

MASTER

Age-friendly cities

The age-inclusive public space in the post COVID-19

Liu, Yanru

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AGE-FRIENDLY CITIES

The age-inclusive public space in the post COVID-19

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Author: Y.(Yanru) Liu 1452819

Graduaton studio urbanism (45 ects)

Healthy and sustainable cities 2020-2021

Graduation committee:

ir. M.W. (Marcel) Musch

ir. S. (Sara) Siegel

prof.dr.ir P.J.V. (Pieter) van Wesemael

dr.ir. P.E.W. (Pauline) van den Berg

drs. J.G.A. (Johan) van Zoest

Eindhoven University of Technology

Department of Architectural Urban Design and Engineering

Architecture Building and Planning, Urban Design

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Colophon

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Author

Yanru Liu

Graduation studio urbanism

Healthy and sustainable cities 2020-2021

Graduation committee

ir. M.W. (Marcel) Musch

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drs. J.G.A. (Johan) van Zoest

Eindhoven University of Technology

Department of Architectural Urban Design and Engineering

Urbanism

Preface

The year-consuming graduation project finally came to an end.

During this year, I encountered many difficulties and struggled a lot. I want to gratitude many people who provide me with solid supports and help. First of all, I must thank the tutors of the graduation committee, Marcel Musch, Sara Siegel, Pieter van Wesemael, Pauline van den Berg and Johan van Zoest for their selfless help. Not only did they give me effective feedback in time during the tutorial, but they were also pleased to sacrifice their personal time to answer my questions when I encountered difficulties. Especially Marcel, as my mentor, is the only tutor who has been participating in my design class since I enrolled in university. The process of working with him is always relaxing. He has never treated anyone stern and can always use to inspire new ideas for me. Led by Marcel's happy teaching method, our one-year-long graduation studio has never been boring.

The fellow student in this studio also played a significant role in encouraging me to help me at work and make me feel emotional support. Anoeck and Wards, thank you for your feedback during the workshops. Bouwe, thank you for your wine for relaxing to celebrate important moments. Kseniia and Sarah, thank you for your comforts and encouragement when I feel depressed. Maarten, thank you for giving me that cup of water to reduce my nervous feeling when we had the first greenlight presentation. Finally, Simone, thank you for always being willing to help everyone and spending your time giving me the presentation feedback. I feel so lucky could participate in the graduation studio with all of you.

I also want to thank my family and friends for their unlimited support. Thanks to Xuandi He and Yufei Jiang for helping me reorganize the storyline when my design is at a bottle of the neck so that I dare to start all over again. Thanks to Yiwon Hu, as my senior and boyfriend, for providing solid emotional support during my most anxious period and often promptly giving valuable comments to my project. Finally, I want to thank my mother. From the beginning to the present, she has been by my side no matter when I am frustrated or making progress. Although she and I are apart by half the earth's distance, my mother's support makes me feel I have never been alone, especially in this corona time.

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Summary

This thesis has gone through two parts of research and design to study how urban designers and urban planners in the post-COVID 19 period can create age-inclusive public space for older adults by changing the built-up environment so that older adults can post-COVID. During the 19th period, they were able to rebuild their own social network.

The research and design are based on the author's observations and feelings. The author has observed that during the COVID-19 outbreak and the implementation of the lockdown policy, older adults are the most vulnerable in terms of physical and mental, and during the COVID-19 period, older adults are in the situation of social isolation. This observation has caused the author to think about how to help older adults rebuild social networks. However, the author is focusing not only on the social behaviour of older adults in the city during the COVID-19 period but also on how to adapt to the social behaviour of older adults in the post-COVID 19 periods by changing the physical elements of the urban built environment. However, it is worth mentioning that people cannot predict whether the social behaviours of older adults will be kept which have been changed after COVID, or will the social pattern return to the social ways before the occurrence of COVID? Since this question cannot be answered for the time being, in the follow-up research and design process, the author paid attention to the changed social patterns of older adults and the social patterns before COVID and thus proposed two different design possibilities. Throughout the research process, the author used literature review, site analysis and photo observation to provide a design theoretical basis for the subsequent design and meet the needs of the following design combined with the actual situation of the selected site.

Bennekel-West-Gagelbosch was selected as a design site in post-COVID 19 to create a suitable social atmosphere for older adults by creating an age-inclusive public space. After analyzing Bennekel-West-Gagelbosch, the author learned that there are residential area and public area in the neighbourhood. Residential and public areas have different built-up environment features, so residential and public areas can adapt to the changed social pattern and restore the social way respectively. Therefore, the two design possibilities proposed in the research phase can be implemented in Bennekel-West-Gagelbosch. Furthermore, Locatellistraat goes through the inside of Bennekel-West-Gagelbosch, dividing the neighbourhood into two completely different areas, so Locatellistraat is also used as the main design object connecting these two areas. In short, the age-inclusive public space designed in Bennekel-West-Gagelbosch suitable for older adults to conduct social activities in the post-COVID 19 periods includes three parts: changing the built-up environment of the residential area to adapt to older adults' changed social pattern; changed the built-up environment of the public area to adapt to the restore social pattern of older adults; changed the Locatellistraat to a transition zone that allows older adults and other residents to freely and safely go through between residential and public areas. Thus, older adults can flexibly choose how and where they want to socialize.

Although the design is based on older adults as the main research and design object to propose an age-inclusive public space, age-inclusive also involves people of other age groups, including employees working in the High-Tech Campus, children, and other citizens. Therefore, in the final design results, the author implanted various functions to meet the needs of different groups of people in the public space.

Introduction

Choosing the topic of the graduation project this time was determined by combining the development trend of modern cities and the personal experience.

Since the overall theme of the graduation project studio is Health and Sustainable Cities, the attention was focused on the most common health-related development issues in urban areas of the world to determine the topic. Ageing is the main demographic problem faced in developing countries (Help age, 2015). With the acceleration of urbanization in developing countries, people's lifestyles and ideologies have undergone significant changes. Urban citizens are more focused on personal career development and improving their quality of life, and their willingness to have children is decreased compared to their previous generations. It can be foreseen that in 2050, the world's major developing countries will also face the problem of ageing populations currently faced by developed countries. Therefore, it is of great research value and significance to pay attention to the healthy living conditions of the older population in urban, both now and in the future. This is why seniors living in urban areas were selected as the target group during the graduation thesis research and design .

The social space of the elderly in the post-epidemic era is the research topic for more personal experience reasons. After the pandemic broke out in March 2020, almost all countries in the world have entered a state of lockdown. The Lockdown policy stipulates that people should stay at home as much as possible except for non-essential outings (such as shopping in supermarkets and pharmacies) to reduce the chance of virus transmission. During the lockdown period, I felt a noticeable change in my psychological condition. From the beginning of the lockdown, my psychological state became more and more anxious and collapsed with the continuous extension of the lockdown time and the steadily increasing cases. Staying indoors for a long time, I have no way to meet with friends to relieve my pressure. I feel that I am completely isolated on an island without any help. As a young person who can move freely and obtain specific social supports through the Internet, it is still so tormented, so what about the older adults who are blocked at home? On the one hand, the older adult is a group that is more vulnerable to viruses. On the other hand, the elderly who can use technical communication tools to maintain social activities are lower than the young. There are some barriers for older adults to use the technical device to get social support like younger generations, such as financial issues, vision impairment and lack of the knowledge of obtaining assistance from this technical device (Mohadis & Ali, 2014). Therefore, it means that certain proportion of older adults suffer more severe social isolation than the young during the lockdown period.

This has led me to think about whether the elderly can still maintain their social network despite such severe social isolation. How do older adults maintain the social network and conduct social activities? Has the social pattern of older adults changed from before the pandemic? Can our existing urban public space adapt to this change? Can urban designers use urban design as a tool to improve the quality of existing public spaces to meet the new social needs of older adults in the post-pandemic? I started year-long research and design of social space for older adults in the post-pandemic with these doubts and thoughts.

Research Question

The main research question raised by the thesis of this topic is:

How to design an age-inclusive public space for older adults to keep the social connection in post-COVID 19?

Based on the main research question, I divided the main research question into three sub-questions to answer the main research question in more detail. The three sub-questions are:

- 1. How the COVID-19 changed older adults' social patterns in the public space?*
- 2. Will these changes remain or restore?*
- 3. How to use urban design as the tool to change the built-up environment so that the built-up environment becomes age-inclusive and adapt to the social pattern in post-COVID 19 at the same time?*

The first and second sub-questions provide specific theoretical support for subsequent design and transform theoretical research results into specific design guidelines. The third sub-question is an intervention to help transform the results of theoretical research into specific designs.

Methods

Three main research methods were used in the research part: literature review, site analysis and photo observation.



1.Literature review

The literature review is the method used throughout this design study. At the beginning of the research project, the research topic was combined with health and sustainable living through the literature review. Through literature review, the researcher can learn about previous related research results, narrow the research direction, and find the research gap of this research to form a new research question. In this study, the researcher read much literature on older adults' social behaviour in the public space and learned about the social significance of public space for older adults. Then compare the social pattern of older adults before and after the pandemic to understand what should be focused more on urban design in the post-COVID 19.

In addition to assisting researchers in understanding the research background and forming the research questions, the literature review also helps the researcher continuously improve the later design stages. Because the issues involved in urban design are not independent of each other, under the design conditions of creating a more older-friendly age-inclusive public space in the post-COVID 19, the selected neighbourhood's specific circumstances will also be taken into account. In the design process, new problems are constantly discovered, so it is necessary to continue to read the literature research related to the new problems to make the design more comprehensive.



2.Site analysis

Site analysis enables the theoretical research carried out by the literature review in the early stage to be put into practice in combination with the actual urban environment. The selected site's criteria to be studied in this study are: there is enough outdoor space to improve the current situation through design in the future; a considerable part of the elderly population currently lives in the neighbourhood. After setting the selection criteria, this study selected the neighbourhood of Bennekel-West-Gagelbosch as the primary research object. In site analysis, the researcher specifically studied the relationship between the neighbourhood's location and the surrounding environment and the composition of residents within the neighbourhood to provide a research basis for the following specific design strategy.



3.Photo Observation

The observation method is a research method for investigating and recording the behaviour of people around Bennekel-West-Gagelbosch. It is a part of site analysis, but observation is not a matter of the bird's perspective on the neighbourhood's physical environment. Instead, it is more to observe and record human behaviour patterns in the built environment from a human scale. By observing and recording people's behaviour patterns in Bennekel-West-Gagelbosch, the researcher can better understand residents' living habits in this area and thus understand which physical elements promote residents' activities and which physical elements have adverse effects on residents' activities.

In addition to observing people's activity patterns, photo observation can also discover from the human perspective in the subsequent design where the existing built-up environment needs to be improved by design and provide a pre-improvement for the subsequent detail design—the status quo of comparison.

Changes in the Social Pattern of Older Adults since the Outbreak of COVID-19

In this chapter, the researcher mainly compares the social pattern of older adults before the outbreak of COVID-19 and the social pattern of older adults after the outbreak of COVID-19 and then summarizes the different use of public space by older adults before and after the outbreak of COVID-19. Researches show that there are different selection preferences of older adults to use public space in different period for socializing. In this chapter, the literature review is mainly used to explore the impact of COVID-19 on the social behaviour activities of older adults in the social space. The researcher mainly used location, types of social activities, staying time and duration in public space, gender preference of socialization, and social objects of older adults these five aspects to compare the social patterns of older adults before and after the COVID-19 outbreak.

-The social pattern of older adults in public space before the COVID-19

Location

As a citizen, older adults indeed have the right to enjoy their social experience in public space. According to previous research, most older adults prefer encountering others in third place (Berg, Kemperman, Kleijn, & Borgers, 2015). Ray Oldenburg identified the third place as a public place where people could put their concern aside and enjoy their time interacting with others. Oldenburg's definition of third place emphasizes that public space should have the function to relax people and help people build social networks with each other and excludes home place and workplace (Oldenburg, 2000). Third place includes streets, parks, cafe, restaurant, shop and other similar public space. In all of these third place, the commercial place and catering place play a crucial role for older adults to obtain social support in the general time (Kang & Ridgwa, 1996).

Types of social activities

In addition to the above social activities that directly interact with people, older adults use their senses like hearing, visual, and feeling to interact with surrounding people indirectly. It is also an important way for older adults to participate in public life and build social connections. It also indirectly provides older adults with an opportunity to have occasional social contact with others (Wulf, 2018). When designing the age-inclusive public space and meeting the needs of older adults who like to engage in pre-structured activities, consideration should also be given to older adults who prefer to engage in indirect and causal social interaction.

Staying time and duration in public space

Most older adults have a free schedule to go out for social activities. When older adults are in retirement, there is no need to follow regular work hours. They can go out for activities at any time of the day. It is precise because older adults can freely arrange their schedules during the day, so older adults spend a long time in public spaces. Therefore, the age-inclusive public space is designed for long-time staying, not for passersby (Noon & Ayalon, 2017).

Gender preference

There is homogeneous gender preference in the social activities of older adults in the public space. Men prefer to participate in pre-planning activities with familiar friends, while women prefer unstructured conversations where they meet occasionally. Therefore, in the research and design of friendly ageing in the public space, the homogeneous gender preference of older adults of different genders should be taken into account (Noon & Ayalon, 2017).

Socialize with who

Under normal circumstances, older adults are more willing to have social connections with people in different groups. People used to have a certain misunderstanding about designing a public space suitable for older adults for social activities, thinking that the social scope of older adults is only limited to the same age group. However, designing a specific space only for older adults cannot encourage older adults to engage in social activities actively. On the contrary, older adults do not want people to treat them as a group that needs special care. Socializing with people in diverse groups can make older adults feel that they are still acceptable to society (Peace & Holland, 2019).

-The social pattern of older adults in public space after the COVID-19 breakout

Location

After the COVID-19 outbreak, due to the above places' limited space characteristics, older adults' safety considerations and the requirements of complying with the lockdown policy, older adults avoided going to the above places for gatherings during the pandemic period.

In this pandemic outbreak, urban planners and urban designers are encouraged to face the challenge to search for a specific public space typology that considers density, distance, and public health conditions, so that people can still get social in the pandemic or post-pandemic period. During the pandemic period, urban green space is one of the space types contributing to urban public health. The active role of urban public green space in this pandemic has also prompted people to re-think the status of the existing green space. The large-scale urban park plays a vital role in maintaining urban residents' healthy lives during this pandemic, which is even more critical for older adults. City parks have become places for older adults to exercise and socialize with others to ease social isolation and maintain mental health. In addition to large parks, community parks, small parks, and other informal green spaces within walking distance have also received increasing attention for older adults' health status during the pandemic period. Creating a decentralized network of small green spaces around the living environment will be more conducive to older adults approaching nature and obtaining social supports while ensuring their health (Honey-Rosés, et al., 2020).

Types of social activities

During COVID-19, older adults' social activities do not change much from before the outbreak of COVID-19. Older adults can still interact directly with other people in the form of dialogue or conversation and can use their senses to feel the presence of people around them.

Staying time and duration in public space

With the increasing peak of case data, the restrictions of the lockdown policy have become more and more stringent. Some countries have also enacted curfew policies. Take the Netherlands as an example. The curfew is from 9 pm to 4:30 am the following day, and no one is allowed to go out unless necessary (Dutch News, 2021). This shows that the night social time of older adults is limited. In addition to the curfew policy, older adults will also minimize their stay in public space to fear being infected. Therefore, the time for older adults to socialize in the public space is much shorter than before the COVID-19 outbreak and is subject to time constraints.

Gender preference

The gender differences in the social activities of older adults have not changed much from before the COVID-19 outbreak because COVID will not affect people's gender habits.

Socialize with whom

Compared with before the COVID-19 outbreak, older adults are more willing to socialize in the social bubble they are familiar with during the pandemic period. Moreover, the lockdown policy strictly limits the number of visitors, so most of the social objects of older adults are with family or friends during the pandemic period.

The above comparisons presented in the form of tables can make the research conclusions more straightforward. Table 1 shows the differences in the social activities of older adults before and after the COVID-19 outbreak.

Table 1 The differences in the social activities of older adults before and after the COVID-19 outbreak

	Before the COVID-19 breakout
<p>Location</p> 	<p>-Every public place except working place can be used as social space for older adults. And these social space run through the entire city level.</p> <p>- Third place is the social place most frequently used by older adults.</p> <p>-Among all the third places, commercial and catering places are places where older adults can easily get social support.</p>
<p>Types of social activities</p> 	<p>There are two types of social activities for older adults.</p> <p>-Proactive social activities: Older adults directly have conversation and interaction with others.</p> <p>-Passive social activities: Older adults use their sense to feel, watch and listen to others. But they do not directly talk with others.</p>
<p>Time and duration</p> 	<p>Due to the most of older adults are retired, so they have flexible schedule to socialize with others.</p>
<p>Gender preference</p> 	<p>-Female older adults prefer to have socialization with casual conversation.</p> <p>-Male older adults prefer to have socialization with the pre-organized group.</p>
<p>Socialize with whom</p> 	<p>Older adults want to encounter different group of people so that they can avoid the social isolation.</p>

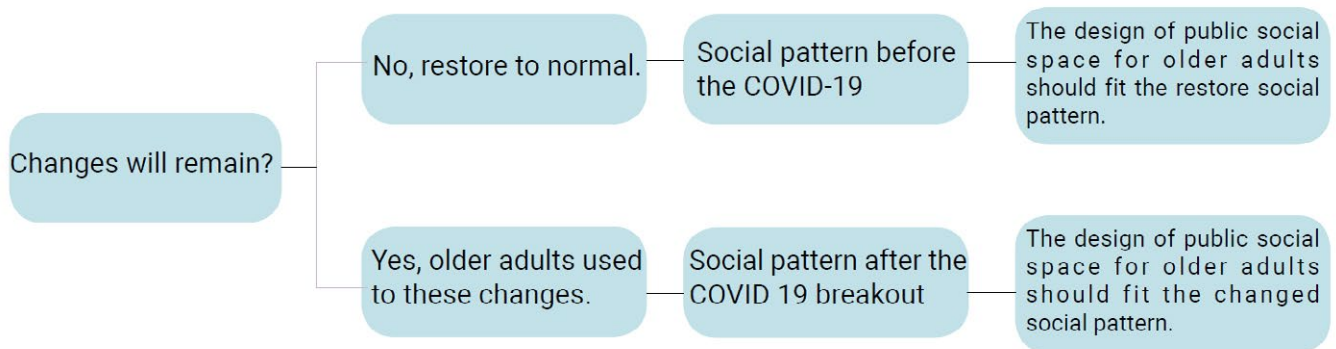
	After the COVID-19 breakout
Time for older adults.	-Older adults will choose to carry out activities near their homes or within the neighbourhood.
Places where	-Greenspace has become an important outdoor meeting place during COVID-19.
and interaction	There are two types of social activities for older adults. -Proactive social activities: Older adults directly have conversation and interaction with others.
and hear	-Passive social activities: Older adults use their sense to feel, watch and hear others. But they do not directly talk with others.
schedule to	The lockdown and curfew policy make the social time of older adults become limited.
socialization.	-Female older adults prefer to have socialization with casual conversation.
and meeting.	-Male older adults prefer to have socialization with the pre-organized meeting.
how they can reduce	Older adults prefer to socialize with their familiar families or friends. Social activities happen within their social bubbles.

Whether These Changes will Remain or Not

The main answer in this chapter is the second sub-question. Since the outbreak of COVID-19 has brought changes to the social activities of older adults in the public space, whether these changes can be kept after the end of COVID-19 is related to how urban designers adapt to these changes in COVID-19 by designing public spaces in the future.

However, the current fact is that COVID-19 is not over yet. No one can predict whether the social pattern of older adults will restore to before COVID-19 or the changed social pattern will be kept after the COVID-19. Due to the unpredictability of the future, urban designers have two scenarios when designing public space for socialization when post-COVID 19: The first is that the social pattern of older adults will return to what happened before COVID-19. The design of public space should be improved according to the existing situation to fit the normal social needs. The second is that the changes in the social pattern of older adults during COVID-19 will remain, so the public space design in post-COVID 19 must adapt to these changed social patterns.

The Figure 1 shows the generation of the two scenarios.



The Figure 1 The generation of the two scenarios

Design Public Social Space in the Post-COVID 19

After conducting the corresponding theoretical studies, these theoretical studies need to be transformed into design elements for the social space design in the post-COVID 19.

Scenario 1: Design elements of restore social pattern

i. Connected urban system

In the absence of COVID, the social spaces of older adults may be located in all corners of the city, which means that these social spaces have an extensive city connection system to ensure that older adults can reach here smoothly.

ii. Multiple functions

Social space has many types of functions and programs, which means that it can attract different groups to go there, creating objective conditions for older adults to socialize with diverse groups. At the same time, multiple functions and programs can give older adults the willingness to stay here for a long time.

iii. Free and public entrance

Because the time and duration of older adults' visits to the public space are very flexible, the entrance of the social space does not need to be guarded and can be opened to the public, which allows older adults to enter here without a time limit.

Scenario 2: Design elements of changed social pattern

i. Green spaces near the housing or neighbourhood

Many investigations and studies have shown that urban public green spaces have become the most frequently visited outdoor public places during COVID-19, and older adults are no exception. Green space can effectively alleviate the social isolation experienced by older adults during isolation. In addition, designing green spaces around the living environment of older adults can allow older adults to feel connected to the outside world during home quarantine.

ii. Semi-private space for the social bubble of older adults

The social scope of older adults during COVID-19 is limited to familiar friends and family members to avoid reducing the risk of infection. Therefore, delimiting a specific semi-private space for older adults with their social bubble in the public space, on the one hand, can ensure the health of older adults in the public space, and on the other hand, help older adults return to the public space to establish a social connection.

iii. Place for a short stay

As older adults spend less time in outdoor public space during COVID-19, it is necessary to temporarily design venues and facilities for older adults to stay near older adults' homes to have daily short stay outside.

Figure X shows the design elements required for the social space of post-COVID 19 in a schematic form.

Design elements of social space for unchanged social pattern

-Connect to the urban system

-Multiple functions : Attract different groups so that older adults have opportunities to meet them

-Accessible entrance: So that older adults can freely enter into the place

Design elements of social space for changed social pattern

-Green space near home and housing in the neighbourhood

-Semi-private social space for social bubble

-Facilities for short stay

Figure 2 The design elements required for the social space of post-COVID 19

Site Analysis

The previous theoretical research and the implementation of the overall design guideline need to be implemented in conjunction with the specific design situation. Different sites have different physical characteristics. The site selected for this design is Bennekel-West-Gagelbosch. The selection of this residential area as the object of the design is based on the following criteria:

- i. The residential area's existing demographic data shows that older adults occupy a certain proportion in the residential area. The residents of this residential area have more residents who feel unhappy in life than those in other residential areas. It means that there are older adults and unhappy people's wellbeing should be paid attention to.
- ii. There are some undesigned open spaces in this residential area, and these open spaces have the potential to be improved.

Bennekel-West-Gagelbosch is located to the southwest of Eindhoven, as Figure 3 shows, surrounded by Blaarthemseweg, Roffart and Locatellistraat. The neighbourhood is about 3km away from the centre of the city. On the south side of the neighbourhood is the Dommel River, and on the other side of the Dommel River is the High Tech Camps which is directly facing Bennekel-West-Gagelbosch. Some other residential areas are surrounding the chosen neighbourhood. The residential area is built with high density, but the height of the houses is not high. These residential communities are a kind of suburban residential area. There are many public facilities around the neighbourhood, such as HTC 8 Frits Philips Sports Forest, Eindhoven Tennis "Volley", Sportpark-South Dommeldal, Helicon VMBO MBO Eindhoven and Recreatieplas Hanevoet are all distributed around the neighbourhood. Take bus lines 15, 16, 18, 19, 319 to reach the residential area directly. The Figure 4 shows the context of the neighbourhood.

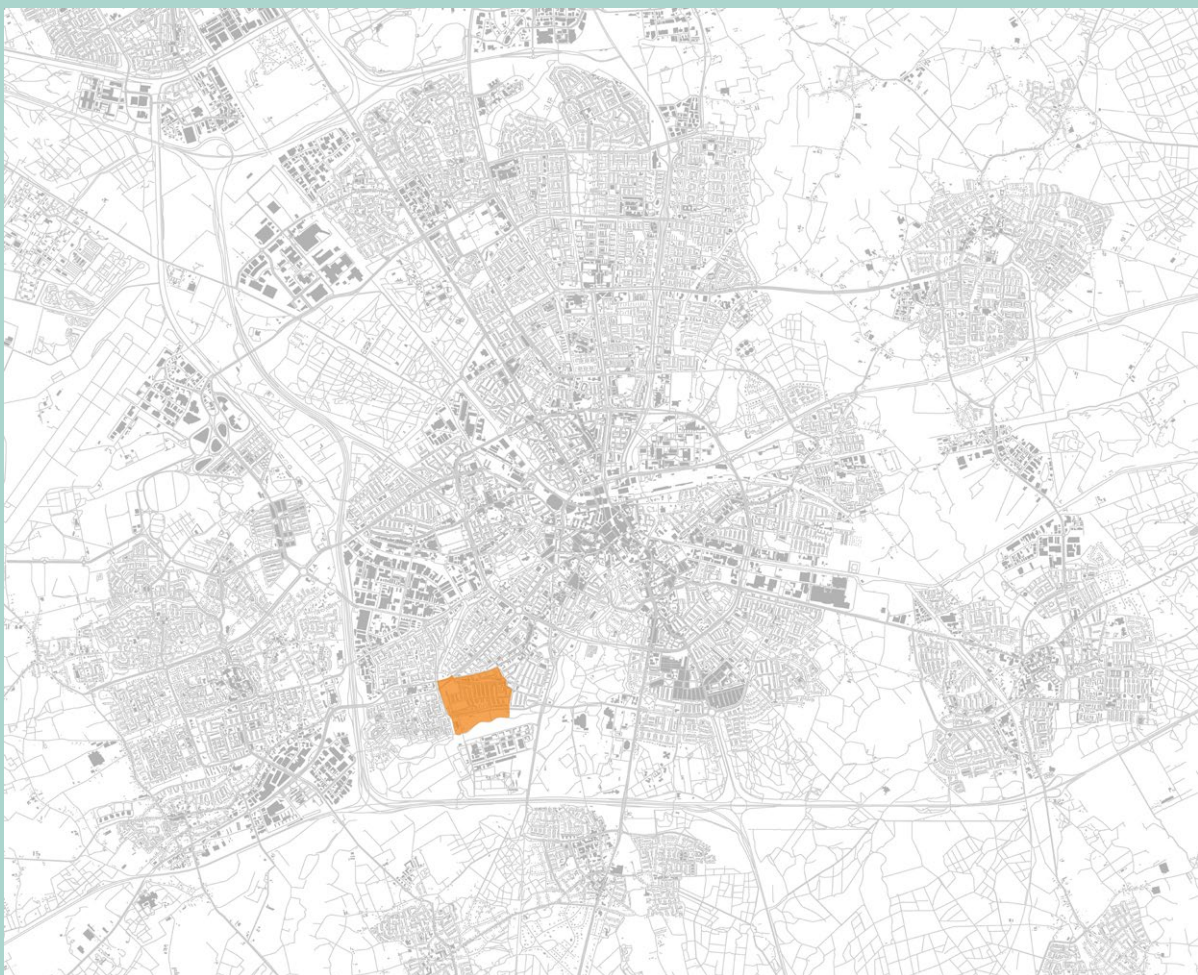


Figure 3 Location of Bennekel West Gagelbosch neighborhood in Eindhoven





Figure 4 The context of Bennekel West Gagelbosch neighborhood

The age composition of residents in Bennekel-West-Gagelbosch is ageing. Among them, 895 residents (26.5%) are over 65 years old (Information neighborhood Bennekel West Gagelbosch, 2020). Figure 5 shows the age composition of the population within the neighbourhood. According to statistics from Eindhoven municipality, 7% of residents in the neighbourhood feel unhappy (Eindhoven, 2018).

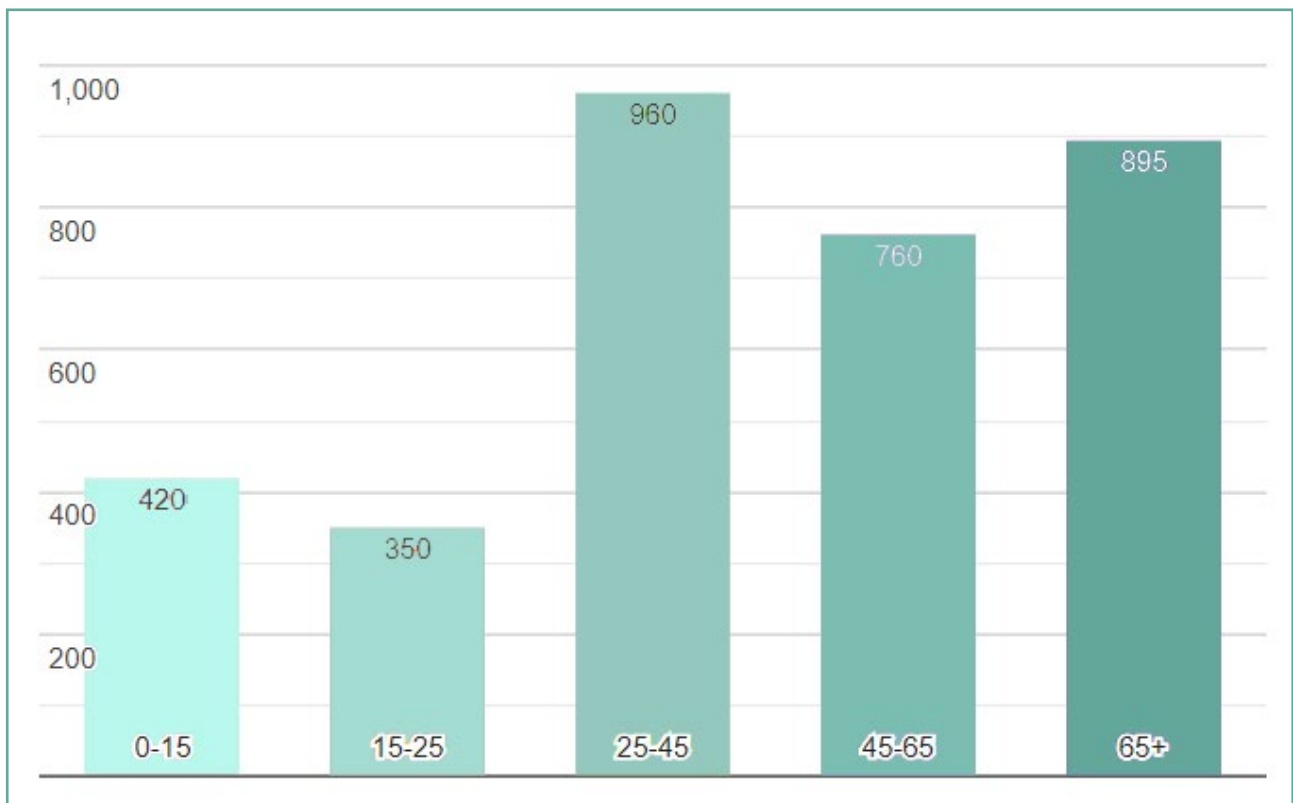


Figure 5 Inhabitants by age - Bennekel West Gagelbosch neighborhood

It can be seen that Bennekel-West-Gagelbosch is in line with the criteria of the design site. According to the previous literature review analysis, the social locations of older adults could spread across the entire city before the COVID-19 outbreak, but after the COVID-19 outbreak, the social locations of older adults were narrowed to the neighbourhood level. The graphical results of the combination of chosen design site and theoretical research are as follows showing in Figure 6 and Figure 7:

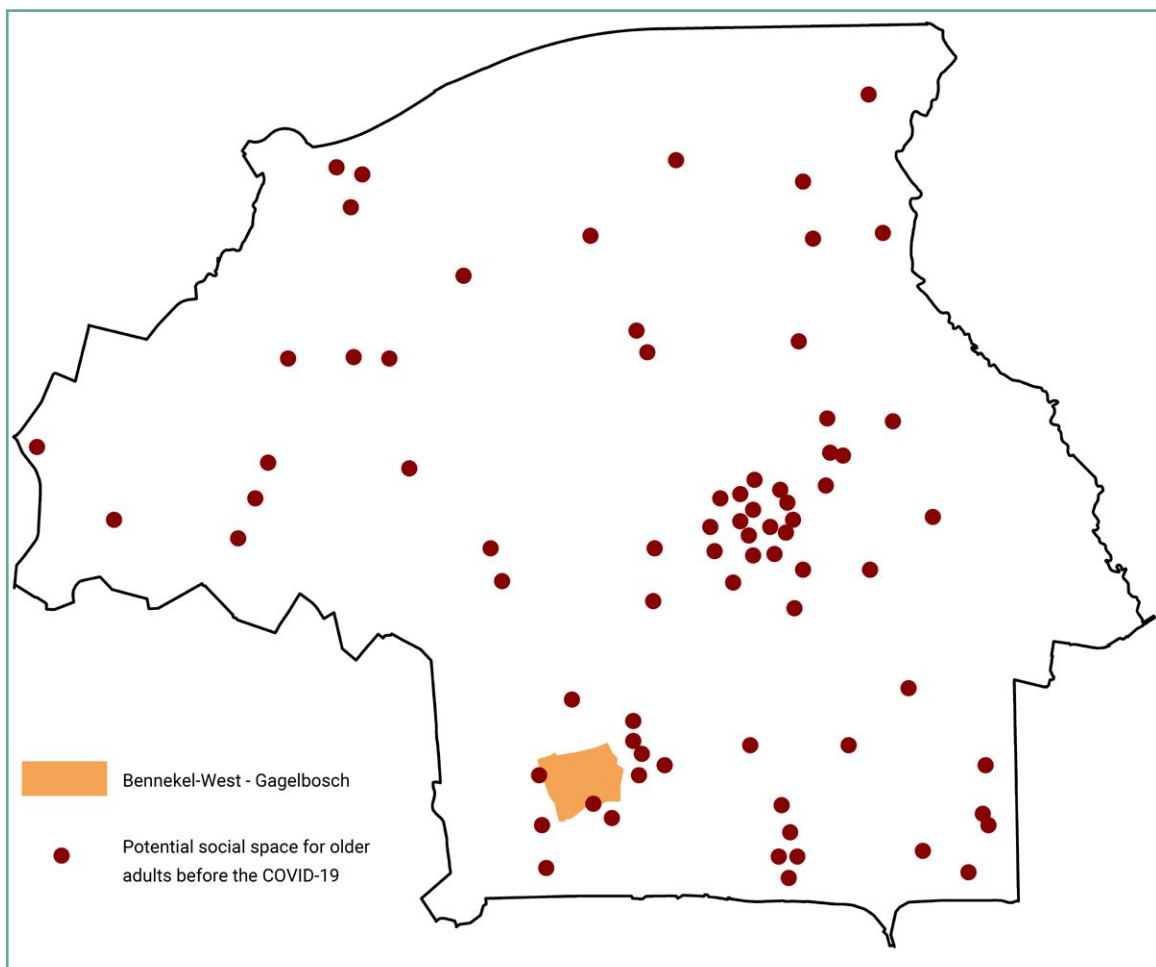


Figure 6 Social location of older adults before COVID-19 breakout

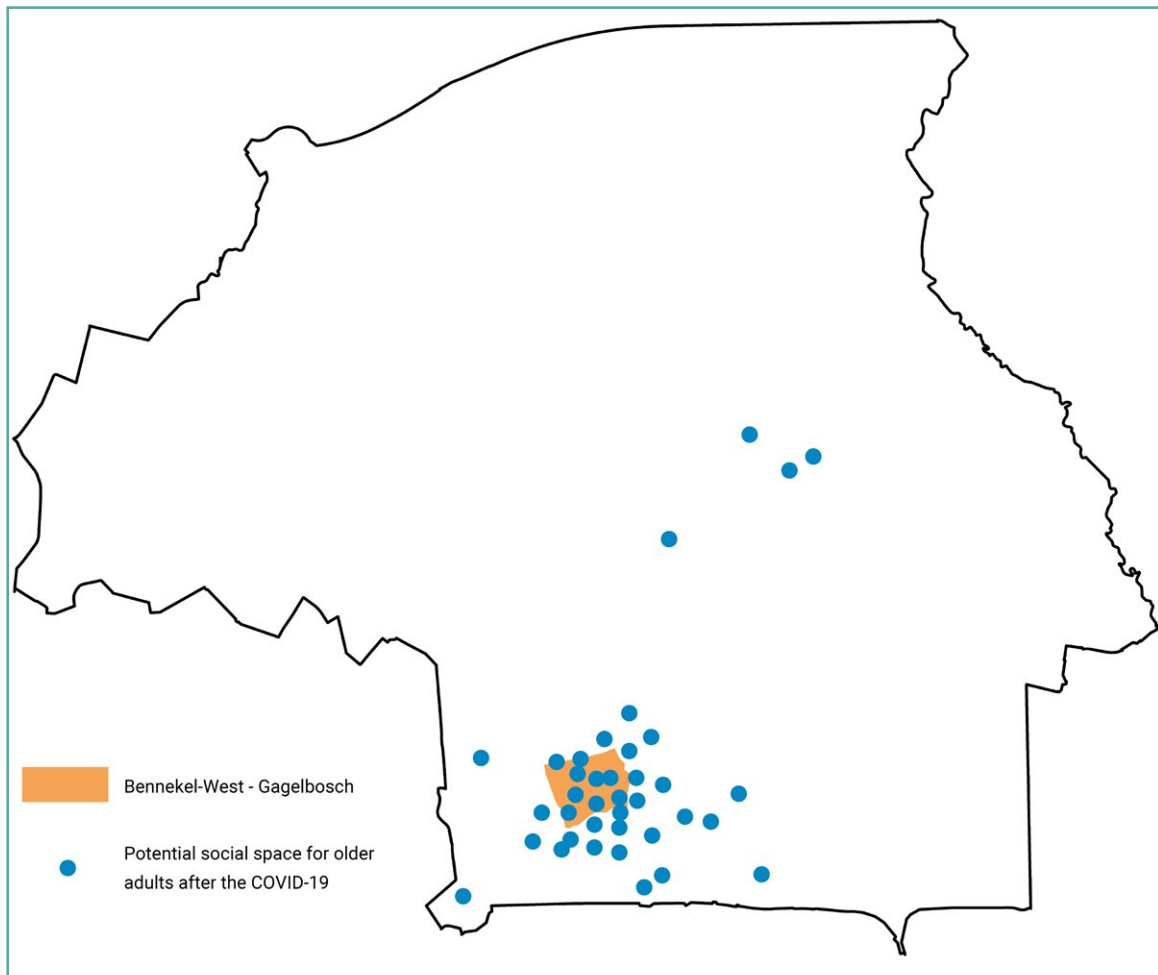


Figure 7 social location of older adults after COVID-19 breakout

-Locatellistraat divides the neighbourhood into two parts

There is a very important road—Locatellistraat passing through the selected neighbourhood, which divides Bennekel-West-Gagelbosch into two parts. The part north of the Locatellistraat is a residential area with green space for internal residents, while the part south of the Locatellistraat is facing the public, and the part south of the Locatellistraat directly faces the High-Tech -Campus and Dommel river is go across the area. Figure 8 shows that Locatellistraat divides the whole neighbourhood into two parts. The land in the south of Locatellistraat can also connect to many public facilities around it. The public spaces in the local residential area can only face the residents inside the neighbourhood. Built-up environment in the local residential area is quite closed. Figure 9 and Figure 10 shows the difference between local residential area and public area.

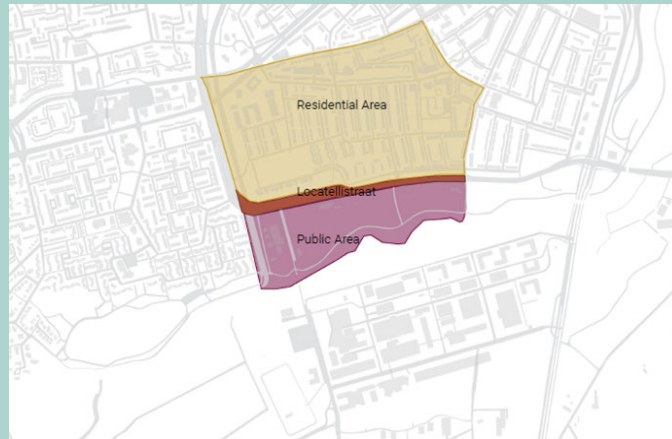


Figure 8 Locatellistraat divides the whole neighbourhood into two parts

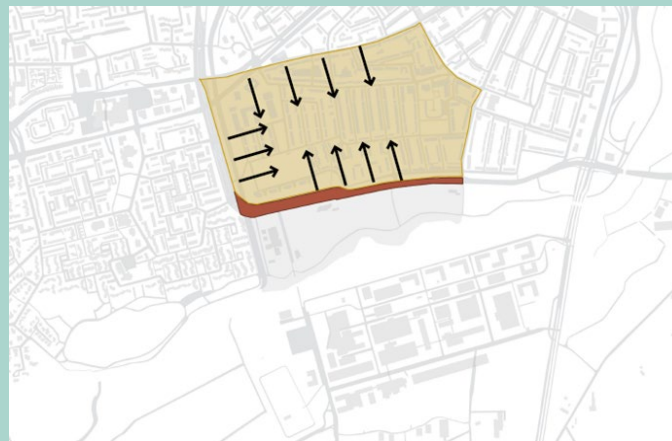


Figure 9 Residential area is enclosed and introvert



Figure 10 Public area is open and connected with other surrounding area

-Design principles are applied to different areas of the neighbourhood

Based on the above analysis of the built-up environment of Bennekel-West-Gagelbosch, the local residential area separated by Locatellistraat can be used to implement scenario 2, that is, the social space of older adults in the post-COVID period is to adapt to the changed social pattern of older adults. The public area separated by Locatellistraat can be used to implement scenario 1, that is, the social space of older adults in the post-COVID is adapt to the restored social pattern.

Combining the actual situation of the design site and the basic design elements analyzed in the previous literature review, design principles adapted to different regions are further proposed:

Scenario 1-Design principle for public area:

- i.** To ensure the connectivity of the public area with other areas of the city, set up different entrances and exits around the public area plot so that older adults and other residents living around the plot and other urban areas can quickly enter the area.
- ii.** Create the ability for older adults to socialize with different groups. Design different programs and functions in the public area to attract different groups of people to this place for activities.
- iii.** There are already many existing facilities in and around the public area. These existing facilities will be improved and transformed to further enhance the area's attractiveness to other urban residents.
- iv.** Use the existing green space and Dommel river in the public area to create a social space that enables older adults to get close to nature.
- v.** Establish a connection between the High-Tech Campus and the public area so that the High-Tech Campus employees can interact with other people and reduce the social isolation between the High-Tech Campus and the residents in other surrounding areas.

Scenario 2-Design principle for local residential area:

- i.** Create a social space in the neighbourhood that allows older adults to socialize near their homes. Improve the quality of the existing green space inside the neighbourhood so that older adults can enjoy a social environment close to nature.
- ii.** The social activities of older adults in the neighbourhood are mainly carried out inside the social bubble. Under such circumstances, older adults will hope that their social activities will not be interfered with by other people as much as possible, so the social space for the social bubble should be a certain degree of isolation from the public space.
- iii.** It is necessary to create a short stay place inside the neighbourhood so that older adults meet acquaintances in the street and want to have unexpected social activities.
- iv.** Improve the quality of the road inside the neighbourhood to increase the willingness of older adults to go out for social activities.

-Solve the isolation of two areas caused by Locatellistraat

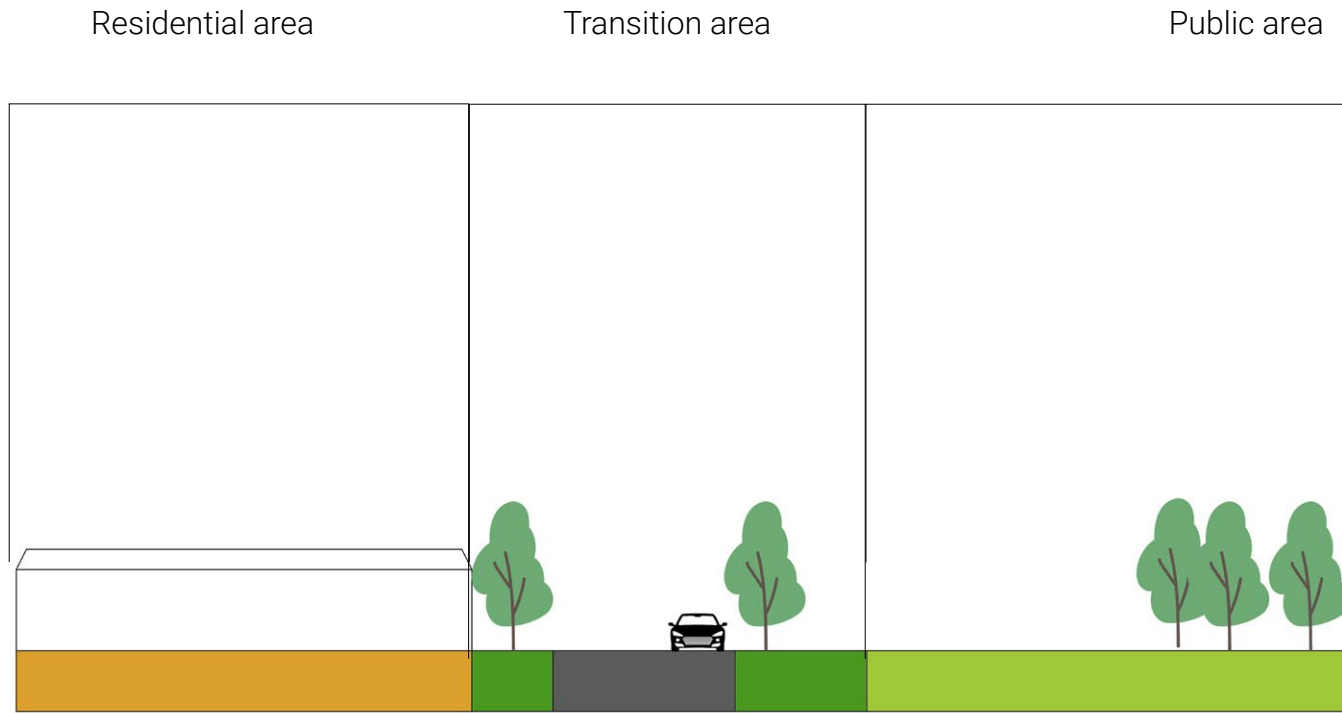
However, it is worth noting that even if the Locatellistraat expressway divides Bennekel-West-Gagelbosch into two parts with different publicity, this does not mean that the local residential area and the public area are entirely separated. Older adults in the post-COVID 19 periods should not be fixed for the social pattern but should have different possibilities: they can choose to return to the public area to socialize with various people after the epidemic is over, or in the next wave when the epidemic came, older adults once again chose to socialize in the neighbourhood. Therefore, for older adults living in Bennekel-West-Gagelbosch, solving the existence of Locatellistraat as a barrier allows older adults to choose social space more flexibly according to different situations and different social needs. Therefore, after designing the local residential area and the public area, the two areas must be connected to provide older adults with different social space options. So the design strategy should include designing residential area to fit the changed social pattern, designing public area to fit the restore social pattern, and designing Locatellistraat as a transition place as Figure 11 shows.





Figure 11 Three parts of design strategy

Figure 12 shows a section that there are different options for older adults to have social activities in different places. At the same time, Locatellistraat is playing a role of transition.



High-Tech Campus

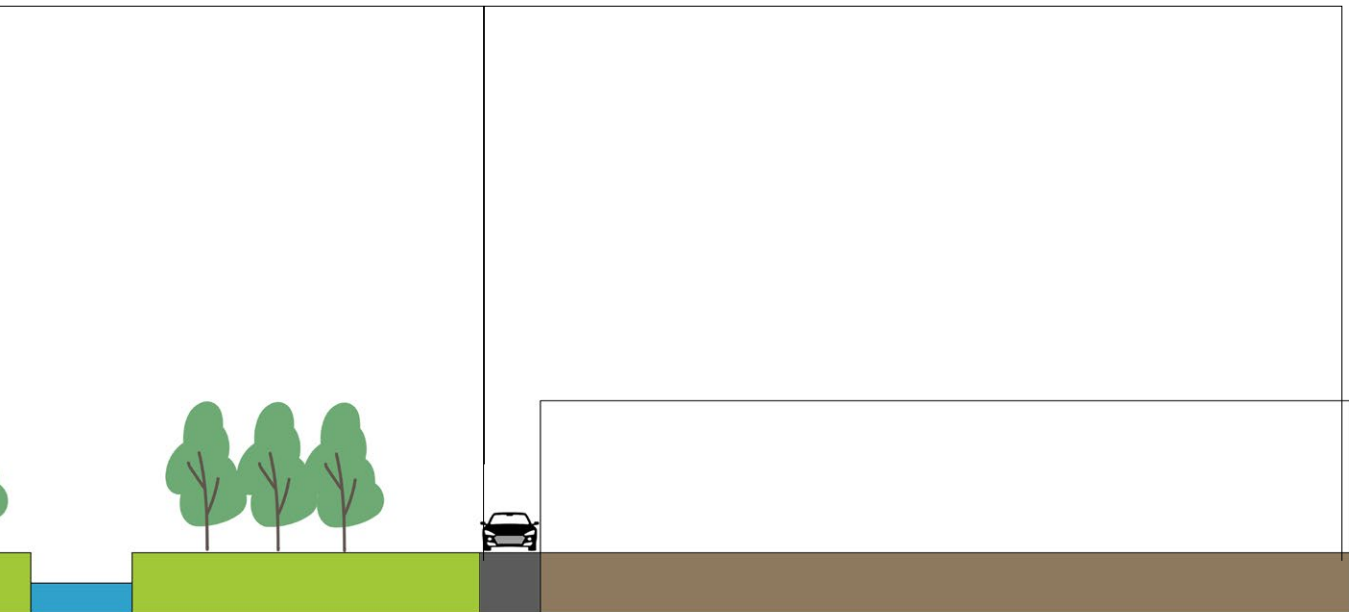
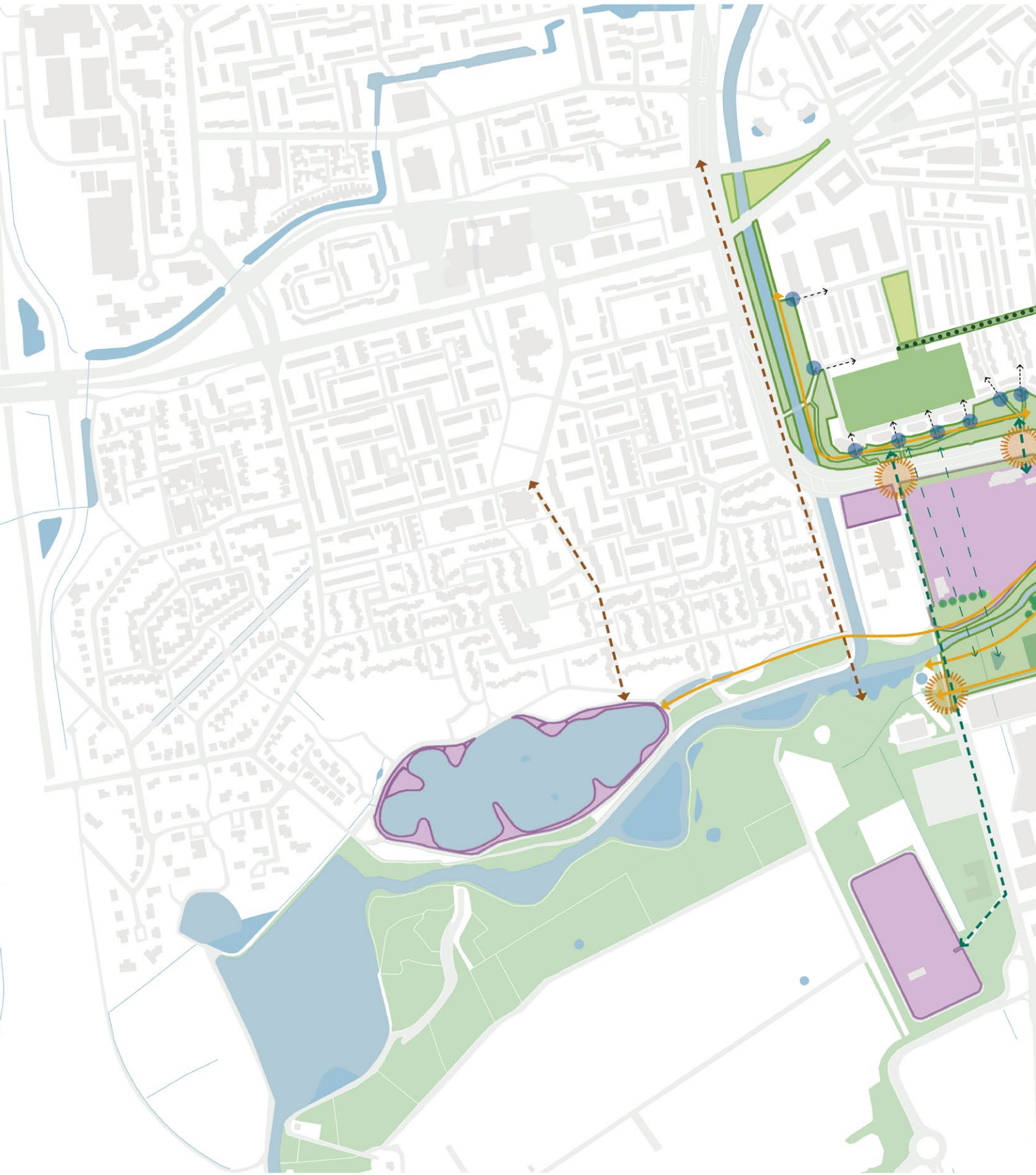


Figure 12 The section is about older adults may transit from residential area to Public park area by going across Locatellistraat

Design: Overall Concept Map

This concept map showing as Figure 13 summarizes the design principles, and it is also the overall framework of the design.

In this overall concept mapping, it can be seen the different levels of city connection systems. The red arrow indicates that people from all directions of the city can enter this plot, and there are five main gates for people to enter here. A greenway structure is built in the residential area separated by the Locatellistraat to connect the existing green space so that older adults can have a social space close to the green space in the neighbourhood. A park that all the public can access is mainly designed along the Dommel river in the public area. This park is close to the High-Tech Campus. In this park, a line of sight between the High-Tech Campus and the opposite residential area can be constructed. Locatellistraat is a transition area that can connect residential areas and public areas. There is a street park on the side of the road. This street park can be seen as a continuation of the public park. Three gates in locateellistraat can connect residential area and public area.



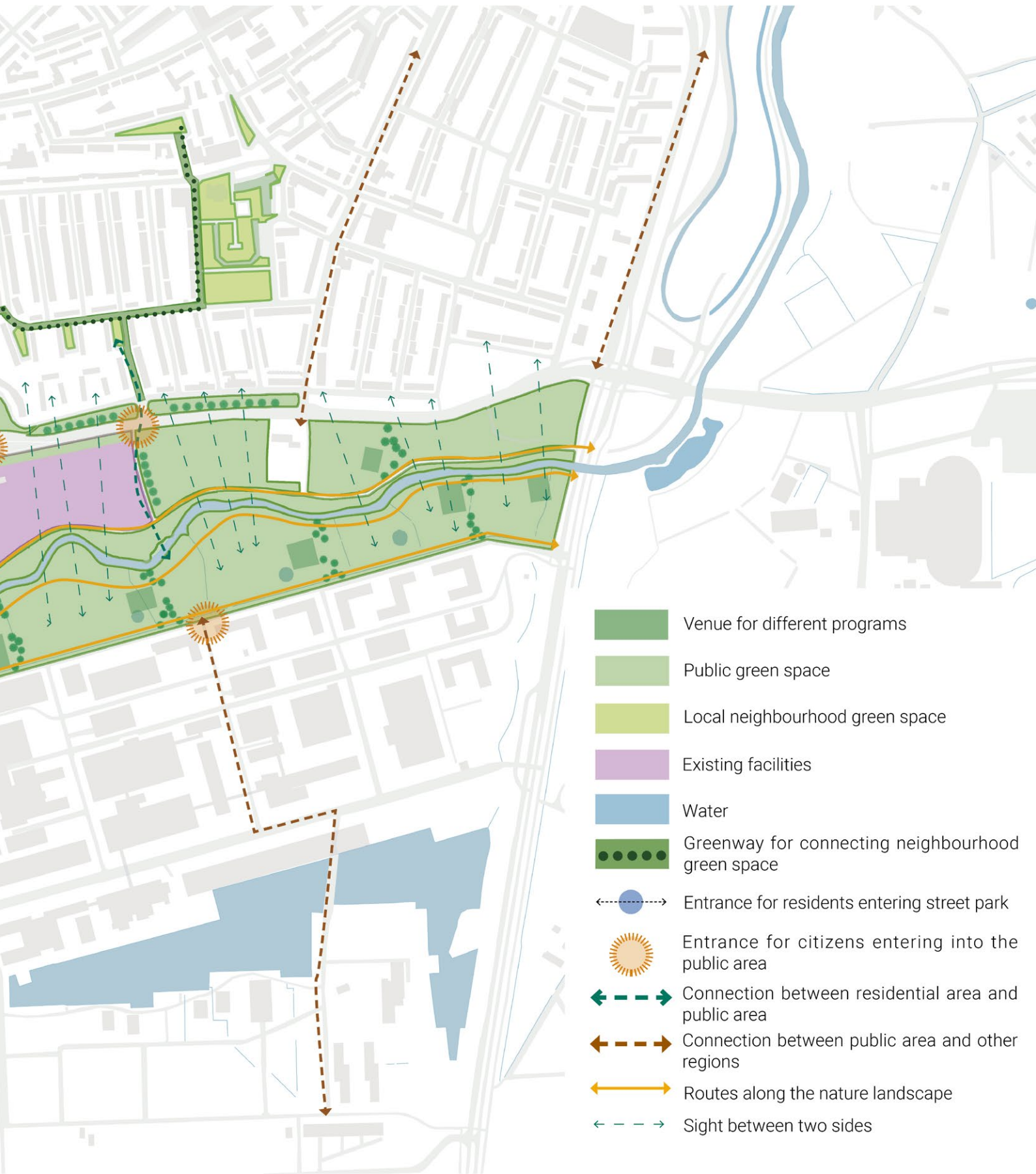


Figure 13 The overall concept mapping

Design: Overall Function Map

Figure 14 shows the functions that Bennekel-West-Gagelbosch has after designed. The functions in the residential area are mainly scattering green space for residents living in this neighbourhood. In contrast, the public area with sports facilities and public park is opened for all citizens to use. Furthermore, some commercial and catering functions have been added at the entrance that connects the residential area with the public area to attract residents living in the residential area to go across the Locatellistraat to enter the public area. There are also some catering functions on the High-Tech-Campus side. These catering functions form a continuity in the physical space and guide people working in High-Tech-Campus to enter the public park gradually.



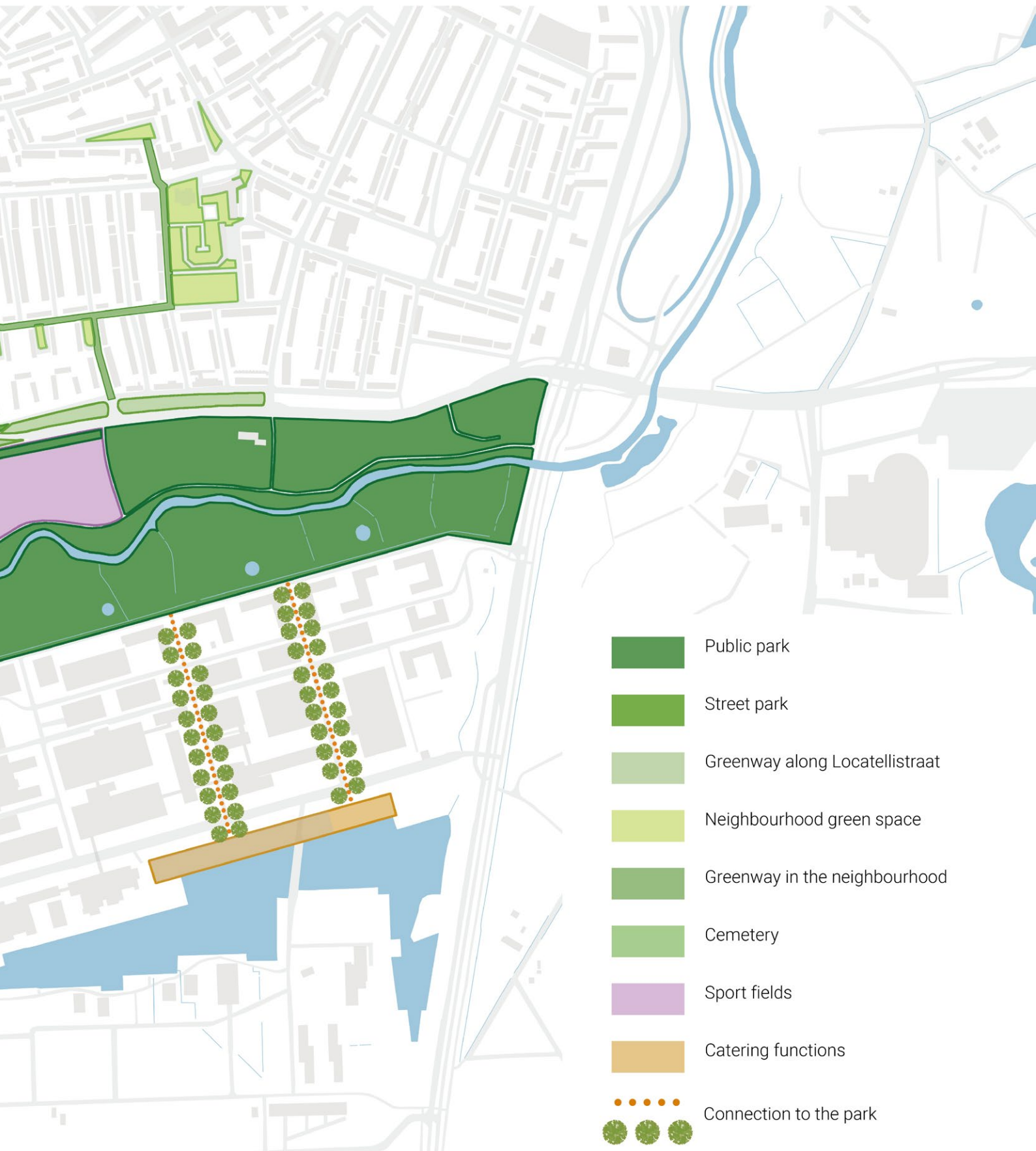


Figure 14 The overall function mapping

In the next steps, the design of residential area, transition area and public park area will be introduced respectively.

Design of Residential Area

The design of the residential area is fitted for the changed social pattern during the pandemic. It needs build up green environment and social space for older adults with their familiar friends and relatives in the neighbourhood. Designing greenway can achieve this. Four sections of roads have been designed. They are marked with A, B, C, D. The sections of these roads before and after designing were drawn. It can be seen that the width of the roads have been changed and some facilities were added. Figure 15 shows the design of the neighbourhood area.

It can be clearly seen in Figure 15 that trees and bushes are added to both sides of the road to increase the greenery on the road.





Figure 15 The green structure design mapping

Next, how to increase the greenway design by changing the road design will be described. The description will compare the section before the road design and the section after the design and use photo observation from the human perspective to describe how to improve the road design from the detailed design to create a social space for older adults through the greenway.

i. Design of the section A

In section A, there are not many changes, but the green way of the existing road is used to add seats so that older adults can have a place to rest when passing this section of the road, and they can also sit and share People passing by interact.

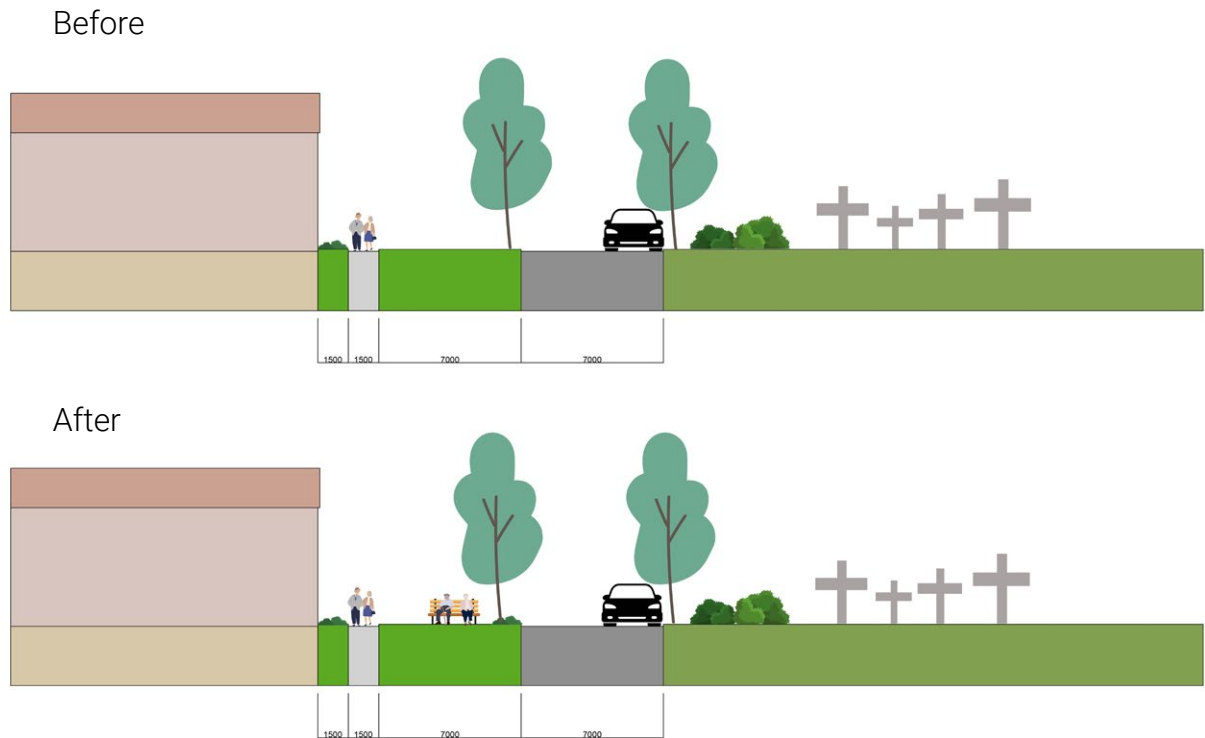


Figure 16 The design of section A

From the perspective of a human perspective, it can be seen more clearly what has changed in this section of the road. The Figure 17 show the condition before designing.



Figure 17 The condition before designing of Section A

Judging from the current situation, section A already has a greenway, but the greenway has not been used. The sidewalk near the cemetery is very narrow, and it is difficult for pedestrians to walk on it. In addition to dense bushes and fences around the cemetery, the cemetery looks even more not welcome.



The detail design can change the current condition. The Figure 18 shows the detailed design of from the human perspective. It can be seen from the detail design of section A that some benches have been added to the existing green way, the sidewalk close to the cemetery has been widened, the fence around the cemetery has been removed, and the bush has been trimmed short.

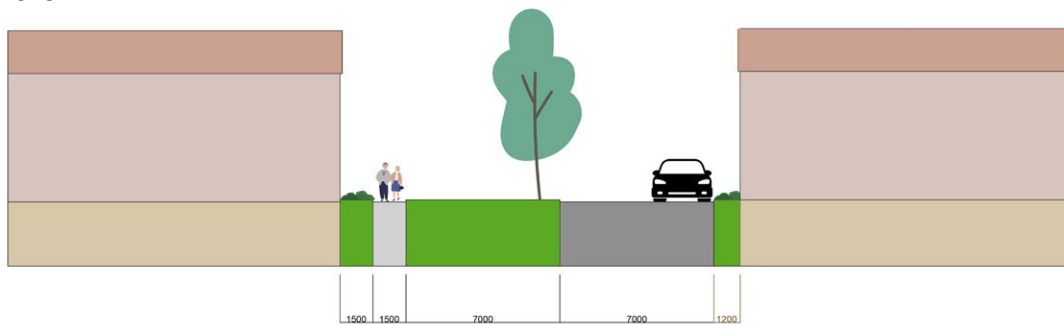


Figure 18 Detailed design of section A

ii. Design of the section B

The changes made in section B are mainly to use the existing greenway to create a space suitable for older adults to socialize with others. Since the greenway of this section of the road is in the middle of the residential house, it can be used to create a space that all neighbours can share. If older adults live in the surrounding housing, this greenway also creates opportunities for older adults to socialize with their neighbours. So some playing facilities and fitness facilities for older adults are placed on the greenway.

Before



After

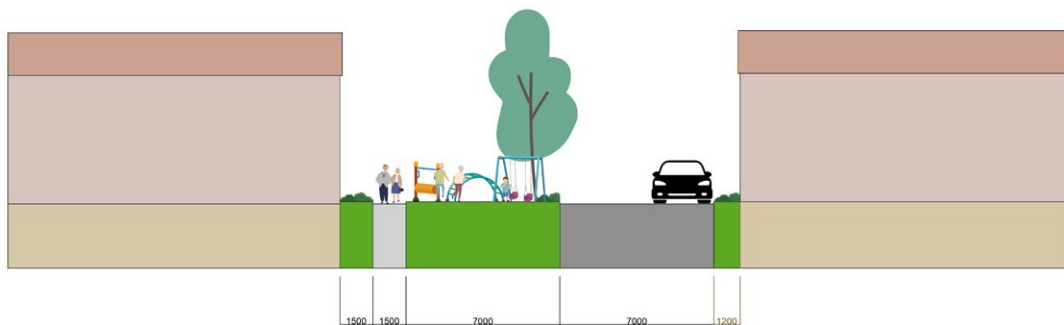


Figure 19 The design of section B



Figure 20 The condition before designing of Section B



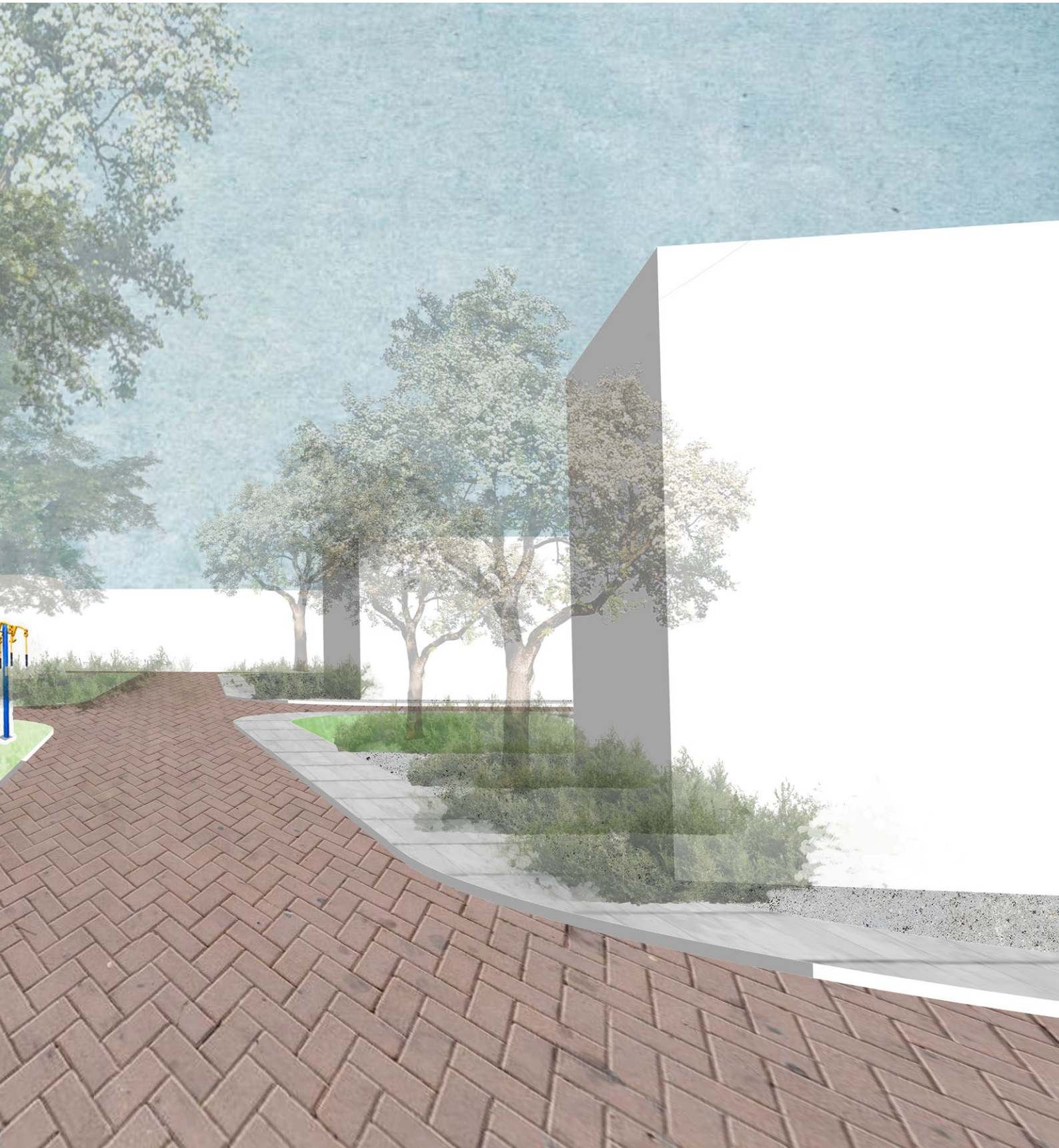
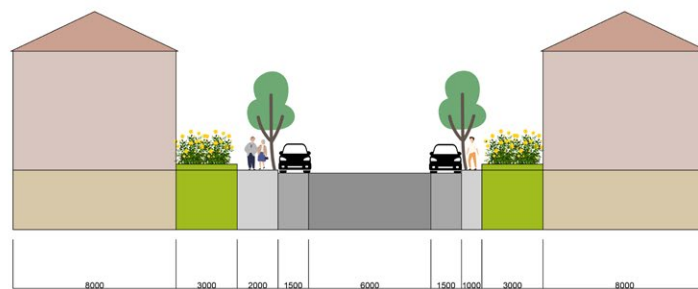


Figure 21 Detailed design of Section B

iii. Design of the section C

The design intervention made in section C is to reduce one of two parking lanes to increase the width of the sidewalk and increase the greenway on both sides of the road. Since two parking lanes occupy the existing road, older adults need to compete with cars for road space. Therefore, increasing the width of the sidewalk and increasing the greenway by reducing a parking lane can increase the frequency of outdoor activities for older adults. The benches are also increased on the greenway so that older adults can have rest anytime when they are travelling out.

Before



After

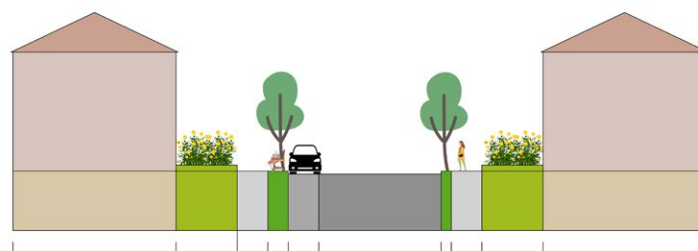


Figure 22 The design of section C



Figure 23 Current situation of Section C



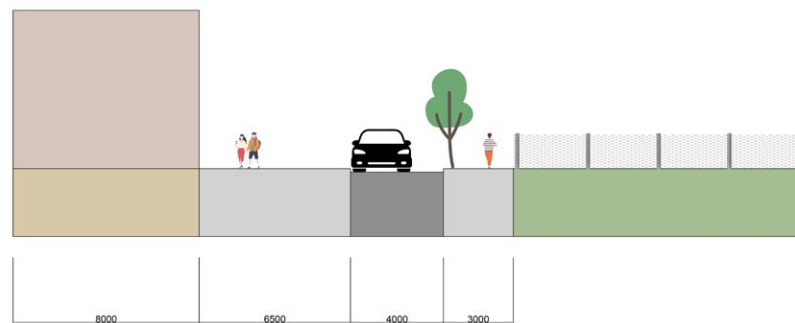


Figure 24 Detailed design of Section C

iii. Design of the section C

Section D is a section of road close to the existing neighbourhood green space. The other side of the road is a residential building. This section of road is wider than other roads, but there is not much greenery around it. Therefore, the design intervention in section D is also to increase greenery. In addition, the fence around the existing green space beside the road should be removed so that this green space becomes more open and can be connected to the greenway. In addition, some children playing facilities are also placed inside the green space, and this green space can be turned into a community park serving the entire neighbourhood.

Before



After

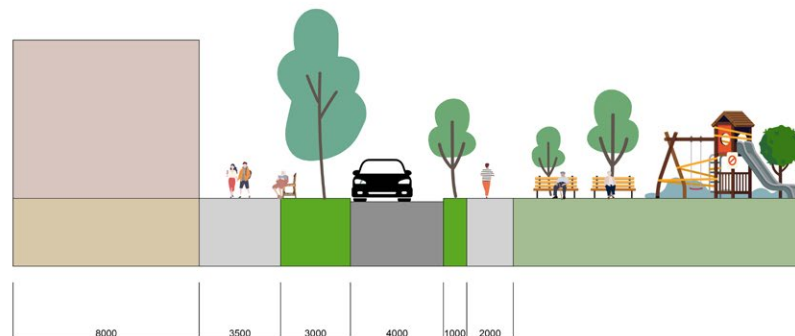


Figure 25 The design of section D



Figure 26 Current situation of Section D





Figure 27 Detailed design of Section D

Design of Community Park

In addition to designing a connected greenway to create a space that allows residents to generate social activities, a community park that can provide leisure and entertainment activities for residents in the neighbourhood is also designed.

Figure 28 shows that this community park is in the northeast corner of the neighbourhood and is now a wasteland that has not been designed.



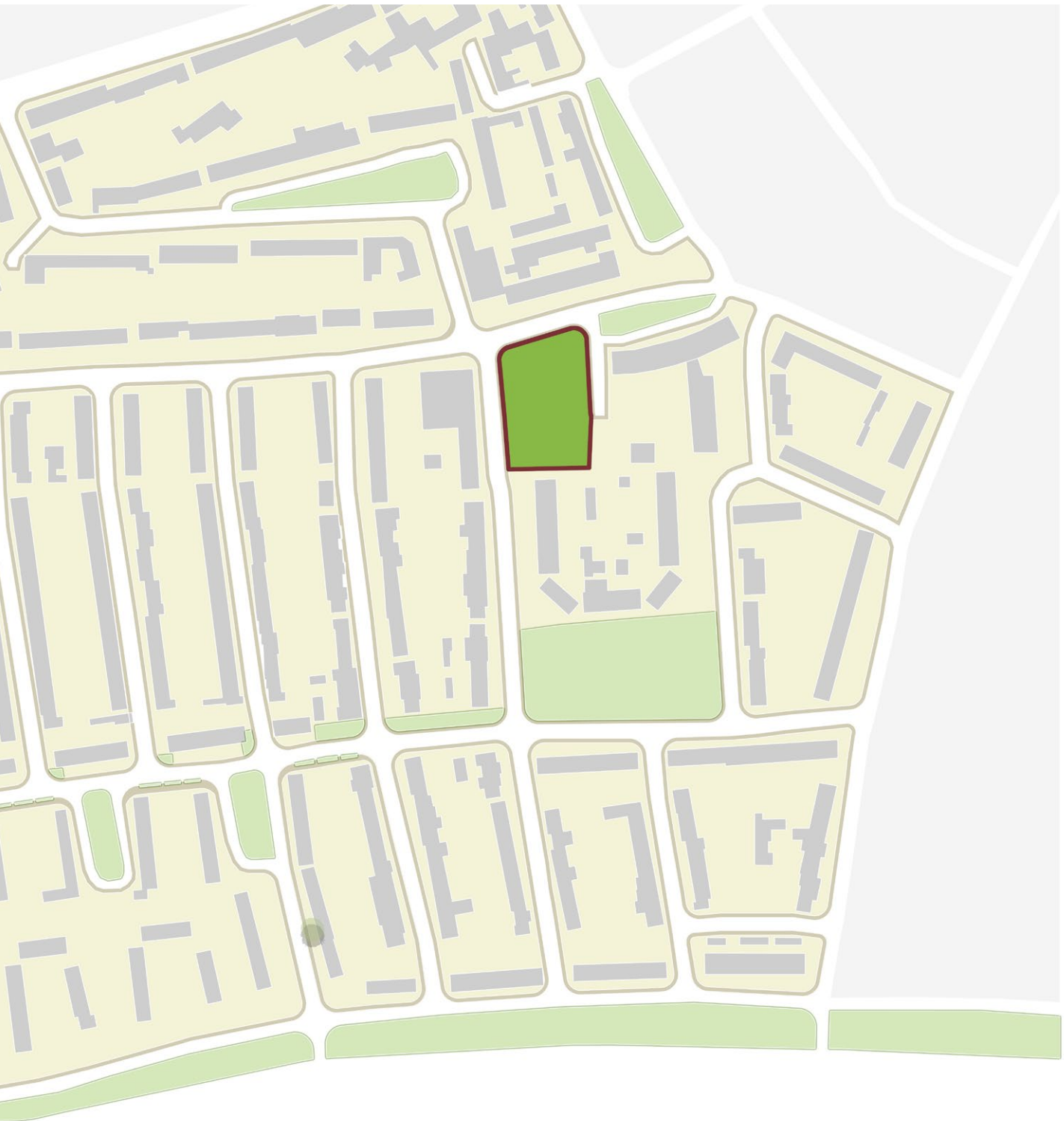


Figure 28 Location of the designed community park

Figure 29 shows the current context around this wasteland. There are some catering facilities and shops in the northern part of this wasteland. There is a five-story apartment housing located in the east side of this wasteland. In the middle of this wasteland and the apartment housing is a parking lot. There is a temporary building next to the parking lot that is used as a community activity centre.





Figure 29 Context around the current wasteland

Figure 30 shows the design concept for this community park. The main entrance of this community park is located in the north and west, facing the surrounding catering facilities and shops. Parking a lot, originally located between the existing wasteland and the apartment housing, is transformed into a green space.



This green space extends the community park to the apartment housing and can provide residents with a suitable living environment. The route can be directly connected to the entrance of the apartment housing, allowing residents to get closer to the green space. The original parking space is transformed into a parking lane along the road. The temporary building will be replaced by a pavilion for older adults meeting there.



Figure 30 Designing concept of community park

From the human perspective, it can be more intuitively seen how this undesigned wasteland is transformed into a community park. Figure 31 and Figure 32 are showing current views of the wasteland. Figure 33 and Figure 34 are showing designing view from human perspective.



Figure 31 Current view of the wasteland (1)



Figure 32 Current view of the wasteland (2)





Figure 33 Design of community park (1)





Figure 34 Design of community park (2)

Design of Transition Area

Since older adults will not always conduct social activities only in the neighbourhood, older adults may also need to go to the public area for social activities. Before older adults go to the public area to socialize, they need to go through the Locatellistraat. Locatellistraat is now a bustling road. This busy road is a barrier for older adults, but the barrier can be turned into a transition area by design.

Figure 35 shows the overall design structure of the transition area.

In this transition area structure, three gates can connect the residential area and public area. The red gates are the main connection gate, and the orange is the secondary gate. On the side close to the residential area is street park.





Figure 35 Overall structure of transition area

This street park can be seen as an extension of the public area to the neighbourhood area. Next, the design concepts of these three gates will be described separately.

i. Design of the Gate A

The design concept is to make Gate A more open by reducing people's visual barrier and increasing the attractiveness of the opposite area. Many messy bushes cover the visual sight of older adults. Moreover, many vehicles with high speed are passing very fast when passing the street, so the primary design strategy is to trim these messy bushes shorter, and increase the greenway in the middle of the road to reduce the width of the roadway so that the car speed of is reduced. In addition, there are some speed limit signs placed on the side of the road to remind people to slow down when driving past here. Zebra crossings, traffic lights, and road paving of different materials are also used to help older adults safely cross this busy road. In addition, there are cafes, squares, and seats on the opposite side of Gate A to increase the willingness of older adults to cross the road and enter the public area.

The following section(Figure 36) shows what area people will pass if they choose Gate A to reach the opposite area: People will first pass through the street park, then arrive at the road with the greenway, traffic light, and limited speed sign, and then arrive at the catering facilities. The area opposite.



Figure 36 Section of Gate A



Figure 37 Current condition of Gate A





Figure 38 Detailed design of Gate A

ii. Design of the Gate B

Gate B is the secondary gate in this area. The design strategy of this secondary gate is the same as that of Gate A. From the current situation, the biggest problem with Gate B is that trees and shrubs block the entrance, and there is even no one will notice that there is an entrance and exit here. The improvement and adjustment of the status quo are mainly achieved by reducing the existing bush's occlusion of people's sight and making this entrance more open to attracting people's attention. Hard pavement and zebra crossings of different materials are used to guide older adults safely across the road. A new green belt is added in the middle of the road to reduce the speed of the car.

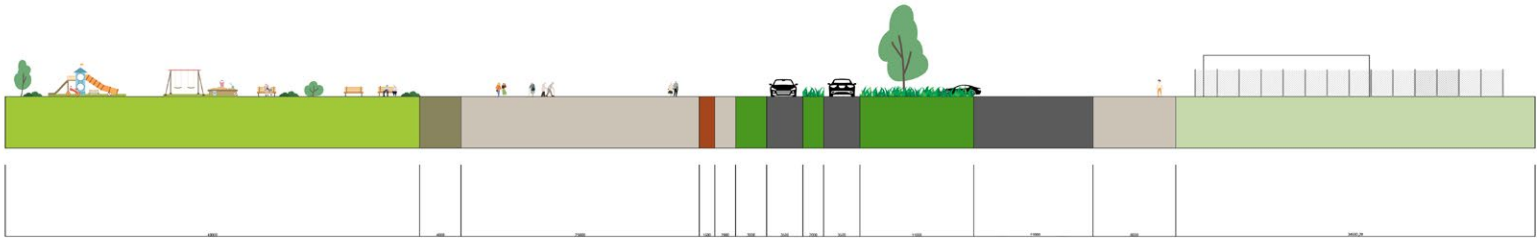


Figure 39 Section of Gate B



Figure 40 Current condition of Gate B





Figure 41 Detailed design of Gate B

iii. Design of the Gate C

The design of Gate C is the same as the previous two gates. The main thing is to design a square at the entrance, trim the bush to make this entrance visible, and add green belts and speed limit signs on the road to slow the car. Design zebra crossings, traffic lights and particular road paving in the middle of the road to guide older adults to pass Locatellistraat safely. When arriving at the opposite side, a sign of the park will tell people that this is an entrance to the park, and there is a route with different paving materials at the entrance of the park that will guide people into the public area.

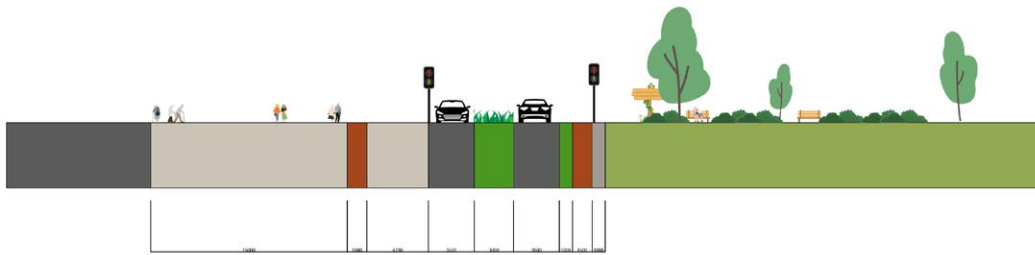


Figure 42 Section of Gate C



Figure 43 Current condition of Gate C





Figure 44 Detailed design of Gate C

Design of Public Area

The third part of the design is about the design of the public area. This public area can allow people from all areas of the city to enter and can increase the opportunities for residents living in Bennekel-West-Gagelbosch to interact with people in the High-Tech Campus. At the same time, it can make older adults close to nature and to be able to interact with other people in the natural environment.

Figure 45 shows the design structure of the public park.

Figure 45 shows that the design of the public park is mainly about how people enter this area, so there are five entrances in this area. The two red entrances are the main gates because these two gates can connect the residential area and the High-Tech Campus. The yellow route is designed to guide people to walk in this park with a sense of direction, and light yellow areas are places where people can rest and perform activities. The dark blue arrow represents the bridge connecting both sides of the Dommel river.

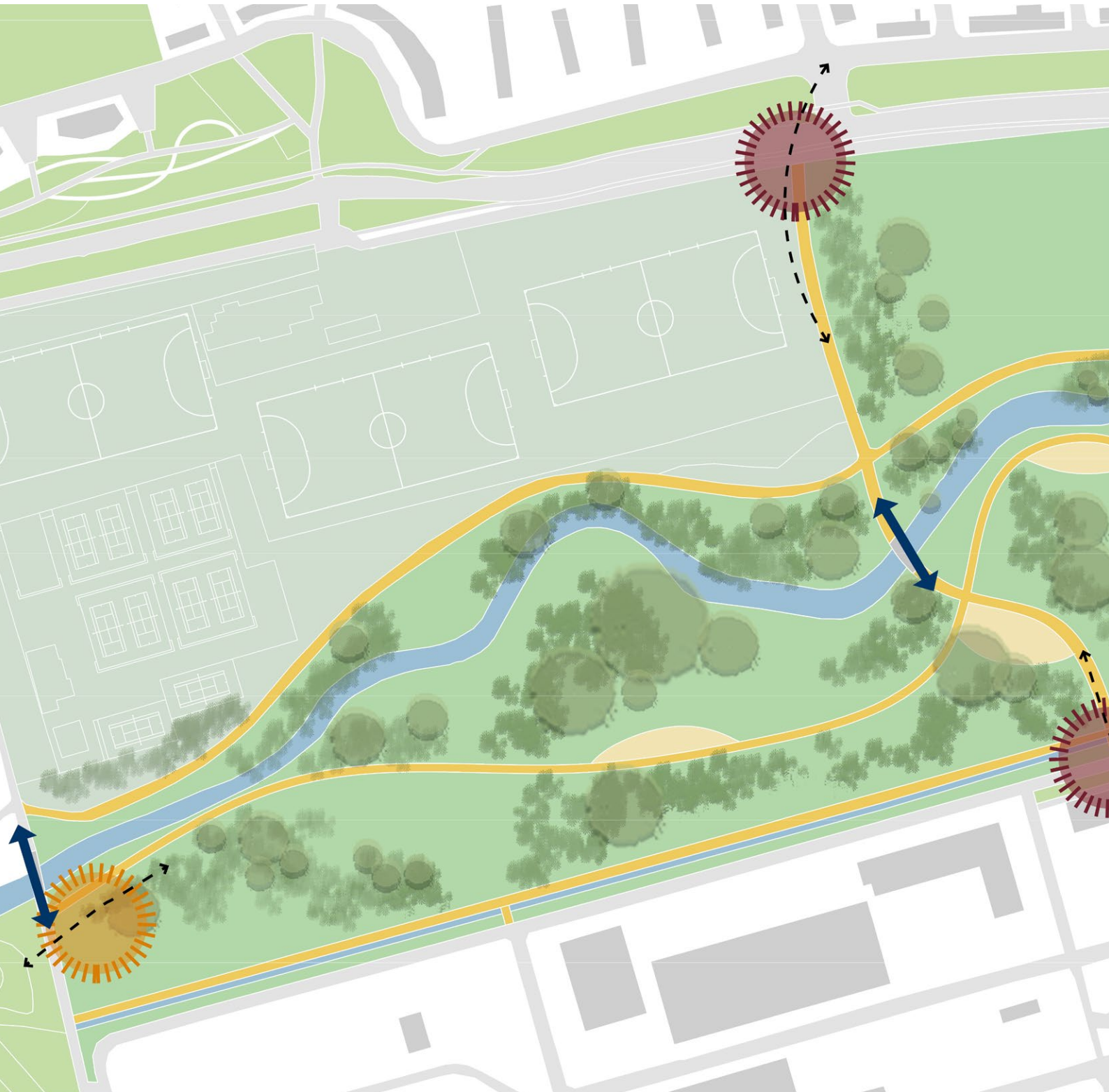




Figure 45 Structure of public park

i. Entering from the main gate in the park

The first part of the design is about when older adults enter the park from the main gate and come to the river. Judging from the status quo, whether older adults or other people come to the river, there is no way to see the scene on the other side of the river. Cluttered trees and shrubs block people's sight. There is no way for people to reach the other side of the river. Both banks of the Dommel river are separated from each other. Figure 46 shows the current situation when people enter this area and come to the river.



Figure 46 Current condition about arriving at the river side

Detail design mainly reduces the obstruction of the line of sight by the bushes so that people on both sides of the strait can have line-of-sight communication. At the same time, routes and bridges are added to allow people to cross the Dommel River better to reach the opposite bank. Some Catering cars can be parked here to attract more people to this area. Figure 47 shows the design of the riverside.





Figure 47 Design of the riverside

ii. Entrance from High-Tech Campus

The main problem with the entrance on the side close to the High-Tech Campus is that the existing trees and shrubs are too dense, making it invisible for people working in the High-Tech Campus to see the inside of the public park. On the side of the High-Tech Campus building close to the public park, no facility can attract the employees of the High-Tech Campus to go close to this public park. Figure 48 shows the current status of the entrance to the public park from the High-Tech Campus.



Figure 48 Current condition of the entrance near High-Tech Campus





Figure 49 Detailed design of the entrance near the High-Tech Campus into the public park

iii. When people enter in the park

Figure 50 shows what people face when they enter the public park. Trees and shrubs grow very disorderly inside the public park. People will feel lost when walking in it and feel like walking in such a park is very insecure, especially for older adults with significantly reduced perception ability. The subsequent detailed design is shown in Figure 51, adding routes that can guide people's walking directions and small squares that can make people rest in the public park. Some rest facilities will be placed on the small squares to increase the convenience of people, especially for older adults walking inside this public park.

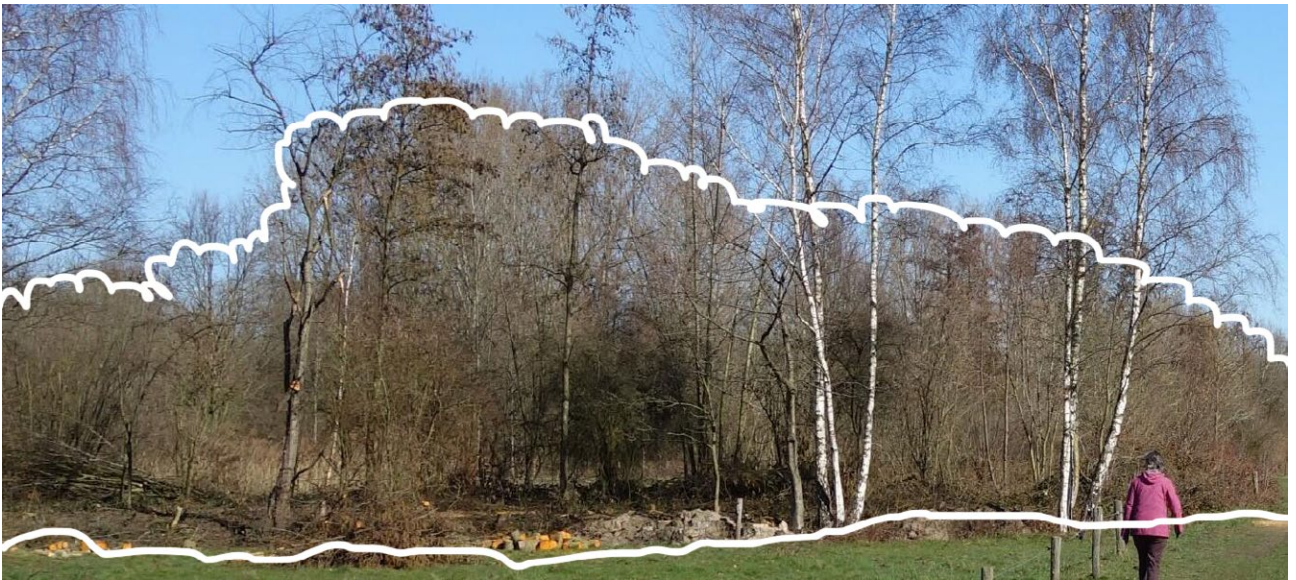


Figure 50 Current condition when walking into the park





Figure 51 Detailed design of inside of the park

iv. The east gate

The public park is very closely connected with the periphery of the city. The east side of the park is connected to a road with a lot of traffic and pedestrian flow. However, there is no entrance on this road that allows people to enter the park, as shown in Figure 52. The detailed design of the east gate opens up an entrance that allows pedestrians to enter. Extending the route in the park to the road to the east can play a better guiding role. Figure 53 shows the newly opened park entrance close to the eastern road.



Figure 52 Current condition of the east road





Figure 53 Detailed design of adding entrance of the east road

Place for Resting in the Public Park

In addition to enhancing the convenience of surrounding residents to enter the park, the public park's design also adds some small squares inside the park for people to rest and stay. Statues and seats are placed on these small squares. The statue is like a sign to remind older adults that there is a place for them to stay, and the seats provide objective conditions for older adults and tired of walking to rest in the park. In addition, there is a small square with different designs appearing at every distance, preventing people from feeling monotonous and boring when walking on the route. Employees working in High-Tech Campus can also enter the park during lunch break and enjoy the quiet atmosphere in the park.

Figure 54 shows the location of different small squares in the public park.





Figure 54 Locations of small squares

Design of Square A

If people enter this public park from the west, Square A is the first square to stop and rest. There are movable chairs on the square, and people can stop and rest on this square when they are tired. There are also some low concrete walls around it, which play the role of space division. People can also sit and rest on these low concrete walls. This square has a statue with modern elements. The existence of these statues is also to attract people to stay here.

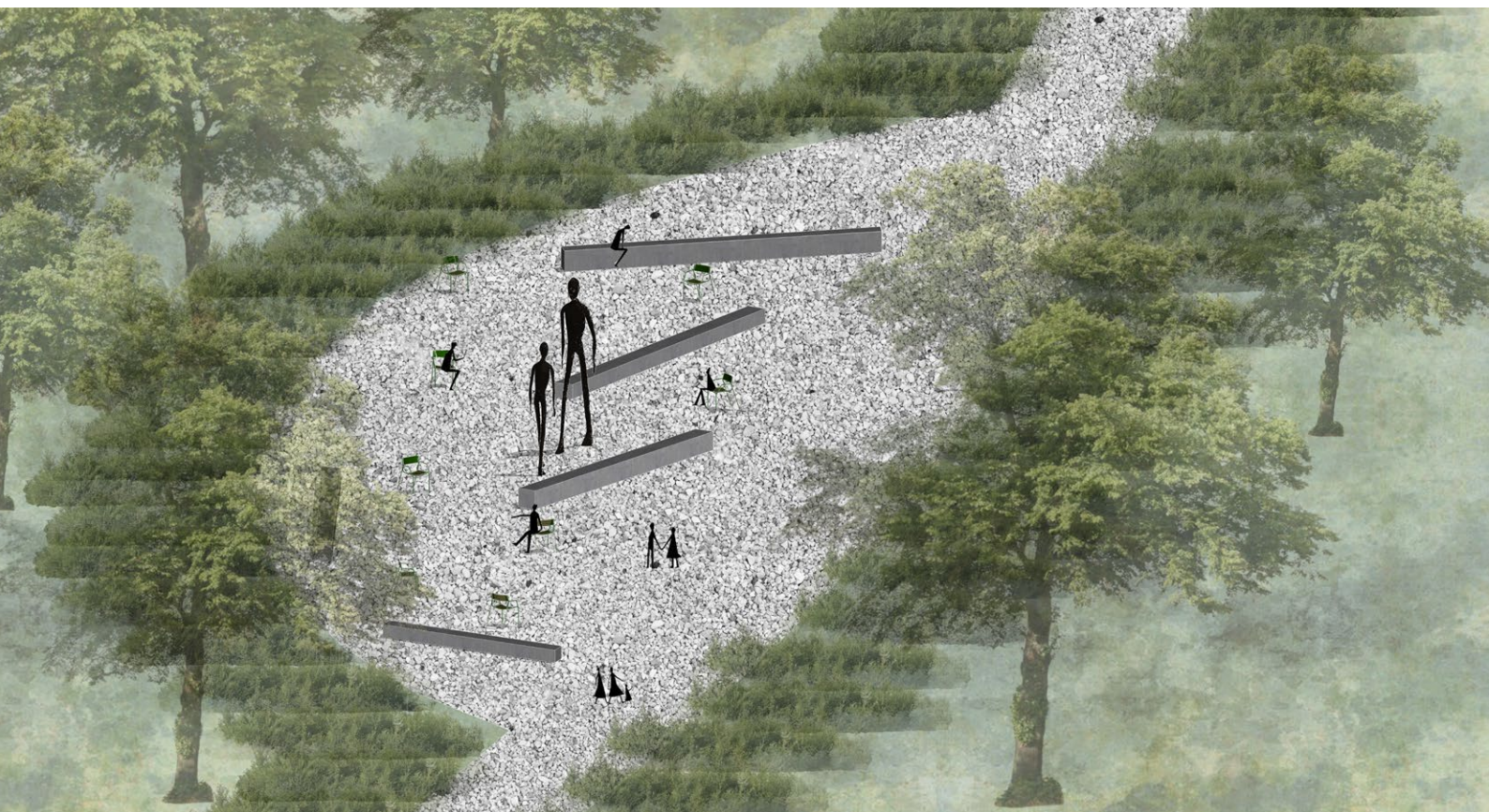


Figure 55 Isometric of Square A

Design of Square B

Square B is located directly opposite the entrance of the High-Tech Campus. A wooden landscape platform was built on this square, and some landscape structures were erected on the landscape platform. These structures can play an identifying role and increase the attractiveness of this entrance, thereby attracting more employees working in the High-Tech Campus. In addition, it can improve the interaction between the employees of the High-Tech Campus and the residents of the surrounding residential areas.

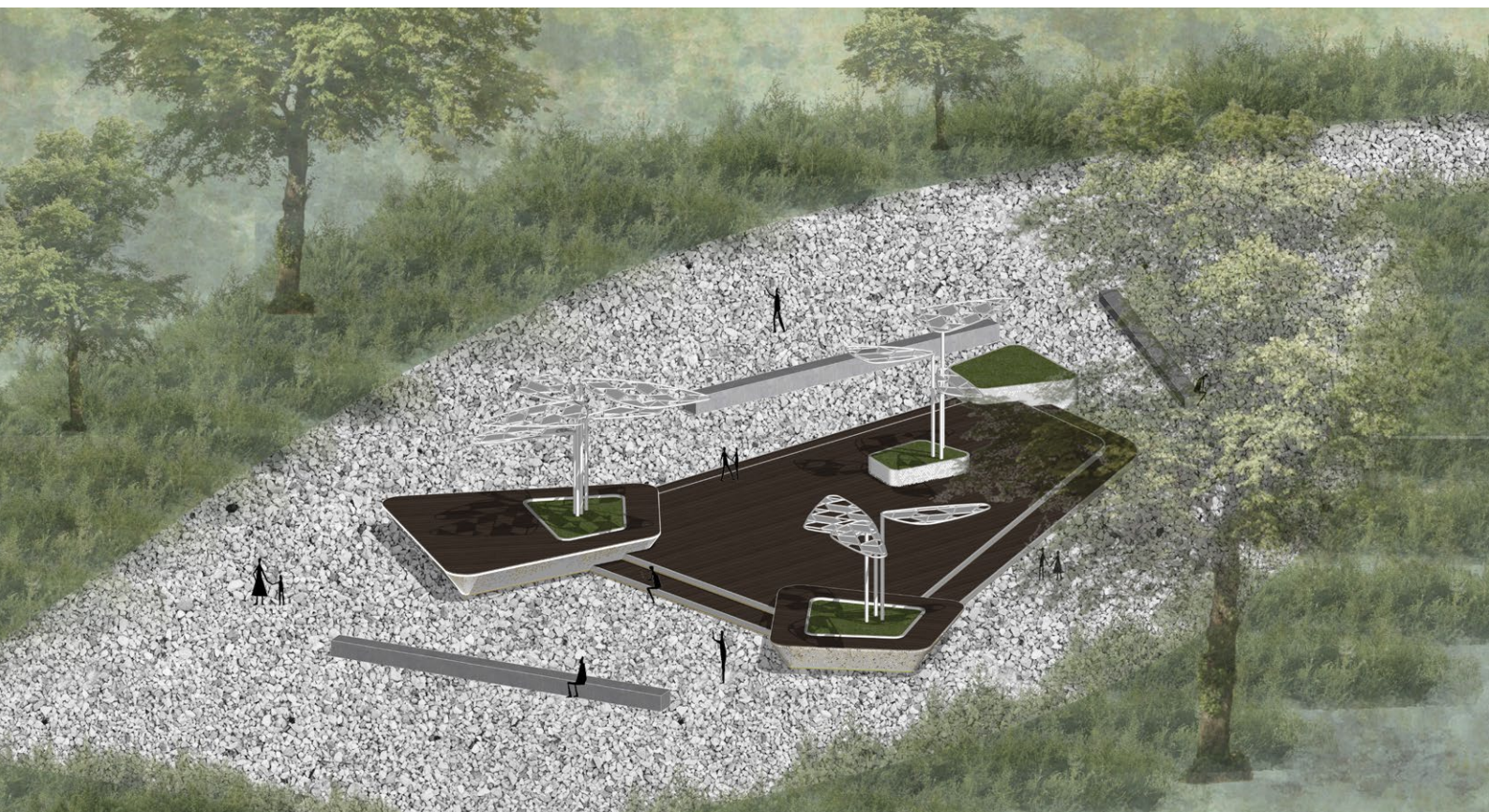


Figure 56 Isometric of Square B

Design of Square C

Some modern statues and movable seats are also placed on Square C to attract people to stay here. Square C is located next to the Dommel River. Therefore, when people stay and rest next to this square, they can also see the beauty of the opposite bank of the Dommel River and have eye interactions with people on the other side of the river.



Figure 57 Isometric of Square C

Design of Square D

Square D is another entrance square near the High-Tech Campus. Some trees that are different from the surrounding tree species are planted in the tree pool on this square. In addition, some irregular seats are placed around the tree pond. On the one hand, these seats provide people with facilities to sit down and rest. On the other hand, they are to limit the space and protect the number of trees planted in the tree pool from being easily hurt and also played a role in identification.

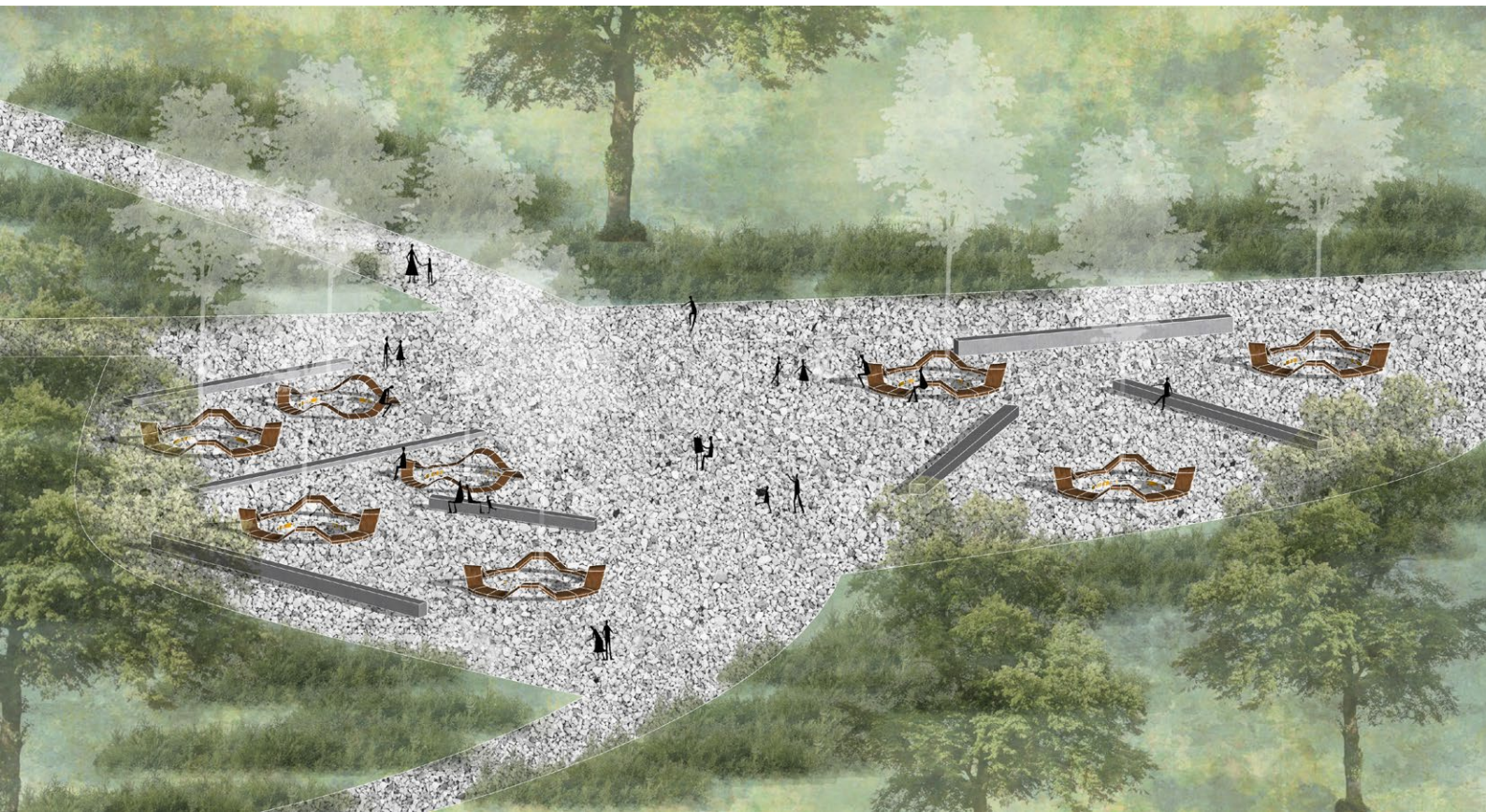


Figure 58 Isometric of Square D

Design of Square E

Square E is located at the park's east entrance, and Square E exists as the entrance square of the east gate. Square E is also equipped with modern-style sculptures, movable seats and low concrete walls to form a place for people to stay and rest.

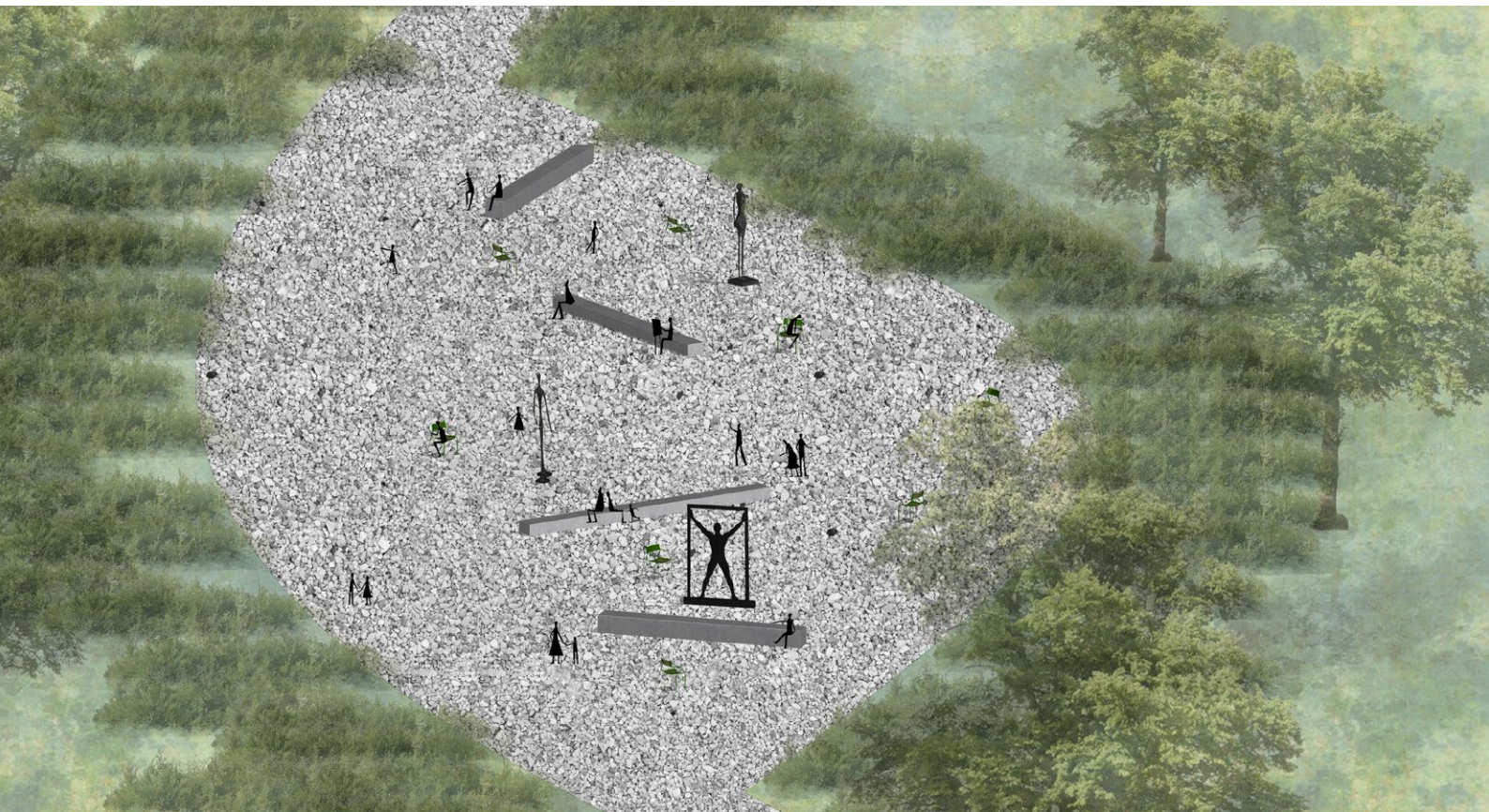
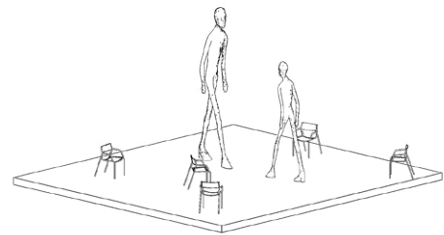


Figure 59 Isometric of Square E

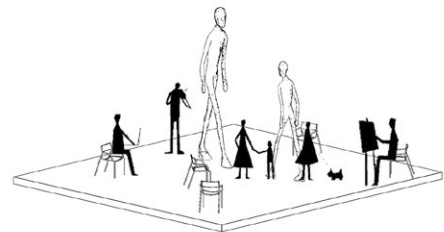
These square will be transformed from informal place to formal place

It is worth mentioning that these squares are not given a specific function. They provide a place for people to stay. People can do whatever they want in these venues, and activities in these squares are informal at this time. When the number of people staying in these squares reaches a particular scale, it can attract new formal functions into the venue.

Statues and seats serve as signs to attract people to stay here. There are no certain functions were given.



When people entering in these squares, they can do multiple activities there. Such as painting, playing with dogs, chatting.



With more and more people are attracted to enter these squares, some certain functions will be appeared, such as catering function.



Figure 60 These space will be transformed from informal space to formal space with functions

Conclusion

The above research and design answer the research question raised by this project: How to design an age-inclusive public space for older adults to keep the social connection in post-COVID 19?

Three sub-questions were put forwarded to answer the main question. Each sub-question can get an independent conclusion.

The first sub-question is How the COVID-19 changed older adults' social patterns in the public space? To answer this question, the author learned about the characteristics of older adults' social activities in the public area by consulting many works of literature. Social location, social time, gender preference of social activities, types of social activities, and social objects were compared and analyzed the difference in social patterns of older adults before and after the outbreak of COVID-19, and the author listed the results in the form of a table. In this part, the theoretical research results obtained are: before COVID-19, various types of public spaces in the city may become social places for older adults, and after the occurrence of COVID-19, the scope of social places for older adults is narrow in the neighbourhood area. Before the outbreak of COVID-19, older adults had flexible and free time to go out to socialize. After the outbreak of COVID-19, due to lockdown and curfew restrictions, the social time of older adults was also restricted. Before the outbreak of COVID-19, older adults liked to socialize with a variety of people. After the outbreak of COVID-19, older adults tended to socialize with people they know. Therefore, it can be concluded that before the occurrence of COVID-19, the social pattern of older adults was: variety in the choice of social location, diversity of social objects, and flexibility of social time. After the outbreak of COVID-19, older adults have the characteristics of being at the neighbourhood in the choice of social location, social objects are limited to acquaintances, and social time is limited.

After answering the first sub-question, the second sub-question was then proposed, namely: Will these changes remain or restore? Future situation vision has to be predicted to change the existing built-up environment to adapt to older adults' social patterns in the post-COVID 19 periods. Will the social way of older adults switch back to before the pandemic, or will it continue the social way that has changed during the pandemic? But no one can predict the future situation, which means that both of these situations are likely to happen during the post-COVID 19 periods. Therefore, when designing the public space next, two possibilities need to be considered in the future.

The third sub-question is about creating age-inclusive public space suitable for older adults' social activities, namely: How to use urban design as the tool to change the built-up environment so that the built-up environment becomes age-inclusive and adapt to the social pattern in post-COVID 19 at the same time? The author answered this sub-question through a combination of site analysis and design. The two design possibilities proposed in the second sub-question were implemented at this stage when answering this sub-question. Through investigation, the author knew that different built-up environments in the selected neighbourhood could achieve the two different design visions proposed above. In addition, designing a transition zone between the two areas with different physical aspects can help older adults and others residents have opportunities to choose social places flexibly. In the design stage, the author paid attention to the social needs of older adults living in the selected neighbourhood and paid attention to the activity needs of citizens of other age groups and different groups living and working in the surrounding area. The final design presents the vision of a venue that can provide activities for other citizens, thereby creating an actual age-inclusive public space.

But it has to be admitted that the research and final design of this report still have shortcomings. The design principle extracted by the author from the theoretical part applies to the general situation. However, due to cultural differences, older adults in different countries and regions will have different social patterns. The chosen site is located in the Netherlands, but the report lacks a specific mention of the social model of older adults in the Netherlands. Suppose a researcher or designer chooses the same theme for research design in the future. In that case, the influence of culture on the behaviour patterns of older adults could be analyzed, which can make subsequent designs more targeted.

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