenance and dry out quickly****. But then I thought, well,* ***this is a community plaza, it is meant for people, so in this case it should be possible****. A little bit of green is better than no green at all."*

7.2 What needs to change?

Certain aspects or features of the design might have been good in principle but could improve through some adjustment or alteration.

Ms. Noordman made the argument for several target species, that the habitat provided could be improved:

- 11. "***The sparrowhawk*** *really does need a larger forest than he is given in the design in its current state"*
- 29, 31. "***The blackbird*** *will not settle in a nesting box, but will make its own nest in a tree, woodpile or shrubs. You need to make sure there are low trees and other low vegetation, then it (****the blackbird****) will surely come."*
- 141. *"****The bumblebee*** *will not make the insect hotel its home, he needs a hill and holes in the ground to nest."*
- 142. *"80% of all* ***bee*** *species will nest underground or in the reeds, not in the insect hotel."*

This shows that there is clearly room for more specialized habitat creation within the space. It could also mean the space is not large enough to house certain species that were target, as could be the case with the sparrowhawk.

A second change proposed during the interview was to not just create a slope on the visitor side of the water feature, but to extend the slope around the entire feature, especially the North-West side, which is exposed to the most sunlight during the day.

- 69. *"I would like to see* ***the entire bank, especially the North side to be more nature friendly, which would cause the reeds to spread****. But it will also cause* ***an increase in other aquatic plants which in turn attract insects****."*
- 73. *"If you create* ***a slope on the North side****, then it will grow in in no time. It is really important* ***to make it more sloped on that side****."*
- 126. *"****The slope is also very important*** *for* ***the dragonflies*** *to be able to lay their eggs."*

This slope would create a more nature friendly bank, which would increase flora, which attracts fauna, the ability for the planted reeds to spread along the bank and a breeding ground for aerial insects such as mayflies and dragonflies.

A key insight Ms. Noordman provided in regard to the human-nature interaction, is the isolation of the exploration path from the actual wild areas within the space.

- 87. *"I think **it is perfect that you run a single path through the wild area and leave the rest at peace**. If you make sure that it is difficult to leave the path, **by using thorny or stinging plants, you can ensure the peace for the flora and fauna in the wild areas**."*
- 145. *"I think you can use **the stinging nettles as hostplants for butterflies**, while they **serve as a barrier for people at the same time**."*

While she believes the path itself is a good idea to have children come closer to nature, she states it is important to keep visitors on the designated paths. By employing natural barriers such as thorny shrubs or stinging nettles, visitors should be deterred from leaving the path. Simultaneously the plants serve as essential habitat for several target species such as butterflies and bird species like the blackbird. Stinging nettles are already present at the location where the path passes through the trees, so a change would be as simple as maintaining this already existing fauna.

The trashcans are another idea that found the approval of Ms. Noordman, though she had some ideas on how to further optimize them to minimize spillage or vandalizing of the cans in question.

- 120. *"I thought **the proposal for trashcans was really powerful**. You need to make sure they are **closed trashcans**, where no crows or rats are able to pillage them. And you could **add a rack to the side where people can put their empty cans and bottles**. That way people don't go digging through the trash itself to find them for deposit money."*

Making the trashcans pillage proof is definitely a good addition and the bottle racks on the side are already in place in several locations in Amsterdam. This would make it easy for the municipality to apply these same structures in this space.

As mentioned before when talking about the bees and bumblebees, Ms. Noordman explained how insect hotels while useful for some species, do not cover the habitat requirements for many other target species. However, she does see an important educational role for the insect hotels.

- 142. *"**An insect hotel is interesting**, and I would definitely **leave it in the design for education purposes**. People can really see what is going on in these insect hotels."*

Adding signage to explain to visitors what species do make the insect hotel their home and in what ways the hotel helps other species would be a good way to further improve the educational quality of the hotels.

A final change proposed by Ms. Noordman concerns the community square and its surrounding foliage.

- 180. *"It is **good to expand upwards**, you can grow many things that provide fruit and vegetables. It would also **help with climate adaptation**, because **these are the places (Amsterdam Zuid-Oost) where there is very little green.** And **if it gets really hot** in the summer, you want to cool down and **these higher types of vegetation can create shade.**"*

Another multipurpose change. By building structures to support climbing fauna along the community square, shade can be created during hot sunny days, especially along the south side of the square. These climbing plants would further discourage visitors from entering the wild areas beyond the square and the plants may provide visitors with fruits and vegetables to pick, improving human-nature interaction.

Could expand upwards for plant growth along the community square (180)

7.3 What needs to go?

There are parts of the design that would not work in the eyes of Ms. Noordman, or at least not work as intended.

During the interview the concern was expressed that it would be hard for certain types of species, especially small mammals and amphibians to reach the space from surrounding green areas. This concern has materialized in the proposal by excluding many small mammals and entirely excluding amphibians from the target species list.

- 103. *"I don't think the concern is that warranted. **The roads are pretty slow and should be easy to cross**, especially at night. With the Bijlmerweide close by, which we equipped especially to increase frog and toad numbers, there are a lot of amphibians in the area."*
- 106. ***"I think the frog population can easily exchange (between Bijlmerweide and this space)**, especially if pools dry out in the Bijlmerweide and the water feature in this space is still holding water."*

With these words Ms. Noordman sent the concerns out the door.

Besides an expertise in ecology, Ms. Noordman has also dealt with infrastructure surrounding public areas and community squares. With that experience she expressed concern for the location of the zebra crossing in the top right corner of the design.

- 201. *"I know that **zebra crossings are not allowed to be so close to a corner**, because you would hit someone before you turn the corner."*

This is an issue that is easily resolved by either removing the zebra crossing or moving it further down the street, away from the corner.

7.4 What needs to be added?

Finally, Ms. Noordman also proposed some design interventions of her own.

An addition to the overall final product that was proposed by Ms. Noordman is a map showing the connections between the case study space at the Kempering and surrounding green spaces.

- 13-23. *"Have you included a map of how the green areas are spread around your chosen area? I think it is **important to visualize the connections between green spaces**, because if **you find bottlenecks or other obstacles** you can motivate why these **obstructions should be dealt with to improve the connection between green spaces**. I think it will make the story you are trying to sell stronger."*

Though not a direct comment on the design, to convince the municipality to use the plan for actual implementation, it is important to make as strong a case as possible. Creating a map to show the importance of the Kempering space as part of the broader green infrastructure of Amsterdam Zuid-Oost can be an important aspect in strengthening this case.

In a similar way, the case can be strengthened by creating a more specific list of plant species that would inhabit the space.

- 38. *"If you indicate **specific species of flora**, you can create a more concrete design."*

The inclusion of a specialized mowing pattern and schedule helps people feel more comfortable in an area that they might find 'too wild' or 'dirty'.

- 119. *"I think you can do a lot with management. **It is good to let nature do its thing**, because that will mean **native species will start to grow**. By **using mowing patterns**, sometimes mowing one part, sometimes the other, you can show people you are maintaining the site, while simultaneously leaving nature be as much as possible. I think **it is important to keep an area around the paths free** and to make sure **the sculpture remains accessible through the exploration paths**."*

While it is important for this site to let nature take over parts of it and show people the progression of nature of time and the change it brings to the space, it is also important that people feel safe visiting. By creating a custom mowing schedule and pattern people and nature can be satisfied.

Another opportunity that Ms. Noordman saw that was not fully explained in the plans is the educational possibilities the space offers.

- 108. *"**The combination of recreation and education is a really strong one**. This space provides the opportunity of learning about nature within the city. You can **teach people from the neighborhood that nature is really important**, so **education can serve as a big ecosystem service for the neighborhood** especially with kids playing in the space."*

Education is mentioned as part of the interventions but can take on a much bigger role within the design. The placement of more educational signs at points of interest throughout the space can teach visitors about the processes taking place around them and the species they can find in their own neighborhood and what these species can do for them.

Something else that is part of the interventions but has not found its way into the final design is the idea of a permaculture or fruit trees. Ms. Noordman believed this to be a missed opportunity for human-nature interaction in a neighborhood that can learn so much about nature. An opportunity for people to experience not all nature is 'dirty' or 'scary'.

- 36. *"**Berries and fruits** and seeds are also important for the **birds that stay in the Netherlands during winter**."*
- 152. *"**I think it (fruit trees) could be a good combination**, especially in Zuid-Oost there is a need for food forests and picking gardens. **The Atalanta also benefits from the fruits during fall** when there are fewer flowering plants."*
- 169-170. *"**Fruit trees could definitely fit in that location (bottom left section of grass next to community square)**. You could use the sides of the community square, this would also serve as a barrier shielding the community area."*

So the fruit trees would not only be useful for visitors, but also for the target species as a source of food during periods when other sources of food may be scarce. Ms. Noordman also proposed a location for these trees, the currently empty bottom left and the fringes of the community square. In these locations fruit trees could easily be accessed by visitors, but they might disturb animals who want to eat the fruit. Planting some berries or fruit trees in the wild areas should provide animals with a safe source of food.

The isolation of the exploration path has been discussed prior, using nettles and thorny shrubs. During the interview however, another idea surfaced.

- 92. *"**To separate the path and nature you could think to put down wooden hedgerows** where the path passes through the thickest part of vegetation where animals really need their privacy. **Moths and other arthropods will make it their home** as well as some bird species. To create these dead hedges, you can **contribute so much to the biodiversity because they support an entirely different type of habitat**."*

The idea is strong and would increase the HES provided by the space. There is however a risk of secluding the visitor too much from the natural areas of the space. Lower dead hedges (1-1,5m) can be a great addition to other deterring methods such as the stinging nettles.

In the spirit of creating more niche habitats, the Ecocathedral, though part of the proposed interventions, did not make it into the final design. The sculpture in the center is a variation on the idea, but during the interview it became clear that creating a stone Ecocathedral would be beneficial for the space.

- 95-97. *"**I think the stone Ecocathedral is a good addition**, because it houses an **entirely different set of species**. Especially for **amphibians** who would use the **holes left under the cathedral to shelter during winter** it would be a nice addition."*

Because of the omission of amphibians during the selection of target species, the Ecocathedral seemed to be unnecessary, but Ms. Noordman has expressed how amphibians will definitely visit the site. This makes the idea of adding the stone cathedral after all not such a bad idea.

7.5 final summary and overall impression

Overall Ms. Noordman was very positive and enthusiastic about the final design. To summarize, Ms. Noordman voiced her expert opinion on not just the ecological effect of the proposed design interventions like the insect hotels, the effect of walking paths through the wild section of the space and the efficacy of introduced water feature on attracting local species. She is also someone that has worked in Amsterdam Zuid-Oost, she is familiar with the people living there and certain cultural characteristics of the neighborhood. She explained how the inhabitants of the area need outdoor meeting spaces to socialize, like the community plaza and how they tend to be more scared of wilderness, and especially animals, which strengthens the intent to separate people and the wilderness as much as possible for those who desire that separation.

- 193. *"I believe you are very far along. There are some very good points in the design. You have clearly given the design a lot of thought and that shows in how you were able to combine so many interventions. You gathered a lot of knowledge. I have seen designs from actual designers that did not include this much attention to detail."*

So the overall impression is positive, this does not mean nothing could or should be changed. Given the vast list of changes and additions, a review of the final design should be done. The possible changes to be made are further explained in chapter 7.6.

7.6 final design strategy improvements

The feedback provided by Ms. Noordman is summarized into seven additional design tools and strategies that can be implemented in the spatial design scenario:

1. Introducing hostile fauna along exploration paths
2. Introducing hedgerows along exploration paths
3. Increasing the area for eco-friendly banks around the water feature
4. Addition of a permaculture
5. Providing specialized habitat for terrestrial pollinators
6. Addition of educational or informative signs
7. Options for vertical green in paved areas

Reference images are used to visualize how these new design tools would take shape within the IGS. To indicate the spatial impact of these new design tools, a section of the spatial design scenario is provided, as well as the numbers of the design strategies that will be influenced by the introduction of new strategies.

The hostile fauna placed along the exploration path is the first key intervention added to the final design. Using plants such as stinging nettles (*Urtica dioica* and *urens*) and brambles (*Rubus*), visitors are deterred from leaving the **designated paths** that lead them through the wild section of the site. They are to be placed along the exploration path (11) and the forest edge (10).

Figure 9: reference images showing how hostile fauna can line the exploration paths and create a natural barrier.

It could be the case that visitors are unaware of the hostile nature of these plants, so information on the plants is provided by **signs** at the start of every path. This plays into the **educational value** of the site as well.

The second implemented change that helps to separate the paths from the wild nature beyond them are dead hedges. These structures not only create a physical barrier, but also create new micro habitats for target species such as the **Cyanistes caeruleas (Blue tit)** who can forage for food and nest in the hedge and almost all **arthropods** and even some **pollinators** can find a suitable habitat in them.

Figure 10: reference images showing branch hedges that can serve as habitat and clear barriers to prevent unwanted visitors in certain parts of the space.

Using lower hedges (1-1,5m) can be suitable to create a barrier for entry but doesn't obstruct the view of the wild nature beyond the hedge. Taller hedges (>2m) can be used for areas that need total seclusion from people visiting the space. The hedges would be placed along the exploration paths (11) and if needed, along the forest edge (10).

Eco-friendly banks or NVO's are another addition to improving HES within the space. The early design already implemented slanted slopes, but mainly for safety reasons. This type of eco-friendly bank creates multiple zones that can be inhabited by different species, **increasing biodiversity**. The recommendation by Ms. Noordman was to surround the entire water feature (1) with these slopes for maximum effect.

Figure 11: reference images showing how NVO's can improve biodiversity, visual perception and physical interaction between visitors and flora.

The relatively open space at the bottom left of the site can be used for a small **permaculture**, that also functions as a food forest for visitors to interact with. This permaculture increases the interaction visitors have with nature and in turn **boosts social interaction** amongst visitors interacting with the permaculture together. It also provides an opportunity for volunteer initiatives that look after the trees and shrubs of the permaculture, that are likely to further improve social participation of lonely elderly for example.

Figure 12: Reference images showing how a permaculture can stimulate social interaction, volunteering initiatives and serve as educational highlights within a green space. A smaller area such as the design image (top right) shows can make an impact.

This addition to the site is, like the eco-friendly banks, to ensure a suitable habitat to attract valuable target species to the site. Creating sandy hills and barren ground among the field of grass in the center of the site attracts species such as **Bombus terrestris** and other bumblebee and wild bee species. Creating this habitat around the art installation (12) makes for an interaction opportunity between visitors and animals.

Figure 13: reference images showing what the habitat can look like as part of the space and the pollinating species it can attract.

Part of the original proposed design strategies, but not part of the overall design, signs with information for people to educate themselves on the goings on within the green space. They can be used **to warn** for hostile vegetation, **to show** a map of the space or **to teach** about species found on site. The addition of these signs boosts the **educational qualities** of the space, improving CES, while making visitors aware of how to best maintain HES.

Figure 14: reference images showing how signs can be used in the space to warn (middle bottom), inform (top right) or guide (bottom right).

A final addition to the overall design is the inclusion of more **vertical green**. This addition is especially impactful in the paved areas of the space, like the entrance paths and community square. By adding vertical green in these areas, more **shade** is created for visitors and people who do not like to venture further into the wilder areas of the space can still **interact with nature**. Structures can be designed to support this vertical green, while maintaining a natural feeling. Such structures can double as a distinct entrance to the site or as a **landmark**.

Figure 15: reference images showing how vertical green can take shape within the space and serve as a landmark or entrance way into the site.

Overall, the new design strategies and tools create additional benefits for users of the site by improving the effect of HES and CES. The key improvements are the increase in specialized habitat for target species, improved educative qualities of the site, increasing opportunities for interaction with the site and social interaction with other visitors of the site and preventing conflict between diverse types of users of the site.

These seven newly proposed design strategies are based on Ms. Noordman's impression of the spatial design scenario from chapter 6 and the proposed design strategies and synergy analysis from chapter 5. These seven strategies and tools are an addition to the spatial design scenario presented in chapter 6 but are not developed into a new spatial design scenario. Chapter 8 discusses the reasons for and consequences of this choice for the validity of the result.

8. Discussion

Discussing key findings, interpretations of the results, limitations and opportunities for further research are crucial to rounding out the research process. A critical evaluation of the research, by assessing the used methods and confronting the results with existing literature, is necessary to strengthen the validity of the thesis and prove its added value to existing knowledge.

Key findings and Interpretations

The results of the thesis prove that the site ate the Kempering is currently used ineffectively but holds potential for enhancing human and ecological benefits. Interviews with residents show that they prefer nearby green spaces over the green space at the Kempering in its current state. This is mainly due to a lack of engaging features, excess trash laying around and a lack of seating options. However, interviewees also expressed a desire for better facilities, along with an improvement in biodiversity within the Kempering space.

To reach a functional balance between HES and CES, sixteen design interventions are proposed that aim to improve the usability of the space, without compromising the informal character, which is so important to certain groups of users (Soga & Gaston, 2016). Movable seating, designated main walking routes and exploration paths of a semi-formal nature that preserve ecological integrity while allowing for exploration are some examples of interventions that maintain this balance between HES and CES. The interventions emphasize a minimal physical intervention within the space, maintaining its informality and minimize disordering the established habitat. This method aligns with the urban acupuncture theory by Unt and Bell (2014). They advocate for small-scale design interventions to stimulate ecological and social benefits with urban green spaces.

A central theme in deciding which design interventions work best for improving the IGS are the synergies between the interventions. The example of bordering the exploration paths with hostile vegetation or hedges shows clearly how interventions on their own might not be as effective, but when used together are able to add real benefits to the space. Through these synergies new insight into the possibilities for spatial organization of an IGS is provided. Being able to efficiently place design interventions within the final spatial design scenario builds on the research done by Konijnendijk et al. (2013), who state that design can positively influence the effectiveness of HES provided by IGS. Finding the synergies and being able to stack and boost functions of the design interventions aligns with the findings of Lovell & Taylor (2013). However, it also became clear that certain design strategies are crucial to include in the spatial design scenario, even when they show discord with other strategies. Trash cans and streetlights show discord with many other strategies in the synergy analysis but are crucial to improve users perceived safety and cleanliness of the space.

Another key finding is the contribution that management of the IGS can play in the local support and appreciation of the IGS by visitors and locals. Ms. Noordman brought attention to the impact management could have on the space in her evaluation of the first spatial design scenario. She stated the importance of "*letting nature do its thing*" to give native species a chance to flourish, this is similar to the idea of Raxworthy (2013) of letting nature develop with the space, to ensure a sense of novelty. However, she also suggests implementing mowing patterns to prevent overgrowth or a sense of neglect that might intimidate visitors. The same goes for keeping the area around the paths free of overgrowth. This is an insight that is also supported by Rall & Haasse (2011), who support implementing mowing and pruning along sightlines to improve perceived safety of the visitors. These two points of view seem slightly contradictory but can be implemented simultaneously when the spatial design scenario ensures that there is room for both letting nature do its thing and for people to explore the space without feeling scared or intimidated.

Limitations and Future Research Recommendations

The main limitation of the study is its hypothetical nature. The proposed design interventions have not been implemented in a real-life situation and therefor lack the necessary data to prove their effectiveness. Future studies should thus focus on implementing the interventions in, for example, a living lab setting, and collect data on how the interventions affect biodiversity, community engagement and attraction of target species over time. This would provide insights in the true impact the interventions would have on the CES and HES, which for now remain speculative.

A second limitation lies in the species research that has been done on site. This research was limited to one visit with an expert, on one day, which does not provide a representative insight into the species present. The risk of false 0-observations (not observing something while it is present) is high with a single instance of data collection. For this reason, this type of data collection usually take place over several days and preferably several times a day (Kadlec et al., 2012). Future studies should implement these conditions before taking on the collection of data to ensure representable results.

The analysis of the synergies between the proposed design interventions provides another opportunity to improve for future research. Though the synergy analysis was approved by an expert, the basis for the analysis was still created based on my own knowledge, judgement and experience of interactions within green spaces. Though this knowledge is built on years of studying biology and urban green space, the proper way to evaluate the synergies would have been to use proven scientific methods like setting criteria to judge the interaction between design

interventions on or to provide references supporting the choices made in the analysis. The results of the analysis could also be subjected to peer review before taking them as truth and using them to motivate the choices made for the final spatial design scenario.

A lack of iteration when it comes to the spatial design scenarios discussed with the expert is also a limitation. The expert was only able to provide feedback on a single design scenario. Had the research been done properly, the first round of feedback would have been integrated into a new design scenario and presented to the expert again. While the first round of feedback resulted in several new design strategies in chapter 7.6, the lack of iterations following these newly developed strategies limits the strength of the final design. Another way to improve the validity would have been to present the same design scenario to multiple experts and integrate feedback from multiple points of view into a final design scenario. Presenting the spatial design scenario to users of the space that were interviewed to motivate new design strategies is a final method for collecting feedback, to test whether the spatial design scenario is perceived as an improvement or not.

Practical Implications and Future Applications

The results show the possibility of integrating CES and HES within urban IGSs, through minimal design interventions. For municipalities, this approach serves as a model to enhance ES in urban contexts where resources and space might be limited or where inhabitants would prefer the informality of the green space be maintained. By Implementing these findings in for example a 'Living lab' setting, data could be collected on how effective the proposed interventions truly are, offering insights for designs in similar spaces and environments in the future. How the site is managed after strategies are implemented is also an important practice to collect data on. This means the case can serve as a model for other municipalities in similar situations that are looking to enhance the HES and CES of their IGSs in a cost-effective way, with minimal physical interventions within the space.

This signals a potential for local support and acceptance if the site were to be adapted and improved. The potential increase in biodiversity is supported by the species research, which suggests that more species could be attracted to the space through the proposed interventions, especially birds and insects.

Interdisciplinarity

The research underlines the importance of using an interdisciplinary approach for environmental design. By combining insights from sociology, urban planning and ecology, multiple urban challenges are addressed simultaneously. The integral approach allows for a balanced overall design, considering both social and ecological dynamics. This ensures that the design improves both the HES and CES of the IGS, enriching the receptivity of the design to both community and ecological needs.

9. Conclusion

The focus of this thesis is on informal urban green spaces, paying attention in particular to the interaction between CES and HES within these informal spaces. By studying the current state and potential of the Kempering site, using design to bridge the gap between those states, I was able to analyze how the proposed design interventions would interact. This provided a clearer understanding of how CES and HES don't only co-exist but are able to elevate each other, challenging the common notion that these services are inherently antagonistic. Four sub questions have been answered throughout the thesis, building up to answering the main research question.

First the current state was addressed, and it became clear that the IGS is underused, compared to other green spaces in the area. It has a limited biodiversity and shows minimal signs of maintenance. Local interviewees perceived the site as neglected but thought it had potential for improvement.

Secondly, based on interviews and research on observation databases, the potential of the IGS to provide CES and HES was established. Biodiversity can be enhanced by attracting target species with diverse habitats and the community around the site can be engaged by adding amenities that promote social interaction.

Thirdly, targeted design strategies and tools were developed to improve the provision of HEs and CES between the current state and potential of the site. By analyzing the interaction between the strategies, a spatial design scenario was created that applied the proposed strategies such as pathing, seating and wild vegetation effectively within the physical space.

Lastly this spatial design scenario and analysis on the interaction between the strategies was expertly reviewed, leading to new insights on how the spatial design could be further improved and highlighting how low-impact and adaptable solutions that were proposed align with both ecological and social needs.

All this gathered information leads into answering the main research question, "*How can design improve the habitat ecosystem services of informal urban green space while incorporating cultural ecosystem services?"* It is addressed in two ways:

First, make informed design choices when it comes to implemented design interventions. When working on improving both HES and CES, it is important to assess the needs of both non-human and local citizens. This involves going into the neighborhood and talking to the citizens that use the space, to find out how they use and perceive the site, and what potential they envision for the space. These interviews revealed, though

the current state of the site is not viewed positively (due to a lack of appeal and interactive options), there is potential for improvement. Local citizens expressed an interest in the introduction of more nature, benches, trashcans and walking paths. Electing to involve the community in the early stages of the design process provided both valuable insights and increased support for the proposed interventions.

On the side of the HES, it is crucial to do thorough research into the species present at the site and the habitats they require. In addition, identifying other target species that could be attracted to the site creates a clearer picture of the site's ecological potential. In summary, the success of the proposed design interventions relies on both an understanding of human and ecological needs. This is achieved through community engagement and ecological research.

Second is analyzing synergies and trade-offs (disservices) between the proposed interventions. To do this, an understanding is required of how design interventions might impact space and each other, both on their own and when combined with other interventions. Spatial planning is critical when it comes to preventing trade-offs and maximizing synergies. A solid example is the exploration path that crosses the wild area. It allows people to interact with nature, while minimizing their ability to disturb it thanks to hostile fauna and hedges. Synergies are also evident in the community square, where benches and chairs enhance the effectiveness of several interventions by encouraging social interaction. Ultimately, the design interventions, as part of the RtD, explore the gap between the current state and the potential of the site. They explore how HEs and CES provisioning can be integrated and how the potential of the site can be reached. They do this, while crucially maintaining the informality of the site. Informality is what attracts a varied range of visitors, human and non-human. This set differs compared to formal parks. Informality is maintained by limiting the spatial or physical impact of CES-oriented interventions and making sure the space is also able to maintain its HES-oriented interventions.

By considering not only the current state of informal green spaces but also their potential, and by using minimal but strategic design interventions, management and optimizing the spatial design scenario through finding synergies between design interventions, the ecosystem services provided can improve significantly without losing the informal nature of the space. This case study is an example for similar informal green spaces in cities the world over, that highlights their potential to make a positive contribution to their neighborhoods as green paradises, where people can interact with nature and each other. A case for informal green spaces to not be dismissed as unused incomplete green spaces that can only serve as a target for the next big urban development but are instead able to serve the neighborhood by improving livability, biodiversity and social cohesion!

References

1. Ahern, J. (2007). Green infrastructure for cities: the spatial dimension. In. In *Cities of the future: towards integrated sustainable water and landscape management. IWA Publishing*.
2. Angold, P. G., Sadler, J. P., Hill, M. O., Pullin, A., Rushton, S., Austin, K., ... & Thompson, K. (2006). Biodiversity in urban habitat patches. Science of the Total environment, 360(1-3), 196-204.
3. Assessment, M. E. (2001). Millennium ecosystem assessment.
4. Begay, W., Lee, D. R., Martin, J., & Ray, M. (1984). Quantifying qualitative data. Journal of Library Administration, 40, 3-4.
5. Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science, 19*(12), 1207-1212.
6. Bogner, A., Littig, B., & Menz, W. (2009). Introduction: Expert interviews—An introduction to a new methodological debate. In Interviewing experts (pp. 1-13). London: Palgrave Macmillan UK.
7. Bolund, P., & Hunhammar, S. (1999). Ecosystem services in urban areas. *Ecological economics*, *29*(2), 293-301.
8. Boyd, J., & Banzhaf, S. (2007). What are ecosystem services? The need for standardized environmental accounting units. *Ecological economics*, *63*(2-3), 616-626.
9. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77.
10. Campo, D. (2013). The accidental playground: Brooklyn waterfront narratives of the undesigned and unplanned. Fordham Univ Press.
11. Caspersen, O. H., Konijnendijk, C. C., & Olafsson, A. S. (2006). Green space planning and land use: An assessment of urban regional and green structure planning in Greater Copenhagen. *Geografisk Tidsskrift-Danish Journal of Geography*, *106*(2), 7-20.
12. Cheesbrough, A. E., Garvin, T., & Nykiforuk, C. I. (2019). Everyday wild: Urban natural areas, health, and well-being. *Health & place*, *56*, 43-52.
13. Costanza, R. (2008). Ecosystem services: multiple classification systems are needed. *Biol Conservat*, *141*, 350-352.
14. Del Tredici, P. (2010). Spontaneous urban vegetation: reflections of change in a globalized world. *Nature and Culture*, *5*(3), 299-315.
15. Díaz, S., Fargione, J., Chapin III, F. S., & Tilman, D. (2006). Biodiversity loss threatens human well-being. *PLoS biology*, *4*(8), e277.
16. Ehrlich, P., & Ehrlich, A. (1981). Extinction: the causes and consequences of the disappearance of species.
17. Farahani, L. M., & Maller, C. (2019). Investigating the benefits of 'leftover' places: Residents' use and perceptions of an informal greenspace in Melbourne. *Urban Forestry & Urban Greening*, *41*, 292-302.
18. Fernández-Juricic, E. (2002). Can human disturbance promote nestedness? A case study with breeding birds in urban habitat fragments. *Oecologia*, *131*, 269-278.
19. Fernandez-Juricic, E., & Jokimäki, J. (2001). A habitat island approach to conserving birds in urban landscapes: case studies from southern and northern Europe. *Biodiversity & Conservation*, *10*, 2023-2043.
20. Fischer, L. K., Eichfeld, J., Kowarik, I., & Buchholz, S. (2016). Disentangling urban habitat and matrix effects on wild bee species. *PeerJ*, *4*, e2729.
21. Fischer, L. K., von der Lippe, M., Rillig, M. C., & Kowarik, I. (2013). Creating novel urban grasslands by reintroducing native species in wasteland vegetation. *Biological Conservation*, *159*, 119-126.
22. Fisher, B., Turner, R. K., & Morling, P. (2009). Defining and classifying ecosystem services for decision making. *Ecological economics*, *68*(3), 643-653.
23. Friesen, M. (2009). Applying ATLAS. ti and Nesstar WebView to the LibQUAL+® results at UBC library: Getting started.

24. Gatrell, J. D., Bierly, G. D., & Jensen, R. R. (2011). *Research design and proposal writing in spatial science*. Springer Science & Business Media.
25. Gibb, H., & Hochuli, D. F. (2002). Habitat fragmentation in an urban environment: large and small fragments support different arthropod assemblages. *Biological conservation*, *106*(1), 91-100.
26. Godefroid, S., Monbaliu, D., & Koedam, N. (2007). The role of soil and microclimatic variables in the distribution patterns of urban wasteland flora in Brussels, Belgium. Landscape and Urban Planning, 80(1-2), 45-55.
27. Gómez-Baggethun, E., Gren, Å., Barton, D. N., Langemeyer, J., McPhearson, T., O'farrell, P., ... & Kremer, P. (2013). Urban ecosystem services. *Urbanization, biodiversity and ecosystem services: Challenges and opportunities: A global assessment*, 175-251.
28. Goulson, D., Hughes, W., Derwent, L., & Stout, J. (2002). Colony growth of the bumblebee, Bombus terrestris, in improved and conventional agricultural and suburban habitats. Oecologia, 130, 267-273.
29. Guo, S., Su, C., Saito, K., Cheng, J., & Terada, T. (2019). Bird Communities in Urban Riparian Areas: Response to the Local-and Landscape-Scale Environmental Variables. *Forests*, *10*(8), 683.
30. Hard, G. (2001). Natur in der Stadt?. Berichte zur deutschen Landeskunde, 75(2-3), 257-270.
31. Henderson, I. G., Wilson, A. M., Steele, D., & Vickery, J. A. (2002). Population estimates, trends and habitat associations of breeding Lapwing Vanellus vanellus, Curlew Numenius arquata and Snipe Gallinago gallinago in Northern Ireland in 1999. Bird Study, 49(1), 17-25.
32. Hermanides, E. (2014, August 11). Wat is de verschrikkelijkste plek van Amsterdam? Deel 5: De Vluchtgarage. Het Parool. Amsterdam. Retrieved September 11, 2023, from https://www.parool.nl/nieuws/wat-is-de-verschrikkelijkste-plek-van-amsterdam-deel-5-de-vluchtgarage~b70b4f0d/.
33. Holt, E. W., Lombard, Q. K., Best, N., Smiley-Smith, S., & Quinn, J. E. (2019). Active and passive use of green space, health, and well-being amongst university students. *International journal of environmental research and public health*, *16*(3), 424.
34. Kadlec, T., Tropek, R., & Konvicka, M. (2012). Timed surveys and transect walks as comparable methods for monitoring butterflies in small plots. *Journal of Insect Conservation*, *16*, 275-280.
35. Kim, G., Miller, P., & Nowak, D. (2016). The value of green infrastructure on vacant and residential land in Roanoke, Virginia. *Sustainability*, *8*(4), 296.
36. Knapp, A. E. (2004). We Asked Them What They Thought, Now What Do We Do? The Use of LibQUAL+ (™) Data to Redesign Public Services at the University of Pittsburgh. *Journal of Library Administration*, *40*(3-4), 157-171.
37. Konijnendijk, C. C., Annerstedt, M., Nielsen, A. B., & Maruthaveeran, S. (2013). Benefits of urban parks. *A systematic review. A Report for IFPRA, Copenhagen & Alnarp*, 1-70.
38. Kowarik, I. (2011). Novel urban ecosystems, biodiversity, and conservation. Environmental pollution, 159(8-9), 1974-1983.
39. Kumar, P. (2012). *The economics of ecosystems and biodiversity: ecological and economic foundations*. Routledge.
40. Lee, A. C. K., Jordan, H. C., & Horsley, J. (2015). Value of urban green spaces in promoting healthy living and wellbeing: prospects for planning. *Risk management and healthcare policy*, 131-137.
41. Lewis, M. A., Fitzgerald, T. M., Zulkiewicz, B., Peinado, S., & Williams, P. A. (2017). Identifying synergies in multilevel interventions: the convergence strategy. Health Education & Behavior, 44(2), 236-244.

42. Lovell, S. T., & Taylor, J. R. (2013). Supplying urban ecosystem services through multifunctional green infrastructure in the United States. *Landscape ecology*, *28*, 1447-1463.
43. Lowry, H., Lill, A., & Wong, B. B. (2013). Behavioural responses of wildlife to urban environments. *Biological reviews*, *88*(3), 537-549.
44. Luo, S. (2021). Disclosing Interstices: Open-ended Design Transformation of Urban Leftover Spaces. *A+ BE| Architecture and the Built Environment*, (16), 1-370.
45. Luo, S., & Patuano, A. (2023). Multiple ecosystem services of informal green spaces: A literature review. *Urban Forestry & Urban Greening*, 127849.
46. Mahan, C. G., & O'Connell, T. J. (2005). Small mammal use of suburban and urban parks in central Pennsylvania. *Northeastern Naturalist*, *12*(3), 307-314.
47. Mallinger, R. E., Gibbs, J., & Gratton, C. (2016). Diverse landscapes have a higher abundance and species richness of spring wild bees by providing complementary floral resources over bees' foraging periods. *Landscape ecology*, *31*, 1523-1535.
48. Martínez, A., Eckert, E. M., Artois, T., Careddu, G., Casu, M., Curini-Galletti, M., ... & Fontaneto, D. (2020). Human access impacts biodiversity of microscopic animals in sandy beaches. *Communications biology*, *3*(1), 1-9.
49. Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-being, biodiversity synthesis*
50. Müller, N., Ignatieva, M., Nilon, C. H., Werner, P., & Zipperer, W. C. (2013). Patterns and trends in urban biodiversity and landscape design. *Urbanization, biodiversity and ecosystem services: challenges and opportunities: a global assessment*, 123-174.
51. Muratet, A., Porcher, E., Devictor, V., Arnal, G., Moret, J., Wright, S., & Machon, N. (2008). Evaluation of floristic diversity in urban areas as a basis for habitat management. *Applied vegetation science*, *11*(4), 451-460.
52. Németh, J., & Langhorst, J. (2014). Rethinking urban transformation: Temporary uses for vacant land. *Cities*, *40*, 143-150.
53. Netherlands Environmental Assessment Agency (PBL). (2024). *Spatial scenarios as a tool for future-proof spatial planning in the Netherlands* (Publication No. 5593). PBL Netherlands Environmental Assessment Agency.
54. Pauleit, S., Ambrose-Oji, B., Andersson, E., Anton, B., Buijs, A., Haase, D., ... & van den Bosch, C. K. (2019). Advancing urban green infrastructure in Europe: Outcomes and reflections from the GREEN SURGE project. *Urban Forestry & Urban Greening*, *40*, 4-16.
55. Pauleit, S., Hansen, R., Rall, E. L., Zölch, T., Andersson, E., Luz, A. C., ... & Vierikko, K. (2017). Urban landscapes and green infrastructure. In *Oxford research encyclopedia of environmental science*.
56. Paulin, M., Remme, R., de Nijs, T. (2019). Amsterdam's green infrastructure: valuing nature's contributions to people. *RIVM Letter report 2019-0021. Ministery of health, welfare and sport*.
57. Pautasso, M. (2007). Scale dependence of the correlation between human population presence and vertebrate and plant species richness. *Ecology letters*, *10*(1), 16-24.
58. Pietrzyk-Kaszyńska, A., Czepkiewicz, M., & Kronenberg, J. (2017). Eliciting non-monetary values of formal and informal urban green spaces using public participation GIS. *Landscape and Urban Planning*, *160*, 85-95.
59. Pincetl, S., & Gearin, E. (2005). The reinvention of public green space. *Urban geography*, *26*(5), 365-384.
60. Potschin, M., & Haines-Young, R. (2016). Defining and measuring ecosystem services. *Routledge handbook of ecosystem services*, *1*, 25-44.
61. Rall, E. L., & Haase, D. (2011). Creative intervention in a dynamic city: A sustainability assessment of an interim use strategy for brownfields in Leipzig, Germany. landscape and urban Planning, 100(3), 189-201.

62. Raxworthy, J. (2013). Novelty in the Entropic Landscape: Landscape architecture, gardening and change. *Doctoral Dissertation*.
63. Rodríguez, J. P., Beard Jr, T. D., Bennett, E. M., Cumming, G. S., Cork, S. J., Agard, J., ... & Peterson, G. D. (2006). Trade-offs across space, time, and ecosystem services. *Ecology and society*, *11*(1).
64. Roy, L. L. (1973). *Natuur Uitschakelen: Natuur Inschakelen*. Ankh-Hermes, Deventer.
65. Rupprecht, C. D. (2017). Informal urban green space: Residents' perception, use, and management preferences across four major Japanese shrinking cities. *Land*, *6*(3), 59.
66. Rupprecht, C. D., & Byrne, J. A. (2014). Informal urban green-space: comparison of quantity and characteristics in Brisbane, Australia and Sapporo, Japan. *PloS one*, *9*(6), e99784.
67. Rupprecht, C. D., Byrne, J. A., Ueda, H., & Lo, A. Y. (2015). 'It's real, not fake like a park': Residents' perception and use of informal urban green-space in Brisbane, Australia and Sapporo, Japan. *Landscape and Urban Planning*, *143*, 205-218.
68. Schütz, C., & Schulze, C. H. (2018). Park size and prey density limit occurrence of Eurasian Sparrowhawks in urban parks during winter. Avian Research, 9(1), 1-8.
69. Semeraro, T., Scarano, A., Buccolieri, R., Santino, A., & Aarrevaara, E. (2021). Planning of urban green spaces: An ecological perspective on human benefits. *Land*, *10*(2), 105.
70. Shwartz, A., Turbé, A., Simon, L., & Julliard, R. (2014). Enhancing urban biodiversity and its influence on city-dwellers: An experiment. *Biological conservation*, *171*, 82-90.
71. Sikorska, D., Łaszkiewicz, E., Krauze, K., & Sikorski, P. (2020). The role of informal green spaces in reducing inequalities in urban green space availability to children and seniors. *Environmental science & policy*, *108*, 144-154.
72. Sikorski, P., Gawryszewska, B., Sikorska, D., Chormański, J., Schwerk, A., Jojczyk, A., ... & Łaszkiewicz, E. (2021). The value of doing nothing–How informal green spaces can provide comparable ecosystem services to cultivated urban parks. *Ecosystem services*, *50*, 101339.
73. Sikorski, P., Szumacher, I., Sikorska, D., Kozak, M., & Wierzba, M. (2013). Effects of visitor pressure on understory vegetation in Warsaw forested parks (Poland). *Environmental Monitoring and Assessment*, *185*, 5823-5836.
74. Soga, M., & Gaston, K. J. (2016). Extinction of experience: the loss of human–nature interactions. *Frontiers in Ecology and the Environment*, *14*(2), 94-101.
75. Stappers, P. J., & Giaccardi, E. (2017). Research through design. In The encyclopedia of human-computer interaction (pp. 1-94). The Interaction Design Foundation.
76. Sukhdev, P., Wittmer, H., Schröter-Schlaack, C., Neßhöver, C., Bishop, J., Brink, P. T., ... & Simmons, B. (2008). The economics of ecosystems and biodiversity. na.
77. Twerd, L., & Banaszak-Cibicka, W. (2019). Wastelands: their attractiveness and importance for preserving the diversity of wild bees in urban areas. *Journal of insect conservation*, *23*, 573-588.
78. Tzoulas, K., Korpela, K., Venn, S., Yli-Pelkonen, V., Kaźmierczak, A., Niemela, J., & James, P. (2007). Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review. *Landscape and urban planning*, *81*(3), 167-178.
79. Unt, A. L., & Bell, S. (2014). The impact of small-scale design interventions on the behaviour patterns of the users of an urban wasteland. *Urban Forestry & Urban Greening*, *13*(1), 121-135.
80. Van den Berg, A. E., Maas, J., Verheij, R. A., & Groenewegen, P. P. (2010). Green space as a buffer between stressful life events and health. *Social science & medicine*, *70*(8), 1203-1210.

81. Vaughn, P., & Turner, C. (2016). Decoding via coding: Analyzing qualitative text data through thematic coding and survey methodologies. Journal of Library Administration, 56(1), 41-51.
82. Villasenor, N. R., Chiang, L. A., Hernández, H. J., & Escobar, M. A. (2020). Vacant lands as refuges for native birds: An opportunity for biodiversity conservation in cities. *Urban Forestry & Urban Greening*, *49*, 126632.
83. Vojvodíková, B., Tichá, I., & Starzewska-Sikorska, A. (2022). Implementing Nature-Based Solutions in Urban Spaces in the Context of the Sense of Danger That Citizens May Feel. *Land*, *11*(10), 1712.
84. Wensveen, S. A. (2005). A tangibility approach to affective interaction.
85. Wenzel, A., Grass, I., Belavadi, V. V., & Tscharntke, T. (2020). How urbanization is driving pollinator diversity and pollination–A systematic review. *Biological Conservation*, *241*, 108321.
86. Westman, W. E. (1977). How Much Are Nature's Services Worth? Measuring the social benefits of ecosystem functioning is both controversial and illuminating. *science*, *197*(4307), 960-964.
87. Włodarczyk-Marciniak, R., Sikorska, D., & Krauze, K. (2020). Residents' awareness of the role of informal green spaces in a post-industrial city, with a focus on regulating services and urban adaptation potential. *Sustainable Cities and Society*, *59*, 102236.
88. Wolch, J. R., Byrne, J., & Newell, J. P. (2014). Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough'. *Landscape and urban planning*, *125*, 234-244.
89. Wolf, K. L. (2003). Ergonomics of the city: Green infrastructure and social benefits. In *Engineering Green: Proceedings of the 11th National Urban Forest Conference. Washington DC: American Forests* (Vol. 115).
90. Wong, C. P., Jiang, B., Kinzig, A. P., Lee, K. N., & Ouyang, Z. (2015). Linking ecosystem characteristics to final ecosystem services for public policy. *Ecology letters*, *18*(1), 108-118.
91. Wratten, S. D., Gillespie, M., Decourtye, A., Mader, E., & Desneux, N. (2012). Pollinator habitat enhancement: benefits to other ecosystem services. *Agriculture, Ecosystems & Environment*, *159*, 112-122.
92. Wysocki, D., Adamowicz, J., Kosciów, R., & Smietana, P. (2004). The size of breeding territory in an urban population of the Blackbird (Turdus merula) in Szczecin (NW Poland). Ornis Fennica, 81(1), 1-12.
93. Zwierzchowska, I., Hof, A., Iojă, I. C., Mueller, C., Poniży, L., Breuste, J., & Mizgajski, A. (2018). Multi-scale assessment of cultural ecosystem services of parks in Central European cities. *Urban Forestry & Urban Greening*, *30*, 84-97.

Appendix A

This appendix shows the list of flora and fauna identified on sight at the K-buurt. Species that have been indicated by an orange cell have not been identified specifically, but the larger group of species was. The table shows the Latin name, the English name, and the commonality of the species.

K-buurt:					
Species (latin name)	Category	English name		Category	English name
Plants:			Animals:		
Plantago coronopus	relatively common	Buck's-horn Plantain	*Celastrina argiolus*	common	Holly Blue
Capsella bursa-pastoris	common	Shepherd's purse	*Adelidae*	-	fairy longhorn moths
Taraxacum officinale	common	Common dandelion	*Pica pica*	common	Eurasian Magpie
Oenothera	-	Evening primrose	*Acridomorpha*	-	grasshoppers
Trifolium pratense L.	common	Red clover	*Lasius niger*	common	black garden ant
Trifolium repens L.	common	White clover	*Coloeus monedula*	relatively common	western jackdaw
Papaver rhoeas L.	common	common poppy	*Columba palumbus*	common	common wood pigeon
Papaver dubium	common	Blindeyes	*Ichneumonidea*	-	ichneumon wasps
Achillea millefolium	relatively common & incidental import	Yarrow	*Coccinellidae*	-	ladybugs
Centaurea jacea	common	Brown Knapweed	*Heteroptera*	-	true bugs
Glechoma hederacea	common	Ground-ivy	*Bombus hypnorum*	common	tree bumblebee
Galium aparine	common	Cleavers	*Bombus terrestris*	common	buff-tailed bumblebee
Jacobaea vulgaris	common	Ragwort	*Bombus lapidarius*	common	Large red-tailed bumblebee
Cirsium arvense (L.)	common	Creeping Thistle	*Larus argentatus*	common	european herring gull
Cirsium vulgare (Savi)	common	Spear Thistle	*Parus major*	common	great tit
Vicia villosa	relatively common	Fodder Vetch	*Cyanistes caeruleus*	common	Eurasian blue tit
Lamium album	common	White Dead nettle	*Urophora cardui*	common	thistle fly
Anthriscus sylvestris	common	Cow Parsley	*Apis mellifera*	common	honeybee
Galium verum	common	Yellow Spring bedstraw	*Syrphidae*	-	hover flies
Galium mollugo	common	Hedge-bedstraw			
Alliaria petiolata	common	Garlic Mustard - Alliaria petiolata			
Ulmus	-	Elm			
Silene dioica (L.)	common	Red campion			
Crataegus	-	Hawthorn			
Acer campestre	common	Field Maple			
Silene latifolia Poiret	common	White campion			
Matricaria	-	Chamomile			

Centaurea cyanus	relatively common	Cornflower			
Hypericum perforatum L.	common	Perforate St John's-wort			
Potentilla anserina	common	Silverweed			
Daucus carota	common	Common Carrot			
Grasses	-	Grasses			

Appendix B

This appendix shows the target species that were chosen from the field research identification (appendix A) and NDFF database research.

Intended species. Improving habitat services of IGS at K-buurt, Bijlmer, Amsterdam.								
Distance 250 m (NDFF)	Latin name	Dutch name	English name	Distribution	Habitat	Food source	Notes	Remarks from evaluation (will appear or not)
Insect	Anania hortulata	Bonte brandnetelroller	Small magpie	Europe and North America		Stachys, mint and nettle		will appear (common species)
	Celypha lacuna	Brandnetelbladroller	Dark strawberry tortrix	in the Palearctic realm	along woodland fringes, verges, grassy fields and hedges	nettles		will appear (common species)

	Evergestis extimalis	Bruingerande koollichtmot	Gall fly	Palearctic	Brassicaceae species	brassica species		will appear (common species)
	Chrysopilus asiliformis	Geelpootschubsnipvlieg	little snipefly	Most of Europe	various environments, as scrubs, woodland edges, wetlands and gardens			will appear (common species)
	Camptogramma bilineata	Gestreepte goudspanner	yellow shell	Europe and east across the Palearctic to the Altai Mountains	forest and open lands, as well as in wet and dry places			will appear (common species)
	Tephritis hyoscyami	Grijze distelboorvlieg		Palearctic		thistles		will appear (common species)
	Noctua pronuba	Huismoeder	Large yellow underwing	Palearctic				will appear (common species)
	Urophora stylata	Speerdistelboorvlieg		Throughout Europe East to Japan		thistles		will appear (common species)

	Clepsis dumicolana	Kleine klimopbladroller		Spain, France, Italy, Belgium, the Netherlands, Germany, Switzerland, Austria, Slovenia, and the Near East		ivy		will appear (common species)
	Lucilia	Lucilia	Green bottle fly	Worldwide				will appear (common species)
	Ephemeroptera	Eendagsvliegen	Mayflies	Worldwide	Mayfly nymphs tend to live in streams, but some can also be found in still waters. Most common in waters that are cool, clean and at the edges of lakes near the shore. They like to burrow into the substrate in areas with sediment deposits.	Detritivore or herbivore		Will appear (common species)
Arthropod	Salticus scenicus	Huiszebraspin	Zebra spider	Northern Hemisphere		predator, eats insects		will appear (common species)

	Philodromus	Philodromus	Spider	Europe	sunny places on herbs, bushes and trees, broad-leaved, mixed and coniferised woods, thickets, hedgerows and scrub.	predator, eats insects		will appear (common species)
	Araneus diadematus	Kruisspin	European garden spider	Europe and North America		predator, eats insects		will appear (common species)

	Pisaura mirabilis	Kraamwebspin	nursery web spider	Europe	wet environments, such as wet meadows, lowland moors, salt marshes, dunes, the edge of forests, and wet hedges. It inhabits all strata, from the ground to the top of trees, but are not found under rocks or in caves.	predator, eats insects		will appear (common species)

Mollusca	Arion rufus	Rode wegslak	Red slug	Western Europe	garden, agricultural field, woodland, meadows, margins of water bodies, coastal habitat, and moorland	detritus eater	trade-off with garden, food for some birds	will appear (common species)
	Cornu aspersum	Segrijnslak	garden snail	Europe	fruit trees, vegetable crops, rose bushes, garden flowers, and cereals, rotting plant material and on occasion will scavenge animal matter	detritus eater	trade-off with garden, food for some birds	will appear (common species)
Pollinator	Bombus (terrestris/lucorum/magnus/cryptarum)	Aardhommel-groep	Bumblebee	latitudes and altitudes of temperate climates	nest underground, choosing old rodent burrows or sheltered places, and avoiding places that receive direct sunlight that could result in overheating.			will appear

	Vanessa atalanta	Atalanta	Red admira	North Africa, the Americas, Europe, Asia, and the Caribbean	moist woodlands	stinging nettle (Urtica dioica), Buddleia and overripe fruit		will appear
	Celastrina argiolus	Boomblauwtje	Holly blue	Palearctic		Ivy, Ilex, Evonymus, Rhamnus, Robinia, Genista, Spartium, Astragalus, Rubus, Erica, Pyrus and many other plants		will appear

	Maniola jurtina	Bruin zandoogje	meadow brown	Palearctic		rough meadow grass (Poa trivialis), smooth meadow grass (Poa pratensis), Adults feed on nectar from a wide spectrum of plants including Centaurea, Cirsium, Leontodon, Erica, Rubus		will appear

	Gonepteryx rhamni	Citroenvlinder	common brimstone	Europe, Asia, and North Africa	wetlands	two species of buckthorn plants as host plants for its larvae	hibernates as butterfly	will appear
	Aglais io	Dagpauwoog	European peacock	in Europe and temperate Asia		stinging nettle (Urtica dioica), hop (Humulus lupulus), and the small nettle (Urtica urens	hibernates as butterfly	will appear
	Vanessa cardui	Distelvlinder	painted lady	any temperate zone	sunny, brightly lit, open environments and are often attracted to open areas of flowers and clovers	Asteraceae species, including Cirsium, Carduus, Centaurea, Arctium, Onopordum, Helianthus, and Artemisia		will appear
	Autographa gamma	Gamma-uil	Silver Y	Europe and North Africa	a wide variety of habitats, particularly open areas	a wide variety of low-growing plants		will appear

	Polygonia c-album	Gehakkelde aurelia	comma butterfly	Europe, North Africa, and Asia	low-density forests with sunshine and moist soil	Urtica dioica, Ulmus glabra, Salix caprea, R. uva-crispa, and Betula pubescens		will appear
	Osmia cornuta	Gehoornde metselbij	European orchard bee	From Portugal through southern and central Europe, North Africa	early-blooming herbs	in the settlement area		need specific plant
	Pieris brassicae	Groot koolwitje	large white butterfly	Europe, North Africa and Asia	wild and cultivated crucifer, oil-seed rape, cabbages, and Brussels sprouts.	large, open spaces, as well as farms and vegetable gardens		will appear

	Pieris rapae	Klein koolwitje	small white	Europe, Asia, and North Africa	herb Cruciferae – Arabis glabra, Armoracia lapthifolia, Armoracia aquatica, Barbarea vulgaris, Barbarea orthoceras, Barbarea verna, Brassica species		hibernate in dark sheltered locations.	will appear

	Aglais urticae	Kleine vos	small tortoiseshell	Temperate Europe, Asia Minor, Central Asia, Siberia, China, Nepal, Sikkim Himalayas in India, Mongolia, Korea and Japan	common nettle	all kinds of open natural and semi-natural environments: meadows, wastelands, gardens and urban parks		will appear
	Lasioglossum leucozonium	Matte bandgroefbij	sweet bee	North America, Europe, Asia, and parts of northern Africa	yellow-flowered Asteraceae like Hieracium caespitosum, Krigia biflora, Rudbeckia hirta, creeping thistle (Cirsium arvense), Campanula and Rosa, Cornus alternifolia.	open habitats, normally on sandy or chalky soil	solitary bee	need specific plant
	Osmia bicornis	Rosse metselbij	mason bee	Europe, northern Africa, and western Asia	zoophilous and anemophilous plants including oak, maple, poppy and buttercup plant	wooden buildings, pithy or hollow stems, thatched roofs, snail shells, and man-made artificial nests	solitary bee	need specific plant

	Bombus lapidarius	Steenhommel	bumblebee	Central Europe		prefer open terrain	bumblebee	need specific plant
	Andrena bicolor	Tweekleurige zandbij	Gwynne's mining bee	Europe, North Africa and the Middle East	bell flowers	from calcareous grassland to open woodlands	solitary bee	need specific plant
	Bombus pratorum	Weidehommel	Early bumblebee	Europe and parts of Asia		fields, parks, scrubland, and sparse forest	bumblebee	need specific plant
	Colletes daviesanus	Wormkruidbij	Plasterer bee	East and South of the Netherlands	Tanacetum vulgare, Senecio jacobaea, Pulicaria dysenterica, Solidago virgaurea, Matricaria recutita	walls of loamy grooves, roadside embankments or banks of streams, but also between the roots of a fallen tree	solitary bee	need specific plant
Birds	Sylvia curruca	Braamsluiper	lesser whitethroat		eats insects	thick bushes (brambles etc.)		not
	Pica pica	Ekster	Magpie				opportunist, eats everything	maybe
	Garrulus glandarius	Gaai					opportunist, eats everything	maybe

	Apus apus	Gierzwaluw			eats insects		can be helped with special nesting boxes	will appear
	Regulus regulus	Goudhaan			pine/fir trees, eats seeds (pine nuts)			need specific plant (pinus)
	Sylvia communis	Grasmus			insect eater			not
	Dendrocopus major	Grote bonte specht			insect eater, also pine/fir nuts, needs big trees			maybe
	Prunella modularis	Heggenmus			insect eater			maybe
	Passer domesticus	Huismus			eats seeds			need bird house
	Acrocephalus scirpaceus	Kleine karekiet			needs reed in water	wetland		need specific plant (reed)
	Parus major	Koolmees	Great tit		insect and seed eater			need bird house
	Turdus iliacus	Koperwiek			berries and insects and worms etc.			maybe
	Turdus merula	Merel	Blackbird		berries, earth worms			maybe
	Luscinia megarhynchos	Nachtegaal	Nightingale		insect eater			not
	Cyanistes caeruleus	Pimpelmees	Blue tit		insect and seed eater			need bird house

	Erithacus rubecula	Roodborst			insect eater			maybe
	Sturnus vulgaris	Spreeuw			opportunist, eats also insects			need bird house
	Aegithalos caudatus	Staartmees			insect eater			maybe
	Phylloscopus collybita	Tjiftjaf			insect eater			maybe
	Regulus ignicapilla	Vuurgoudhaan			seed eater			need specific plant
	Troglodytes troglodytes	Winterkoning			insect eater			maybe
	Motacilla alba	Witte kwikstaart			insect eater			maybe
	Turdus philomelos	Zanglijster			eats snails			maybe
	Sylvia atricapilla	Zwartkop			insect eater			maybe
	Asio otus	Ransuil			eats small mammals		needs big territory	maybe
	Accipiter nisus	Sperwer			eats birds, similar area needs			maybe
Mammals	Erinaceus europaeus	Egel	Hedgehog		eats snails and earthworms	grassland/lawns		will appear (offer hunting area)

	Pipistrellus pipistrellus	Gewone dwergvleermuis			small insect eater	hunts around trees	profits from plant biodiversity	will appear (offer hunting area)
	Pipistrellus sp. Indet.	Gewone dwergvleermuis			small insect eater	hunts around trees	profits from plant biodiversity	will appear (offer hunting area)
	Eptesicus serotinus	Laatvlieger			small insect eater	hunts around trees	profits from plant biodiversity	will appear (offer hunting area)
	Pipistrellus nathusii	Ruige dwergvleermuis			small insect eater	hunts around trees	profits from plant biodiversity	will appear (offer hunting area)

Appendix C

This appendix lists the exact questions that interviewees were asked during the interviewing sessions.

Part 1: Usage

1. Do you use this green space or not?
- How often do you come here?
  - How long do you often stay here?
- What are other green spaces you would go to in the neighbourhood?
  - Why do you come to this site instead of going to other green spaces?
- **Do you pass by this green space?**
  - What is the destination?

2. How do you get from home to this green space?
- How long does that take?
- Do you think it is easy to reach here?

3. Do you come alone, or do you meet other people here?
- How do you like to do that?

Part 2: Perception

1. What do you enjoy here?
- What aspects of this space are related to that?

2. What aspects you do not like here?
- What aspects of this space are related to that?

3. Are there any changes you would like to see? (Spatial aspects)
- Such as what? / do you mean by …?
- Why do you like to make this change?

Part 3: Recognition of CES:

I will show you a list of cultural activities, could you please let me know if **it's a place for you to do some of those activities:**

- Experiencing the diversity of plants & animals
  - E.g. do you feel or see rich plans and animals?
- Watching plants or animals
- Enjoy the beauty of nature
- Experience cultural heritage, sense of place
  - E.g. do you connect to this place, do you think here has some cultural meaning?
- Environmental education
  - E.g. identify plant species, or understand the value of the natural environment.
- Being inspired by nature
  - E.g. when you are here you feel being inspired and new ideas come to you.
- Walking the dog
- Walking, strolling
- Meeting people

- Picnicking, barbequing
- Gardening

Doing other activities in nature

others, (please specify……)

Part 4: Participants' characteristics

Can we ask you some questions about your personal information? Also, please avoid providing answers if you feel uncomfortable.

1. Gender

Female
Male

2. Age

Younger than 20
20-40
40-65
65-80
Older than 80

3. Occupation

Student
Employed
Retired
Unemployed
Others

4. Education

Secondary education (HAVO/VWO)
Secondary vocational education (MBO)
Polytechnic education / higher professional education (HBO)
Academic education (WO)
- Bachelor
- Master
- PhD

Not applied

Appendix D

A complete transcription of the interview with Dr. Jorine Noordman, black is the interviewer, red text is Ms. Noordman, black text is the interviewer.

1. Dan is de opname nu volgens mij gestart.

2. Ja, ik zie hem lopen.

3. Alright top dan ga ik beginnen met wat vragen.

4. Ik heb overigens ook nog dat het ontwerp zelf in een van de documenten openstaan, mocht je daar naar willen verwijzen oid.

5. Dat is handig.

6. Okee nou, dan wil ik eerst een beetje vragen naar de lokale context.

7. Dus je bent wel bekend, zoals je eerder aangegeven met het gebied Zuidoost en met de groene infrastructuur daar. Dus met oog daarop, hoe denk je dat een dergelijk gebied een dergelijke groene locatie zou passen binnen dat deel van Amsterdam (Zuid-Oost)?

8. **Ja precies. Nou, Ik denk dat deze op zich goed past, zeker gezien Zuidoost, echt hele grote groene vlakken heeft en daartussen veel hoogbouw.**

9. Tenminste voorheen was het heel veel hoogbouw. Het wordt steeds minder, maar aan de andere kant ondertussen wel weer heel veel. Dus Ik denk dat het wel een goede start is, zeker.

10. **En de doelsoorten die je hebt gekozen, denk ik ook.** Dat die daar zeker voor zouden komen, dat **twijfelen over de sperwer zelf. En de laatvlieger vind ik ook nog heel lastig hoor.**

11. **Die sperwer, die denk ik wel van ja, die heeft toch wel echt een wat groter bos nodig dan dat hij nu in op de op de tekening heeft op het ontwerp.** Maar ik denk dat de rest zeker Daarvoor kan komen. Misschien met wat aanpassingen toch ook wel echt een plek kunnen krijgen hier In het ontwerp.

12. OK, Dat is wel aan te horen. Ik weet inderdaad van die sperwer, ik heb met een aantal doelsoorten geprobeerd een wat optimistische blik te houden, en getracht met het ontwerp en het aantrekken van andere soorten om soorten als de sperwer aan te trekken vanuit omliggende gebieden zoals de Bijlmerweide

13. Had jij ook wel overzichtskaartje van hoe het groen om het gebied dat je gekozen hebt heen vertakt?

14. Dat heb ik nu niet nee, ik stel inderdaad wel voor dat het als een soort van springplank ecosysteem kan dienen.

15. Ja precies.

16. Dus dan is het inderdaad Misschien wel handig om die context te visualiseren.

17. Ja, dat denk ik wel, al is het Alleen al met de lijnen of met, nou ja pijltjes dat je aangeeft dat die groene structuren met elkaar verbonden zijn. Of dat die vegetatie met elkaar verbonden is en als je denkt dat het dat er een soort van knelpunt optreedt tussen jouw gebied en bijvoorbeeld de Bijlmerweide. Kan je ook nog aangeven van. Ik stel voor dat ze In het gebied daarnaast ook wat aanpakken om die verbinding toch wel te maken.

18. Ja.

19. Volgens mij had ik die link meegestuurd van de hoofdgroenstructuur.

20. Ja klopt.

21. Daar kan je denk ik wel optekenen of nou ja op aanhaken. Dat is zeg maar altijd het eerste wat ik doe. Als ik naar zo'n gebied kijk van, OK, waar zijn de grote groenstructuren en waar kan ik op aanhaken? En dat teken ik heel simpel met pijltjes.

22. Ja precies

23. Maar ik denk dat dat zeker om dat verhaal om dit sterker te maken een goede zal zijn.

24. Dat is een goede tip, want Ik heb het inderdaad In het begin van mijn scriptie had ik dat wel. Ik heb ooit een keer zo'n plaatje geschetst voor mijn begeleider om dus te motiveren waarom bepaalde soorten waarom het nuttig zou zijn, dus dat kan

25. Ja super.

26. Alright, Als we dan toch bij de soorten zitten. We hadden het dus even over dat het best aannemelijk is dat een aantal van die soorten hier hun plekje kunnen vinden. Daar haakte ik wel een beetje op in met het deel zijn van een groter habitat en niet het habitat zijn an sich.

27. Maar Er zijn wel een aantal interventies die voorstelt dat zoals nestkasten en insectenhotels bijvoorbeeld. Vooral dan insectenhotels nou insecten hebben niet zo'n heel groot habitat nodig, dus dat zal wel goed zitten, maar vooral met die nestkasten. Denk je dat dat aannemelijk is dat dat bijvoorbeeld vogels hier echt hun nest zullen maken?

28. Kom straks nog terug op het insectenhotel, maar ja, Ik denk zeker dat er vogels zijn die hier in dit gebied als je daar een nestkast ophangt dat ze daar op afkomen als de rest van het habitat goed ingericht is. Betekent niet dat alle vogels die je hebt gekozen überhaupt in een nestkast zitten.

29. De Merel bijvoorbeeld die gaat dan niet in een nestkast zitten. Volgens mij had je dat wel opgeschreven, maar die bouwt echt zijn eigen nest, die heeft echt een bos nodig, of hij doet het in een houtwal of heel soms een lage struik of zelfs op de grond.

30. Oké.

31. Maar die gaat niet in een nestkast zitten, maar als je zorgt dat die structuren van nou ja lage struiken boom vegetatie er is, dan zou die er zeker komen, maar dan ook **alleen als er voedsel zit. Dus dan moet je inderdaad dan ook voor zorgen. Dat er slakken zitten dat er wormen kunnen komen dat er genoeg insecten zitten. Nou ja, dat heb je in principe wel gedaan met andere doelsoorten.**

32. Maar bijvoorbeeld de Merel is ook wel eentje die heel erg in de bodem op de bodem aan het scharrelen is en bodemdiertjes zoekt.

33. Ja.

34. Dus ik dacht, Misschien is dat nog een mooie om mee te nemen dat je echt de bodemdiertjes meeneemt In het algemeen. Ik zou, ik weet niet of je ze allemaal moet specificeren dat ze ook wel weer heel erg lastig, maar in ieder geval dat er een gezonde bodem ontstaat. En dat je misschien blad laat liggen?

35. Ja.

36. Ook bessen en fruit noten zaden. Nou ja, voor de merel dan vooral bessen en fruit zijn belangrijk. Die ze zeg maar laat in de winter nog kunnen eten, dus die zijn wel belangrijk, vooral ook omdat de Merel echt wel in Nederland blijft, dus waarschijnlijk ook op die plek blijft zitten, moet je zorgen dat hij of zij In het najaar ook en in de winter ook genoeg eten kan vinden.

37. Ja en Ik denk dat je dan In het plan gebied zoveel mogelijk dichte struiken en lage bomen en Misschien klimop bijvoorbeeld is echt zo'n plant waarin, nou ja, bijvoorbeeld de Merel echt wel een huis kan vinden, maar inderdaad waar spinnetjes en dergelijk, genoeg eten en voedsel te vinden is en ook juist in dat late najaar. Want nu staat de klimop ook in bloei.

38. Als je, nou ja, specifieke soorten beplanting aangeeft, denk ik dat je daarmee wel een concreter ontwerp krijgt.

39. Ja.

40. Ja, Dat is inderdaad is ook een afweging geweest om het om het niet te groot te maken, Maar het is inderdaad wel gewoon echt belangrijk om dus die specificatie aan te geven, in ieder geval bij sommige soorten.

41. Ja, dat denk ik wel. Sommige soorten zullen echt het gebied niet inkomen als je die soorten er niet hebt zitten, ik denk dat we daar straks nog wel op komen.

42. Voor de sterkte dus?

43. Ja, misschien is het nog wel goed om door te gaan op de vogels bijvoorbeeld de pimpelmees die zit wel in nestkasten, wel specifieke afmetingen qua holtes, maar ik weet niet of je zover een zo diep erop in wil gaan. Maar ook in boomholtes dus. Nou ja, die kan ook wel in combinatie met de bomen.

44. Ja.

45. Hij zit wel specifiek bij oude loofbomen In de buurt, het liefst dus. Nou ja, Misschien dat je dan meer in dat oude gebied gaat zitten en dan wel gebruik maakt van jou habitat om daar eten te zoeken.

46. Ja.

47. En, je zou een specifieke bomen kunnen aanplanten voor de mees, omdat die daar op een of andere manier toch het meest op gezien wordt. Volgens mij was het een berk en een haagbeuk. Ook wel veel gezien bij riet, Omdat ze daar ook echt vooral in het najaar kleine insecten uithalen.

48. Ja.

49. En die spinnen (doelsoort) komen daar dan wel weer in terug denk ik dat die combinatie mooi is want koolmeesjes eten, of meesjes in het algemeen die eten graag spinnetjes larve en dan komen die bodemdieren misschien ook wel weer goed terug.

50. Ja.

51. En ja de Zwaluw ook volgens mij de gierzwaluw. Die heeft eigenlijk niet zo heel veel nodig, maar wel de nestkast. Ja of een holte in een berg, maar kan me niet voorstellen dat je dat voor elkaar krijgt in Zuid Oost. Als er maar genoeg voedsel In de buurt is.

52. Volgens mij hebben we een kaart voor gierzwaluwen waar ze nu nestelen in de stad. Maar die vind ik nogal lastig, want volgens mij is vooral het centrum meegenomen en Zuidoost wat minder, aangezien er kennelijk heel veel vogelaars In het centrum zitten. Maar daar hebben ze heel mooi. De kilometerhokken aangegeven, dus hebben ze echt geteld van zoveel zitten er daar zoveel zitten er daar, echt heel Amsterdam geteld.

53. Ja.

54. Maar ik denk wel dat hij daar zit en anders komt ie hier heel graag insecten halen. Aangezien Zuidoost echt wel veel vliegende insecten heeft in verband met het water. En de grote groengebieden eromheen, dus er zitten veel nachtvlinders vlinders sowieso. Maar verder heeft die Zwaluw eigenlijk niet zo heel veel nodig, aangezien die de hele dag In de lucht zit of in zijn nestkastje.

55. OK. Ik had bij hem een beetje ook het waterlichaam in acht genomen, omdat ik de zwaluwen vaak herken als in van “oh, dat is een plek waar vliegende insecten vaak zitten.”

56. Ja.

57. Dus dat dat een goede toevoeging zou zijn om hem (gierzwaluw) echt te stimuleren om te komen, want bij het weide oppervlakte is er nu wel, maar het is de bedoeling dat dat op een gegeven moment een beetje volgroeid dan dat dat een beetje weg gaat, dacht ik, dan hou ik dat deel over.

58. Hetzelfde geldt voor de vleermuizen.

59. Ja zeker.

60. Ik op de lijst staan dat zij (vleermuizen) die open ruimtes meer nodig hebben om te foerageren.

61. Ja.

62. Dus dat was ook een beetje hetzelfde bij dat water ook dat riet wat daar dus omheen zit om een soort van schuilhoek te maken, Maar dat sluit allemaal dus goed aan voorlopig.

63. Ja zeker, Ik denk dat dat riet heel goed aansluit en zeker ook voor de kleine karekiet, die zit ook echt alleen maar In het riet, moerassen gebied. Nou ja, dat is ook echt wel Zuidoost die daar om bekend staat. En of het nou eenjarig rietjes of meerjarig riet, vindt hij volgens mij niet zo heel erg vervelend. Ja, hij zit in slootjes, poldervaarten dus op zich kan die (kleine karekiet) hier wel heel goed zitten. Als het een goeie rietkraag is met een beetje lekkere waterkwaliteit, dan komt hij daar zeker en dan zullen er ongetwijfeld ook genoeg insecten zijn die die daar kan pakken.

64. Ja, denk je dat die die rietkraag zoals die nu is, groot genoeg is voor de doelsoorten of dat het handig is om die uit te breiden? Er wordt daar nu dan echt een hoekje gecreëerd met dikke begroeiing als een soort haag, om het echt af te scheiden van de weg. Maar dan vroeg ik me dus af of dat riet heb ik nu een beetje gebruikt om dus dit een soort van toevluchtsoord te maken voor wat dan ook, maar gebruik wil maken van het Van het water om dat een beetje af te scheiden van de mensen.

65. Ja nee, Ik denk dat dat (schuilplaats) sowieso heel goed is. Ik denk dat hij (kleine karekiet) hier sowieso wel in gaat zitten. Ik vind de schaal een beetje lastig te lezen, maar Als ik de wegen zo'n beetje inschat denk ik dat het zeker groot genoeg is.

66. Oké.

67. Ik vond…, waar is het noorden op deze tekening?

68. Het noorden is de onderkant van de tekening

69. Even kijken hoor, dan zou ik idealiter gezien. Oh ja, wil ik die hele oever van het grote water zeg maar tegen het riet aan. Dus aan de noordzijde die de meeste zonuren krijgt. Die zou ik echt als een natuurvriendelijke oever inrichten, waardoor je nou ja veel riet krijgt, maar ook veel waterplanten waar dan weer heel veel insecten op afkomen. Ik denk dat dat de best georiënteerde kant is en dat je daar ook echt wel de meeste doelsoorten mee kan bedienen met zo'n natuurvriendelijke oever. Die is eigenlijk goed voor alles. En, daar kan dan ook het meeste tegenaan gaan groeien.

70. Maar voor, zoals die nu staat hoe je hem getekend hebt, vind ik hem ook wel heel krachtig, Maar ik zou zeker die oever ook meenemen.

71. Oké. De tekening is ook gemaakt van wat er in een keer toegevoegd zou kunnen worden. Dit zou dan aangeplant worden allemaal. En riet gaat natuurlijk op een gegeven moment wel zijn eigen weg zoeken.
72. Dus in die zin zou de oever dan ook, en dat is ook een belangrijk thema binnen het ontwerp, Novelty en verandering dus dat het de ruimte krijgt om in z'n natuurlijke vorm te groeien en te veranderen over de tijd. Ook om zo te proberen informaliteit van de ruimte te behouden.

73. Ja. Dat zou ik zeker zo laten, en misschien ook dat je die oever dan glooiend maakt. Dat het echt zo nou ja, natuurvriendelijke oever noemen we het, wordt en daar groeit sowieso ongetwijfeld binnen no time heel veel aan. Ik snap inderdaad dat je die wel nou ja, aanplanten dat riet de rest zal zeker groeien. Maar de bedoeling dat je hem echt gloeiend aanlegt, is dus denk ik wel een hele belangrijke zeker aan die kant. De andere kant hoeft minder glooiend te zijn. Zeker Omdat dat meer de recreatie kan, dan wordt denk ik.

74. Ja. Ik had inderdaad al de glooiende oever voorgesteld. Dat was vanuit mijn ogen was het meer voor de veiligheid. Zat het, zeg maar, mocht er een kind of een hond invallen, dat die gewoon eruit kan lopen, in principe. Maar het is mooi om te weten dat het dus ook ecologisch een belangrijk aspect is om te helpen met het stimuleren van de groei

75. Ja jazeker.

76. Nu we de tekening toch voor ons hebben, zie je dat gekrabbel bovenin?

77. Ja

78. Omdat ik dat dus niet aangegeven had op de originele schets, want dat is zoals het nu is met die bomen die daar al staan. Het zijn meestal zijn grote loofbomen, sommige wel ja 15 20m bijna. Het is dus wel de bedoeling dat daar dus ook weer met verloop van tijd om de natuur zijn gang te laten gaan en langzaam die natuurlijke progressie van de natuur over het weiland wat nu echt kaal gras is. Dat het de bedoeling is dat dat langzaam uitbouwt en dat er dus ook meer ruimte komt voor die dichte struiken waar dan bijvoorbeeld de merel en de koolmezen en dergelijke voordeel van hebben.

79. Ja nou ja zeker. Ja lijkt me een goeie.

80. En dan het derde wat er nu aan toegevoegd is de oranje stippellijn, dat is zoals ik het opgezet heb, is dat een verkennings pad.

81. Ja leuk.

82. Vooral voor kinderen bedoeld. Het is natuurlijk niet uit te sluiten dat volwassenen dat ook gaan gebruiken.

83. Dat sluit ook aan op de structuur in het midden, die vleugel vorm. Mijn grootste zorg met dat pad is dat het te intensief gebruikt gaat worden. En dat het dan gaat zorgen voor verstoring van de soorten die
84. hun rust zoeken in juist dat wat wildere gebied.

85. Ja precies.

86. Hoe denk jij dat die impact zou kunnen zijn of hoe je dat het best mitigeert?

87. Ik denk dat het perfect is dat je er een pad doorheen hebt gelegd en dat je de rest eigenlijk een beetje met rust laat. Als je ervoor zorgt dat. Nou ja, dat. Dat wat steviger wordt neergezet, zodat ze er niet snel doorheen kunt lopen, dus misschien zelfs met vervelende prikkel planten of wat dichtere struiken, zodat je zorgt dat die kinderen er niet doorheen gaan rennen en kruipen. Dan denk ik dat dat wel heel erg meevalt.

88. Ja, dus, ik zou hem ietsjes groter maken, meer bomen, meer struiken meer, ja echt doorns.

89. Ja dus ook wel aanplanten ook weer?

90. Ja en misschien nog voor de sperwers. Ik vind hem sowieso moeilijk de sperwer hoor, maar misschien dat je in plaats van alleen loofbomen nog wat naaldbomen kan aanplanten. Een sperwer, houd wel van jong bos, maar zeker ook wel van naald bomen. En ja, hij kan in de stad zelfs in tuinen zitten Als het echt wel rustig is, dus het zou eventueel kunnen. Maar dan een larix of een spar, Dat is echt wel nou ja, een boom waar die sperwers op en in gaan zitten en zelfs in kunnen nestelen. Als dit dan uitgroeit tot een wat volwassener bos, dan denk ik dat hij daar eventueel nog wel in kan zitten. Al zal die misschien sneller de Bijlmerweide verkiezen. Maar het zou eventueel eigenlijk kunnen en zeker als hier genoeg meesjes en merels en lijsters zitten, dus genoeg voedsel dat hij (de sperwer) dit echt wel als een habitat kan gaan zien.

91. Ja dan denk ik dat we van, dus dat pad echt in de natuur kunnen we een beetje over op de synergieën tussen mens en natuur.

92. Oh ja, dat is nogal oh, dan heb ik misschien nog wel een goede combinatie. Sorry, mijn hoofd draait echt overuren als ik eenmaal begin met creatieve dingen. Om het pad en de natuur te scheiden kan je ook denken aan houtwallen, voor de gebieden waar dieren echt rust nodig hebben. Daar gaan nachtvlinders bijvoorbeeld inzitten sowieso heel veel insecten. Daar kunnen ook wel weer andere vogels in gaan broeden en zich verschuilen. Maar ik denk dat je dan ook een soort van hek maakt, waardoor ze er niet makkelijk doorheen kunnen. En Hij is ook nog ecologisch aantrekkelijk en zorgt weer voor voedsel voor bijvoorbeeld de vleermuis en de gierzwaluw die die vliegende insecten wil eten. Maar dat had ik echt wel opgeschreven. Van maak houtenrillen, takkenrillen. Die hagen die je aan de andere kant hebt zitten zijn al een super goed voorbeeld, maar deze rillen zouden weer net een andere habitat ondersteunen.

93. Het kan allerlei vormen aannemen, maar er zit hier zitten echt gigantisch veel motten in en vlinders. Die gaan hier ook overnachten, dus dit is echt wel een goeie om mensen uit die rustpunten te houden.

94. Ja precies, ik denk ook dat deze wallen een beetje de functie van de ecokathedraal kunnen over nemen, ik weet niet of je die gezien had tussen de interventies? Want die is eigenlijk uit het definitieve ontwerp gelaten.

95. Ja zeker, Maar ik denk dat die stenen ecokathedraal oo zeker een goeie toevoeging is, Omdat daar weer hele andere diersoorten in gaan zitten.

96. Ja.

97. En een soort die ik eigenlijk helemaal niet heb met meegekregen hierin waar dat kan dat ik dat gemist heb in mijn drukke agenda waren de amfibieën, kikkers en padden. Die maken zeker gebruik van deze poel. Maar ik denk dat als je die ecokathedraal zo bouwt, dat er op de grond holtes open blijven, dat ze daar ook zeker in gaan zitten in de winter. Dus Ik denk dat dat in combinatie een hele mooie toevoeging is.

98. Ja nee, die amfibie is inderdaad buiten beschouwing gelaten, ook om een beetje de scoop te beperken zodat ik iets meer detail kon stoppen in dus vooral de arthropoda en de vogels.

99. Ja snap ik.

100. Ook omdat we het idee hadden dat die het makkelijkst aan te trekken zijn. Het makkelijkst heen en weer kunnen gaan tussen locaties dat het voor amfibieën toch wat lastig is, ook omdat het omgeven wordt door weg.

101. Ja precies.

102. Dat is wat riskanter. Hetzelfde geldt voor dus de kleine zoogdieren, dus de egels en dergelijke, dat vormt toch wel een risico.

103. **Ik denk dat dat meevalt. Het zijn niet hele grote snelle wegen en best wel, nou ja, makkelijk oversteekbaar, zeker 's nachts. Als die verbindingen van het groen er goed in zitten, dan hebben ze hier niet zo heel veel moeite mee. En in combinatie met de bijlmerweide die hebben we echt speciaal aangelegd voor de ringslang en die ringslang. die eet heel veel kikkers en padden, dus we hebben In de bijl maar wijde maar ook verderop in de Gaasper Zoom hebben we heel veel poelen aangelegd juist om die amfibieën te trekken, dus ik denk dat er heel veel amfibieën In de buurt zitten.**

104. Ja nou bij waarnemingen kwamen ze inderdaad wel voor. De ringslang was ook ooit deel van de doelsoorten, maar leek toch te ambitieus.

105. Denk ook niet dat de ringslang hier per se heen zal gaan. Die heeft echt wel veel meer rust nodig, dus die zal in de Bijlmerweide blijven zitten.

106. Maar ik denk dat die kikker populatie wel makkelijker uitwisseling kan hebben en dat stel in de Bijlmerweide vallen er heel veel poelen droog, maar hier niet. Nou ja, heb je een soort back up voedsel voor de ringslang. Dat klinkt heel lullig, maar het klopt wel.

107. Okee, even binnen de synergiën blijven, hoe denk je verder in dit in dit ontwerp? Hoe de interactie tussen mensen en natuur eigenlijk de habitat ecosysteemdiensten kan hinderen. Dus hoe kun je HES en CES tegelijkertijd laten plaatsvinden zonder dat ze elkaar te veel storen?

108. Nou ja, Ik denk dat je er sowieso al goed over na hebt gedacht in waar de wandelpaden lopen en dat je echt natuur en recreatie redelijk goed gescheiden hebt. Ik denk dat de keus voor bijvoorbeeld het pad, want volgens mij had je een een pad van snippers hout, snippers aangeraden. Ik denk dat dat een hele goeie is om het niet te asfalteren, maar het echt als een natuurlijk product houden, zodat dat nou ja met elkaar kan leven, Maar ik denk ook dat, want die Bijlmerweide is, zeg maar echt natuur natuur, in de stad wel, maar een veel natuurlijker bos en dan is dit meer educatief. Meer in de wijk groen dus die combinatie van educatie recreatie denk ik dat dat wel een hele goeie is, zodat je echt mensen in de buurt laat leren dat natuur heel belangrijk is, dus die ecosysteemdiensten voor de wijk kunnen hier heel groot zijn. Kinderen kunnen hier in spelen.

109. Er zijn niet echt soorten zoals de ringslang die heel erg moeilijk zijn die niet zo goed tegen verstoring kunnen, dus de soorten die je hebt uitgekozen, denk ik dat die hier ook wel kunnen en dat die gewoon ook wel echt in een woonwijk en in een recreatie gebiedje minder verstoord worden en minder gevoelig daarvoor zijn. Dus dat zou heel erg goed zijn. En in combinatie met die poel, het bos en dat paadje door alles heen, volgens mij zelfs een klimboom, denk ik dat dat is.

110. Ja.

111. Nou heel leuk. Dat het een speelterrein is op een natuurlijke manier en dat dat heel goed samen kan.

112. Okee, Dat is fijn om te horen.

113. Dan zou ik nog heel even kort naar die klimstructuur kunnen gaan. Dat is een beetje wat meer op de creatieve kant geschoven. Het is vlakbij de Metrohalte kraaiennest, dus ik dacht iets in die trant met een vleugel te ontwerpen. Maar dat is inderdaad ook wat meer een natuurlijke structuur waar ook weer insecten in kunnen kruipen of waar volgen vinden, terwijl het ook interactief is voor kinderen.

114. Maar wat ook een beetje de bedoeling ervan is, omdat het vanuit het bos richting het pad gaat, wat ook de natuurlijke progressie van de begroeiing vanuit dat bos zou moeten zijn over de tijd, dat mensen een soort van visuele indicatie hebben waaraan ze de natuurlijke progressie kunnen zien. Dus dat de structuur langzaam maar zeker steeds meer opgeslokt wordt door de flora vanuit het bos gebied.

115. Ja dit lijkt me een leuke oplossing.

116. Een ding wel van het de natuur z'n gang laten gaan, wat een zorg was, is dat Mensen het te wild gaan vinden en daarmee misschien oncomfortabel gaan vinden of zich minder veilig gaan voelen in bepaalde gebieden. Hoe denk jij dat dat zit? Het is een hele brede vraag natuurlijk…

117. Nee, Maar ik snap wel nee, ik snap precies wat je bedoelt hoor. Wij krijgen geregeld klachten over dat er kruiden te hoog staan dat er teveel bosjes staan, zeker de combinatie recreatie en struiken in Zuidoost moet ik eerlijk zeggen, trekt ratten aan omdat er veelal voedsel is waar kinderen spelen of waar mensen zitten. En Als we ratten zien, dan leiden ze dat niet van 'Oh, dat komt omdat wij daar eten neerleggen, Maar dat is van oh gatver wat is het hier smerig, dus de bosjes moeten weg.' Dat is een onveilig gevoel.

118. Ik merk dat als je dingen laat aankomen, waaien of op z'n beloop laten gaan dat er meestal wel een klacht komt van sommigen doelgroepen. En die doelgroepen wonen voornamelijk echt wel hier in Zuidoost. Die vinden dat hun kinderen niet buiten moeten spelen, want dan worden ze vies. Maar juist die doelgroepen hebben er heel veel baat bij om hier juist wel in op te groeien. Dus er zit een hele moeilijke lijn in.

119. Maar ik denk dat je met beheer heel veel kan doen. Het liefst wil je dat er heel veel komt aanwaaien dat wat juist heel erg goed is, want dan gaan de planten die er zouden willen groeien juist daar groeien en dat is dan weer goed voor de inheemse soorten die dan ook daar in dat gebied voorkomen. En, je zou daar gewoon je maaibeleid op aan kunnen sluiten, dat je sommige stukken wel kort maait en andere stukken wat meer laat verruigen en dat het een soort kruiden laag naar de bomen toe wordt. En dat je nou ja een deel wel en een deel niet in patronen maaien waardoor de ene keer wel wat gemaaid is en de andere keer niet waardoor je de mens wel laat zien Dat er onderhoud gepleegd wordt, Maar dat je niet in één keer alle dingen die er staan wegneemt voor de natuur. Maar dat je langs de paden dat je zeg maar wel 1 m echt continu blijft maaien en naar de bomen en de struiken toe dat je daar al wat minder maait en af en toe wel wat uit maait. Denk ik dat dat al heel veel kan helpen als je ook zorgt dat dat klimstel goed bereikbaar is en niet helemaal dichtgroeit en de paden een beetje goed onderhoudt

120. Daarom vond ik het ook heel krachtig dat je prullenbakken voorstelt. Want hoe meer prullenbakken en zeker die afgesloten prullenbakken waar geen kraaien en ratten in kruipen, maar ook geen mensen die flesjes verzamelen in kunnen. Of rekken aan de zijkant doen zodat mensen niet in de prullenbak hoeven graaien om flesjes te verzamelen.

121. Het is goed dat je erover na hebt gedacht dat er zo min mogelijk afval is en ook voor bijvoorbeeld de egel die daar heel erg gevoelig voor. Ze zijn een beetje dom en raken snel verstrikt in verpakkingen en touwtjes. Egels en afval zijn echt een dodelijke combinatie.

122. Daar moet je met maaien ook op letten, want egels blijven gewoon liggen en kunnen dan mee gemaaid worden. En ook de glooiende oever is goed voor de egels zodat ze makkelijk het water uit kunnen, want daar vallen ze vaak in.

123. Okee.

124. Die glooiende oever is ook voor de libellen. Je hebt de libellen als een soort gekozen.

125. Ja klopt.

126. Maar die overgang van het water en het land is heel erg belangrijk voor Libelle, zodat ze eruit kunnen. Die leggen hun eitjes In het water. Dan kruipen die larven na een tijdje via rietstengel omhoog. Daar gaat ie eventjes zitten drogen en dan vliegt hij als libelle weg. Die combinatie is heel hard nodig, want anders gaat er geen libelle zitten.

127. Precies.

128. Ja top Dat is ook was ook een deel van het ja beheer dus inderdaad van, dat is ook weer die balans tussen hoe informeel hou je het, hoe formeel maak je het?

129. Ja.

130. Maar ja die maai patronen die je kan toepassen, maar dus ook die prullenbakken die dus wel geleegd worden door de gemeente en dat er wel af en toe iemand aanwezig is zodat mensen kunnen zien dat er wel degelijk onderhouden wordt.

131. En datzelfde geldt waarschijnlijk ook voor dat Community plein wat erbij zit. Het is wel echt voor mensen bedoeld. Dat is dus ook wel de bedoeling dat daar niet allemaal troep op de grond komt te liggen wat dan vervolgens weer de natuur in kan waaien.

132. Nee precies.

133. Dat is eigenlijk het meest schrijnende wat je nu ziet. De locatie is eigenlijk 1 grote zwerfafval vanger.

134. Ja, Ik denk ook wel dat als het een community plein is en zeker in Zuidoost worden best wel veel doelgroepen die graag buiten zitten met de hele familie. Dus Als je zorgt inderdaad dat iedereen daar zou kunnen zitten en een bankje heeft om daar te kunnen picknicken of barbecueën of whatever. Dat je zorgt dat het een buurtplein wordt en een Community plein, Maar dat ze zich ook verantwoordelijk daarvoor voelen, dan houden ze het meestal ook wel schoner.

135. Ja precies dat je een bepaalde eigenschap of noem je dat, eigendom gevoel?

136. Ja.

137. Ja als ze voelen dat het van hun is, dan zullen ze het toch ook sneller opruimen dan dat ze er even van gebruik maken en daarna weer weggaan.

138. We zien ook dat er een soort van samenwerking, bijvoorbeeld het wijkcentrum.

139. Ja, ja, dat zou zijn, dat zou helemaal top zijn.

140. Ja, daar ben ik al een keer langs geweest en daar heb je meestal van die van die Mensen die daar inderdaad heel erg aan verbonden zijn en als die zich verantwoordelijk voelen. Nou dan zijn ze net hun moeder die met slippers achter iedereen aan zitten die een troep maakt. Dus ik denk dat het heel waardevol is om deze mensen erbij te proberen te betrekken.

141. Ik had er nog wel eentje, die moet ik nogmaals aardhommel. gaat niet in een insect hotel zitten. Die gaat echt de grond in muizen holtes, mollen gangetjes, dus je zou een heuvel kunnen aanleggen, een soort van glooiing waardoor ze daar makkelijk in kunnen zitten. En dan die kruiden zijn heel erg belangrijk.

142. Zo een insectenhotel is interessant en ik zou me ook zeker in dit ontwerp laten zitten voor de educatie, want mensen kunnen zien dat er wat gebeurt. Maar de volgens mij 80% van alle bijen zit überhaupt onder de grond en de rest ja zal toch in die rietstengels eerder kruipen dan in zo'n insectenhotel. Maar k heb ook genoeg insecten hotelletjes hier op mijn balkon, maar ook In de volkstuin, Omdat ook leuk is om te zien. Maar heel erg

succesvol is het niet altijd, alhoewel mijn hele ding zit vol dus. Je hebt niet alle insecten daarvoor laat ik het zo zeggen en zeker de aardhommel niet die die gaat niet daarin zitten die gaat in groepjes van nou volgens mij 10 tot 150 exemplaren onder de grond zitten. En, hij kan niet zelf graven, dus hij maakt gebruik van oude holtes van andere beesten. En dan zijn die bodemdieren weer heel erg belangrijk, zoals de mol.

143. En Misschien dan nog als we het toch over de bodemdieren hebben, de rupsen die een vlinder die legt meestal zijn eitjes op bepaalde waardplanten en die zijn heel erg belangrijk. De grootste waardplant is een brandnetel, niet heel fijn tussen de kinderen, maar wel een hele belangrijke en de Atalanta, had jij volgens mij?

144. Ja klopt.

145. Als vlinder soort die zit standaard op de brandnetel dus die ook zeker laten staan en ik denk juist dat dat je kinderen daar wel weghoudt uit die bosjes dus dat is ook prima natuurlijk. Ik denk dat je de brandnetels kan gebruiken als barrière.

146. OK.

147. En zeker omdat brandnetels snel op te voedselrijke grond gaan groeien, zal dat bij die bosjes al sowieso gebeuren.

148. Ja ja, ze staan er nu ook al ja.

149. Ja precies, dus Ik denk vooral niet maaien en weghalen, maar nou ja, accepteren dat ze er zijn en er blij mee zijn dat ze de rust behouden in die bosjes, maar ook dat die vlinder en die rups tevreden zijn.

150. Volgens mij hadden we het daarvoor al bij de merel over fruit.

151. Ja, de bramen en dergelijken

152. Ik denk dat dat nog wel een hele leuke combinatie kan zijn. Zeker in Zuidoost is er veel behoefte aan voedselbossen en pluktuinen en die Atalanta die houdt van rottend fruit In het najaar, omdat er dan wat minder planten zijn die nog bloeien en Hij is een nectar en stuifmeel, nou ja, nectar minder daaruit kan halen dat dat rottend fruit echt wel een belangrijke rol kan spelen in die populatie.

153. Ja verder heb je op de vlinderstichting als je daar de Atalanta opzoekt daar staan de waardplanten sowieso in. Ook de planten waar die het meest op gezien wordt, staan daar, maar ook de habitat plekken. Nou heeft een Atalanta best wel een uitgebreid habitat, niet heel veel voorkeur, maar er staan sowieso hele mooie plaatjes op. En, Ik denk dat je hem heel makkelijk kan inzetten van, nou ja, die Atalanta die komt voor op dit soort plekken zolang het maar nectar rijk is. Ik vind dit soort plaatjes altijd fijn en zeker als het om wat specifiekere vlinders gaat, vlindersoorten. Nou ja, dat je dan aan de onderkant heel makkelijk kan zien wat hun habitat is en waar ze voor komen.

154. Zo zie ik deze vlinder, die heb ik al zo vaak ergens in geplaatst.

155. Ja, ja, Ik heb me ook wel gekozen, deels omdat die gewoon heel makkelijk is, maar toch mooi eruit ziet en mensen waarderen vlinders sowieso. Dat voelt altijd meteen heel heel prettig, prettig gevoel krijgen mensen ervan.

156. Ja zeker weten. Vlinders, hommels ook bijen wat minder.

157. Ja precies, Maar ik heb het idee dat ook wel een beetje aan het veranderen is dat mensen dat meer gaan waarderen.

158. Ja, dat denk ik wel.

159. Maar ook dat daar dus educatie een grote rol kan spelen, om mensen te leren dat ze niet zoveel te vrezen hebben van de natuur. Dat is ook waar ik die insecten hotels een grote rol in zie pakken. Om mensen te leren over hoe de natuur echt in elkaar steekt.

160. Ja, want ik denk dat dat nu Zuidoost ook wel een dingetje kan zijn. Dat er Mensen zijn die gewoon niet of nooit het belang bij gehad hebben om daar iets over te leren of gewoon geen interesse in hebben getoond en daarmee ook wel een beetje angstig kunnen zijn.

161. Dat merk ik echt wel hoor. Ik heb twee jaar in Zuidoost gewerkt als openbare ruimte ontwerper en alles was smerig, vies eng. En verder hadden ze niet het idee dat ze daar zelf aan bijdroegen qua vervuiling en rommel, maar er was geen een beest wat nuttig zou kunnen zijn, want alles wat krioelde was vies.

162. Ja precies.

163. Ik vond het altijd heel bijzonder, maar ook wel weer ergens een uitdaging van. Nou ja, ik moet ook zeggen dat Zuidoost niet meer het Zuidoost is van toen. Er wordt zoveel bijgebouwd en er komen zoveel mensen bijwonen dat het gewoon ook echt wel een gemengd gebied is geworden.

164. Ja heel.

165. En daar ook wel meer mensen zijn die dit soort dingen juist wel kunnen waarderen en in combinatie met die voedselbos plekken dus misschien dat je nog echt wel een voedselbos achtig iets ervan kan maken. Niet Alleen voor de mens, maar ook voor de dieren is dat denk ik een hele belangrijke dat er genoeg voedsel aanwezig is. Maar dan krijg je wel een soort van community plekken.

166. Ja dat is inderdaad zo. Dat is ook een van de interventies was inderdaad een permacultuur aanbrengen. De kritiek die ik in mijn eigen hoofd had was dus dat het dan wel weer zorgt voor heel veel inmenging van mensen in zo een gebied wat dan ook voor dieren bedoeld is. Nou is natuurlijk het idee van een voedselbos dat Mensen met de natuur interacties hebben.

167. Maar ik denk dat dat op zich wel prima kan hier, zeker een rondom die community plek. Dan zullen er heel veel rupsen zijn die die kolen op gaan eten, maar ik denk niet dat ze daar heel erg mee zitten.

168. Nee. Je hebt inderdaad bij dat Community plein dus dat groene hoekje, waar ik eigenlijk niet zo heel goed van wist wat ik er nou mee aan moet, want nu is het gewoon gras. En kan ik me heel goed voorstellen dat mensen daar gewoon gaan zitten picknicken of iets dergelijks. Dat is natuurlijk prima, ook omdat het echt in die hoek zit van oké, dit is helemaal voor de mensen, leef je daar uit in nabijheid van de natuur. Ik denk namelijk dat dat niet groot genoeg is om een beetje iets van fruitbomen neer te zetten.

169. Fruitbomen kunnen daar zeker wel staan, denk ik. Ja en dan zijn het er maar 3. Dat is zeker een overweging waard.

170. Juist inderdaad de randen zijn daarvoor heel erg makkelijk, die zijden helemaal met fruitbomen kunnen doen om alleen al het gebiedje af te bakenen, maar inderdaad ook aan de noordzijde bij dat Community plein. Ik denk dat als je daar 3 fruitbomen neerzet, dat dat ook echt wel een trekker kan zijn, maar op het plein zelf misschien ook al.

171. Er staan nu dus die plantenbakken, het idee van die plantenbakken is wel dat ze te verplaatsen zijn dus dat je het plein voor meerdere functies kan gebruiken. Dat je bijvoorbeeld ook de plantenbakken allemaal naar één kant kan schuiven om een soort van afgebakend stukje voor een privé

aangelegenheid kan maken. Hetzelfde geldt voor de tafeltjes en de stoelen die daar staan. Dat die wel verplaatst kunnen worden. Om meer functies uit het plein te kunnen halen, ook als er bijvoorbeeld optredentjes of iets dergelijks gegeven wordt.

172. Ja precies nee, dat vond ik heel krachtig. Ik ben meestal niet zo'n fan van plantenbakken, omdat die veel onderhoud vergen en snel uitdrogen. Maar toen dacht ik, ja, dit is ook wel echt een community plein, dus dan moet dit hier gewoon kunnen en een beetje groen is dan beter dan helemaal niets.

173. Wel zat ik daar nog te denken aan een pergola? Dat je een soort nou ja, plek, een intieme plek creëert niet te intiem, want dan gaan er gekke dingen gebeuren. Maar dat je daar dan druiven, kiwi 's, dingen in laat groeien die mensen zouden kunnen eten?

174. Passievruchten.

175. Ja.

176. Ja dat is geen gek idee, dat het misschien ook bij de entree zou kunnen?

177. Ja precies dan krijgt dat inderdaad ook een entree, soort van boog, met entree functie.

178. En Misschien geen pergola, want in mijn hoofd is een pergola, meteen zo een hele, ja zo'n box constructie, maar het kan natuurlijk ook in een laan er omheen zitten dat het wel open is en dat mensen daar niet nou ja, gaan drugsdealen en hangen. En waar ze echt het idee hebben dat ze daar nog wel zichtbaar zijn.

179. Ja.

180. Maar de hoogte in is en goed voor de ruimte die je hebt en daar kunnen veel dingetjes in groeien met pluk, groenten en weet ik veel wat allemaal. Maar ook qua klimaatadaptatie, dit zijn toch wel meestal de plekken waar verharding is of waar minder groen is. En Als het echt bloedheet is in de zomer wil je verkoeling en dan zou zo een pergola daar wel aan bij kunnen dragen.

181. Ja.

182. Ja zeker zoals het dus bijvoorbeeld uit het zuiden dat je bijvoorbeeld zou kunnen denken dat aan dus die zuidkant van dat Community plein, dat daar een soort van (dus ik heb er nu dus een bloemenperk zodat mensen niet zomaar denken van oh, ik kan gewoon het gebied daarin lopen) een soort van natuurlijke barrière. Dat je daar zo kan denken aan een aantal soorten van schuttingmachtige, overhellende constructies, waar wel fruit of iets dergelijks aan kan hangen. Dat het een barrière is, schaduw creëert en een plukbos tegelijkertijd is.

183. Ja precies.

184. Ik vond zelf dat het plein een beetje kaal was, ook om te zorgen dat er nog grotere evenementen plaats kunnen vinden, dus dat het niet te verkrampt wordt…

185. Ja precies nee, Daarom dacht ik inderdaad de hoogte in.

186. Ik zal eventjes een fotootje erbij gooien. Ik ben heel erg van de plaatjes en de voorbeelden en de.

187. Moet ik overigens nog een beetje meer gaan doen in mijn scriptie zelf meer plaatjes, meer visualisaties erbij.

188. Ik werk veel Samen met ontwerpers die snappen soms niet wat ik zeg. Hoewel ik zelf een ontwerper ben geweest. Die denken alleen maar in plaatjes en ik ben een beeld denker, dus dat vind ik ook het allerfijnste.

189. Ja, nee, maar zo'n idee had ik inderdaad van wat ik een beetje voor ogen (refereert aan gestuurd plaatje). Ja, Dat is zeker iets om over na te gaan denken. Het is even kijken hoe dat dan in te passen is met die multifunctionaliteit van het plein.

190. Ja. Precies.

191. En daar kan ook weer die klimop en die hop voor de dieren weer een rol spelen. Los van dat dat Misschien geen eetbare planten zijn, maar die kunnen wel weer voor groen zorgen en verkoeling. Oh, en hoop van je bier van maken. Kempering bier.

192. Ja, nou ja, iets, Ik wil inderdaad iets meer, met het zicht op ecologische zaken, de culturele zaken stimuleren. Om zo wel te zorgen dat de scriptie over de relatie tussen de twee gaat.

193. **Snap ik. Ja, Maar ik denk dat je wel echt heel ver was en bent. Dus er zitten echt wel goede dingen in. Ik vind het heel leuk dat je er zo ook over nagedacht hebt om, nou ja, toch, alles erin hebt weten te krijgen. Je hebt echt wel veel over nagedacht en je hebt echt wel veel kennis opgehaald. Dus Ik denk dat je al ver bent hoor. Ik heb meer ontwerpen gezien van echt ontwerpers die al bij ons werken die nog niet zo in het proces zaten en er niet zo over na hebben gedacht, dus op zich.**

194. Dat is een heel mooi compliment. Dankjewel.

195. Alright, Ik heb nog een laatste vraag, denk ik, over de zebrapaden. Die zijn er momenteel niet op de locatie. Op de weg in het Zuiden is wel een verhoging, waar mensen makkelijker kunnen lopen. Ik vroeg me af of jij hier meer van af weet, hoe eenvoudig het bijvoorbeeld zou zijn om de gemeente te vragen zebrapaden aan te leggen?

196. **Daar heb ik heel veel mee te maken. De kans dat ze daar wat doen is aanwezig. Meestal als er echt een community plek is, een schoolplein of een buurthuis, dan gebeurt dat wel. Openbare ruimte vind ik lastig. Ik denk dat ze daar minder happig op zijn, aar het voorstel kan je altijd doen natuurlijk. Ook kan je met inrichting al heel wat doen zodat auto's afremmen, dus bijvoorbeeld vegetatie plaatsen, bomen op een manier dat het lijkt alsof ze een tunnel in gaan, helpt ook al bij het afremmen. Dus Als je een hele grote open ruimte hebt, dan lijkt het alsof je daar 80 kan rijden of 50, maar hoe nauwer het lijkt, hoe meer mensen echt geneigd zijn om af te remmen en hoe meer obstakels zo zien, hoe beter. Dus je kan zeker voorstellen om op de stoep nog een hele rij bomen te laat plaatsen door de gemeente. Als de stoep breed genoeg is, alleen al om die vernauwing toe te staan.**

197. Maar zebrapaden ja zeker naar dat Community plein toe en zeker als dat plein ook nog misschien aan een basisschool gelinkt kan worden.

198. Er zit wel een school in de buurt, maar niet zo dichtbij dat het als een soort schoolplein gebruikt zou kunnen worden.

199. **Ja precies, maar wel een plein misschien waar ze naartoe gaan om te spelen, waar ze heen kunnen voor educatie, dan merk je wel dat de gemeente dit soort plekken eerder geneigd is om veiliger te maken. Denk dat dat wel mee kan helpen.**

200. Ja.

201. **En misschien, want ik zie nu zebrapaden in een hoek liggen, moet je nog even opzoeken wat de richtlijnen zijn voor zebrapaden? Die weet ik niet uit mijn hoofd namelijk, maar ik weet wel dat ze niet zo dicht in een hoek mogen zitten, want dan draai je de hoek om en dan heb je al iemand geschept voordat je ziet dat er iemand loopt.**

202. Ja.

203. Ik weet niet of dat misschien te veel wordt, want als je dit soort dingen uitzoekt dan kan je gewoon net zo goed bij ons aan het werk!

204. Ja, ik heb hem daar neergelegd, want er zit ook zo'n verhoging.

205. Ja, ze zijn logisch. Ik snap wel dat je hem daar legt, want het is wel het doorlopen van het voetpad. Maar het ligt toch de dicht tegen de hoek aan (refereert aan zebrapad Zuid-West van tekening).

206. Ja precies en dan hier daar achter in de hoek ligt ook een speelplaats. En hetzelfde geldt voor de andere bovenop (Zuid-Oost). Daar zit ook een grasveld met een speelplaats. Dus die connectie wilde ik ook veiliger maken met een zebrapad over het fietspad. Zo kunnen de kinderen makkelijker heen en weer gaan tussen de speelplaats en dat verkennings pad.

207. Ja precies.

208. Dan heb ik als allerlaatste vraag nog naar de tabel met synergiën tussen voorgestelde interventies. Zou je zeggen dat u het eens bent met de manier waarop die synergiën aangegeven zijn? Dus zeg maar of de plussen en minnen overeenkomen met hoe u denkt dat de interventies samen zouden gaan?

209. Ja dat denk ik wel. Ik heb ze niet zo uitvoerig bestudeerd als het ontwerp zelf, maar de manier waarop je interventies met elkaar samenwerken in het ontwerp lijken mij heel logisch. Er zijn mij eigenlijk geen dingen opgevallen waarvan ik dacht dat het echt niet, nou ja, zou kunnen werken zeg maar.

210. Oké. Nou dan ben ik door mijn vragen heen! Ontzettend bedankt voor het nemen van de tijd en gebruik mogen maken van jouw expertise. Het is waanzinnig nuttig geweest.

211. Ja graag gedaan, ik vind dit soort dingen echt super leuk om te doen. En, nou ja, mocht je nog iets specifieks willen weten, gewoon een mailtje sturen en als je klaar bent met de scriptie, wil ik het graag zien, want het lijkt me heel leuk.