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HAARLEMMER POCKETS

*DESIGNING KOEPELPLEIN AS A COOLING, RESTORATIVE
POCKET PARK CONNECTED TO LOCAL HERITAGE*

MAARTJE FRENCKEN



HAARLEMMER POCKETS

Designing Koepelplein as a cool, restorative pocket park connected to local heritage

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ABSTRACT

Many Dutch cities lack easily available public green spaces, in Haarlem green spaces in the city center are well hidden and restricted by opening hours. This thesis will look into the creation of a pocket park for Koepelplein in Haarlem as public green space. The project is an example of how small scale projects, in leftover areas, can add to the green infrastructure in the city.

The thesis is guided by the following research question: *How can the design of Koepelplein as pocket park in the historical city center of Haarlem contribute to a more publically available green structure for the neighborhood which can cool down the city, increase the mental and physical wellbeing of inhabitants, and incorporate the local character and heritage in the design?*

The final design for Koepelplein created in this thesis shows how a connection to local heritage can be made through using similar materials and form language. The design also shows that the site can be used as restorative space if it is connected to other pedestrian friendly spaces, if it contains green and and blue spaces, and if both places for rest and social activity are supported. Finally it shows that the addition of big vegetation structures such as trees have a positive effect on cooling down the site, making it a more comfortable space to be used on hot summer days.

INTRODUCING THE PROJECT

CHAPTER 1: INTRODUCTION

THE INTEREST IN GREEN CITIES

1.1 CONTEXT

The current trend in city planning seems to be to increase the amount of green in urban areas. In recent decades the understanding of the positive impact that green and blue infrastructure has on urban life has gained much ground. It increases biodiversity in the city, it can mitigate some of the effects of climate change by cooling down the city and managing stormwater, and it has a positive effect on the mental and physical wellbeing of people (Natuur en Welzijn & Sweco, 2024). The interest in greening our cities becomes clear when looking at recent news articles, many of them highlight the benefits of green cities and showcase new green projects and the interest people have in them. Some headlines are shared in figure 1.1.

The interest in green cities is shared by both

individuals, organisations and municipalities. Many of the municipal visions that have been constructed in recent years state that increasing blue and green infrastructure is one of the main goals. Some examples include the vision of the municipality of Breda; it aims to increase green surface area by greening public space and making the city more climate adaptive, sustainable, healthy, and accessible for everyone. The goal is creating spaces that invite people to meet and move (gemeente Breda, 2021); The vision by the municipality of Zwolle states that having a robust bluegreen network is essential for having a healthy living environment, and that it is one of the basic values that directs the future of the municipality (gemeente Zwolle, 2025). On a national scale guidelines have been created that should help municipalities in achieving

their green visions, this once again shows the importance of a healthy, green, and future proof living environment for people, wildlife, and vegetation (Rijksoverheid, 2024)

However the ambitions of green cities are in many cases still only ambitions. A recent research 'Tekort aan groen in Nederlandse steden' by Natuur en Welzijn & Sweco (2024) has shown that more than half of the neighborhoods in the 32 biggest municipalities in the Netherlands lack public green space when compared to the norm of 75 m2 public green space per address (VROM, 2006).

While new urban areas now often incorporate green spaces in their design, it is difficult to increase the amount of green spaces in

already built areas as these areas often lack the space. This is especially true in historical districts, these districts have often densified over time and can have a protected cityscape which makes changing the urban fabric a challenge.

This thesis will focus on the city of Haarlem, which is currently the most stony city in the Netherlands with an average of only 44 m2 of public green per address (Natuur en Welzijn & Sweco, 2024). This is nowhere near the norm of 75 m2. Within the city there are big disparities in the availability of public green. Some neighborhoods such as Haarlemmerhout contain large park areas; while other neighborhoods, such as Generaalskwartier, have no public green at all.

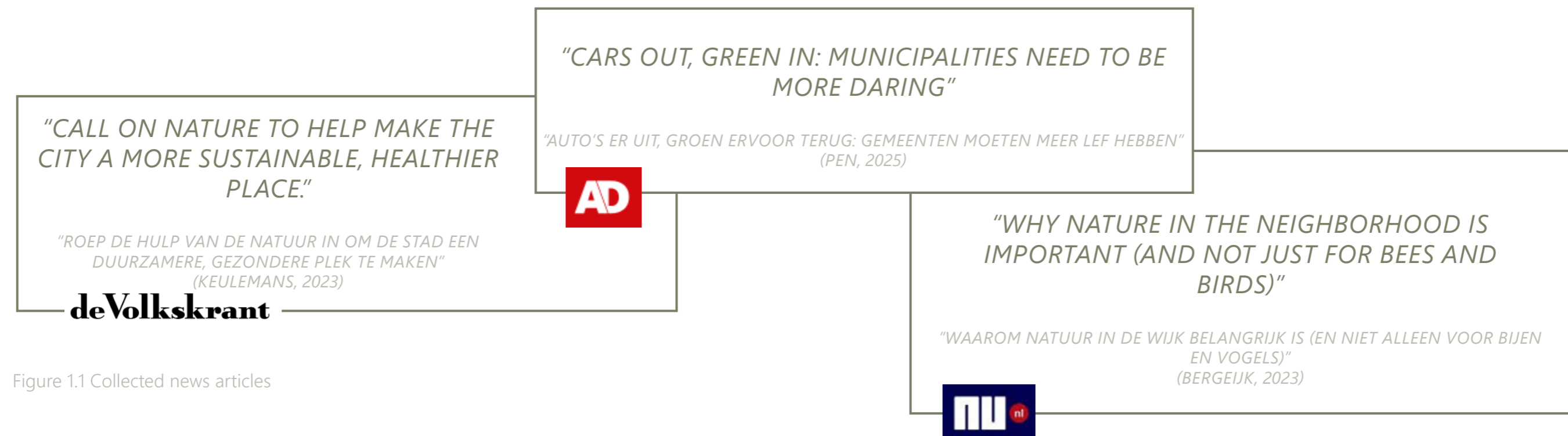


Figure 1.1 Collected news articles

AVAILABILITY OF GREEN IN CENTRUM HAARLEM

1.1 CONTEXT



Figure 1.2 Current Green Structure Haarlem

Within Haarlem, this thesis will zoom in to the district 'Oude Stad', the historical city center. This neighborhood is built up from 5 neighborhoods, none of which fulfill the norm of 75 m² public green per address as seen in figure 1.3. This figure shows that 4 out of 5 of these districts have very little public green spaces, with less than 6 m² of publicly accessible green spaces per address. This is also shown on the map in figure 1.2, which shows all green areas in the neighborhood. The Stationsbuurt, the northern part of the inner city, has some park area along the waterside, it is the only neighborhood that comes somewhat close

to the aforementioned norm. In the other districts green areas are mostly restricted to small courtyards, often hidden from view to those unaware of their existence.

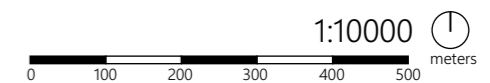
The map also shows that the neighborhood is densely built: there is little open space on street level and many of the buildings are recognized as monuments and are therefore protected, which makes adapting these buildings and streetscapes difficult. There are few accessible green spaces in the neighborhood as of right now, and the neighborhood has little space available to enhance the green structure.

	Area (m ²)	Adresses	Green spaces (%)	Green area (m ²)	Green/Adress (m ²)
Stationsbuurt	510 000	1622	20%	10 200	62,9
Bakenes	250 000	1761	2%	5000	2,8
Binnenstad	270 000	2646	2%	5400	2,0
Vijfhoek	250 000	2155	3%	7500	3,5
Heiliglanden	130 000	1093	5%	6500	6,0
Burgwal	250 000	1720	2%	5000	2,9

Figure 1.3 Public Green in Center Neighborhoods Haarlem. *Data from Gemeente Haarlem. (n.d.)*

LEGEND

- Public Green space
- Semi-Public Green space
- Private Green space



AVAILABILITY OF GREEN IN CENTRUM HAARLEM

1.1 CONTEXT

In figure 1.2 a separation is made between public, semi-public and private green spaces. Private green spaces are mostly personal gardens and backyards; they are fully private. Most of the public and semi-public green areas are maintained by the municipality and can be visited by anyone.

Figure 1.4 looks into three different parks in the historical city center in Haarlem. These parks were chosen to represent the different types of public green spaces that can be found in the city center.

Kenaupark is the largest out of these three, it is easy to find when walking through the neighborhood. Both Wijngaardtuin and Proveniersshof are more hidden as they are situated inside a building block, surrounded by the homes of people, which gives these parks the impression of being more private. The difference between them is that Wijngaardtuin seems to have been created somewhat spontaneously in the leftover space between buildings, while Proveniersshof was clearly designed to be used as a park or garden space. These parks are examples of the courtyards that Haarlem is known for, the 'Haarlemse Hofjes'.

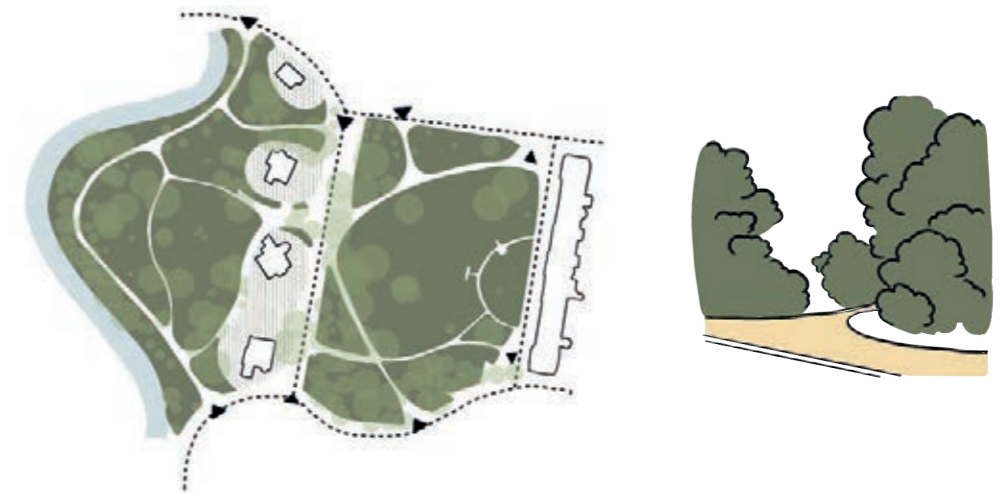
These courtyards are often centuries old, they were created by the church or wealthy benefactors for the elderly, often widowed women. While the houses along these courtyards have often been merged to make them somewhat larger, they are still inhabited. This, together with their small size, and somewhat hidden locations, makes it so that these courtyards are somewhat of a semi-public place rather than fully public. Wijngaardtuin and Proveniersshof, like many of the other courtyards, also have set opening hours. They are only open on Monday to Saturday from 10.00 to 17.00 to guarantee the inhabitants some privacy and quiet.

Figure 1.4 shows the entrances to the three chosen parks; this again illustrates the difference in publicness between these parks. Kenaupark has many entrances and the park is easily visible from the surrounding streets. Wijngaardtuin only has two entrances and these are located inside smaller alleyways, the entrances are defined by a gate, which can be closed outside of the opening hours of the park. Provenierstuin is completely hidden from the street, the single entrance to this park consists of a gate through a building, hiding the park from view.

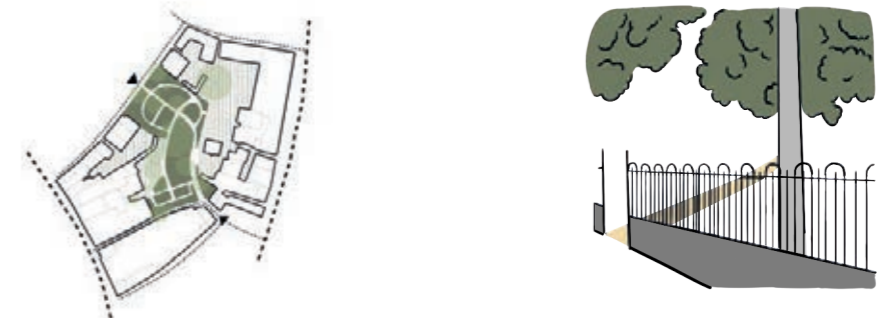
LEGEND

- (Semi-) Public Green
- Private Green
- Entrance
- Trees

Kenaupark



Wijngaardtuin



Proveniersshof



Figure 1.4 Parks in Haarlem

POCKET PARKS

1.2 LITERATURE & CASE STUDIES

There is a lack of public green space and little leftover space in the inner city center of Haarlem. This thesis will look into the creation of pocket parks as a way to add qualitative and public green spaces, without the need for big alterations to the urban fabric of Haarlem.

WHAT IS A POCKET PARK

There is much literature to be found about what pocket parks are, each with their own definition of the concept. Most sources agree that pocket parks are some kind of small urban areas accessible to the public. Blake (2016) highlights that these parks are usually created for the local population as a place of relaxation and social interaction within the bustling urban life. They also state that their extremely local scale is one of the major strengths of these parks. Pocket parks can be adapted to fit a variety of functions and local needs, such as a playground, event space, places for creativity, meeting places or relaxation spots (Blake, 2016; Babalis, 2019).

The creation of pocket parks can happen in many different ways: it can be the result of a local initiative, or part of the urban plan created by municipalities. Over the last decade several European municipalities have created strategies to create pocket parks as a way of greening the city, examples include the 100 pocket parks plan in London, and the Jardins de poche in Lyon (Labuz, 2019). One of the defining characteristics of pocket parks is their small size, however, how small these parks should be is up for discussion. Seymour (1969), one of the first people to define pocket parks, states that these urban

pockets should be less than half an acre in size, a maximum of about 2000 m². Some cities that have recently explored the creation of pocket parks, such as Copenhagen or Krakow, use more than double this size as a guideline; their planning documents state that for a park to be considered a pocket park it may not exceed 5000 m² (Labuz, 2019).

When looking at examples of pocket parks the variety in size becomes clear: Paley park in New York City is one of the most famous pocket parks, it was opened in 1967 and is only 390 m² in size. In comparison the park in Faluta/Prusa streets in Krakow that opened in 2016, is about 1600 m² in size, more than 4 times the size of Paley park (Labuz, 2019). When searching for the extremes you can find Leshan Pocket Park in Shanghai which is about 5600 m² (Archdaily, 2023) as one of the largest pocket parks, or 'the world's smallest park' Nagaizumi, Shizuoka, Japan which is only 0.24 m² (Kuta, 2025). Whether or not these parks could truly be considered pocket parks depends on the definition which is used: is there a size restriction, or is it merely a guideline, and does a pocket park need to fulfill other criteria?

The size of a pocket park can vary greatly but is mostly dependent on local factors, pocket parks are often built on leftover spaces within the urban fabric: this can be an abandoned plot, an area in front of a building or next to a street or otherwise empty or abandoned pockets (Blake, 2016). It also depends on the needs of the community and what kind of functions the pocket park should support.

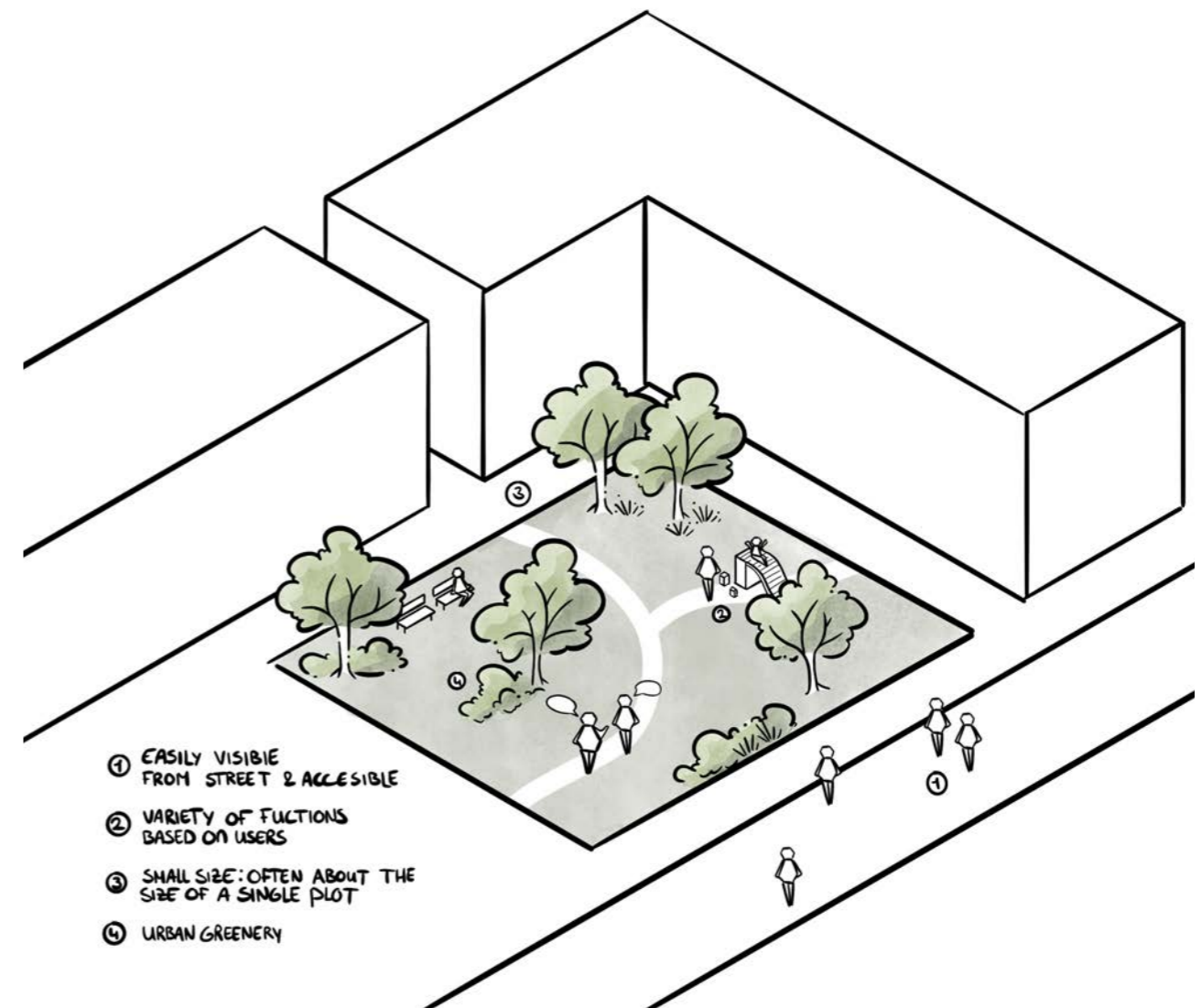


Figure 1.5 Characteristics Pocket Parks

PALEY PARK

1.2 LITERATURE & CASE STUDIES



Figure 1.6 Paley park. Image from PaleyPark.org. (n.d.).

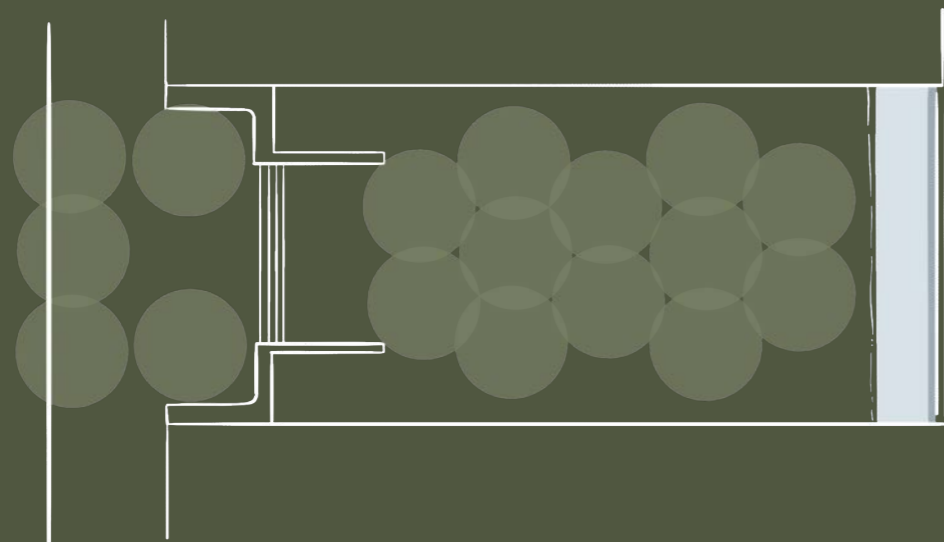


Figure 1.7 Planview Paley Park

Paley park is often seen as the first pocket park, it was created in 1967 and designed by Zion & Breen Associates. The design of this park is often celebrated and used as an example of what pocket parks should be like. The park consists of one rectangular room which is surrounded by walls on three out of four sides. The back wall consists of a waterfall which is the focal point of this pocket park. This waterfall has many purposes: it helps in regulating the temperature of the space, the sound of falling water calms people down and the water and mist is often used by children

as a play element. The waterfall is therefore a great multifunctional design element.

Other design elements include the trees whose canopy creates somewhat of a roof to the space, and the chairs designed by Harry Bertoia that can be moved by visitors, allowing them to adapt the space to their needs. The park has one open side that functions as the entrance, to separate the park from the street a small stairs was added: these steps help in defining the space and in setting boundaries (Watercube design, 2021).

RELEVANCE TO THE PROJECT

- *The design of Paley park shows how many different design elements work together to create a cohesive, usable place.*
- *It shows the importance of entrances, boundaries, flexibility in the use, and sensory interest.*

KRAKOW POCKET PARKS

1.2 LITERATURE & CASE STUDIES



Figure 1.8 Pocket park in Krakow. Image from *The city of Krakow*. (n.d.).



Figure 1.9 Locations pocket parks Krakow in 2022. Image based on *Bajwoluk & Langer (2023)*

A more recent example of the creation of pocket parks are those created in Krakow. These pocket parks were developed by the municipality in cooperation with local communities to add new, accessible green spaces to the city, something which Krakow was lacking in. They are used by residents as spots for socializing and are a way to stimulate people to go outside of their house. Many of them are also planned with the idea of providing ecological benefits: they provide flowering plants for pollinators, can help in dealing with excess rain and purify the air (Cultural heritage in action, 2023).

The first pocket park in Krakow was created in 2016, and two more parks were added the next year. The design of these parks proved to be successful and in 2018 the goal was to

build 18 new parks. Seeing the benefits these parks brought to the city the creation of these pocket parks continued (Zarząd Zieleni Miejskiej w Krakowie, 2018; translated from the original Polish with Google Translate), by now 40 different parks have been established all over the city.

The biggest challenge in building these parks was the skepticism of inhabitants, some of whom believed that the creation of these parks would increase the crime and pathological behaviour in these areas. (Nadace Partnertsví, n.d.) However, after the realisation, the opposite proved to be true: many residents are positive about the parks and regularly use them. They have succeeded in fostering a sense of community and in reducing antisocial behaviour (Cultural heritage in action, 2023).

RELEVANCE TO THE PROJECT

- *This project shows that pocket parks, which when looking at them individually are relatively small project, can have a big impact on the city.*
- *It shows that greening the city, in this case using pocket parks, is an ongoing project that can be continued based on earlier successes or adapted to other needs.*

OPPORTUNITIES AND CHALLENGES OF POCKET PARKS

1.2 LITERATURE & CASE STUDIES

CONNECTION TO LOCAL CONTEXT

One of the main characteristics of pocket parks is their locality and their connection to the local context (Blake, 2016). Designs within landscape architecture are always influenced by their context in some way: some designs aim to be fully integrated into their context, while others aim to stand out by opposing the context they find themselves in. Big city parks often attract people from all over the city. Because of their scale they can support many different activities and often consist of various areas, allowing them more independence from their context compared to pocket parks. Pocket parks are created for a very local scale. Unlike big city parks they are limited in space and lack internal amenities, therefore they often rely on nearby commercial facilities, green spaces and amenities which can increase the utilization rate of these pocket parks (Dong et al., 2023). Because of this pocket parks are often strongly integrated in their surroundings.

Patria et al. (2025) states that this offers opportunities for pocket parks to promote local culture. This connection can be further strengthened by the use of local materials, vegetation and form language. If the size of the parks allows for it, it could also provide a place for community initiatives such as events or exhibitions, in this way the more intangible parts of cultures such as certain traditions could also be given a place within the design. Using these local cultural elements can give a sense of place and identity to the pocket parks that reflect the local community (Patria et al., 2025)

COMMUNITY AND HUMAN WELLBEING

Because pocket parks are so intertwined with

their context and local community, they are to be adapted to this community. In order for pocket parks to be used, they need to be accessible and provide a sense of safety (Dong et al., 2023; Sinou, 2013). They should be easily reachable by foot and should therefore be connected to the pedestrian network. Entrances are to be inviting and easily visible, which makes it easy for visitors to find these spaces and to understand what kind of spaces they are (Sinou, 2013). Without this, the pocket parks may be mistaken for more private spaces, which leads to them becoming underused by visitors.

Pocket parks are built primarily to service people that live nearby and should therefore be adapted to the needs of local inhabitants. While this will likely be a relatively small group of people there will still be a variety of needs and wants within this local population (Blake, 2016; Babalis, 2019). Some people might be looking for a very active place: a place where the community can meet and children can play around. For these kinds of functions it is important for the park to have open spaces, possibly with some kind of play equipment. The space and activities should be inviting for people to join which requires clear sightlines from the streets and throughout the space (Sinou, 2013).

Other people might be looking for a calm resting place within the urban fabric, pocket parks could become a space for people to escape the busy urban life. Research has shown that natural places within the city can help improve mental health: they can help people calm down and regulate emotions (Liu, 2023). This use requires a different use of space compared to the activities mentioned in the previous paragraph: unlike

the more active spaces which require open space and good visibility, people looking for a resting spot may be looking for a space that is a bit more sheltered (Sinou, 2013). These places also need enough places to sit down, preferably surrounded by greenery. Resting spots like these are especially needed in areas that are generally crowded, lack greenery, and have a lot of other activities going on. As this thesis focuses on the city center of Haarlem, creating spaces like these will likely become an important part of the design.

Because of the small scale of pocket parks it is more challenging to support a wide variety of functions and it is often impossible to separate activities by creating different areas for each activity as might be done in a park of a larger scale. Even so these parks may still support various uses by using the available space efficiently, this could include having modular and multipurpose furniture which allows people to adapt the parks to their personal needs (Zhang et al., 2024).

ECOSYSTEM SERVICES

People will only use pocket parks if they offer a pleasant area to stay in. While providing various activities for people is important, a good microclimate is also needed. Pocket parks could help in decreasing the urban heat island effect and provide places with a cooler microclimate by adding vegetation, providing shade and decreasing hard surfaces (Zhang et al., 2024). Another environmental benefit that pocket parks can bring is that they can help in managing stormwater. Possible interventions are adding permeable surfaces and having areas that can temporarily store rainwater such as retention areas or bio-swells. Finally pocket parks can increase the biodiversity in the city by using local

vegetation and providing habitats and food for local wildlife (Zhang et al., 2024).

While the environmental benefits of pocket parks are somewhat limited by the size of these parks, they can still be substantial. Especially so if many of these pocket parks were to be integrated in the urban fabric and if they were to be connected with already existing greenblue infrastructure.

One additional benefit that the creation of pocket parks brings is that they could relieve the stress on large city parks by providing people with activities and resting spaces close to home. This could allow these larger parks to focus on having a more ecological function (Blake, 2016).

CHALLENGES

Aside from these benefits the creation of pocket parks also brings with it some risks and challenges, mostly related to the maintenance of the park. Pocket parks are often heavily used, which, together with possible vandalism, leads to risk of damages that will need to be repaired (Bajak, 1970). If pocket parks are created from local initiatives they are often maintained by locals themselves. These parks are at risk of falling into disrepair and being abandoned when there is a lack of interest and a lack of financial support (Bajak, 1970).

Another risk is that pocket parks that are designed to cater to various needs and for various functions, will attract different user groups, this might lead to a conflict of interest. While this can happen in any public space, pocket parks are at higher risk due to size limitations (Blake, 2016).

PROJECT AIMS AND QUESTIONS

1.3 PROJECT STRUCTURE

PROBLEM STATEMENT

Despite growing awareness of the importance of green and blue infrastructure in urban environments, many Dutch neighborhoods still fall short of meeting the norm of having 75 m² of public green space per household. This is especially true for historical neighborhoods where changing the urban fabric to add new green spaces has proven to be difficult, as these areas often have a high density, limited open space, and contain many protected structures.

This thesis will look into Haarlem, which is currently the most stone-covered city in the Netherlands. The historical city center comes nowhere near the aforementioned norm and the green spaces that do exist are mostly hidden from view. They are restricted by opening hours and are thus unknown to many people.

AIMS

This thesis will explore how the green structure of the inner city of Haarlem can be expanded, and made available to the inhabitants of the neighborhood. Due to the lack of open space in the area this research will focus on the creation of pocket parks: small, publicly accessible urban areas that can be integrated in the existing urban fabric.

The effect that pocket parks have on the urban fabric will be studied through the design of Koepelplein, a location nearby the inner city of Haarlem. The goal of this thesis is to create a design for Koepelplein that adds to the existing green structure of the city, is connected to its local context and heritage, is available for both inhabitants and visitors, has a positive effect on the physical and mental wellbeing of people, and decreases heat stress in this part of the city.

RESEARCH QUESTION

The thesis will be guided by the following research question:

How can the design of Koepelplein as a pocket park in the historical city center of Haarlem contribute to a more publically available green structure for the neighborhood which can cool down the city, increase the mental and physical wellbeing of inhabitants, and incorporate the local character and heritage in the design?

In this research question several keywords are used as shown in figure 1.10. These keywords correspond to the location of the thesis: Koepelplein in the inner city of Haarlem, and to several of the goals that are set for the design. These goals are further explored in the subquestions below:

SQ1. What is the local character of Haarlem and Koepelplein and how can this local character inspire the design for Koepelplein?

SQ2. How can the design of Koepelplein as a pocket park increase mental and physical wellbeing?

SQ3. How can the design of Koepelplein as a pocket park contribute to a cooler microclimate in urban areas?

*How can the design of **Koepelplein** as a **pocket park** in the historical city center of Haarlem contribute to a more publically available green structure for the neighborhood which can **cool down** the city, increase the **mental and physical wellbeing** of inhabitants, and incorporate the **local character and heritage** in the design?*

Figure 1.10 Research question

METHODOLOGY

1.3 PROJECT STRUCTURE

The aim of this thesis is to create a design that transforms Koepelplein into a pocket park. This process for making this design can be divided into several steps as shown in figure 1.11.

The first step in the design process is about analysing the site and its context, which is presented in chapter 2 and 3. Chapter 2 gives a first introduction to the city of Haarlem, the site, and its surroundings. The analyses in this chapter are made through a desk study using open map data from openstreet map and the municipality of Haarlem, and are supported by the impressions made during a site visit. Chapter 3 continues the studies into the local context of the site and looks into the local heritage. The chapter starts with a literature studies on the importance of incorporating heritage in a design, it then looks into two case studies in which heritage was the basis for the design. Finally this chapter looks into what local heritage is related to Koepelplein and its surroundings and gives suggestions on which heritage elements are suited to be adapted into a design.

The next step in the design process for this thesis is to create a conceptual design, the process for creating this concept is showcased in chapter 4 through various sketches. The concept is informed by the findings from the previous step. This chapter correlates to the first subquestion posed: What is the local character of Haarlem and Koepelplein and

how can this local character inspire the design for Koepelplein and Nieuwekerksplein?

Chapter 5 and 6 test the conceptual design. Chapter 5 looks into the restorative effect of Koepelplein. The site will be tested through a framework based on literature studies. Chapter 6 looks into if the conceptual design would decrease heat stress on Koepelplein. The design will be tested by simulating the site in the program ENVIMET which allows for a comparison between the current and designed situations. These chapters are related to the second and third subquestions posed: How can the design of Koepelplein as pocket park increase mental and physical wellbeing? & How can the design of Koepelplein as pocket park contribute to a cooler microclimate in urban areas?

Based on the findings from chapter 5 and 6 the conceptual design will be further detailed in regards to materiality, street furnishings and vegetation. The process of creating this detailed design is presented in chapter 7 and 8 through various sketches. The final drawings and illustrations for the design of Koepelplein are presented in chapter 9.

Finally, in chapter 10 this thesis will reflect on the created design, how it contributes to the city of Haarlem and what lessons can be learned from the design process that was used in this thesis.

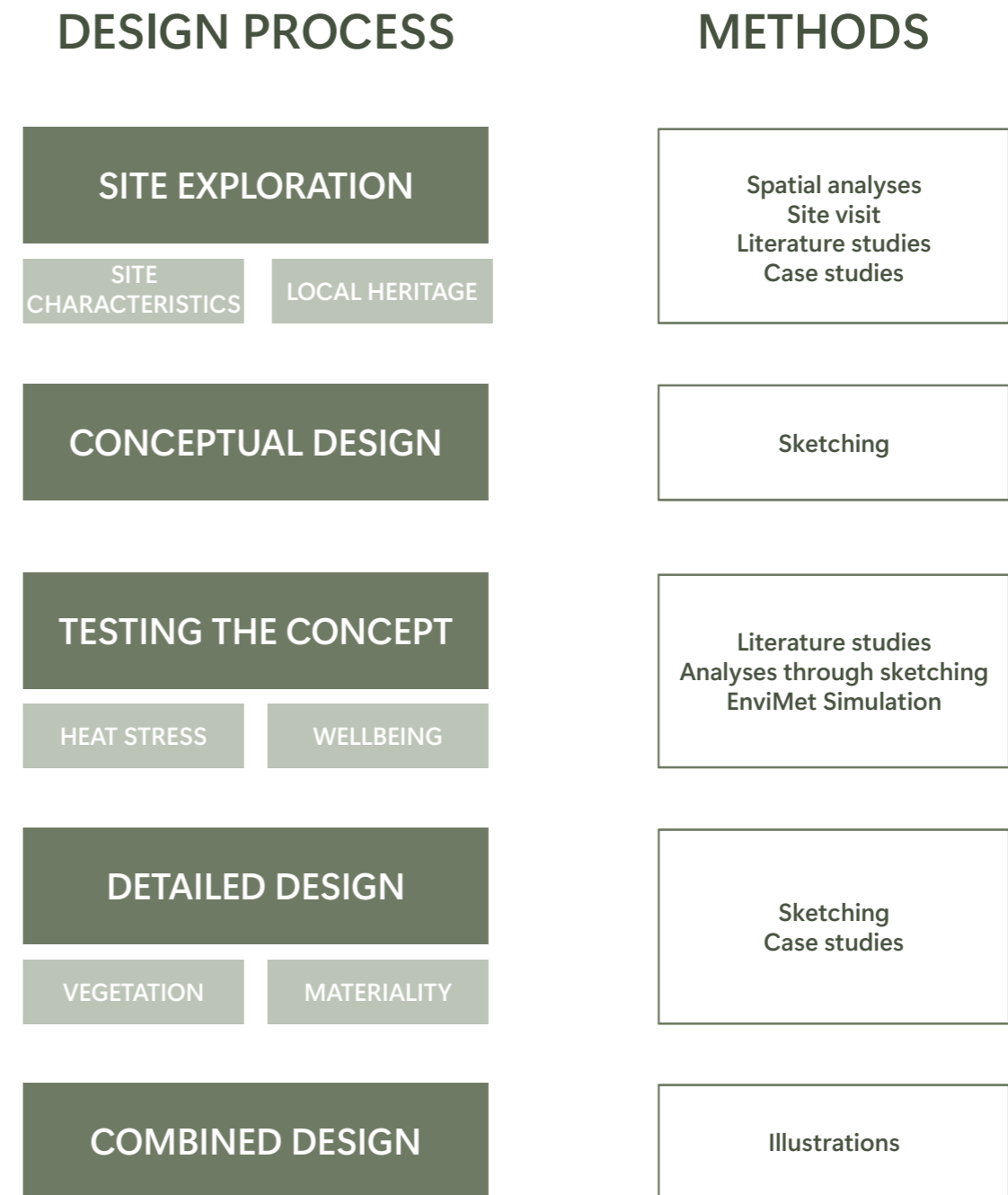


Figure 1.11 Design Process & Methods

EXPLORING KOEPELPLEIN

CHAPTER 2: ANALYSES

INTRODUCING HAARLEM

2.1 CONTEXT

OVERVIEW

As was stated in chapter 1, the location for this thesis is the historical city center of Haarlem. Haarlem is a medium-sized city in the Netherlands with about 160.000 inhabitants (AlleCijfers, 2025). It is the regional capital of North Holland and is located within the metropolitan area of Amsterdam, which is part of the economic center of the Netherlands. Most of the city and its surroundings are urbanized, the landscape surrounding Haarlem consists of dunes and clay polders while the city itself was built on an excavated sea wall. Other landscape elements that characterize the area are the bulb fields to the south of Haarlem, and the pasture lands that separate Haarlem and Amsterdam.

HISTORY OF HAARLEM

Haarlem was first mentioned in texts from the 10th century, and was given city rights in 1245. The historical city is built around the river Spaarne and the 'Herenweg', which was the main road connecting the north and south of Holland. Because of these connections and the development of the cloth, beer and ship industries the city prospered. After a cycle of recessions and prosperous periods, the first major expansion of Haarlem happened in the 17th century when the city was expanded towards the north. In the 20th century, the city was known as the painting city and city of flowers due to its central location near the bulb fields (Noord Hollands Archief, n.d.). Like many dutch cities, Haarlem rapidly expanded after the second world war; these expansions still continue to this day when increasing the

housing stock is one of the most discussed political topics.

FUTURE OF HAARLEM

In their vision for Haarlem in 2045 the municipality defines several goals for the city. The city aims to build new housing and workplaces, promote green energy, and improve the city's infrastructure, especially the infrastructure for slow traffic -pedestrians and cyclists- within the city. There are also many goals of the municipality that align with the aim of creating pocket parks that is explored in this thesis. The municipality stresses the importance of adding green and blue infrastructure to combat the effects of climate change, and create a more healthy living environment; this goal includes increasing the amount and quality of green

spaces both inside and outside of the city (Gemeente Haarlem, 2024). Creating pocket parks could be part of this development of blue and green infrastructure within the city. Another aim of the municipality is to develop the city on a neighborhood scale; they want to enhance the ten-minute network, meaning that all basic amenities should be available within a 10 minute walk or bicycle ride. Part of this goal is also to increase social interaction by providing more meeting places within the neighborhood (Gemeente Haarlem, 2024). Pocket parks would be well suited to be part of this structure.

The site chosen for this project is Koepelplein, the site lies just outside the city center of Haarlem as seen in figure 2.1.

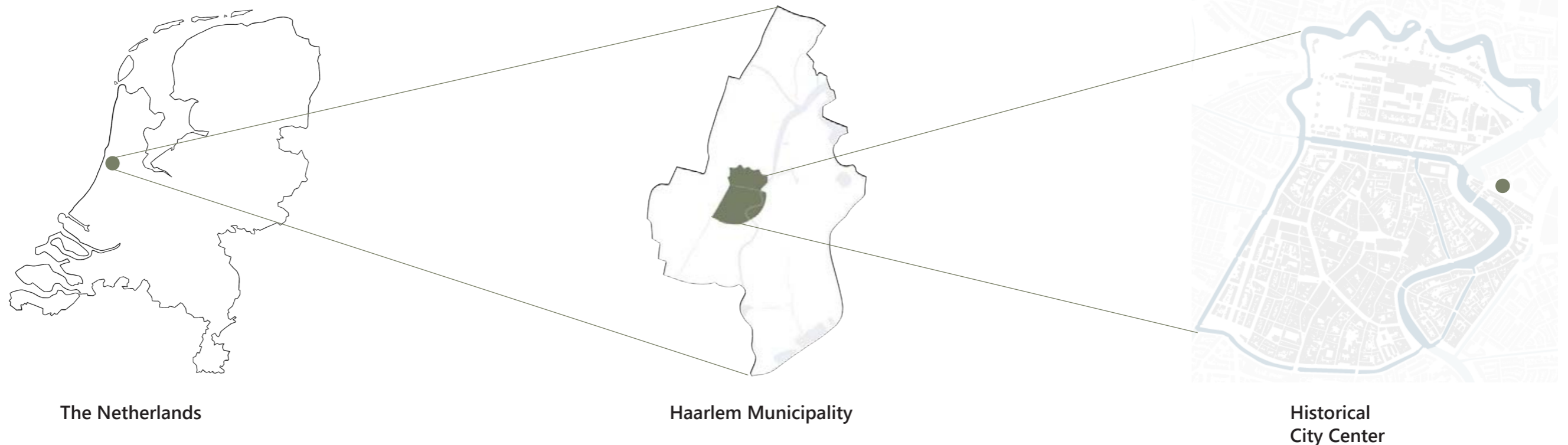


Figure 2.1 Location within the Netherlands

LOCATION CHOICE

2.1 CONTEXT

The site chosen for this project is Koepelplein, a small square in front of the Koepel, just outside of the city center. The choice for this location is based on the need for extra green spaces in the city center, and specifically in the neighborhood Burghwal. This neighborhood has currently no public green space, but there is also very little leftover space to develop, as was seen in the figures in chapter 1. Designing Koepelplein as a public green space gives more people the opportunity to visit a public green space within walking distance.

The reason that Koepelplein specifically was chosen within this neighborhood is because it is part of one of the key development projects that the municipality identifies in the municipal vision for 2045 (Gemeente Haarlem, 2024). Koepelplein is part of the development plan Spaarnesprong, which will be further explained on the next page. By choosing this location the design can incorporate other ongoing developments in Haarlem.

LEGEND

- Within 300 meters of (semi)public green space
- ◎ 100/300 meters to Koepelplein

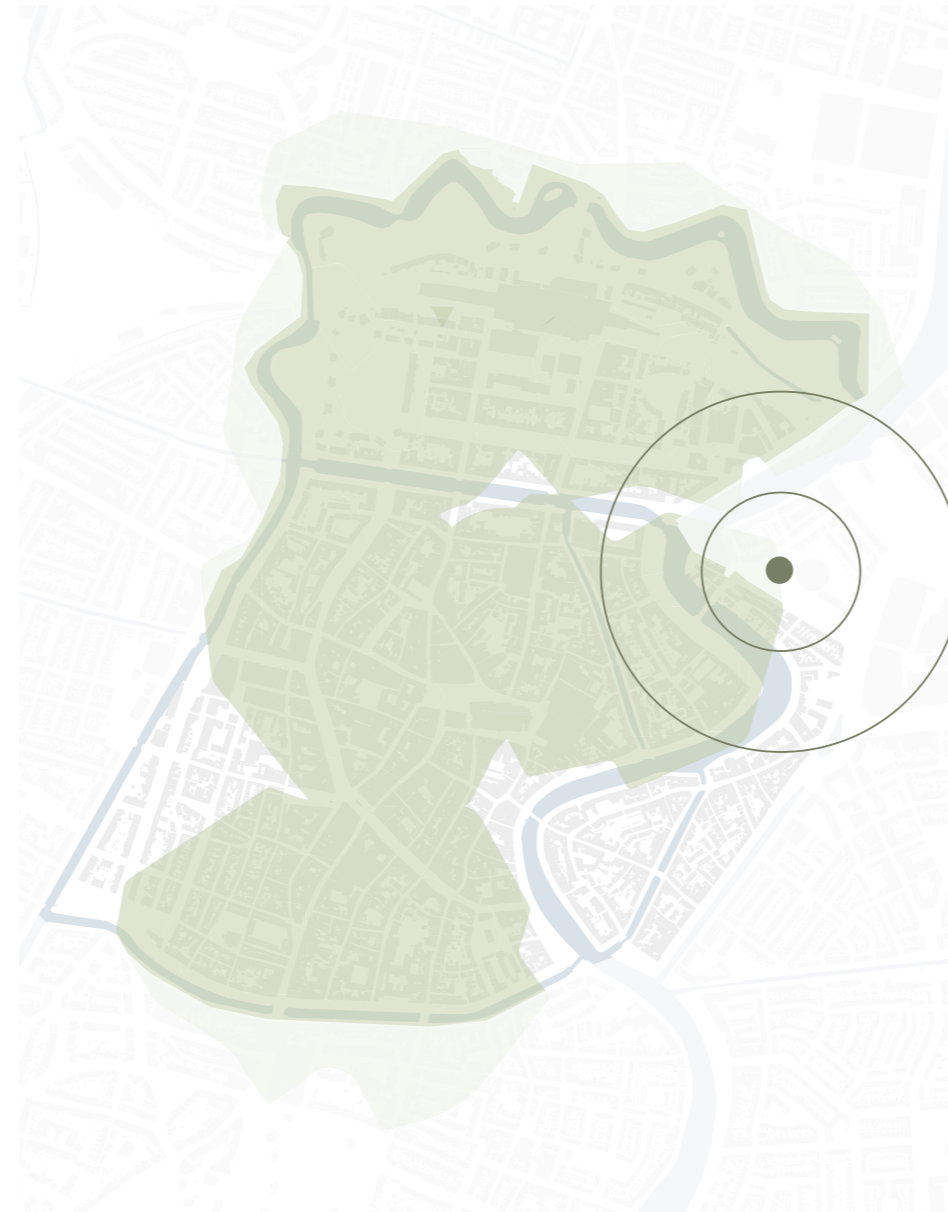


Figure 2.2 Distance to green area

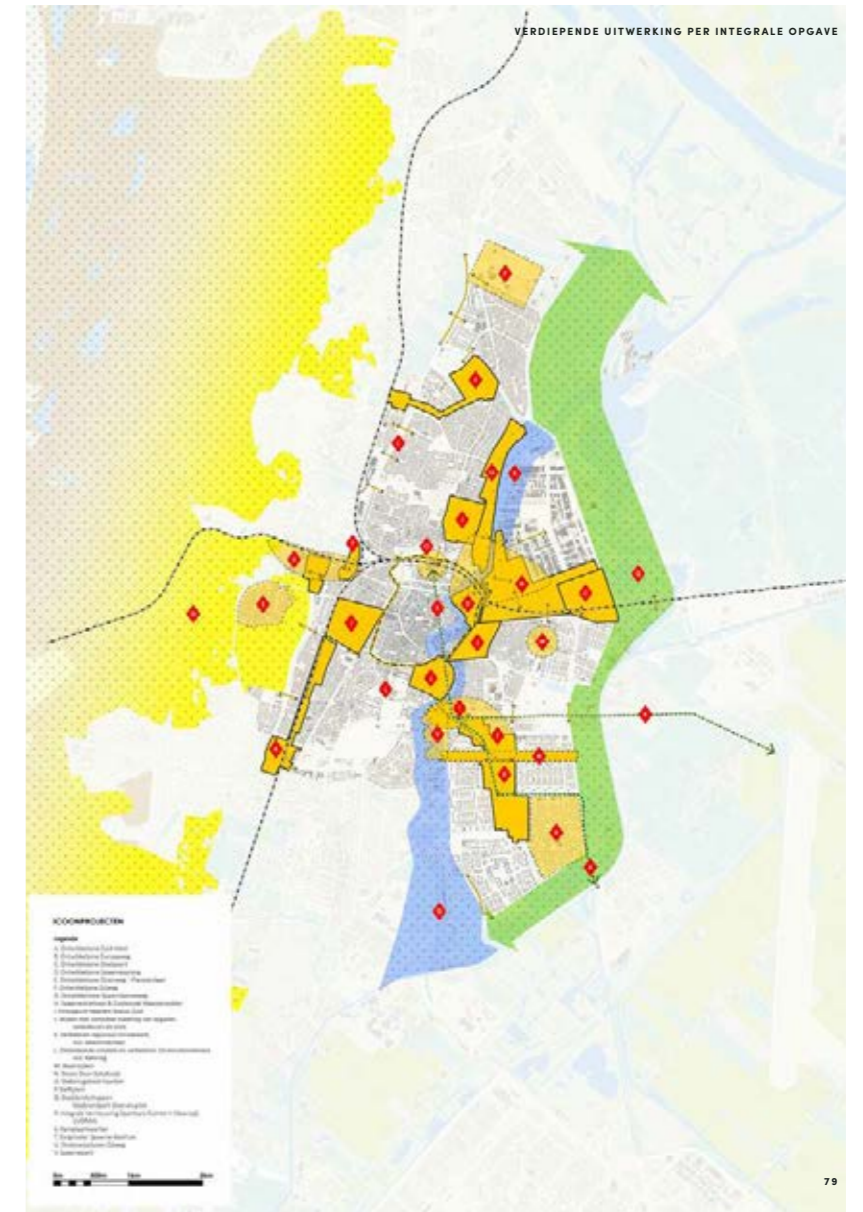


Figure 2.3 Development areas. By Gemeente Haarlem (2024).

DEVELOPMENT SPAARNESPRONG

2.1 CONTEXT

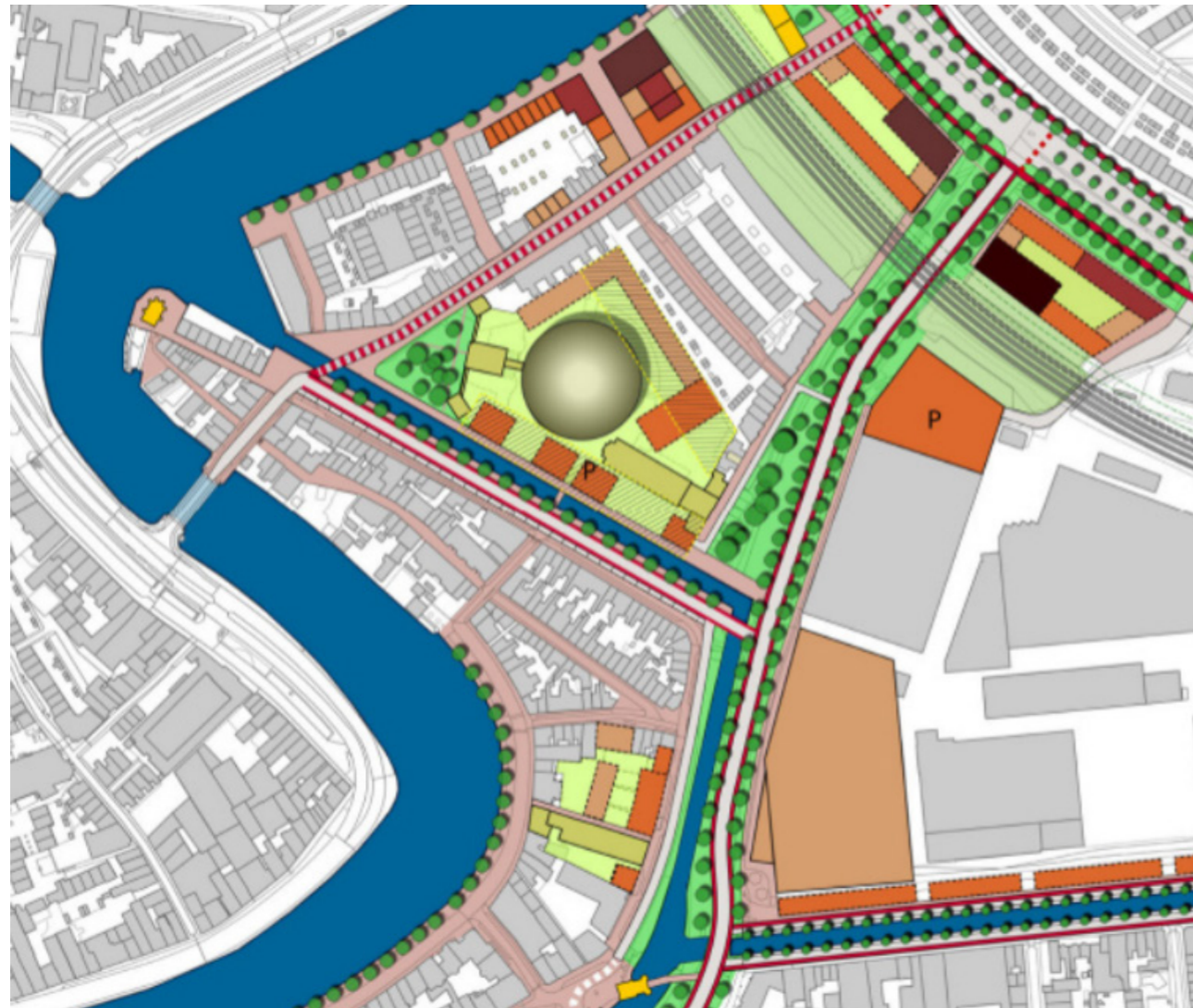






Figure 2.4 Plan Spaarnesprong. From Gemeente Haarlem (2018)

LEGEND

 Private development	 New buildings, 8 stories	 Roads
 Existing buildings, part of development	 New buildings, 9+ stories	 Bicycle path
 New buildings, 1-3 stories	 Water	 Bicycle road
 New buildings, 4-5 stories	 Greenzones	 Sidewalk
 New buildings, 6-7 stories	 Transition zone tracks	

250 meters ↑

Spaarnesprong is one of the development projects that the municipality of Haarlem is currently working on. The main goal of this project is to expand the urban city center by adding public amenities and new housing to the area, and improve the quality of public spaces around the water and new public facilities.

The Koepel is to be one of the main attractions of the neighborhood, it offers a diverse array of activities for visitors. The building is recognized as a national monument and has a very recognizable silhouette through its dome. The spaces surrounding the Koepel, such as the inner courtyard and various entryways, including Koepelplein, are to become public places for people to visit or travel through when making their way through the neighborhood (Gemeente Haarlem, 2018). Surrounding the Koepel new housing is being realised, in 2023 the first of these new housing units, one aimed at students, was opened in the restored former house of detention (DUWO, n.d.).

Another key element in the development project 'Spaarnesprong' is the restoration of the canals along Papentorenvest, Gedempte Oostersingelgracht and Amsterdamse Vaart. These canals are being restored to improve the quality of surrounding spaces, improve local ecology, add more room for water

storage and improve water quality and finally to bring back some of the historical character to the area (Gemeente Haarlem, 2018). Restoring the canals and the aim for the area to become part of the city center also has effects on the infrastructure in the area. In line with the vision the municipality has for the city in 2045 the car is given less importance. Papentorenvest, Gedempte Oostersingelgracht and Amsterdamse Vaart are currently roads designed for car traffic, in restoring the canals on these roads the amount of car lanes will be reduced and more room for cyclists and pedestrians is given along the new waterside. The Catherijnebrug, which is to become part of the main route to the city center, will be closed for regular car traffic and should become more inviting for slow traffic. The bus line that runs along this bridge will be preserved. Other proposals included in the plan are that the Harmejansweg will become a bike road and that new parking will be realized in underground parking near the Koepel (Gemeente Haarlem, 2018).

Due to the changes in infrastructure there will also be more space for green areas in the area. There are currently no public green spaces for the site to connect to, however, this will change in the future when the new canals will have a green edge and some of the current roads will be transformed into a park area.



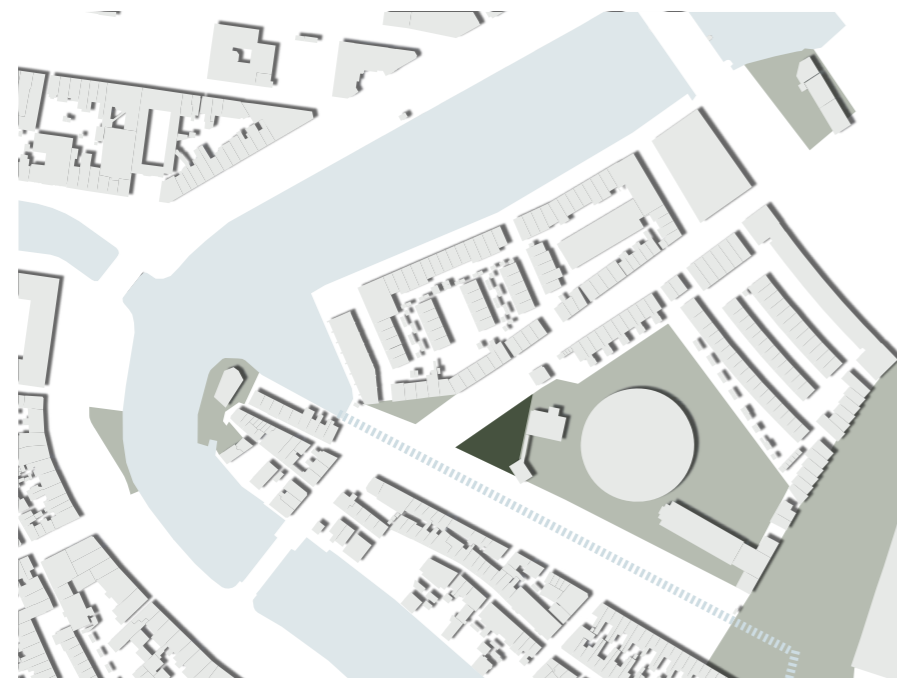
KOEPELPLEIN

Koepelplein is a small square in front of the Koepel, a former dome prison which is now in use as a cultural facility with a restaurant, cinema, study rooms and event spaces. The site is located in the Sportliedenbuurt, just outside of the medieval city center, and is part of the development project 'Spaarnesprong', one of the 'iconic projects' that were defined by the municipality in their vision for the city in 2045 (Gemeente Haarlem, 2024). Koepelplein forms the entrance to Koepel-complex and is one of the potential green areas from the development plan.

Figure 2.5 Photograph Koepelplein

KOEPELPLEIN AND ITS DIRECT SURROUNDINGS

2.2 KOEPELPLEIN ANALYSES



DEVELOPMENT OF PUBLIC SPACE

On the previous page the development plans for Spaarnesprong were discussed. Figure 2.6 shows which areas in the direct surroundings of the site are to be developed as (semi-) public space in the coming years.

- Development Areas
- Water
- Koepelplein

Figure 2.6 Development of public space



AMENITIES

Figure 2.8 shows amenities in the area surrounding the site. The most important of the places shown on this map is the Koepelcomplex, which is the main activity center for the area. Other amenities mostly consist of smaller speciality shops.

- Development Areas
- Water
- Koepelplein

Figure 2.8 Amenities

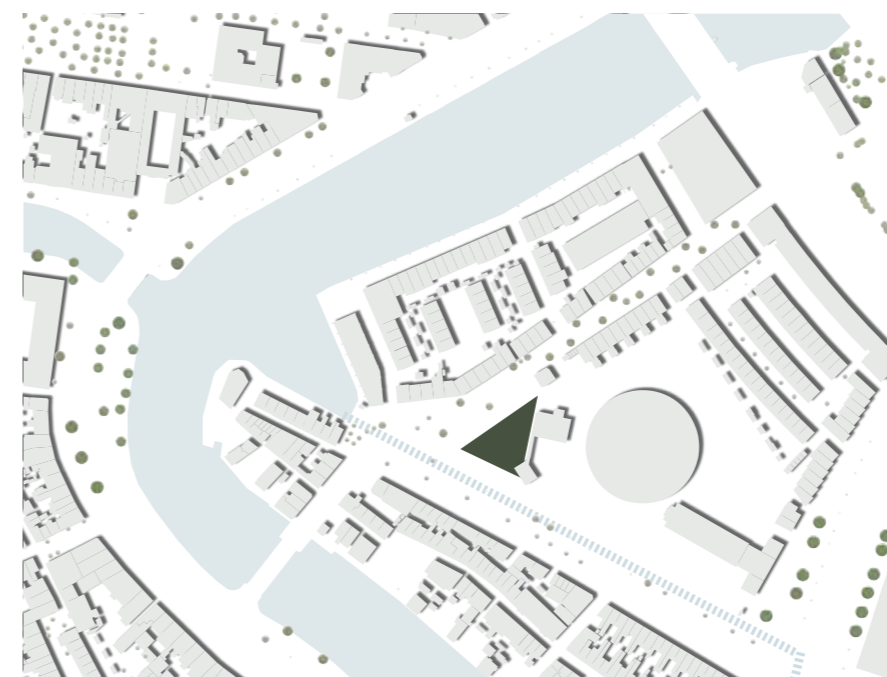


INFRASTRUCTURE

The infrastructure around the site will drastically change in the coming years, the amount of carlanes will be reduced and extra space for pedestrians and cyclists is added. Figure 2.7 shows this new configuration of infrastructure.

- Car Roads
- Pedestrian & Bike Paths
- Water
- Koepelplein

Figure 2.7 Infrastructure



SURROUNDING GREEN

Figure 2.9 shows that there are currently no public green spaces in the direct surroundings of the site. The green structure is limited to the trees shown in the figure.

- Trees - Varying Sizes
- Public green
- Water
- Koepelplein

Figure 2.9 Green spaces & trees

250 meters ↑

SITE VISIT

2.2 KOEPELPLEIN ANALYSES

On the 18th of October, 2025, a site visit to Koepelplein was undertaken. The site visit took place on a Saturday around noon, which means that there was a limited amount of people visiting the site, most people seemed to visit for recreational purposes. The goal of this site visit was to experience the site, with a special focus on how the site is connected to its surroundings, the dimensions of the site, how the area can be subdivided, and how the area is currently being used.

Figure 2.10 summarizes the first impressions of this site visit, note that this is a representation of an experience and is therefore subjective. The most notable findings from the site visit were how the site forms the entrance to Koepelplein and how it is divided in different parts based on the user group - pedestrians, bicycles and cars. These findings are explored more in depth on the next pages.

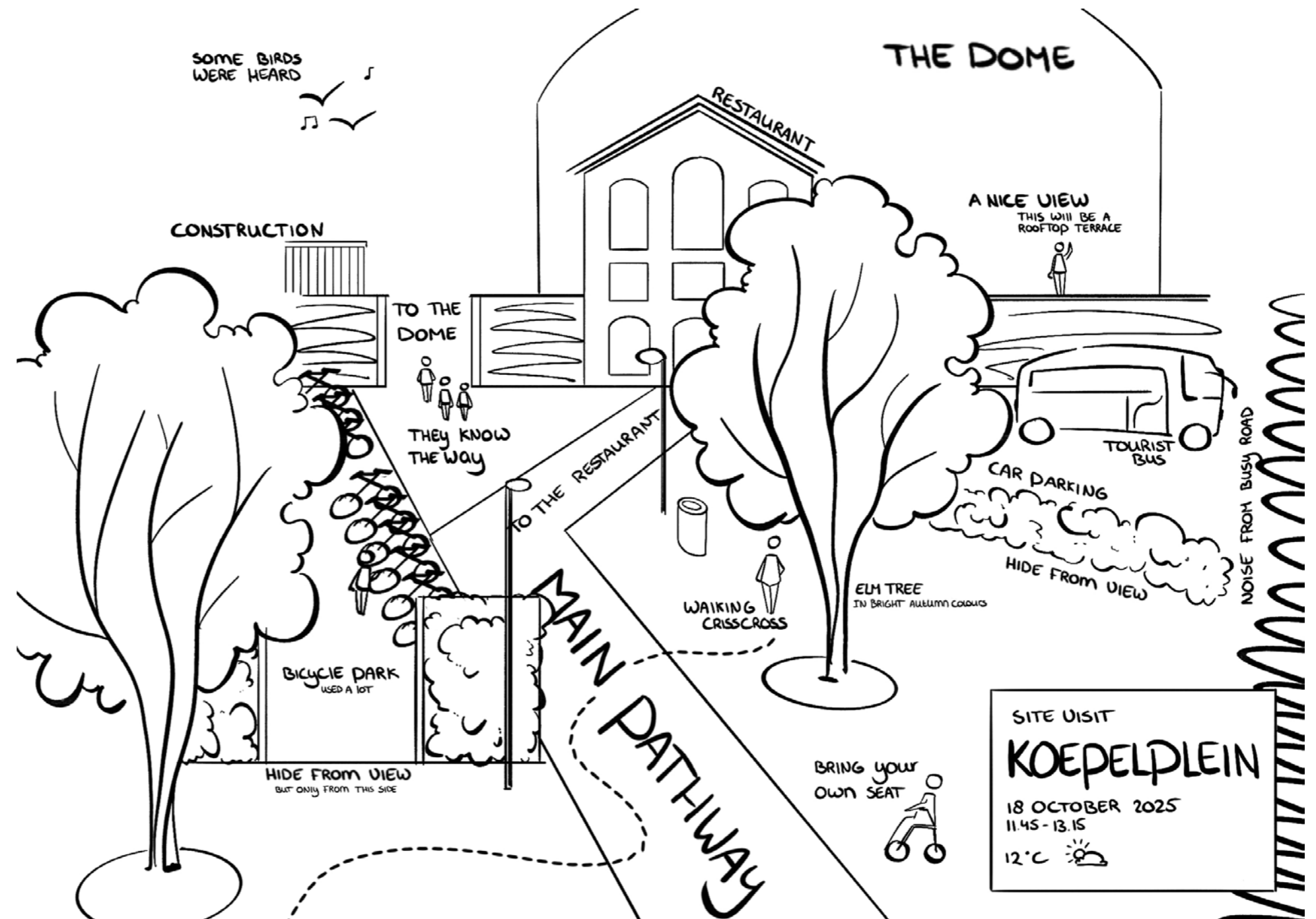


Figure 2.10 Impressions from site visit

ENTRANCES & ROUTES

2.2 KOEPELPLEIN ANALYSES

When traveling from the city center to the Koepel you will likely cross Catherijnebrug, this bridge gives access to the neighborhood burgwal and the Spaarnesprong development area. Following the road, the Koepel and Koepelplein will quickly come into view. When entering the site many will be tempted to follow the yellow brick path which seems to lead to the entrance of the complex. However this path leads to restaurant and

hotel, and while you can cross through this building to reach the dome -which is the main activity center of the complex and therefore the place where most people will want to go- it does not seem to be the main route.

The main path people seem to take instead deviates from the yellow brick path and circles around the restaurant and hotel. This other route is currently not the most inviting

as construction work is happening next to the pathway. If this is to be one of the main routes to the dome, then this path is to be carefully designed to be as inviting as a main entrance.

Originally the site seems to be designed with the idea of passing through the restaurant building which explains the different colour bricks that guide to the entrance. However

the restaurant has appropriated the hallway within this building, causing people to find an alternate route rather than passing through the restaurant. The main routes are shown on the map in figure 2.12. This map also shows the main routes for bikes and cars.



Figure 2.11 Reaching Koepelplein

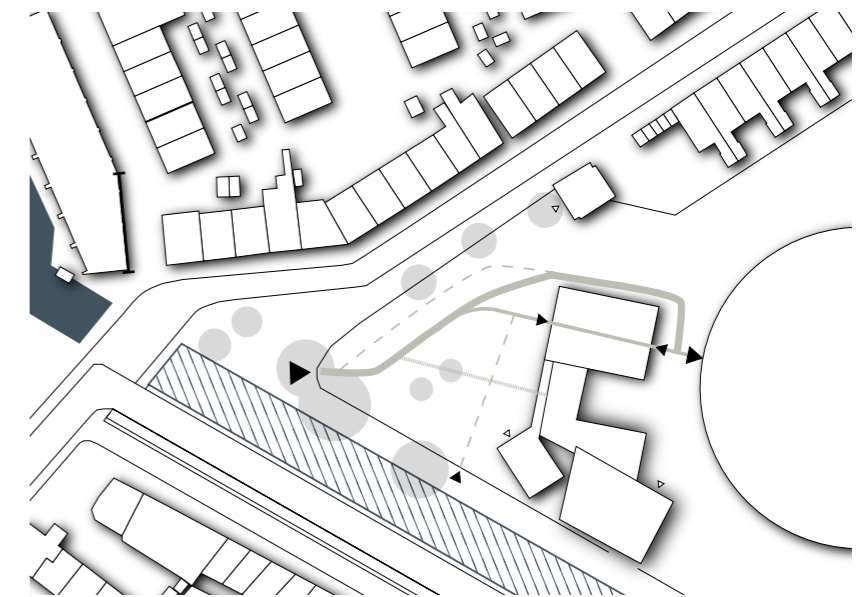


Figure 2.12 Routes & Entrances Koepelplein

LEGEND

- ▶ Public Entrance
- ◁ Private Entrance
- Main routes
- - - Vehicle route

100 meters ↑

SITE ANALYSES

2.2 KOEPELPLEIN ANALYSES



Figure 2.12 Vegetation on Koepelplein

VEGETATION

The site consists mostly of hard surfaces with some trees that provide shade. These trees are mostly placed along the edge of the site, with the exception of the elm trees which are placed along the entrance and can draw people in. Most of these trees seem to be removed in the proposed plans for Spaarnesprong (gemeente Haarlem, 2018), this is likely related to the construction of the canal.

The other trees seem to be just outside of the site, an effect which is reinforced through the hedges that are placed along the trees. These hedges divide the site in three areas: the pedestrian area, the bicycle parking and the car parking. This divide on the site makes the site seem smaller than it is.

LEGEND

- Oak Tree
- Elm Trees
- Linden Trees
- Unknown Small Trees
- Hedges

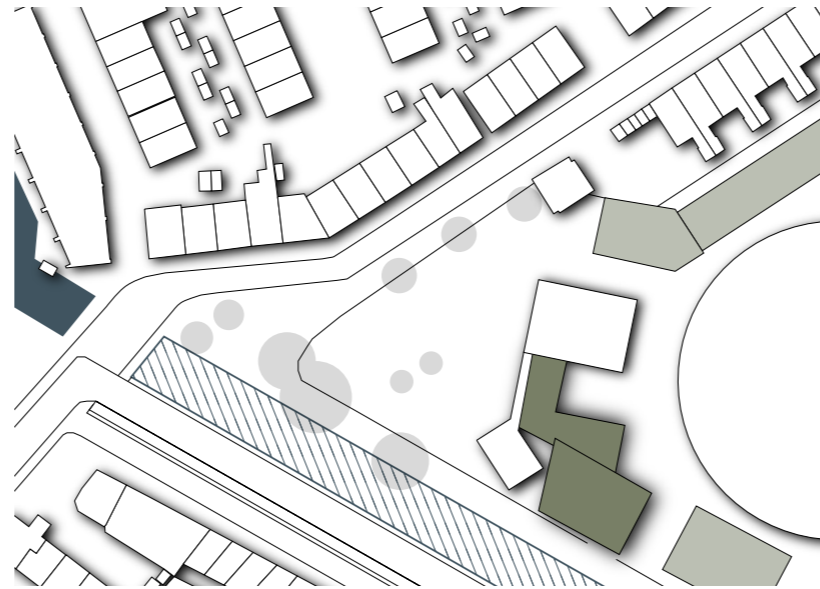


Figure 2.13 Planned Buildings Koepelplein

PLANNED BUILDINGS

Around the Koepel there are many ongoing developments, there is the recently completed transformation of the koepel, but also the many plans of creating new housing in and around Koepelcomplex. The first of these housing units, a student housing complex, is already realised and in use. Figure 2.13 shows this new housing complex and other projects that are not yet realised and still seem to be subject to change. A lot of the housing on and around the site consists of apartments which seem to be aimed at students or small households.

LEGEND

- Public Green space
- Semi-Public Green space

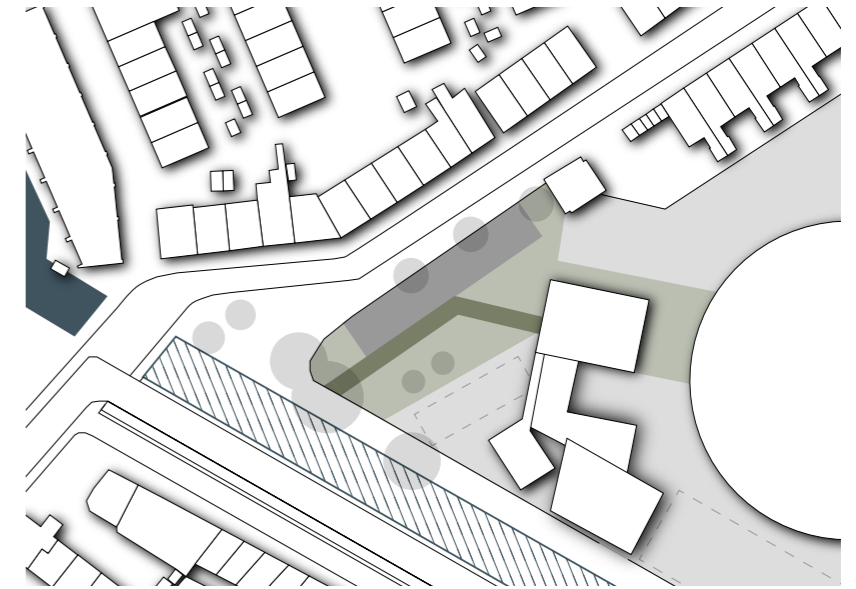


Figure 2.14 Materiality of Surfaces Koepelplein

MATERIALITY OF SURFACES

Figure 2.14 shows the different materials for surfaces currently on the site. The map shows the brick pavings that characterize the pedestrian areas, a the different colour brick seems to be used to emphasize that what should have been the main route on the site. Concrete tiles are used for the bicycle parking. Many of the other areas surrounding the site are still under construction, the surface of these areas consists of dirt and gravel, later in the realisation of the project these surfaces will be made of bricks paving, the same as the pedestrian areas on site.

LEGEND

- Public Green space
- Semi-Public Green space
- Private Green space
- Private Green space

100 meters ↑

CLIMATE

2.2 KOEPELPLEIN ANALYSES



Figure 2.15 Distance to cool spot inner city Haarlem. From Stichting Climate Adaption Services. (n.d.)

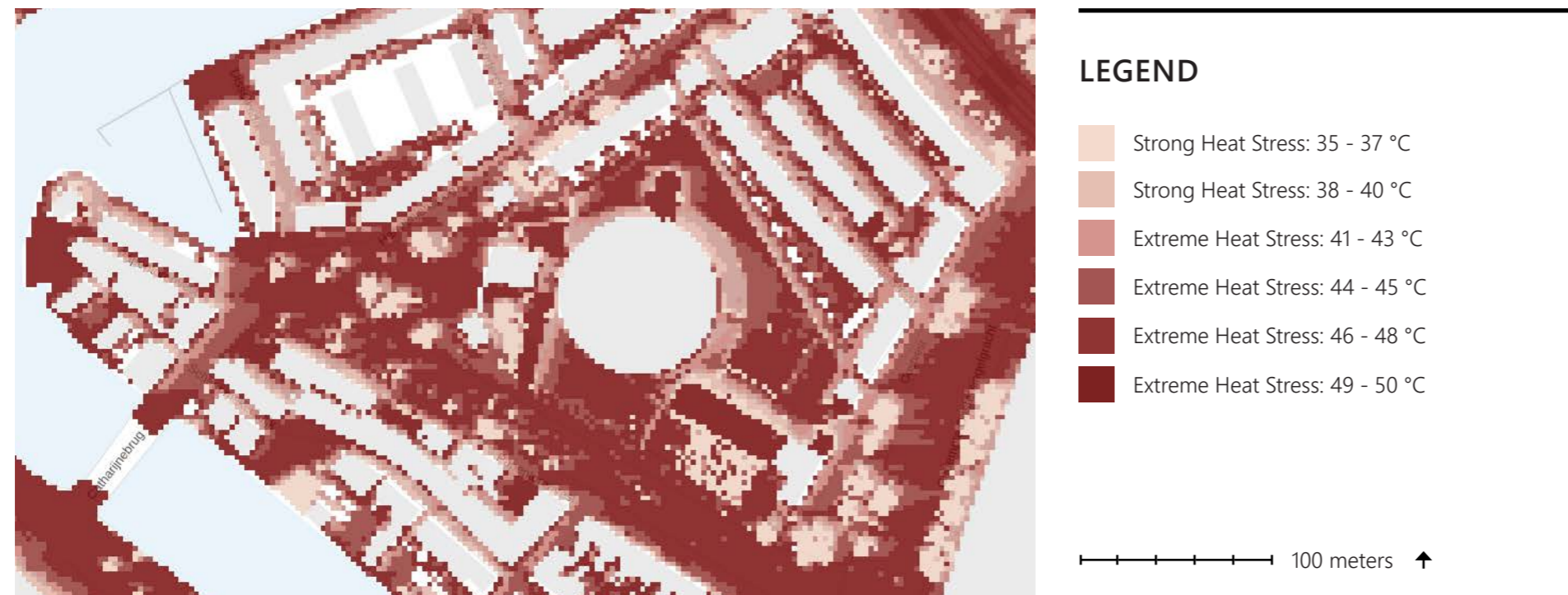


Figure 2.16 Extreme heat Koepelplein and surroundings. From Stichting Climate Adaption Services. (n.d.)

As was stated in the municipal vision of Haarlem, the city deals with extreme heat stress. As such it is important to have cool spots for people to visit within walking distance, figure 2.16 shows the distance people have to travel to visit a cool spot within the city center (Stichting Climate Adaption Services, n.d.). This map clearly shows that there is a lack of cool spots in the neighbourhood Burgwall, Koepelplein lies on the border of this neighborhood and could add a much needed cool spot within walking distance for part of this neighborhood.

Figure 2.17 shows the perceived temperature of a hot summer day in the area surrounding Koepelplein. Both this map and the map in figure 2.16 are made by Stichting Climate Adaption Services (n.d.). The figure shows that the area currently deals with extreme heat stress with perceived temperatures of over 46 degrees Celsius. On this map there are some cooler spots visible within the area, these spots correspond with the placement of trees, showing the effect that adding trees has on cooling down the city. Although these spots are significantly cooler than their surroundings, there is still heat stress even in these spots. Having a larger uninterrupted canopy cover could lessen the heat stress and should be one of the goals for the design. One thing to note with this figure is that it shows the current situation, which is bound to change with the planned adaptations, the new nearby water structure and added vegetation should cool down the

HERITAGE KOEPELPLEIN

CHAPTER 3: ANALYSES

HERITAGE BASED DESIGN

3.1 LITERATURE & CASE STUDIES

THE IMPORTANCE OF HERITAGE BASED DESIGN

The way we understand heritage has changed a lot in the past decades. Ripp & Clifford (2025) explore this changing definition of heritage in their paper. They show that once, heritage was mostly considered as something static, a glimpse to our past visible through a collection of monuments that were to be managed by conservators and planners. This type of thinking surrounding heritage prioritised tangible heritage, especially within the fields of urban planning and landscape architecture.

Nowadays, the definition of heritage is much broader, the recommendation on the historic urban landscape, as defined by UNESCO (2011), is seen as a starting point for the new way of thinking surrounding heritage. The scale on which heritage is considered has changed from buildings or other structures to include a wider context, such as the surrounding landscape and urban fabric in all its facets. This also includes social and cultural practices, and more intangible concepts such as identity (UNESCO, 2011). Identity, both of individuals and group-identity, is considered to be linked to both the spatial realm and to sociohistorical narratives (Ripp & Clifford, 2025). Having a strong connection to the local heritage can strengthen the place's identity, which in turn can enhance community engagement and quality of life in an area (UNESCO, 2016).

The HUL -historic urban landscapes-guidebook, published in 2016 by UNESCO builds further on this definition of heritage,

and is an attempt at giving guidelines to cities on how to deal with heritage in a new way. It explains the importance of heritage and culture in our current world which is characterized by rapid urbanisation and globalisation. The guidebook states that "rapid uncontrolled urbanization has led to the deterioration and destruction of urban heritage. Threatening the identity, the local culture of communities, and their sense of place". Cities all over the world have become more similar to each other, culture and heritage can be the thing that defines cities in their identity and it is that which sets them apart from other places. It can foster a community and sense of pride for a place. Integrating local heritage in urban planning can connect new developments to an existing culture, which is essential for sustainable economic and social developments (UNESCO, 2016).

HERITAGE BASED DESIGN FOR POCKET PARKS

How does this understanding of heritage impact the design of pocket parks? Chapter 1 explored that locality is one of the main characteristics of pocket parks: they are created within the existing urban landscape and are mainly used by the local community. Patria et al. (2025) explore how pocket parks can play a role in restoring local heritage and culture in cities where these have decreased drastically due to the rapid urbanisation. They mention the same benefits in regards to planning with local heritage as the guidebook by UNESCO (2016), namely that pocket parks, when designed with local culture and heritage in mind, can increase

a sense of belonging and place identity. They then continue to explore culture through a framework which includes 5 main elements of culture: religious culture, social culture, material culture, ecological culture and linguistic culture. In practical terms this means that pocket parks, and urban design in general, should give space for the expression of culture and that they should be adapted to the local community (Patria et al.,2025). Material culture can be presented through the use of local materials, motives and patterns in the design, but also by giving space to regularly used objects. An example of this is the extensive bicycle usage in the Netherlands, because many people use bikes there is a need for bike infrastructure: cities need bike paths and a place to park bicycles. Ecological culture can be represented by the use of local vegetation, but also by adapting to the local climate and micro climate. In

a city prone to heavy rainfall and flood-events, adaptations need to adapt to this amount of water by, for example, creating wadis and water retention areas. Social and religious culture can be represented through gatherings and activities, pocket parks could be designed as a suitable venue for these if they have the support of the local community (Patria et al.,2025).

Urban culture and local heritage are dynamic elements, they are constantly changing and can mean different things to different people. The design of pocket parks and other urban areas should therefore not be static, but able to adapt together with these cultural elements. They should be multifunctional and available to a wide variety of people, as even within the local community huge differences in culture can exist.

ST. MICHAELS FORTRESS AND THE REVITALIZATION OF SIBENIK

3.1 LITERATURE & CASE STUDIES



Figure 3.1 St. Michael's fortress. Image from Šibenik Tourism. (n.d.).



Figure 3.2 Poljano square. Image from BIG SEE. (n.d.).

Description: Šibenik is an old coastal town in Croatia with a rich history, a large historical center and many monuments. Yet this once industrial town has faced many economic challenges in previous decades due to the decline in industry. Recently restoration and revitalization projects have taken place in this town which have improved quality of life in the city and have attracted more tourism to the area (Cultural heritage in action, 2023).

The restoration and revitalisation of the town started with the restoration of the St. Michael's fortress, one of the four fortresses in the city. This fortress, like many of the other monuments, was neglected and did not offer much more than a nice view over

the city; there were no other amenities. The fortress has been restored and transformed into one of the most prestigious stages and exhibition spaces in Croatia, which has led to a constant interest and new streams of tourists (Cultural heritage in action, 2023). It has also led to a new interest in restoring the town's monuments which has paved the way to many other projects in Šibenik making the city center livable again. Amongst these projects are the restoration of the other three fortresses and the reconfiguration of Poljana square. The reconfiguration of Poljana square was especially impactful for the residents of the town, as it now forms an entrance to the old town which has made this district more accessible (Rivas et al, 2022).

RELEVANCE TO THE PROJECT

- The restoration of St. Michaels Fortress shows the importance of balancing the restoration of historical structures and the addition of new functions to attract people.
- The restoration of St. Michaels Fortress has opened the door to other restoration and development projects in the city of Šibenik, similar to how the development of the Koepel is leading to the redevelopment of its surroundings.

OGRÓD KRAKOWIANEK

3.1 LITERATURE & CASE STUDIES



Figure 3.3 Ogród Krakowianek pathway. Image from ZZM (2024).



Figure 3.4 Ogród Krakowianek structure. Image from ZZM (2024).

This garden is one of the 40 pocket parks created in Krakow as part of their pocket park project, which was used as a case study in chapter 1. This park was opened in 2024 and commemorated the right to vote of Polish women in 1918, an important event which placed Poland as one of the most democratic and progressive countries in Europe at the time. The park tells the story of more than a dozen women in their fight for equal rights, through the garden an educational path in the garden is created, on this path

striking metal structures are placed where you can read the stories of these women. In the center of the park a memorial square with a symbolic plaque is placed. A hundred trees were planted as a symbolic number, there are also over a thousand shrubs and flowers planted, and new seating areas have been created to enhance the user experience (Ciepka, 2024; Zarząd Zieleni Miejskiej w Krakowie. (2024); translated from Polish through Google translate).

RELEVANCE TO THE PROJECT

- *This project is an example of a very direct way of telling a story about something worth remembering.*
- *Through the use of small architectural interventions the park becomes more than 'just a pocket park' but instead becomes a physical representation of the story it wants to tell, while still offering a new qualitative urban space to the city. Similar structures could be designed to tell the story about the Koepelcomplex on Koepelplein.*
- *The project also has some more indirect ways of honoring the story by planting the one hundred trees.*

HISTORY OF THE KOEPEL

3.2 KOEPELPLEIN HERITAGE

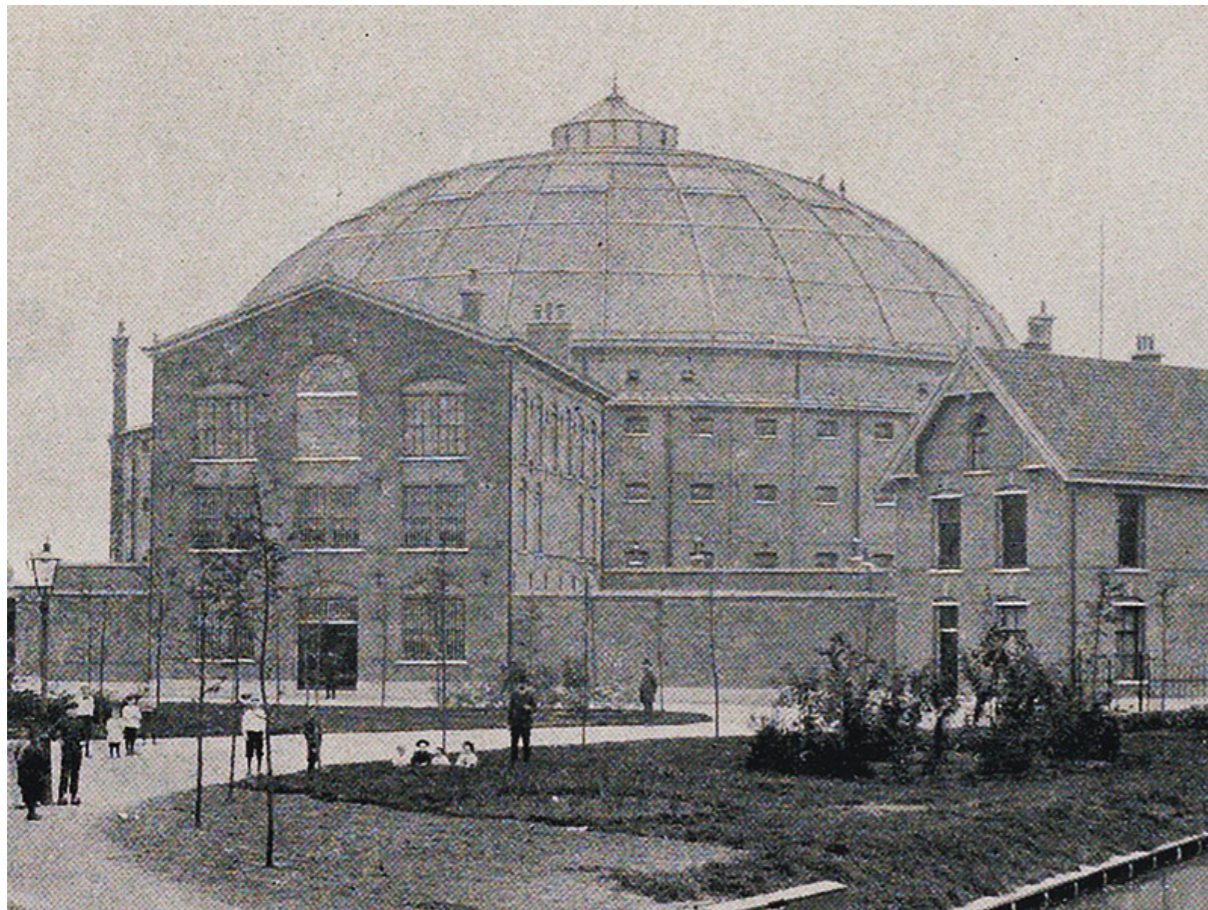


Figure 3.5 Koepelplein next to the old canal. *Image from Filmkoepel (n.d.)*

Koepelplein is located just outside of the medieval city center. The canal along Papentorenvest, which the municipality plans to restore, was once part of the city's defenses and ran on the outside of the medieval city walls. With the expansion to the city in the 17th century the site came to be located within the walled off area of the city, yet the development of this part of the city was limited to some shipyards on the river shore (Gemeente Haarlem, 2018). In the 19th century the area surrounding the Koepel began to be more developed as space was needed for new industries, during this time more permanent buildings were placed and a new railroad was realized. The site itself remained empty until the construction of the dome prison which started in 1894 (Gemeente Haarlem, 2018).

The dome prison was completed in 1901 and functioned as a prison complex until 2016.

Because of its large size and remarkable shape it became a well known building in Haarlem, one which many people had opinions about. In a newspaper article from 1964 an author reminisces about the time before the prison complex was built and calls it a hulking building of remarkable ugliness, yet a building that defines the view of the city (Haarlem's dagblad, 1964). Yet in 2016 -when the prison had to close due to outdated facilities and not adhering to modern detention requirements- a citizen initiative was started to preserve the building and open it to the public as a landmark for the city. After the building was temporarily used to house refugees, it was sold to the newly established Panopticon association with the aim of transforming the old prison complex into a place for all people in Haarlem. The plan for the Koepel included restaurant spaces, office spaces, meeting rooms and a cinema (Bregje-Snijders, n.d.; deKoepel, n.d.).

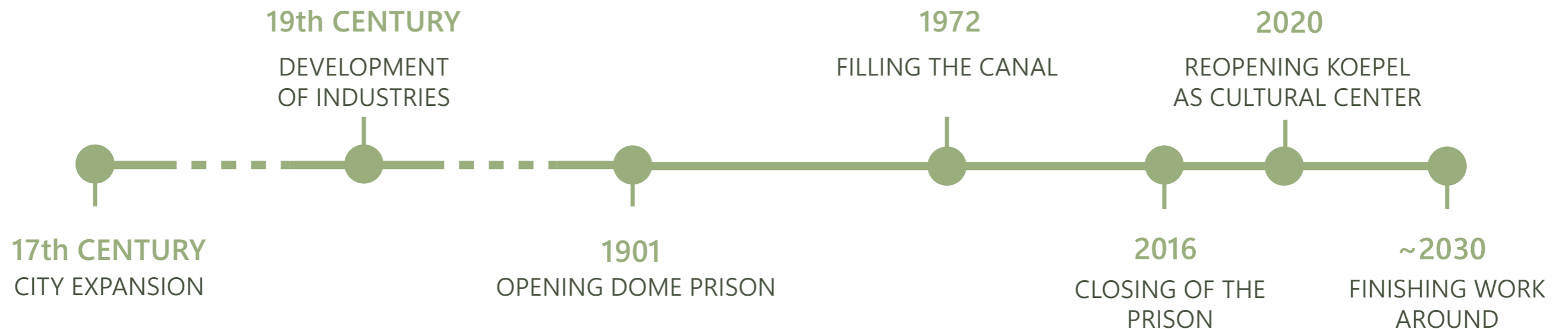


Figure 3.6 Timeline Koepelcomplex

TRANSFORMATION OF THE KOEPEL

3.2 KOEPELPLEIN HERITAGE

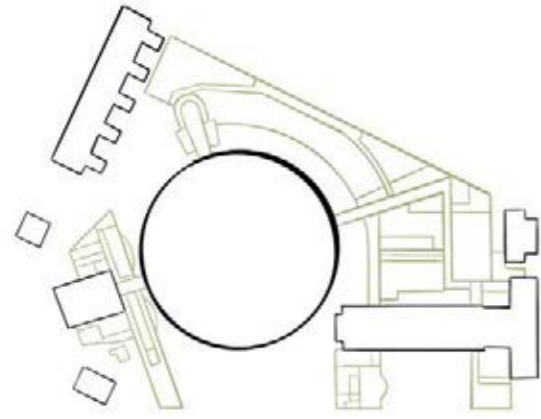


Figure 3.7 Demolished Buildings

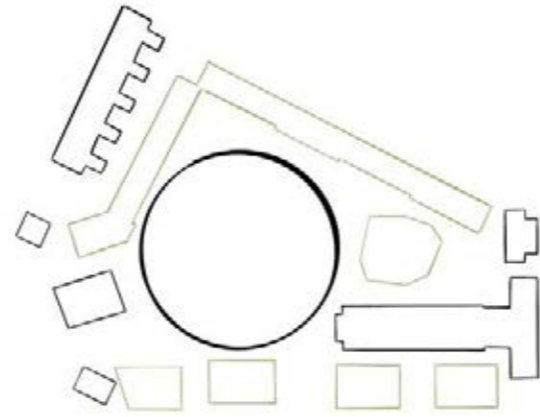


Figure 3.8 Planned Buildings

The transformation of the Koepel brought with it many questions on how to deal with the heritage of the site. A first consideration was about which buildings to preserve and which to demolish. During its time as a prison new buildings, such as sporting facilities, kitchens and recreation spaces, were added to the complex (De Koepel, n.d.). Many of these additional buildings were removed in the transformation, while new buildings, mostly for housing, are planned to be built as seen in figure 3.8. Other considerations were in the use of the prison complex. Some of these required technical solutions such as the creation of the cinema, this required a basement to be dug out without affecting the monumental building, and a new ground floor had to be constructed (De Koepel, n.d.). Others affected the appearance of the

building itself. To get more light into the cells, and make them more usable, new windows were added (De Koepel, n.d.).

When visiting the Koepel nowadays there are many ways in which the story of the building is told, first of all is, of course, the architecture itself: both from the outside as from the inside it is easily recognizable as a former prison with the bars on the windows and the small cells inside. When entering the building you can visit an exhibition about the history and transformation of the building, which is -like the womans garden in Krakow- a very direct way showcasing the local heritage. The building also gives a platform for new expressions of culture: some of the cells on the ground floor have been transformed into small exhibition places as seen in figure 3.10.



Figure 3.9 Original cells
Image from De Koepel (n.d.)



Figure 3.10 Cells as Art Expo



Figure 3.11 Exhibition the Koepel

DESIGN INSPIRATION

3.2 KOEPELPLEIN HERITAGE

The design for Koepelplein is part of the broader project of developing the Koepelcomplex, within this complex the Koepel itself has already been renovated and reopened. In this transformation from prison to activity center there was a clear focus on designing with heritage as can be seen in how many of the aspects of the Koepel have been reused and have been given a new purpose.

Koepelplein can take inspiration from this very recognizable monument within the city. The main characteristic of the Koepel is of course the large dome. This dome shape can be reinterpreted into the design of Koepelplein, the design can make use of circular motives in the park design. A three dimensional reference to this dome shape could be made through vegetation. Shrubs and trees of varying heights can be planted to mimic the shape of the dome. Another

element that could inspire the design comes from the interior of the dome-prison. Inside the dome prison opens in a big open space, surrounding this big space are the small rooms that were once upon a time in use as the cells as seen in figure 3.13. This idea of contrasting big open spaces with small rooms can be used in the design of Koepelplein. Finally, Koepelplein can serve as a connection between the Koepel and the canal which the municipality aims to restore. This canal

is another part of the heritage of the place which could be emphasized in the design. the old photograph in figure 3.12 shows how the waterside was connected to Koepelplein through a green area mostly consisting of a lawn which allows people to sit down in the grass and get close to the waterside. This could be an inspiration for the design which allows for interaction with the water.



Figure 3.12 Waterside connection
Image from Filmkoepel (n.d.) Edited.



Figure 3.13 Central open space in the Koepel
Image from Filmkoepel (n.d.)



Figure 3.14 Characteristic Dome-shape
Image from Filmkoepel (n.d.) Edited.

CREATING A CONCEPT

CHAPTER 4: DESIGN PROCESS

OVERVIEW PROCESS

4.1 DESIGN PROCESS - CONCEPT

This chapter will summarize the design process and present the concept for Koepelplein. Figure 4.1 shows a diagram of the various steps that were taken in the design process, and links them to the various findings from the analyses. This is part 1 of the diagram which shows the design process up until the final concept for Koepelplein. Other parts will be discussed in chapter 7 & 8, they look into the design details of Koepelplein.

The next pages will zoom in to the various steps and explain the decisions that were made throughout the process. The full sized version of the diagram in figure 4.1 can be found in Appendix 1.

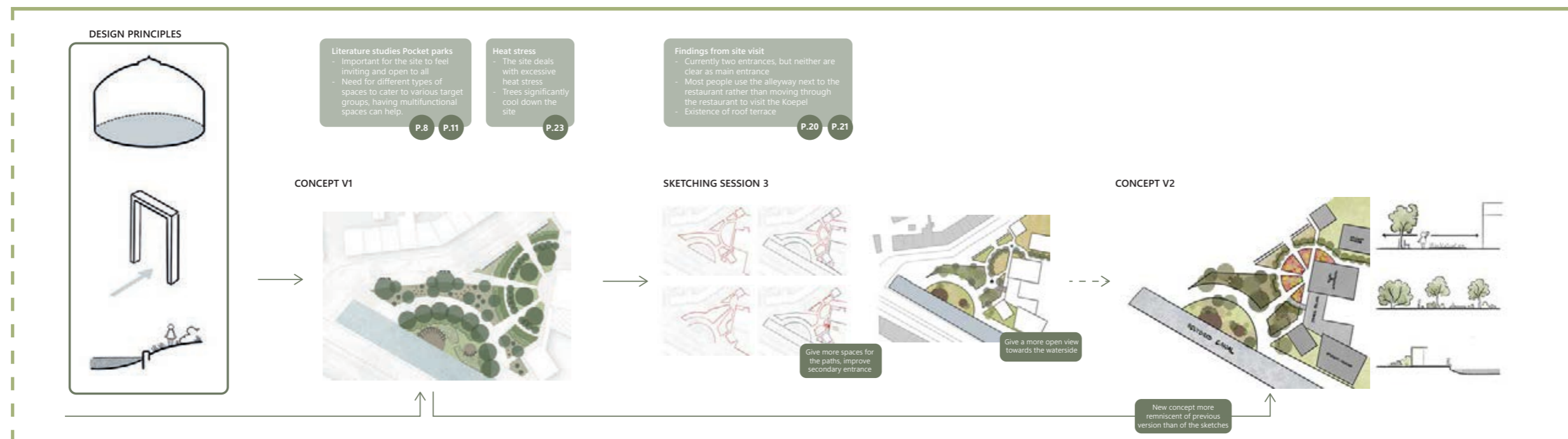
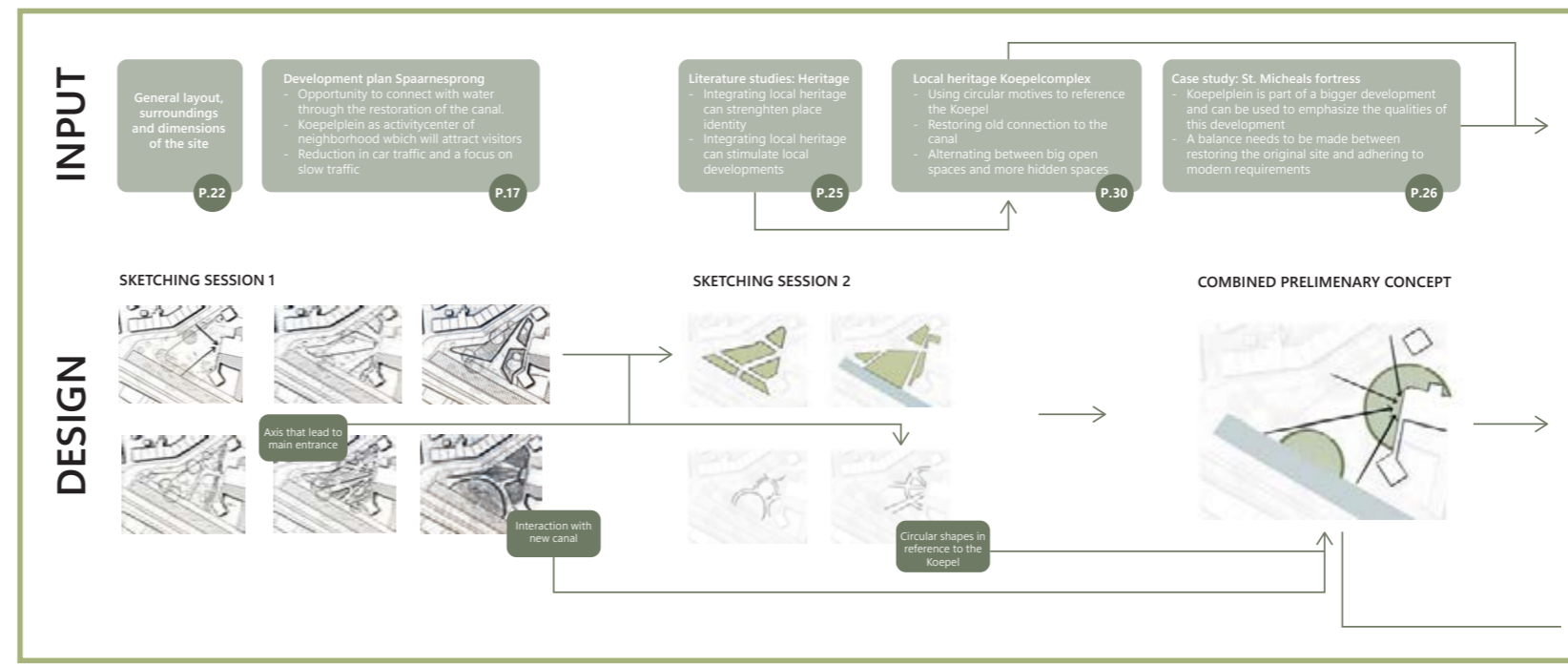


Figure 4.1 Overview design proces

SKETCHES

4.1 DESIGN PROCESS - CONCEPT

General layout, surroundings and dimensions of the site

P.22

Development plan Spaarnesprong

- Opportunity to connect with water through the restoration of the canal.
- Koepelplein as activitycenter of neighborhood which will attract visitors
- Reduction in car traffic and a focus on slow traffic

P.17

The first sketching phase started without much input from analyses; this sketching session was about understanding the site, and exploring what kind of space it is. The sketches in figure 4.2 show that the entrances to the Koepel formed the starting point for the design process; the first sketches explore how people are likely to move throughout the site, based on the site layout, and draw different pathways towards the entrance of the restaurant. In these first sketches two main routes are visible: one from the harmejansweg to the east of the site and one from the promenade along the canal to the south of the site.

The sketches in this phase play with different geometries, most of the sketches in this phase use sharp angles to define the different pathways. The later sketches from this day show some experiments with more organic shapes that can also be found in the final concept. The last sketch also shows a direct connection to the canal, which adds new possibilities for interacting with the water. This connection the canal can be found in almost all of the following sketches, and in the final design proposal.

SKETCHING SESSION 1

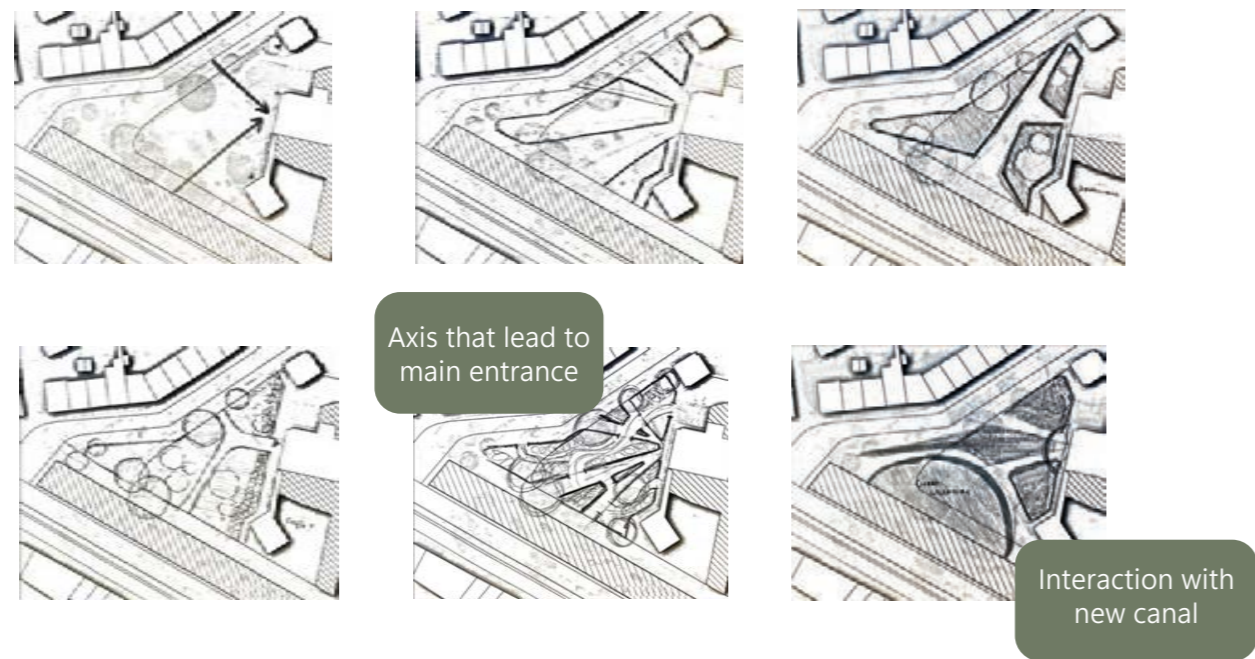
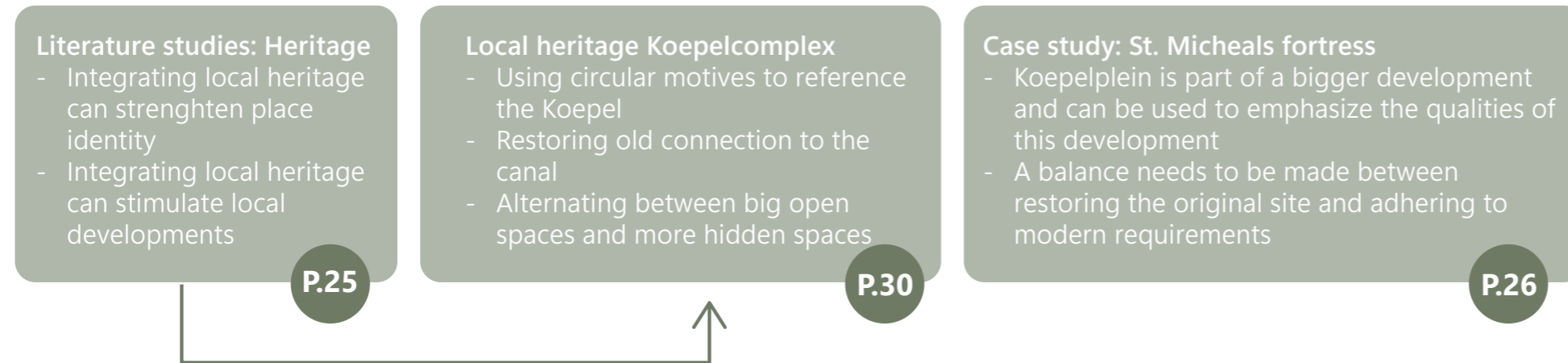


Figure 4.2 Overview design proces, sketching part 1

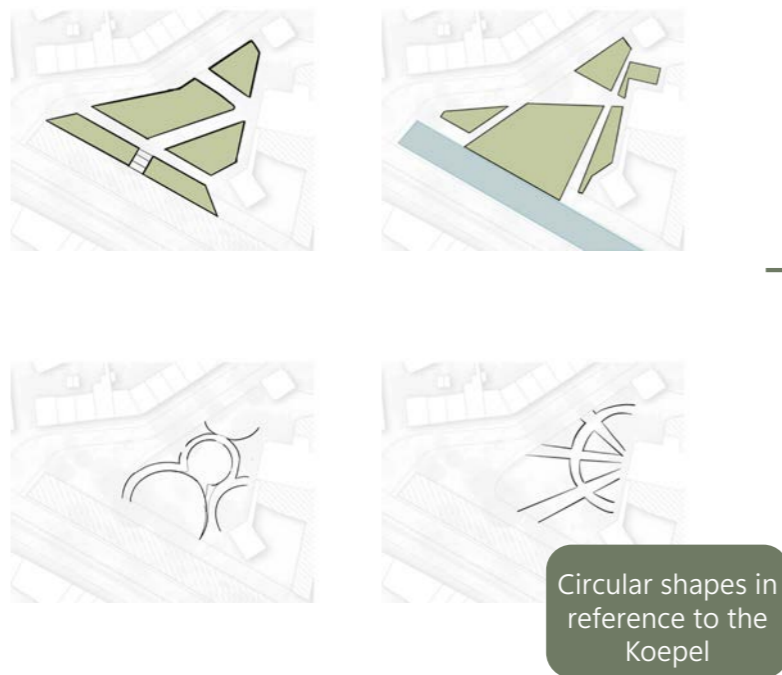
SKETCHES

4.1 DESIGN PROCESS - CONCEPT

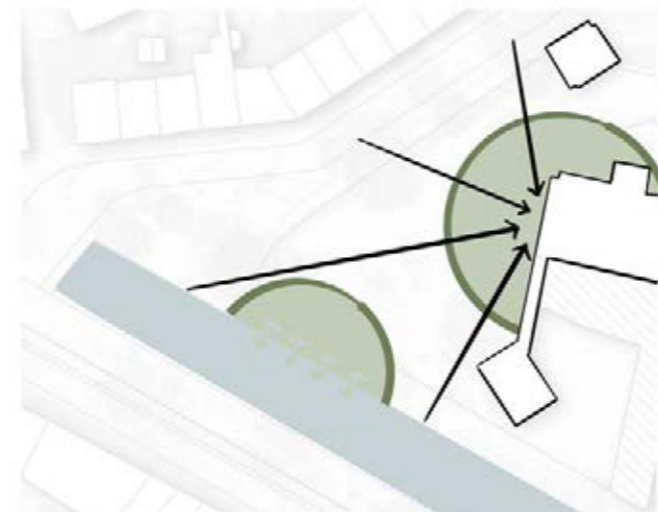


The second sketching phase shows a shift to digital drawings. While this phase still only focuses on the geometry, it is more informed by the analyses made about the site. Most notable is the studies into the local heritage of Koepelplein. The studies show that linking a design to the heritage of the place can help in developing place identity, and that it can promote other development projects in the area, in the future. This confirms the need of highlighting the entrances which links the site to the Koepelcomplex and the desire to connect the site to the canal, which is reminiscent of the situation 100 years ago, and which can be a nod to the history of the place. To create a stronger link between the site and the Koepelcomplex, these sketches experiment with circular and dome shapes on the site, which is the most notable architectural feature of the koepel.

SKETCHING SESSION 2



COMBINED PRELIMINARY CONCEPT

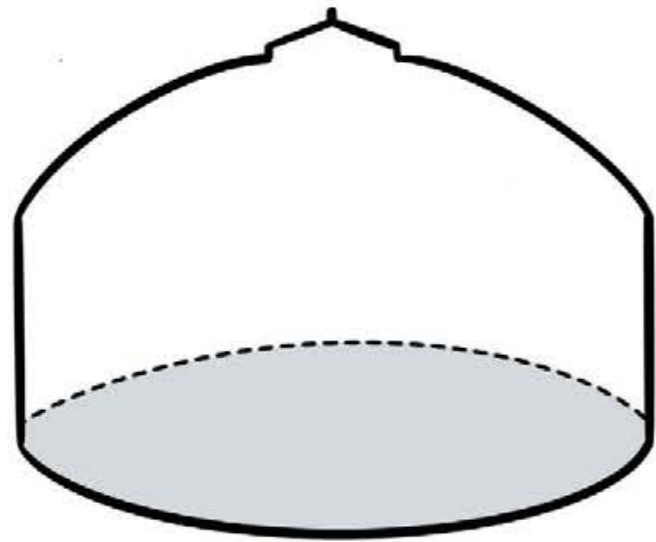


In the sketches two different design thoughts are explored: the first is using the angular shapes to highlight the main entrance which is a continuation of the previous sketches; the second idea is to use circular shapes for the reasons stated above. This sketching phase concludes in a preliminary concept that shows the main ideas from the first two sketching phases that should be included in the final concept: the circular shapes, guiding people towards the entrance and having a connection to the waterside. These ideas are used as the main design principles for the design which are explained on the next page.

Figure 4.3 Overview design proces, sketching part 2

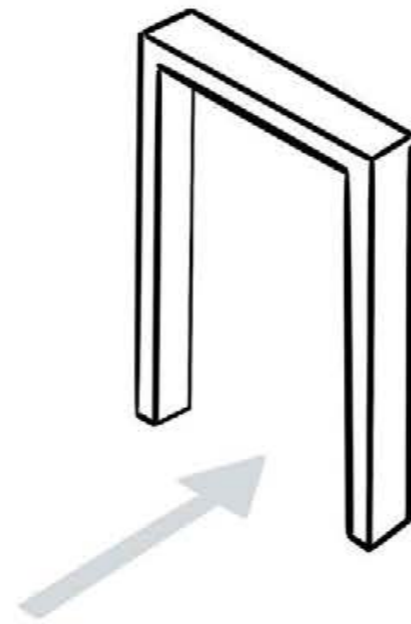
DESIGN PRINCIPLES KOEPELPLEIN

4.1 DESIGN PROCESS - CONCEPT



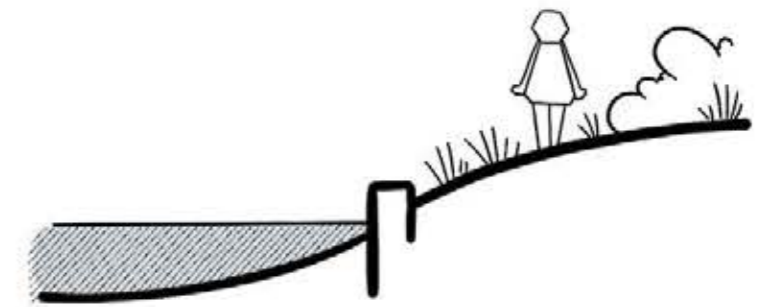
INSPIRATION KOEPELCOMPLEX

Koepelplein is part of the Koepelcomplex and should therefore be designed in a way that harmonizes with the design of the Koepel. This can be achieved by using a recognizable form language such as circular shapes and by using similar materials as found in the Koepel, which is mostly brick and some steel for staircases and such. It should also incorporate the planned design for the new buildings and spaces around the Koepelcomplex as far as these designs are known.



EMPHASIZING ENTRANCES

Koepelplein is one of the main entrances to the Koepelcomplex yet the analyses in chapter 2 have shown that the current route and entrances on the site are unclear. While the current design of the site seems to want people to pass through the restaurant building, many people seem to prefer walking around this building through an alleyway instead. The design should give more clarity on the entrances, and it should design the different entrances as qualitative spaces to pass through.



CONNECTING TO THE CANAL

The municipality aims to restore the historical canal along Papentorenvest amongst others, this canal runs at the edge of Koepelplein. The design could therefore connect to this new waterway and could offer opportunities for people to interact with the water. This connection to the water was also present back when the old canal still existed, incorporating this in the design could be used to bring back part of the heritage of the place.

Figure 4.4 Design principles Koepelplein

COMBINED CONCEPT

4.1 DESIGN PROCESS - CONCEPT

Literature studies Pocket parks

- Important for the site to feel inviting and open to all
- Need for different types of spaces to cater to various target groups, having multifunctional spaces can help.

P.8

P.11

Heat stress

- The site deals with excessive heat stress
- Trees significantly cool down the site

P.23

CONCEPT V1



Figure 4.5 Overview design proces, concept version 1

This version of the concept is a collection of the ideas from earlier sketches, and it is the first version of the design that defines the use and character of various areas created by the geometry. It is more detailed than the earlier sketches and adds the placement of vegetation and seating areas to the geometry. Notable about this version of the design is the very clear half-circular shapes and the axis that lead to the entrance of the restaurant and the Koepel which were already seen in some of the sketches. New to this concept is the varying width of the paths: the wide paths to the south of the site use the dimensions of the promenade on the waterside, the paths then decrease in size towards the main entrance to better adapt to the human scale.

Within the design different types of areas are created, something which the literature studies into pocket parks in chapter 1 concluded was essential. The space needs different areas with different uses to cater to a wider user group, having these different spaces also allows different groups to use the place at the same time.

This is especially important for Koepelplein which is the entrance to Koepelcomplex, but also is to become a public green space for the neighborhood. It will attract two very different user groups: those visiting the Koepel and locals from the neighborhood.

The Koepel is the main activity center for the neighborhood but also has functions -such as the cinema and the office spaces- that attract people from all over the city, and possibly beyond that. People visiting the Koepel will likely want to move through

Koepelplein quickly, for them being able to find the main entrance easily will be the most important design consideration.

On the other hand locals might want to use Koepelplein as a park space, a resting spot located on the way to the city center, or a meeting spot for socializing with neighbors. These people will spend more time on Koepelplein itself which means that it must be a qualitative space with opportunity to sit down.

These two different usergroups show a conflict in the use of Koepelplein, for one group it is a transition space while others want to remain on the site. In this first version of the concept different areas exist for different people. The north side of Koepelplein consists of the axis that lead to the main entrance, this part of the site is designed as transition space, vegetation adds visual interest to the space but people can move through this space easily. Then there is the waterside, in this area multiple seating areas will be created which allows people to sit down and meet; it is also separated from the rest of Koepelplein by the promenade along the canal and the tree lane that folds around the space. Between these spaces a more natural looking area is created, this area can be used as a play area but is also another way of separating the different user groups. In this area many new trees are places to create an almost full canopy cover, something which should cool down the site, this is needed as the analyses have shown that the site deals with severe heat stress. New trees are also to be planted in other spaces within the site as shown in the conceptual plan.

CHANGING ENTRANCES

4.1 DESIGN PROCESS - CONCEPT

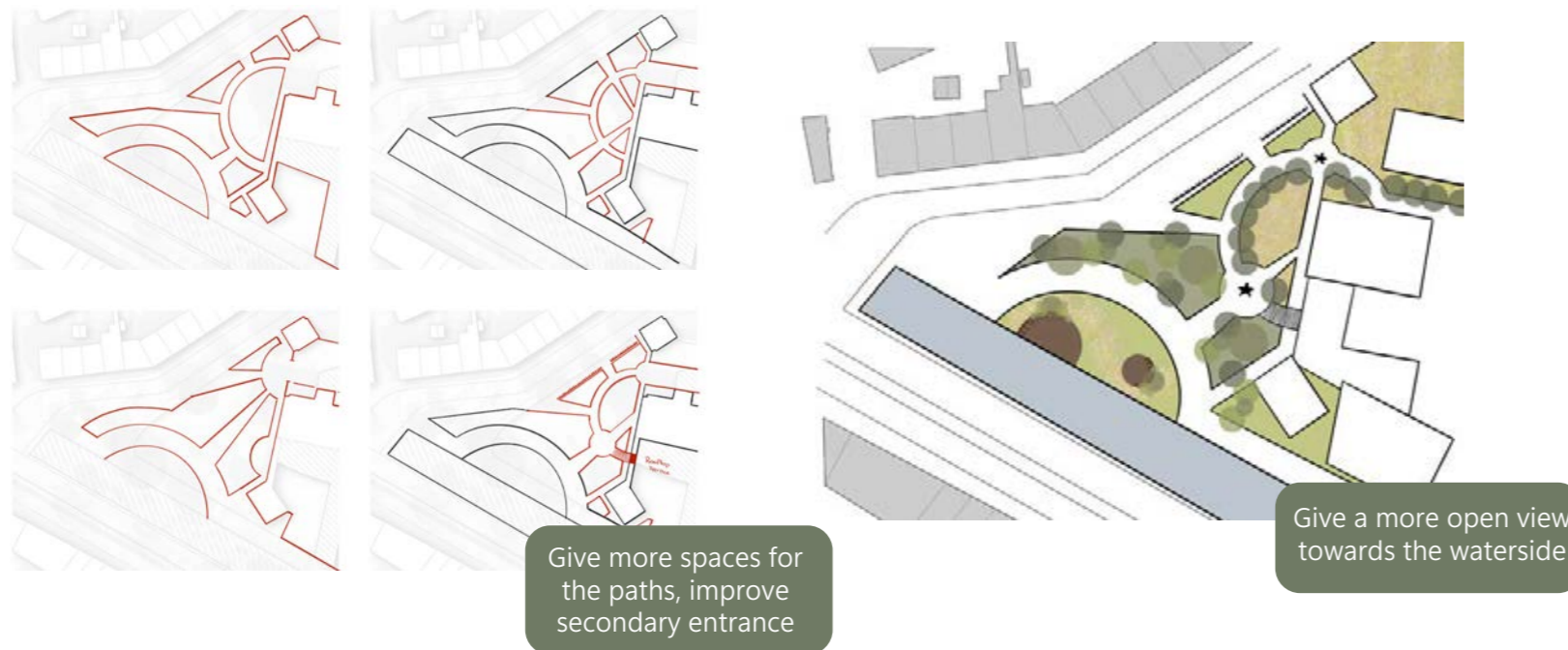
Findings from site visit

- Currently two entrances, but neither are clear as main entrance
- Most people use the alleyway next to the restaurant rather than moving through the restaurant to visit the Koepel
- Existence of roof terrace

P.20

P.21

SKETCHING SESSION 3



The site visit to Koepelplein gave some new insights which affected the design proposal: during this site visit it became apparent that while the entrance through the restaurant may be designed as one of the main entrances to the Koepel, it was not being used as such. People instead took the route that went around the restaurant to enter the Koepel. Another piece of information that came from the site visit is that next to the restaurant a rooftop terrace will be created, while the exact use of this rooftop terrace is unclear at the time of making this design it is something which could be incorporated, for example through the addition of a staircase which gives access to the space.

Based on these findings the design process entered another sketching phase, one which explored shifting the entrance to this alley. Most of the sketches are still based on the previous concept with its circular shapes and axes that lead to the alleyway, instead of to the restaurant and with the addition of a staircase leading to the rooftop terrace.

The final sketch, or concept drawing, from this sketching phase shows that the circular shape in the top half of the conceptual plan continues into the alleyway next to the restaurant. The path to this alleyway is broadened to give it the impression of being the main pathway, and some of the axis that led to the restaurant are removed in this version to take away attention from this entrance, and instead lead people through the alley. Small, circular squares are created in places where the pathways meet, these small squares could be designed as highlights on Koepelplein by for example placing statues or something else as a focal point. A final change in this concept compared to the previous concept is that the area at the waterside is more open, which allows for people to see this area, and the seating areas within, more easily, and invites people to enter.

Figure 4.6 Overview design proces, sketching part 3

CONCEPTUAL DESIGN

4.1 DESIGN PROCESS - CONCEPT

Although new sketches and a new concept were made during the third sketching phase, this version of the concept reminds more of the first version of the concept than of these more recent sketches. The reason for this is that the restaurant building, the building that in the current design of the place is the main entrance, is a very characteristic building and allows for a direct way to access to the Koepel rather than the need to circle around. It allows for a better entrance if the interior design of the restaurant were to change. Some things that were taken from the third sketching phase is making the circular pathway larger and creating more quality in the entrance through the alleyway. The result is that this new concept has two possibilities for entering

the Koepelcomplex, giving people a choice on which entrance to use. This conceptual design can also work longterm if functions in, and around the Koepel were to change. Because the circular pathway is enlarged in this version of the concept there is less room for the creation of the half dome shape through vegetation as was proposed in a previous concept. Instead the inner circle of this pathway consists of colourful plantings adding visual interest, bulbs could be used in these plantings making a reference to the bulb region in which the city is located. More details of the vegetation design are offered in chapter 8. This concept also uses the idea of having a more open waterside which was proposed in sketching phase 3.

LEGEND

- Lawn
- Meadow
- Play Forest
- Flower Border
- Canal
- Buildings

25 meters ↑

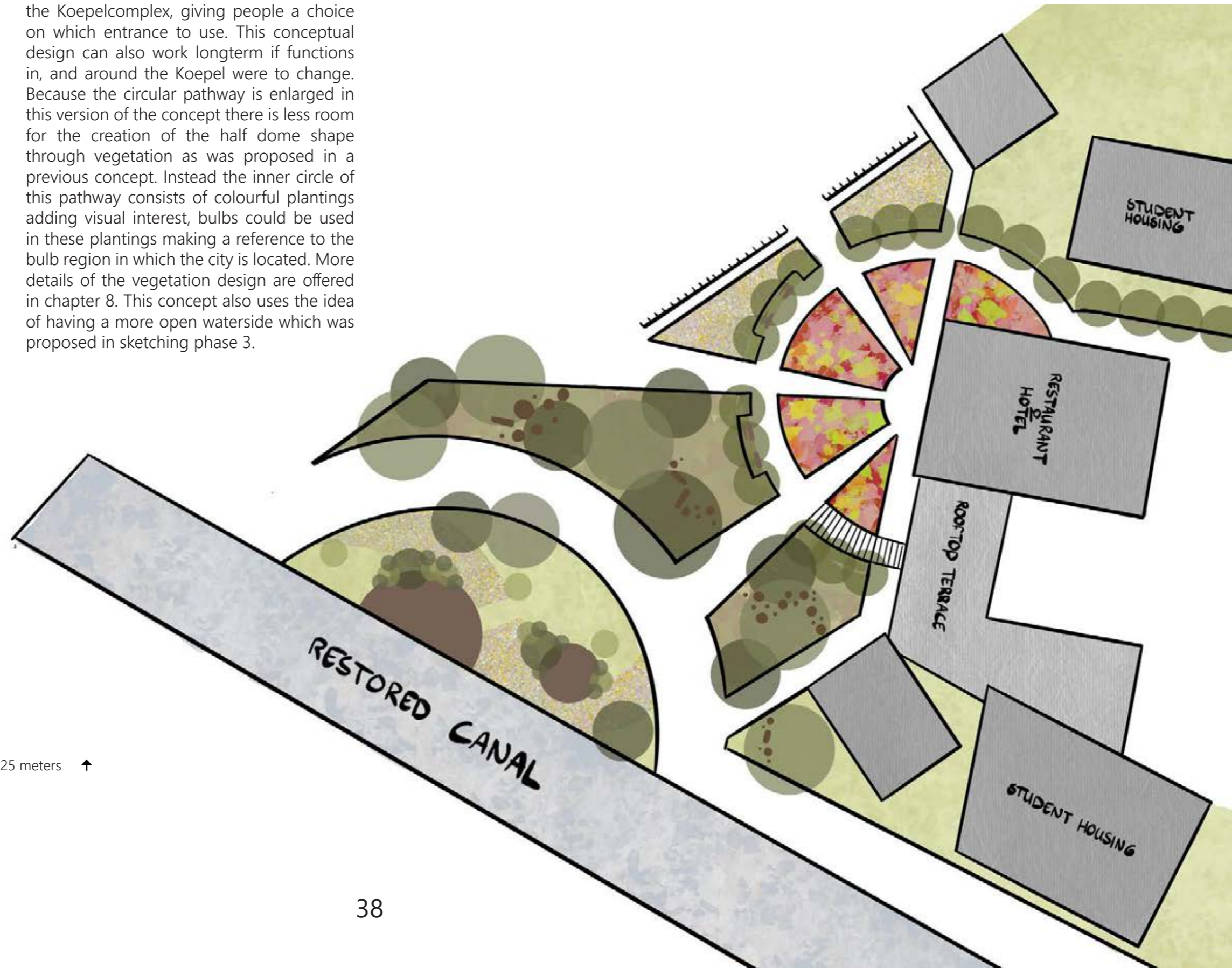
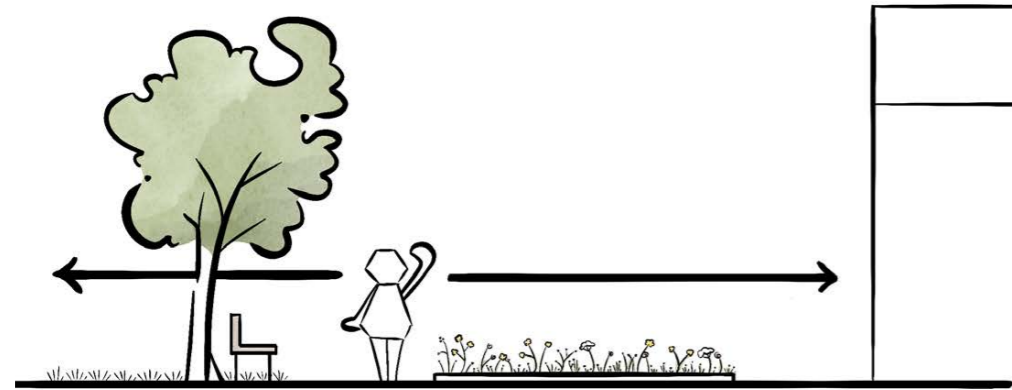


Figure 4.7 Conceptual design

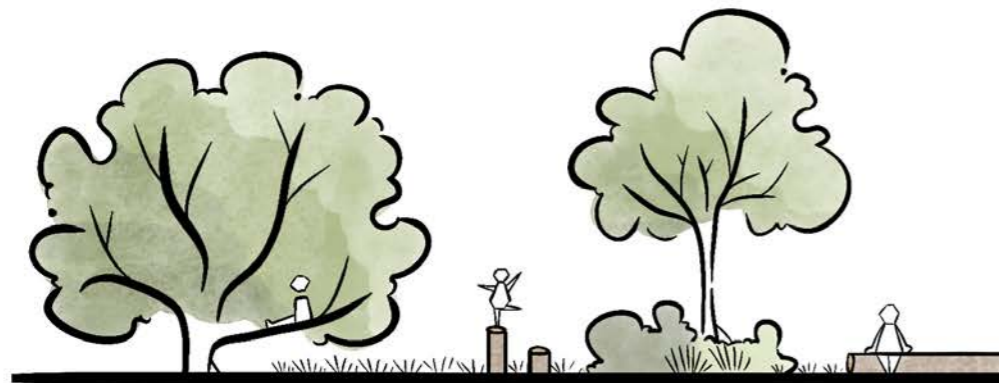
3 AREAS

4.1 DESIGN PROCESS - CONCEPT



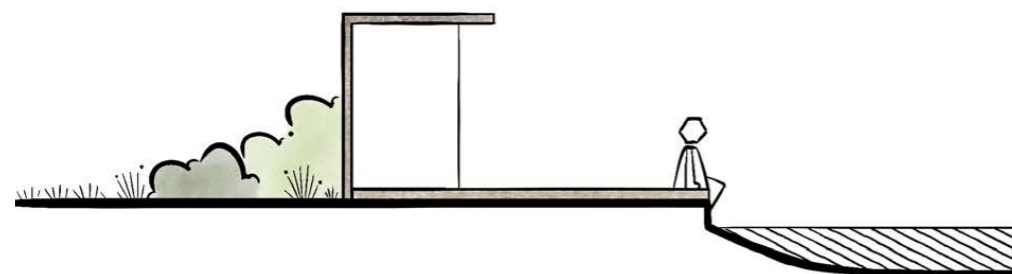
ENTRANCE AREA

In the design for Koepelpark three main areas are created, the first of which is the entrance area. This area is meant for people visiting the Koepel and is designed as a transitional space. Visitors are led to one of two entrances via different axes and a wide circular path. Around this circular pathway trees are placed in such a way that they don't limit the view towards the entrance. On the other side of this pathway colourful plantings are placed, adding visual interest to the area which changes with the seasons.



FOREST AREA

The second main area in the proposed design is a forest, adventure type of area. In this area different tree species of different shapes and sizes are planted in a seemingly random way, giving it a bit more of a naturalistic look. This area can be used as a play area, some of the trees planted are meant to become climbing trees and some other equipment that makes play possible is placed, examples of this are logs for balancing and jumping. The small forest idea will also stimulate the imagination of children using the area.



WATERSIDE AREA

The final area is area near the waterside, here Koepelplein connects to the canal. This space is meant as a more typical park space where people can sit down, rest, and possibly have a chat with other visitors. Seating areas are placed both near the waterside and towards the path, and small clusters of vegetation give some places privacy while keeping other open, some kind of shelter could be created around these seating areas. Within this area a meadow ribbon is to be created with spring flowers, other times of the year the place will function as a lawn, which is also a space where people can sit down or where children can play in summer.

Figure 4.8 Conceptual sections: Three areas

KOEPELPLEIN AS RESTORATIVE SPACE

CHAPTER 5: TESTING THE CONCEPT

URBAN GREEN SPACES FOR HUMAN WELLBEING

5.1 LITERATURE STUDY

The World Health Organisation (WHO) states that 'well-being is a positive state experienced by individuals and societies. Similar to health, it is a resource for daily life and is determined by social, economic, and environmental conditions.' (WHO, 2021). In their glossary the WHO (2021) links wellbeing to quality of life, resilience, and health. In a different report 'Urban green spaces and health' the WHO (2016) collects and summarizes the beneficial effects that green spaces have on human health. These benefits will be briefly discussed in the text below.

The first positive effect that green spaces have is the effect on the physical wellbeing of people. Physical inactivity is a big risk factor to global mortality and one that is increasing as more people start living in urban areas. People living close to green areas show more physical activity which improves fitness and decreases obesity in these areas (WHO, 2016). People living close to green areas generally spend more time outdoors, which has a positive effect on the immune system and leads to an increased exposure to sunlight; this increases Vitamin D and positively affects circadian rhythm which leads to better sleep (WHO, 2016). Other benefits that green spaces bring are related to the effect that they have on their environment: green spaces can reduce noise and air pollution, and heat stress which in turn positively affects human health and wellbeing. Finally there are the effects that green spaces can have on mental health and wellbeing. Urban green spaces offer the opportunity for people to socialize, it allows people to meet and gives them a sense of community, it decreases loneliness

in an area which is a predictor for morbidity and mortality (WHO, 2016). Green spaces also have a restorative effect on human wellbeing, there are two main theories for this: Psycho-physiological stress reduction theory and attention restoration theory. Psycho-physiological stress reduction theory claims that having contact with nature can help people reach a more positive emotional state, as people are naturally predisposed to find non-threatening natural stimuli relaxing. Attention restoration theory assumes that people have two types of attention to give: directed attention and involuntarily attention. Being in a natural environment triggers people to give involuntarily attention to interesting stimuli, this restores the amount of directed attention people can give to more complex tasks (WHO, 2016).

The report concludes that there are many benefits to having green spaces in the city and that these benefits strongly outweigh the detrimental effects -such as exposure to allergenic pollen or infections carried by insects- that green spaces can have. They state that there is a need for both large city parks and small, local green spaces and that creating a well connected green network would greatly benefit cities (WHO, 2016).

RESTORATIVE CITIES FRAMEWORK

In the book restorative cities the authors Roe and McCay (2021) talk about how cities can have a big impact on human wellbeing, and specifically mental wellbeing. They aim to show the association between mental health and the city fabric: bad housing, crime and noise, and poor quality neighborhoods have

a negative impact on our mental health, while parks, squares, gardens and creative spaces can have a positive impact (Roe and McCay, 2021). In the book Roe and McCay give guidelines on creating restorative environments, places that can help people regulate their emotions, recover from stress and mental fatigue, and that reduce feelings of depression and anxiety. They show many of the same benefits as the WHO (2016) collected in their report. This book then takes the next step and creates guidelines

for creating restorative cities. This framework explains aspects of the restorative city in seven different concepts: the green city, the blue city, the sensory city, the neighbourly city, the active city, the playable city, and the inclusive city (Roe and McCay, 2021). The following pages will summarize the findings of the book for these different concepts, and will test whether the conceptual design is suited as a restorative space.

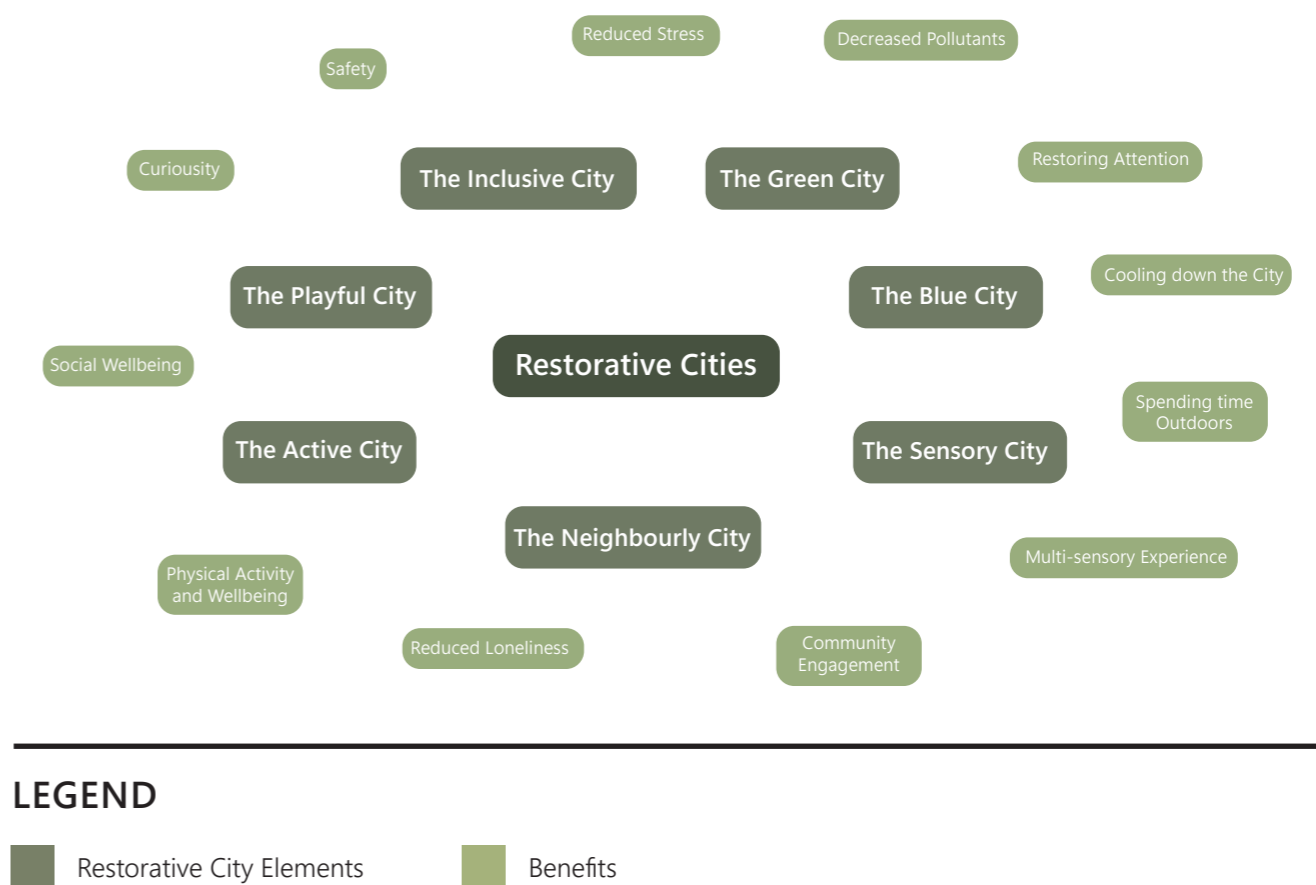


Figure 5.1 Restorative cities framework. Inspired by Roe & McCay (2021).

THE SENSORY CITY

5.2 RESTORATIVE CITIES FRAMEWORK

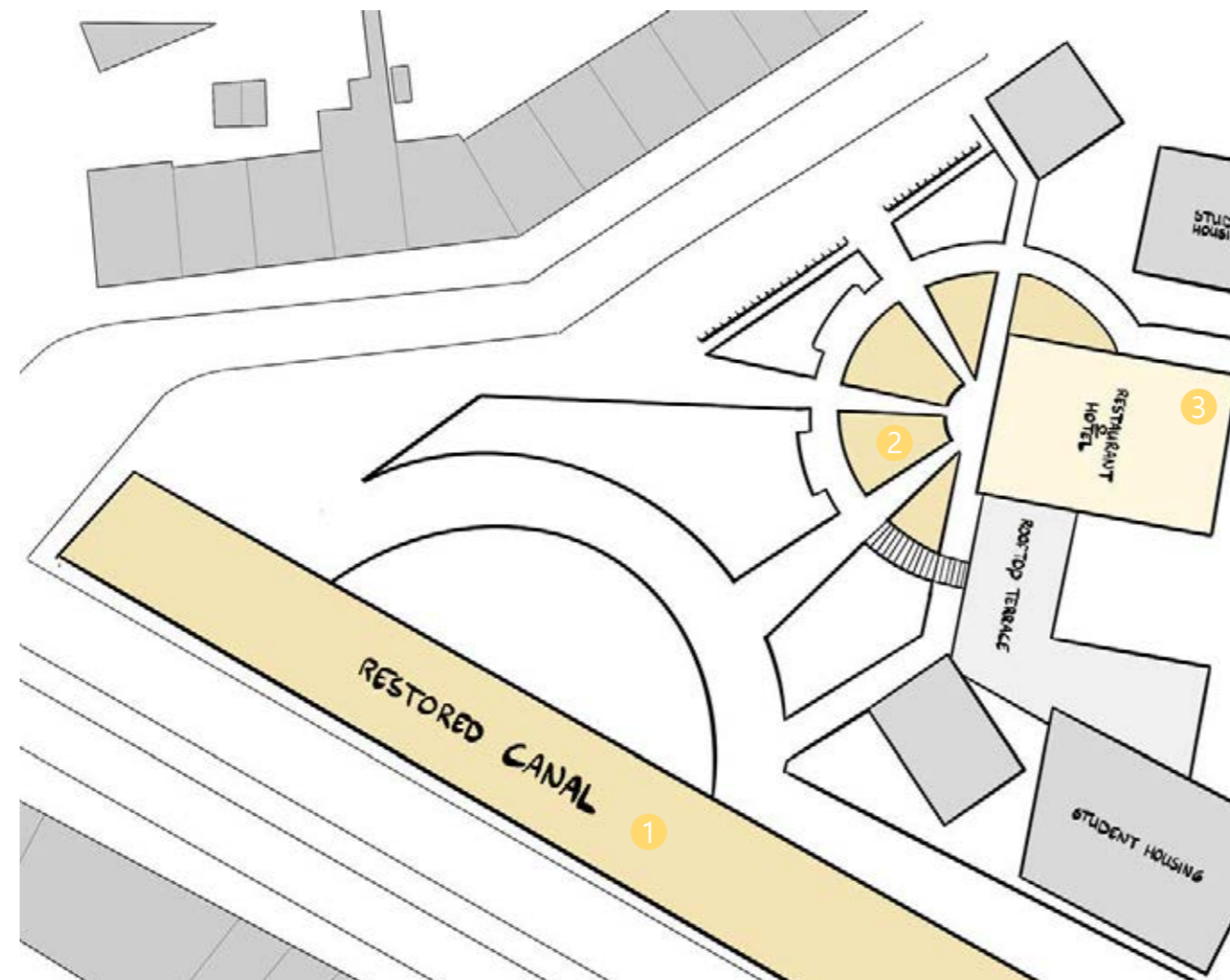


Figure 5.4 Restorative cities framework - The sensory city
Sketch inspired by Roe & McCay (2021).

LEGEND

- ① Restored canal
- ② Plantings
- ③ Restaurant/cafe

— 25 meters ↑

FRAMEWORK

The sensory city is both about decreasing unwanted sensory stimuli and promoting positive sensory stimuli (Roe and McCay, 2021). An example of designing with sound is decreasing noise pollution from busy streets, while at the same time designing positive soundscapes by using different materials that can give off sound in the right circumstances. Examples include leaves rustling with the wind, water flowing from a fountain or steps being heard on the gravel surface. These examples are also linked to the sense of touch; people can experience different textures and materials, which allows them to focus more on their surroundings, fostering an interest. To engage the sense of taste food gardens could be created and markets could take place. In design the sense of sight is almost always engaged but this sense could be further stimulated through colourful facades and artworks within the city. People consider spaces with symmetry and good sense of scale and proportion to be more visually pleasing. These elements can be incorporated in a design to generate more interest from passersby (Roe and McCay, 2021).

DESIGN

The current plan for Spaarnesprong reduces many of the unwanted sensory stimuli such as the sounds from the busy car road. In addition to that, the proposed design adds new desired sensory stimuli: the planting surrounding the entrance adds visual interest to the place and, if the right vegetation is chosen, can introduce a pleasant smell. The water body adds a new experience where people can touch the water. The water will likely flow very slowly and therefore not generate much sounds of its own, but could also add an auditive experience when it's raining. And finally the restaurant, even if it's a place where one has to order to be able to sit there, gives people the opportunity to eat and drink something which engages the senses of taste and smell. These various sensory stimulants encourage people's engagement with the place which has a positive impact on human wellbeing (Roe and McCay, 2021).

THE NEIGHBOURLY CITY

5.2 RESTORATIVE CITIES FRAMEWORK

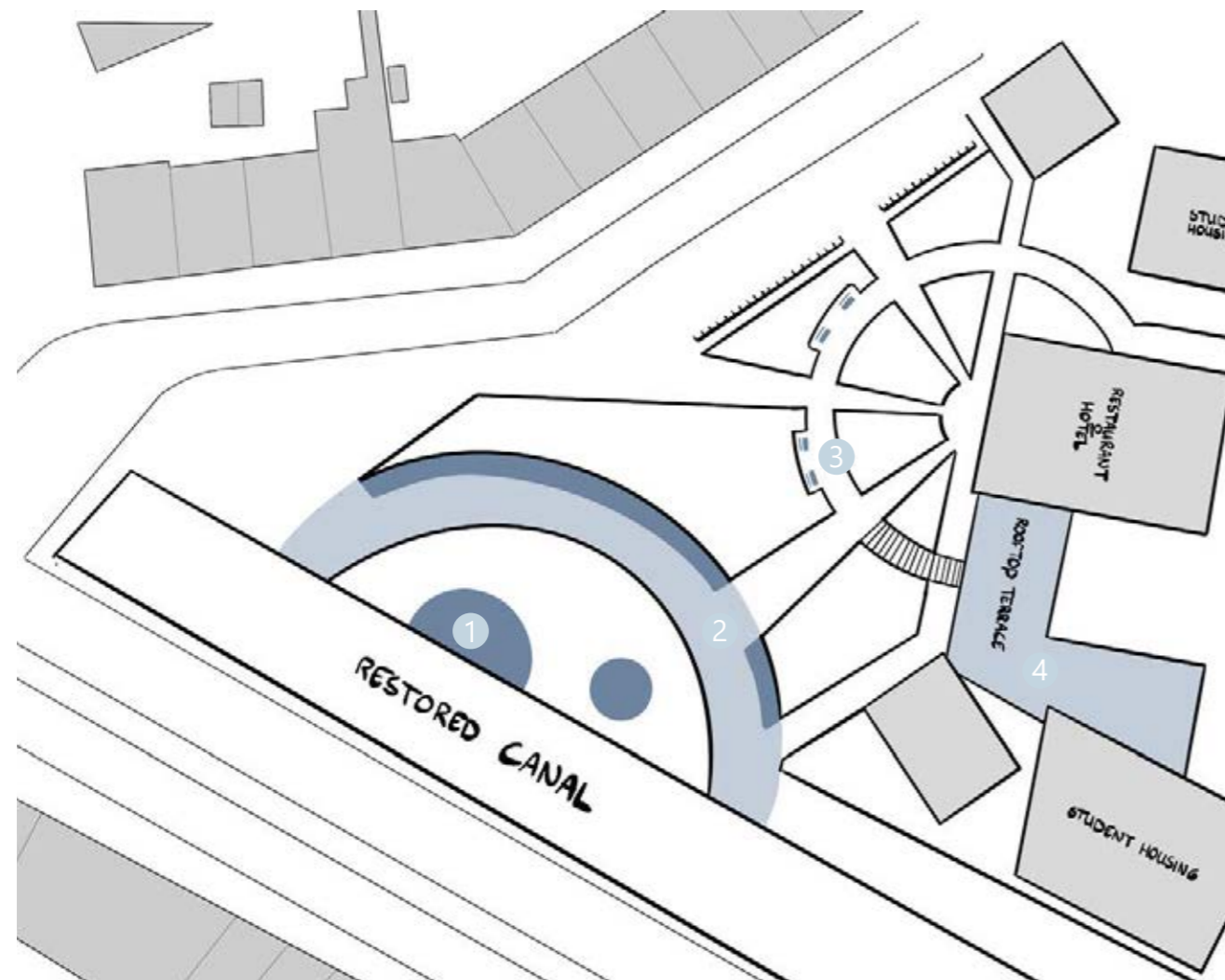


Figure 5.5 Restorative cities framework - The neighbourly city
Sketch inspired by Roe & McCay (2021).

LEGEND

- ① Waterside seating
- ② Canal promenade
- ③ Seating
- ④ Rooftop terrace

25 meters ↑

FRAMEWORK

The neighbourly city is about increasing social interaction within a city or neighbourhood. Having a strong social network within a neighbourhood or city can decrease feelings of loneliness and social isolation, people who have a strong social network are less likely to develop mental health problems and they can recover more quickly than those who do not have this type of network (Roe and McCay, 2021).

In order to establish a network in a place it is important for people to have the opportunity to meet the same people regularly. This can be a challenge in big cities where you could encounter thousands of strangers every week; stimulating people to use amenities nearby their homes can help in limiting the size of a community, allowing people to encounter the same people regularly, which increases the chance of people developing deeper relationships with their neighbours (Roe and McCay, 2021). Pocket parks can be one of the places where these neighbourly relations are formed as they are meant to be used by the very local communities. Another important factor in creating a neighbourly city is for people to remain living in the same neighborhood, if people tend to move often they have less of an incentive to form relationships with their neighbours.

Design elements that help stimulate the neighbourly city on a small scale include linking social spaces to places that people

use regularly such as schools. It creates safe, informal places that offer the opportunity for people to meet. Preferably these spaces are welcoming to all and require no purchase to participate. They should provide permeable facades that stimulate walkable neighborhoods, and they should also provide participatory activities for all ages (Roe and McCay, 2021).

DESIGN

One of the challenges for the design of Koepelplein is to find a balance between creating an entrance space for people visiting the Koepel-complex, and creating a green space where locals go to meet people or rest. In its current iteration the design is more focused on being an entrance to the Koepelcomplex; the design is more catered towards tourists and other people who visit the place irregularly. There are not that many places to sit down, and there is little space for activities separate from those the Koepel already offers. It does not invite locals to regularly visit, something which is important in creating a sense of place and community as described by Roe and McCay (2021).

Different places within the design that can be developed with the ideas of the neighbourly city in mind are the green seating areas by the waterside, the promenade along the canal, and the rooftop terrace. Especially the function and design of the rooftop terrace and the promenade are unclear in the conceptual design. All three of these places need to be developed further if they are to contribute to having a restorative design.

THE ACTIVE CITY

5.2 RESTORATIVE CITIES FRAMEWORK

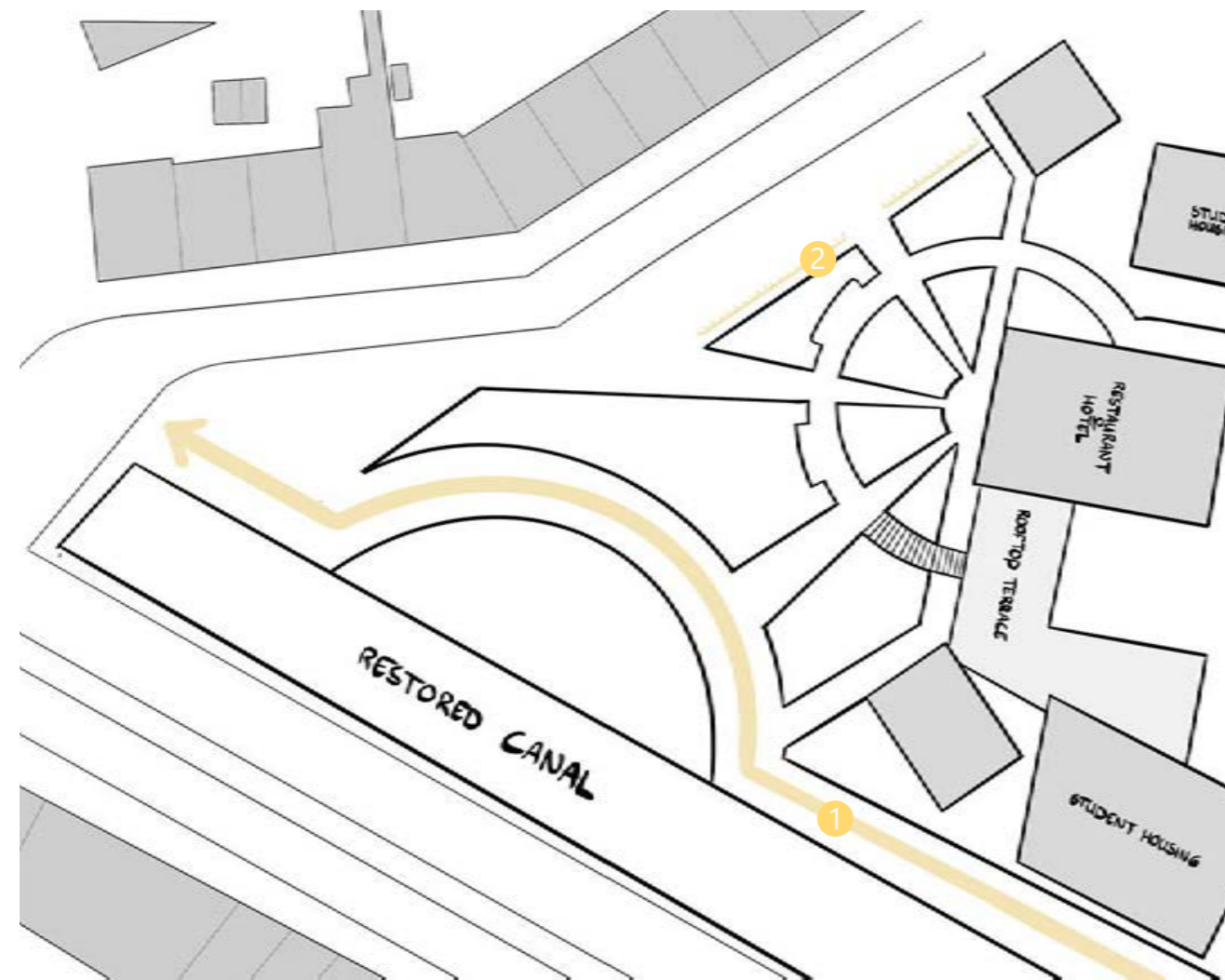


Figure 5.6 Restorative cities framework - The active city
Sketch inspired by Roe & McCay (2021).

LEGEND

- ① Canal promenade
- ② Bicycle racks

— 25 meters ↑

FRAMEWORK

The active city shows that mental wellbeing is very much linked to physical wellbeing. By stimulating people to move and exercise people will have better physical health; they are fitter and the chances of chronic illnesses reduce, which in turn increases mental wellbeing. Nowadays, many people do not move enough, they take the car to go anywhere in the city and mostly sit behind a desk during the day. City planning could help in making movement part of the daily routine for people: by providing safe and interesting places nearby homes, people are more likely to walk or cycle to their destination, rather than take the car (Roe and McCay, 2021; WHO, 2016). Creating these walkable, active cities also helps in achieving other aspects of restorative cities: moving more slowly allows for people to meet, and green and blue spaces can be designed to stimulate people to be more active by providing places for physical exercise.

In order to achieve the active city it is important for people to feel safe while moving around. This means that decent lighting and ample pedestrian space are needed. It is also important to stimulate the senses of people that are moving more slowly, an interesting, lively environment invites more

people than a deserted block with closed off facades. Finally it is important for spaces to be adapted to the climate: in cities that deal with heat stress shade should be provided and in wet climates there might be a need for shelter from rain and wind (Roe and McCay, 2021). Many of these design elements are also discussed in the inclusive city.

DESIGN

The active city is mostly something which plays on a larger scale, in the area surrounding the site. To the east of the site you can find a bike road and there are many bike paths and pedestrian paths surrounding the restored canal, this also includes the promenade which goes through the design site and is highlighted in figure 5.6. On the site some space is reserved for bicycle parking to stimulate people to take their bike. Elsewhere in the plan for the Koepel Complex more space is given for bicycle parking (Gemeente Haarlem, 2018).

Although there are few design elements on the site itself that promote the active city, the site is part of the development plan for Spaarnesprong which promotes walking and cycling. The site is one of the spots which could be a destination for people to go to within their neighborhood.

THE INCLUSIVE CITY

5.2 RESTORATIVE CITIES FRAMEWORK

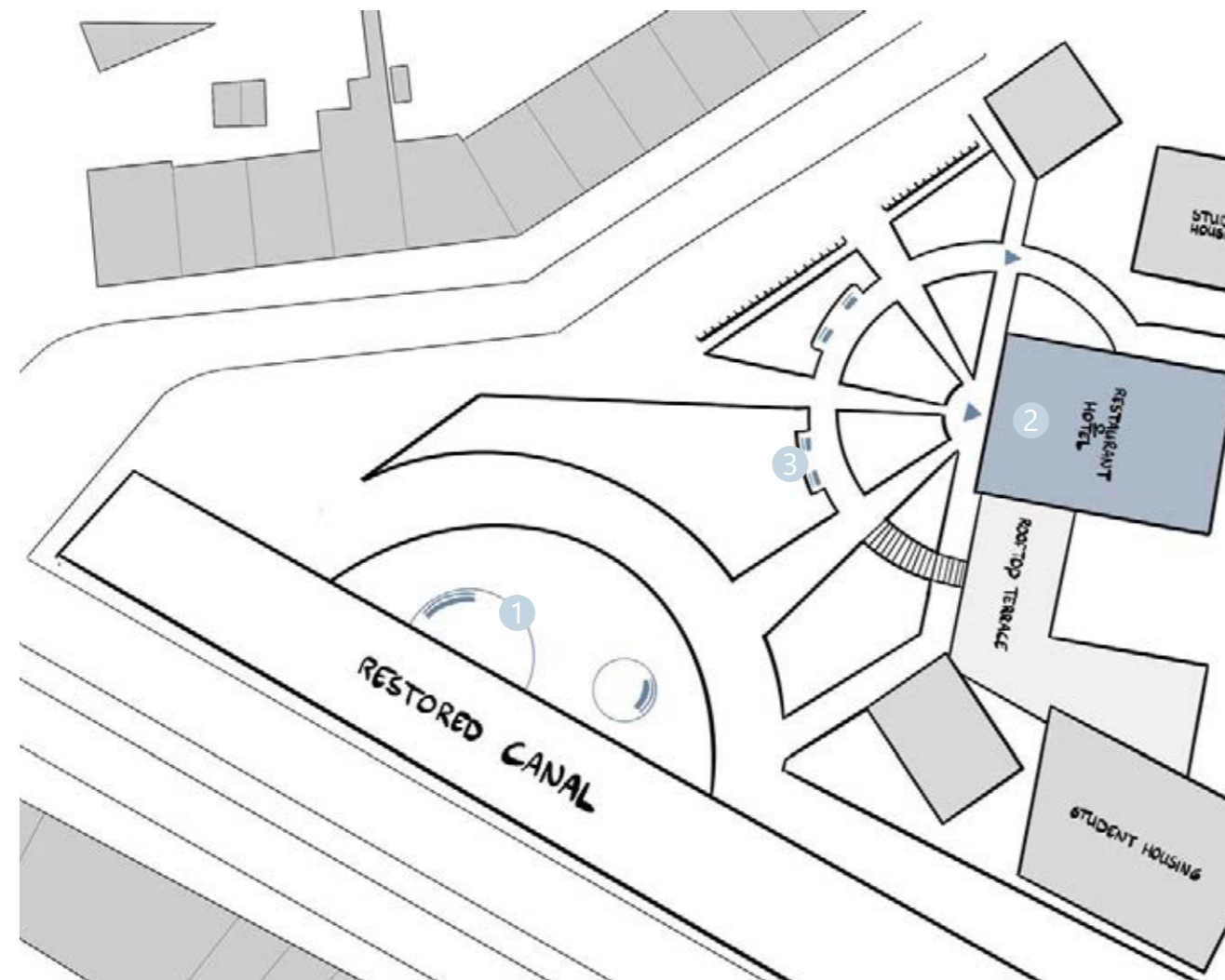


Figure 5.8 Restorative cities framework - The inclusive city
Sketch inspired by Roe & McCay (2021).

LEGEND

- ① Waterside seating
- ② Restaurant
- ③ Seating

— 25 meters ↑

FRAMEWORK

The inclusive city focuses on making urban, restorative spaces accessible for everyone, this includes looking at the wants and needs of different genders, ethnicities and age groups (Roe and McCay, 2021). To be inclusive a place should be accessible and safe for everyone: Pedestrian infrastructure should consist of wide streets, it should include pedestrian ramps, and provide ample places to sit down; clear signage should be used for people to easily find the way. Safety should be ensured by having good lighting, a visual connection with the streets surrounding the place, and if possible have some kind of natural surveillance throughout the day which requires varied functions to be on, or near the site (Roe and McCay, 2021, Zhang et al., 2024). Finally a design could include several subdivisions which allows multiple groups of people to use the site at the same time (Roe and McCay, 2021).

DESIGN

One of the design principles for Koepelplein was to emphasize the entrances, meaning that these entrances are easily visible. In the design there is also always a view towards the street as the areas within the design are quite small. Different areas exist that can be used by different groups of people, and new seating areas are proposed which makes the design more inclusive.

While most of the design is on equal level there is an exception to this: the rooftop terrace. This area is only accessible by a staircase, there is no elevator access from the nearby buildings and the height difference is too large to reasonably add a ramp in the design to access this area. This means that the rooftop terrace should not become the main community space within the design as it would not be accessible to all visitors.

KOEPELPLEIN AS RESTORATIVE SPACE

5.2 RESTORATIVE CITIES FRAMEWORK

Looking at the various aspects of the restorative cities framework when applied to the conceptual design of Koepelplein, it becomes clear that in many ways the place would function as a restorative space. It includes many green spaces, and makes a connection to the water of the canal, which can restore attention and decrease stress in visitors. There are many sensory stimuli and there is some opportunity for play which engages people's creativity. Having these

elements in the neighborhood, close to one of the main pedestrian routes towards the city center, gives a place to stay and rest for those moving through the area. This type of space can stimulate people to go outside and take a walk or cycle there.

Figure 5.9 shows that there is an overlap between various design elements: the same element is used to achieve different goals within the restorative city framework. For

example the seating near the waterside is part of both the blue city and the neighbourly city.

Some aspects that the design for Koepelplein can improve on are the social spaces. A large part of Koepelplein is designed as the entrance to the Koepel, which makes it a transitional space. More attention needs to be given to what Koepelplein itself can bring to the neighborhood, this includes the

seating area, the promenade and potentially the roof terrace. These elements need to be further developed in a more detailed design. In a more detailed, three dimensional design more attention could also be given to sightlines and open and closed spaces, this can help in having the place be usable by multiple groups at the same time, it is beneficial for both the social use of the site, as for making the site inclusive and safe.

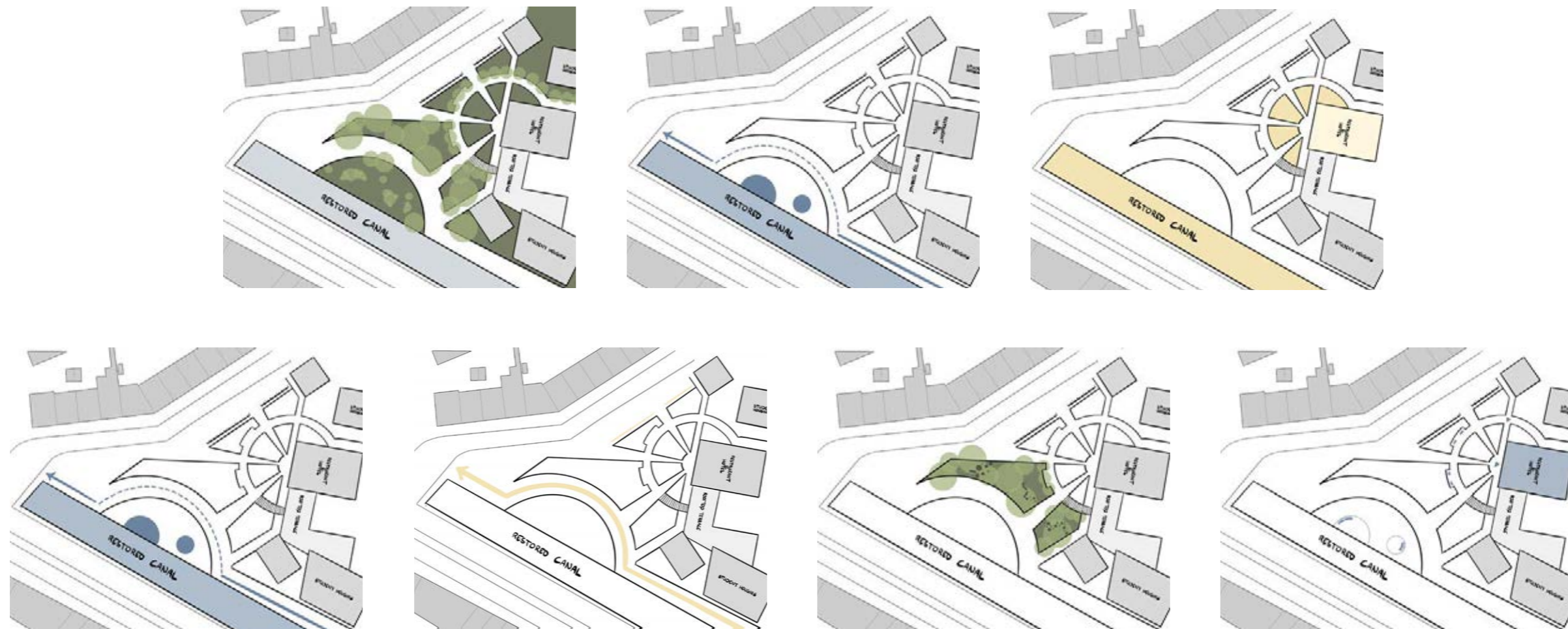


Figure 5.9 Collected sketches restorative city framework

DECREASING HEAT STRESS

CHAPTER 6: TESTING THE CONCEPT

RECOMMENDATIONS ON REDUCING HEAT STRESS

6.1 LITERATURE STUDIES

Heatwaves are becoming more common due to climate change; especially in urban areas these heatwaves can lead to extreme heat stress. A policy brief by the European Commission shows that the temperatures in urban areas are on average 4-6 degrees celsius higher than in surrounding rural areas, this so-called urban heat island effect is caused by an abundance of sealed surfaces, heat emitting surfaces, lack of ventilation and lack of greenery (Iodice et al., 2024). Extreme heat stress is the cause for multiple health risks and increased mortality rates, it also has a negative effect on air quality as the urban heat island can trap atmospheric pollutants (Iodice et al., 2024; Soltanifard & Amani-Beni, 2025).

The policy brief (Iodice et al., 2024) gave several recommendations on how to reduce the heat stress in European cities. Some of these were related to better monitoring heat, creating action plans and providing basic necessities such as drinking water, which is outside the scope of this thesis work. Other recommendations are part of the urban design of the city and could therefore be incorporated in the design for Koepelplein; most of these recommendations are about increasing vegetation and shaded areas in public spaces, infrastructure and buildings. They also recommend incorporating more

water features in public areas (Iodice et al., 2024).

Soltanifard & Amani-Beni (2025) have undertaken a systematic review of the various cooling benefits that urban green spaces can bring. This study concludes that there are three main mechanisms through which urban green spaces can cool urban environments: shading, evapotranspiration, and spatial patterns. The most significant cooling effect is achieved through a combination of these mechanisms (Soltanifard & Amani-Beni, 2025).

Shading is mostly achieved through the placement of trees and can reduce the surface temperature by ~2-7 degrees celsius. (Soltanifard & Amani-Beni, 2025). This effect is dependent on vegetation type and is limited to the area directly surrounding the vegetation. Evapotranspiration can be achieved through various vegetation types and can reduce air temperature by ~1-5 degrees celsius locally (Soltanifard & Amani-Beni, 2025). Spatial patterns can have a large impact on local temperatures, they can reduce the surface temperature by ~2-7 degrees celsius and air temperature by ~1-3 degrees celsius (Soltanifard & Amani-Beni, 2025). These cooling effects are very dependent on the spatial structure itself:

large parks can cool larger areas -cooling can extend 300-500 meters from the park- while smaller urban green spaces, such as pocket parks, have a cooling radius of less than 100 meters. The cooling effect is also dependent on the fragmentation: connected green spaces have a bigger cooler effect (Soltanifard & Amani-Beni, 2025). A study by Ma et al. (2023) confirms that the cooling effect of pocket parks can be stretched to around 100 meters radius at pedestrian height surrounding the park which allows for multiple pocket parks to be strung together, and create a cooling effect for the city. This study also found that trees, especially when clustered give a significant cooling effect. to optimize this the these trees should be placed in such a way that they shaded the pathways (Ma et al., 2023).

THERMAL COMFORT

Thermal comfort is a subjective measurement on how satisfied people are with their thermal environment (Emetere, 2022). While various studies have shown that air temperature has the strongest correlation with thermal sensation, it is not the only parameter that influences thermal comfort (Porwal et al., 2025). There is also the mean radiant temperature, which is based on the temperature of surrounding surfaces with which the occupant can exchange radiant

heat, it is very dependent on the materials used for these surfaces (van Paassen, 2004). Another atmospheric factor is the wind speed, higher wind speeds can have a cooling effect by increasing the bodies convective heat loss (Porwal et al., 2025). The final atmospheric factor for thermal comfort is the relative humidity which is a measure for how much water vapour can be absorbed by the air (van Paassen, 2004), this affects the bodies ability to cool itself through evaporation and is most relevant in very humid situations (Porwal et al., 2025).

Apart from these atmospheric factors thermal comfort is also dependent on the activity level and the type of clothes being worn (van Paassen, 2004) and will be different for each person as it is a subjective measurement: age, gender, personal preference and experience all affect the experienced thermal comfort of a person.

ENVIMET SIMULATIONS

6.2 ENVIMET - METHOD



Figure 6.1 Surfaces current situation
Made using Envimet

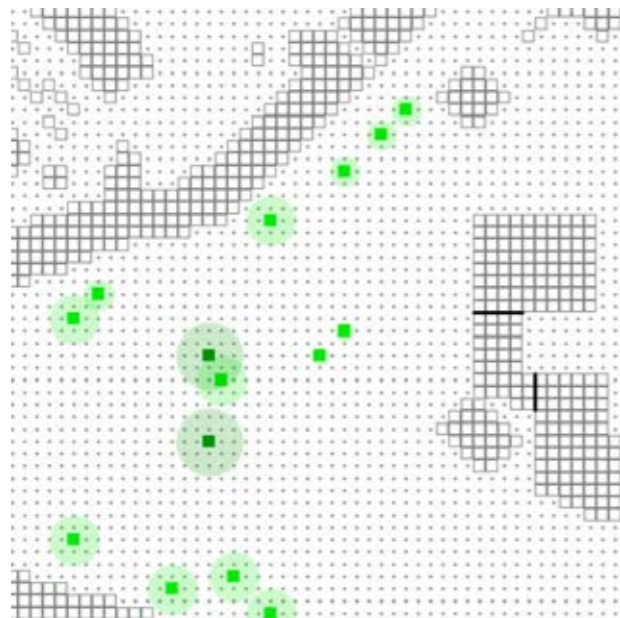


Figure 6.3 Vegetation current situation
Made using Envimet



Figure 6.2 Surfaces conceptual design
Made using Envimet

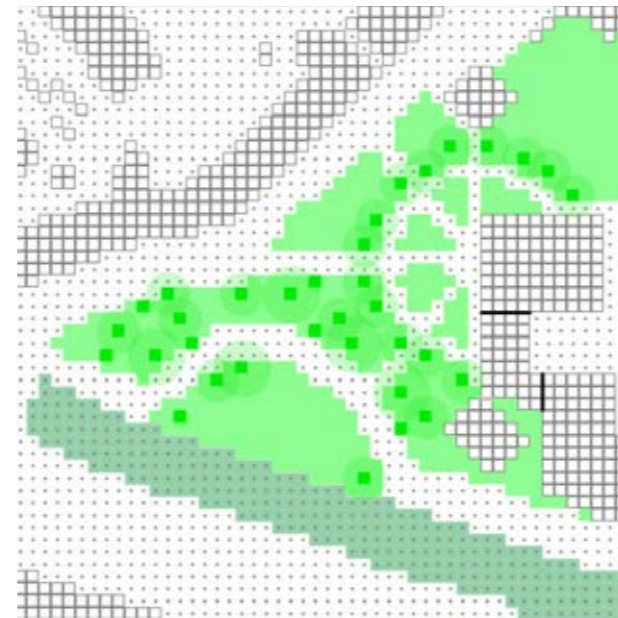


Figure 6.4 Vegetation conceptual design
Made using Envimet

LEGEND

- Buildings
- Asphalt
- Concrete
- Open soil
- Brick path
- Water, 1m depth

Grid size 2x2 meters N
↑

LEGEND

- Low vegetation cover
- Tree 6 meters
- Tree 12 meters
- Terrain depth: 1 meter

Grid size 2x2 meters N
↑

In this chapter an analysis of the heat stress on Koepelplein is made using Envimet, a modelling software program used to simulate the microclimate for a site. This thesis will use Envimet to determine how the proposed changes from the conceptual design affect the air temperature compared to the current situation. The simulation will focus on the effects of surface material and vegetation.

The Envimet simulations are based on a grid model of the site, for Koepelplein a 50x50 grid has been made with each cell representing a 2x2 meters area. Figure 6.1 and 6.2 show the surface material models for the current situation and the conceptual design. The figures show that the main difference between the current situation and the conceptual design is the addition of open soil -where vegetation will be planted- and water. The materials used in this model are based on the Envimet standard values.

Figures 6.3 and 6.4 show the grid model for vegetation and terrain. The model for conceptual design contains more vegetation however the model for the current situation contains some bigger trees that are already located on site but have been removed in the design.

POTENTIAL AIR TEMPERATURE

6.3 ENVIMET - RESULTS

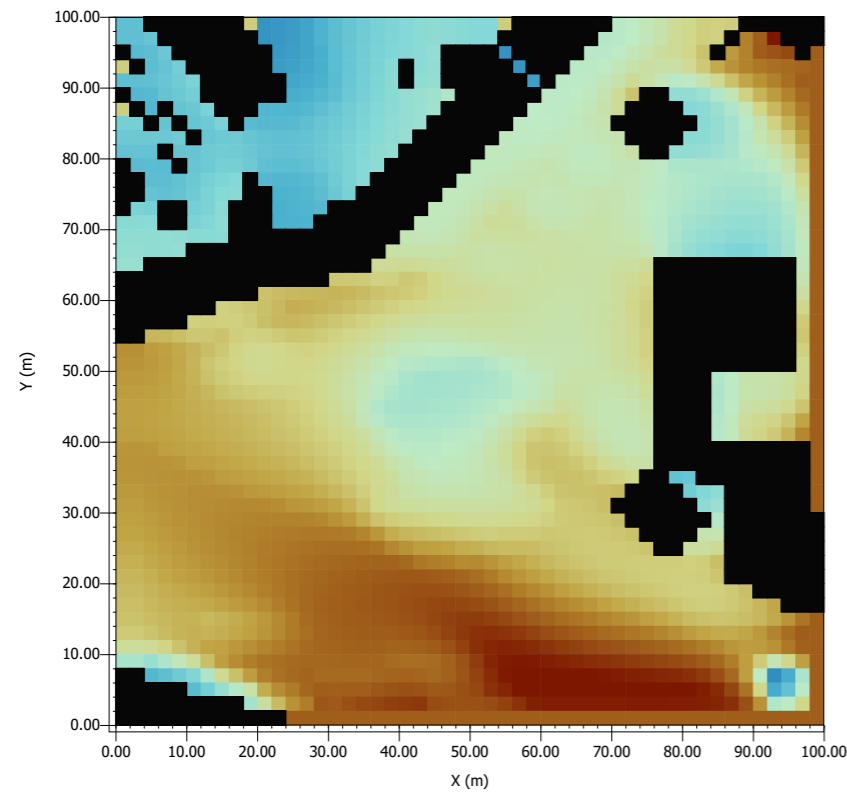


Figure 6.5 Air temperature current situation 01/07/2015 16.00
Made using Envimet

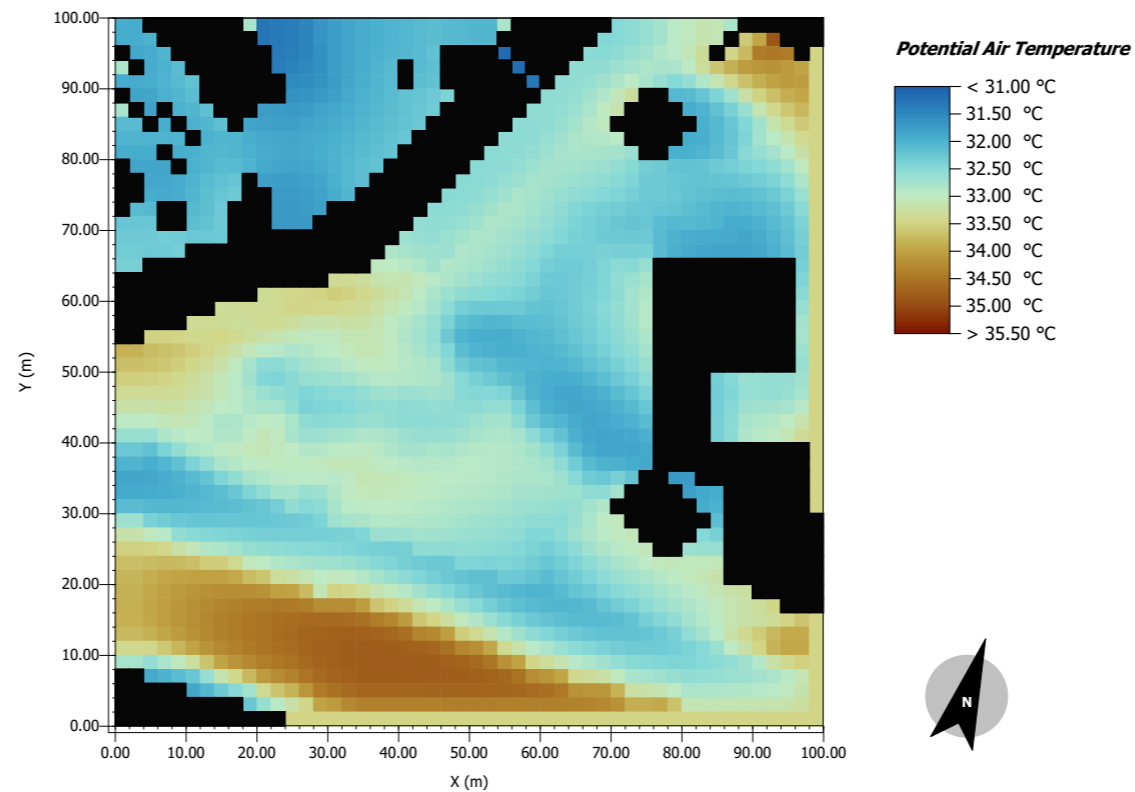


Figure 6.6 Air temperature conceptual design 01/07/2015 16.00
Made using Envimet

Figures 6.5 and 6.6 show the potential air temperature on Koepelplein in both the current situation and the conceptual design for the first of July 2015. This date was chosen as it was previously used in the analyses of the urban heat island effect shown on the map in figure 2.16 in chapter 2. The climate data used for this simulation is shown in figure 6.7 and was obtained from Weerstatistieken.nl. (n.d.).

The maps show that the potential air temperature on Koepelplein decreases with about 1-2 degrees celcius in the conceptual design. This change is due to the added vegetation and the partial removal of the road compared to the current situation. This decrease in temperature is in line with the predictions on temperature decrease of Soltanifard & Amani-Beni, 2025 that were discussed on page 51.

	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Temperature (°C)	18.83	20.25	21.67	23.08	24.50	25.92	27.33	28.75	30.17	31.58	33.00	31.58	30.17
Relative humidity (%)	63.44	58.67	53.89	49.11	44.33	39.95	34.78	30.00	32.87	35.73	38.60	41.47	44.33

Average windspeed: 4 m/s
Average winddirection: 123°
No cloud cover

Figure 6.7 Climate data 01/07/2025. Data from Weerstatistieken.nl. (n.d.)

MEAN RADIANT TEMPERATURE

6.3 ENVIMET - RESULTS

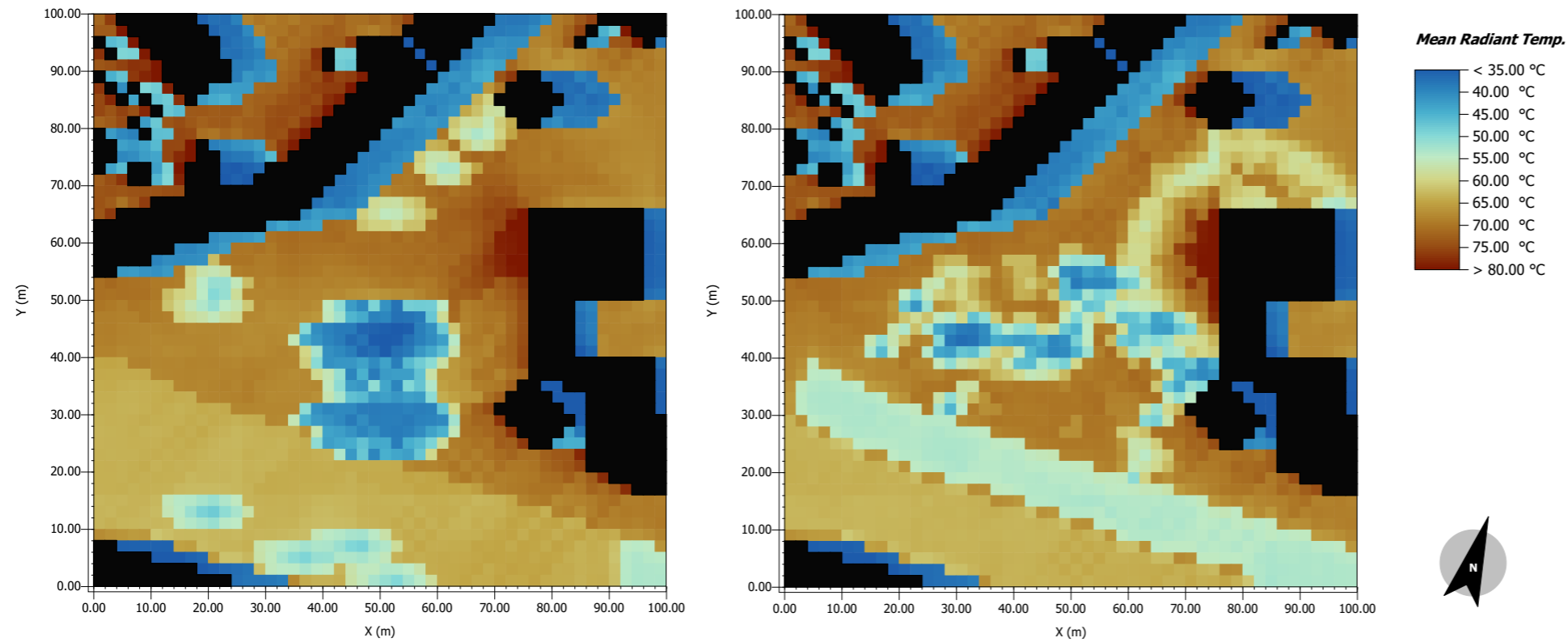


Figure 6.8 MRT current situation 01/07/2015 16.00
Made using Envimet

Figure 6.9 MRT conceptual design 01/07/2015 16.00
Made using Envimet

The mean radiant temperature (MRT) is shown in figures 6.8 and 6.9 for the current situation and the conceptual design. Both figures show that the MRT changes drastically throughout the site with temperatures between 30 and 80 degrees. The maps show that trees are the most important factor in bringing down the MRT: the placement of trees can be overlapped with the cooler areas on the map.

Comparing the two maps shows that the added trees, and the new canal in the conceptual design cool down the overall site. However, it also shows that bigger trees, which in this comparison can only be found in the current situation, have a bigger cooling effect than multiple smaller trees. Future variations should experiment with preserving existing vegetation and adding larger trees.

	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Temperature (°C)	18.83	20.25	21.67	23.08	24.50	25.92	27.33	28.75	30.17	31.58	33.00	31.58	30.17
Relative humidity (%)	63.44	58.67	53.89	49.11	44.33	39.95	34.78	30.00	32.87	35.73	38.60	41.47	44.33

Average windspeed: 4 m/s
Average winddirection: 123°
No cloud cover

Figure 6.7 (repeated) Climate data 01/07/2025. Data from Weerstatistieken.nl. (n.d.)

WINDSPEED

6.3 ENVIMET - RESULTS

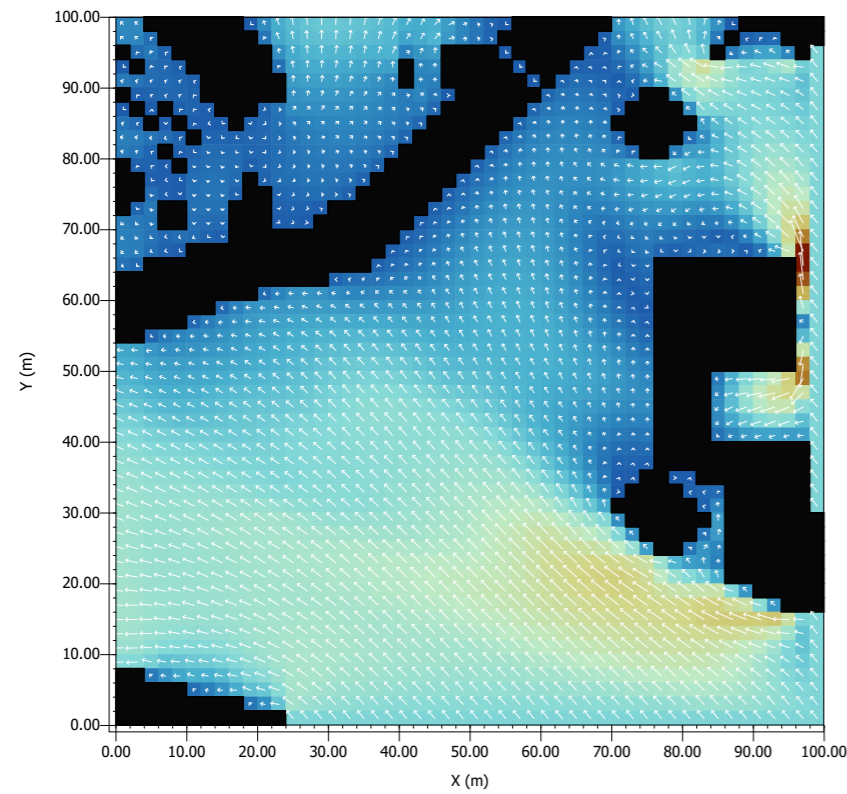


Figure 6.10 Wind speed current situation 01/07/2015 16.00
Made using Envimet

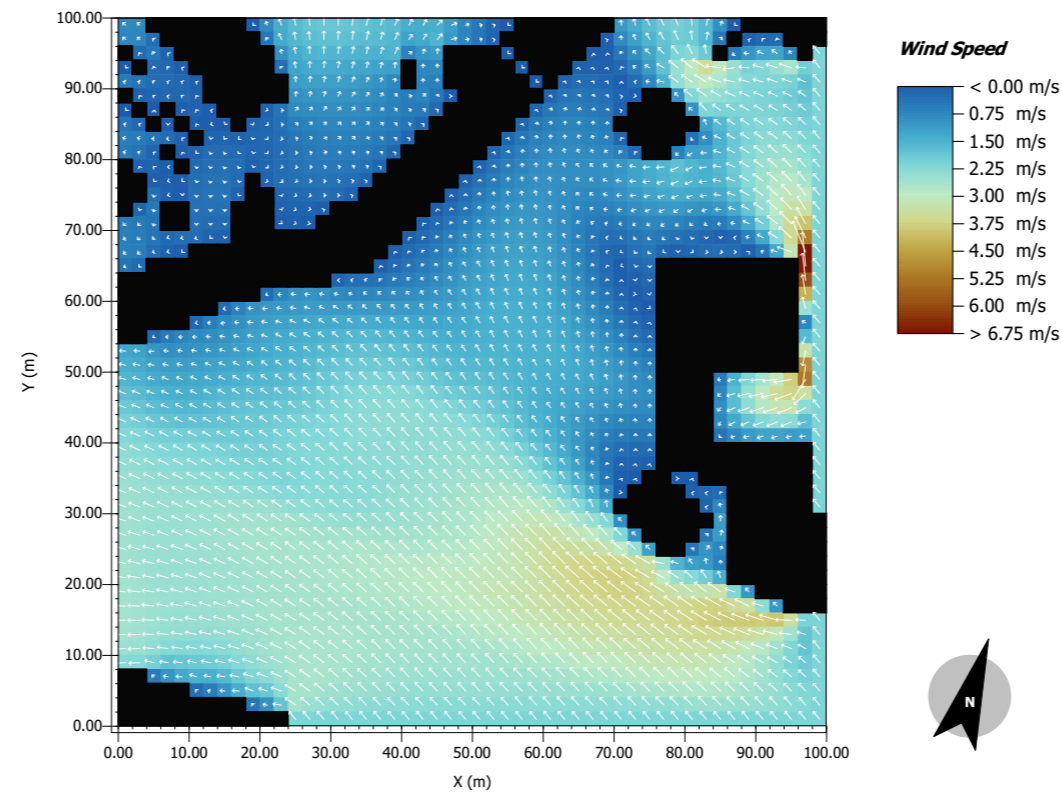


Figure 6.11 Wind speed conceptual design 01/07/2015 16.00
Made using Envimet

The wind speed on Koepelplein for the first of July 2015, at 16.00 is shown in figures 6.10 and 6.11. The figures show that the proposed design changes have little effect on the wind speeds on site in these conditions. The wind speeds seem to be almost wholly determined by the building masses which will not change in the design. Future analyses of design variations will therefore not look at the changes of wind speed on the site.

	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Temperature (°C)	18.83	20.25	21.67	23.08	24.50	25.92	27.33	28.75	30.17	31.58	33.00	31.58	30.17
Relative humidity (%)	63.44	58.67	53.89	49.11	44.33	39.95	34.78	30.00	32.87	35.73	38.60	41.47	44.33

Average windspeed: 4 m/s
Average winddirection: 123°
No cloud cover

Figure 6.7 (repeated) Climate data 01/07/2025. Data from Weerstatistieken.nl. (n.d.)

RELATIVE HUMIDITY

6.3 ENVIMET - RESULTS

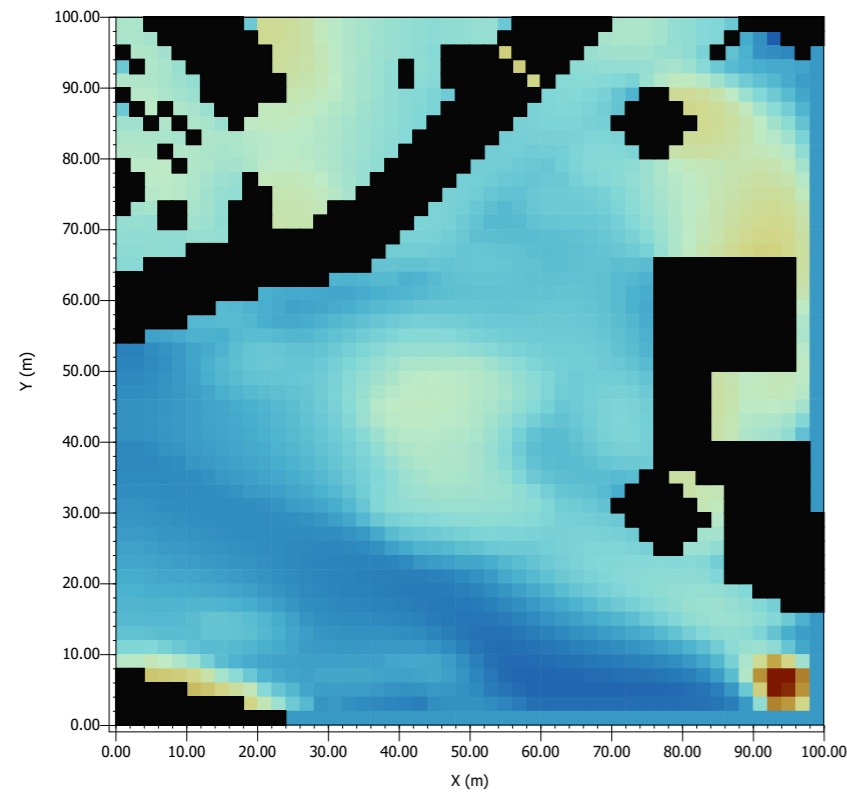


Figure 6.12 Relative Humidity current situation 01/07/2015 16.00
Made using Envimet

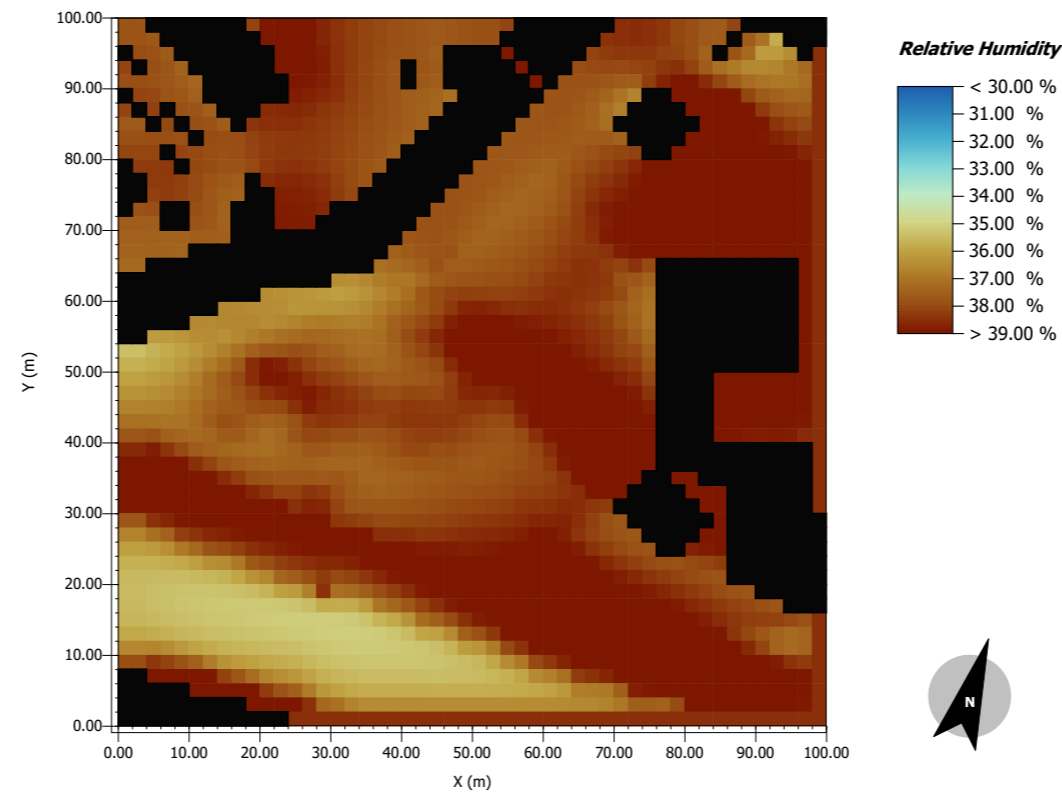


Figure 6.13 Relative Humidity conceptual design 01/07/2015 16.00
Made using Envimet

Figures 6.12 and 6.13 show the relative humidity on Koepelplein in the current and designed situation for the first of July 2015 at 16.00. The figures show that there is a big difference in relative humidity between the current situation and the design. The restored canal is the main cause for this difference, adding a new water body to a situation where there previously was none will increase the water vapour absorbed by air. Other changes, such as the addition of vegetation only have a very limited effect.

Future analyses of design variations will not look at the changes of relative humidity on the site as the addition of the canal is treated as a given in the design, and other changes seem to have little to no effect

	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Temperature (°C)	18.83	20.25	21.67	23.08	24.50	25.92	27.33	28.75	30.17	31.58	33.00	31.58	30.17
Relative humidity (%)	63.44	58.67	53.89	49.11	44.33	39.95	34.78	30.00	32.87	35.73	38.60	41.47	44.33

Average windspeed: 4 m/s
Average winddirection: 123°
No cloud cover

Figure 6.7 (repeated) Climate data 01/07/2025. Data from Weerstatistieken.nl. (n.d.)

ALTERNATIVE DESIGNS

6.4 DESIGN VARIATIONS

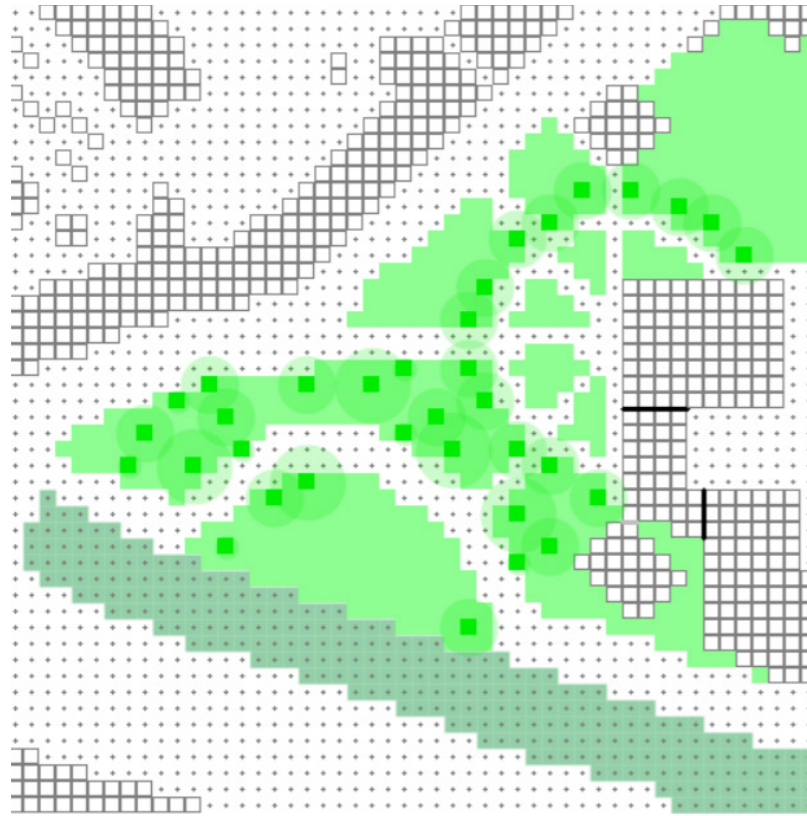


Figure 6.5 (repeated) Vegetation Conceptual design.
Made using Envimet

CONCEPTUAL DESIGN

This page shows two variations based on the conceptual design shown above. The variations have been used as input in envimet to simulate the changes to the air temperature and mean radiant temperature. The results of this simulation are shown on the next page.

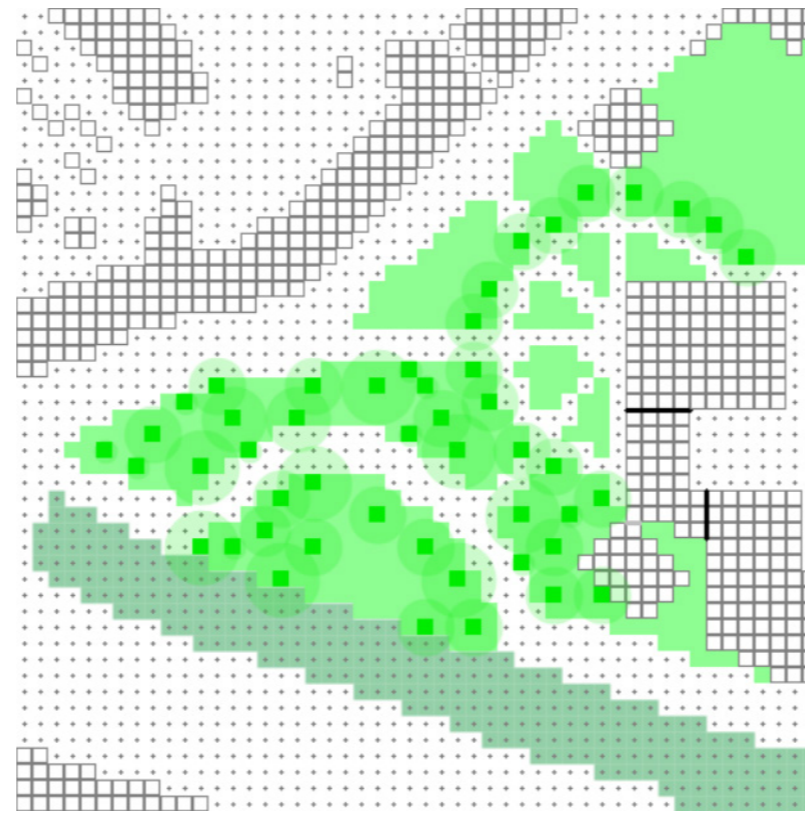


Figure 6.14 Vegetation variation 1. Made using Envimet

VARIATION 1: EXTRA TREES

The first variation to the conceptual design adds more trees to Koepelplein, the trees added in this variation are of similar size as those that used in the conceptual design, meaning that most trees added are between 5 and 10 meters in width and height.

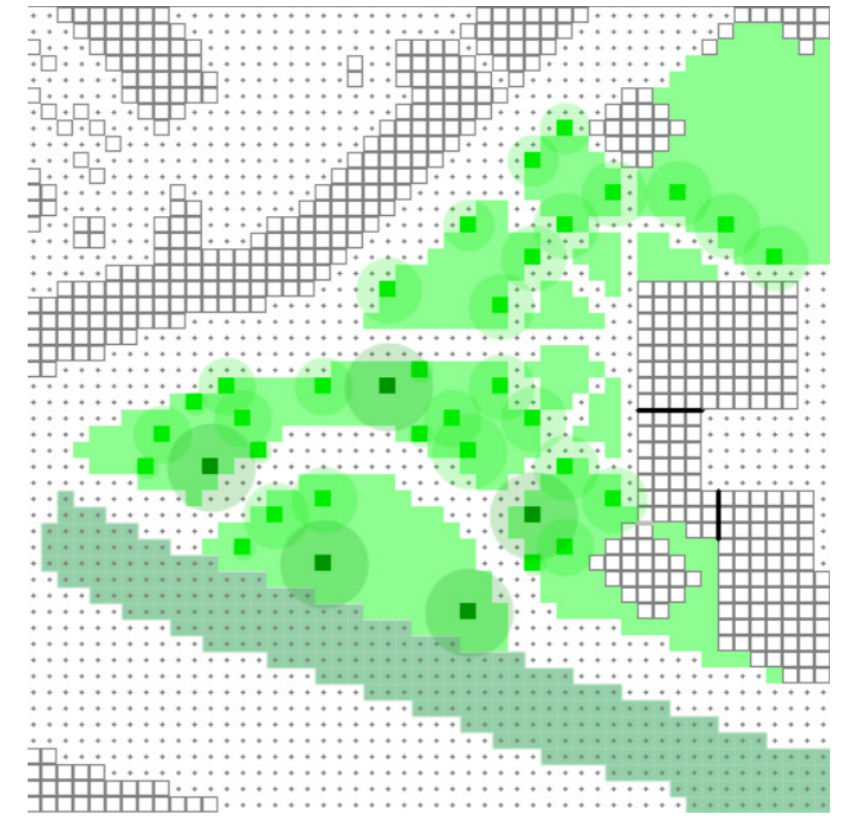


Figure 6.15 Vegetation variation 2. Made using Envimet

VARIATION 2: LARGER TREES

The second variation keeps the amount of trees relatively similar to the conceptual design but uses somewhat larger trees instead. This is best visible in the area near the waterside and the tree lane near the entrance area. This variant includes trees that are currently present on site, some of which were removed in the original concept.

ALTERNATIVE DESIGNS

6.4 DESIGN VARIATIONS

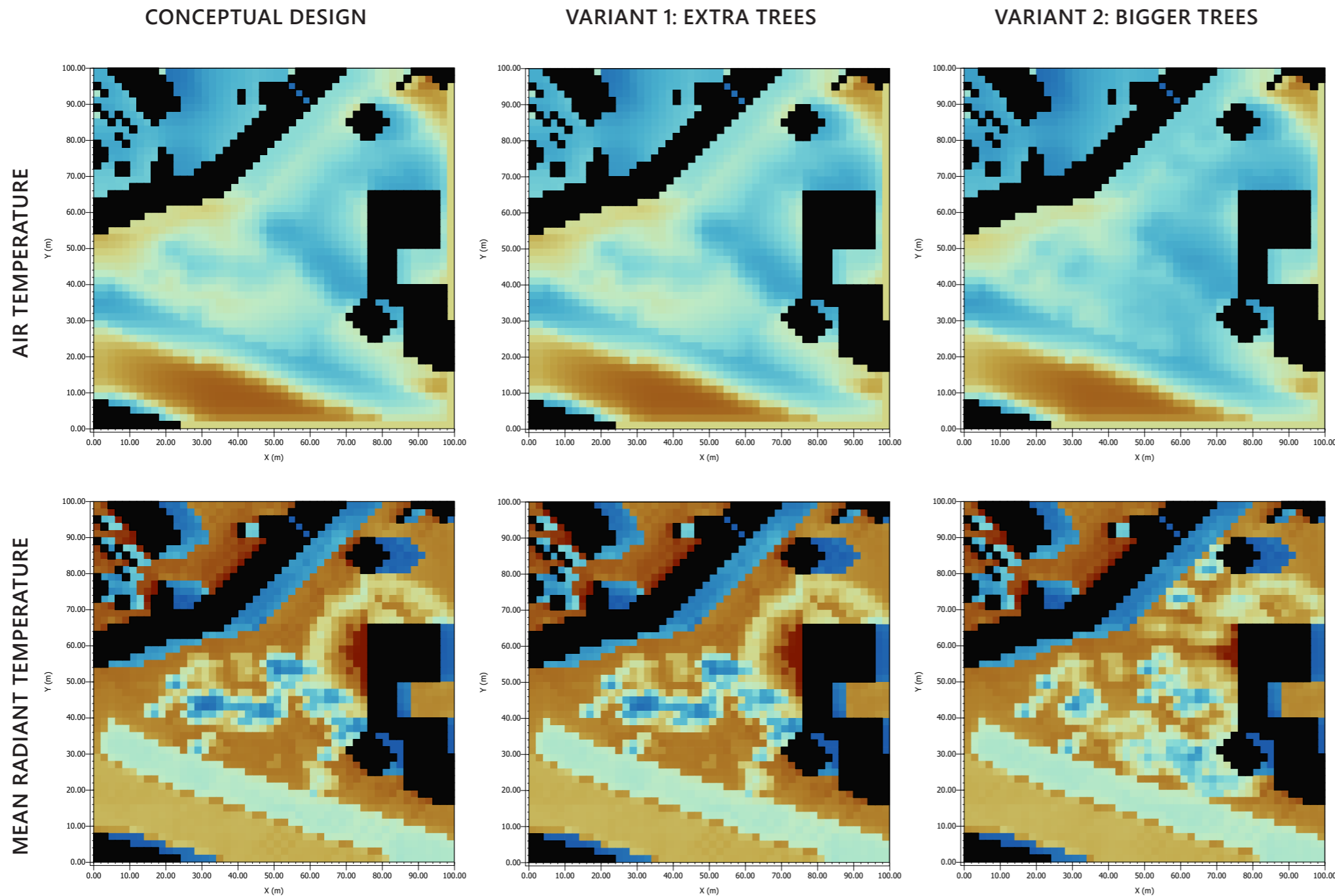


Figure 6.16 shows the potential air temperature and mean radiant temperature for the simulated variations and the first design concept. The figure shows that adding more trees of similar size has almost no effect on decreasing the temperatures of Koepelplein; no difference is visible in maps with the chosen intervals, meaning that the change in temperature is less than 0,5 degrees celsius for the air temperature, and less than 5 degrees for the mean radiant temperature. When looking at the second variation: increasing the size of some of the trees, a more noticeable difference is visible. In this variation the size of cooler areas increases, which decreases the overall temperature of Koepelplein. The larger trees currently on site -that were not present in the proposal by the municipality or the conceptual design- should be preserved and a slightly larger trees should be chosen for the tree lane surrounding the entrance area.

LEGEND

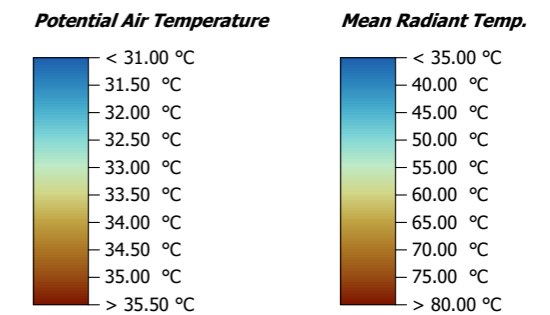


Figure 6.16 Climate simulation of design variants. Made with Envimet.

STREET FURNISHINGS

CHAPTER 7: DESIGN PROCESS

PROCESS OVERVIEW

7.1 DESIGN PROCESS - FURNISHINGS

This chapter presents the design process of the street furnishings proposed for Koepelplein. Figure 7.1 shows the various steps of this design process and links it with analyses and findings from previous chapters. The full sized version of this diagram is added in appendix 1.

The street furnishings designed in this chapter are meant as an eye catcher for Koepelplein and as something for visitors to recognize. Since this thesis focuses on only Koepelplein, rather than the Koepelcomplex as a whole, suggestions for placement are only for Koepelplein. However, the designed street furnishings would also be suitable for other outdoor public spaces in Koepelcomplex.

Only one type of street furnishing is designed in this chapter, this is due to a limitation of time, and because the assumption is made that other street furnishings will be reused from the site and adapted from the design of other areas in Koepelcomplex.

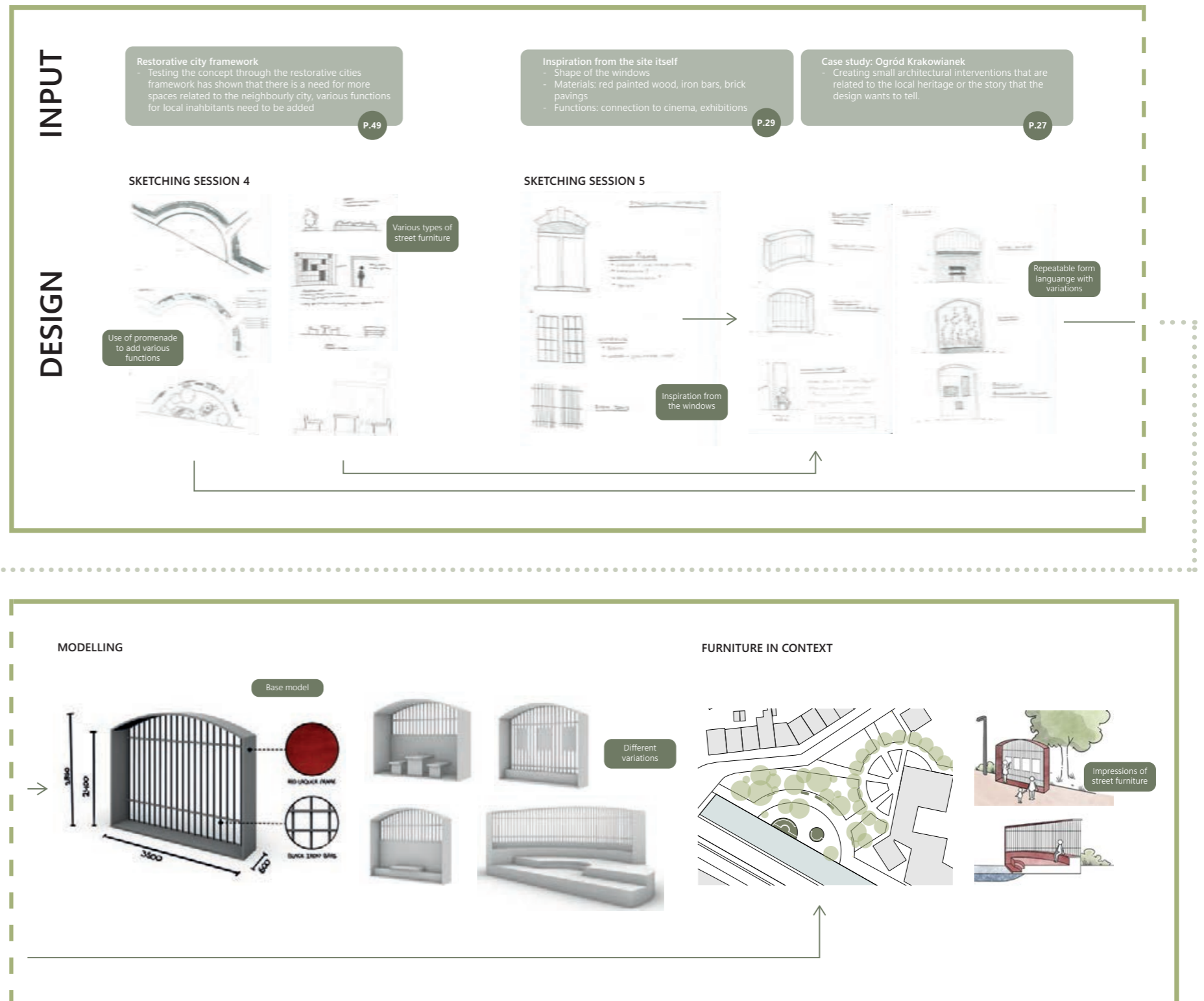


Figure 7.1 Design process street furniture overview

SKETCHING

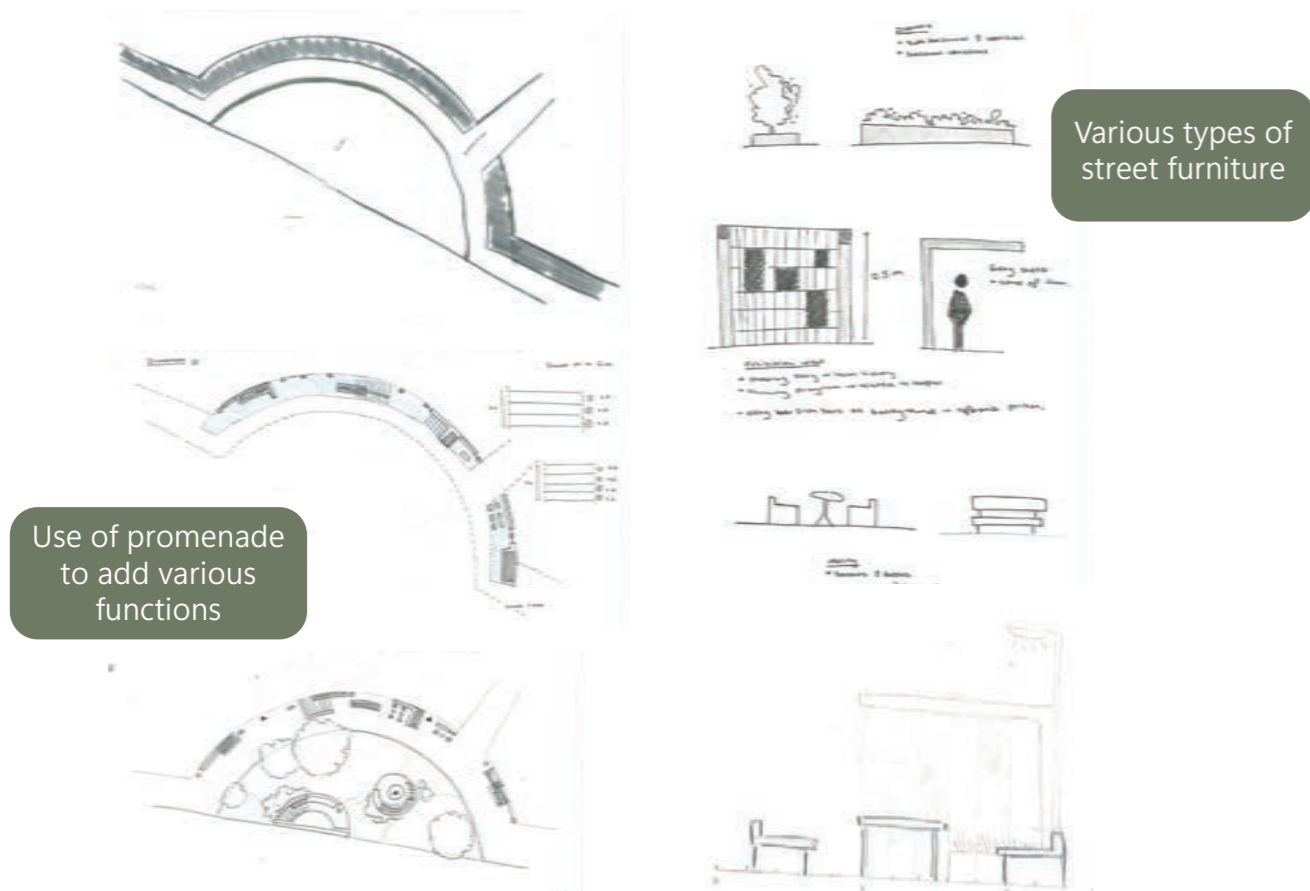
7.1 DESIGN PROCESS - FURNISHINGS

Restorative city framework

- Testing the concept through the restorative cities framework has shown that there is a need for more spaces related to the neighbourly city, various functions for local inhabitants need to be added

P.49

SKETCHING SESSION 4



Testing the conceptual design made in chapter 4 using the restorative cities framework by Roe and McCay (2021) has shown that the design needs more spaces for people of the neighborhood. Chapter 5 concluded that the promenade and the waterside would be suitable places to add more neighbourly functions to the design. This was the starting point for the sketches shown in figure 7.2.

Figure 7.2 shows how the idea for some kind of street furniture that can support different functions on Koepelplein was developed. The

first sketches show the location for this street furniture: they are placed on the promenade near the canal and near the waterside. Other sketches show a first exploration in how this street furniture could look, and what functions can be added. Some important ideas from this sketching phase are the inclusion of various seating areas, vegetation, shelter, and some kind of space for exhibiting posters. The exhibition space could be related to the cinema and exhibitions that are located in the Koepel.

Figure 7.2 Overview of the design process, sketching part 4

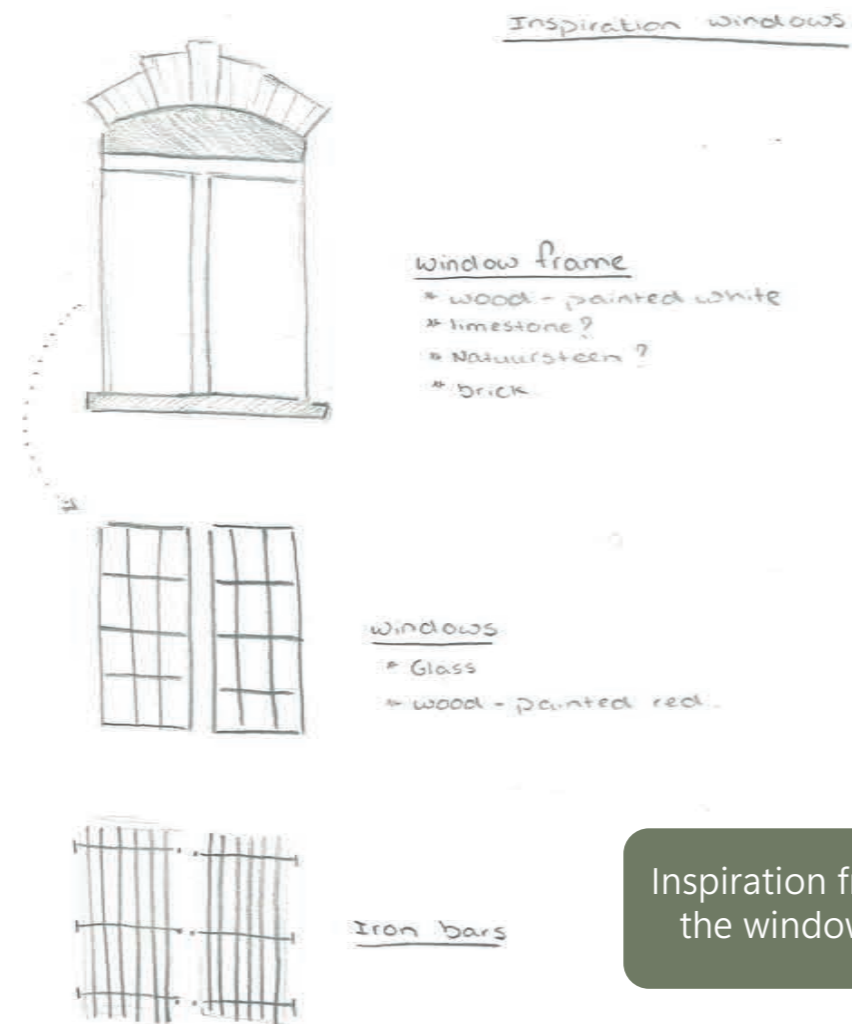
INSPIRATION WINDOWS

7.1 DESIGN PROCESS - FURNISHINGS

Inspiration from the site itself

- Shape of the windows
- Materials: red painted wood, iron bars, brick pavings
- Functions: connection to cinema, exhibitions

P.29



Inspiration from the windows

The goal for the street furnishings is for them to be a recognizable element that can be repeated and used for various functions. They should also have some connection to the context of the Koepel and Koepelplein. To create this connection inspiration was taken from the windows of the surrounding buildings. Figure 7.4 shows the various

elements of these windows: the window frame with a slightly rounded top, the window panes, and the iron bars that remind of when the buildings were used as a prison. Some of the characteristics of these windows have been translated into a base structure for the street furnishings shown on the next page.



Figure 7.4 Facade and window details of prison building

Figure 7.3 Overview of the design process, sketching part 5

STREET FURNISHINGS

7.1 DESIGN PROCESS - FURNISHINGS

Case study: Ogród Krakowianek

- Creating small architectural interventions that are related to the local heritage or the story that the design wants to tell.

P.27



Figure 7.5 Overview of the design process, sketching part 5

Figure 7.5 shows sketches made for a repeatable form for street furnishings for Koepelplein. This form is inspired by the shape of the windows discussed on the previous page. In the proposed base structure one can recognize the curved top and iron bars. From this base form several variations

based on different functions have been made. The functions are mostly the same as those proposed in the earlier sketching phase: there are variations for structures that include seating, support plantings and some which can exhibit posters or the like.

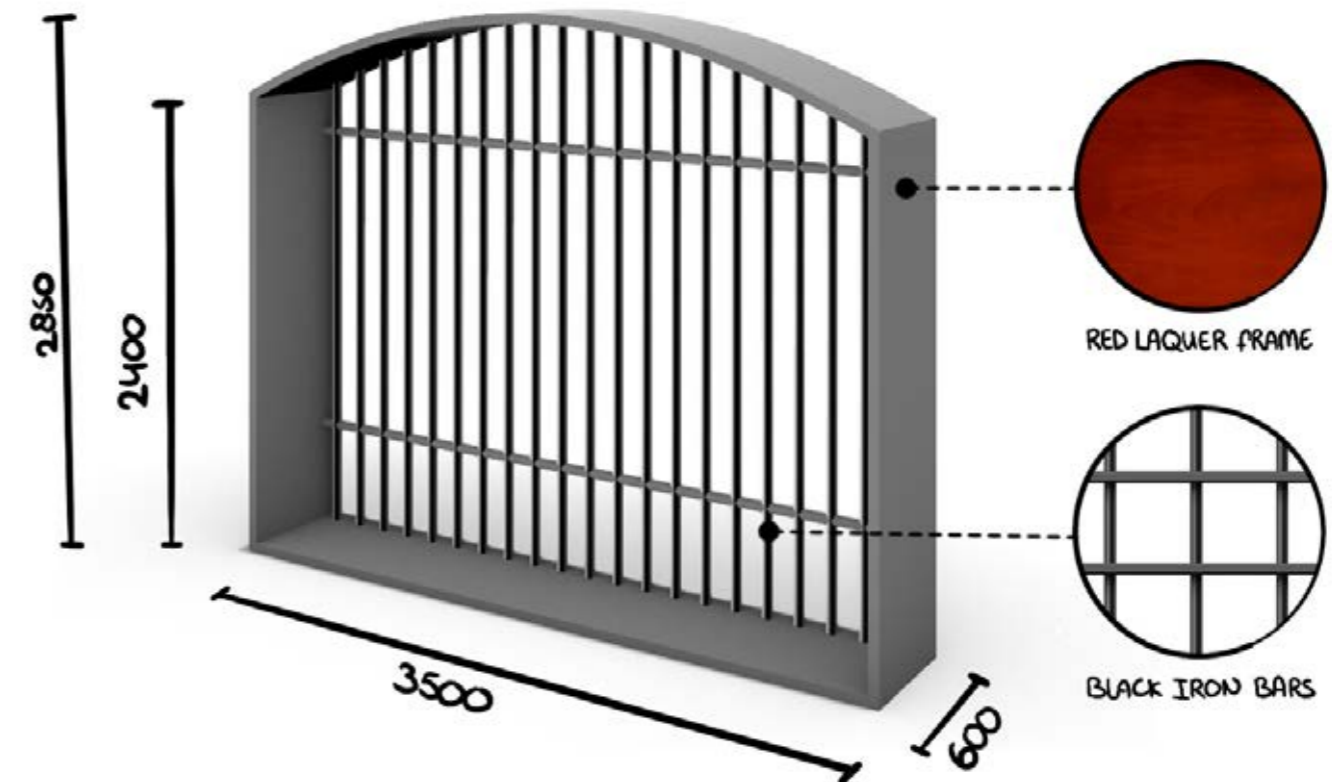


Figure 7.6 Overview of the design process, Modelling

Figure 7.6 shows a first modelling of the base form for these furnishings, it shows the dimensions and gives a suggestion for the materials used. The chosen materials are also based on the windows at Koepelplein, the iron bars are reminiscent of the bars in front of the windows and the red lacquered

wood is similar to doors of the restaurant building. The red lacquered wood fits well with the warm tones found at Koepelplein in the buildings and pavings, but also brings attention to the street furnishings, this allows them to become a recognizable asset for the site.

CONNECTING TO THE DESIGN

7.1 DESIGN PROCESS - FURNISHINGS



Figure 7.7 contains a map with a suggestion for the placement of the designed structures. The placement of the street furnishings are focused on the promenade, as was proposed in the earlier sketches. However, in this map there are also some structures added in a different part of Koepelplein. By repeating the same structures, the different areas of the site can be connected.

In figure 7.7 four possible variations are shown. The first two variations are of regular size, The first variation contains a bench and planters to the site, and a back wall that gives shelter from wind and privacy. The other is used for exhibitions and can be used to hang posters or artwork, ideally these structures would be used in collaboration with exhibitions and screenings in the Koepelcomplex. The next variation contains a picnic bench and is double the width of the other structures. Finally there is one structure designed for the waterside, this variation is bigger than the others and is shaped like a half circle. Within this structure several steps are created which allow people to go down to the waterside, the steps themselves can also be used as seating.



Figure 7.7 Location and variations of street furniture

IMPRESSIONS

7.1 DESIGN PROCESS - FURNISHINGS

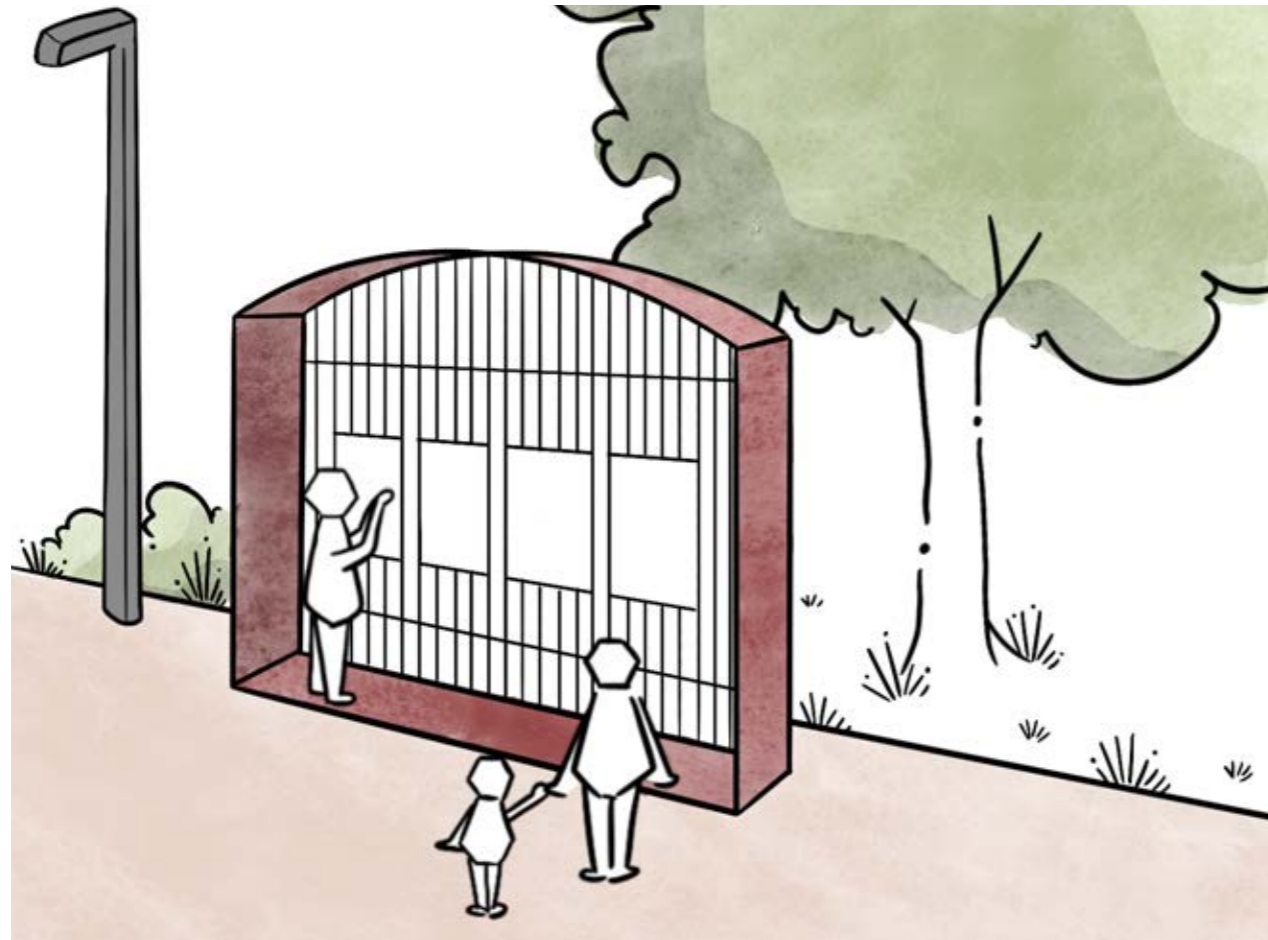


Figure 7.8 Impression canal promenade

Figure 7.8 shows a sketch of one of street furnishings meant as exhibition space places on the canal promenade, from this promenade the structures are easily visible and gain attention from visitors.

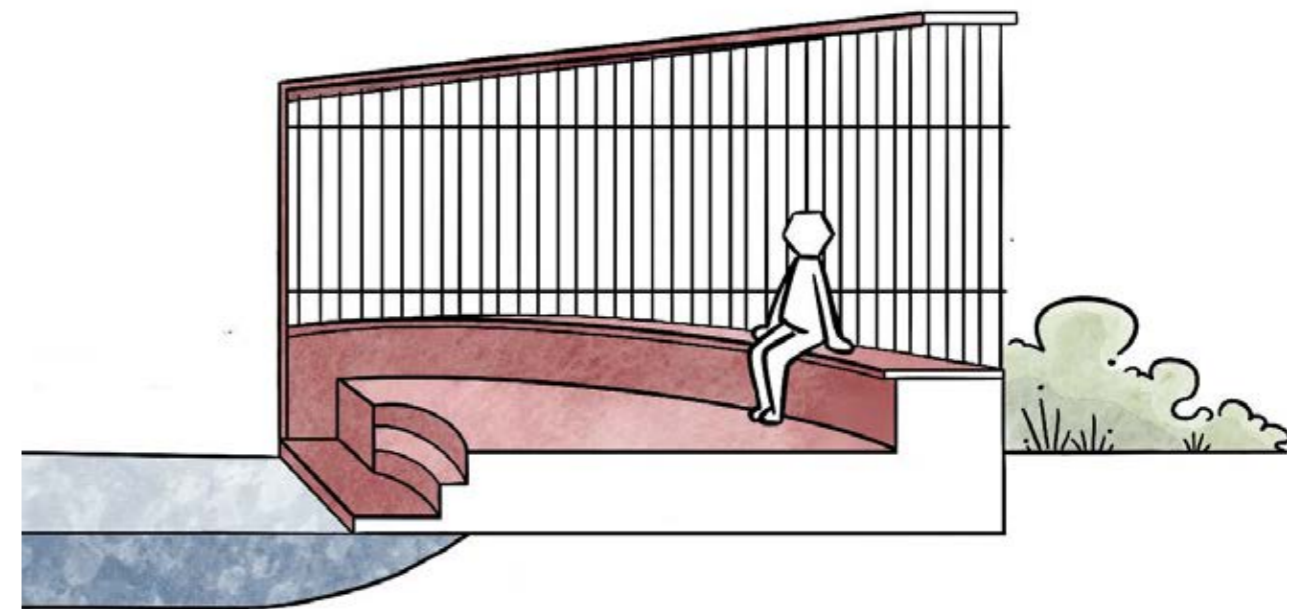


Figure 7.9 Impression waterside

Figure 7.9 shows another street furnishing, this one placed directly next to the canal, It is shaped like stairs which allows people to get down to the waterside, the steps also function as seating area.

VEGETATION DESIGN

CHAPTER 8: DESIGN PROCESS

VEGETATION TYPES ON SITE

8.1 VEGETATION ON SITE

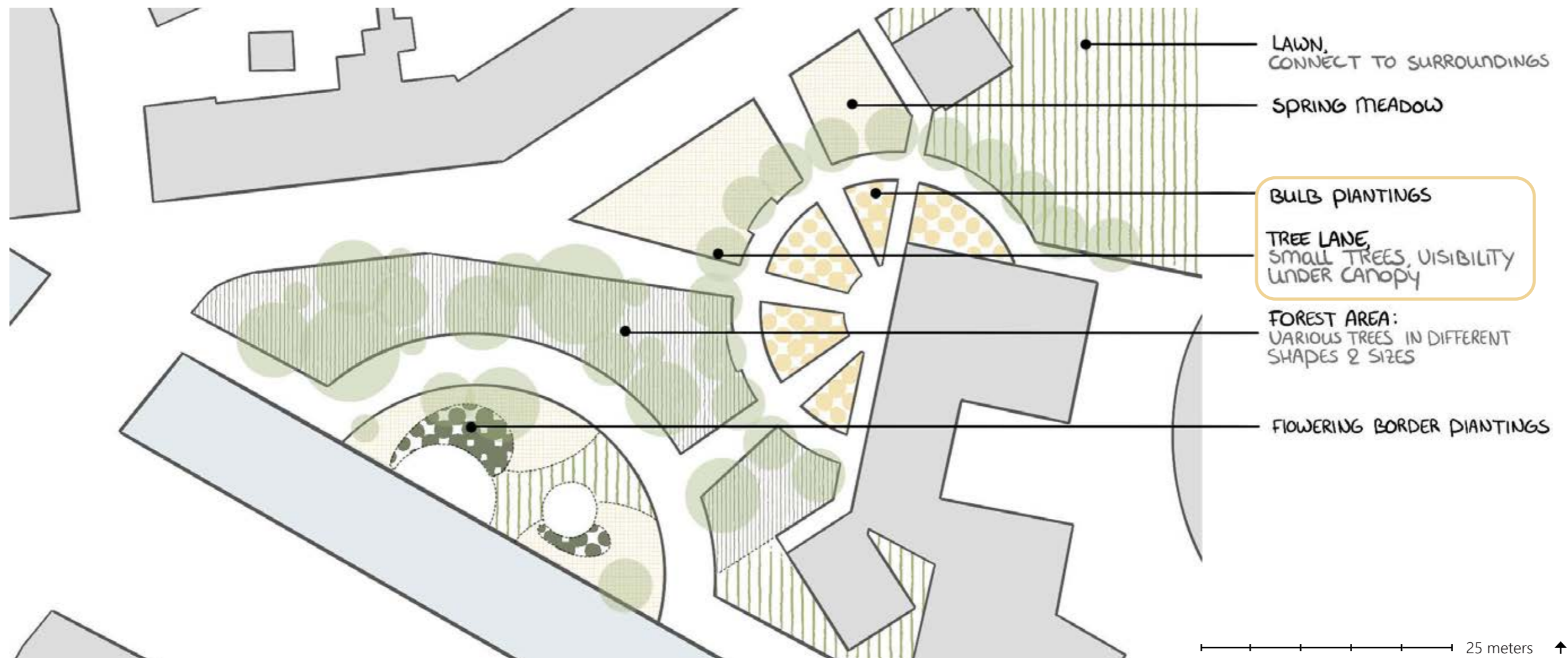


Figure 8.1 Different types of planting on Koepelplein

The design for Koepelplein includes different types of vegetation for different areas. Figure 8.1 shows the concept for the various vegetation structures in the design. The areas on the edges of the site are meant to connect to other parts of Koepelcomplex, they should have a similar vegetation type as these areas, it will likely be a lawn area. There

is also some lawn area near the waterside which can be used by people to sit, or lie down. Surrounding this lawn area will be a spring meadow, adding a flowering period early in the year, and transforming in a lawn area in summer, when people are more likely to want to interact with the water. In this area there are some trees and shrubs, some of

which are already existing on site.

The play/forest area has the highest density of trees, it has a full canopy cover adding shade in summer, and creating a more sheltered place. Different species, sizes and shapes of trees should be planted here. Some of the trees should be coppiced to become

multistemmed trees that would be suitable as climbing trees.

Finally there is the entrance area with a tree lane and flowering borders. This rest of this chapter will focus on the details of the vegetation in this area.

ENTRY AREA

8.1 VEGETATION ON SITE

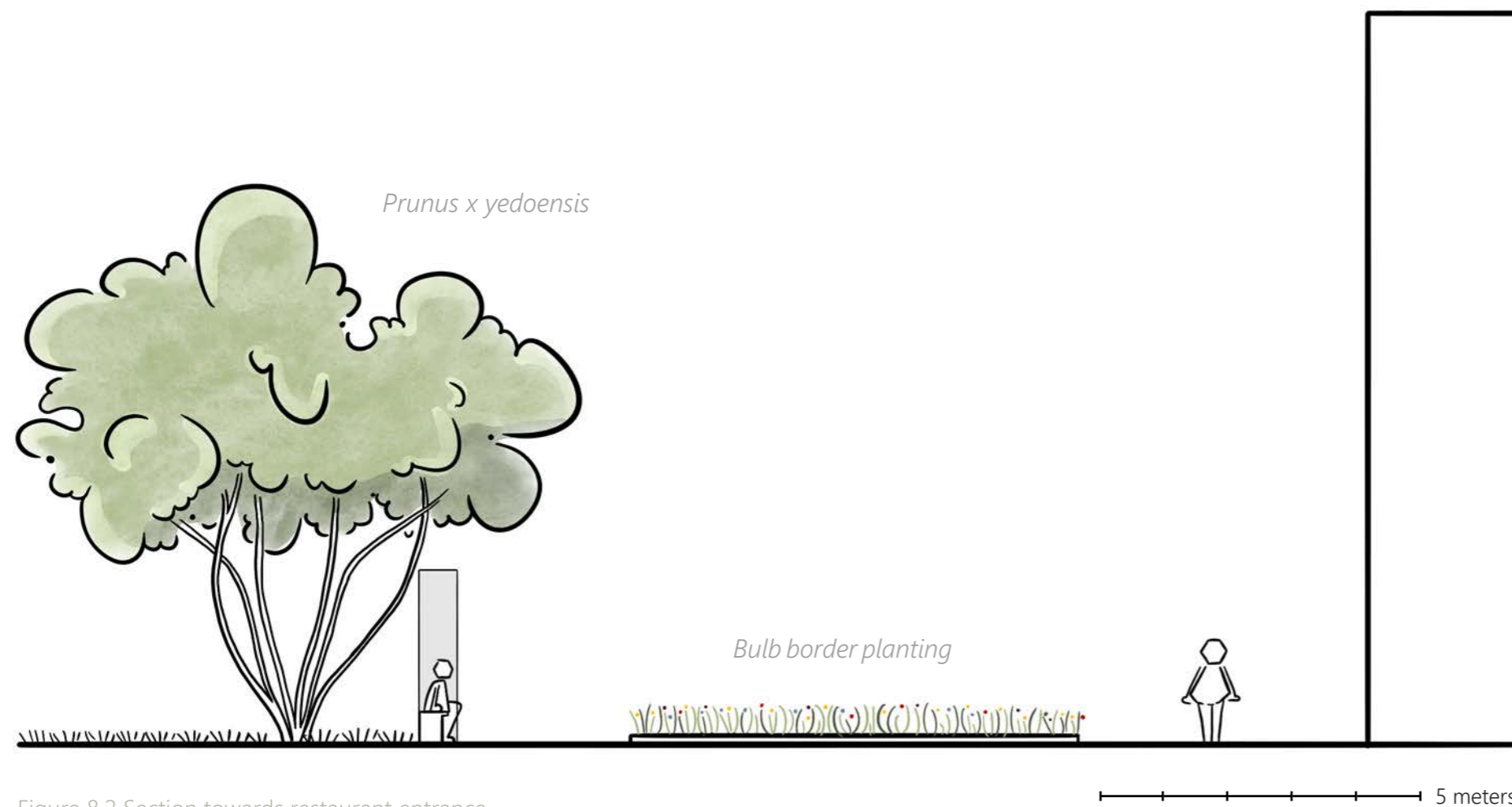


Figure 8.2 Section towards restaurant entrance



Figure 8.3 Seasonal differences *Prunus x yedoensis*

There are two types of vegetation structure in the entrance area: the tree lane, and the bulb planting.

For the tree lane a multistemmed *Prunus x yedoensis* was chosen, these trees offer interest in all four seasons as seen in figure 8.3. Spring is characterized by white blossoms, in summer the tree has green foliage, which turns yellow/orange in autumn, finally in winter the multistemmed trees offer an interesting structure when there is nothing in bloom. The trees should be pruned in such a way that the foliage starts at about 3 meters high when the tree is fully grown. This allows for visibility on eye level, making the entrance area visible from the street. It also allows for the street furnishings designed in chapter 7 to be placed under the canopy. The maximum height and width of the tree should be no more than 10 meters.

The other vegetations structure in the entrance area is the bulb planting, this planting is placed in a half circle within the tree lane and consists of various spring flowering bulbs and perennials flowering in summer. The next pages will go into more detail on these plantings.

PROCESS OVERVIEW BULB PLANTINGS

8.2 DESIGN PROCESS BULB PLANTING

This chapter creates a vegetation design for the bulb border near the entrance area. This planting was chosen to be detailed because of the connection the bulbs have with the city of Haarlem, and because it is meant as an eyecatcher for those visiting the Koepelcomplex. Figure 8.4 shows the design process for this planting. Unlike the previous two design process overview drawings it does not have an input category. There is little input from analyses or case studies from earlier in the project, instead references are directly mentioned in the accompanying text in the rest of the chapter. The rest of this chapter zooms in on this overview on different parts of the design process for this bulb border. The full sized version of the process overview is added in appendix 1.

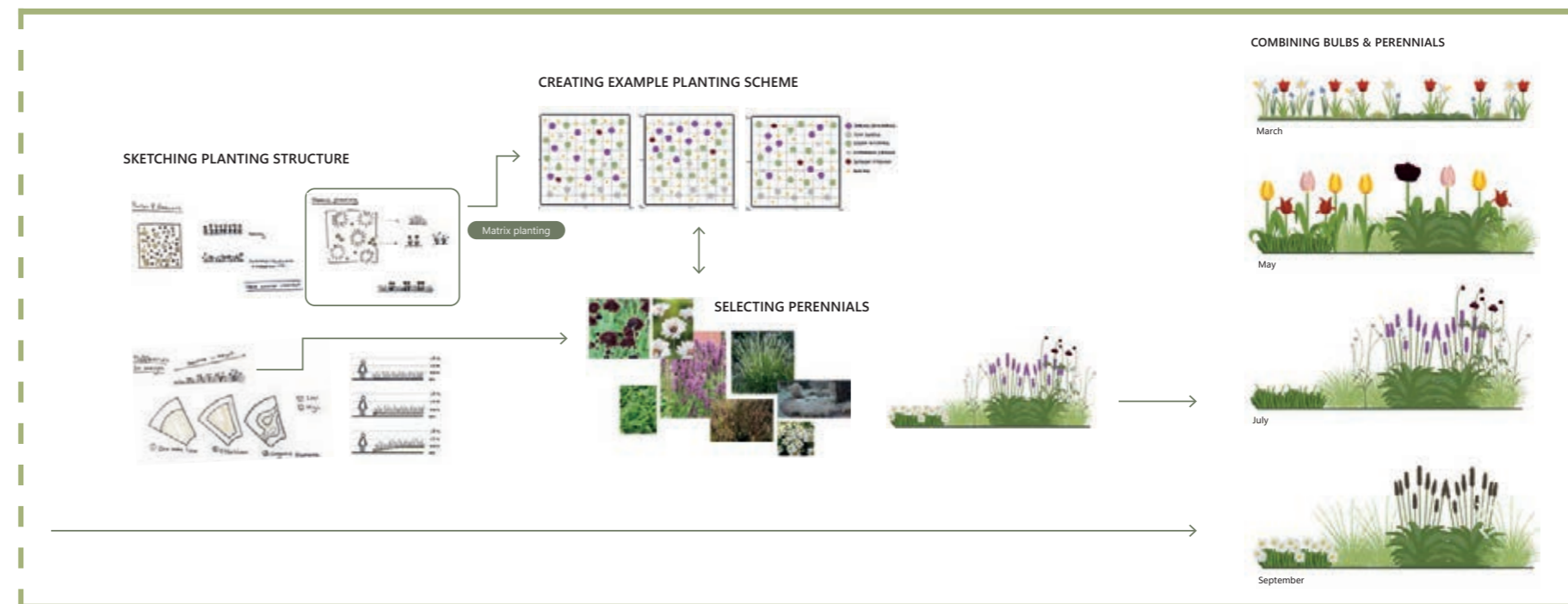
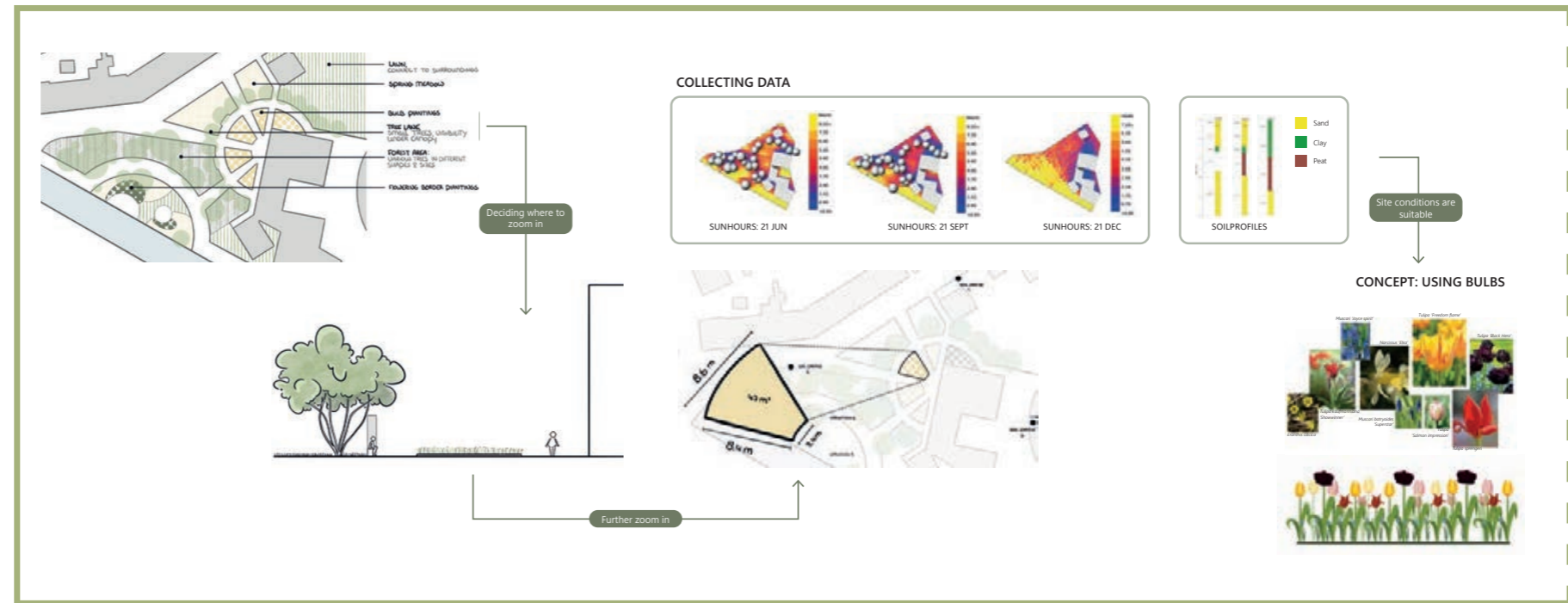
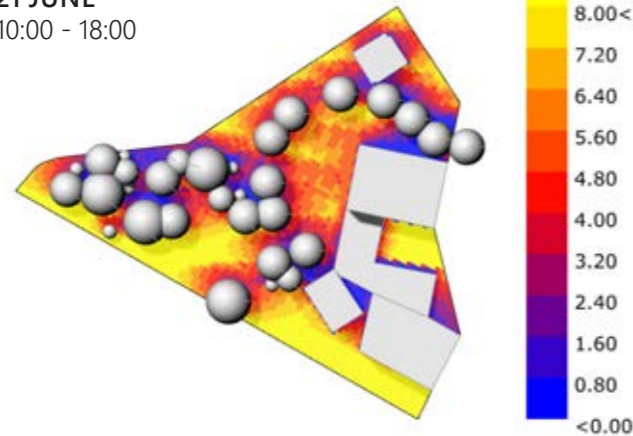


Figure 8.4 Process overview bulb planting

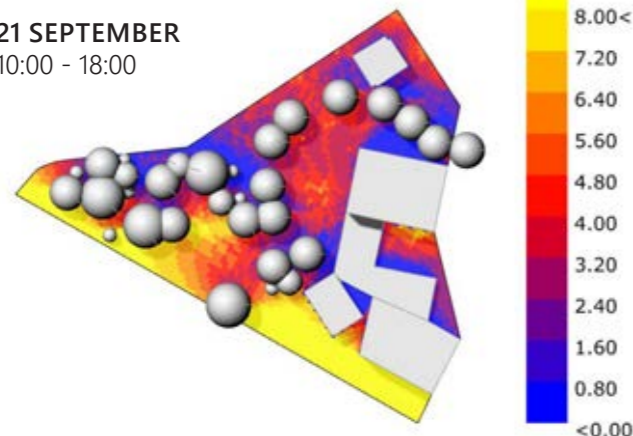
SITUATION

8.2 DESIGN PROCESS BULB PLANTING

21 JUNE
10:00 - 18:00



21 SEPTEMBER
10:00 - 18:00



21 DECEMBER
10:00 - 18:00

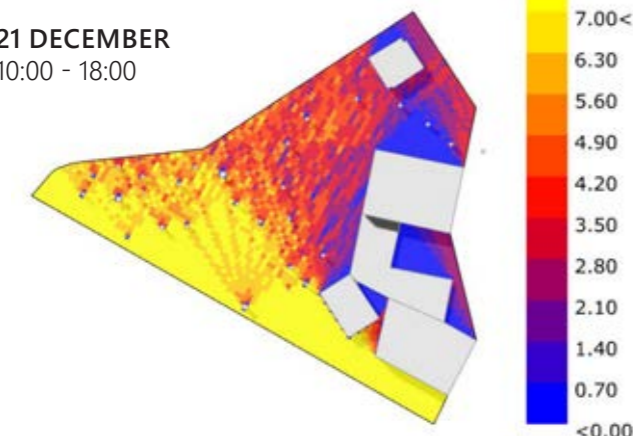


Figure 8.5 Sunlight analyses. Made with Ladybug.

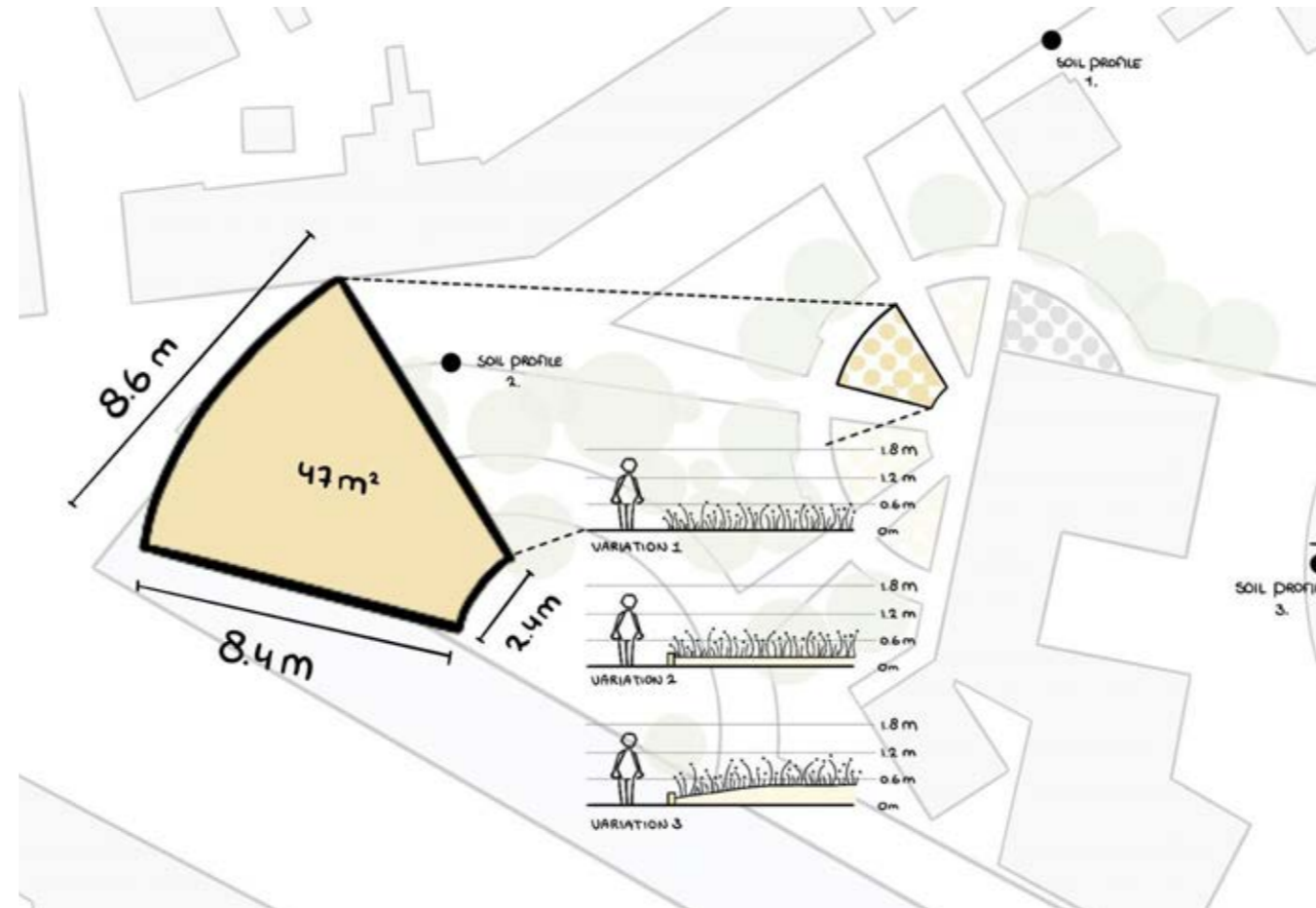
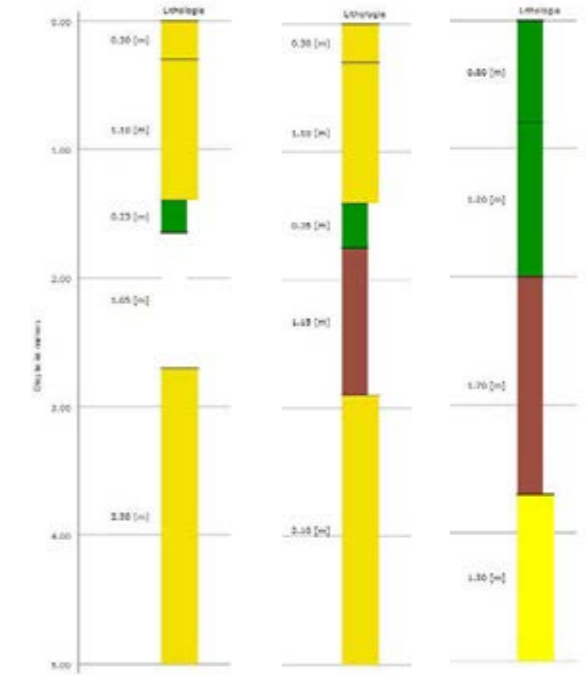


Figure 8.6 Bulb planting situation drawing

The figures on this page look at different characteristics of the site chosen to be a bulb planting. First are the sunlight analyses in figure 8.5. The figure shows that while the planting beds are not in full sun for the entire day, a good amount of direct sunlight reaches them each day. One note that needs to be made with the diagrams in figure 8.5 is that a solid model is used for the trees. In reality, some filtered light will pass through the foliage, meaning there will be a bit more sunlight than the diagrams show. While

most of the planting beds shown can be said to have a sunny/half sunny location. However, that can not be said for the northern most planting bed, this planting bed is in full shade for most of the day due to the adjacent building. A different design needs to be made for this location, this can be either based on shade tolerant plants or replacing the planting entirely.

Figure 8.7, shows the soil profiles obtained from Dinoloket.nl (n.d.), they show that the



LEGEND

Yellow Sand Green Clay Brown Peat

Figure 8.7 Soil profiles. From DINoloket.nl (n.d.)

site has a top layer of either sand or clay. Profile 1 and 2 both show a top layer of sand, however, these profiles are also made directly next to the road, the sand was likely placed here while constructing the road. Therefore, soil profile 3 will be used as reference, the assumption is made that the top layer of soil for the plantings is clay. One thing to note is that these soil profiles were originally made in 1940 and 1968 and thus might have changed with construction activities (DINoloket.nl, n.d.).

CHOOSING BULBS

8.2 DESIGN PROCESS BULB PLANTING

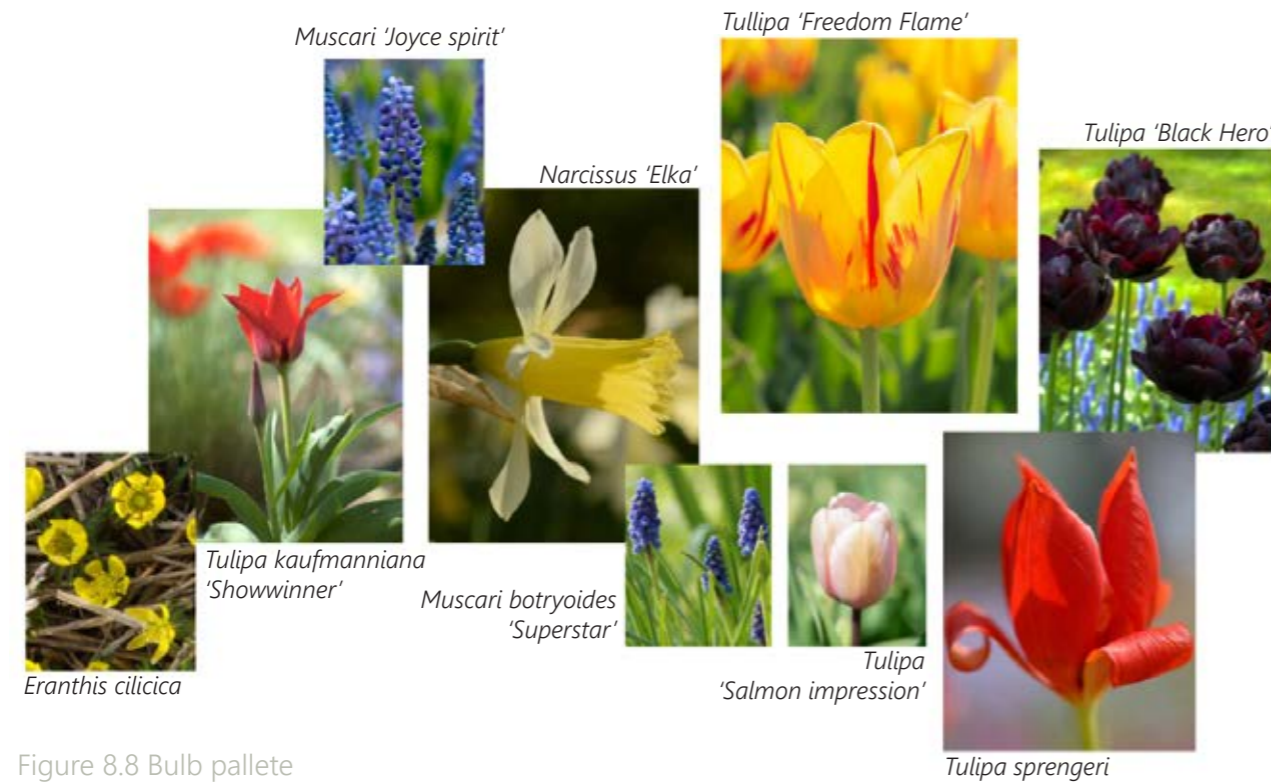


Figure 8.8 Bulb palette
Made using images from De Warande. (n.d.)

It has been stated many times in this chapter, but the plantings created in this chapter are designed around the use of bulbs. Bulb plants were chosen as the starting point for this planting due to the connection the city of Haarlem has with these flowers. Haarlem is also called 'the city of flowers' or the 'flower capital' because of its location in the bulb region. Every year events related to these flowers are organized in the city, some examples from recent years include flower parades and picking gardens (VisitHaarlem.com, n.d.).

The bulb region is best known for its colourful tulip fields, which will also be represented in the design. For the planting in Koepelplein several well known, spring-flowering bulb plants were chosen in a variety of colours. Figure 8.8 shows the selection that was made.

The flowering season starts in February with *Eranthis cilicica*, these tiny yellow flowers are then followed by *Narcissus 'Elka'*, *Muscari 'Joyce spirit'*, and the first tulip: *Tulipa kaufmanniana 'Showwinner'*. In April more of the tulips start blooming and the height of the planting increases, *Tulipa 'Freedom flame'* is the main star during this month and is accented by hints of pink, red and black. These tulips flower until around the end of May, after which they die down for the rest of the year. No summer flowering bulbs were chosen for this planting as they are generally not hardy, and would have to be dug up each autumn and replanted each spring. The spring-bulbs chosen all have the ability to come back year after year (De Warande, n.d.), which decreases the maintenance required for these plantings. More information on the chosen bulb mix is collected on page 75.

PLANTING & MAINTENANCE

- The narcissus and tulipa need a nutritious soil to grow well, for the tulipa it is important that this soil is well drained. The assumption is made that the top layer of soil on Koepelplein consists of clay, the drainage of this soil needs to be tested and possibly improved upon by adding sand before planting the bulbs.
- The bulbs need to be planted in autumn, at a depth of about 8 cm for the smaller bulbs and 15 cm for the larger bulbs (van der Kloet, 2022).
- After the bulbs finish flowering the flower can be removed, however the stem and foliage should be left intact as these are necessary to allow the bulbs to come back the next year (van der Kloet, 2022). Ideally the withering foliage should be covered by foliage from other plants to maintain the aesthetic of the planting.



Figure 8.9 Border impression - May

SKETCHING

8.2 DESIGN PROCESS BULB PLANTING

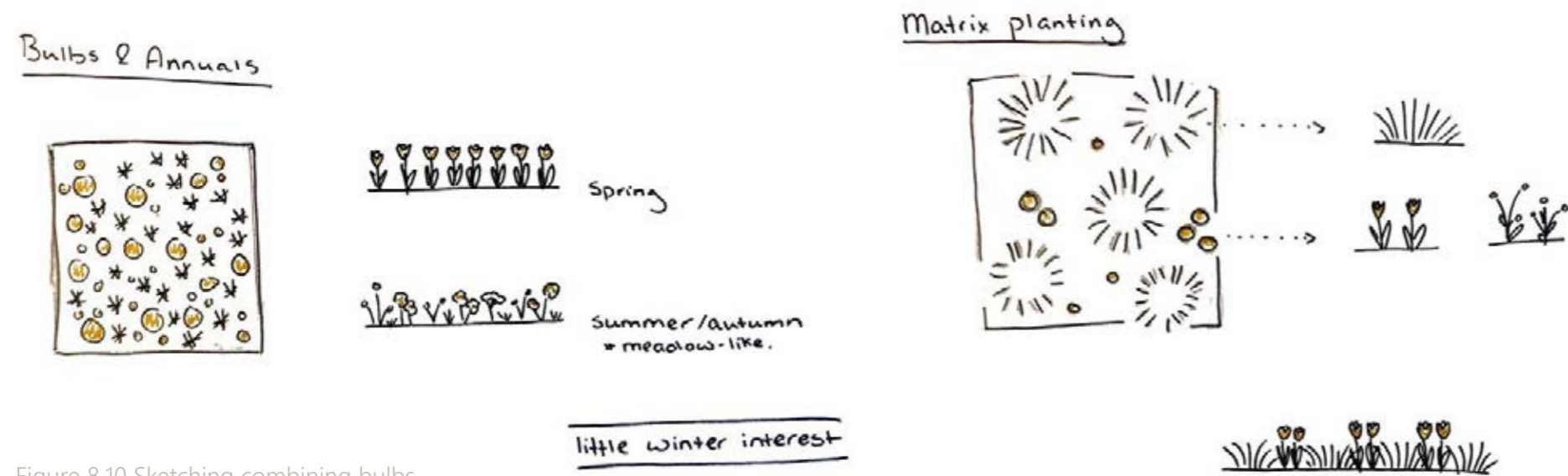


Figure 8.10 Sketching combining bulbs

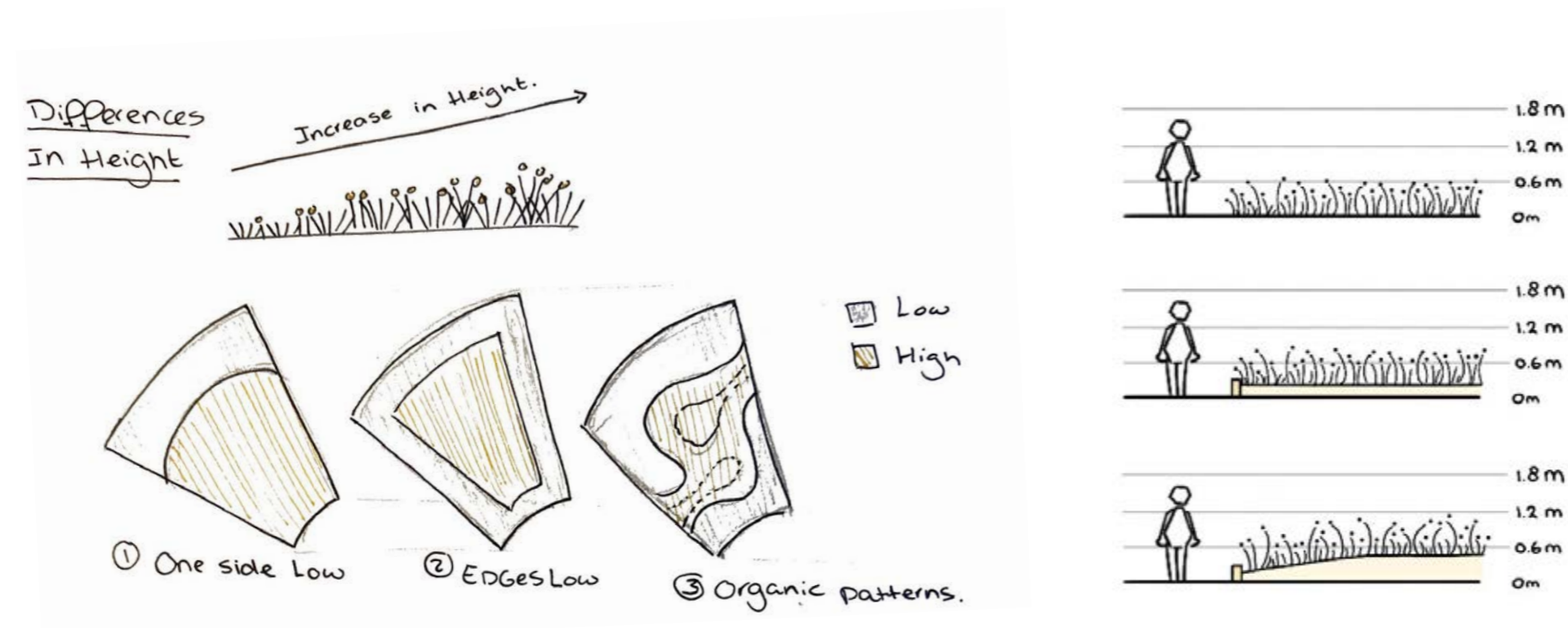


Figure 8.11 Sketching structure

The planting discussed around the spring-bulbs presented on the previous page needs to be combined with other plants to create a yearlong interest. Figure 8.10 shows two ways to combine the bulbs with other plants, in the first example the bulbs are combined with annuals flowering plants in summer, and possibly some summer-flowering bulbs. This would give a meadow-like planting with a lot of plants flowering at the same time in spring and summer. A disadvantage of this type of planting is that there are few structural plants and that the interest of this planting is fully dependent on the flowering period, in late autumn, winter and up to early spring this planting will be bare. Instead in this project is chosen for a matrix like planting: a planting consisting of structural plants that are interesting year round with some individual or small groups as visual focal points (Kingsbury & Ouddolf, 2023).

Figure 8.11 shows some sketches regarding the structure of the planting, first are sketches regarding the height of the plantings, and increasing the height gradually throughout the border. For this the middle option: increasing the height towards the center, was chosen. Next are sketches regarding the framing of the border. Here the choice was made to forego a frame and place the vegetation on the same level as the pathway.

CHOOSING PERENNIALS

8.2 DESIGN PROCESS BULB PLANTING



Figure 8.12 Perennial palette
Made using images from Appeltern (n.d.); Knolgardens (n.d.) & Yarinde (n.d.)



Figure 8.13 Impression perennials - August

As was stated on the previous page, the planting is inspired by matrix plantings: plantings consisting of one or a few main species with some individuals or small groups embedded. The main species are often rather unassuming and good at filling up the space in the planting, they serve as the backdrop for other species which often add more visual interest through colour or contrasting structures (Kingsbury & Ouddolf, 2023). For the planting discussed in this chapter the main species chosen are *Sesleria autumnalis* and to a lesser extent, *Stachys officinales*. *Sesleria autumnalis* is a relatively low, dense grass that is well suited as a groundcover. In late summer to early autumn it grows white spikes which turn brown later in the year. *Stachys officinales* is more of an eye catcher: in summer it gets purple flowering stems, which turn brown after blooming but whose structure remains intact for months thereafter. Figure 8.12 shows the plant both in bloom

and with its spring and autumn structure. Both of these plants grow in clumps making them suited as groundcover and both add a structural interest to the planting after the flowering period has passed.

Scabiosa atropurpurea 'Black Knight' and *Catananche caerulea* 'Alba' are spread through the planting in small quantities to add more colour and visual interest to the plantings. These plants flower in summer, after the last of the bulbs have stopped flowering

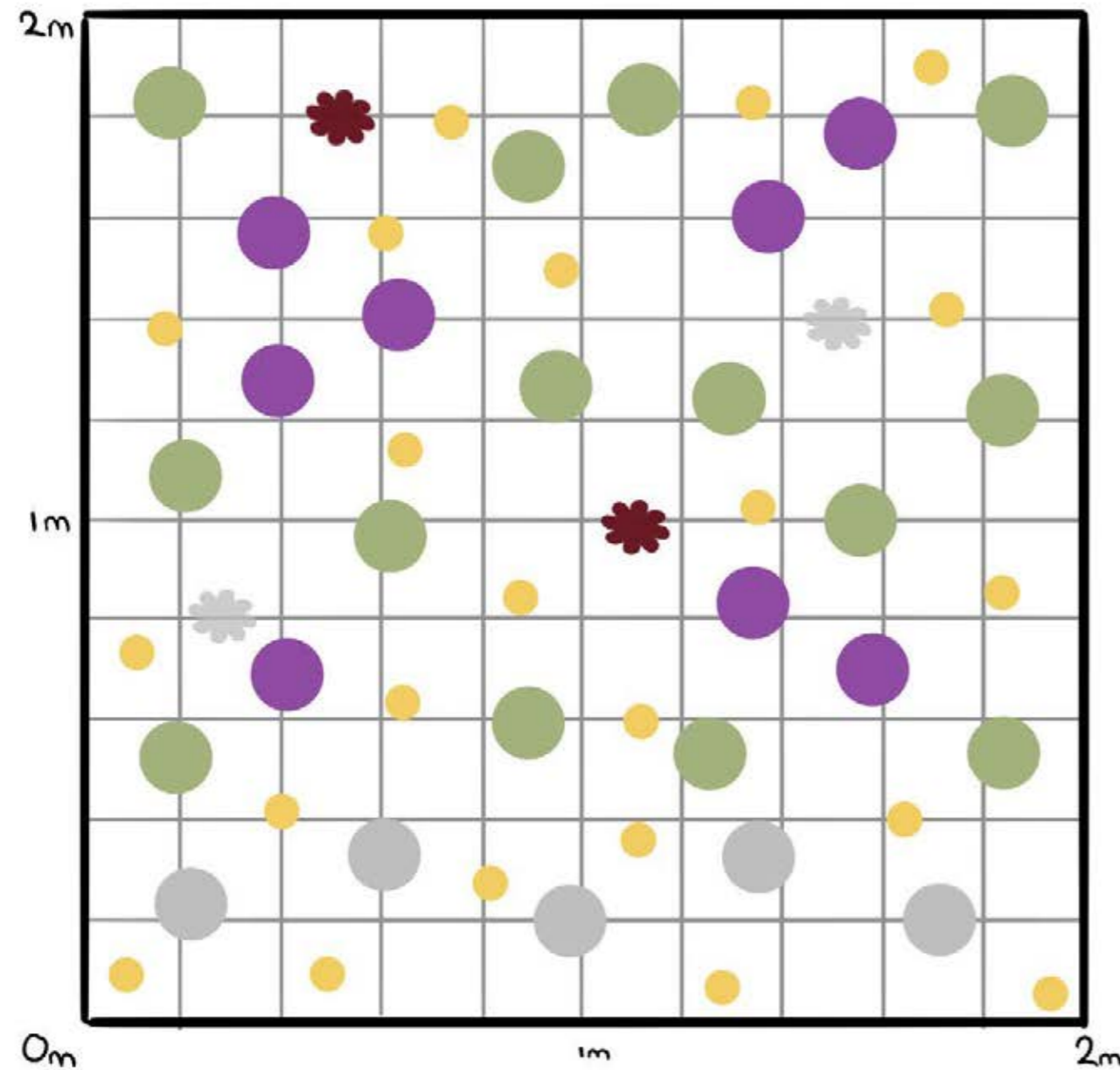
The final plant in the perennial mix is *Aster dumosus* 'Schneekissen'. This plant is included for two reasons: it can be used at the front of the border to create some difference in height, and because it flowers for most of autumn extending the flowering period of the border.

PLANTING & MAINTENANCE

- The *Sesleria autumnalis*, *Stachys officinales* and *Aster dumosus* need to be cut back each spring, around March to tidy the planting and stimulate new growth. Cutting back these structural perennials also gives room to the early flowering spring-bulbs, making them more visible in the planting.
- The flowers and foliage of *Scabiosa atropurpurea* and *Catananche caerulea* can be removed after they finish flowering.
- *Scabiosa atropurpurea* and *Catananche caerulea* are relatively short-lived perennials, and might need to be replaced after some years to maintain the aesthetic of the planting (Plantentuin Esveld, n.d.).

PLANTING SCHEME

8.2 DESIGN PROCESS BULB PLANTING



- STACHYS OFFICIANALES
- ASTER DUMOSUS
- SESLERIA AUTUMNALIS
- CATANANCHE CAERULEA
- SCABIOSA ATROPUREA
- BULB MIX

Figure 8.14 2x2m Planting plan

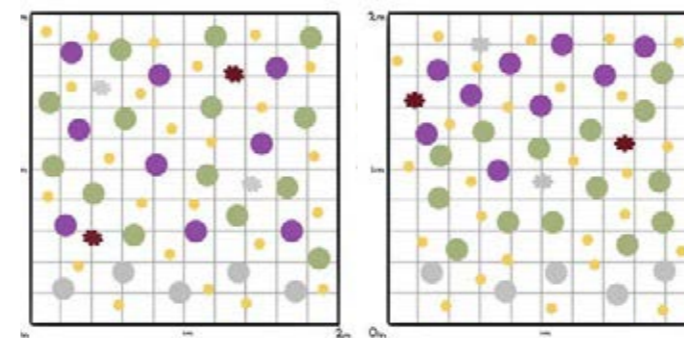


Figure 8.15 Variations planting plans

Figure 8.14 shows a 2x2 meters example planting plan for the bulb border planting at Koepelplein, this example is meant to show the structure used for the planting. An average of 8 plants/m² is used for this example which is within the recommended quantity proposed by a nursery. Most of the planting consists of a matrix planting with *Sesleria autumnalis* as main species, within this matrix some small groups of *Stachys officinales* are planted, near these groups there are some *Scabiosa atropurea* and *Catananche caerulea* added as accents. The front of the planting changes the structure and consists out of just one species: *Aster dumosus*. This perennial is lower than the other and therefore is part of the height gradient created within the planting.

All throughout the planting bulbs are planted between the perennials, these bulbs are randomly mixed according to the percentages on page 75. On page 76 more information on the perennial mix is presented.

Figure 8.15 shows two other variants for the planting plan from the sketching process.

BULB MIX

8.2 DESIGN PROCESS BULB PLANTING

Latin name	Common name	% in mix	Height (cm)	Winter interest	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Okt
<i>Eranthis cilicica</i>	Winter aconite	5	8	No	Yellow								
<i>Muscari 'Joyce spirit'</i>	Grape hyacinth	15	20	No		Blue							
<i>Narcissus 'Elka'</i>	Daffodil	20	25	No		Grey							
<i>Tulipa kaufmanniana 'Showwinner'</i>	Tullip	10	25	No		Red							
<i>Muscari botryoides 'Superstar'</i>	Grape hyacinth	10	20	No			Blue						
<i>Tullipa 'Freedom Flame'</i>	Tullip	20	50	No			Yellow						
<i>Tulipa 'Salmon impression'</i>	Tullip	5	50	No			Pink						
<i>Tulipa 'Black Hero'</i>	Tullip	5	60	No				Dark Red					
<i>Tulipa sprengeri</i>	Tullip	10	35	No				Red					

Figure 8.16 Bulb mix



Figure 8.17 Section border - March



Figure 8.18 Section border - May

500 mm

PERENNIAL MIX

8.2 DESIGN PROCESS BULB PLANTING

Latin name	Common name	% in mix	Height (cm)	Winter interest	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Okt
<i>Catananche caerulea</i> 'Alba'	Cupid's dart	5%	50 -70	No									
<i>Scabiosa atropurpurea</i> 'Black Knight'	Sweet scabious	5%	40 -80	No									
<i>Stachys officinales</i>	Betony	30%	30 - 75	Yes									
<i>Aster dumosus</i> 'Schneekissen'	Aster	15%	20 - 30	No									
<i>Sesleria autumnalis</i>	Autumn moor grass	45%	30 - 50	Yes									



Figure 8.19 Perennial mix



Figure 8.20 Section border - July



Figure 8.21 Section border - September

500 mm

DESIGN KOEPELPLEIN

CHAPTER 9: DESIGN

DESIGN OVERVIEW

9.1 INTRODUCING THE DESIGN

① HIGHLIGHTING THE CONNECTION TO KOEPELCOMPLEX

② PROVIDING A COOLING AND RESTORATIVE SPACE

③ CONNECTING TO THE RESTORED CANAL

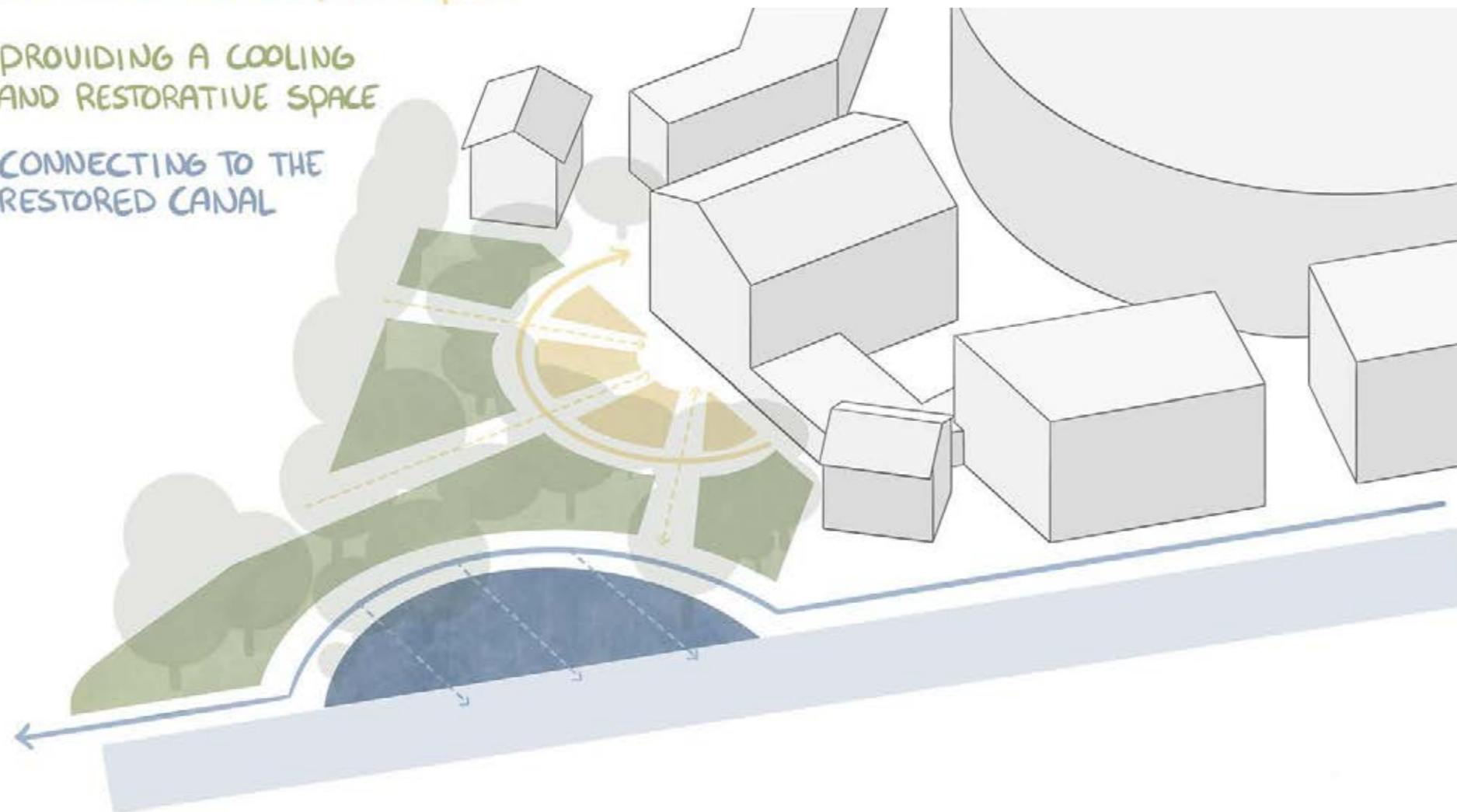


Figure 9.1 Design concepts

This chapter presents the design that was made for Koepelplein. As was stated in chapter 1, the goal was to add a qualitative, publicly available green space to the city center of Haarlem. The location for the design is Koepelplein, a small public square which forms the entrance to the Koepel-complex, which is an activity center at the edge of the

city center. In chapter 4 a conceptual design was made based on the site-analyses. The design presented in this chapter expands on this conceptual design, and integrates findings and details from other chapters of this thesis.

Figure 9.1 shows the main goals for the

design of Koepelplein. First of all is the desire to highlight the entrance to Koepel-complex. Koepel-complex will attract visitors from all over the city, for these visitors it is important to be able to easily identify the entrance and to be able to move through the site quickly. As was discussed in chapter 2 and 4 there are two possible entrances: one through the

restaurant building, and the other through an alleyway next to the restaurant. The design keeps both entrances, and aims to make sure that both entrances offer a qualitative space for visitors to move through.

The second goal for the design is to provide a cooling, and restorative space to the inner city of Haarlem. Analyses in earlier chapters have shown that the site deals with extreme heat stress, and that there is a lack of publicly accessible green spaces in the surroundings of the site. In the design new vegetation is added which provides shade, and cools down the space. Extra seating and other street furniture was designed to provide resting places and places for social interaction.

Finally there is the goal of connecting to the restored canal, allowing people to connect with the water. The area directly next to the canal is made accessible for visitors. The wide canal-promenade allows people to walk along the waterside throughout the neighbourhood. This promotes physical activity and offers a new route between the city center and development area Spaarnesprong.

The connection to the waterside created in the design is reminiscent of the historical situation, it is one of the links that the site makes to its local heritage. Similarly, in the design many circular shapes are used as a nod to the Koepel, which is well known for its dome-shape. The street furniture is inspired by the old cells and windows, it can be used for small exhibitions or promotions related to the programme of Koepel-complex, or as a resting spot for visitors.

CHANGES FROM THE CONCEPTUAL DESIGN

9.1 INTRODUCING THE DESIGN

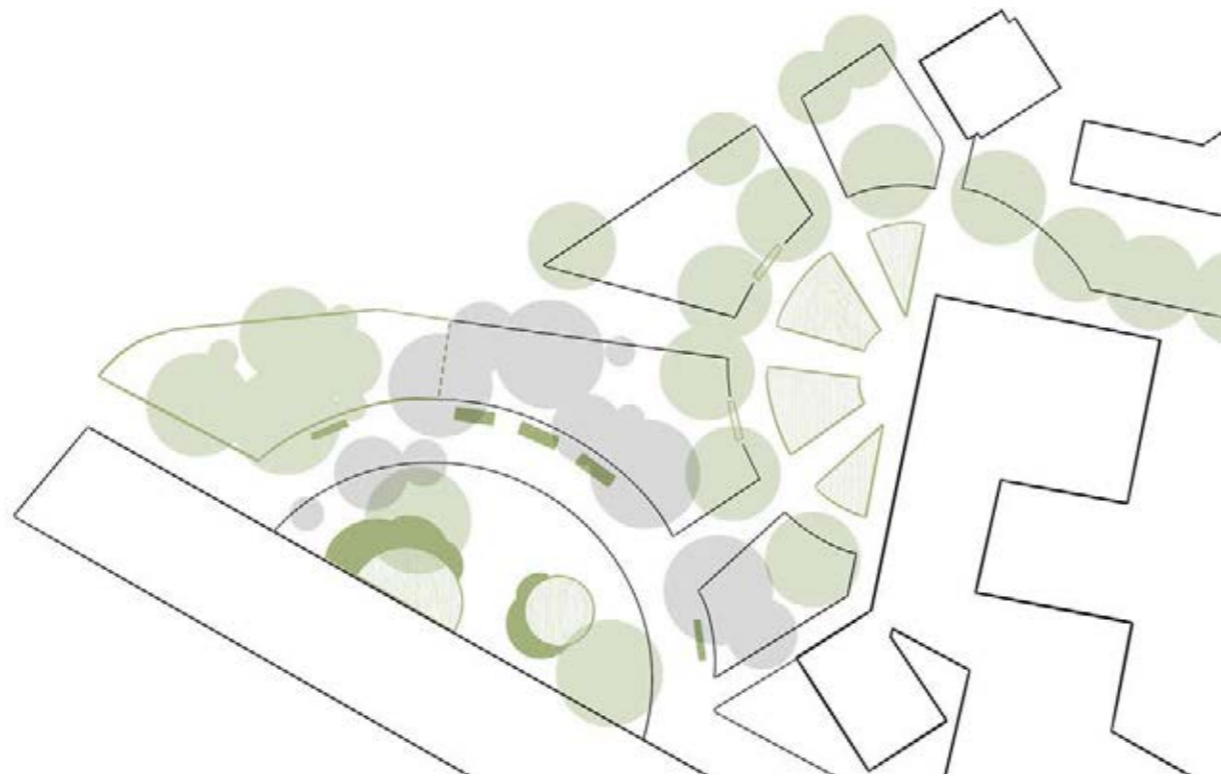


Figure 9.2 Additions to the conceptual design

LEGEND

Added elements
 Detailed elements
 Unchanged elements

50 meters ↑

Although the design presented in this chapter is very similar to the conceptual design from chapter 4, there are some key differences. The first change is the addition of street furniture, which allows the place to be used as a more social space, something which chapter 5 showed was missing in the conceptual design. The design for this street furniture is explored in chapter 7. Different variations of these structures have been made, which can be used for different ends. Most of the structures give some kind

of sheltered seating area for people, but there are also variations which can be used as exhibition place: these exhibition spaces could be used for local art, in combination with exhibitions in the Koepel, or they could be used to promote movies and activities hosted in the Koepel. The form language and materials used in these structures are based on the characteristic windows of the Koepelcomplex and the iron bars link the structures to the history of the place as a prison.

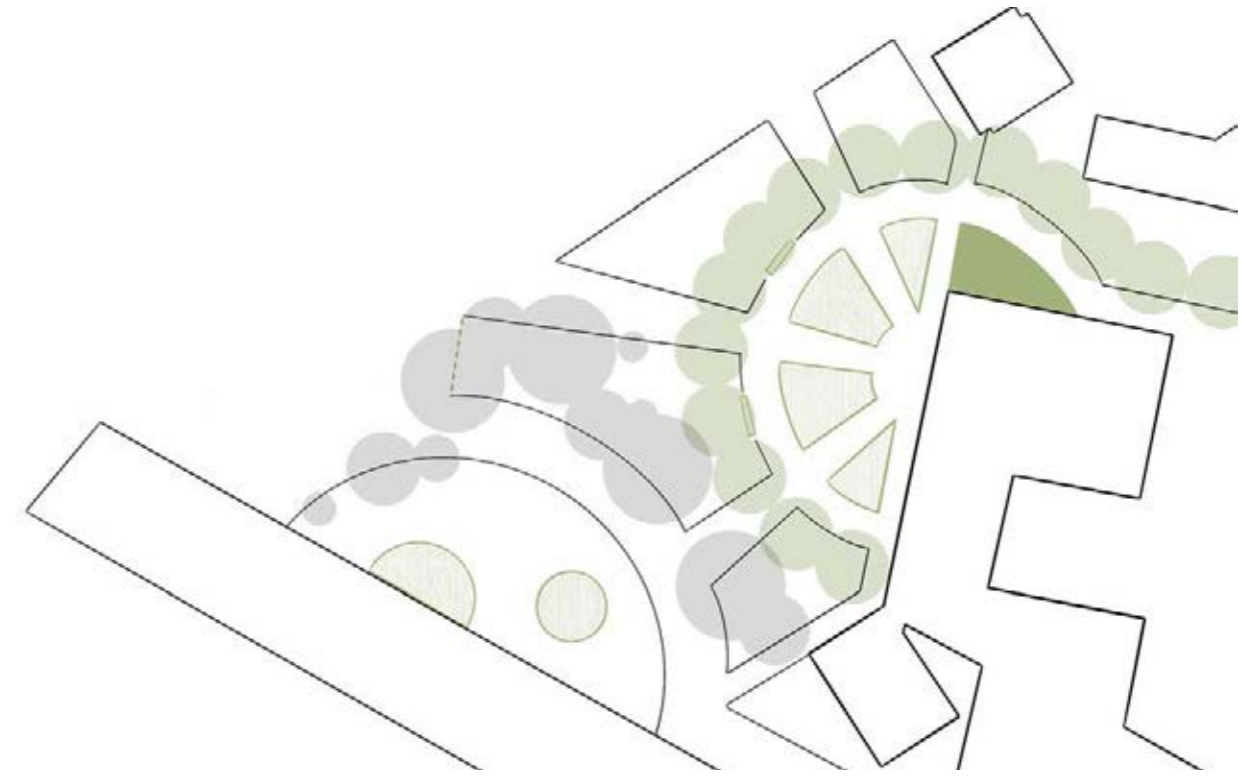


Figure 9.3 Removals from the conceptual design

LEGEND

Removed elements
 Detailed elements
 Unchanged elements

50 meters ↑

The second change in the design compared to the conceptual design is in the vegetation structure. To ensure that Koepelplein can be a cool place on a hot summer day, larger trees were added which gives a bigger shaded area compared to the conceptual design. In chapter 6 the effect of using larger trees is shown through microclimate simulations. These simulations have shown that increasing the size of the trees is more important than adding more trees when trying to improve the cooling effect. It also

shows the importance of preserving the larger trees existing on the site.

A final addition to the design in this chapter compared to the conceptual design, is that parts of the vegetation design, especially in the entrance area, is more detailed. A planting plan, including bulbs and perennials, was proposed in chapter 8.

KOEPELPLEIN 1:500

9.2 DESIGN KOEPELPLEIN



Figure 9.4 Planview Koepelplein. Scale 1:500

LEGEND

 Lawn	 Spring Meadow	 Flowering Planting	 Trees	 Restored canal	 Street Furniture
 Brick paving	 Existing Buildings	 Future Buildings	 Roof Terrace	 Entrance	 25 meters ↑

SECTION AA - ENTRANCE AREA

9.2 DESIGN KOEPELPLEIN

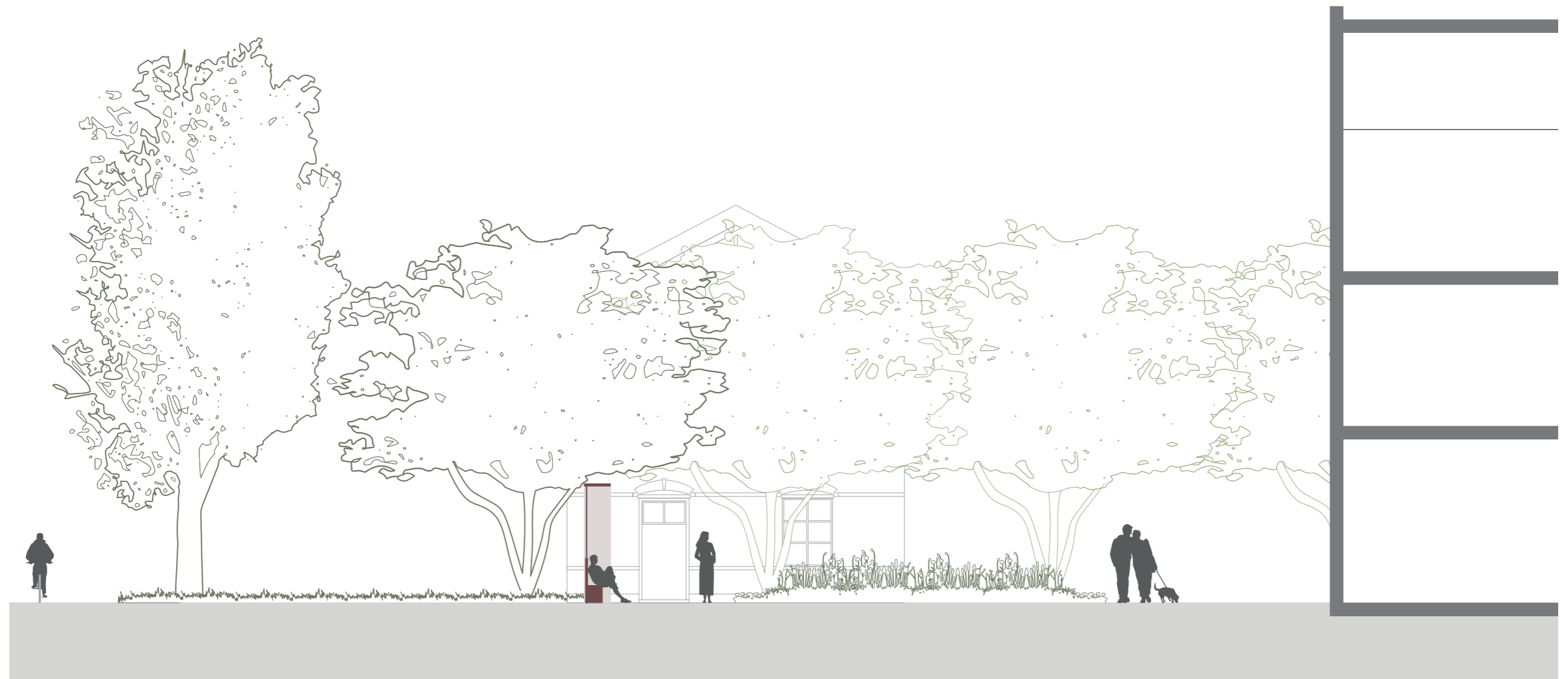


Figure 9.5 Section Entrance area. Scale 1:100

The entrance area consists of multiple axes leading to the restaurant building, and a wide, circular pathway offering an alternative entrance through the alleyway next to the buildings. This circular pathway is guided by

a lane of multistemmed *Prunus x yedoensis*. The trees give structure to the path in all seasons, and forms a permeable barrier between Koepelplein and the surrounding streets. In the inner circle colourful plantings

are created to add visual interest throughout the flowering season. In summer colourful bulbs grow in these plantings, which are overtaken by perennials and grasses later in the season. The flowering period of this

planting is from early March to late October. More information about the species mix, flowering times and structure can be found in chapter 8 where these plantings are discussed in detail.

IMPRESSION C - ENTRANCE AREA

9.2 DESIGN KOEPELPLEIN



Figure 9.6 Impression Entrance area

SECTION BB - WATERSIDE AREA

9.2 DESIGN KOEPELPLEIN



Figure 9.7 Section Waterside area. Scale 1:100

5 meters

The waterside area of Koepelplein is aimed towards locals who desire to visit a green space close to home. It is placed along the canal-side promenade, and can be used as a resting spot on the way towards the city center. Both on the promenade, and on the green area next to the water seating areas have been designed. Some of these structures are designed in such a way that they can shelter visitors from the elements.

The area next to the water is a spring meadow, after the meadow has been cut in late spring, it becomes a lawn that is accessible to people who want to reach the waterside in summer, when temperatures rise. The area could be used for sunbathing or playing.

The backdrop for this area is a more naturalistic area where many new trees are planted, it provides shade to cool down the site. This backdrop can be seen in the impression shown on the next page. The trees located near the waterside are mostly already existing oak, and elm trees; the impression shows that these trees are larger than the newly planted trees. The trees add quality to the space and have a big effect on cooling down the place. Preserving these trees during the construction of the canal is therefore important.

IMPRESSION D - WATERSIDE AREA

9.2 DESIGN KOEPELPLEIN



Figure 9.8 Impression Waterside area

CONCLUDING

CHAPTER 10: DISCUSSION & CONCLUSION

DISCUSSION

10.1 DISCUSSION

THE DESIGN PROCESS

In this thesis a design proposal for Koepelplein in Haarlem, the Netherlands is made. The starting point for this thesis was an interest in how more available green spaces could be created in Dutch cities, from the beginning the focus within this topic was looking at how these spaces can be used, and how they are perceived.

During the thesis process several decisions have been made that, looking back, have shaped the project. The first major decision within this project was the choice in scale and location. Many city centers -places where a lot of people visit- lack free, available public spaces that are created with the goal of providing a resting place where people can stay for some time, rather than immediately moving through the space. Green spaces would be well suited to this goal. Because there is often a lack of space in these kinds of urban areas, the decision was made to look into pocket parks in this thesis, as these parks are often created in leftover pockets. They do not require big changes to the existing urban fabric.

The project focuses on Haarlem specifically, it is the city in the Netherlands with the least amount of publicly available green space, and because the public green spaces that exist in the city center are often hidden and limited by their opening hours. Within Haarlem the choice was made to focus on just one location, rather than studying multiple locations. Finding the most suitable locations could have been a project in itself, and would have led to a more planning oriented project rather than a design project. There are likely many more suitable locations for similar

design projects, Koepelplein was chosen for its connection to an ongoing redevelopment project within the municipality. This gave some first outlines on what the goals for this space should be. Early in the process there was another location studied. However, during the project it was decided to focus on just one location, which allowed the design to be adapted to different angles and add more detail. Having multiple locations would have been interesting as it allows for a comparison between the designs. This would allow to draw conclusions to be drawn on what elements of the design, and the process are location specific, and which elements can be generalized to designing pocket parks in Haarlem. However, drawing these conclusions would require more than two designs, something which was not feasible within the time constraint of the thesis.

The second major decision in the design process was the decision to focus on local heritage, human wellbeing and reducing urban heat in the design. The literature study in chapter 1 has shown that there are many different benefits to the creation of pocket parks, and each of these benefits could have become a focus point for the thesis. The chosen foci were selected for their variety and their link to the context. The project site is part of a renovation project of a monumental building, which made the focus on local heritage well suited. Most of the neighborhood deals with extreme heat and there are very few public spaces for inhabitants of the neighborhood to meet in or rest.

The way these foci are incorporated in the design process is different for each of them.

To connect the design to the local heritage an analysis was made early in the process. This analysis led to some design ideas which were incorporated in the conceptual design. The other two foci: human wellbeing and reducing heat stress, only came into play after the conceptual design was already made. Instead of being used as input in the design they were used as a way to test the conceptual design. This gave some new input on how to go from conceptual design to the final design proposal. While both of these testing moments have brought changes to the design, the conceptual design did not change drastically.

Another way to go about it would have been to do these tests before a conceptual design was chosen. This would have enabled a better argumentation as to what conceptual design to choose, and which elements of the design and possible uses to prioritize. The advantage of the chosen method is that a conceptual design was proposed relatively early in the process, which could be further refined with later analyses. However, using these focus points as a way of testing the conceptual design, and making changes to this design, meant that the research and design phase became very intertwined. All throughout the process new sketches and analyses were made that have had an effect on the final design. The design of Koepelplein went through many iterations, and while a first concept was established early on, the final design has integrated elements from many different angles based on the analyses done.

METHODS

Within the design process many different

methods have been used. Some methods such as making sketches, or doing a literature review have been used for a variety of topics and have been repeated in different parts of the process; while others, such as the Envimet analyses, were specific to one topic.

The method that was used the most over the course of creating this thesis was sketching. Sketching was used as both an analysis and design tool within the thesis. In the first phase sketches were made based on the current situation, which served to better understand Koepelplein as it is now. Observations from the site visit - another method used during the thesis- was often the starting point for these analytical sketches. Later in the process these analytical sketches became less common but they were still used as a way to understand the restorative effect of Koepelplein and the vegetation design.

As a design tool sketching was used as a way to generate options for possible designs, and to understand how the design would work in the context of Koepelplein. These design sketches were made all throughout the project and for different scales: at the beginning sketches were made for the entire site, which were eventually developed into the conceptual design. Later, sketches were used to generate options for designing the street furniture and vegetation structures.

Most of the topics discussed in this thesis have started with a literature review, the goal of these literature studies was to get a first introduction into the topic, and to understand the importance of addressing this topic in the design for Koepelplein. As such many of the literature studies start by looking into

DISCUSSION

10.1 DISCUSSION

reports of well-known organisations such as the European Union or the World Health Organisation, they highlight the relevance, challenges, and possible solutions that relate to the topic. Afterwards the literature studies delves into more specialized academic literature that shows how the academic world treats this topic, which gives more clarification on the concepts and solutions that were introduced.

In some cases, the literature studies are complemented by case studies, such as in chapter 1 where case studies are used to give an example of what a pocket park is, what design elements can be considered, and what effect the design of pocket parks can have on a bigger scale. The case studies are a way to link the literature to real life projects, they make it easier to understand what the effect on Koepelplein could be. The number of case studies done in this thesis is rather limited, and looking back at the project, more case studies could have been incorporated.

While most topics compare multiple sources the topic of human wellbeing uses only one book, 'restorative cities' by Roe & McCay, as a main source. This book offers a framework for understanding what elements are important in creating restorative places, this framework was used in this thesis to argue that the design will have a restorative effect. The framework is well-referenced and incorporates academic literature. It highlights both the risks and benefits to human wellbeing, and offers ways to translate these findings into urban design interventions. Roe & McCay are both experienced authors within this field: Roe is a professor in Design and Health, Urban + Environmental planning at the school of

architecture at the university of Virginia, in the past she was a Senior Research Leader in Human Wellbeing and Behavior Change for the Stockholm Environment Institute (University of Virginia School of Architecture, n.d.); McCay is the Founder of the Centre for Urban Design and Mental Health and specializes in public health and health systems (Centre for Urban Design and Mental Health, n.d.). To link this framework to the design of Koepelplein several sketches were made that highlight various design interventions that benefit the elements of the restorative city. While it is difficult to give an exact conclusion on how much of a restorative function the conceptual design of Koepelplein has, it does show that there are many elements that should improve this restorative function, which, within the frame of this thesis, is a satisfactory result.

The second method that was used to test the conceptual design, are the Envimet environmental simulations. This is a very different type of method compared to the testing done on human wellbeing, it is more exact and gives clear results. Envimet is a modelling software that can be used to simulate the microclimate on site, it analyses the situation based on a grid structure which allows the user to input build structures, materials, vegetation and topography. The program is well suited to showing what design elements make a difference to the microclimate. In this thesis it was used to see how the conceptual design decreases the heat compared the current situation, and to see if making small changes to the conceptual design could have a further positive effect on decreasing heat stress on Koepelplein.

The analysis was based on a 2x2 meters grid, this was due to a limitation of the Lite version of Envimet, which limits the simulated area to a 50x50 grid. As the Envimet simulations in this thesis are mostly meant as a tool to compare different situations for Koepelplein, rather than creating the most accurate representation of the microclimate, it was decided to work with the standard values for materials and vegetation within the program rather than adding new, site-specific materials. This decision was also based on the lack of knowledge of the exact materials used on site. Finally the Envimet simulations in this thesis are done for the first of July, 2015, this was an exceptionally warm day on the site, therefore most of the results related to temperature exceed what people would consider comfortable. On a normal summer day the temperatures on Koepelplein would likely be considered comfortable. The results show a noticeable difference between the current, and designed situations, showing that the design does decrease heat stress. The results are in line with what was expected based on the literature studies done.

RESULT AND LIMITATIONS

The design for Koepelplein has shown that even a relatively small area can be designed in a way that supports different functions, and offers different environments to people. The design adds qualities to the neighbourhood -such as a place to rest, meet people and cool down in summer- which were previously missing. It gives an example of greening the city on a small scale, which could serve as inspiration for other projects aimed at creating green spaces in densely built neighbourhoods. It also gives an example of a design process which incorporates local

heritage, human wellbeing, and decreasing heat stress in the design, which constantly switches between analysis and design.

While the created design of Koepelplein improves on these focus points, there are many other things the design could have focused on that were not studied in this thesis, and which would have led to drastically different outcomes. This is a limitation which exists for almost all projects, as every design prioritises some elements over others. One of these elements is the adaptation to the local community. The literature studies into pocket parks have shown that one of the major benefits of creating pocket parks, compared to larger city parks, is that pocket parks can be adapted to the local community more easily. This requires a good understanding of the local community which can only be gained by involving them in the process. Due to the limited time, and distance to the site, it was not possible to include this in this thesis project. This might be the most important focus point missing from this thesis, and is something which would be recommended for other projects dealing with the design of small scale public spaces.

Another limitation of the design is that only two areas have been detailed, while the rest of the design of Koepelplein remains at a general scale. This limitation was due to the limited time that was set for this project. If the design were to be developed further it could focus on making designs for other street furnishings, such as the play equipment for the playable forest area, and adding a vegetation design to other parts of the design.

CONCLUSION

10.2 CONCLUSION

Haarlem is the stoniest city in the Netherlands and lacks publicly accessible green space in its city center, the green spaces that do exist are generally well hidden and limited by opening hours. This thesis proposes a design for a pocket park at Koepelplein, a small square just outside the city center that is part of Koepelcomplex, Koepelcomplex is an activity center and tourist attraction for the neighborhood. Because of its location and link to Koepelcomplex it will be a space that has many passersby; people either making their way to the city center or people visiting the Koepel. It is therefore a location well suited to green development as it could benefit a lot of people.

The design for Koepelplein is created with several design principles in mind: it should be connected to the Koepel in form and materiality, the entrances should be clearly emphasized to invite visitors, and a connection to the newly restored canal should be provided. Apart from these design principles, certain challenges were set for the design based on a literature study into pocket parks. The topic for these challenges are represented in the main research question for this thesis: *How can the design of Koepelplein as a pocket park in the historical city center of Haarlem contribute to a more publically available green structure for the neighborhood which can cool down the city, increase the mental and physical wellbeing of inhabitants, and incorporate the local character and heritage in the design?*

Looking back at the project, a conclusion can be drawn for this research question and the accompanying sub questions. The local character of Koepelplein was simplified in the form language used in the design; it can be found in both the circular motifs used in the design, and in the design of the street furniture based on the windows of the old prison complex. The design also brings back the connection to the waterside of the canal that existed once upon a time. Another link to the local heritage could be added by using the exhibition spaces to showcase this heritage. A small nod to the heritage of Haarlem, as city of flowers, is given in the addition of bulb plantings, the type of flowers that the region is known for.

To increase the mental and physical wellbeing of people visiting Koepelplein, the restorative cities framework was used. This framework showed the importance of increasing the access to green and blue spaces, and the need for different types of spaces for people to meet and rest, which Koepelplein provides. Because Koepelplein is part of the bigger development project Spaarnesprong, it can be connected to other public spaces currently under development creating a route to the city center which motivates people to move and exercise.

Finally, to decrease the heat stress on site, many trees were added and the amount of hard surfaces emitting heat was decreased. Various Envimet simulations have shown the cooling effect of the design, showing that

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