INTERGENERATIONAL INTERACTION CONSTRUCTED

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Note. Image by Author

ABSTRACT

Intergenerational co-housing could provide a solution to enable the ever-growing group of older people who want to live independently for as long as possible. The government also encourages older people to age in place to relieve pressure on healthcare services. For this form of housing to succeed, there must be good social cohesion between generations, where both older and younger people benefit from mutual exchanges of knowledge and support, ensuring they both feel cared for and valued. Building mutual relationships is essential to making these communities a success.

The aim of this research is to identify architectural elements and best practices that promote social encounters among different age groups, thereby enhancing social inclusion. This interaction between built environments and social dynamics originates from Foucault's concept of architectural influence on behavior and Bourdieu's idea of habitus.

To increase the willingness to move among different age groups, their housing preferences have been researched and categorized into the eight domains established by the World Health Organization to create an age-friendly neighborhood.

An analysis of case studies from intergenerational communities in Germany, Belgium, and Norway revealed insights into privacy levels, collective spaces, safety perceptions, and circulation

patterns. The findings highlight the importance of creating in-between spaces that serve as informal meeting points, promoting social inclusion and community cohesion. By integrating functional design elements and fostering intergenerational interactions, the research aims to identify best practices for developing inclusive and supportive housing environments that cater to the needs of all age groups.

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INTRODUCTION

“First life, then spaces, then buildings -
the other way around never works."
Jan Gehl

The United Nations expects that by 2050 one in six people (16%) of the world's population will be 65 years or older (Figure 01). This will be caused by increased life expectancy at birth, improvements in survival at an older age, and a decline in fertility (Figure 02).[1]

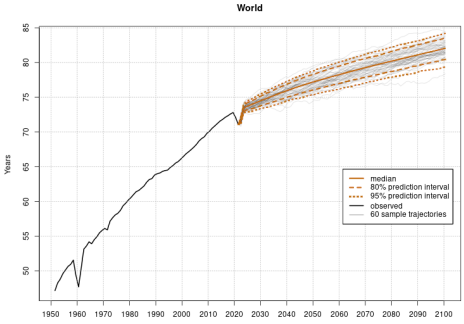


Figure 01: Life expectancy worldwide (Source: United Nations)

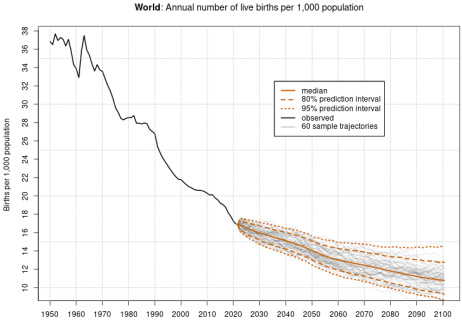


Figure 02: Prediction of births worldwide (Source: United Nations)

Currently, in the Netherlands, 20% of the population is 65 years or older.[2] While the share of older people will increase in the coming decade, the number of retirement homes will decline. At the same time, governments in many countries promote living independently at home for as long as possible. The number of older people is going to rise in the future due to increased longevity. While they maintain better health and fitness for longer, aging is inevitably accompanied by certain limitations. Older people want to maintain independent living, a goal the government also encourages. However, there is insufficient availability of appropriate housing for older people to move to. So there are challenges to finding solutions for housing older people.

Initially, it is necessary to clarify who is referred to when discussing the elderly group. The cut-off age of 65 that the UN uses as the dividing line

1
"Ageing | United Nations," United Nations, 2019, accessed October 22, 2023.

2
Statline CBS, "Bevolking, huishoudens en bevolkingsontwikkeling; vanaf 1899," (December 15, 2023, February 15, 2024 2023). https://opendata.cbs.nl/#/CBS/nl/dataset/85524NED/table?defaultview.

between young and old came about during the Industrial Revolution, when a limit was placed on working, and a retirement age was set.[3] The age of 65 became the age limit in many countries at which age older people ceased to be part of the labor force. This was caused by the fact that it was often physically impossible to continue working any longer. Being aged from then on was linked to the chronological division of time, and ageism emerged.[4] The concept of ageism was first formally described by Dr. Robert N. Butler in 1969.[5] He advocated for recognizing and combating the process of systematically stereotyping people for being old. The World Health Organization (WHO) shares Butler's view, defining ageism quite clearly:

> "Ageism refers to the stereotypes (how we think), prejudice (how we feel) and discrimination (how we act) towards others or oneself based on age."[6]

Ageist thinking still shapes society through the spatial design of our public spaces, despite new ways of thinking that have emerged since the late 20th century.[7] This new way of thinking included gerontological and psychological shifts in science in the concept of age. According to gerontological science, the process of aging is not only influenced by biological factors but also by the social and material transformations that take place throughout an individual's life.[8] In psychology, the research shifted towards focusing on personal development, like education and experiences in life.[9] It became clear that developing yourself and staying active socially and physically helps you stay healthy.

3
R. C. Atchley, "Retirement as a Social Institution," Annual Review of Sociology 8, no. 1 (1982): 269, https://doi.org/10.1146/annurev.so.08.080182.001403.

4
John R. Gillis, "The Case against Chronologization," 1987 17, no. 2 (1987): 98, https://doi.org/10.16995/ee.1373.

5
Thomas Nicolaj Iversen, Lars Larsen, and Per Erik Solem, "A conceptual analysis of Ageism," Nordic Psychology 61, no. 3 (2009): 6, https://doi.org/10.1027/1901-2276.61.3.4.

6
"Ageing: Ageism," World Health Organization, updated March 18, 2021, 2023, accessed November 1, 2023, https://www.who.int/news-room/questions-and-answers/item/ageing-ageism.

7
Dominique Hauderowicz and Kristian Ly Serena, Age-inclusive public space (Berlin: Hatje Cantz, 2020), 24-5.

8
Stephen Katz, Cultural aging: Life course, lifestyle, and senior worlds (University of Toronto Press, 2005).

9
Peter Coleman, John Bond, and Sheila Peace, "Ageing in the twentieth century," Ageing in society: an introduction to social gerontology (1993)

The World Health Organization (WHO) abilities for healthy aging:

- to meet their basic needs;
- to learn, grow, and make decisions;
- to be mobile;
- to build and maintain relationships; and
- to contribute to society.

Following the results of these studies, the World Health Organization (WHO) has identified five functional abilities for healthy aging.[10]

The focus of this research report is on building and maintaining relationships. Building and maintaining relationships can only be initiated when people meet. When people meet, relationships can be built and maintained. This is where architecture can contribute to. Architecture is the enclosure of space, the distinction between what is inside and outside. Architecture can divide and unite people. Architecture can bring people together, enabling social encounters.

Social encounters are essential for building and maintaining relationships. Furthermore, benefits have also been found in social encounters between different age groups, or what is commonly called intergenerational connections. Research shows that intergenerational connections increase self-esteem and feelings of well-being for older and younger people. Besides, intergenerational connections can also help both older and younger people feel cared for and valued.[11]

While research on intergenerational communities focuses primarily on older residents, this research aims to look more broadly. While research

10
"Ageing: Reducing social isolation and loneliness among older people," World Health Organization, 2024, accessed January 29, 2024, https://www.who.int/health-topics/ageing/reducing-social-isolation-and-loneliness-among-older-people#tab=tab_3.

11
Sinan Zhong et al., "Intergenerational communities: A systematic literature review of intergenerational interactions and older adults' health-related outcomes," Social Science & Medicine 264 (2020/11/01/ 2020): 8, https://doi.org/10.1016/j.socscimed.2020.113374.

focusing specifically on the older population in intergenerational communities is important, it should be part of a more inclusive approach considering the well-being and dynamics of the entire community. Research focusing exclusively on the older population might miss the potential benefits of intergenerational interactions and the impact on other age groups living in those communities. A community can be seen as a network of diverse social interactions, highlighting the interdependence among neighbors to produce well-being. Establishing social connections within the neighborhood can be an important support system for older people within a community.

This study aims to identify the spatial design of community housing where architectural boundaries promote social encounters between all ages.

Therefore, the main question that I want to address is:

"To what extent do intergenerational programs and initiatives promote social inclusion for all ages in spatial design, and what are the best practices for creating successful intergenerational interactions?"

THEORETICAL FRAMEWORK AND METHODOLOGY

In the initial phase of the research, the key elements used to address the research question are identified. This chapter explains how these elements are determined and discusses the method employed to answer the research question.

THEORETICAL FRAMEWORK

The spatial configuration of the built environment affects human behavior, as posited by poststructuralists Foucault and Bourdieu.

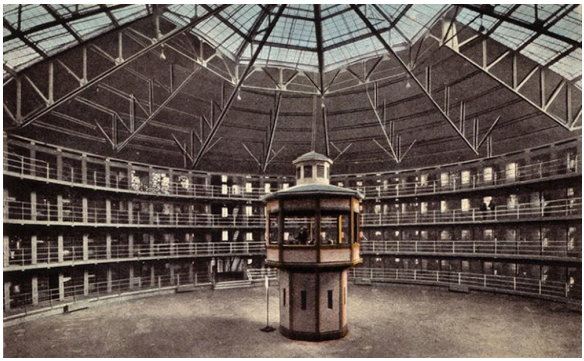


Figure 03: Bentham's panopticon (Source: https://www.highlandcityclub.com)

Since Michel Foucault reasoned the power of architecture through Bentham's Panopticon in a prison, he made clear that architecture can influence people's behavior.[12] This panopticon designed by Jeremy Bentham consists of a central tower within a circular prison allowing guards to observe the prisoners. In contrast, the prisoners remain unaware of whether they are under surveillance (Figure 03). Foucault realized that architecture determines this perceived control.

12
Rajiv Shah and Jay Kesan, "How Architecture Regulates," Journal of Architectural and Planning Research 24 (12/01 2007): 11-2.

Bourdieu expanded on this idea with his concept of Habitus. This concept of Habitus is clearly defined by John Archer in his research on the social theory of space:

> "Each person's set of cognitive and motivating structures, according to which that person fashions knowledge and initiates activity, not least in regard to relations between self and built space."[13]

Archer further explains:

> "Built environment and habitus mutually sustain each other, but neither has absolute control over the other."[14]

I align with these social thinkers in how they show the interconnectedness of the behavior of individuals with architecture. It seems that architecture can play a role in arranging social encounters.

This research aims beyond the sole objective of generating social encounters. To create more social encounters is to create more interactions between people of different age groups within a community. This intergenerational community only works if everyone feels included. This feeling of inclusion, or social inclusion, is a multifaceted concept encompassing a range of dimensions, including economic, cultural, political, and participating aspects.

The concept of social inclusion began in Europe with the recognition that groups in society were excluded. In 1974, it was the former French

13
John Archer, "Social Theory of Space: Architecture and the Production of Self, Culture, and Society," Journal of the Society of Architectural Historians 64, no. 4 (2005): 431, https://doi.org/10.2307/25068197.

14
Archer, "Social Theory of Space: Architecture and the Production of Self, Culture, and Society," 431.

Secretary of State for Social Action, René Lenoir, who acknowledged groups being excluded within the welfare state.[15] Vulnerable groups of people, such as the handicapped, marginal, or asocial persons which he estimated made up one-tenth of the French population were not covered by the social insurance system. Concerns about this social exclusion triggered a counter-reaction aimed at promoting social inclusion.

Today, major organizations such as the World Health Organization, the World Bank, and the United Nations are addressing the problem by highlighting its importance in their reports, offering solutions, and lending money for solutions.

The United Nations defines social inclusion as follows:

> "The process of improving the terms of participation in society for people who are disadvantaged based on age, sex, disability, race, ethnicity, origin, religion, or economic or other status, through enhanced opportunities, access to resources, voice and respect for rights."[16]

Social inclusion encompasses various dimensions. The economic facet involves evaluating accessibility to employment, income, and economic resources, concurrently addressing issues such as income inequalities and poverty reduction. The cultural dimension centers on the need to acknowledge and respect cultural diversity, identity, and expressions. Prioritizing efforts to combat discrimination, prejudice, and stereotypes

15
UNDESA, Leaving No One Behind: The Imperative Of Inclusive Development, United Nations (New York, 2016), 18.

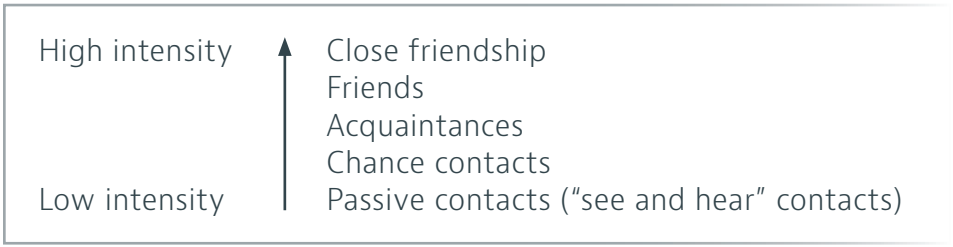
16
UNDESA, Leaving No One Behind: The Imperative Of Inclusive Development, 20.

is essential within this realm. Additionally, the political aspect underscores the importance of active participation in decision-making processes and governance, emphasizing adherence to the protection of civil and political rights. Lastly, the participatory element entails ensuring access to education, healthcare, and social services, and facilitating the establishment of social networks and relationships.[17]

This theoretical framework provides a basis for understanding, analyzing, and promoting social inclusion. It recognizes the multidimensionality of the concept and the interplay of various factors that influence individuals' and communities' social inclusion.

METHODOLOGY

Opportunities for social encounters can occur at all levels. In his book, Life Between Buildings, Jan Gehl describes different degrees of social encounters. He categorizes them from low up to high intensity.[18]



All degrees of these social encounters are important here, including those of low intensity. These low-intensity encounters are valuable as independent forms of contact and precede more complex interactions. The gradient from low to high intensity can also be compared with the

17 UNDESA, Leaving No One Behind: The Imperative Of Inclusive Development, 18.

18 Jan Gehl and Jo Koch, Life between buildings : using public space (Washington, DC: Island Press, 2011), 15-17.

gradient from public to private. In the public domain, low-intensity encounters predominate, but in the private area, high-intensity encounters are more important. For example, friends and family that you invite into your home.

The categorization from public to private encounters has been studied by the social psychologist Irwin Altman since the 1970s.[19] He proposes three types of territories by combining earlier research on human territoriality (Figure 04). Primary territories are private spaces where the owner has exclusive rights to use the space. These are places within a home, that are easily personalized. Secondary territories are semi-public places where an individual regularly interacts with acquaintances or neighbors. Public areas are territories where almost anyone has temporary access, provided they comply with the relevant rules.

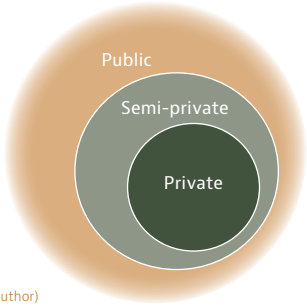


Figure 04: Altman's three territories of privacy (Diagram by author)

Julia Robinson uses the American dwelling pattern as a prototype for her analysis of privacy, and she distinguishes seven domains of increasing privacy.[20] Starting with the public civic domain (this is the zone of unfamiliar, where anyone can go). Followed by the public neighborhood domain, comprising a group of 100 to 500 people (the domain of shared interest, where anyone can go

19 Irwin Altman, "The environment and social behavior: privacy, personal space, territory, and crowding," (1975): 209-11.

20 Julia W Robinson, "Institutional space, domestic space, and power relations: Revisiting territoriality with space syntax" (paper presented at the in Proceedings. 3rd International Space Syntax Symposium, 2001), 5, 6.

who appears to have a reason). The third domain is that of semi-public, comprising approximately 5-30 people (where anyone can go who appears to have a reason, but where neighbors may feel they can confront someone who appears to be unsanctioned or acting inappropriately). The fourth domain is the semi-private; this is adjacent to the private area and is controlled by the occupant. The fifth area is the private domain and is the communal part of the private area, such as a shared kitchen or living room. The sixth area is the semi-intimate domain which is shared by the household group. This is where visitors need permission from the household group to be there. And lastly, the seventh area is the intimate domain, which is the bedroom or bathroom. This is the exclusive domain of the individual within the household group (Figure 05).

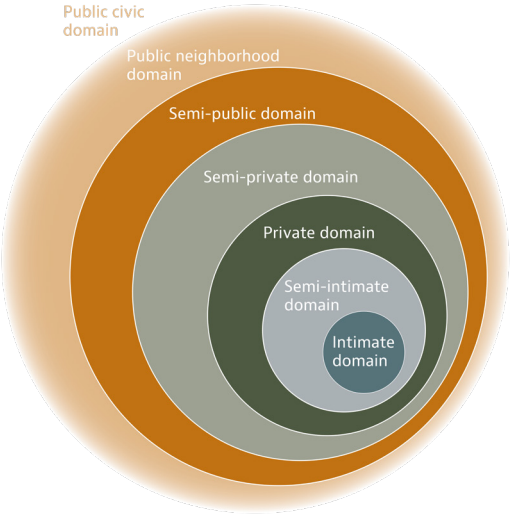


Figure 05: Robinson's seven domains of privacy (Diagram by author)

For this research, this division by Robinson to categorize spaces based on privacy is used to analyze three case studies. The case studies chosen are in countries surrounding the Netherlands, namely:

WagnisART in Germany, Bijgaardehof in Belgium, and Vindmøllebakken in Norway. The selected case studies are all intergenerational communities with a wide variation in resident ages from the twenties to seventies. The different communities also vary in size and number of residents.

Besides privacy as a means of measuring the degree of social interaction, these case studies are analyzed on the integration of collective spaces into the residential building.

Furthermore, how residents perceive the feeling of safety is a crucial part of feeling free to engage with society. Jane Jacobs stated the importance of this sense of safety by having eyes on the street. By this, she was not referring only to the number of people actually on the street but also the view of the street from adjacent houses.[21]

Circulation is another important aspect in enabling encounters. Circulation can determine the extent to which residents and/or visitors encounter each other daily.

Finally, in-between spaces are informal meeting places, where many social encounters and public engagements are possible while still having the protection and the comfort of the familiar context of the home. An analysis of what in-between spaces are will be described later in this report.

21
Jane Jacobs, The death and life of great American cities, 1st Vintage books edition ed. (New York: Vintage Books, 1992), 54.

TARGET GROUP

This research focuses on enhancing social interaction across diverse age groups. This social interaction between younger single people and (single) older people is driven by the necessity for housing designs that provide a positive and meaningful aging experience for older people as well as foster a positive and social community for singles.

OLDER PEOPLE

Older people aspire to maintain independence for as long as possible. A goal the government encourages as well. However, many of the residences where older people currently live are unsuitable for aging in place. It is essential to establish these adapted homes for older people.

Furthermore, facilitating the relocation of older people has a beneficial impact on the housing market. The release of larger single-family homes by older people creates opportunities for young families to acquire suitable living spaces, subsequently making room for first-time buyers.

To achieve this relocation, it is necessary to make it attractive for older people to move to new housing. The World Health Organization (WHO) has developed eight interconnected domains for cities to become more age-friendly. Within each of these domains, I will explore interventions that contribute to creating a pleasant and meaningful old age for older people (Figure 06 on page 24).

Figure 06: Eight interconnected domains for cities to become more age-friendly by the World Health Organization (Diagram by author)

1 COMMUNITY AND HEALTH CARE

Accessible and affordable community and health services play a vital role in maintaining older people's health, independence, and activity. Prevention in healthcare is key. Exercise is a crucial element in preserving physical and mental function. Another often overlooked, aspect is the positive impact of proximity to nature. This impact on health is two-fold. First, green spaces increase the appeal of outdoor activities, promoting physical and social engagement. Second, the visual complexity of the landscape contributes to mental recovery and overall well-being.[22]

However, when health issues arise and healthcare becomes necessary, a clustered housing arrangement can alleviate the increasing pressure on healthcare services by bringing those in need of care closer together. The trend towards offering 24-hour care services in clustered senior housing facilities is on the rise.[23]

Additional healthcare services, such as physiotherapy and a nearby medical practice, combined with ample meeting places for social interaction, can further support seniors in remaining in their homes for an extended period.[24]

2 TRANSPORTATION

Mobility problems increase with aging, which reduces their action radius. Public transportation within 500 meters is preferred so it is available to most older people.[25]
Accessible and affordable public transport is

22
D. T. C. Cox et al., "Doses of neighborhood nature: The benefits for mental health of living with nature," Review, BioScience 67, no. 2 (2017), https://doi.org/10.1093/biosci/biw173.

23
MAX, "De terugkeer van het verzorgingshuis," in Meldpunt (the Netherlands, February 2, 2024 2024), TV. https://www.maxmeldpunt.nl/uitzendingen/de-terugkeer-van-het-verzorgingshuis/.

24
Norbert Broenink, "Zo verleid je senioren om te verhuizen naar passende woonvormen," March 14, 2023, 2023, https://gerontijdschrift.nl/artikelen/zo-verleid-je-senioren-om-te-verhuizen-naar-passende-woonvormen/.

25
E. J. Timmermans et al., "The association of the neighbourhood built environment with objectively measured physical activity in older adults with and without lower limb osteoarthritis," BMC Public Health 15 (Aug 3 2016): 8, https://doi.org/10.1186/s12889-016-3347-8.

important and ensures older people can stay active and remain engaged with their community and have access to health, social, and commercial facilities.

3 HOUSING

The housing conditions of older people are often linked to their quality of life and whether they can live independently and actively in their community.

For age-friendly residences, the home should be step-free and single-story, with slightly wider doors to remain accessible for residents with mobility challenges. In multi-story homes, an elevator is essential. The bathroom should be spacious, featuring a walk-in shower with support options like additional wall-mounted grab bars and no threshold. Preferably the location of the toilet is near the bedroom

The University of Sheffield has compiled a table outlining the minimum accessibility requirements, categorized based on the function of the residence and wheelchair dependency (Figure 09 on pages 28-29).[26]

In addition to declining mobility, the functioning of the eyes changes too as you age. The eye may have more difficulty focusing, struggle to adapt to rapidly changing light intensities, and exhibit a reduced ability to distinguish contrasts between light and dark. Due to this declining vision, reading a book may become challenging without adequate (day)light.[27]

26
Sheffield University, "DWELL - Access Standards," (United Kingdom, n.d.). https://dwell.sites.sheffield.ac.uk/findings/age-friendly/access-standards.

27
Mariëlle Aarts and A. C. Westerlaken, "Field study of visual and biological light conditions of independently-living elderly people," Gerontechnology 4 (07/01 2005): 142.

4 SOCIAL PARTICIPATION

Loneliness among older people is becoming an increasingly significant issue in the Netherlands. Loneliness should not be underestimated, as humans are social beings. Feeling lonely can have a profound impact on well-being, leading to psychological and physical ailments such as depression, cardiovascular diseases, and Alzheimer's Disease. Loneliness even increases the risk of premature death.[28]

According to the National Institute for Public Health and the Environment (RIVM), 46 percent of adult Dutch citizens in the age group of 65-74 reported feeling lonely, with 11 percent experiencing severe loneliness (Figure 07). In the age group of 75-84, this share increases to 52 percent, with 12 percent being severely lonely. Among those aged 85 and above, these shares are even higher at 63 percent and 16 percent, respectively. Moreover, 36% of all individuals aged 65 and older experience social isolation (Figure 08).[29]

Social isolation can be prevented by encouraging seniors' participation in social activities. It is

28
WHO, "Ageing: Reducing social isolation and loneliness among older people."

29
Volksgezondheid_en_Zorg, "Eenzaamheid | Leeftijd en geslacht." https://www.vzinfo.nl/eenzaamheid/leeftijd-en-geslacht.

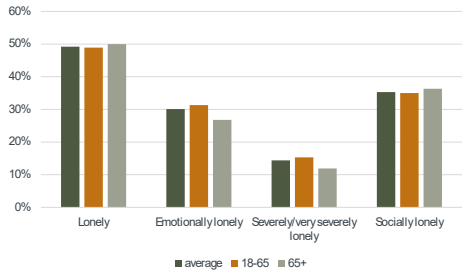


Figure 07: Figures of types of loneliness in the Netherlands per age group (Source: RIVM)

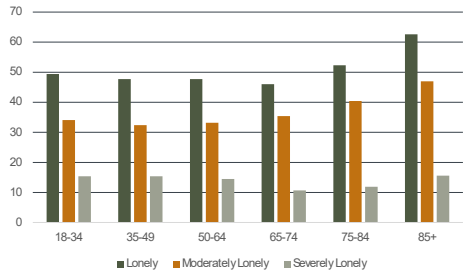


Figure 08: Gradations of loneliness in the Netherlands per age group (Source: RIVM)

Minimum accessibility standards for dwellings. All figures in mm.

FEATURE	Building Regs M4(1) - Visitable dwellings	Lifetime Homes (LH) - 2010	Building Regs M4(2) 2015 - Accessible + adapatable dwellings	Building Regs M4(3)a 2015 - Wheelchair ADAPTABLE dwellings	Building Regs M4(3)b 2015 - Wheelchair ACCESSIBLE dwellings
CAR PARKING + DROP OFF					
Private parking bay (within curtilage)		4800 x 2400 level (or gently sloping) parking bay that can be widened to 4800 x 3300	As LH	4800 x 2400 parking bay with 1200 clear zone to rear and one side (6000 x 3600)	As M4 (3)a
Communal parking bays		Min. 1 no. 4800 x 2400 parking bay 'close' to communal entrance with 900 clear zone to one side	As LH	If provided, each parking bay is 4800 x 2400 1200 clear zone to both sides	As M4 (3)a
APPROACH ROUTE					
Approach route - general	Step-free (gently sloping or ramped) 'if possible'. *See M4(1): 1.7 for details of acceptable ramps.*	Step-free route to primary entrance (or step-free route to alternative entrance) must be provided. Step-free route must be level or 'gently sloping' (up to 1:12 for a distance of 2000)	As LH	Step-free route to all private entrances must be provided (whichever floor the dwelling is on). Step-free route must be level or 'gently sloping' (up to 1:12 for a distance of 2000)	As M4 (3)a
Approach route min. width	900	900 (private) or 1200 (communal)	As LH	1200 (external + internal)	As M4 (3)a
External steps	Only acceptable where step-free access is unfeasible. *See M4(1): 1.8 for details of acceptable steps.*	On steeply sloping sites alternative access (eg. steps) should be discussed with the local planning authority to agree a workable solution.	Only acceptable as an alternative route. *See M4(2): 1.11 for details of acceptable steps.*	Only acceptable as an alternative route. *See M4(3): 1.11 for details of acceptable steps.*	As M4 (3)a
COMMUNAL ENTRANCE					
Min. level landing in front of entrance		1500 x 1500	As LH	As LH	As M4 (3)a
Min. covering over entrance		900 deep and wider than the doorset	900 x 1200 wide	1200 x 1200	As M4 (3)a
Communal entrance door(s) - min. clear width	775	800 (or 825 if at right-angles to a access route <1500 wide)	850	As M4 (2)	As M4 (2)
Communal entrance door(s) - nib		300 nib to leading edge (pull side)	300 nib to leading edge (pull side) which extends 1200 clear	300 nib to leading edge (pull side). 200 nib to following edge (push side). Both nibs extend 1800 clear	As M4 (3)a
Communal entrance door(s) - threshold	Accessible (15 upstand)	As M4 (1)	As M4 (1)	As M4 (1)	As M4 (1)
Clear space inside entrance door(s)			1500 clear space between internal lobby doors (or sliding)	1500 turning circle	As M4 (3)a
COMMUNAL LIFTS + STAIRS					
Communal stairs	To meet Building Regs Part K	Easy going stair: 250 min going, 170 max. rise	To meet Building Regs Part K	To meet Building Regs Part K	*To meet Building Regs Part K*
Lifts	Lift recommended but not required. *See M4(1): 1.11 for acceptable lift spec.*	Lift recommended as good practice but not required.	Lift required to provide step-free access to upper-floor private entrances (ie. apartments) *See M4(2): 3.16 for acceptable lift spec.*	Lift required to provide step-free access to upper-floor private entrances (ie. apartments) *See M4(2): 3.16 for acceptable lift spec.*	As M4 (3)a
Lift landing	1500 x 1500	As M4 (1)	As M4 (1)	As M4 (1)	As M4 (1)
Lift car size (internal)	900 x 1250	1100 x 1400	As LH	As LH	As LH
Lift door clear opening	800		As M4 (1)	As M4 (1)	As M4 (1)
DWELLING ENTRANCE DOORS					
Clear opening width	775	800	850	As M4 (2)	As M4 (2)
External door nib	300 nib to pull side	As M4 (1)	300 nib (which extends 1200 deep to pull side)	300 nib (which extends 1800 deep to pull side), plus 150 nib to hinge side	As M4 (3)a
Threshold	'Accessible' (150 step permissible)	Accessible (15 upstand)	As LH	As LH	As LH
PRIVATE ENTRANCE LOBBY / HALLWAY					
Entrance hallway - minimum dimensions	n/a (minimum 900 corridor width applies)	As M4 (1)	minimum 1500 between any lobby door swings	1800 long x 1500 wide clear space. minimum 1500 between any lobby door swings	As M4 (3)a
Wheelchair storage + charging space				1100 deep x 1700 wide (accessible from a minimum clear width of 1200). Wheelchair storage space can be identified but used for an alternative purpose (eg. storage)	1100 deep x 1700 wide clear space (accessible from a minimum clear width of 1200)
PRIVATE INTERNAL DOORS					
Internal doors - minimum clear opening widths (excludes cupboards)	750-800 (dependant on corridor width)	750-900 (dependant on corridor width)	750-800 (dependant on corridor width)	850	As M4 (3)a
Internal doors nibs - minimum width		300 nib to pull side	As LH	300 nib to pull side, 200 nib to push side	As M4 (3)a

Figure 09: Part 1 of the overview of the minimum accessibility standards for dwellings (Source: University of Sheffield)

Minimum accessibility standards for dwellings. All figures in mm.

FEATURE	Building Regs M4(1) - Visitable dwellings	Lifetime Homes (LH) - 2010	Building Regs M4(2) 2015 - Accessible + adaptable dwellings	Building Regs M4(3)a 2015 - Wheelchair ADAPTABLE dwellings	Building Regs M4(3)b 2015 - Wheelchair ACCESSIBLE dwellings
INTERNAL SPACES + CIRCULATION					
Corridors - minimum clear widths	900 (750 allowed at pinch points)	As M4 (1)	900	1050	As M4 (3)a
Living spaces		1500 turning circle required for living + dining spaces (alterantively provided by a 900 x 1400 turning ellipse)		Minimum area for kitchen / living / dining space (25 sq.m for 2 bedspaces, 27 sq.m for 3 bedspaces)	As M4 (3)a
Kitchen		1200 clear in front of units (1500 turning circle recommended)	As LH	1500 clear in front of cupboards	As M4 (3)a
Clear width around furniture		750 between furniture (excludes occasional items)			
Clear space around beds		750 to both sides (or one side of single) and foot	As LH	1000 to both sides (or one side of single) and foot. 1200 square clear zone to each side of principal bedroom	As M4 (3)a
Built-in storage space				Minimum area for built-in general storage (2.0 sq.m for 2 bedspaces, 2.5 sq.m for 3 bedspaces)	As M4 (3)a
PRIVATE CIRCULATION - VERTICAL					
Private stairs	To meet Building Regs Part K	900 clear width. Stairs should be able to have a stair-lift fitted	To meet Building Regs Part K		
Platform lift		1500 x 1000 aperture identified between ground floor + upper floors for future provision of platform lift. Space may be used for other purposes but be easily adapted		1650 x 1100 aperture identified between ground floor + upper floors for future provision of platform lift. Space may be used for other purposes but be easily adapted	1650 x 1100 through lift installed between ground floor + upper floors. 1500 turning circle in front of the liftway at all levels
SANITARY FACILITIES					
Wetroom / accessible shower room - minimum dimensions		2150 x 2000 (calculated from minimum turning / access requirements)	2150 x 2000 (calculated from minimum turning / access requirements)	2450 x 2200 (calculated from minimum turning / access requirements). Suitable for 2-3 bedspaces.	As M4 (3)a
Minimum showering zone		1000 x 1000	1000 x 1000	1200 x 1200	As M4 (3)a
Second WC / cloakroom - minimum dimensions	1500-1600 deep x 850-1050 wide (dependant on door positioning)	As M4 (1), but additional space + shower drainage required to ground floor WC in dwellings with two or more storeys	As M4 (1), but additional space + shower drainage required to ground floor WC in dwellings with two or more storeys	1600-1700 deep x 1200-1300 wide (dependant on door positioning)	As M4 (3)a
Grab rail support / fixings in sanitary facilities		On all walls within a height band of 300 – 1800 from the floor	On all walls, ducts, and boxings	On all walls, ducts, and boxings	As M4 (3)a
Hoist requirements		Route identified from main bedroom to bathroom. Structure in place for future installation		Ceiling structure of WCs / bathrooms and every bedroom capable for the fitting of a hoist	As M4 (3)a
KITCHEN					
Kitchen worktop - minimum length to accommodate appliances + fittings			4330 (2 bedspaces) / 4730 (3-4 bedspaces).	6130 (2 bedspaces) / 6530 (3-4 bedspaces)	Kitchen worktop min length as M4 (3)a. See M4 (3): 3.14 for additional kitchen specification
WINDOWS					
Window heights		800 maximum cill height in living room	850 maximum cill height in living room	850 maximum cill height in living room	As M4 (3)a
Window approach		750 clear width (excludes kitchen window above worktop)	750 clear width required in bedrooms only	750 clear width required in bedrooms only	As M4 (3)a
Window controls - height		maximum 1200 above floor level	main living room window is within 450-1200 above floor level (all other windows 450-1400)	main living room window is within 700-1000 above floor level (all other windows 450-1200)	As M4 (3)a
SERVICE CONTROLS					
Switches + socket heights	450-1200 above floor level	450-1200 above floor level and 300 from any corner	450-1200 above floor level and 300 from any corner	700-1000 from floor level and 700 away from any corner.	As M4 (3)a
Consumer unit switch height	1350-1450 above floor level	As M4 (1)	As M4 (1)	As M4 (1)	As M4 (1)
Intercom / door entry system				Required with door release facility in main bedroom / living space	As M4 (3)a
thermostats / heating controls			900-1200 above floor level	Radiator controls 450-1000 above floor level.	As M4 (3)a
PRIVATE OUTDOOR SPACE					
Balcony / terrace minimum dimensions				1500 depth with 1500 clear turning circle	As M4 (3)a

Figure 09: Part 2 of the overview of the minimum accessibility standards for dwellings (Source: University of Sheffield)

important leisure, social, cultural, and spiritual activities are within the reach of the community. Facilities that provide space for these activities help them stay engaged and informed.

Intergenerational activities are mutually enriching and fulfilling for all ages, with older people passing on knowledge, traditions, and experience while the young may help seniors with new technology and practices.

5 OUTDOOR SPACES AND BUILDINGS

The external environment has a major impact on the mobility, independence, and quality of life of older people as they go about their daily lives beyond the comfort of their homes.

An Ideal living environment for older people to age in place consists of recreational areas, enough rest areas, and a secure environment.

Recreational areas provide places to meet other people, whether acquainted or not, or to sit and enjoy watching other people. Enough rest areas along the way allow older people to rest along the route, so it can be divided into sections.[30]

Another aspect of outdoor spaces is safety. A community will not be cohesive and integrated if residents feel unsafe. Feelings of unsafety will discourage especially older people from going about their daily lives independently and will affect social integration between generations. Fear of crime whether realistic or not, and feelings of vulnerability increase with aging.

30
Gehl and Koch, Life between buildings: using public space, 162.

6 RESPECT AND SOCIAL INCLUSION

An inclusive society encourages older people to participate more in their city's social, civic, and economic life. This, in turn, promotes active aging.

Social participation and intergenerational interactions help clear negative preconceptions about aging.[31]

Social engagement can contribute to older people's esteem. Older people will stay engaged within the community when they are involved in activities in which they have experience. These age-friendly activities will help them feel valued in their community.

7 CIVIC PARTICIPATION AND EMPLOYMENT

Older people are an asset to the community, and they continue contributing to their communities after retirement. An age-friendly community offers older people the opportunity to keep involved in society, for example through volunteer work or paid employment.

8 COMMUNICATION AND INFORMATION

Staying connected with events, news, and activities with timely, accessible, and practical information is a key part of active aging. Technology allows information to spread quickly, but it also plays a role in social exclusion because older people do not use certain platforms. The community should take care to ensure that information reaches older people.

31
Zhong et al., "Intergenerational communities: A systematic literature review of intergenerational interactions and older adults' health-related outcomes," 2.

YOUNGER SINGLE PEOPLE

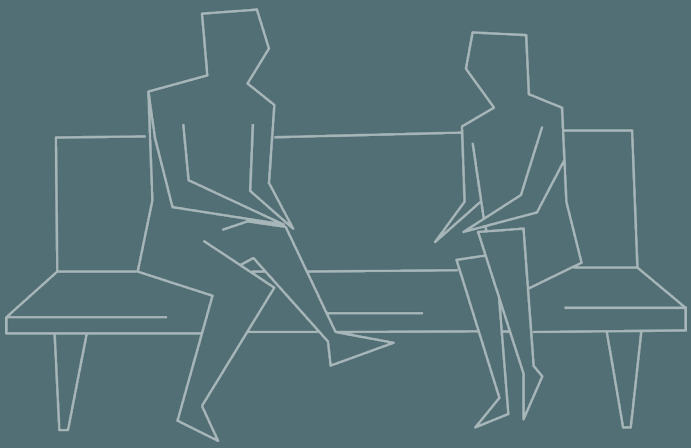
In addition to the group of older people younger single people will also be included. The addition of this target group comes from the desire to combine different age groups to form a cohesive intergenerational community. They can provide mutual support. For example, the older person can look after the younger person's child, while the younger person can assist by running errands for the older person.

A growing group of single households among young people can be distinguished
In 2003, there were 2.4 million single people. The Central Bureau of Statistics (CBS) expects this to increase in the coming years to 3.4 million in 2030.[32] Relationship dissolution and aging are the main causes of this growth.

The housing market has not adapted to this change. In the Netherlands, most of the housing stock is designed for the nuclear family. Almost 64% are single-family homes.[33] In general, singles often seek a different type of home than families. In the absence of alternatives, they occupy these single-family homes, as do the older people discussed earlier. Offering more suitable housing for singles or single parents could also make more single-family homes available to young families from this side.

32
Statline CBS, "Huishoudens; grootte, samenstelling, positie in het huishouden, 1 januari," (August 7, 2023, March 16, 2024 2023). https://opendata.cbs.nl/#/CBS/nl/dataset/82905NED/table?search-Keywords=huishouden.

33
Statline CBS, "Woningvoorraad; woningtype op 1 januari, regio," (September 22, 2023, March 16, 2024 2023). https://opendata.cbs.nl/#/CBS/nl/dataset/85035NED/table?searchKeywords=woning-voorraad.



IN-BETWEEN SPACES

The two target groups in this research, the older and the younger represent two polarities. These are two complementary halves of the same entity. Even more so, the older people have been young and the younger people will become old. One cannot exist without the other.

These two complementary halves being of the same entity is an insight that Aldo van Eyck arrived at while analyzing Martin Buber's dialogical philosophy. Buber notes that:

> "Individualism implies part of man, whilst collectivism implies man as a part."[34]

True polarities, such as small and large, open and closed, part and whole, are not contradictory or mutually exclusive entities. Instead, they are distinctive components, opposing polarities are dual phenomena of the same entity. Van Eyck identified the space between these components. In his book "The Child, the City, and the Artist," Van Eyck refers to this as:

> "The in-between acquiring form. On the other side of the subjective, on this side of the objective, on the narrow borderline where I and you meet lies the in-between realm."[35]

This in-between realm is not to be regarded as a negligible margin. It is just as important as the reconciled opposites themselves.

> "Being the moment where contrary tendencies come into balance, it constitutes

34
Aldo van Eyck, Vincent Ligtelijn, and Francis Strauven, The child, the city and the artist: an essay on architecture: the in-between realm, Writings, (Amsterdam: SUN, 2008), 54.

35
Eyck, Ligtelijn, and Strauven, The child, the city and the artist: an essay on architecture: the in-between realm, 54.

> a space filled with ambivalence, and thus space that corresponds to the ambivalent nature of man."[36]

間

A concept closely related to this in-between realm is what the Japanese call the concept of MA. The English translation of MA can be described as gap, interval, distance, or stretch. However, it also means a period of time and duration. With the concept of MA, this in-between in time and space is meant. It is deeply rooted in the Japanese community and encompasses various aspects, such as the pause between a speaker's words is seen as highly sophisticated. In art, this space is as important as the subject itself. Japanese art, in contrast to Western paintings, involves large unpainted areas that are as significant as the painted areas. Another example is Ikebana, the art of flower arrangement, where the composition emphasizes the space in between. It is applied in many other forms of art in Japan such as calligraphy and music.[37]

In Japanese architecture, MA is expressed as a transitional situation. Kisho Kurokawa stated the importance of MA as an intermediary space. He says:

> "It allows the two opposing elements of dualism to abide by common rules, to reach a common understanding."[38]

In a traditional Japanese wooden townhouse called Machiya Kurokawa identified MA in the space beneath the eaves, the Engawa. The Engawa, which is a strip of decking, often finished in wood or bamboo, functions as the periphery

36
Francis Strauven, Aldo van Eyck - shaping the new reality (2007), 10.

37
Henk Oosterling, "A culture of the inter," Sensus communis in multi and intercultural perspective. Würzburg: Könighausen & Newman (2000).

38
Kishō Kurokawa, The Philosophy of Symbiosis (London, New York, NY: Academy Editions; Distributed to the trade in the U.S.A. by St. Martin's Press, 1994).

between the Japanese house and the garden. Furthermore, in the lattices of the Machiya the residents' privacy is regulated, while at the same time, an appropriate level of openness towards the outside is regulated (Figure 10).[39]

Yoshinobu Ashihara identifies the concept of MA in architecture as the Positive-Negative space (PN). He refers to the positive space (P) as an intentionally planned space by human interference. With this space, boundaries are initially established and subsequently constructed inward, towards the center, thus centripetal. Whereas the negative space (N) is indicated as a more spontaneous, infinite, and diffuse space, thus centrifugal. Ashihara's concept of PN space is reflected in Japanese traditional gardens, where the landscape is artificially recreated and the N-space is brought inside. At the same time, this N-space is also the extension of P-space (Figure 11).[40]

In addition to identifying the in-between spaces as the Japanese did, Herman Hertzberger also endorsed the importance of the possibility of encounters in these what he called unnamed spaces. This is where the importance of this

39
Kurokawa, The Philosophy of Symbiosis.

40
Yoshinobu Ashihara, Exterior design in architecture (New York: Van Nostrand Reinhold, 1970), 21.

Figure 10: Engawa around a traditional Japanese machiya (Image by OCDP)

Figure 11: Japanese Garden of Ryoanji (Source: Kinukake-no-Michi Road Association)

in-between space comes forward as a place for human interaction. These unnamed spaces are important as they can function as informal gathering places, providing the protection and comfort of the familiar context of home.[41] The in-between space is best expressed through

41
Herman Hertzberger, Jop Voorn, and John vert English ed Kirkpatrick, Space and the architect : lessons in architecture 2 (Rotterdam: 010 Publishers, 2000), 210.

ARCHITECTURAL ELABORATION OF THE IN-BETWEEN SPACES

the relationship between interior and exterior. For example, Kurokawa created a sunken garden connected to an atrium/lobby in his design for the Nagoya Art Museum to create an architectural solution for this relationship. The sunken garden functions as a planar gap (Figure 12).
In the building for Fukuoka Bank, Kurokawa designed a semi-open interior space that interpenetrates interior and exterior (Figure 13).

With the design of the Nara City Museum of Photography, he created a natural flow from interior to exterior. He used glass walls under a solid roof to create lightness and

Figure 12: Nagoya City Art Museum (Source: Aichi Prefecture)

Figure 13: Headquarters of the Bank of Fukuoka (Image by Yuko Matono)

transparency, making the building look floating above the ground (Figure 14).[42]

Similarly, this interior/exterior relationship is seen in the solutions Aldo van Eyck applies in his architecture. In his design for the Schmela Gallery he interiorizes the exterior through a roofless vertical void (Figure 15).

Figure 14: Irie Taikichi Memorial Museum of Photography Nara City, Nara (Image by Aya Kawamoto, 2007)

For the Hubertus House, he designed a multi-story doorway between the interior and exterior (Figure 16).

Figure 15: Schmela Gallery (Image by Achim Kukulies, 1971)

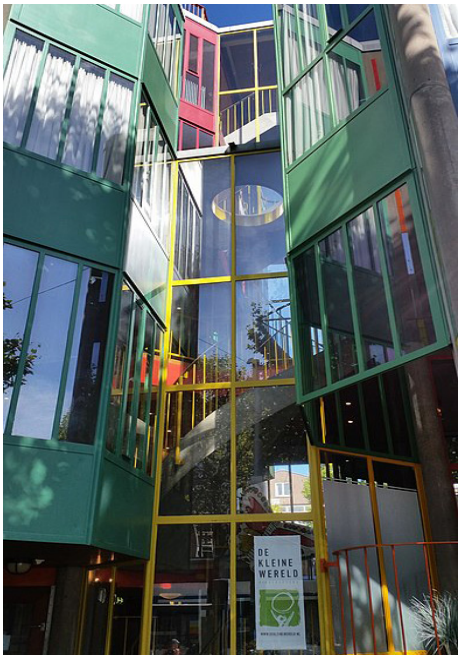


Figure 16: Hubertus House (Image by Cees Camel, 2022)

42
Maryam Farhady and Jeehyun Nam, "Comparison of In-between Concepts by Aldo Van Eyck and Kisho Kurokawa-Through Theories of' Twin Phenomena' and' Symbiosis'," Journal of Asian Architecture and Building Engineering 8, no. 1 (2009): 21.

The movement of the color blue from inside to outside provides a connection between the interior and exterior in Van Eyck's design for the Court of Audit (Figure 17).[43]

In-between spaces can also respond to the public-private relationship, as Van Eyck shows in the Amsterdam Orphanage. In this building, a large open square reaches into the building's center to form the gradual transition between the reality outside of that from inside (Figure 18).

For Herman Hertzberger these in-between spaces are inviting spaces and opportunities for interaction with various degrees of privacy. He calls this the habitable in-between and defines it as:

> "everything that is in-between the official, all things that have a name, that have a significance. When you say "a house," when you say "a shop," it has a name, it is a clear thing. But everything that is still open for getting significance is what you would call in-between".[44]

43
Farhady and Nam, "Comparison of In-between Concepts by Aldo Van Eyck and Kisho Kurokawa-Through Theories of' Twin Phenomena' and' Symbiosis'," 21.

44
Hauderowicz and Serena, Age-inclusive public space, 78.

Figure 17: Aldo and Hannie van Eyck's extension for the Court of Audit (Source: collection Nieuwe Instituut, 2023)

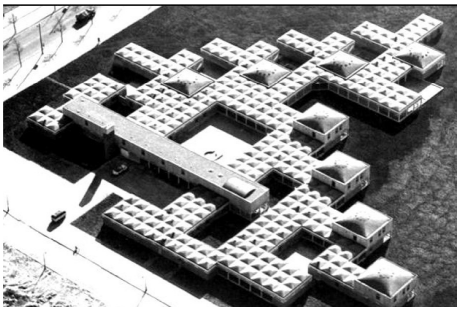


Figure 18: Amsterdam Orphanage (Source: collection Nieuwe Instituut, 2015)

In his housing project Dönche in Kassel, Hertzberger designed balconies that are partly covered and partly open to the outside, allowing residents to choose whether or not they want contact with their neighbors (Figure 19).
In the same project, the landings of the staircases are enlarged to encourage residents to privatize them and turn them into small meeting places.

In De Drie Hoven, Hertzberger created a small portico with half doors to encourage contact between residents (Figure 20).[45]

In the Apollo schools, the central hall with large dimensioned stairs, functions as a seating area. The different floor levels around this central hall allow interaction between students (Figure 21).[46]

45
Hauderowicz and Serena, Age-inclusive public space, 80.

46
Hertzberger, Voorn, and Kirkpatrick, Space and the architect : lessons in architecture 2, 256.

Figure 19: Part of the „Wohnschlange" Dönche in Kassel (Source: Hafenbar, 2008)

These in-between spaces are transitional spaces between exterior and interior, or from public to private spaces. However, Herman Hertzberger links these transitional spaces to possibilities for interaction between residents.

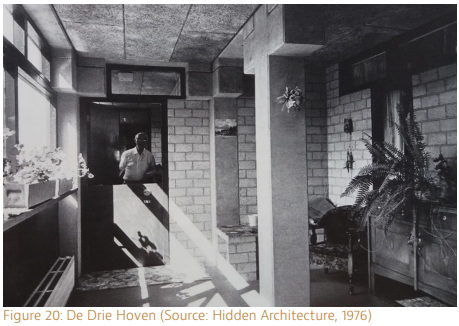


Figure 20: De Drie Hoven (Source: Hidden Architecture, 1976)

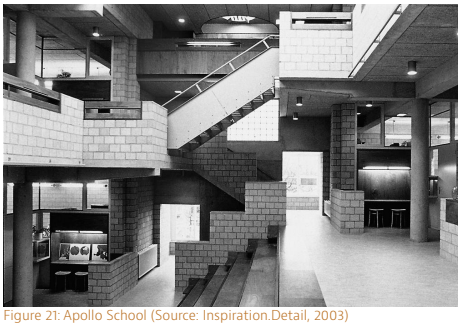


Figure 21: Apollo School (Source: Inspiration.Detail, 2003)

CASE STUDY ANALYSIS

Three projects in the neighboring countries of the Netherlands have been selected to gain a deeper understanding of their approach to co-housing.

The emphasis is on the utilization of shared spaces and promoting social interaction among both residents and visitors by analyzing the degree of privacy, routing, and in-between spaces. By compiling these analyses for each case study and comparing them to one another, a conclusion can be drawn on which components which case study performs best.


III
II
I

I WAGNISART

Figure 22: Impression of Wagnisart (Image by Julia Knop, 2018)

II BIJGAARDEHOF

Figure 23: Impression of Bijgaardehof (Image by Laurian Ghinitoiu, 2022)

III VINDMØLLEBAKKEN

Figure 24: Impression of Vindmøllebakken (Image by Sindre Ellingsen, 2021)

I WAGNISART

Figure 25: Aerial view of Wagnisart (Source: Euroluftbild.de/Robert Grahn)

architect	SHAG Schindler Hable Architekten and Bogevischs Büro Architekten & Stadtplaner
location	Munich, Germany
coordinates	48.183487596877384, 11.598480084316428
year	2016
owner	Wohnbaugenossenschaft Wagnis eG
number of units	138 residential units
area	20,275 m²

Figure 26: Context plan of Wagnisart (Source: Archdaily, edited by author)

INTRODUCING WAGNISART

Bogevischs Buero Architekten and SHAG Architekten collaborated on a project within the newly developed Domagkpark residential district, a former military site in the north of Munich, which served until 2010 a large artists' colony for temporary use. The WagnisART was developed and designed jointly with the later inhabitants as part of an urban development project.

The flexibility of the zoning plan allowed for creative freedom in designing buildings with minimal restrictions. This enabled the shaping of structures that not only open up to their surroundings through courtyards and passages but also create intimate communal spaces for the residents. The housing complex consists of five standalone buildings, each organized around spacious central staircases.

Figure 27: The garden landscape of Wagnisart (Image by Julia Knop)

PRIVACY ZONING

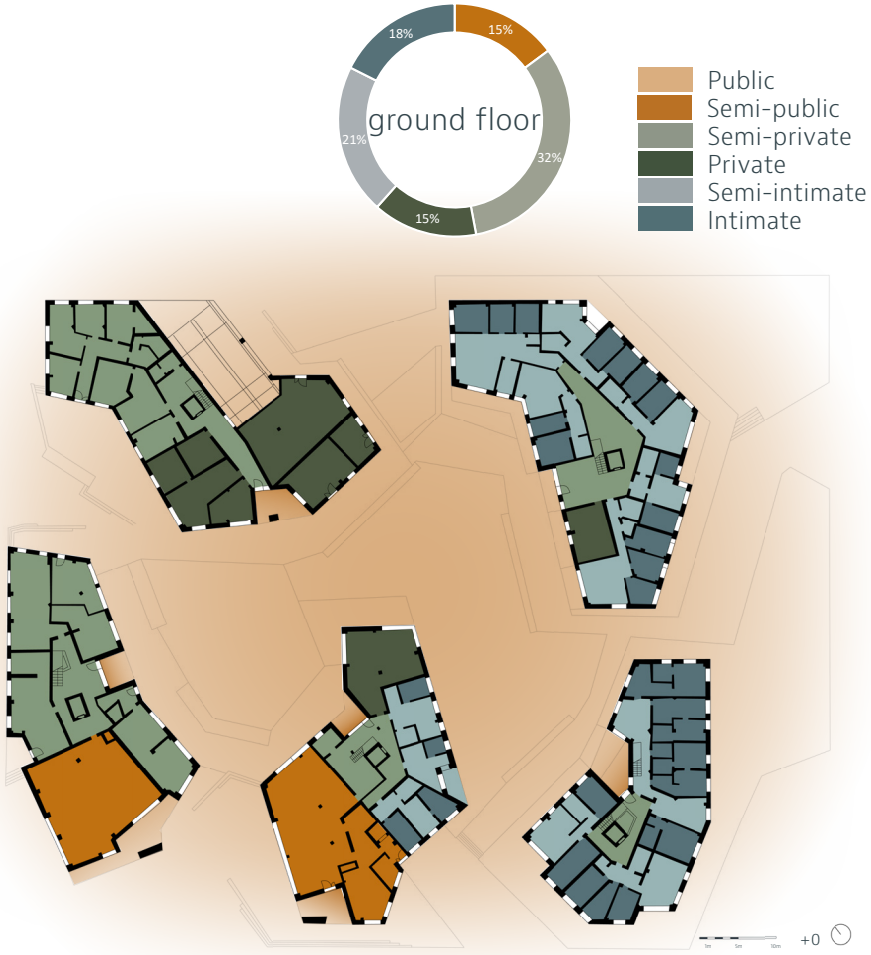


Figure 28: Privacy levels in ground plan Wagnisart (Created by author)

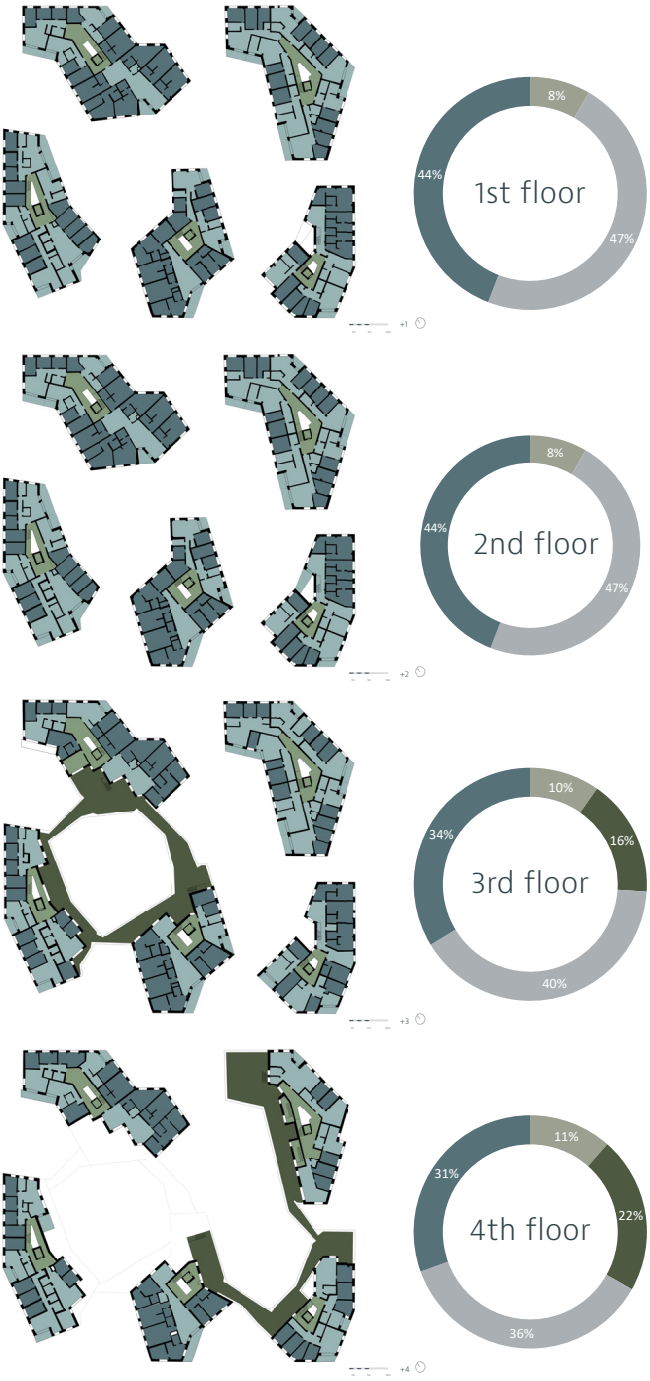


Figure 29: Privacy levels plans 1-4 Wagnisart (Created by author)

A vibrant place has been created that defines the quality of this urban neighborhood by providing both openness and privacy to the neighborhood and its residents.

Of the constructed area, 28% consists of a form of common use, mainly concentrated around the courtyard square. The plinth contains most of the common areas, including rentable spaces, offices, studios, and hospitality. The other floors are residential and are reserved for the semi-intimate and intimate spaces. The air bridge is accessible only to owners. Three-quarters of the private spaces for the residents comprise the air bridge.

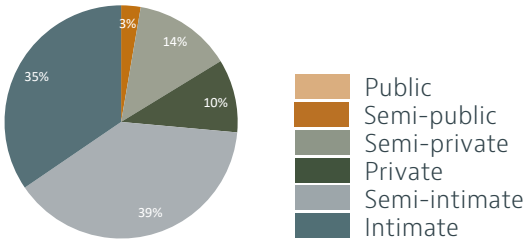


Figure 30: Chart of total percentages of privacy levels in Wagnisart (Created by author)

The entrances to the residential clusters are oriented inwards to the courtyards. The entrances lead to the core of the building where the intimate spaces spread out on all floors.

74% of the living area is the private part of each household, i.e. (semi-)intimate, of this 47% is intimate.

SENSE OF SAFETY

To make Wagnisart a lively place, several programmatic solutions have been devised. Liveliness contributes to a sense of security. The more people there are, the more people can look out for each other. During the day, offices and studios create liveliness on the courtyard square. In fine weather, the café's terrace also contributes to this. In the evening, the restaurant, café, and event space - when rented out - are places to attract visitors from the surrounding neighborhood.

A distinction is made between a more public courtyard square surrounded by a public and community program and a collective garden surrounded only by dwellings.

PROGRAM

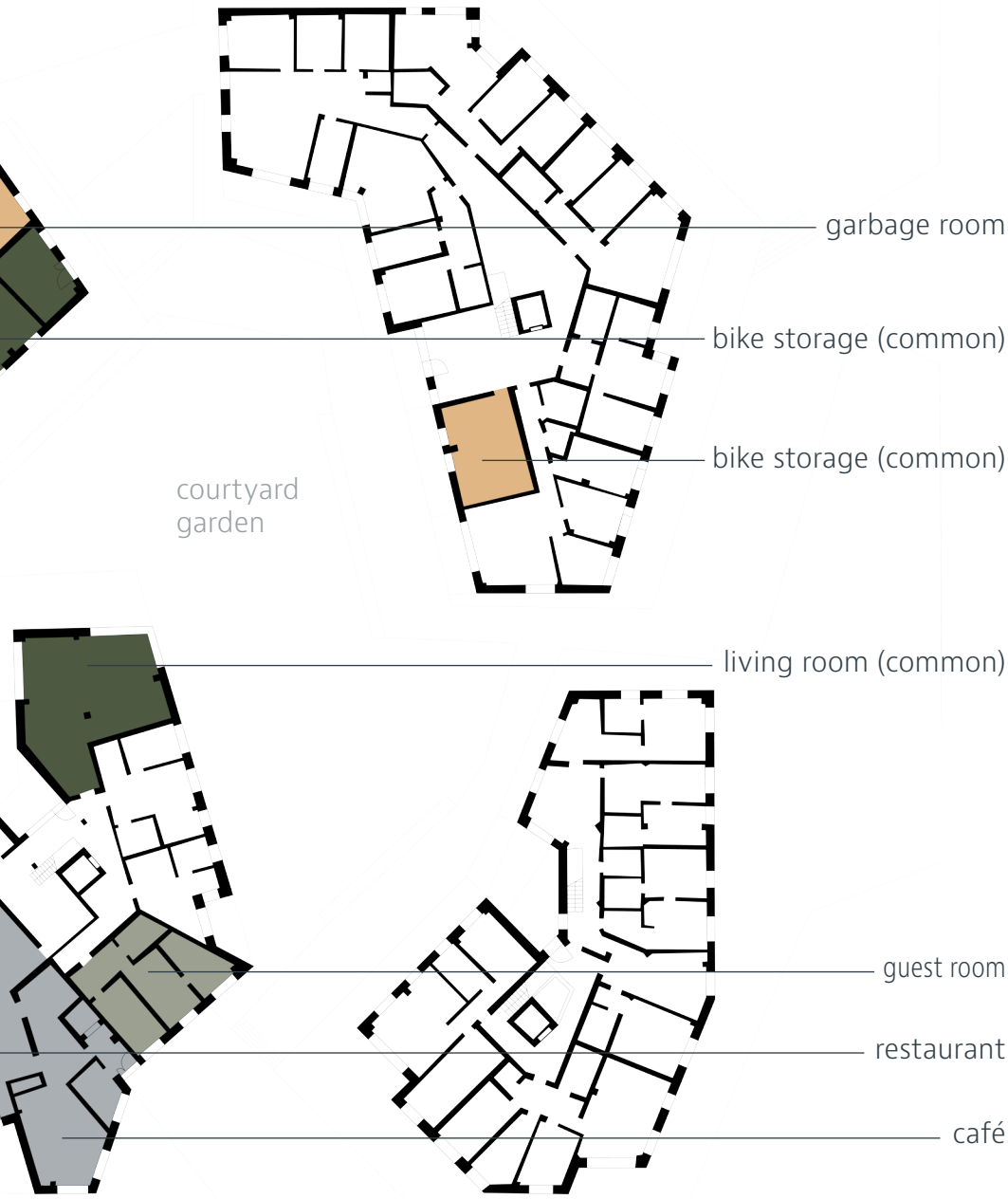
Many windows overlook the courtyards and surrounding paths. The courtyards are well-lit, which also contributes to the sense of security. Within the five buildings, the routing is logical and the staircases in each building are spacious.

The different programs are centralized around the central courtyard, formed by three of the five buildings. There is a wide differentiation in the program. These different programs create liveliness during the day and night. During the day various programmatic functions such as the offices and studios attract people from outside. The location of the restaurant, café, and event space is concentrated on one corner of the complex to prevent noise pollution while attracting (non-)residents in the evening.

The green spaces are open to the public, providing places for the children from the neighborhood to play.

GROUND FLOOR

Figure 31: Community spaces in Wagnisart (Created by author)


garbage room
bike storage (common)
bike storage (common)
courtyard
garden
living room (common)
guest room
restaurant
café

CIRCULATION

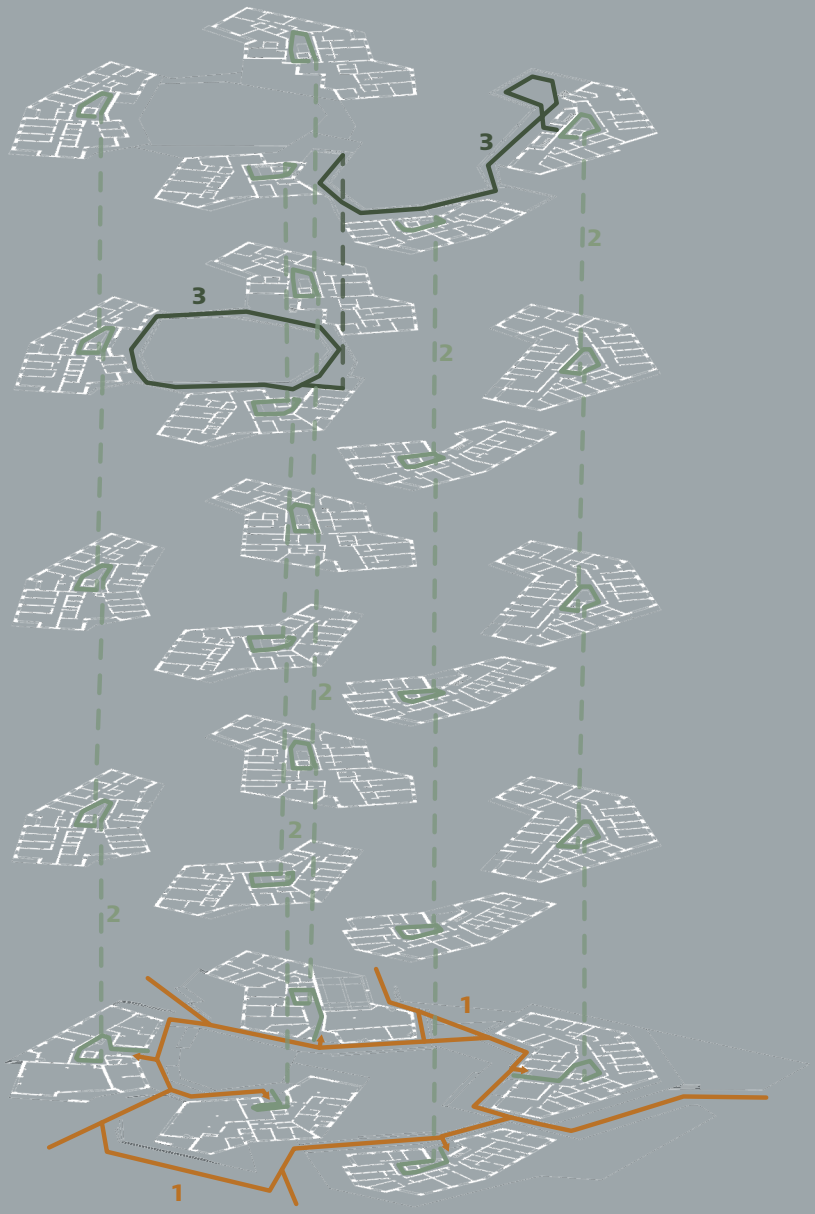


Figure 32: Circulation Wagnisart (Created by author)

Figure 33: Staircase in Wagnisart (by Julia Knop edited by author)

2

The internal circulation areas are spacious, allowing more room for contact between residents. It even is spacious enough to play table tennis in it.

3

Private airbridge, only accessible for the residents

Figure 34: overview of the courtyard square in Wagnisart (by Julia Knop edited by author)

1

The ground floor is open for public. The enclosed entrances function as a transitional zone to semi-public.

Several pathways run through the complex from multiple directions. However, these are not shortcuts, but rather meandering routes.

The spacious staircases create extra community space and enhance possibilities for contact between residents

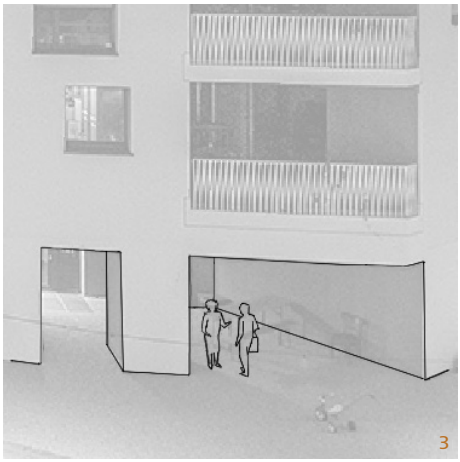
The functional separation of the airbridge that is private and only for residents to use and the more public ground floor may cause residents to have less contact with visitors.

Figure 35: Green space and routing Wagnisart (Created by author)

IN-BETWEEN SPACES

In addition to the many communal spaces offered by Wagnisart, several in-between spaces can be identified that provide opportunities for informal contact.

Figure 36: 1. balconies overlapping , 2. small garden with low vegetation, and 3. covered entrance transitional space from outside to inside (Source: Julia Knop, edited by author)



II BIJGAARDEHOF

Figure 37: Aerial view of Bijgaardehof (Source: Bijgaardehof)

architect	Bogdan & Van Broeck
location	Ghent, Belgium
coordinates	51.05215498793719, 3.7437509857231515
year	2022
owner	Co-housing Wijgaard, De Spore, and Biotope
number of units	59 residential units
area	9,375 m²

Figure 38: Context plan of Bijgaardehof (Created by author)

INTRODUCING BIJGAARDEHOF

The architectural firm Bogdan & Van Broeck transformed an abandoned triangular-shaped factory site into a community consisting of three residential groups with 59 dwellings, a neighborhood health center, shared indoor and outdoor spaces, and a studio overlooking the Bijgaardepark.

With the support of the urban planning company Sogent and the city of Ghent, Bijgaardehof is highly committed to sustainability at both the urban planning and project levels.

It presents an ambitious and diverse program around encounters and interactions, Currently, it is one of the largest cohousing projects in Flanders.

The intended intergenerational mix of housing has been achieved. The youngest resident is in their 20s and the oldest is in their 70s.

Figure 39: The inner garden of Bijgaardehof (Image by author)

PRIVACY ZONING

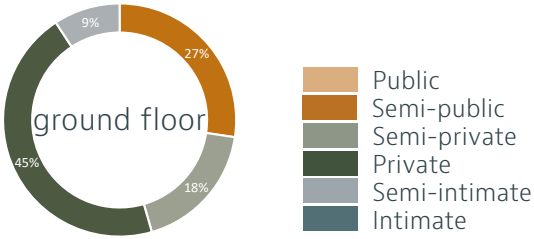
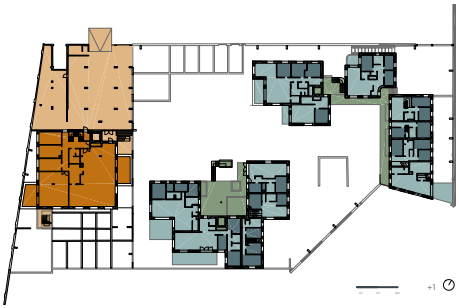
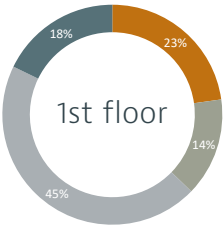
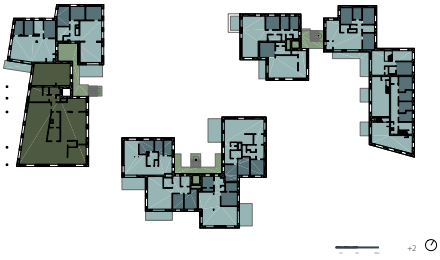
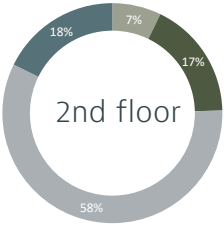


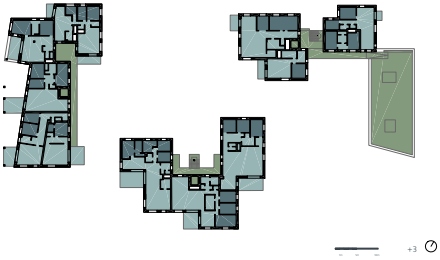
Figure 40: Privacy levels in ground plan Bijgaardehof (Created by author)

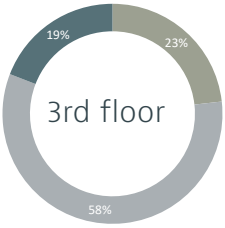


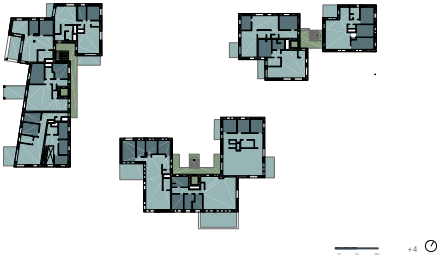












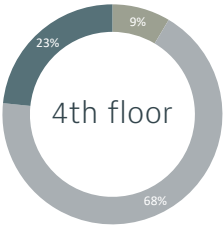


Figure 41: Privacy levels in plans 1-4 Bijgaardehof (Created by author)

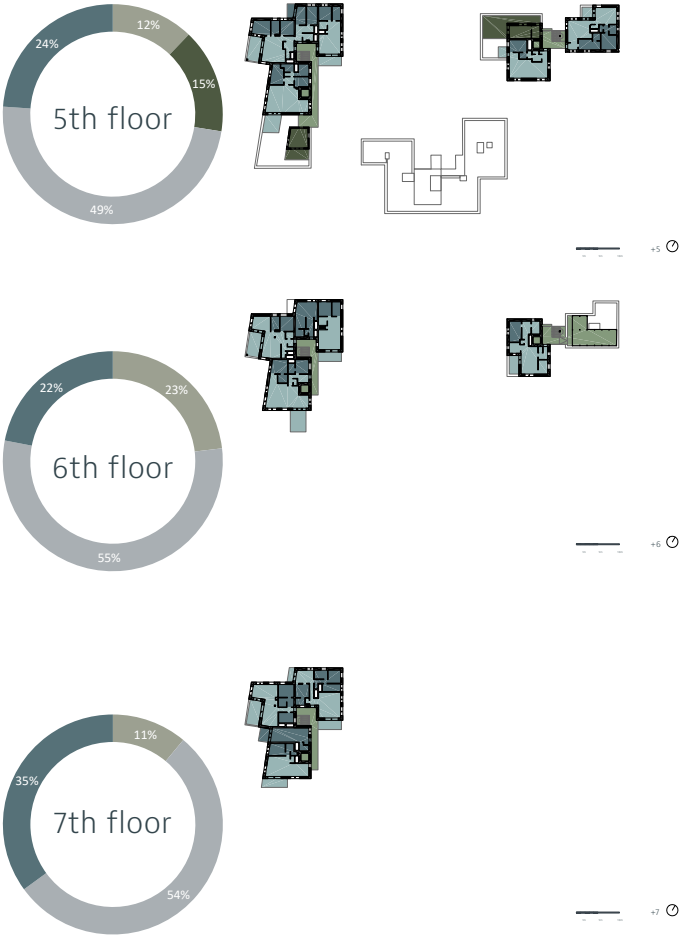


Figure 42: Privacy levels in plans 5-7 Bijgaardehof (Created by author)

Its location surrounded by railroad tracks on one side and commercial buildings on the other side makes it an isolated space. Also for visitors, the site feels closed off because of the preserved outer walls of the former factory. Although these walls are pierced with several openings, they still enclose the site, making it a more privatized area for the residents.

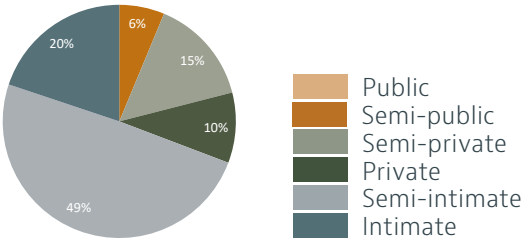


Figure 43: Chart of total percentages of privacy levels in Bijgaardehof (Created by author)

The courtyard garden formed by the apartment buildings and the former factory walls function as a communal garden for the residents. The adjacent Bijgaardepark functions as a public space for the neighborhood.

Although the galleries are freely accessible, they feel as if entering a private area.

69% of the living area is the private part of each household, i.e. (semi-)intimate, of this 28% is intimate.

SENSE OF SAFETY

The placement of the windows facing all corners of the site and the exterior galleries facing the courtyard means that there is lots of visual contact with the courtyard and its immediate surroundings. The pathways to different apartments through the courtyard provide a sense of safety through multiple visual contacts.

The former factory wall running around the site forms a barrier as protection to the surrounding area.

PROGRAM

The health center is the only program in the complex that attracts people from outside. Other facilities are communal. Bijgaardehof residents organize a monthly cultural activity: a film, a lecture, or a small theater performance to which all residents are invited, as well as the neighborhood residents. Each of the three buildings has its common areas such as a laundry room, kitchen, living room, workspace, and guest room, limiting contact between residents within their building.

GROUND FLOOR

bike storage (common)

living room (common)

play area (common)

courtyard
garden

health center

bike storage (common)

laundry room (common)

office room (common)

FIRST FLOOR

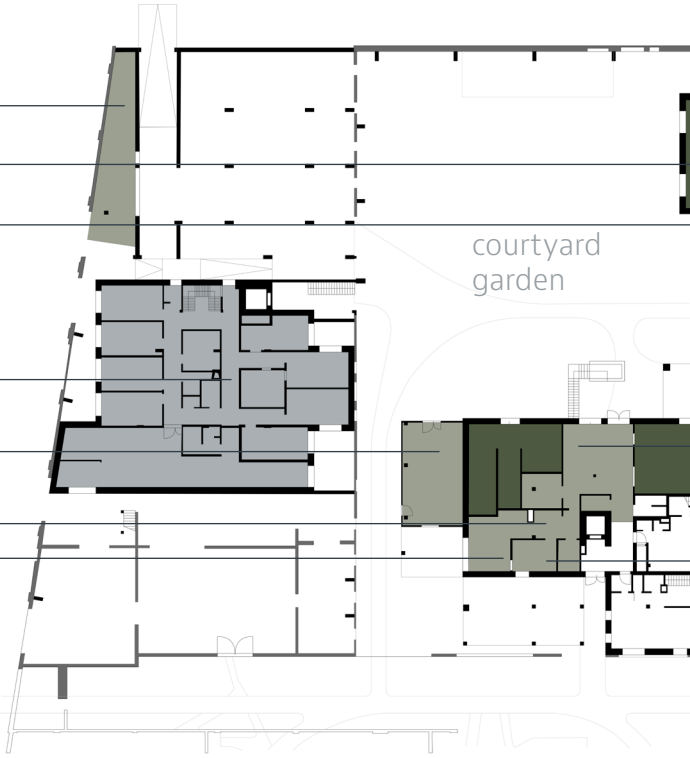
office room (common)

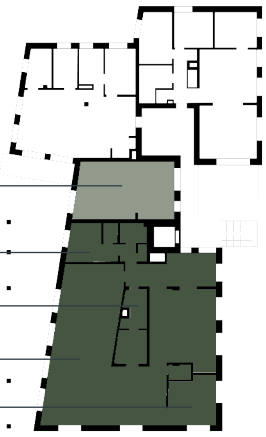
guest room (common)

laundry room (common)

living room (common)

play area (common)





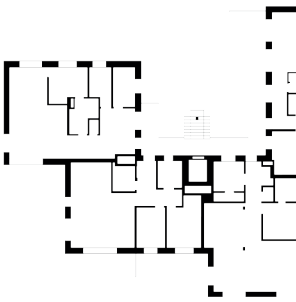
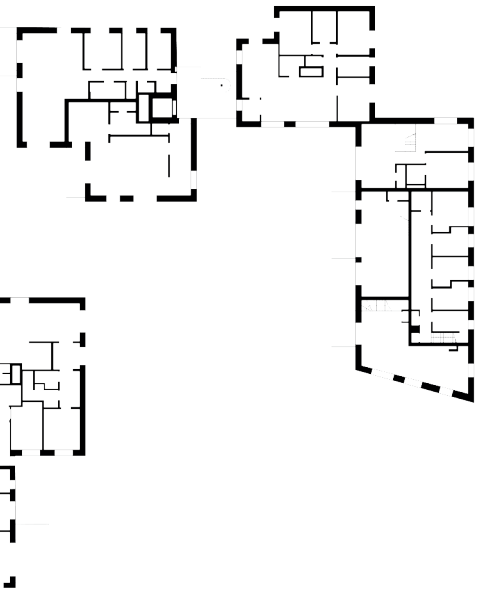


Figure 44: Community spaces in Bijgaardehof (Created by author)


guest room (common)
office room (common)
laundry room (common)
bike storage (common)
workshop (common)
play area (common)
living room (common)
guest room (common)



CIRCULATION

Figure 45: Circulation Bijgaardehof (Created by author)

Circulation is deliberately located on the outside of the buildings to create more opportunities for spontaneous encounters.

Figure 46: Level of privacy in Bijgaardehof (Image by Laurian Ghinitoiu, edited by author)

1
The ground floor is open for public. The open entrances still publicly accessible

People coming to the health center enter directly into the building in which it is located, minimizing interaction with the surrounding residential neighborhood.

The parking lot for residents is deliberately constructed at ground level with daylight entry so that it can be turned into an indoor or semi-outdoor space in the future if necessary.

The entire complex has been made wheelchair accessible with adapted parking spaces, spacious paths, elevators and restrooms, and wide doors without thresholds.

The galleries function as streets at a height.

Figure 47: Green space and routing Bijgaardehof (Created by author)

IN-BETWEEN SPACES

Bijgaardehof situated between old factory walls has multiple chances for encounters through in-between spaces. Several opportunities open up with the remains of the factory

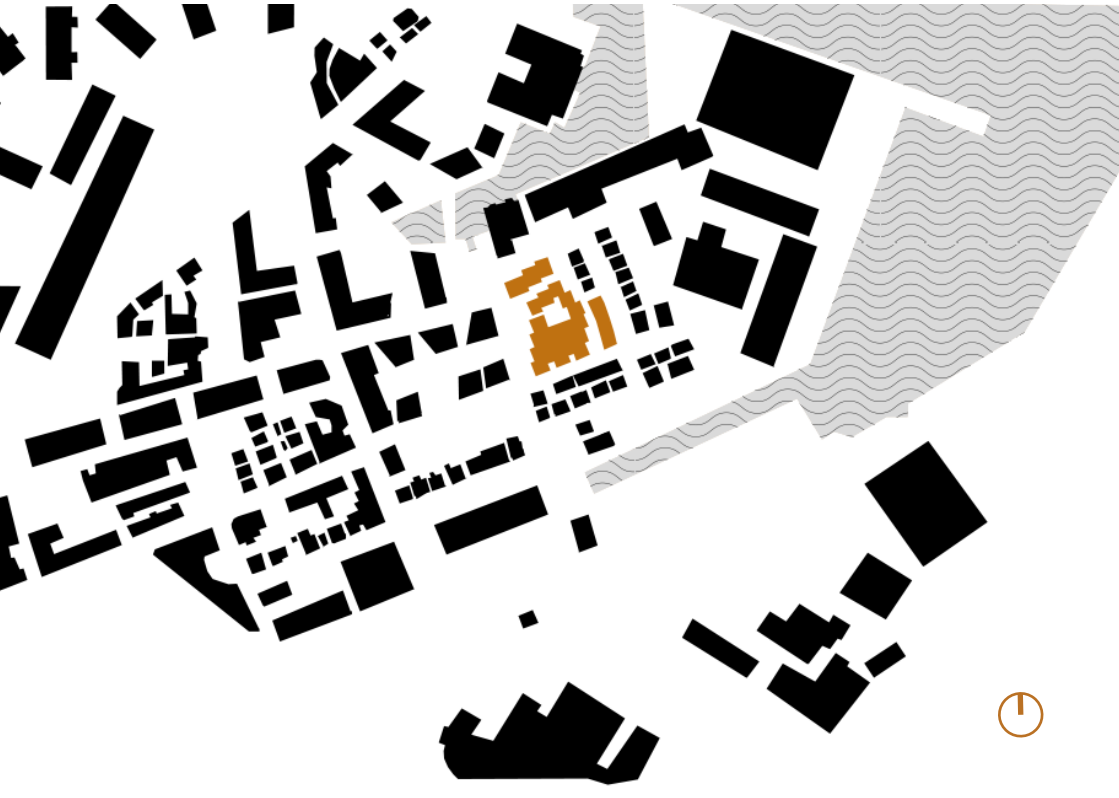
Figure 48: 1. factory wall as an informal meeting place (Source: Laurian Ghinitoiu, edited by author), 2. gallery connected with the courtyard (Source by author), and 3. covered transitional space from outside to inside (Source by author)

III VINDMØLLEBAKKEN

Figure 49: Aerial view of Vindmøllebakken (Image by Jiri Havran)

architect	Helen & Hard
location	Stavanger, Norway
coordinates	58.97139146594515, 5.749061709003415
year	2019
owner	Gaining By Sharing AS
number of units	40 co-living units, 4 townhouses, and 10 apartments
area	4,950 m²

Figure 50: Context plan of Vindmøllebakken (Creatied by author)



INTRODUCING VINDMØLLEBAKKEN

Helen & Hard Architects and Kruse Smith Real Estate developed this co-housing project Vindmøllebakken in Stavanger. The all-wood construction refers to the typology of traditional wooden houses in the neighborhood.

Instead of the nuclear family, residents in Vindmøllebakken consist of single parents, older people who want to age in place, single people, and people who wish to live more sustainably. They own their apartments and were involved in the planning and development process. It is based on the principles of sharing through the model Gaining by Sharing developed by Helen & Hard Architects along with Indigo Vekst and Gaia Trondheim.

Although the 40 apartments are slightly smaller than usual, they have all the amenities plus approximately 500 square feet of shared space. These shared spaces form the heart of the building and are easily accessible to all residents. Some spaces encourage social activity (Figure 50), while others are more private where residents can retreat.

Figure 51: Double-height community space in Vindmøllebakken with a visually open connection to the courtyard (Image by Jiri Havran)

PRIVACY ZONING

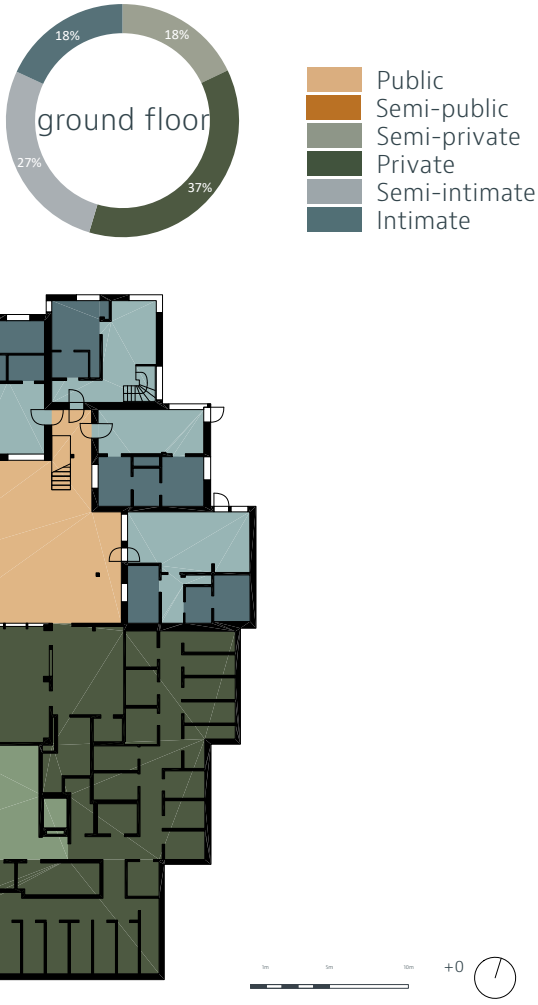


Figure 52: Privacy levels in ground plan Vindmøllebakken (Created by author)

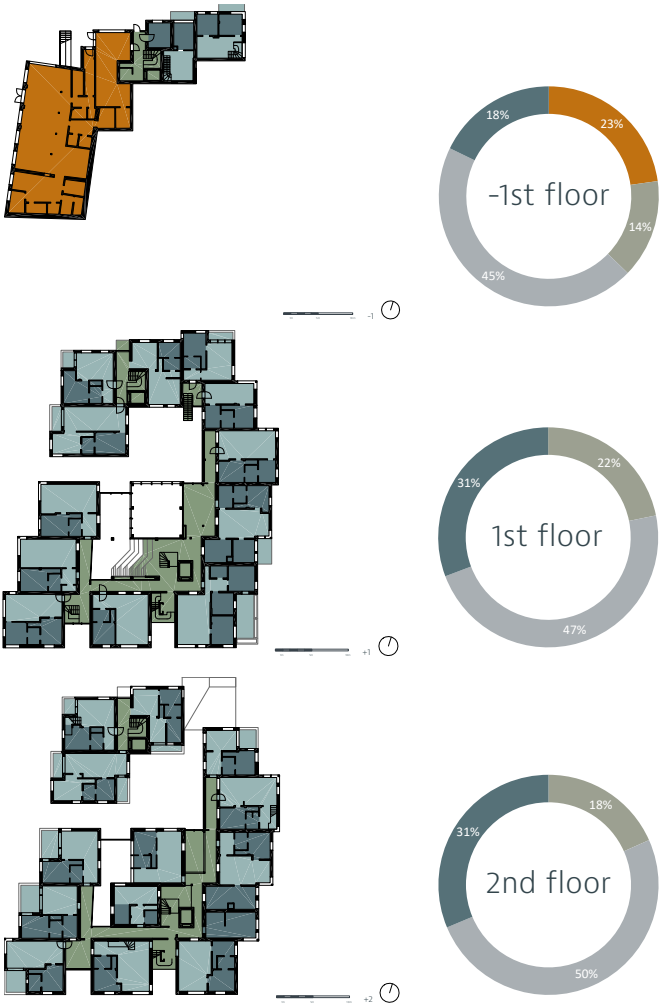
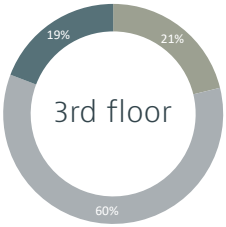
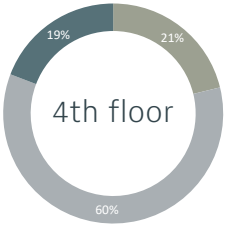
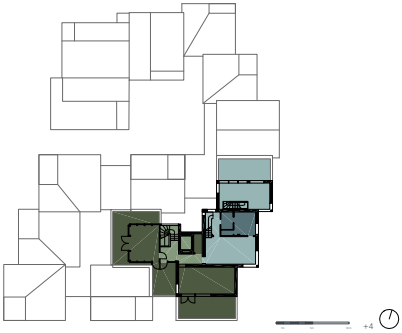


Figure 53: Privacy levels in plans -1, 1, and 2 Vindmøllebakken (Created by author)







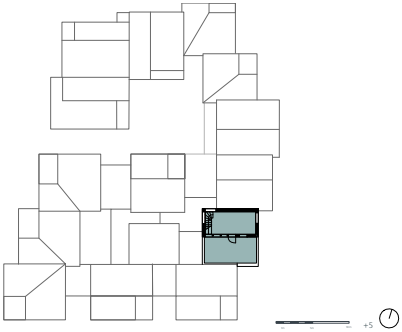


Figure 54: Privacy levels in plans 3-5 Vindmøllebakken (Created by author)

The main entrance adjacent to the courtyard garden is accessed through one side of the building. It starts on the roof of the lower restaurant, forming the more public garden section. Then it leads to a narrower section, which provides access to the courtyard garden. This narrower section generates a transition from the more public section to the more private of the courtyard. Although this courtyard can be seen as a public area, it almost functions as a semi-private area.

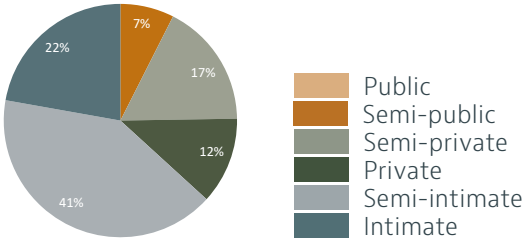


Figure 55: Chart of total percentages of privacy levels in Vindmøllebakken (Created by author)

Most of the private areas are located around the central double-height entrance hall and are easily accessible to all residents.

63% of the living area is the private part of each household, i.e. (semi-)intimate, of which one-third is intimate.

SENSE OF SAFETY

The inward-facing environment, where the entrance is in the core of the building, surrounded by apartments overlooking the courtyard entrance, makes it a safe and enclosed space. Although the courtyard entrance has no physical barrier and is open to the public it feels like an exclusive area for residents.

PROGRAM

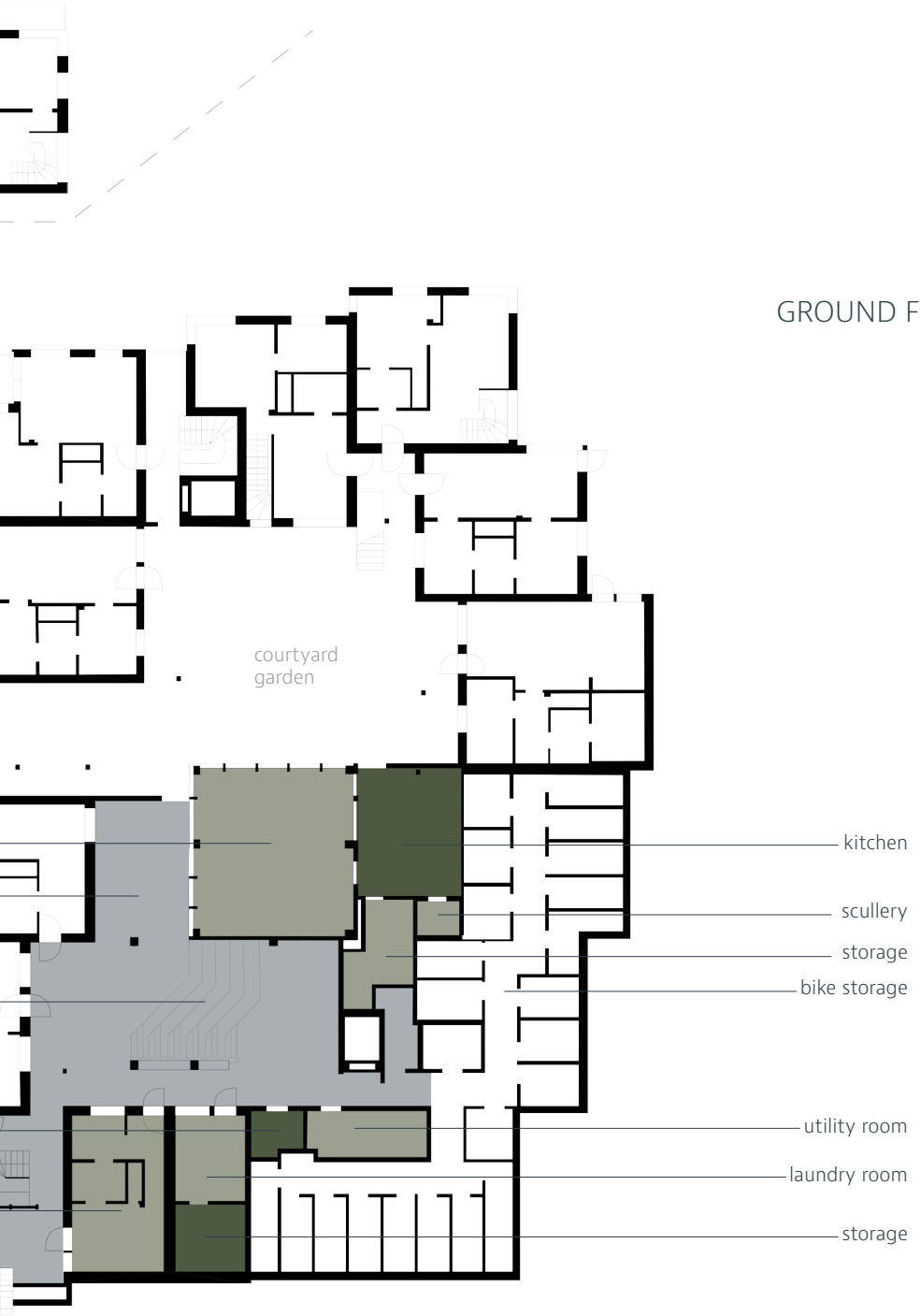
The program is completely focused on the residents. The restaurant included in the building block only has a connection to the street. This is a lower street that runs outside the complex and therefore not directly connected to the rest of the community.

All common areas benefit the residents. Besides a living room and the large hallway leading to the amphitheater-like space, there is a laundry room, a kitchen, a library, a greenhouse, and a guest room.

- 1 FLOOR

Figure 56: Community spaces in Vindmøllebakken (Created by author)

GROUND FLOOR



CIRCULATION

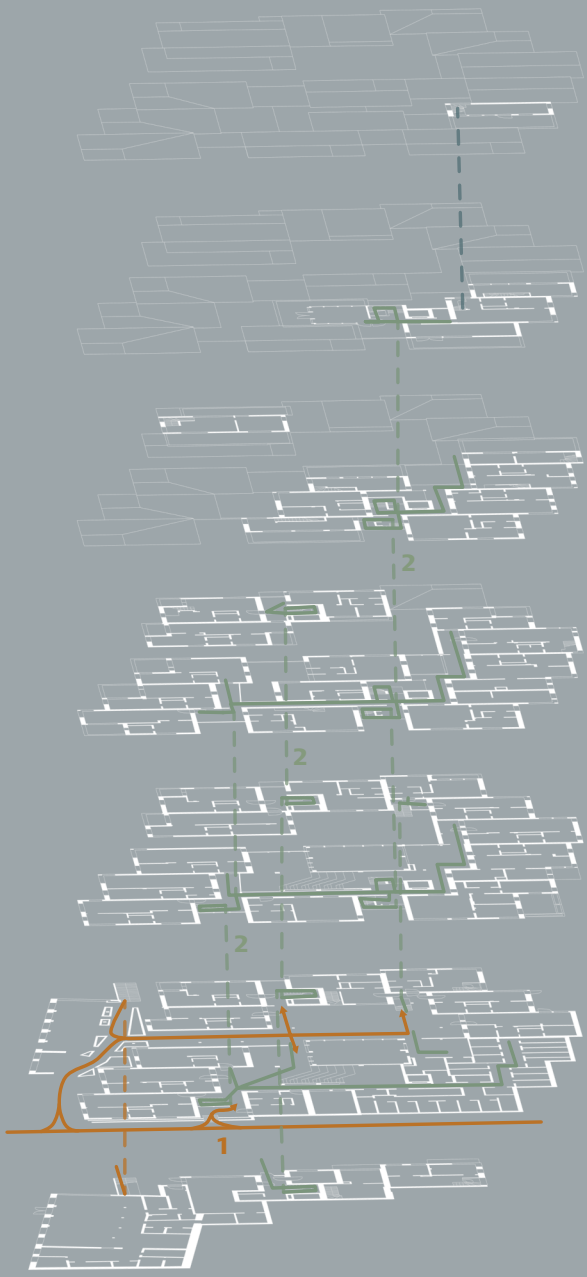


Figure 57: Circulation Vindmøllebakken (Created by author)

Figure 58: Level of privacy in Vindmøllebakken (Image by Sindre Ellingsen, edited by author)

The entrance to the restaurant is on the street that runs around the building block. No attempt has been made here to create a connection between visitors to the restaurant and residents.

The residents can choose between two routes to their homes. The first is the fast route. These are the decentralized entrances, which connect directly to the street. The second is the route through the common areas. This entrance is located in the center of the building in the courtyard.

Figure 59: Green space and routing Vindmøllebakken (Created by author)

IN-BETWEEN SPACES

Vindmøllebakken is all about community living. Interconnecting spaces are an integral part of the design. All connecting corridors are sized larger so they can be used for other purposes, such as a meeting space or a workspace.

Figure 60: 1. Amphitheater the meeting place par excellence, and 2. the larger sized corridor (Source: Sindre Ellingsen, edited by author)

CONCLUSIONS

Intergenerational co-housing could provide a solution to enable the ever-growing group of older people who want to live independently for as long as possible. A goal the government encourages as well. For this form of housing to succeed, there must be good social cohesion between generations, with each generation feeling included.

To achieve the relocation of older people, it is necessary to make intergenerational co-housing attractive. This is only possible if the housing needs of older people are met as much as possible. However diverse this group may be, it is still possible to identify housing requirements that apply to the largest group of older people. The following interventions are significant.

Accessible and affordable community and health services play a vital role in maintaining older people's health, independence, and activity. As do accessible and affordable public transport and proximity to health, social, and commercial facilities.

For houses to be age-friendly they should be step-free, with wider doors, a spacious bathroom, and sufficient (day)light without rapidly changing light intensities.

Providing space for participation in social activities between generations keeps them engaged and informed and can be mutually beneficial. Moreover, it can help eliminate negative preconceptions about aging.

Outdoor space has a major impact on the mobility, independence, and quality of life. Outdoor space should consist of recreational areas, enough rest areas, and a secure environment.

Finally, care must be taken to ensure that information on events, news, and activities reaches older people so that they feel involved and stay involved.

To achieve intergenerational social cohesion, opportunities for contact between generations must be created. After all, relationships can only be built and maintained when people encounter and meet each other. An architectural means is to use the in-between space. This in-between space is an important informal way to create encounters as indicated by Herman Hertzberger.

Furthermore, in-between spaces as Aldo van Eyck shows, are the intermediate spaces that can ensure a gradual transition between two complementary elements. For example, a transition from the natural environment (of the Delfland area) to the built environment (of the Tanthof neighborhood). In his plan for the Amsterdam orphanage, Van Eyck also shows this in-between space can arrange the slow transition of a community into a neighborhood.

Lastly, the in-between space can blur the transition from outside to inside as Kisho Kurokawa shows in several of his designs.

Increasing social connection is closely related to privacy; when social encounters are maximized,

privacy will be minimized. Conversely, if privacy is maximized, social encounters will be minimized. The case studies show that partially giving up privacy for the community can enrich social encounters, while still having enough privacy.

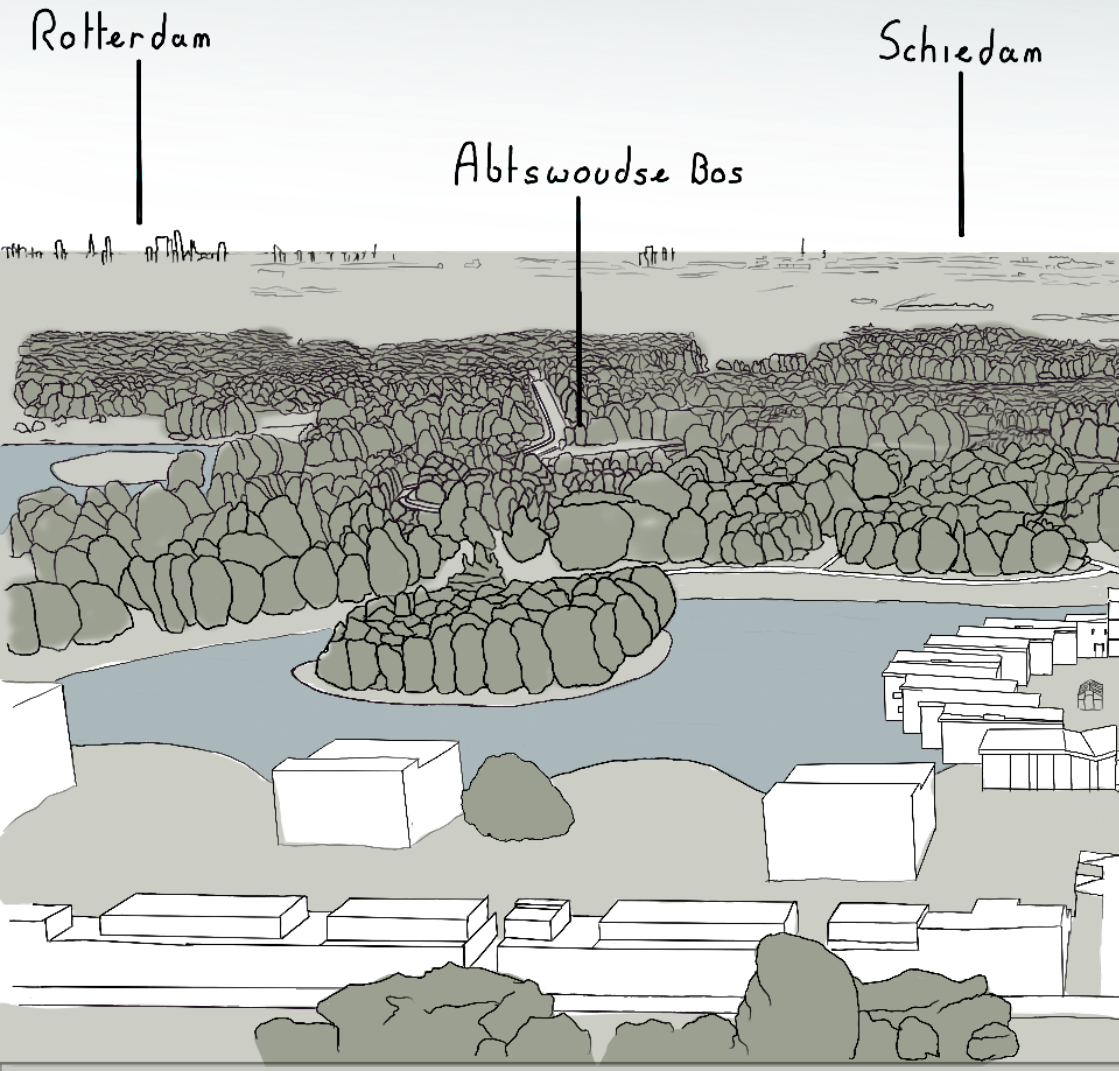
The table on the following pages shows the performance of the case studies on the different aspects that are associated with social encounters and the conclusions taken.

	PRIVACY	SAFETY
WAGNISART	A distinction is made between the courtyards that are open to the entire neighborhood and the airbridge that is open only to the residents.	Programmatic differentiation creates liveliness during the day and evening with windows overlooking the courtyards.
BIJGAARDEHOF	The courtyard garden is a communal garden for residents. The adjacent Bijgaardepark is for the entire neighborhood. The external galleries are freely accessible but feel like private space.	Windows and exterior galleries overlook all corners of the property. The former factory wall forms a barrier as protection to the surrounding area.
VINDMØLLEBAKKEN	A narrower section giving access to the main entrance to the courtyard generates a transition from the public to the private part of the courtyard.	The entrance is in the core of the building, surrounded by apartments that overlook the courtyard, creating a safe and enclosed space.
SHARED CONLUSIONS	10%-12% is the common part for private areas, such as community spaces.	Create visual contact with a protected courtyard.

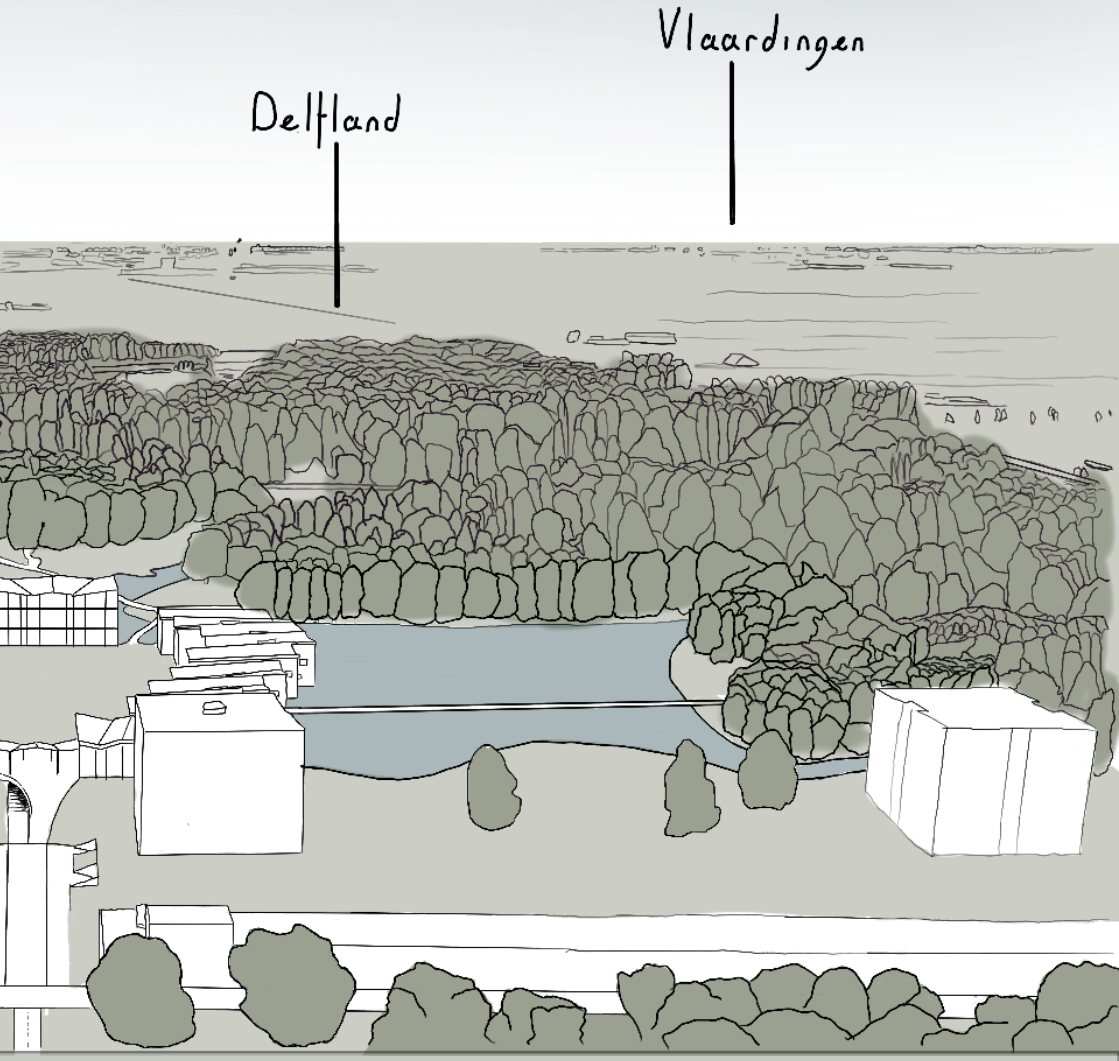
PROGRAM	CIRCULATION	IN-BETWEEN SPACES
Programmatic differentiation attracts people from outside with a wide variaty of different community spaces for residents.	Several pathways run through the complex from different directions as meandering routes.	The covered and spacious entrance provides possibilities for meeting, as do the overlapping balconies and small gardens with low vegetation.
The health center and resident-organized cultural activities attract people from outside. The wide variety of community spaces is reflected in each apartment block.	The entire complex has been made wheelchair accessible. The galleries function as streets at a height.	A covered outdoor courtyard space and overlapping galleries and balconies for informal contact.
The broad program is entirely community-oriented, including an amphitheater-like space. The restaurant has no connection to the apartments.	The main entrance is in the center of the building in the courtyard, but there are also decentralized entrances that open directly onto the street.	All connecting corridors are sized larger so they can be used for other purposes, such as a informal meeting spaces or workspaces.
Share facilities that can be common, saving space within apartments and sharing the cost of purchasing all kinds of appliances.	Oversize circulation spaces to allow other uses while making it wheelchair accessible.	Create visual contact through balconies and dimension entrances wider to allow longer stays, enabling encounters.


DESIGN

Community loop



Bird's eye view south to Delfland


Vlaardingen
Delfland

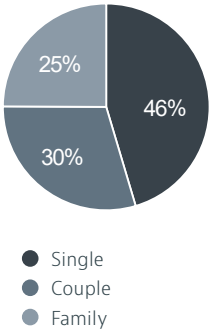
Location

The location for this project is at the border of Delfland in a suburb area of Delft called Tanthof. This edge area between the buildings of the neighborhood and the open recreational Abtswoudse forest, with the open land of Delfland behind it, consists of former farmland that is now vacant land.

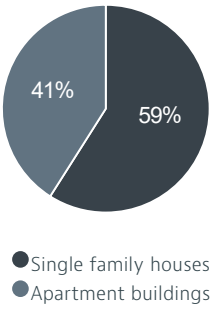
Many residents are satisfied living in Tanthof, a neighborhood centered around families with children, offering playgrounds and other amenities. However, the area is currently characterized by a lack of diversity, with 46% of dwellings occupied by single households and 59% of the housing stock consisting of single-family houses.

Despite the enjoyment residents find in their living environment, leading many to remain there, the population is aging. A quarter of the residents are 65 or older. As single-family houses become too spacious for these older residents, there are no suitable alternatives available.

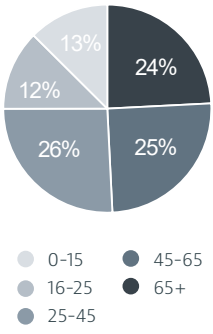
Type of household



Housing type

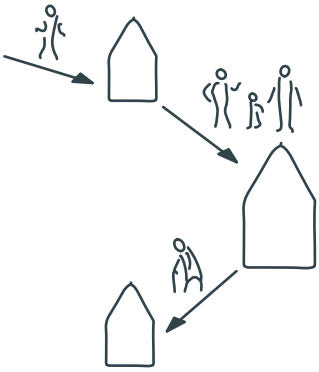


Age groups



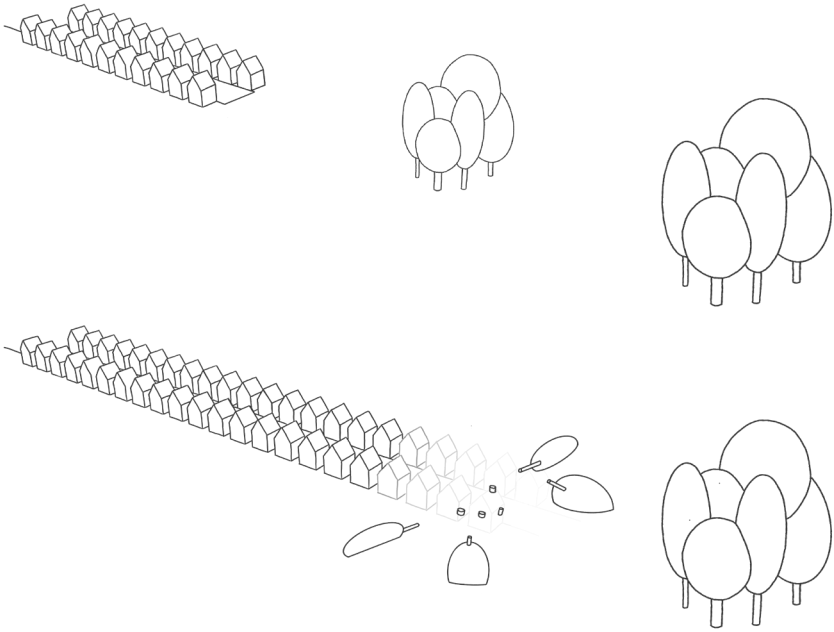
To make Tanthof a more inclusive neighborhood, it is necessary to encourage housing mobility. Older residents should move to more suitable housing where they can age in place, allowing young families to move into the vacant single-family houses. This, in turn, opens up housing for first-time buyers. These new young families will revitalize the neighborhood, which is designed for nuclear families. Although my design contributes to a more inclusive neighborhood that no longer is centered around families.

My project will optimize space usage, as the average single-family house occupies 130 square meters. In contrast, my design allocates only 100 square meters per household without requiring additional infrastructure. This results in a significant space-saving of more than 30%, enhancing the overall efficiency of the neighborhood



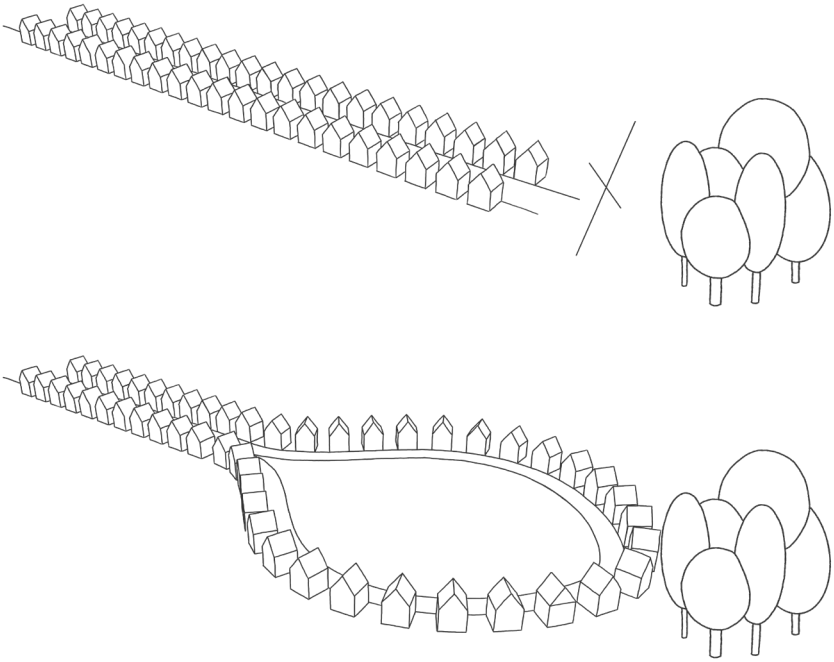
Housing from birth to grave

Ending the urban sprawl by creating a final loop



Many city edges often have dead-end streets, creating loose ends in the urban layout. New neighborhoods can easily be added to this existing infrastructure. This pattern of urban sprawl must come to an end.

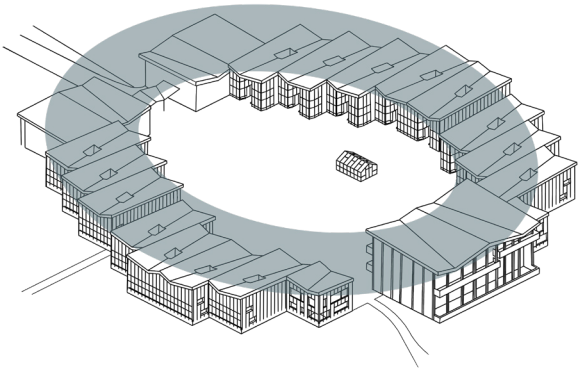
To prevent further expansion into vulnerable natural areas or farmland it is essential to implement a final development to halt this endless expansion at city peripheries. This is what the community loop aims to achieve.

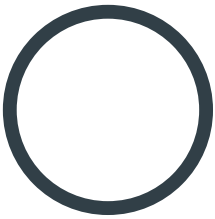


Tanthof West

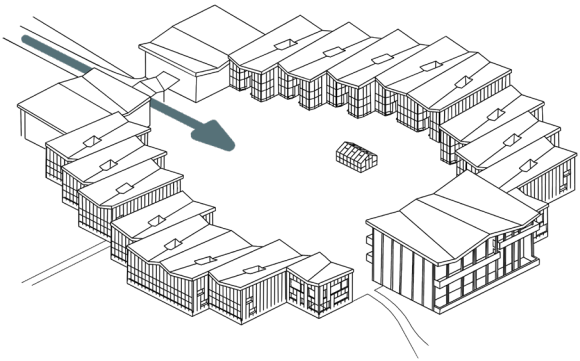
Tanthof East

Maximizing community and social interaction

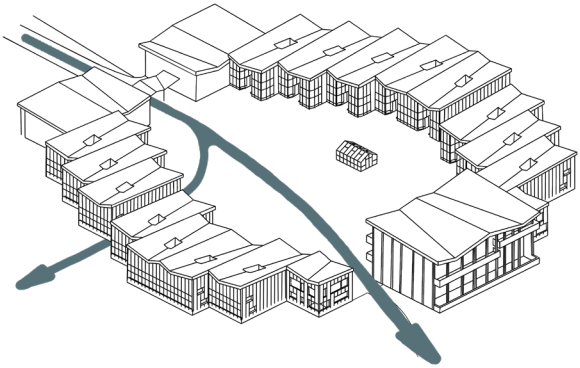


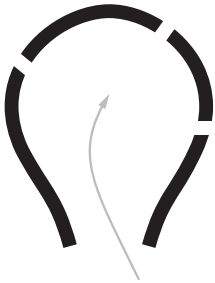


Closed comunity



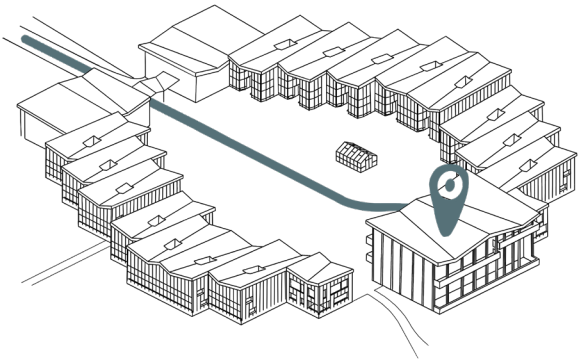
Create a routing

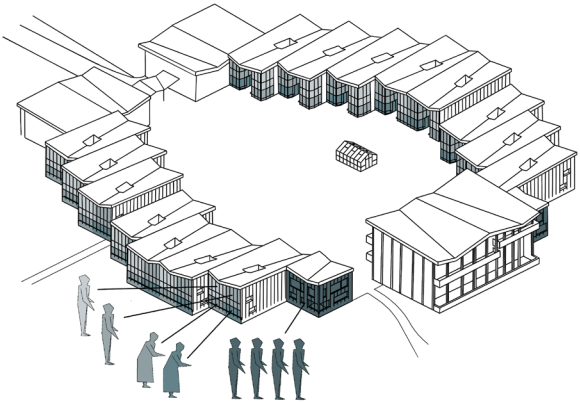




Invite visitors

Create a destination



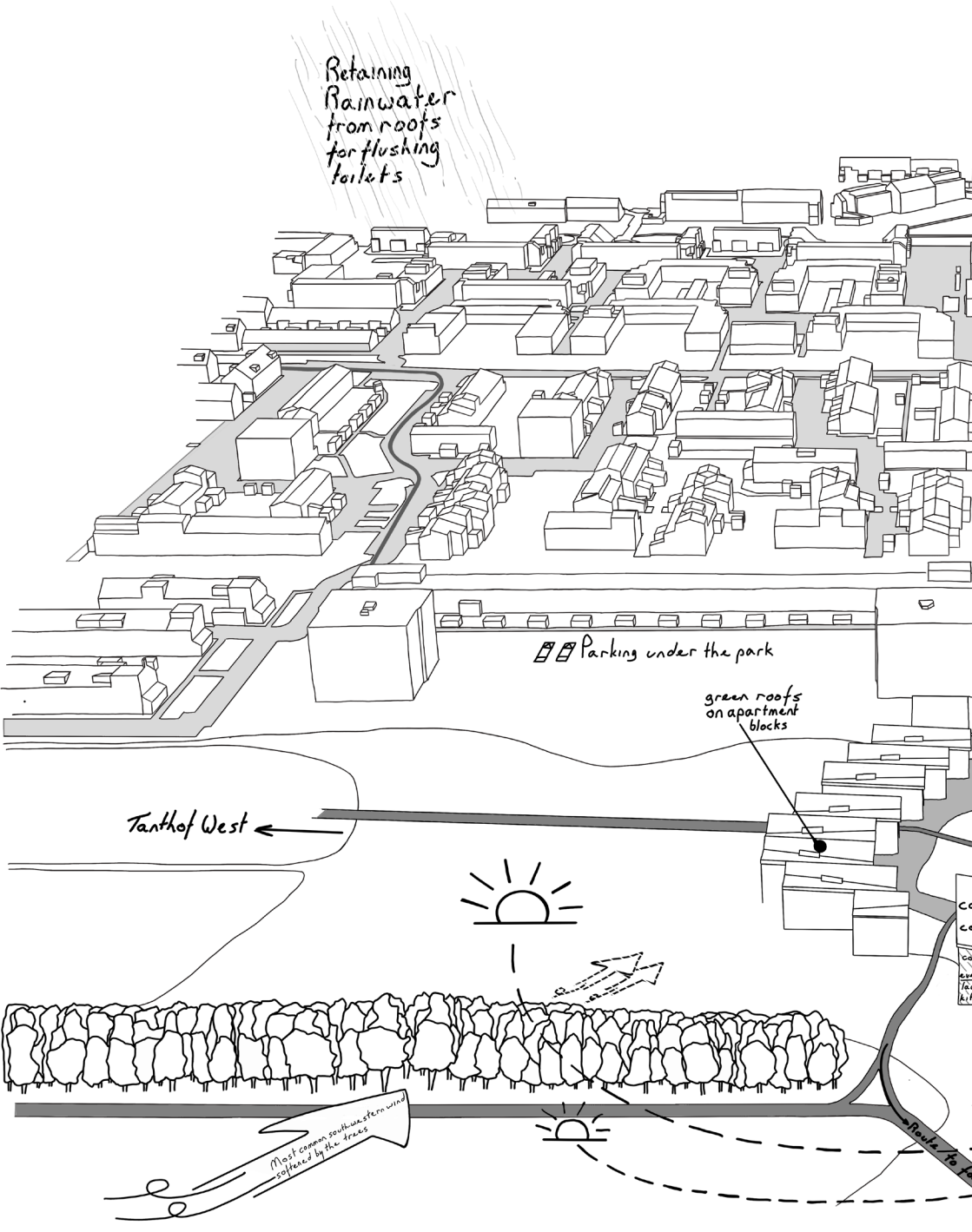


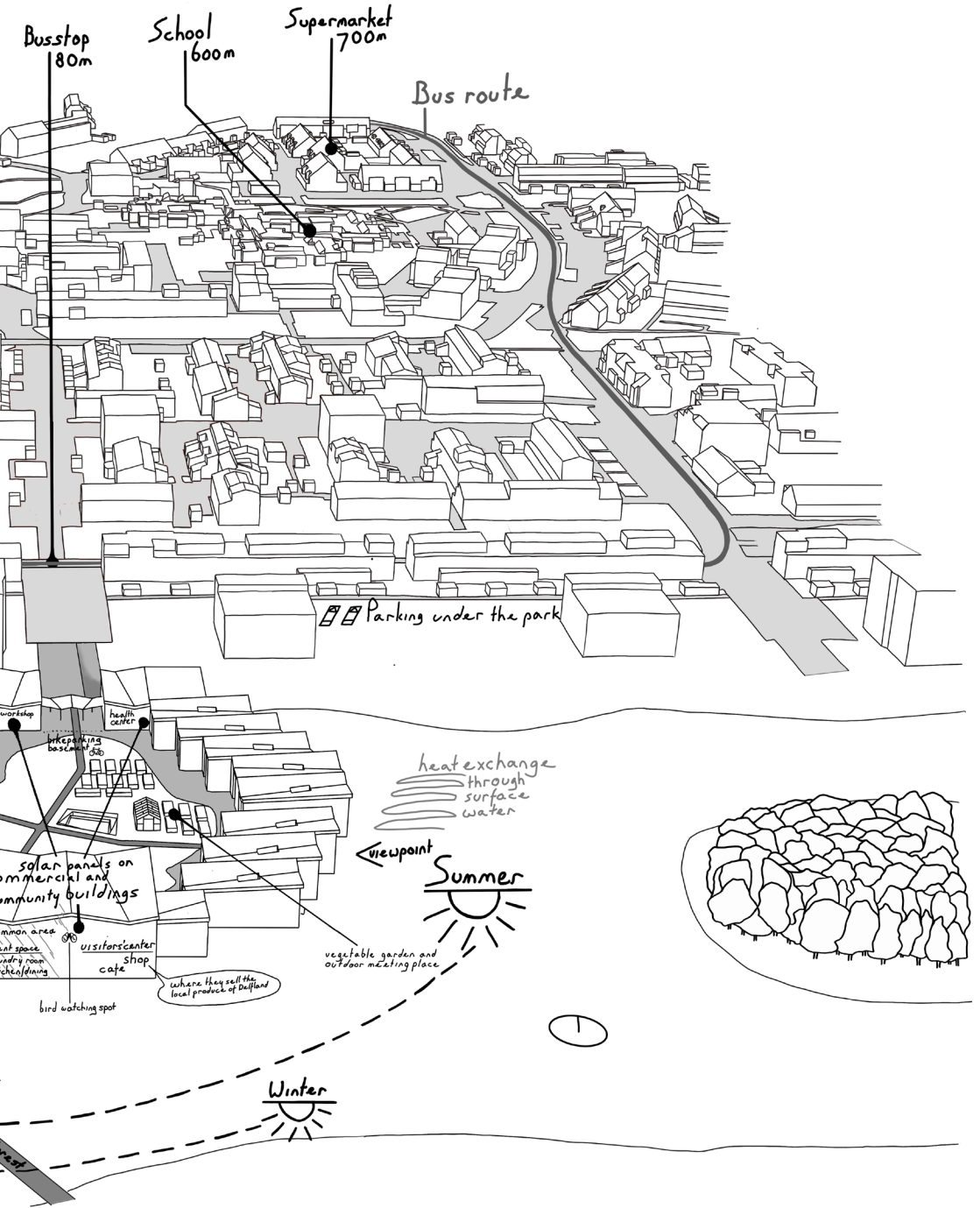
Target group

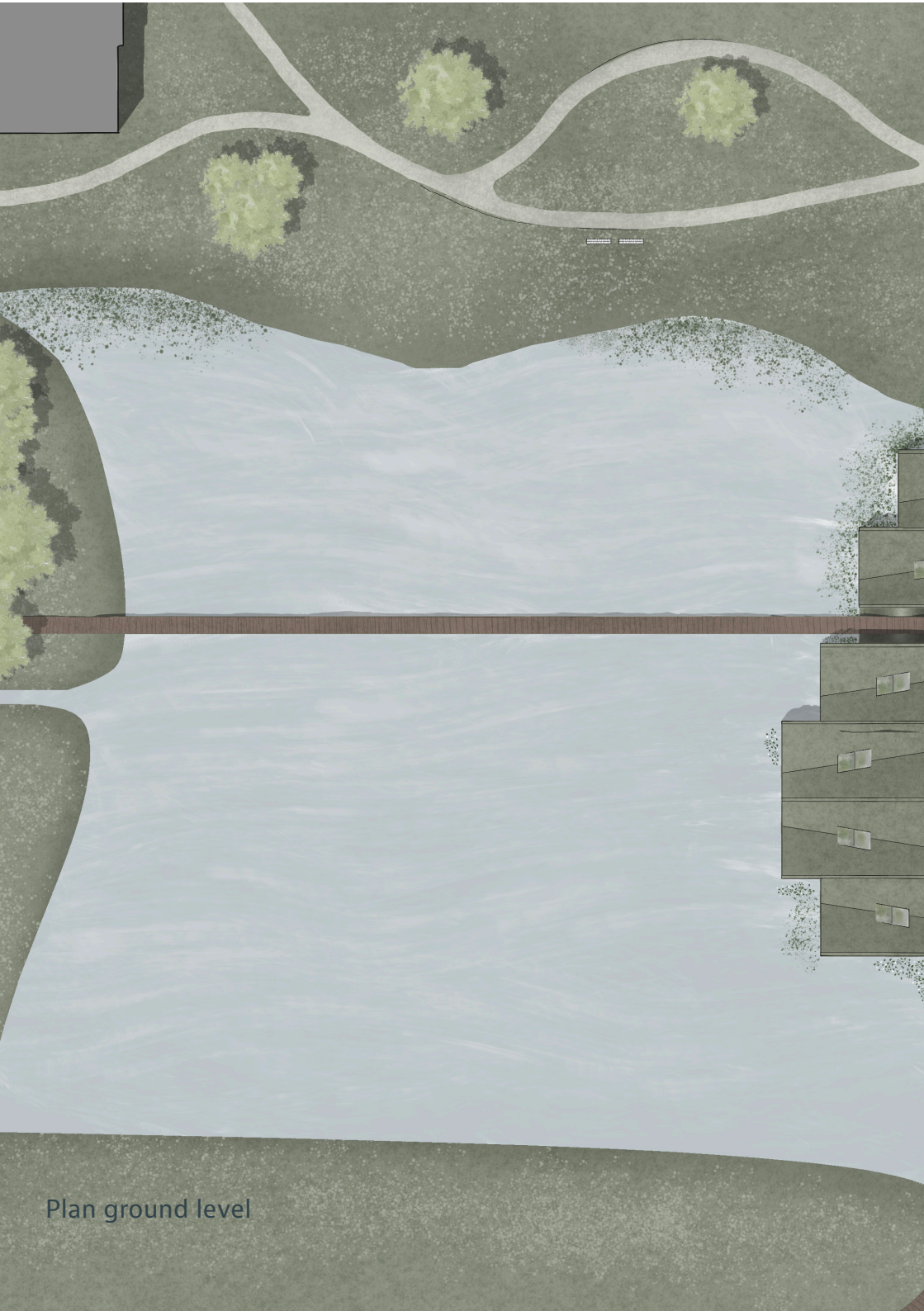
(Single) Older person (65+ years)

Single person (20-50 years)

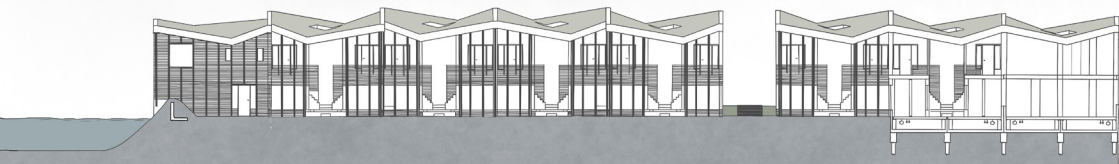
Bird's eye view north to Tanthof East



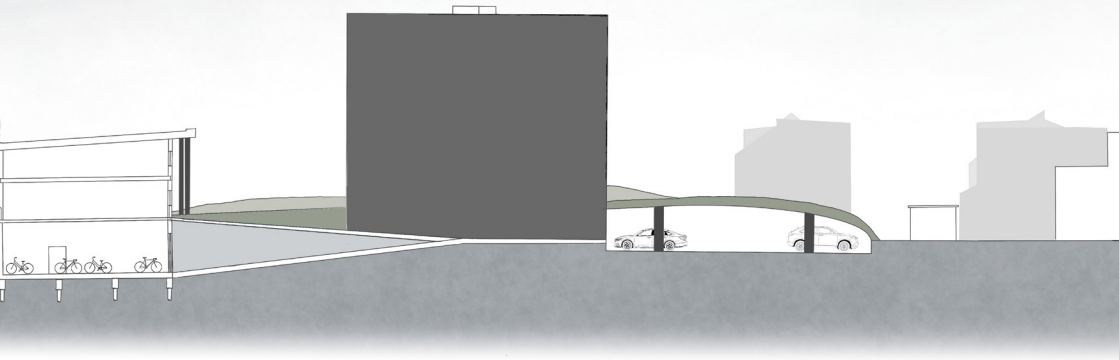

Busstop
80m
School
600m
Supermarket
700m
Bus route
Parking under the park
workshop
health center
bikeparking basement
solar panels on
ommercial and
ommunity buildings
mmon area
nt space
ndry room
chen/dining
visitors'center
shop
cafe
where they sell the local produce of Dellland
bird watching spot
vegetable garden and outdoor meeting place
heat exchange
through
surface
water
viewpoint
Summer
Winter



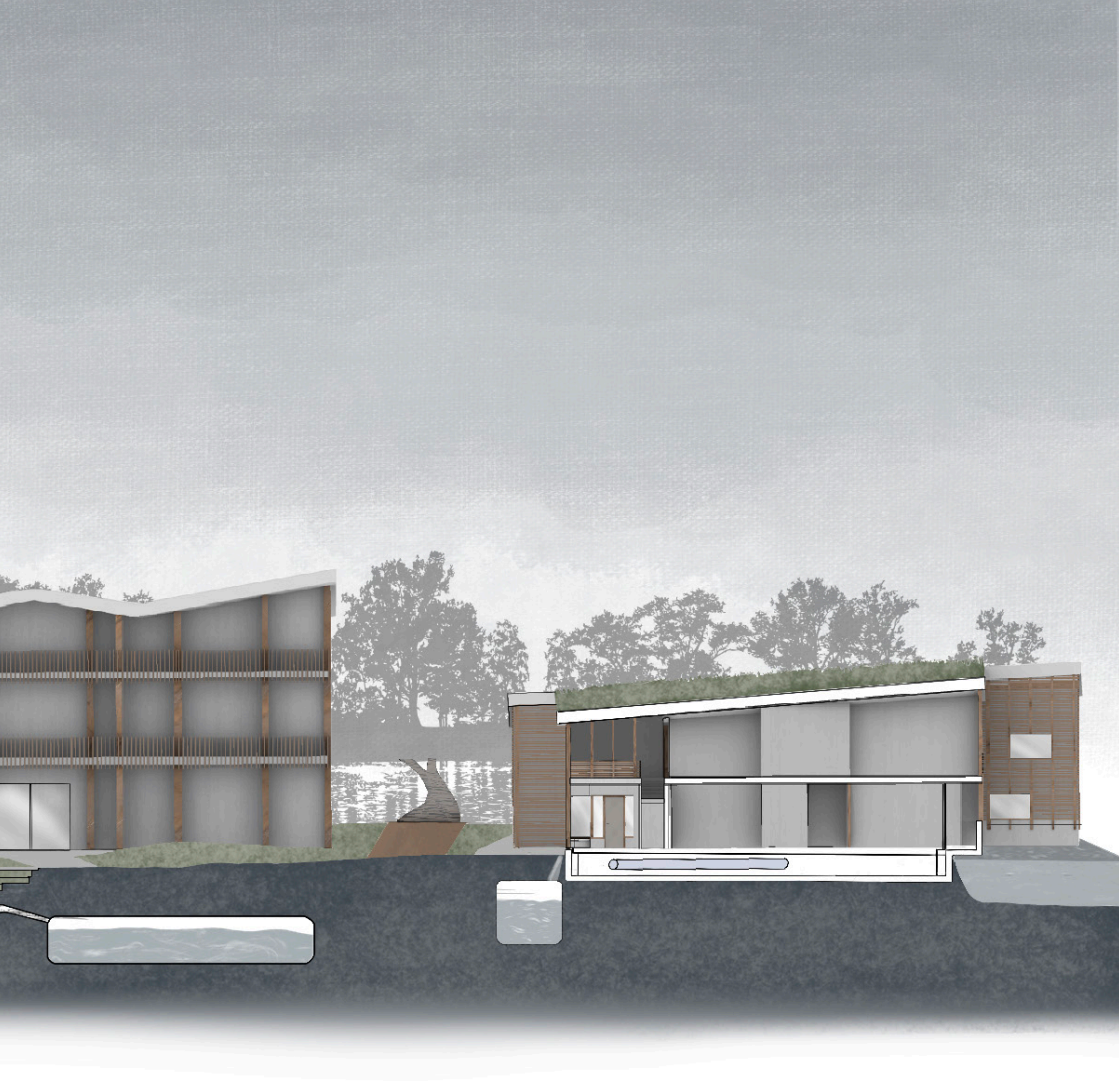
Plan ground level



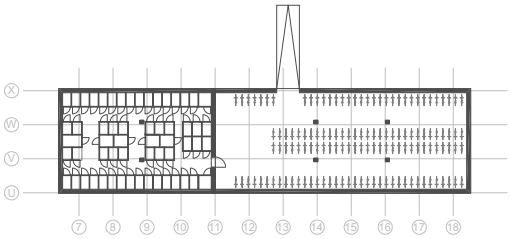
Section North-South



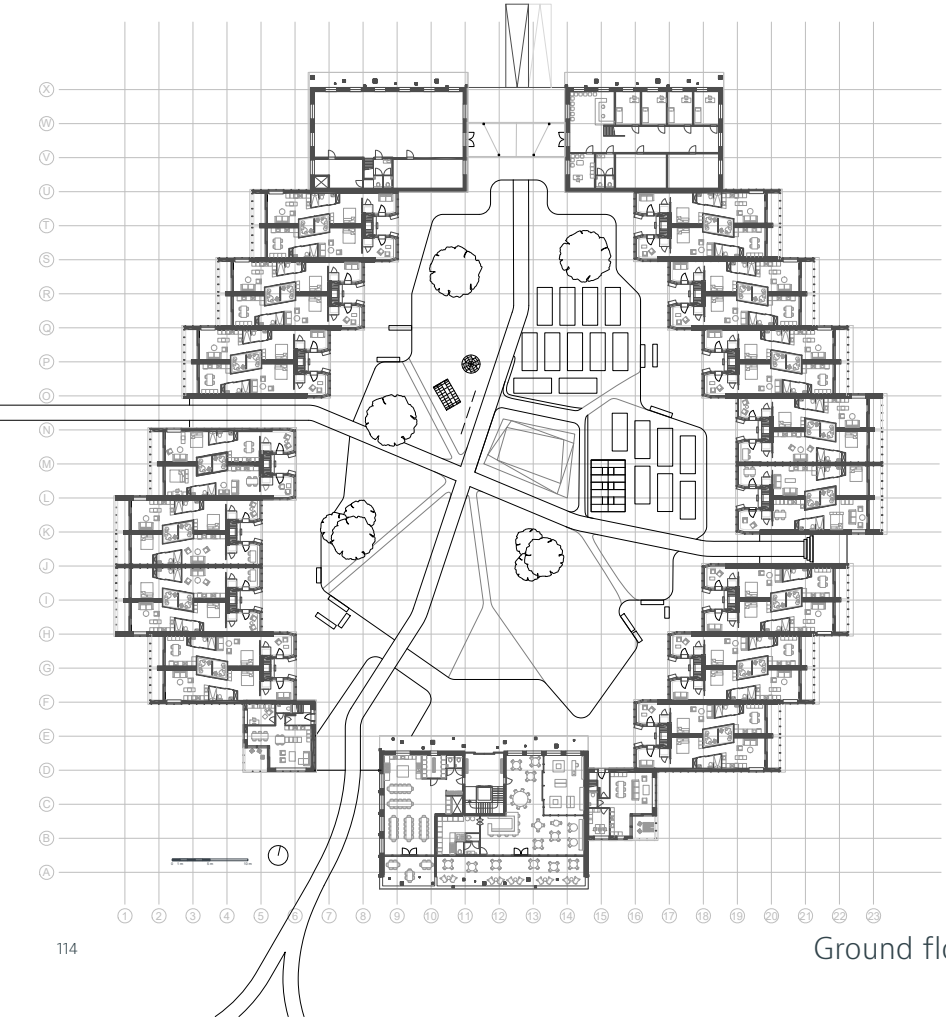
Section East-West



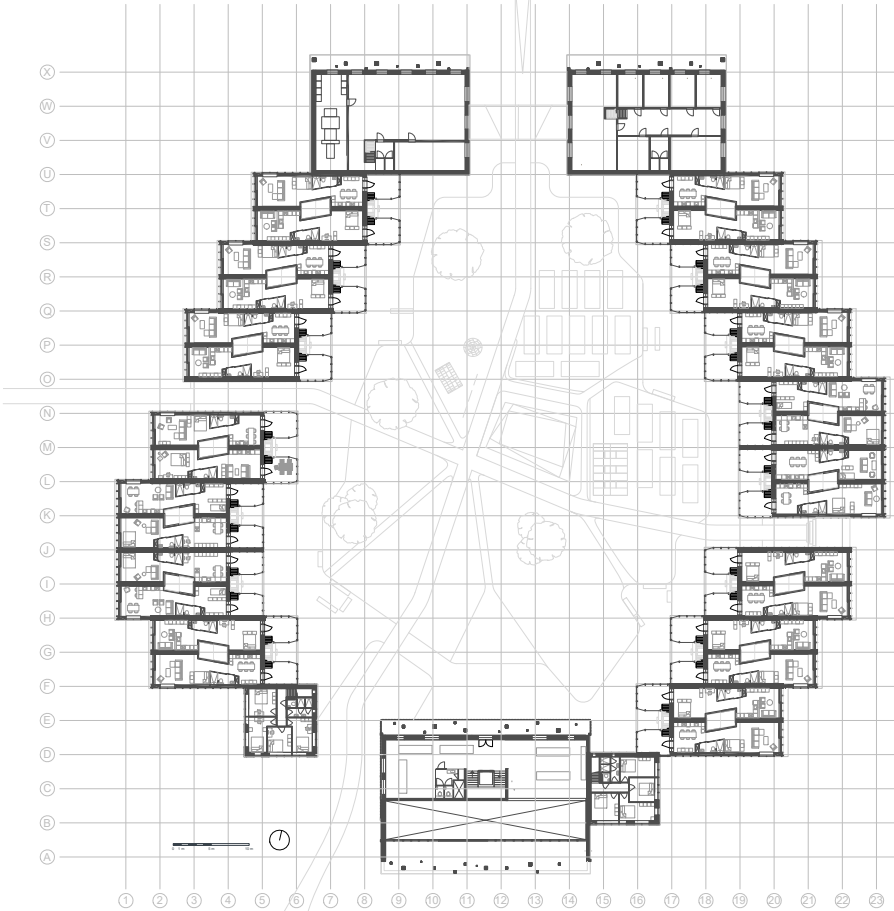
Siteplan



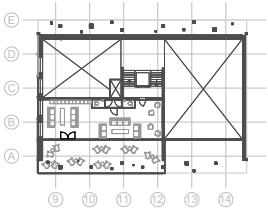
Basement floor



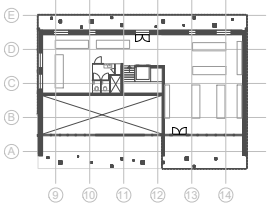
Ground floor



First floor



Mezzanine



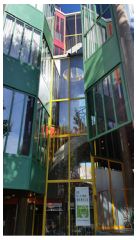
Second floor

The
In-

Between space

Aldo van Eyck's in-between spaces

For Van Eyck the in-between space is the borderline where two opposing elements meet, this space, filled with ambivalence and thus space, corresponds with the ambivalence nature of people. In Aldo van Eyck's design for the Hubertus house this in-between space is the void at the entrance. This void is also reflected in my design.



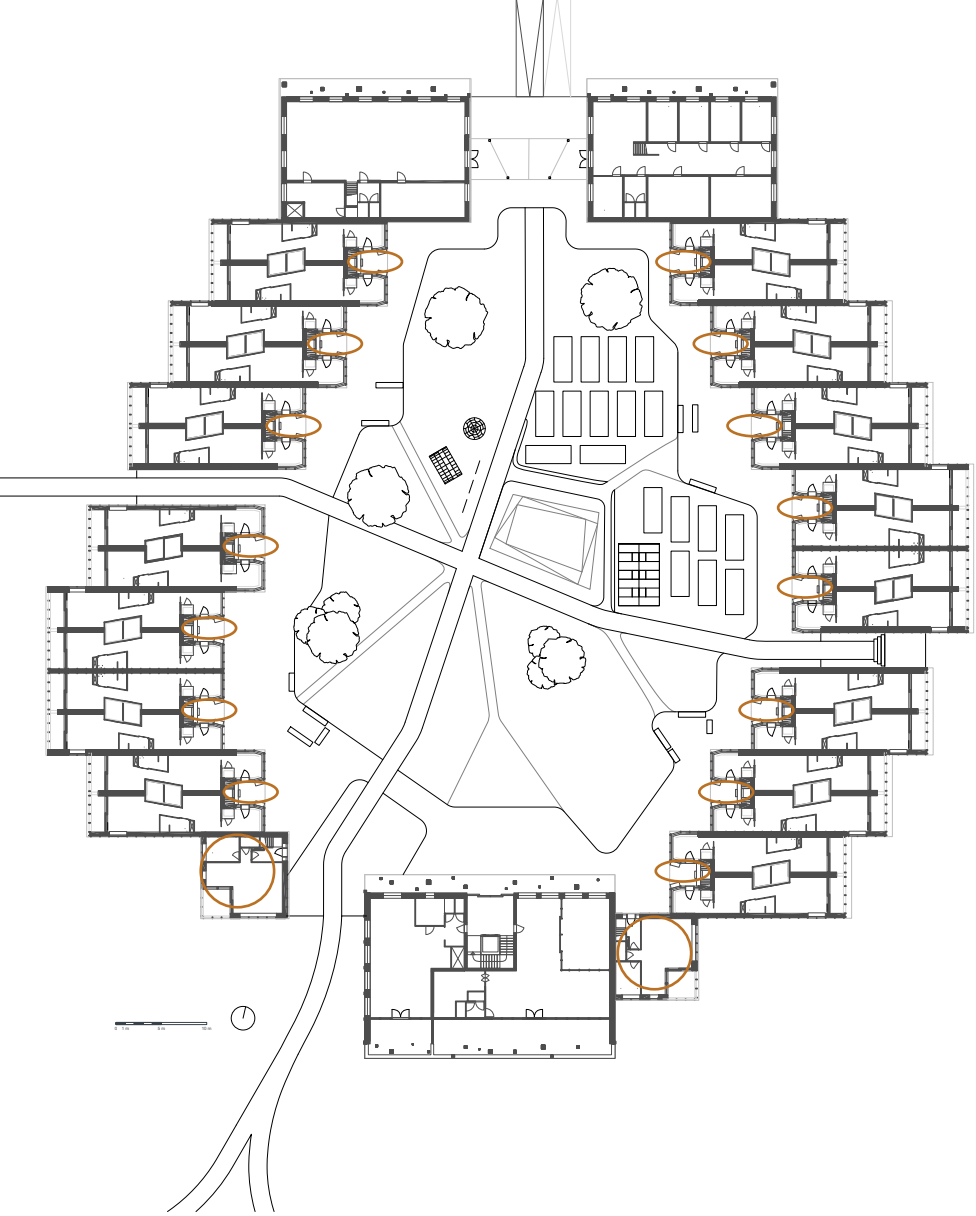
Kisho Kurokawa's in-between spaces

Kurokawa views in-between spaces as transitional zones, such as those from inside to outside. In his design of the Nara City Museum of Photography, he created a seamless flow from the interior to the exterior. Similarly, my garden chambers at the front of the houses serve this purpose.

Herman Hertzberger's in-between spaces

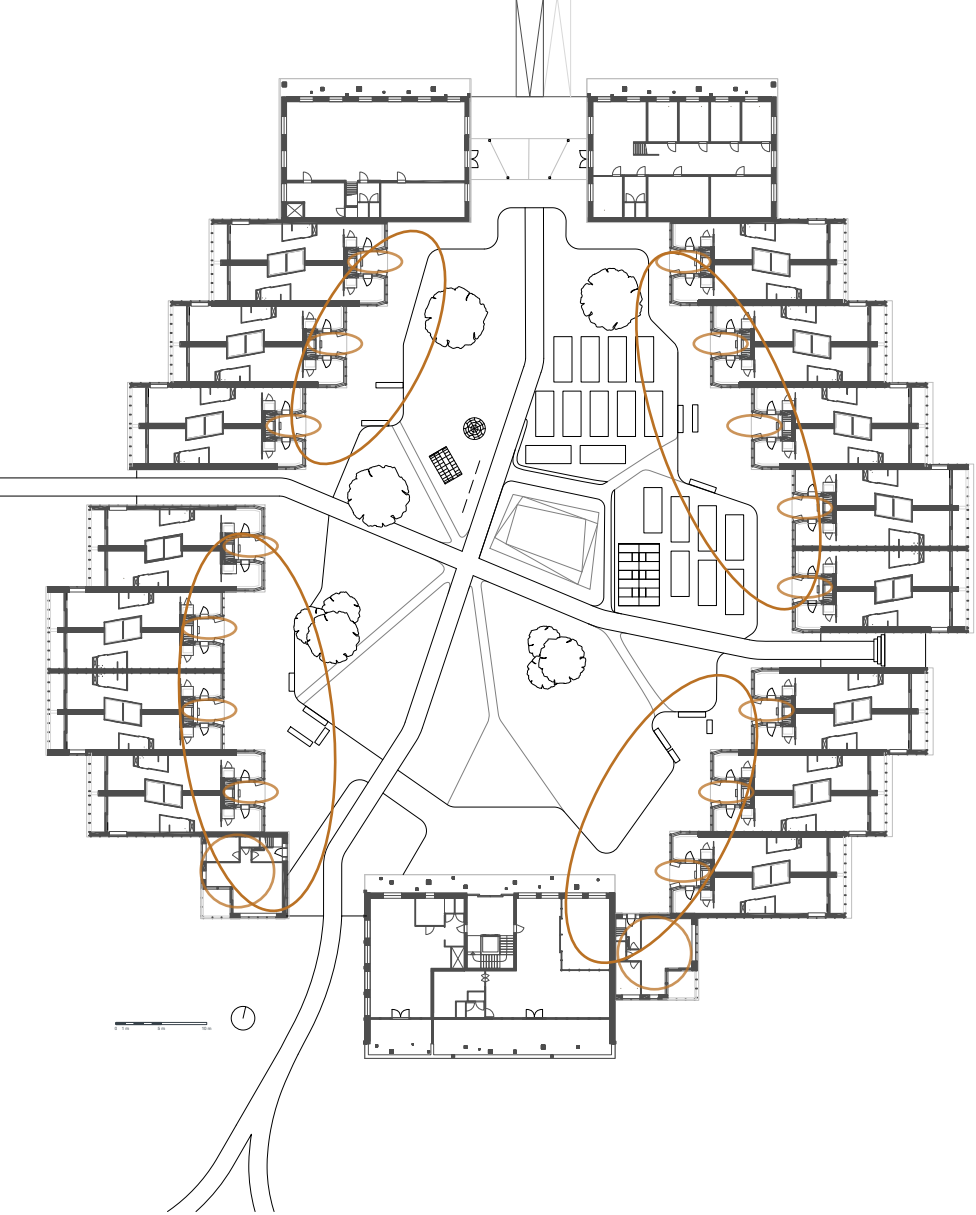
The most practical in-between spaces are what Hertzberger calls "unnamed spaces," where interaction is possible. An example is the balcony-to-street and the balcony-to-balcony connection at Dönche Kassel. The balconies in my design also facilitate this type of interaction.

Hertzberger utilized stairs as places for informal meetings, as seen in the Apolloschool. Similarly, my design fosters opportunities for spontaneous interaction.



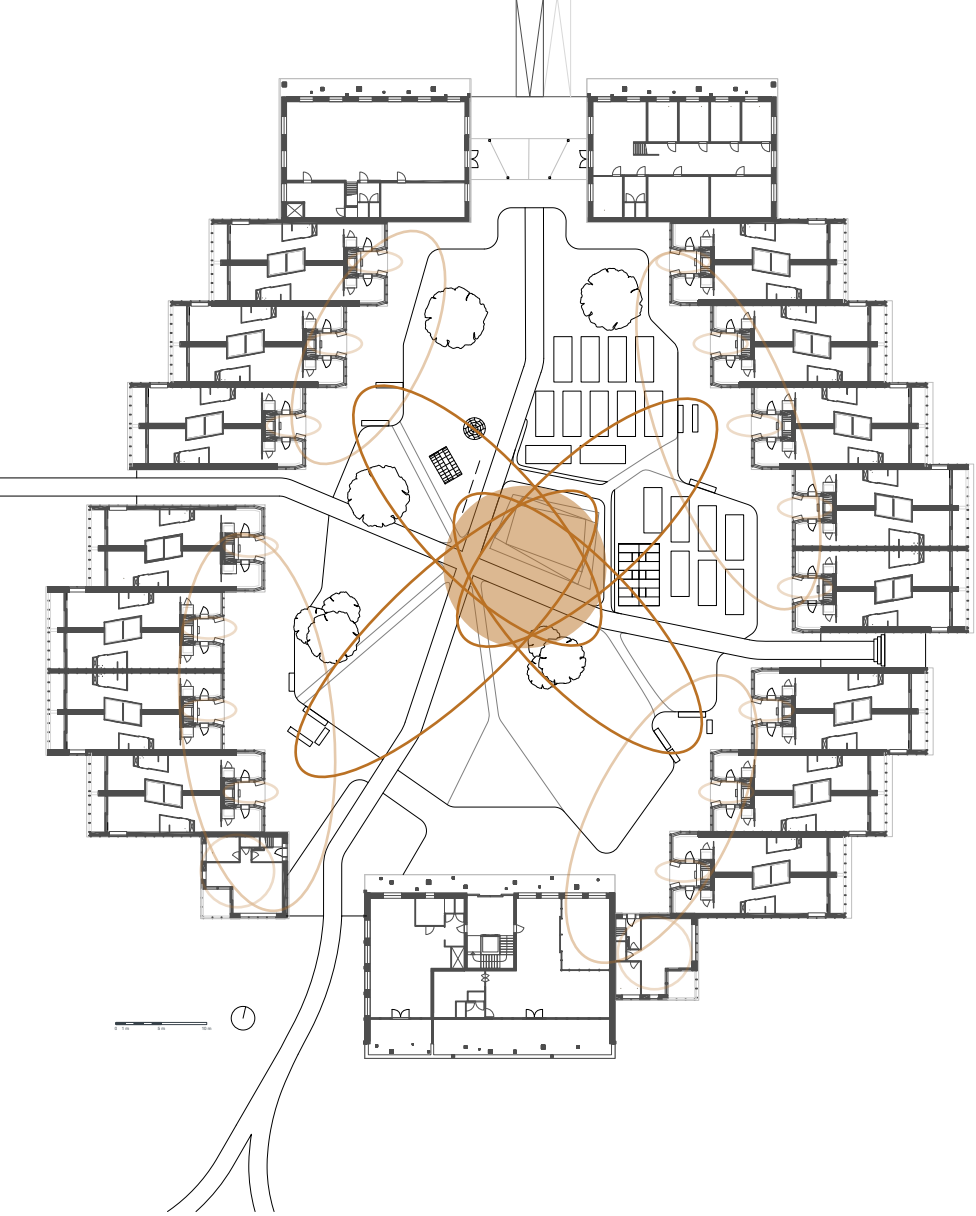
In-Between Spaces

The in-between space, described by Herman Hertzberger as the undefined areas where interaction is possible, as discussed in a previous chapter, has been designed in my project as a place where young and old come together. The younger residents come from the first floor via a staircase that first brings the younger residents together in the middle, where the two front doors of the older residents open onto. The staircase serves as a meeting place. The first phase of interaction starts with the block of four, consisting of the closest neighbors.



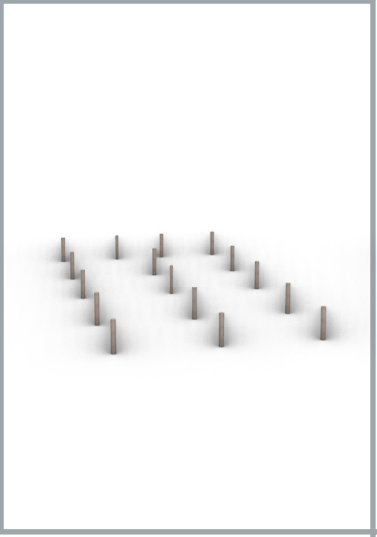
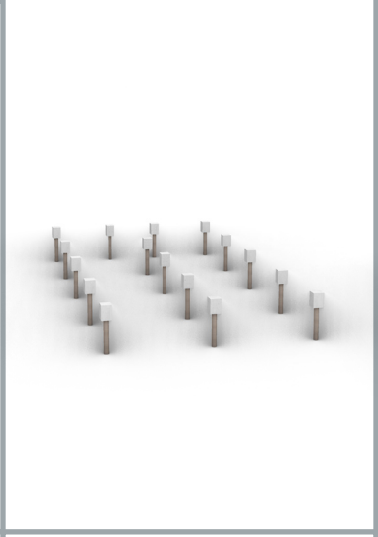
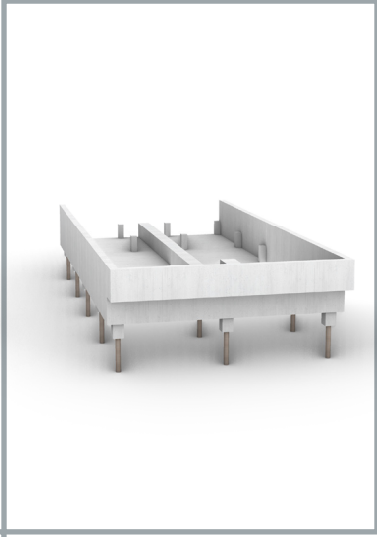
In-Between Spaces

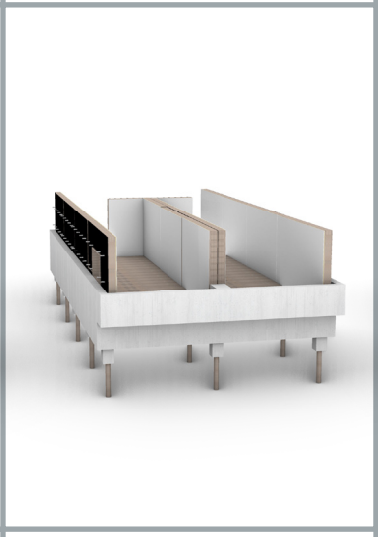
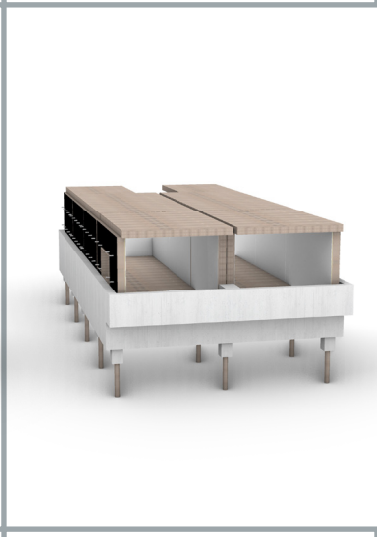
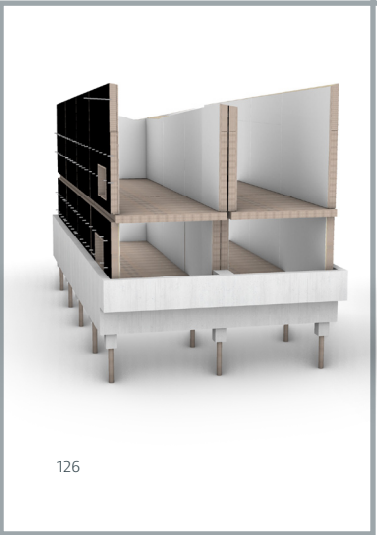
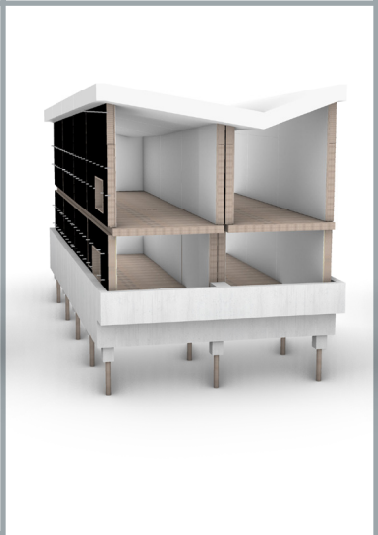
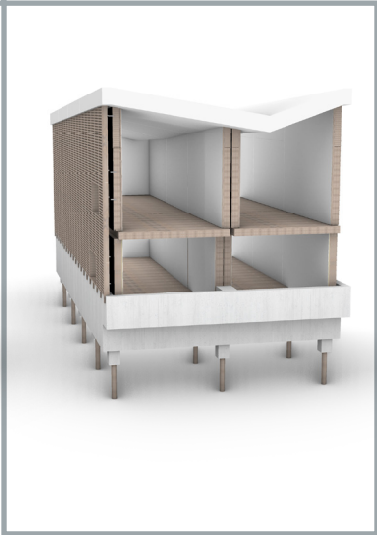
The second phase of interaction expands to include a quarter of the residents, thereby gradually increasing the opportunities for interaction.

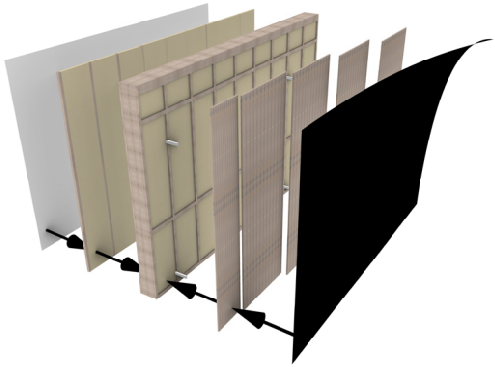


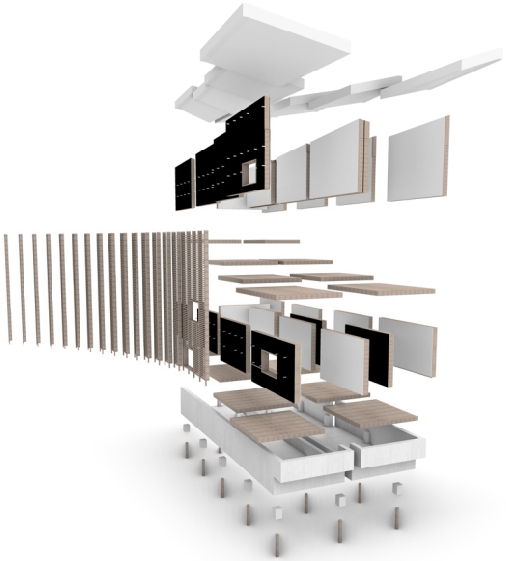
In-Between Spaces

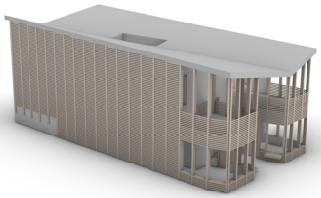
The third and final phase of interaction culminates in the middle of the courtyard garden, where most of the outdoor activities take place. At this lowest point, there is a water buffer, which is a cross between a water square and a wadi, or in other words, a wadi square, and it can serve many functions. It can be used as a theater, playground, or an outdoor meeting place. Surrounding this water square are various features such as a vegetable garden, a greenhouse, and a children's playground.

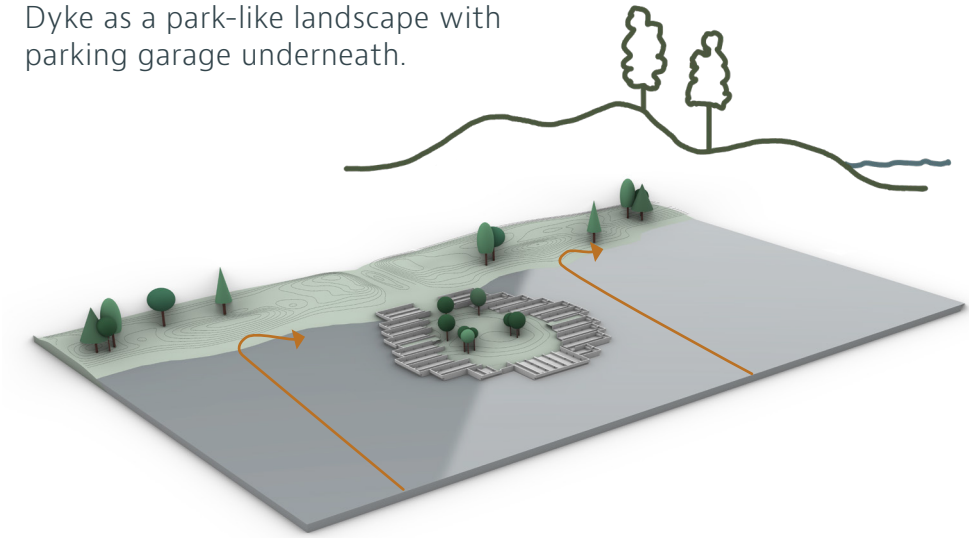


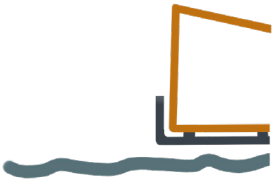


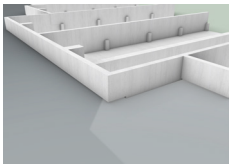


Water defence systems

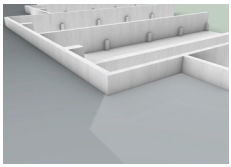
Dyke as a park-like landscape with parking garage underneath.



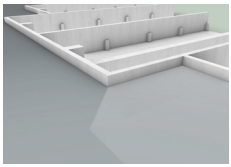




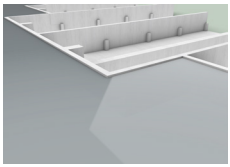
+ O m NAP (normal level)



+ 0.4 m NAP

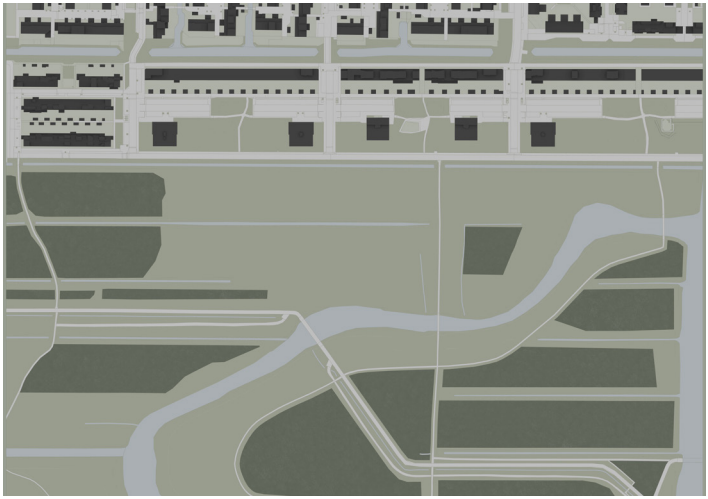


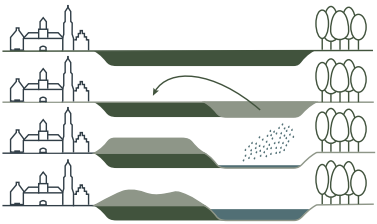
+ 0.8 m NAP



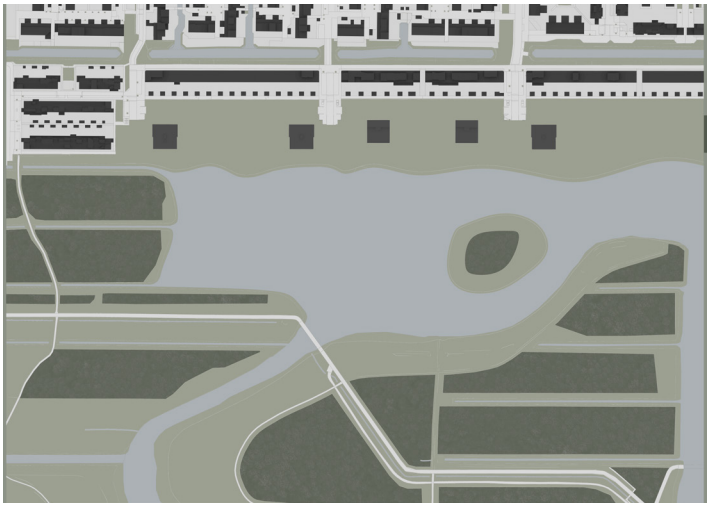
+ 1.2 m NAP (maximum level)

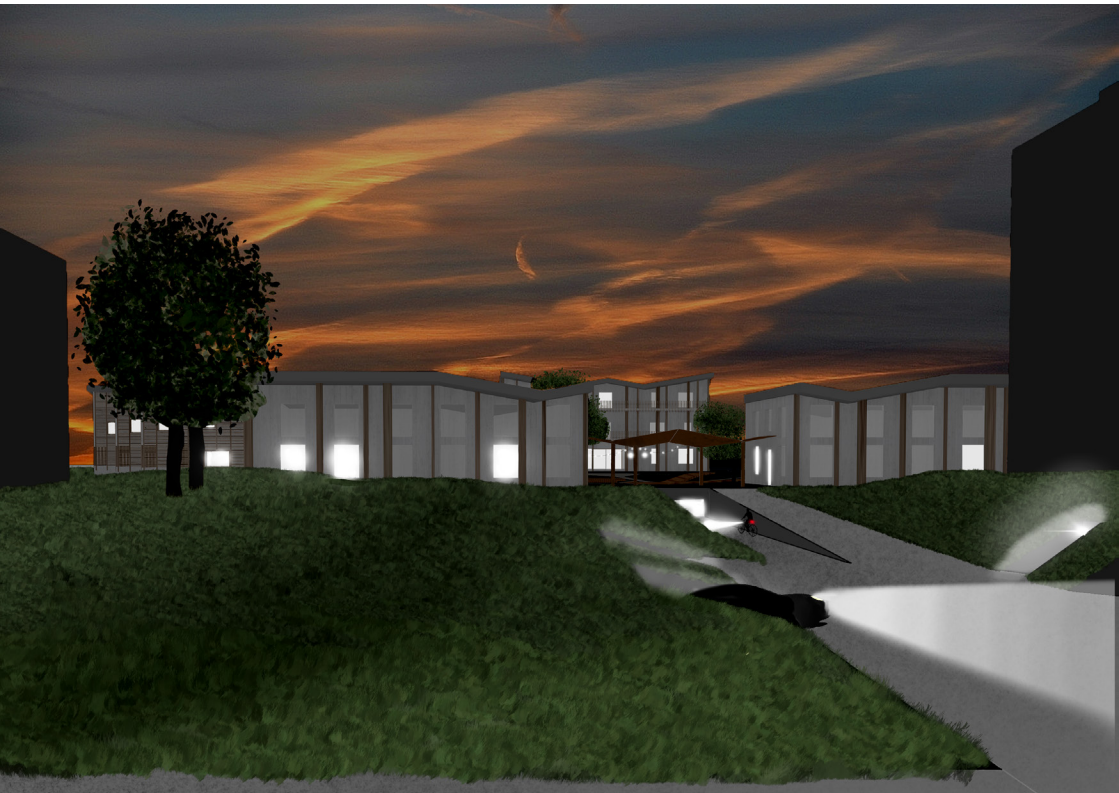
Dyke as a landscape

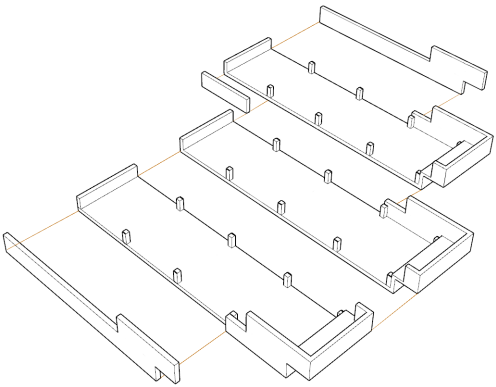




The landscape is constructed using soil from the surrounding area maintaining a closed soil balance to create a small lake. The height difference offers easy access to the bicycle parking in the basement. Cars can be parked behind the existing apartment buildings, leaving a green landscape for the residents to enjoy.





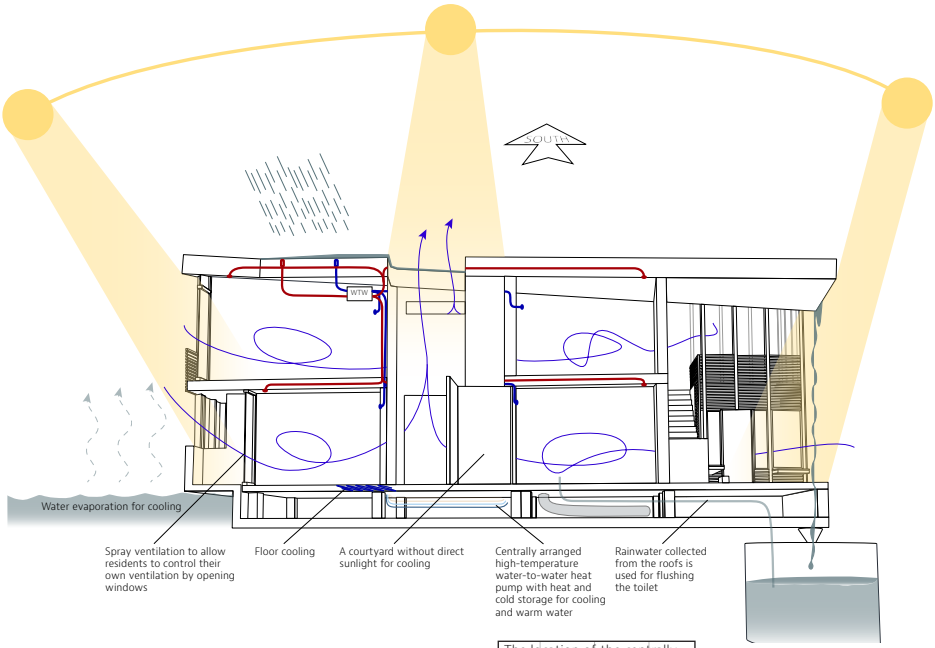


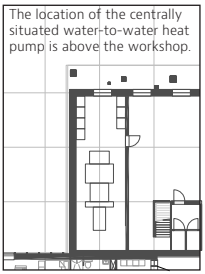
Water defence system

The prefab concrete elements act as foundations and water barriers. The house built on this foundation is not thermally and structurally connected to these concrete elements.

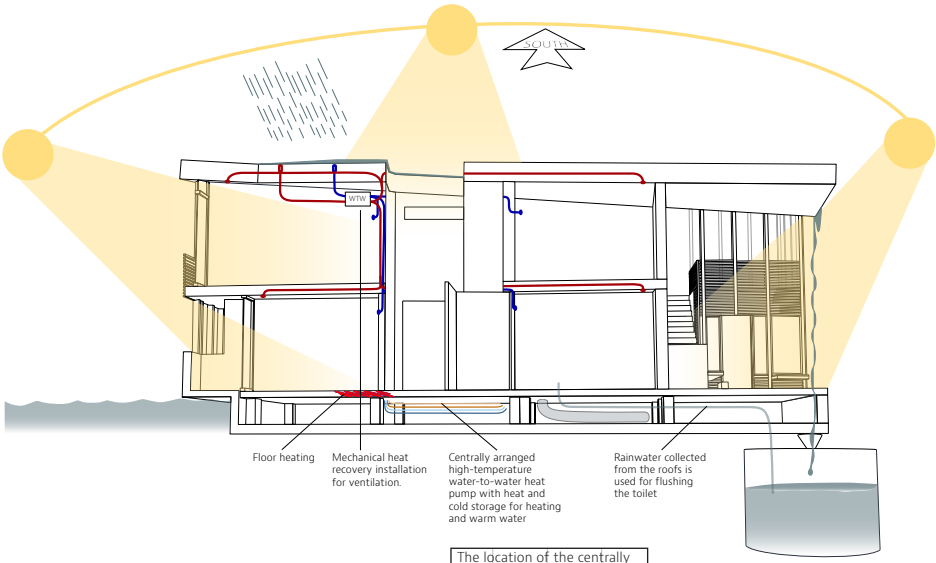
If water seeps through, it does not penetrate the building but instead flows away via the crawl space underneath, towards the inner courtyard that slopes down in the middle.

Climate diagram for Summer

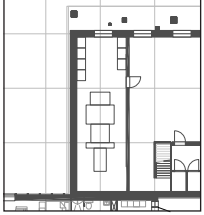




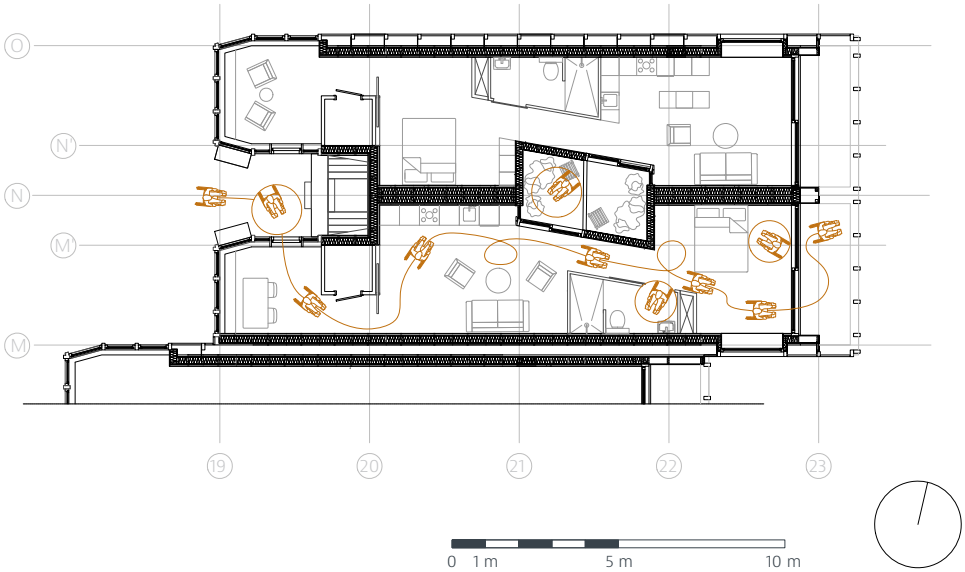
Climate diagram for Winter



The location of the centrally situated water-to-water heat pump is above the workshop.



Floorplan


O
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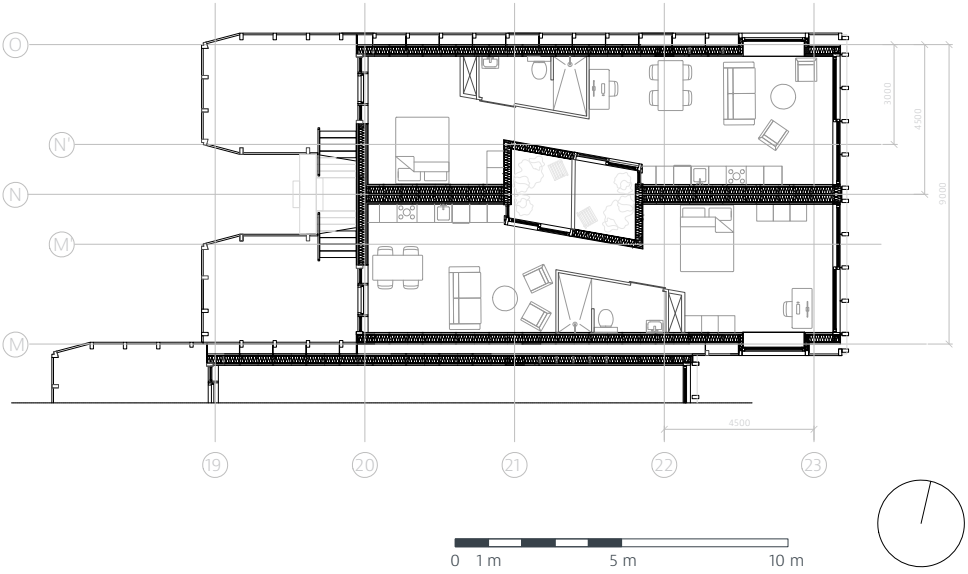
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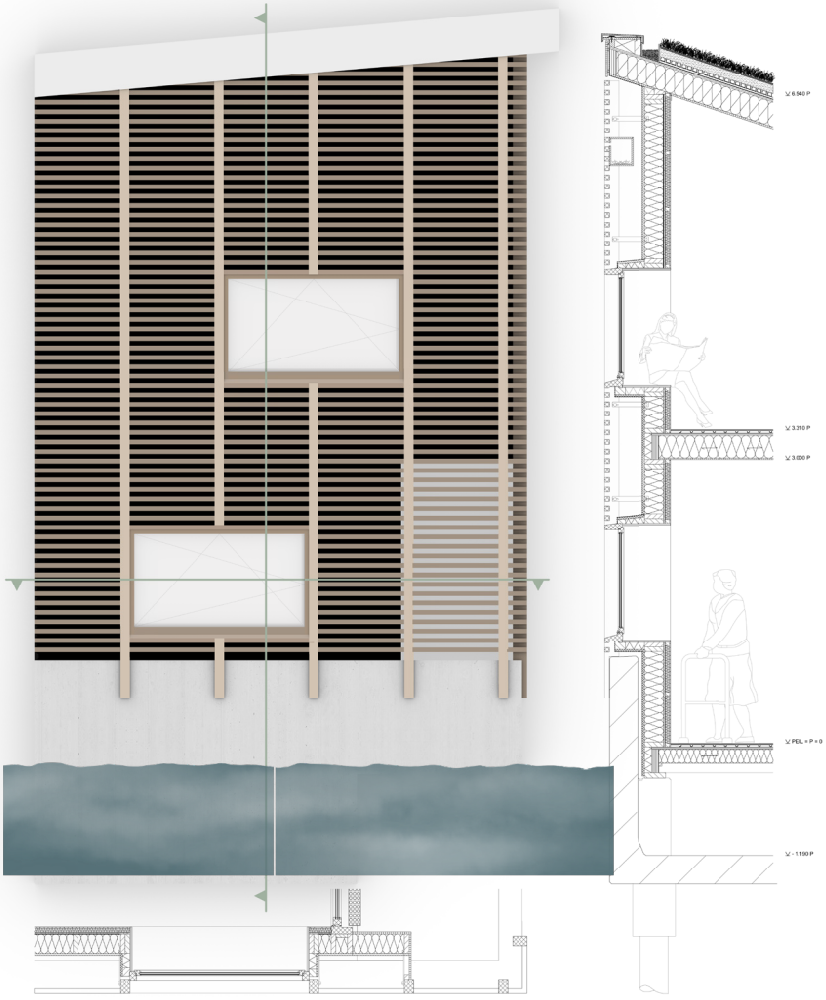
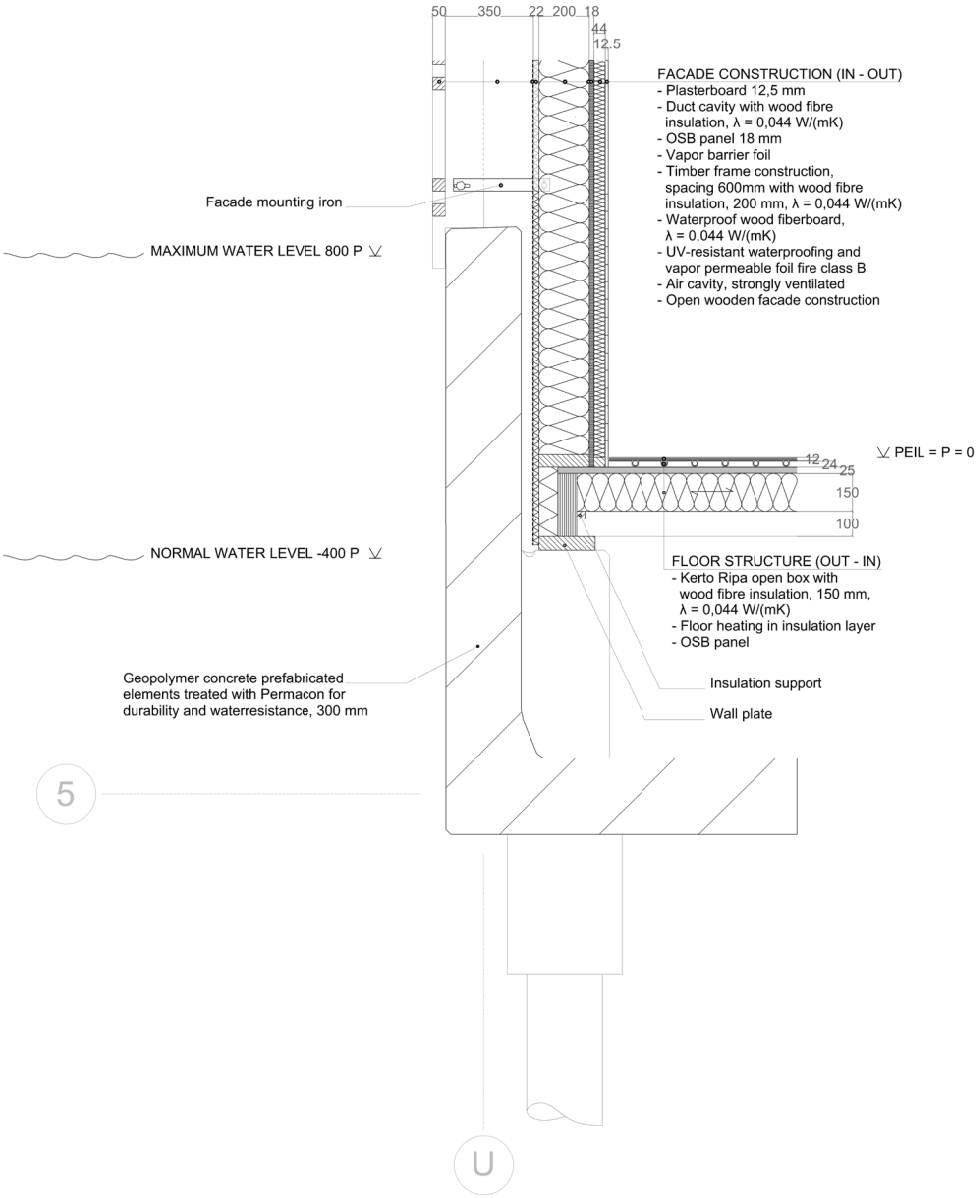
3000
4500
9000
4500
0 1 m 5 m 10 m

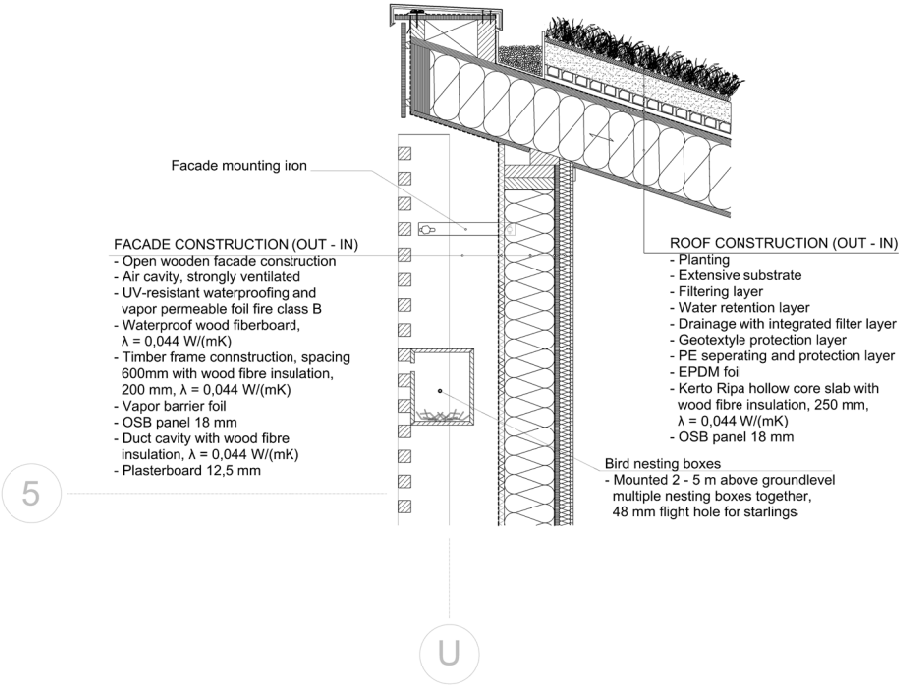
Façade fragment



Details

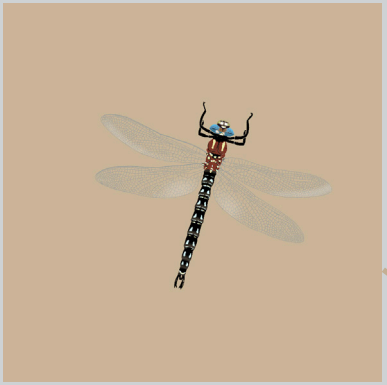


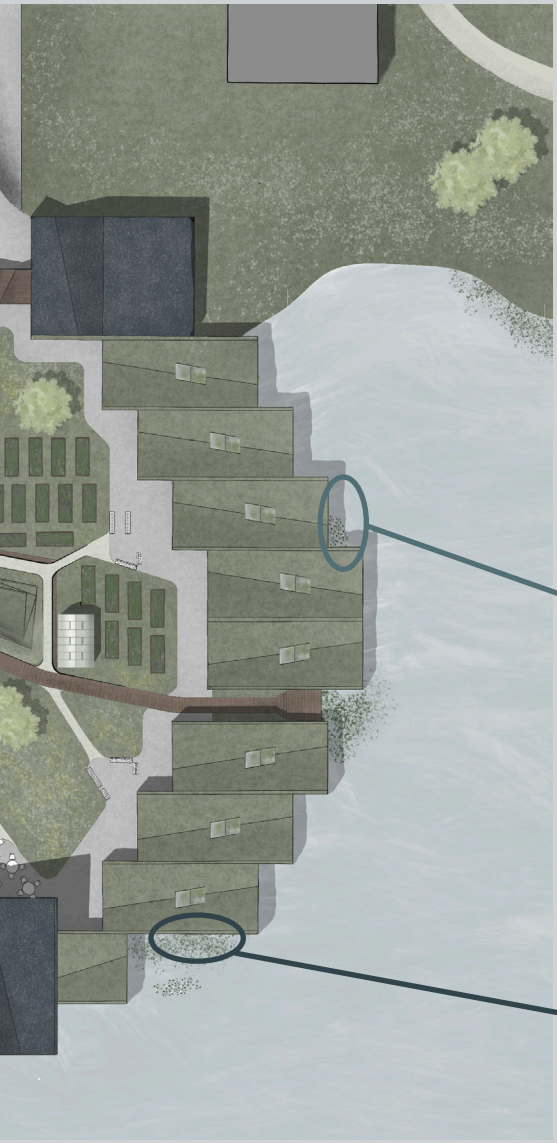
foundation crawl space wall connection

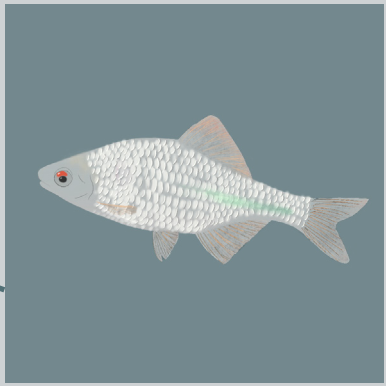


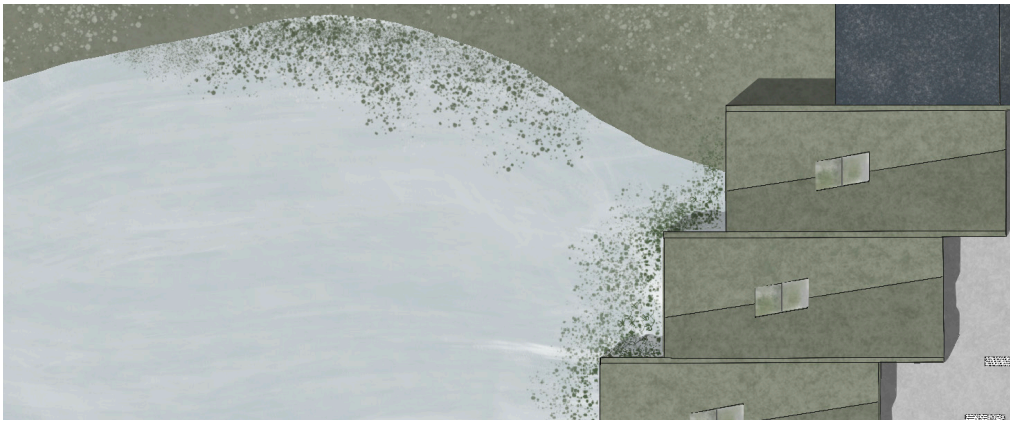
roof wall connection

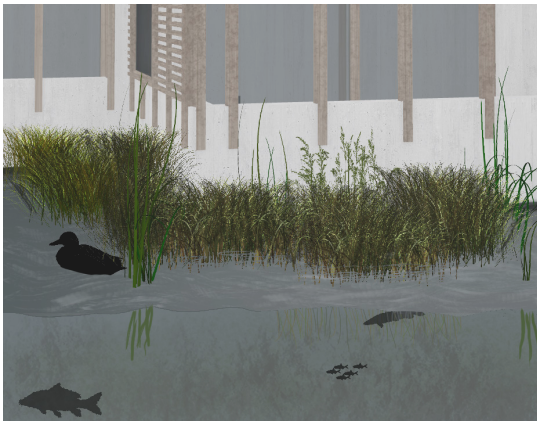
Enhance biodiversity











Hairy Dragonfly

The Hairy Dragonfly is a small species of dragonfly that lives in clean, clear waters with richly vegetated, nature-friendly banks, featuring both above and underwater plants.

Early Bumblebee

The Early Bumblebee lives in meadow areas, light forests, gardens, and parks. The mature colony of the Early Bumblebee consists of around 50 to 200 workers, and its nests are located above ground in compost heaps and bird nests.

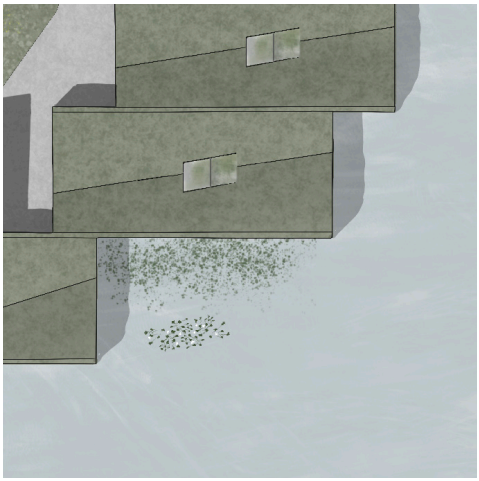
Sparrow

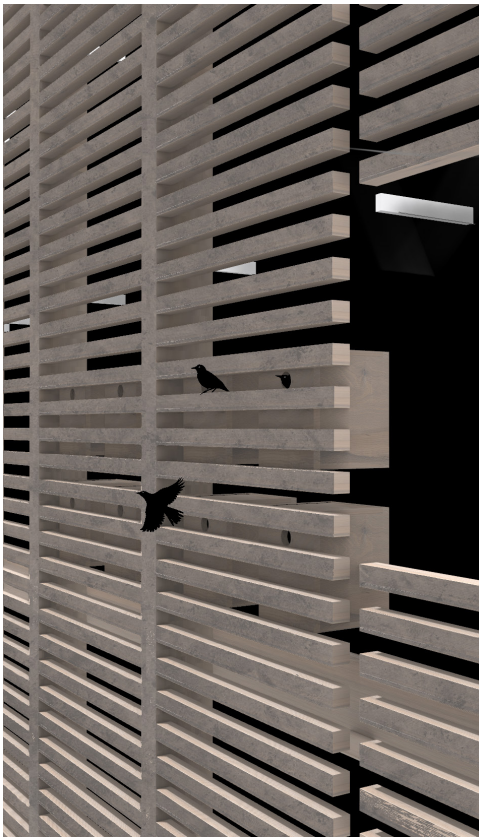
Sparrows are very good at building nests in bushes and hedges. The nest mostly consists of twigs, straw, feathers, and dog hair.

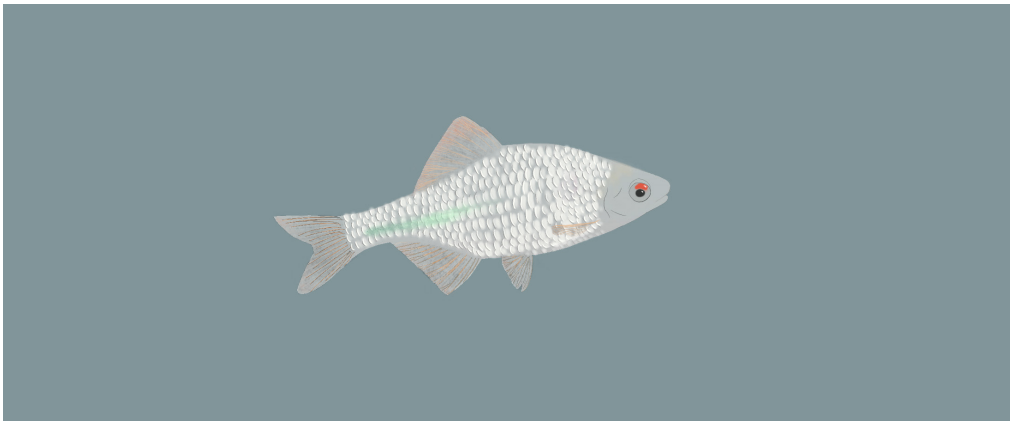
The number of sparrows is declining, so it is good to facilitate as many opportunities as possible for them to make nests.

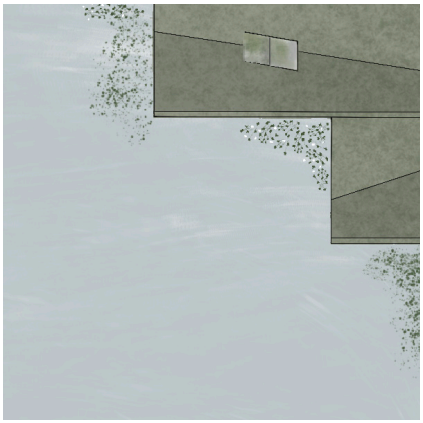
Starling

Starlings live in groups and breed in close proximity to each other. They are still numerous, but their numbers are decreasing rapidly.



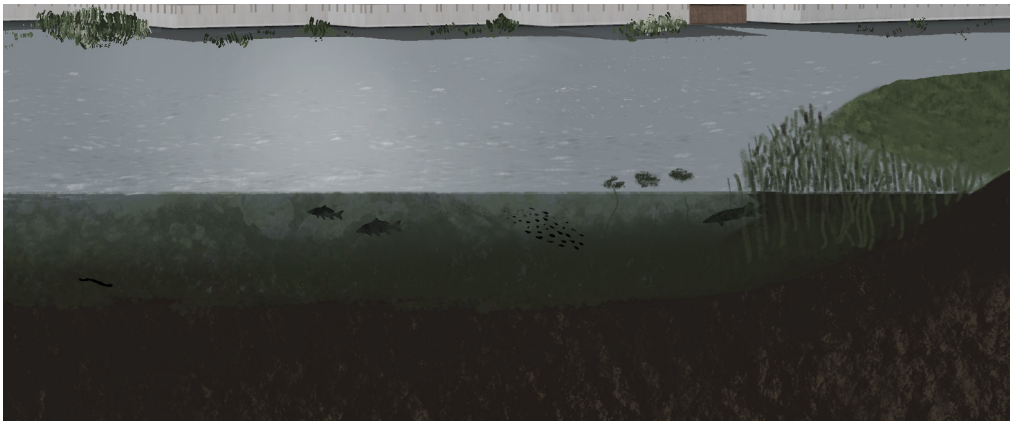






Bitterling

The Bitterling thrives in still or slowly flowing water with well-developed underwater vegetation. They lay their eggs in freshwater mussels.



REFLECTION

In this final part, I reflect on my work during my Advanced Housing Design graduation studio, which is part of the Architecture track of the MSc Architecture, Urbanism & Building Sciences at the TU Delft. Using the following questions, I reflect on my approach to researching and designing my project.

- What is the relation between your graduation project topic, your master track?

- How did your research influence your design/recommendations and how did the design/recommendations influence your research?

- How do you assess the value of your way of working (your approach, your used methods, used methodology)?

- How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

- How do you assess the value of the transferability of your project results?

The relation between my graduation project topic and my master track

The Advanced Housing studio's topic is 'Ecology of Inclusion'. The aim of the studio is that Dutch cities must become more sustainable, sociable, and healthier to live in, with decreasing availability of space. Considering the city as a functioning ecology that does not separate the contemporary challenges of the urban as separate parts, but moves with nature with material flows and diverse habitats. The goal for us as designers is to respond to these challenges with a holistic approach to find new ways of Dutch housing production that allow for more social and sustainable living. My interest in finding solutions related to an aging population, the housing crisis, and the climate crisis very much fits the studio theme.

Housing the ever-aging population concerns me personally. There have already been several examples of aging family members continuing to live independently in homes and an environment that proved unsuitable. My project aims to create an intergenerational community, with mutual benefits for both older and younger people. Both by sharing knowledge and by keeping involved and active. In my research, I focused on ways to connect these generations by promoting interaction. The site is an suburban area where most developments are single-family homes that are not or are less suitable for older people to age-in-place. I am creating a neighborhood that is more social and inclusive for all generations, in a neighborhood where you can continue to live from your birth to your grave.

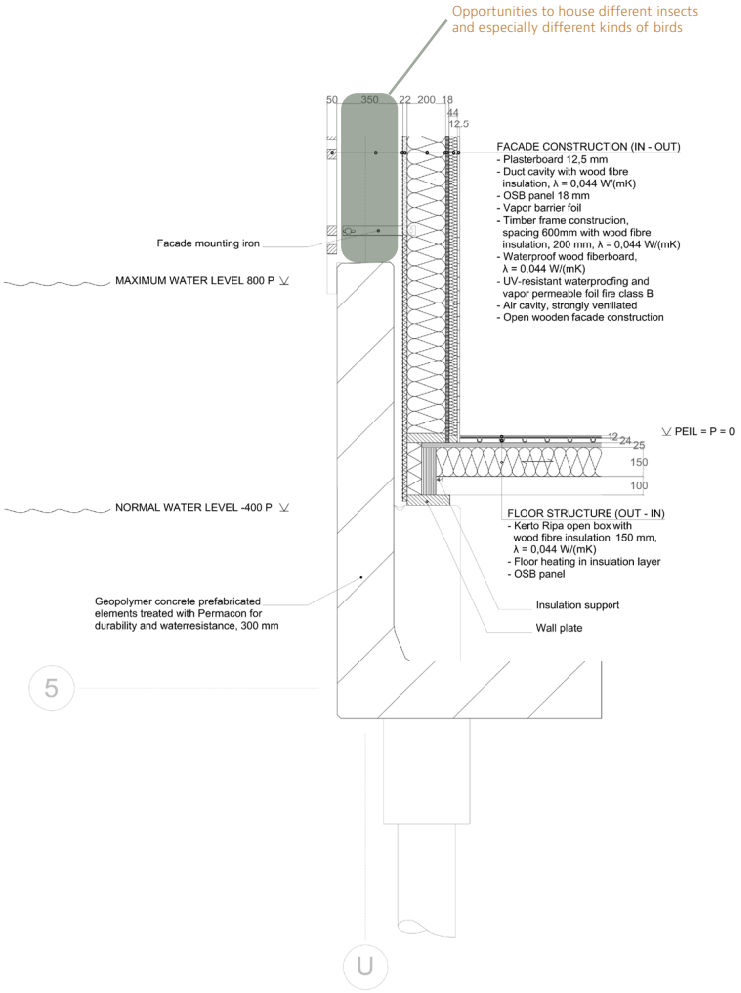
My design for a water-sensitive community that offers a solution against the increasing risks of flooding is in line with ZUS Office's plan. Their design for 'National Productive Park Delfland' is the starting point for the Studio. They plan to make Midden Delfland future-proof. In the eyes of ZUS, this area will function as a buffer for the Rotterdam-The Hague Metropolitan Region against excess rain or flood water. It will become the green lung for this region with new forms of agriculture and nature conservation while maintaining recreational use. They allow small development but want to densify at the edge. This edge must also protect urban regions from rising water.

The mutual influence of my research and design

Researching the desires and recommendations of older people informed my design decisions concerning housing and environments designed specifically for this group, aiming to make them feel comfortable and interested. My literature review on in-between spaces significantly influenced the layout of residents' apartment entrances, the positioning of stairs to the first floor, and the placement of balconies.

Additionally, I drew inspiration from Aldo van Eyck's concepts implemented in the Amsterdam Orphanage, which guided the design and layout of the courtyard.

Exploring the opportunity to utilize the extensive air cavity between the cladding and interior structure prompted further investigation into attracting and housing various bird species and insects within this space.



Assessing the value of my way of working

For my research, I used different research methods to arrive at research findings and conclusions. Each method played a role in finding the right design solutions to each design problem. I dove into literature studies to gain basic knowledge on the topic of aging and the implications of designing for older people, which already gave me many insights.

Further insights came from the case studies I selected. All case studies located in the surrounding countries of the Netherlands were cohousing developments varying in size and number of residents. To find out how these case studies performed on various aspects to measure the level of social interaction. These aspects are the level of privacy, integration of collective spaces, security, circulation, and interstitial spaces. Engaging with a resident from the case study Bijgaardehof in Ghent (Belgium) enriched my

understanding far beyond what comparative analysis alone could offer.

Reflecting on my approach, I recognize the importance of choosing case studies nearby to enable direct observation and interaction with residents, facilitating firsthand observation and interaction with residents. Exploring on-site also proves invaluable. Further depth would be to talk to residents at Tanthof, where my project is situated, to understand their housing needs.

Assessing the academic and societal value, scope and implication of my graduation project, including ethical aspects

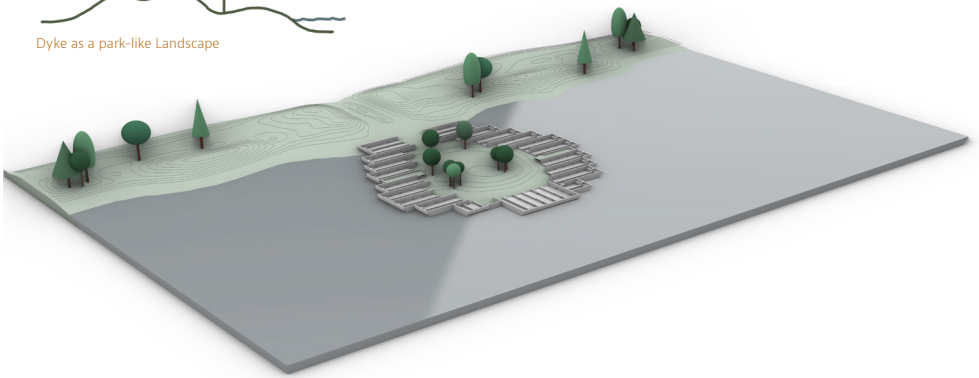
The focus of my design is to create an intergenerational community, where individuals support one another, such as older residents caring for the children of young single-parent families and the younger generation assisting the elderly. With the prospect of an aging population and the related implications of a shrinking workforce, a declining number of nursing homes, and the importance placed on the elderly living independently for as long as possible, this will become a new reality that needs consideration.

Although the project is intended to provide a solution for Tanthof residents, the question is whether it can be arranged so that these

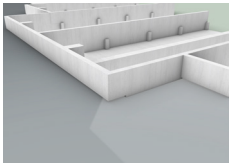
residents are given priority before it is made available to people from outside Tanthof. Or should everyone have an equal right to live there, especially given the current housing crisis?

A new way of building that is more sustainable and protects against water will be of great social value to the Netherlands. With the expectation of increasingly extreme weather conditions due to climate change, such as heavy rainfall and longer periods of drought. But also the need to capture larger amounts of fresh water as a buffer in the wet season and to use in the dry season, my design of a water-sensitive community will be part of creating awareness that we live in a delta.

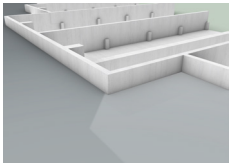
Dyke as a park-like Landscape



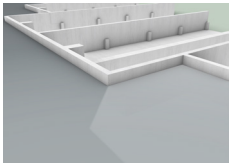
The prefab concrete elements act as foundations and water barriers. The house built on the foundation is not thermally and structurally connected to these concrete elements.



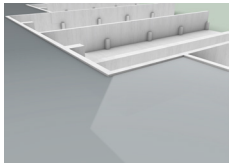
+ O m NAP (normal level)



+ 0.4 m NAP



+ 0.8 m NAP



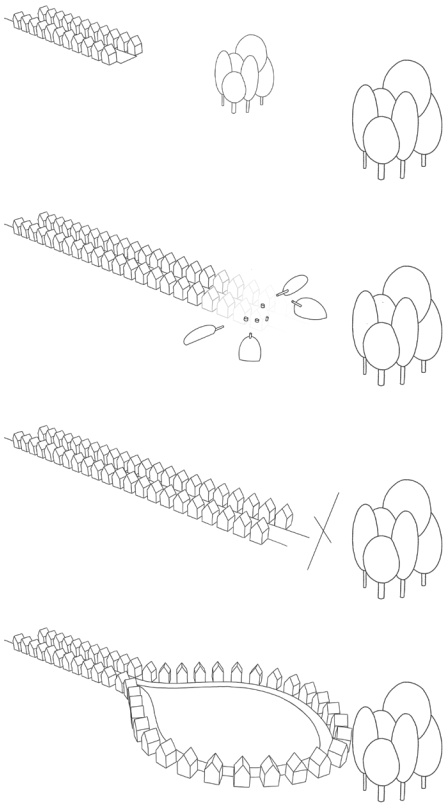
+ 1.2 m NAP (maximum level)

Assessing the value of the transferability of my project results

Open land is under increasing pressure for development to meet the high demand for housing, it is crucial to set boundaries for development. My design of the closed loop at the end of dead-end streets at the edge of the city can mark this end. This can stop urban sprawl and preserve sensitive natural areas. This design can serve as a prototype for other cities.

My concept of an intergenerational community is not new, but it has rarely been applied in the Netherlands. Much more research could be done on transforming existing suburban neighborhoods consisting mainly of single-family homes into inclusive communities, where individuals of all ages find a home. Through my research, it became clear that older people have a strong desire to

remain in the neighborhood they have long called home, where their social ties are deeply rooted. While my proposal is only one of many approaches, it offers a path to fostering such inclusive neighborhoods.



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