graduation project advanced housing design

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This book was created to support the graduation work within the Advanced Housing studio at Delft University of Technology. It consists of two interconnected parts: the initial research, titled "A Happy House: Adapting to Changing Family Compositions and Lifestyles", and the subsequent design project "GAIA", set in a productive post-war neighborhood Westwijk.

I want to thank Victor Loop and Amrita Sen for their contribution to our group work at the beginning of the year. I'd also like to thank our instructors, including Robbert Guis, Alejandro Campos Uribe, and Stephan Verkuijlen. They have provided valuable guidance throughout this academic year.

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A HAPPY HOUSE

Adapting to Changing Family Compositions and Lifestyles.

Abstract
In the past, homes built in large quantities were based on traditional household compositions, primarily designed for conventional families. This is evident in the model home by Robberts (Giudici, 2018). Due to a focus on typologies and the mass production of such homes, architects often still design residences intended for traditional family lifestyles. However, the NOS (2023) indicates that the housing crisis is not solely caused by a shortage of homes but also by a lack of suitable housing. Therefore, the research question to be addressed is: "What types of house typologies are suitable for accommodating the needs and preferences of various lifestyles?"

By examining the floor plans of Robberts and Hartsuyker-Curjel, it becomes clear that a floor plan can significantly influence people's lifestyles. This analysis focuses on the deeper needs of individuals who live together or alone and their perceptions of their living spaces, rather than on superficial desires. Key aspects that frequently emerge include the experiences of intimacy and privacy, which vary according to different household compositions. The research is primarily supported by "A Pattern Language: Towns, Buildings, Construction" (Alexander et al., 1997) and "The Social Logic of Space" (Hanson & Hillier, 1989).

In addition to a literature review, the application of these theories was examined within contemporary households in the Netherlands. Three types of households were chosen for this study: a couple (empty nesters), a living-apart-together (LAT) relationship, and a single-person household. These groups do not (or no longer) fit within the traditional family composition, often resulting in a mismatch between residents and their homes. Based on interviews, relational diagrams were created, with the literature supporting these diagrams. The interviews provide insights that lead to a better understanding of the needs of these demographics outside of traditional families and result in better-suited housing designs.

Finally, these findings were applied in the design process, ensuring that the resulting housing is more adaptable to various lifestyle types.

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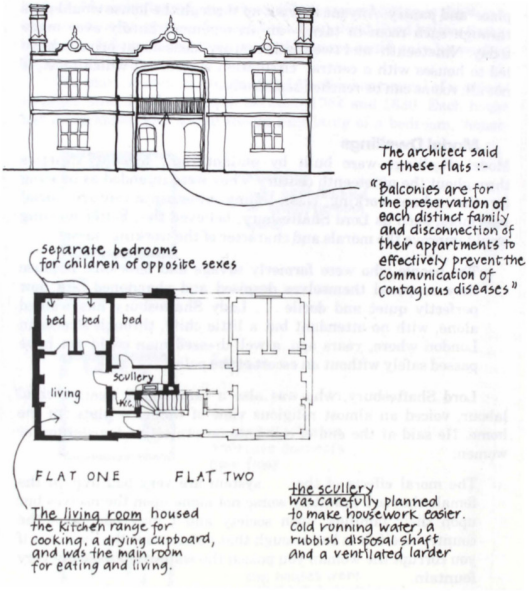
1. Problem statement

Today, we persist in constructing homes that refer back to housing models of the 18th century. For instance, consider the house designed by Henry Roberts in 1851, referred to as a "Model house for families" (Giudici, 2018). While not immediately evident, it's spatial organization is rooted in a social construct in which men and women have children assigned to separate rooms by gender, with women primarily responsible for domestic work. Designers frequently draw upon familiar typologies, perpetuating their use due to their prevalence. However, these conventional designs generally cater to only a small segment of the population, and even for them, the period during which children actually live in such arrangements is brief.



"Model house for families". Roberts (1851)

In the realm of housing, there is a prevailing tendency to replicate the same architectural typology. In the context of feminist architecture, the argument is made that any space constructed by human hands can never be entirely neutral. It inevitably mirrors the normative societal constructs of gender, class, and race, thus reinforcing these constructs in the process (Weisman, 2000). Numerous studies have shown that the majority of homes, particularly those in suburban areas, have become intrinsically tied to the architectural embodiment of heteronormativity (Ripley, 2017). People no longer seek homes that impose conformity; instead, they desire residences that adapt to their unique needs.

This issue is underscored in an NOS article from 2023, which highlights that the housing crisis in the Netherlands has been driven not only by a shortage of homes and high prices, but also by a misalignment of homes with the life stages and associated needs of those seeking them.

From the initial exploration of the literature, it is observed that numerous studies delve deeply into the widespread normative assumptions in housing designs. Furthermore, certain architects have ventured into this discussion with innovative floor plans, such as Luzia Hartsuyker-Curjel, Sophie Delhay, Kenwood, and others. Nevertheless, there remains a conspicuous gap in research concerning "alternative" family compositions, which also grapple with the same issues. This thesis aims to highlight these challenges and offers a design solution that can benefit not only the specific target audience but also a broader public. A change is needed in the prevailing social norms that still dominate housing typology!

This research takes a look at the mismatch between current housing and contemporary social composition. **The research question sought to answer is, "What types of house typologies are suitable for accommodating the needs and preferences of various lifestyles?"**

2. Research method

The research uses a variety of methods, including case study analysis, literature review and conducting semi-structured interviews.

Initially, two floor plans are shown to demonstrate that floor plans influence lifestyles and how architects deal with this. For this purpose, the floor plan of Roberts and that of Luzia Hartsuyker-Curjel have been used.

The study will commence with a literature review addressing several questions. The primary question, along with sub-questions, aimed to be answered are: What are the contemporary individual's requirements within the context of housing? The goal of this inquiry is to delineate the essential requisites for individuals living independently. This includes aspects such as privacy, autonomy, and comfort. Furthermore, it's crucial to explore the connection between these needs and the physical environment they inhabit. The second sub-question to be addressed is: What does a contemporary family/community look like? Both questions are closely interconnected, as the individual cannot be considered in isolation from their context, which in this case are the family/community.

After gathering theoretical insights, the focus shifts to observing individuals in their surroundings. This approach allows for an examination of how people interact with their environment, a discussion of their needs, and an exploration of the relationships they cultivate within their space. To observe and engage with target groups, three types are selected, which are living in the Netherlands and around the same age. The empty nesters: Terraced houses were once designed for this target group when they still had children; however, having live-in children is only a small part of these people's lives. The singles: A large proportion of Dutch households are single-person households (CBS, 2023). The LAT relationship: This group consists of two people who are in a relationship but do not live in the same house.

Semi-structured interviews and observations will take place, involving one person from each selected family composition. The interview consists of a kind of game where residents give their perception of their own home, designate spaces for interaction, lay out spaces and indicate what they want to share. This is done to ultimately create a bottom-up design where the home becomes more efficient and better suited to the needs of the residents. The homes become an integral part of a larger design.

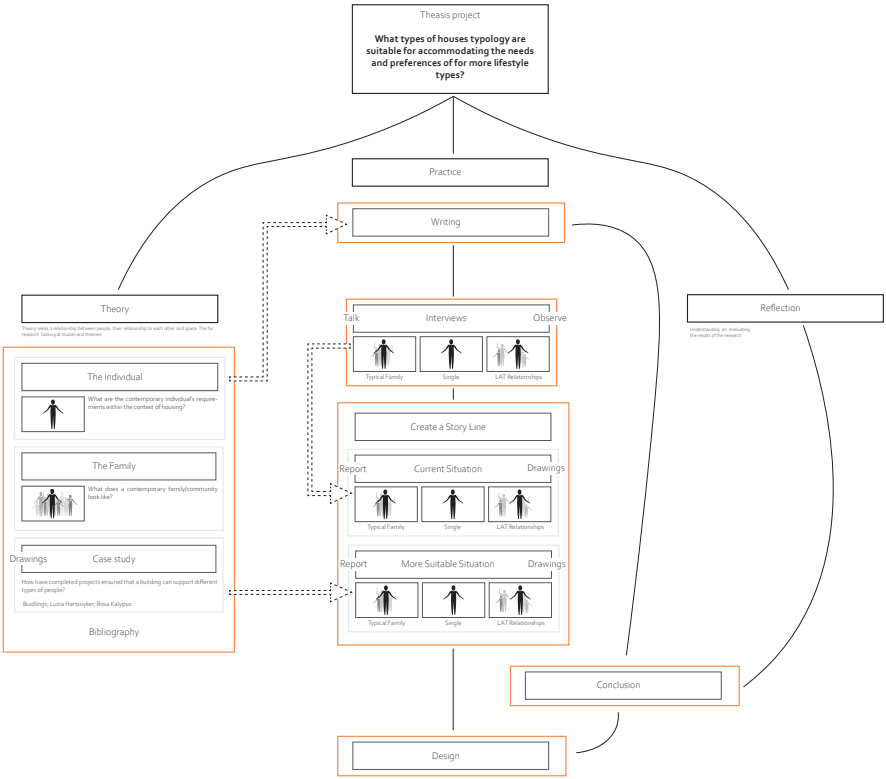


Diagram of the research method. (Own work)

3. Theoretical framework

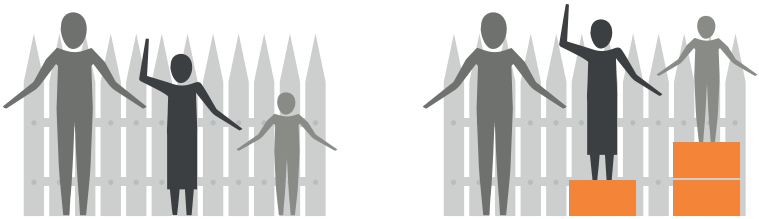
In the pursuit of reshaping living environments, this research navigates through the intricate dynamics of equality, equity, individuality, family, and the ever-evolving concept of social permanence.

3.1 Equality vs equity

Within this research, the positioning regarding the terms *equality* and *equity* is of paramount importance. As per Espinoza (2007), *equality* can be conceptualized as the sameness of treatment, asserting the fundamental equality of all individuals, while 'equity' can be conceptualized as fairness, taking into account individual or group circumstances.

In the context of the built environment, social equality involves investments aimed at creating positive effects in communities that have suffered due to systemic biases, discriminatory policies, or a lack of consideration for diverse user needs within a community, often favoring a *one-size-fits-all* approach (BPD, n.d.).

Turning to post-war neighborhoods (as in the case of the graduation project), they were designed from a modernist ideological perspective. Modernists strive to promote *equality* in society (Nio, 2012). The pursued interest is often collective, sometimes at the expense of individual interests.



Visualizing the difference between equality and equity. (Own work)

Individuals who deviate from heteronormative norms do not find their place within this collective vision, and the homes designed in the suburbs do not accommodate them either. As Ripley (2017) observes, suburban areas did not provide inclusive housing options for queers. To address these issues of inequality, this proposal and the subsequent research approach the topic from an individual standpoint, emphasizing *equity*.

3.2 The individual

The interior space serves as a tangible expression of people's perceptions, experiences, and emotions (McCarter, 2016). It mirrors how individuals utilize, inhabit, modify, and conform to space, enabling them to reside, live, move, and engage in the rituals of their daily lives. This underscores the notion that the essence of a building lies not merely in its four walls and roof but in the lived-in space within.

In many instances, homes are constructed with the expectation that individuals will conform to the predetermined setting, the dwelling dictates, and lifestyle adjusts accordingly (top-down approach). However, this method may lack user-friendliness, rendering the home unsuitable for the rituals the occupant wishes to embrace. The research is therefore conducted from a bottom-up approach, determining the desires first and then adapting the home accordingly.

3.3 The family

The definitions of family and community are open to debate (Family and Community, 2019). Over time and across cultures, what constitutes a family has varied.

Families have been traditionally seen as adaptive systems responsible for tasks like reproduction, socialization, and the well-being of members, as well as maintaining social control and transmitting culture (Family and Community, 2019). Both family and community are dynamic, subject to negotiation within changing social structures.

Similarly, the concept of community resists a narrow definition (Crow & Allan, 1994). Communities are groups of people who, though not necessarily related, share common elements that foster shared interests, identity, and solidarity.

Family and community, as dynamic social structures, share commonalities in their tasks, such as caregiving and social interaction. This implies an overlap between the two concepts. Creating a sense of community can be highly beneficial, promoting collaboration among individuals (Jarvis, 2014).

3.4 Social permanence

Social permanence is crucial for the final design. The problem statement underscores that contemporary needs differ from those in the past. In this context, the notion can be categorized into two aspects: relative permanence (long-lasting) and absolute permanence (forever) (Soylu, 2019).Absolute permanence is against nature, everything decays, everything dies. Relative permanence on the other hand is changeable depending on the culture, needs, practices of the user, and the characteristic of the era.

The redesign (as outlined in the methodology section) is designed with the near future in mind, acknowledging that it may change or deteriorate over one or two generations, focusing on responsible use of materials and future societal changes.

3.5 A home

The essence of *home* transcends mere physical structures. It's a complex psychological and social phenomenon deeply rooted in the human experience of dwelling (Zaborowski, 2005). Unlike animals, humans don't just inhabit spaces; they create *homes*. The concept of home extends beyond a place; it embodies socio-spatial entities, emotions, security, and identity. It's a warehouse of emotions, a place of routinization, and a significant nucleus for the living self (Giddens, 1991).

Creating a home isn't solely a top-down product of institutional systems or social structures (Handel, 2019). It's an ongoing process woven into everyday practices, influenced by ethnicity, gender, class, and other facets of identity. Homes are places of relationships, experiences, and contested options, interweaving privacy, intimacy, and sanctity. They evolve through routine practices, imbuing spaces with a sense of *feeling at home*.

Moreover, our bodies play a significant role in shaping our sense of home. They serve as the basic constituents of human life, influencing interactions and identity-making (Blumen et al., 2013). Feminists have debated the significance of biology in constructing gender roles, while post-modern scholars focus on the cultural meaning of the body, interpreting it as a representation of power relations.

Ultimately, the concept of home isn't static; it's a dynamic, ongoing process of making a place for oneself in both physical and psychological spaces. It's about shaping identities, fostering connections, and embracing the continuous act of dwelling in the world.

3.6 A Pattern Language

The book *A Pattern Language* is widely used within this research and is the second part of a series that introduces a new approach to architecture and planning (Alexander et al., 1997).

The first book (*The Timeless Way of Building*) forms a comprehensive whole along with the aforementioned book. *A Pattern Language* provides detailed patterns that people can use to design neighborhoods, houses, gardens, rooms, and communities (Alexander et al., 1997). These patterns are derived from observing places around the world that were built by people, not architects, and thus reflect intrinsic human nature over centuries. The book serves as a practical guide to enhance architecture, offering solutions to common design problems in the built environment. Each pattern addresses a frequent issue and proposes a versatile solution, illustrated with examples, ensuring that no two design solutions are ever the same.

3.7 Space syntax

Space syntax is a spatial analysis tool that calculates and quantifies spatial relationships in built environments at all scales (Van Nes & Yamu, 2021). In towns, cities, and villages, space syntax measures the degree of spatial integration of a street in relation to all other streets within a system. Inside buildings, it evaluates the spatial integration of rooms relative to one another. Developed and refined since the 1970's, the method was pioneered by Professor Bill Hillier from the University College of London.

This research often references the book *The Social Logic of Space*, which introduces a groundbreaking theory of space, explaining how and why it's a crucial component of societal function (Hanson & Hillier, 1989). This theory is based on a novel approach to describing and analyzing the spatial patterns created by buildings and urban environments.

4. Case study

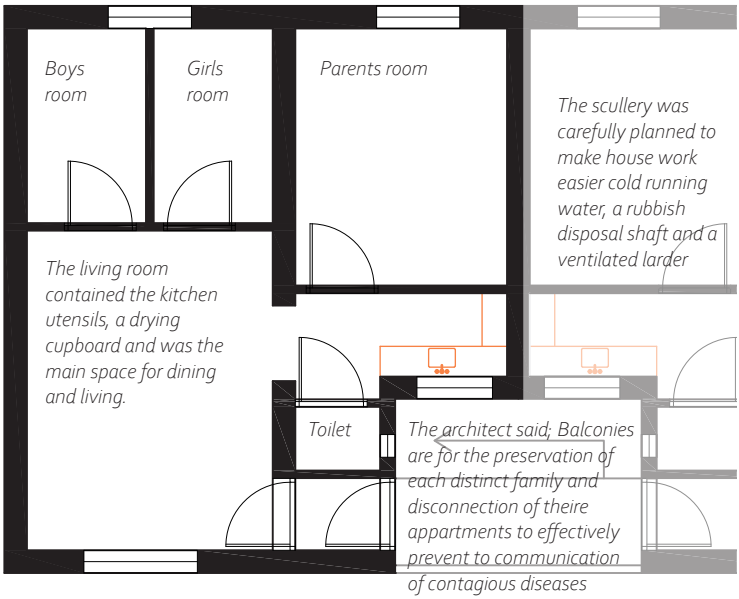
Model Dwelling, Henry Roberts

The house seen on the right was designed in 1850 by Henry Roberts. It was intended to be replicable (Boys, et al., 1984).

Within the house, the aim of the "Model Houses" was to create hierarchies, orchestrate asymmetries, and ultimately enforce very specific behaviors (Giudici, 2018). The flat is dominated by a living room that provides access to two small bedrooms and a utility room. From the utility room, one can access a water closet and a larger bedroom. The plan clearly describes the type of family life for which it was designed: father and mother sleep in the large bedroom, from where the mother has easy access to the utility room and also visual oversight of the living room. The children are to be separated by gender: one room for boys, one for girls. The family would share nothing with the neighbors except a space for washing and drying larger items, allowing it to function as a truly 'nuclear' household.

Most model homes also had rules and regulations to govern "decent" behavior, attempting to prevent non-family members from staying overnight and ensuring that paid work, such as laundry, was not performed inside the home (Boys, et al., 1984). This latter rule prevented women from engaging in their traditional professions. In their design and management, model homes proved to be precursors to modern social housing. For instance, it was only since the 1980s that council tenants have had the right to have overnight guests in their own homes.

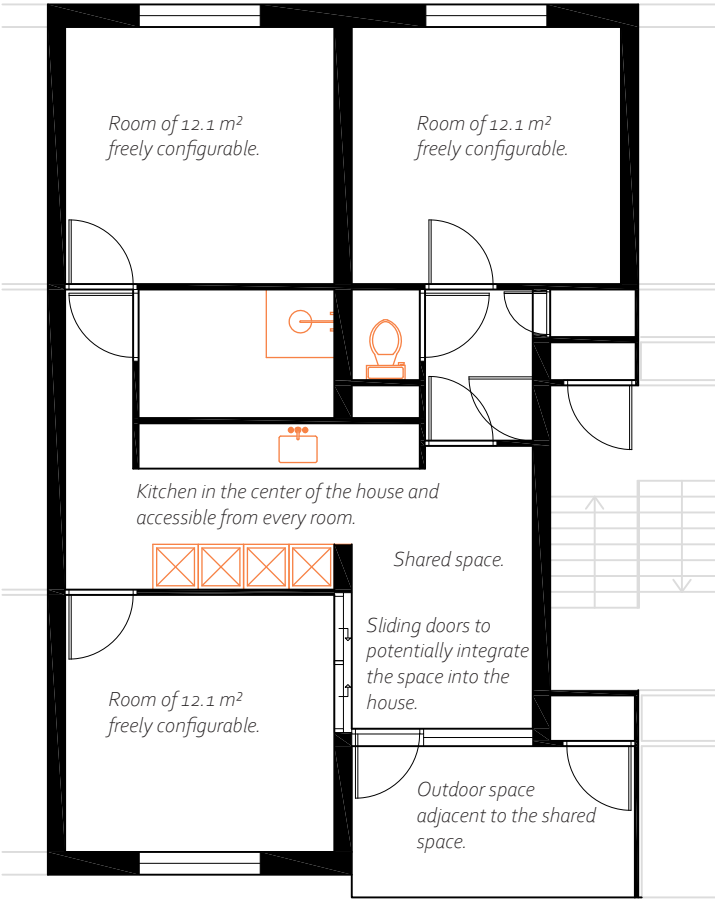
Separate bedrooms for childeren of opposite sex



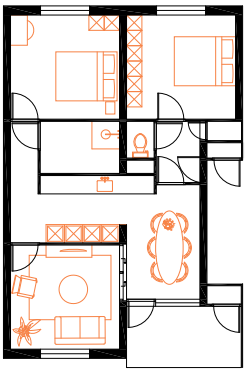
1.100 'Model house for families.' Roberts (1851)

Non-hierarchical house, Luzia Hartsuyker-Curjel

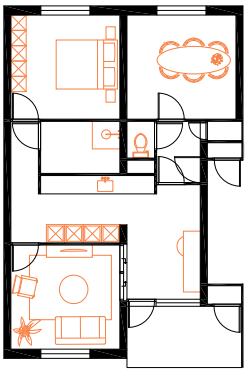
The proposal of a non-hierarchical house was inspired by feminist criticism on the nuclear family and the absence of "a room of one's own" for housewives (Tummers-Mueller & Novas, 2021). The clever spatial arrangement enables multiple uses while fitting into the constrained housing standards set for subsidized social housing. Here are several options for how the house can be arranged and which target group each layout suits.



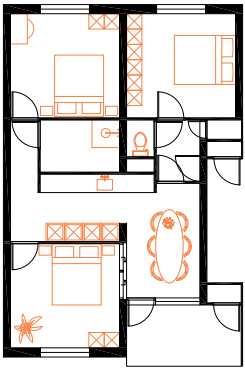
1.100 Floorplan of the "non-hierarchical housing unit" (Luzia Hartsuyker-Curjel)



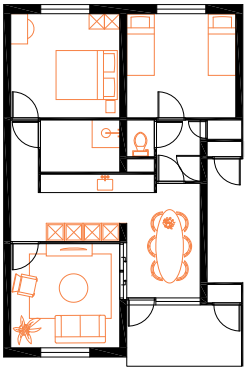
This house is designed for two adults who do not have an intimate relationship. One of the rooms is designated as a sitting room. (Own work)



This house is designed for a single person or a couple with an intimate relationship. One room is designated as a sitting room and another as a dining room. (Own work)



This house is designed for three people who do not have an intimate relationship. There are three bedrooms of the same size. (Own work)



This house is designed for a small family. There are two bedrooms and space for a sitting room. (Own work)

5. The home in theory

In this chapter, the theories primarily outlined in the books *Pattern Language* (Alexander, 1977) and *The Social Logic of Space* (Hanson & Hillier, 1989) are expounded upon. These theories have been utilized to investigate various household dynamics. The interviews serve as a tool to assess the applicability of these theories to a specific demographic in today's Dutch society, these are only discussed in the next chapter.

This chapter will be divided into three distinct sections. It will commence with an exploration of the dynamics of relationships within families, couples, and single-person households. Additionally, the book will elucidate various methodologies for crafting specific spatial experiences and comprehending the relationships within a household. Subsequently, it will delve into the perception of space, examining how space is subjectively experienced. Finally, it will explore the experience of private and public domains.

Perception of space 4.2.1

But how does a house truly become a home? It's not merely about tangible elements like photos on the fridge or a designated parking spot, but rather, the living space transforms into a home by embodying an envisioned idealization of concepts such as safety, freedom, intimacy, privacy, social interaction, and identity (Giddens, 1991) (Blumen et al., 2013). In the realm of spatial sociology (Hillier and Hanson, 1984), there's an exploration of the influence people exert over their surroundings, enabling individuals to choose whether to engage with specific systems. The home, instead of being confined to a fixed functional description, emerges as a realm of relationships and experiences, encompassing numerous, often debated possibilities — a meaningful core for one's living essence (Blunt & Dowling; Massey, 1994; Valentine, 2001; Fenster, 2013).

Identity: people have a need to personalise their homes.

Safety: People seek a safe place.

Privacy: People have the need to live in their own bubble.

Freedom: People have a place where they can make their own choices.

Tasks and care: People need space to carry out their caregiving tasks.

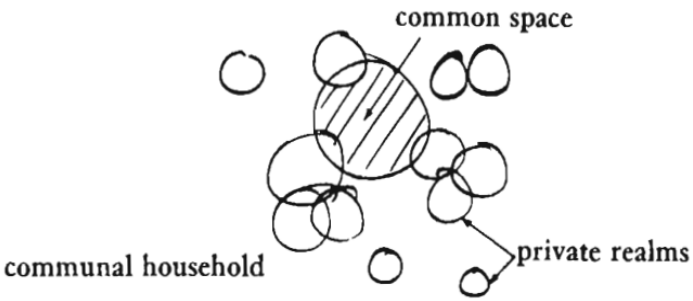
Intimacy: People need a place where they can be intimate with each other, and all of it in the form of care.

(Game for the research) The study of various target groups is approached through the lens of behavioral principles. By attributing value to spaces based on the specific values individuals associate with those spaces, the purpose of each space can be discerned. This method enables the determination of space value through these considerations.

Apart from the emotional connection we foster with a house, it also serves as a space for fulfilling caregiving duties. What distinguishes a home (private) from a public space is the ability to carry out tasks that might not be permissible or socially acceptable elsewhere (Mouton, 2020). Consider activities like intimate moments (in the bedroom), cooking (kitchen), and personal hygiene (bathroom). This underscores that, beyond the sense of returning home, the house functions as an immobile toolkit.

Furthermore, there are numerous tasks for which we presently allocate separate spaces — spaces that could be shared more efficiently, either optimizing space or collectively addressing the demands of these tasks. The degree of intimacy, privacy, and social interaction sought varies for each task; for instance, a dedicated space for intimate moments. When looking at spaces and their perception (see previous section), it becomes clear that the more intimate and private the space is perceived to be, the more people prefer not to share the space.

The interviews conducted reveal whether people are willing to share space with others outside their household and which spaces they deem important.



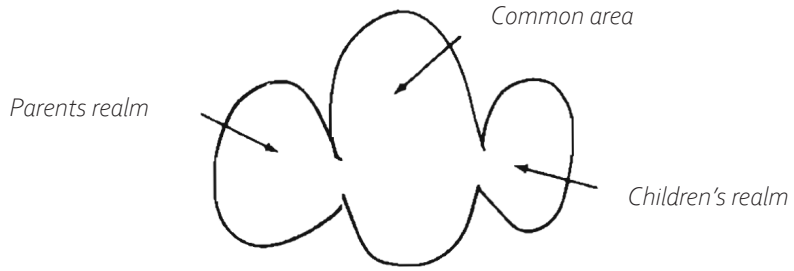
Common space, communal households en private realms (Alexander, et al., 1997).

House holds 4.2.2

In the book *A Pattern Language* (Alexander et al., 1977), various types of households are described: family (everyone living together), the nuclear family (compromising two parents and children), couples, and a house for singles. These compositions are examined to better understand the relationship between the residents and the expression of spatial organization.

Family homes

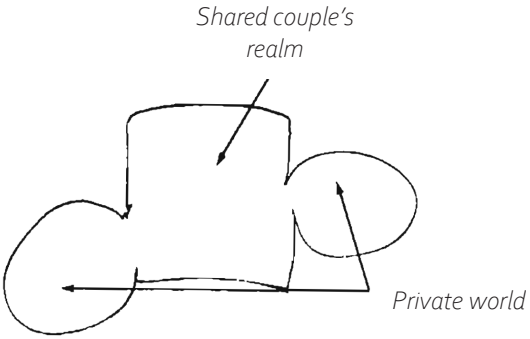
In family homes, a harmonious balance between communal and private spaces is essential (Alexander et al., 1997). Each household member should have their own private realm, tailored to their territorial needs, which is typically delineated by floors or walls. Moreover, there should be ample shared spaces for communal activities, such as dining together. An ideal living arrangement would involve distinct realms for couples and designated areas for children.



Schedule for small families `from A pattern language Cities, buildings, construction (Alexander, et al., 1997).

Couples

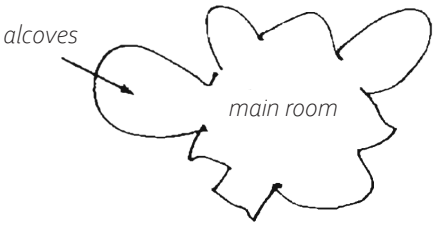
A couple constitutes a small family unit consisting of two individuals. There is a scarcity of homes specifically tailored to this demographic. Presently, the focus in home design leans towards single-person households and families. However, a two-person household should be able to share functionalities that both occupants utilize (Alexander et al., 1977). Yet, it's equally crucial for each individual to have space to express their individuality, necessitating designated areas (a floor, room, corner, table, etc.) for this purpose. Hence, achieving a balance between togetherness and solitude is paramount. As the bond between the couple deepens, there arises a greater need for shared spaces conductive to intimacy, thus fostering the creation of shared-public and shared-private spaces.



Schedule for couples from A pattern language Cities, buildings, construction (Alexander, et al., 1997).

Single-person households

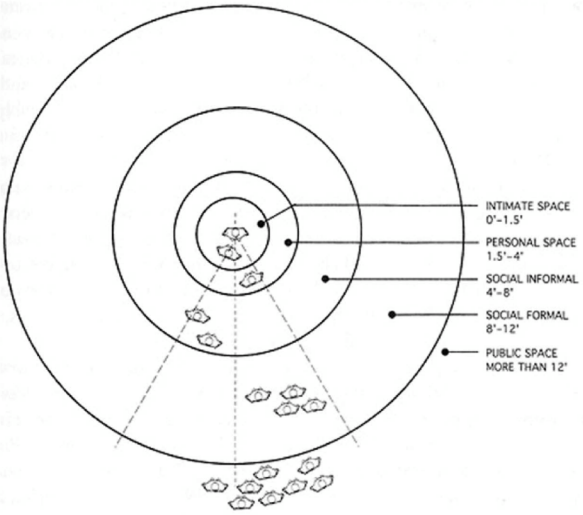
Many single-person households reside in family homes (Alexander et al., 1977). However, these homes are frequently oversized and consequently challenging to maintain. Since they occupy the space alone, their living quarters may be confined to a single room. Within this room, various areas may be designated to accommodate the individual's needs (bedding, reading nook, bathing area, etc.).



Schedule for single-person households from A pattern language Cities, buildings, construction (Alexander, et al., 1997).

Private vs. public 4.2.3.

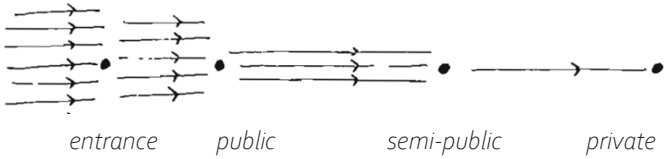
As beings grounded in physical existence, we are perpetually situated (Mouton, 2020). Irrespective of our location, we continually evolve, as beautifully expressed in the poetics of place (Bachelard, 1958); we constantly shape and utilize our capabilities. There is a wish to emphasize the distinction between a public sense of development and a private one. It becomes apparent that it is primarily at home where one can "let go of their guards", slow down, allowing thoughts to wander, reminisce about past events and emotions, achieving harmony within themselves; essentially, it's an opportunity to 'experience oneself.' In this sense, dwelling, or in-dwelling, is conceptualized as pivotal to self-conception or self-identity, seen as central to human well-being. While we may perceive a space a certain way, there remains a hierarchy within spaces. This is influenced by the more private aspects of a space and the more open areas, along with the perception of these spatial elements.



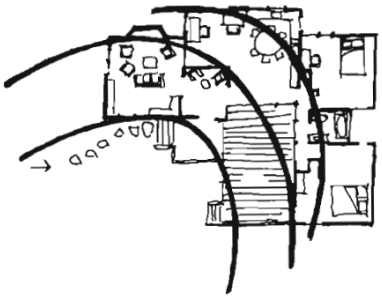
Social interaction diagrams and experiance of public life, from A pattern language Cities, buildings, construction (Alexander, et al., 1997).

As can be seen from the different household compositions, everyone living together needs certain measures of privacy, which can be either in a dwelling or at a street residential level. Without a thoughtful arrangement of intimacy and privacy within the living spaces, both residents and visitors may experience discomfort (Alexander, et al., 1997). It is crucial to establish a well-considered organization for individuals permitted in various areas. This is why the perception of space cannot be divorced from social interaction within that space.

The diagram below shows that interaction goes along with the sizes in which a more private space is experienced. It's common for the more public areas to be situated closer to the entrance, while the more intimate spaces are positioned farther back. This arrangement enables residents to control who they invite into specific areas based on their relationship with the visitor (Alexander, et al., 1997).



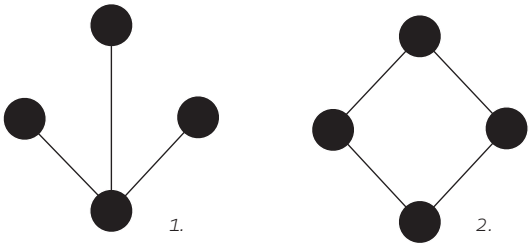
Social interaction diagrams and experiance of public life, from A pattern language Cities, buildings, construction (Alexander, et al., 1997).



Social interaction diagrams and experiance of public life in a terras house, from A pattern language Cities, buildings, construction (Alexander, et al., 1997).

However, within a home, the distinction between residents and visitors is not only made through the configuration of space. The configuration of the home also affects the level of interaction and privacy experienced by residents. The book *The Social Logic of Space* (Hanson & Hillier, 1989) describes how this influences interaction.

In the book, a distinction is made between two systems of interaction: 1. discontinuous (distributive or asymmetric) configurations and 2. continuous (non-distributive or symmetric) configurations. (see the diagram below)

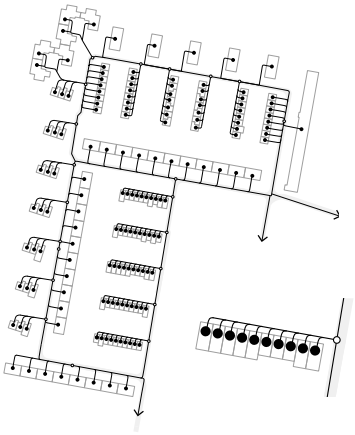


1. Discontinuous configurations and 2. Continuous configurations fram "The Social Logic of Space" (Hanson & Hillier, 1989)

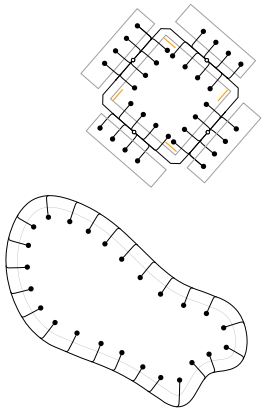
The spheres depicted in the diagrams can be interpreted across various scales. At the neighborhood level, they may represent individual houses, with the connecting lines delineating the overall configuration of residences. On a more localized level, such as within a single dwelling, these spheres signify interconnected rooms, with the lines denoting transitions between spaces, whether through doorways, openings, or partitions.

The scheme is further elaborated upon using the neighborhood-level context of Westwijk Vlaardingen (the location of the graduation project), a post-war neighborhood in the Netherlands. Upon examining the configuration diagram below, it becomes apparent that many spaces are interconnected through a discontinuous ordering. To access the next house, one must always traverse through another dwelling. In this setup, the actor has no alternative route options, leading individuals who do not need to reach the last house to bypass it entirely (Hanson & Hillier, 1989). While this arrangement offers significant privacy for the last resident, it results in limited interaction and social oversight for residents further down the line.

In contrast, a continuous configuration fosters enhanced interaction and social oversight (Hanson & Hillier, 1989). Moreover, it provides the actor with greater freedom of movement throughout the neighborhood, thereby contributing to a more enjoyable neighborhood experience for both residents and visitors. Unlike dead-end streets, which often dictate privacy levels, the continuous configuration offers more fluidity and connectivity.



1. Discontinuous configurations in Westwijk, Vlaarding based on The Social Logic of Space" (Hanson & Hillier, 1989), (Own work)

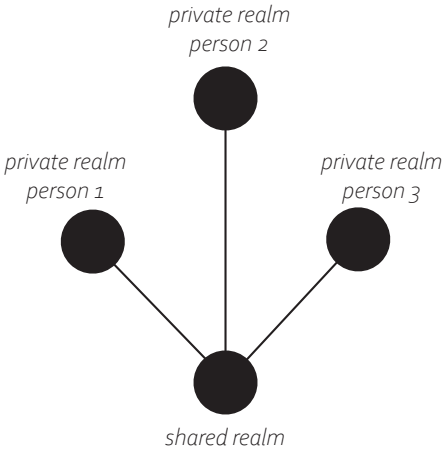


2. Continuous configurations on The Social Logic of Space" (Hanson & Hillier, 1989), (Own work)

When we examine the household scale, these systems can again be applied (Hanson & Hillier, 1989). As mentioned earlier, a discontinuous system results in less interaction within the rooms and more privacy. Taking the schema for a three-person household, each end provides a private space for one resident and a shared space for all occupants.

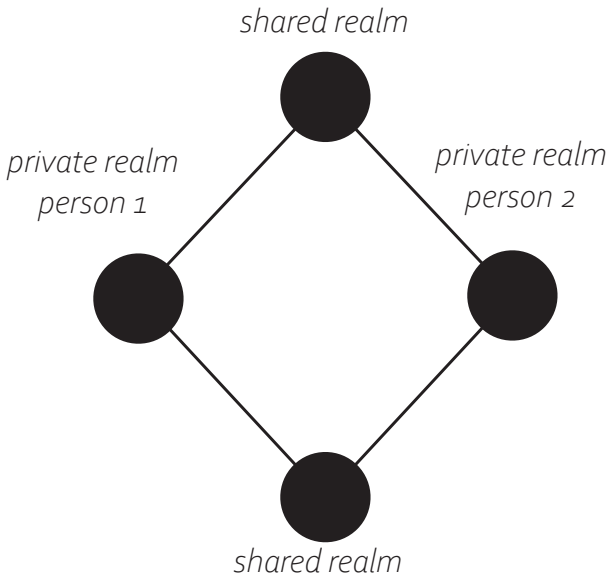
Because all residents must share the same space and have no freedom of choice in this regard, interaction among them is necessary (Alexander et al., 1997). The resident cannot do this in the way they want; even if they do not feel like it or their mental state does not permit it, they must engage in interaction. This means residents are less likely to develop social skills as they have less control over the situation than they would like.

This kind of scheme is often seen in family homes because it provides a lot of privacy. In addition, it is a good scheme for households where interaction is not needed or avoided.



1. Discontinuous configurations three-person household "The Social Logic of Space" (Hanson & Hillier, 1989)

Continuity enhances the flow within spaces, granting individuals the freedom to navigate and make choices in their movement. Moreover, it facilitates increased interaction among small groups (Alexander et al., 1997). Implementing such systems is more feasible and effective in settings without hallways, where circulation occurs through shared spaces. Consequently, incorporating these layouts into floor plans contributes to elevated quality in homes for communities fostering social interaction.

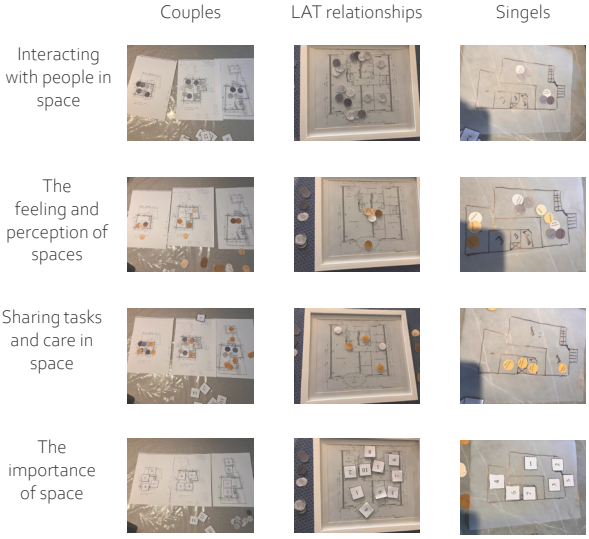


2. Continuous configuration three-person household "The Social Logic of Space" (Hanson & Hillier, 1989)

5. The home in practice

In today's diverse living landscape, many individuals find themselves in homes that do not align with their desires and needs (NOS, 2023). Through interviews, we aim to investigate the residences of those who deviate from the conventional row house typology, which is primarily designed for families with children. The selected target groups include empty nesters (couples), individuals in long-distance relationships, and singles. Beyond the mismatch with family homes, it is intriguing to compare these target groups to explore the role of a partner in household interactions.

The ultimate objective is to analyze the living situations of these individuals to design homes tailored to their needs, fostering more efficient use of space. The interviews are semi-structured, incorporating both a game and a conversation. The game consists of several rounds: 1. Space usage 2. Access of others to the space 3. Perception of the space. 4. Sharing of spaces 5. Importance of the space.

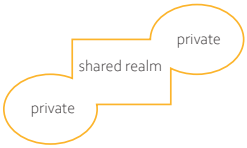


The surveys at the kitchen table of the different target groups. the schemas are elaborated on further in the chapter.(Own pictures)

2 persons

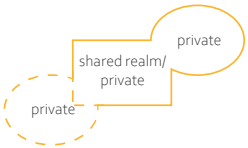
1 persons

Couples



Individuals seek a space that offers shared functionalities (Alexander, et al., 1997). Furthermore, each person requires their own space to safeguard their individuality within the relationship and to express their identity. It is crucial that both parties have dedicated space where they can fulfill their personal needs without creating a sense of exclusion for the other. Maintaining a sense of control in this dynamic is of utmost importance.

LAT relationships



The occupancy of this residence varies, alternating between a single-person household and a two-person household. This unique arrangement places the home between a single-person living situation and that of a couple, straddling the realms of both privacy and shared spaces.

Singels

Single-person houses are scarce; typically, singles are living in family houses (Alexander, et al., 1997). This leads to the group occupying more space than required. The space is exclusively designated for the resident's private domain, eliminating the need for a shared realm.

The house use

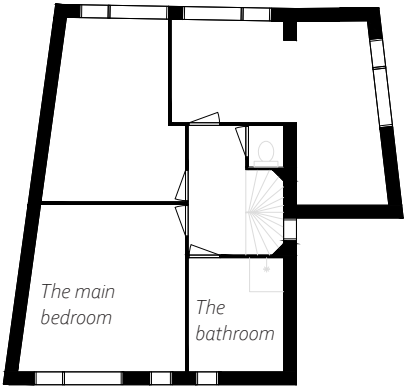
Loes and Ijnze

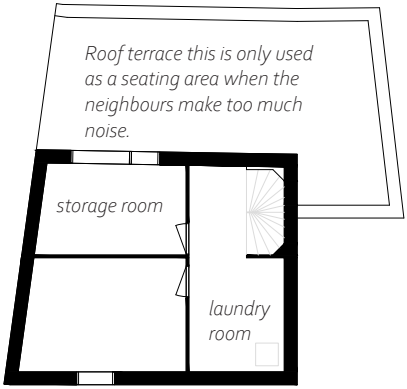
This is Loes and Ijnze's home. They purchased the house during its construction phase, living there with their two daughters. However, the youngest daughter moved out five years ago. Presently, they still inhabit the same house, acknowledging its spaciousness (182 m2 of usable area) and considering parting with the upper floor. Having both retired, they appreciate the comfort of continuing to reside in this neighborhood. Despite their desire to downsize, finding suitable homes within the neighborhood that meet their criteria proves to be a challenge.

The couple enjoys reading and Ijnze is in the process of writing a book. They also like to go travelling.

The old nursery of their eldest child. It is now used as a guest room and storage.

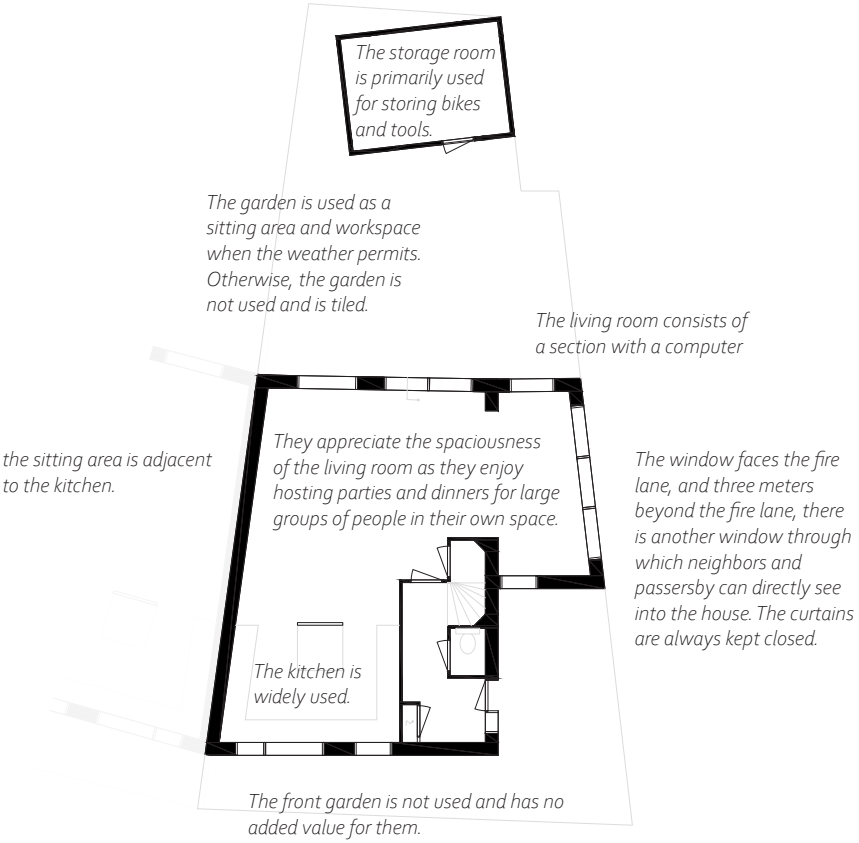
Their youngest child's old nursery. It is now used as a guest room and Ijnze's study.





Loes' old study which has hardly been used since her retirement. There is a large bookcase that they prefer to have in the living room but due to lack of empty walls, it is upstairs.

Floorplan the home of Loes and Ijnze; 1ste floor and 2nd floor 1. 200, Zoetermeer. (Own work)



Floorplan the home of Loes and Ijnze; groundfloor 1. 200, Zoetermeer. (Own work)

Perception of rooms

Loes and Ijnze

When the functions of the homes and the spaces for interaction became clear, they were asked to articulate their feelings about each space. This was done to gain a deeper understanding of what specific rooms mean to the residents.

A recurring theme is safety, which is integral to every space and is therefore fundamental for the home. A few years ago, an attempted break-in prompted the couple to enhance their home security.

Privacy is also a recurring theme. They don't face issues with the neighbors, but due to the closely built houses, there is often visibility and unintended interaction when they are inside the home. This is why, if they were to win the lottery, they would prefer to buy a detached house.

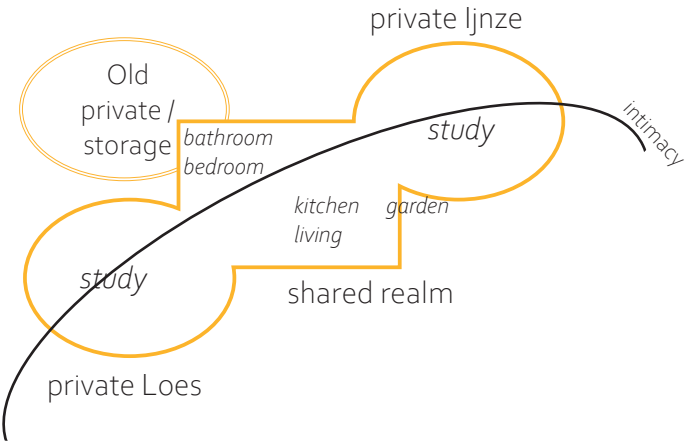
Identity is attributed to the living room since they enjoy expressing themselves and showcasing their identity to visitors. It is also assigned to the study room, where a large bookshelf stands, as the couple considers reading an integral part of their identity.

Furthermore, the couple each has their own study space. They express that they experience a sense of freedom here, as they can leave their belongings and use the room without interference from the other.

The bedroom is the most intimate space and is one of the few areas where few people are allowed. It's noteworthy that when discussing the bedroom, the focus is solely on the bed and sleeping, rather than considering the room as a whole.

In addition, some rooms have not been named as they are mainly intended as storage space. Furthermore, the items they keep are meant for the children, but since they don't have space, the items are with them.

Floorplan the home of Loes and Ijnze, Zoetermeer. (Own work)



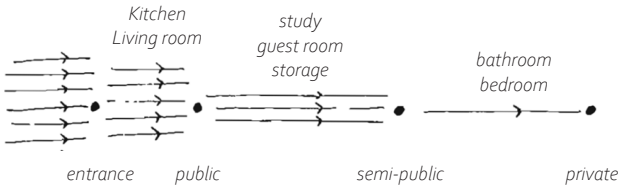
Schedule of house use of Loes and Ijnze, Zoetermeer. (Own work)

Public life

Loes and Ijnze

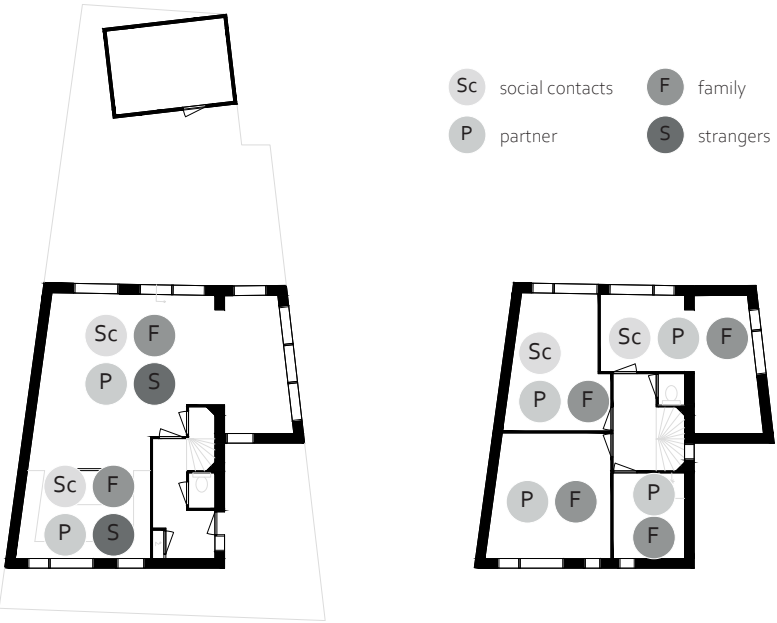
When asked about their interactions with people in different areas of their home, Ijnze and Loes express openness to welcoming a variety of individuals. Their daughters remain an integral part of the family and are included in shared spaces. A significant portion of the home are considered open spaces for everyone, with the condition that they maintain control.

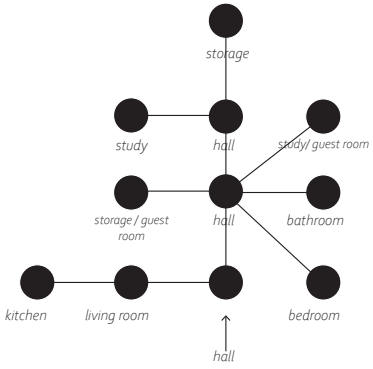
The diagram below outlines the perceived degrees of public and private within these spaces. The kitchen and living room are deemed the most public, while the bedroom and bathroom are considered the most private.



Social interaction diagrams and experiance of public life, from A pattern language Cities, buildings, construction (Alexander, et al., 1997). Based on the house of Loes and Ijnze.

When examining the relationship diagram (see the following page) of the dwelling, it becomes apparent that the home is primarily intended for families. There is limited flow through the rooms, observed only in the hallways and the living room. This implies that many areas are designed for individual use. Nevertheless, the couple notes that interactions also take place in other rooms. A more suitable design should enhance this interaction by establishing greater continuity in the shared spaces.





Floorplan the home of Loes and Ijnze, Zoetermeer. (Own work)

Relationship diagram based on the house of Loes en Ijnze, based on sociologic of space. (Own work)

Shared space

Loes and Ijnze

This segment aims to explore whether residents are receptive to sharing spaces or currently have more space than they require.

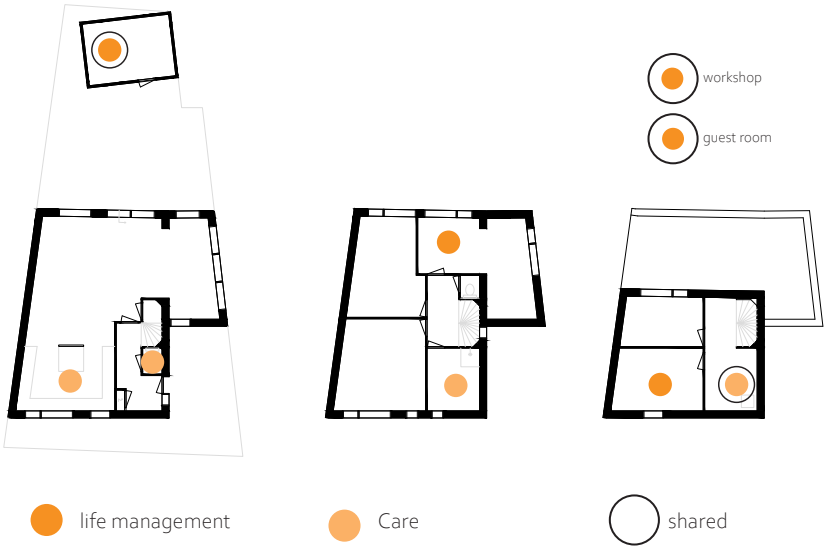
The sharing of space

The initial query in this segment revolves around their perception of caregiving and maintaining their livelihood. Subsequently, they are asked whether they are open to sharing space with individuals outside their household. While the notion of sharing space and time could potentially save resources, it doesn't resonate with this couple. They prefer to maintain exclusive access to the spaces they currently utilize, with the exception of a communal laundry area.

However, they express keen interest in having shared facilities at the neighborhood level, such as guest accommodations — particularly beneficial if one of the parents requires additional assistance — and a workshop for engaging in collective crafting and DIY endeavors.

Important spaces

In this segment, participants were tasked with ranking the importance of various spaces. They found the living areas (living room and kitchen) to be of utmost importance, followed by the bedroom (which interestingly they view solely as a place for a bed) and the bathroom. After identifying their top priority, they expressed a desire for a dedicated workspace, with the remainder of the house serving primarily as storage.

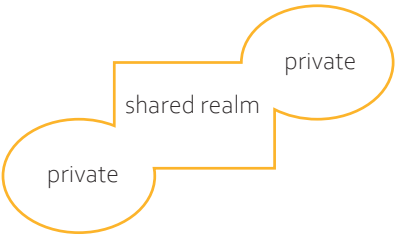


Floorplan the home of Loes and Ijnze, Zoetermeer. (Own work)

Floorplan the home of Loes and Ijnze, Zoetermeer. (Own work)

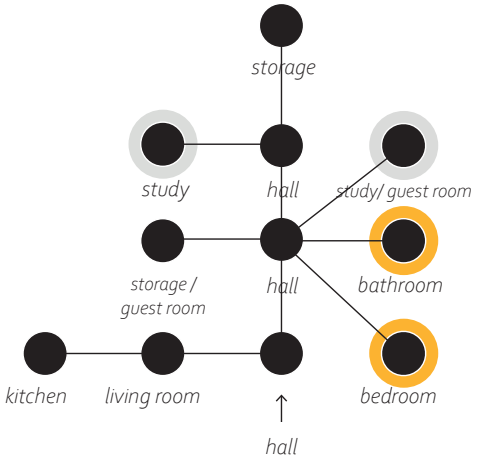
Conclusion The house

Loes and Ijnze



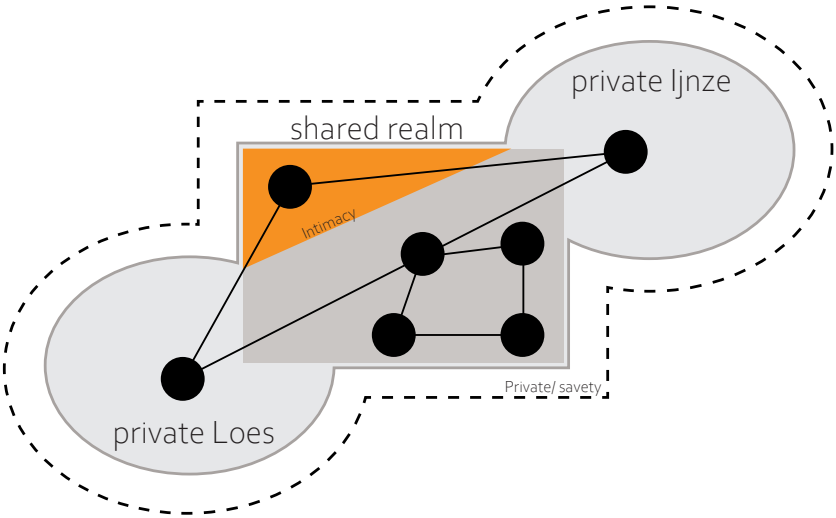
Individuals seek a space that offers shared functionalities (Alexander, et al., 1997). Furthermore, each person requires their own space to safeguard their individuality within the relationship and to express their identity. Model from pathern langues. (Own work)

When examining Alexander's pattern (above) alongside Hiller's ideas on space and sociology (pattern below), numerous spaces exhibit a private character due to their descriptive nature. However, it is crucial to note that only specific areas should possess a descriptive character. These spaces, requiring heightened intimacy, more privacy, and increased freedom, are the ones to prioritize.



Relationship diagram based on the house of Loes en Ijnze, based on sociologic of space; Hillier and Hanson (1984). orange are the most intimate spaces and grey the most free spaces based the private spaces of one of the couples. (Own work)

This represents the scheme when both theories, along with the patterns highlighted by the residents, are taken into account. This design fosters greater continuity. Moving forward, the more private domain is achieved by integrating the private aspects of both couples. This not only enhances the intimacy of specific spaces but also allows the couples more access to each other's domains. The home is intended to exude a sense of privacy and security towards the outside world.



Relationship diagram based on the house of Loes en Ijnze, based on sociologic of space and pathern langues. (Own work)

The sizing of the spaces has not been taken into account in the scheme; further examination is needed in this regard. This scheme will act as the groundwork for the new design. Specific spaces are not labeled since ongoing studies are being conducted to determine the necessary areas. Additionally, alternative spaces may emerge based on residents' preferences, such as dressing rooms or relaxation areas.

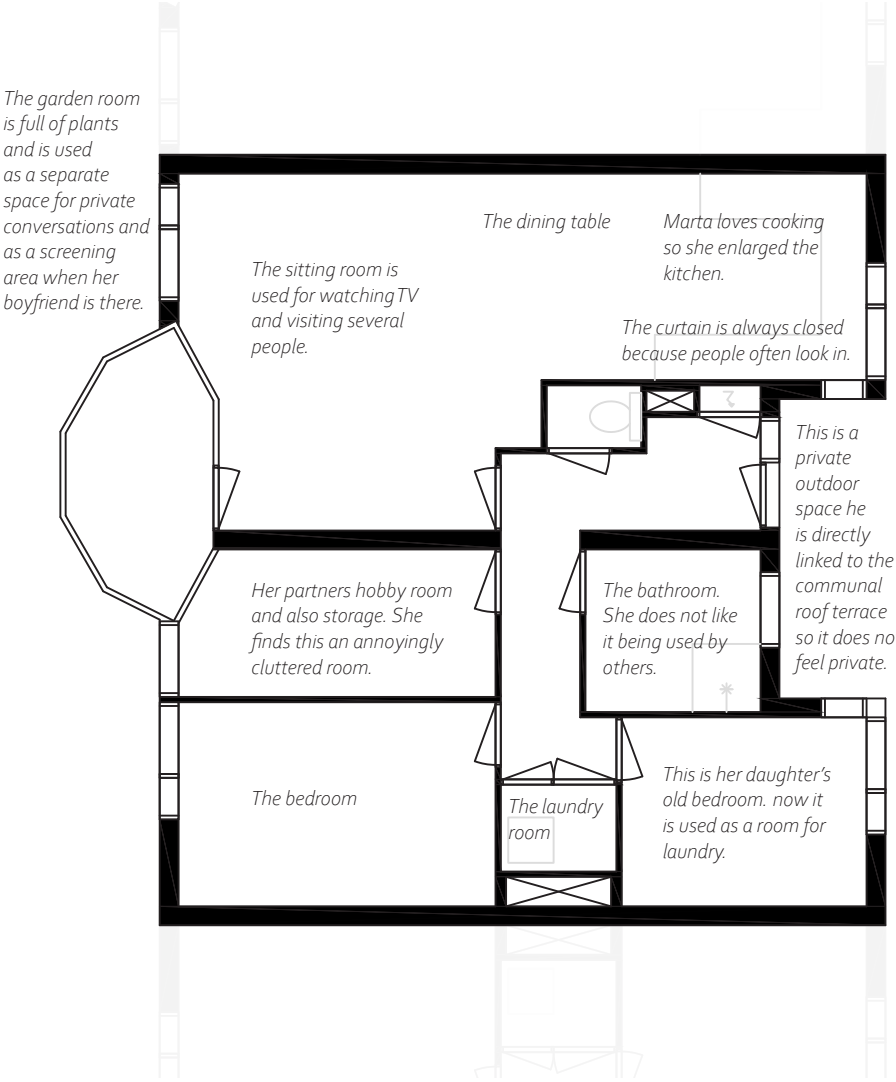
The house use

Martha

This is Martha's home; she relocated eight years ago from another residence in The Hague. Her current dwelling is within an apartment complex, boasting a total floor area of 82m2. The decision to move stemmed from her daughter approaching an age where leaving home was imminent, and the previous residence seemed too spacious. Even though her daughter departed five years ago, Martha takes pleasure in her current abode, viewing herself as more of an observer.

In a long-distance relationship, Martha's boyfriend has a separate room dedicated to his hobbies for the times they spend multiple days at her place or at his. Martha values her independence, expressing a preference not to be a caretaker in a relationship. Consequently, her boyfriend has minimal influence over the household.

Employed as an elementary school teacher, Martha finds joy in caring for children because "they deserve it". Beyond her professional life, she extends her nurturing tendencies to the children in the building, engaging in small acts of kindness for them.



Floorplan the home of Martha; 1.100, Den Haag. (Own work)

Perception of Space

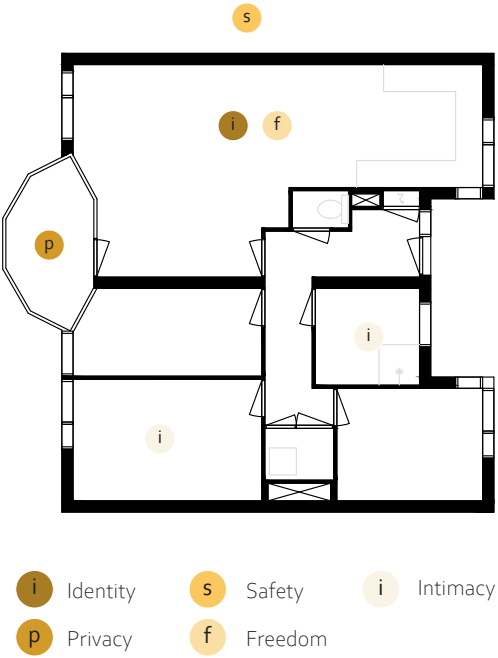
Martha

When the functions of the homes and the spaces for interaction became clear, they were asked to express their experiences with each space. This was done to gain a deeper understanding of what specific rooms mean to the residents.

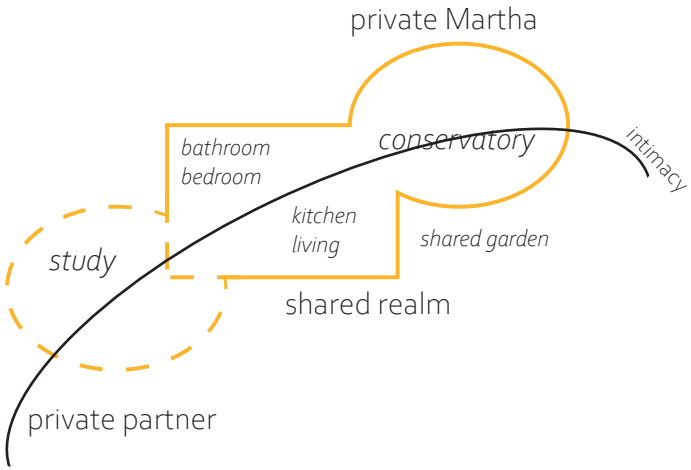
An important theme is safety, which is crucial for every space and therefore fundamental for the home. Privacy is also a recurring theme. Due to the close proximity of the house and the balcony, there is significant visibility. It's fortunate that the house is situated on the first floor, providing limited visibility from the street side. The most privacy is felt in the garden room; while guests are invited here, they are not allowed to enter the space themselves. This room also serves as a second living area for private conversations when the partner is present.

Identity and freedom are associated with the living room, where they enjoy expressing themselves and showcasing their identity to visitors. They feel they can truly be themselves here, which grants them a sense of liberation. The bedroom and the bathroom are considered the most intimate spaces and are among the few areas where only a select few are permitted.

The room she has little affection for is her friend's room. While she appreciates that he has a space dedicated to his hobbies, she personally does not find the room appealing.



Floorplan the home of Martha, Den Haag. (Own work)



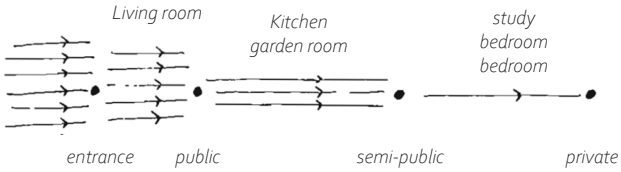
Schedule of house use of Martha, Den Haag. (Own work)

Public life

Martha

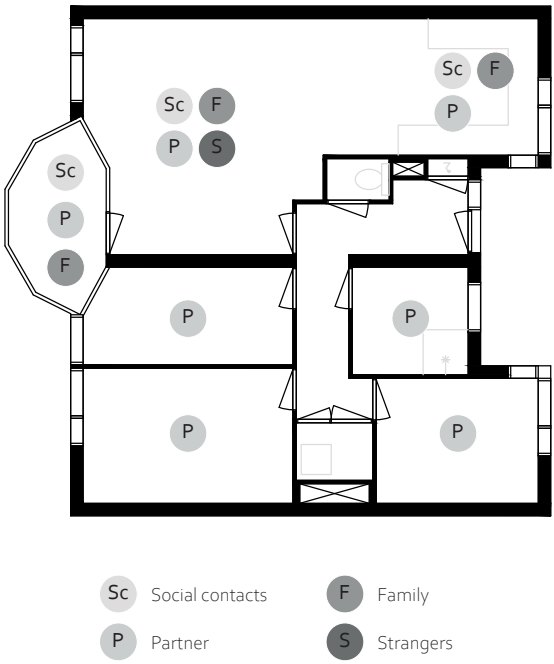
When asked about interactions with people in various parts of her home, Martha reveals that she welcomes different individuals into her space. While her daughter is permitted in different areas, it's usually for specific tasks. Most rooms are off-limits to anyone but her partner.

The diagrams below show the perceived levels of public access and privacy within these spaces. The living room is deemed the most public area, while the bedroom, study, and bathroom are considered the most private.

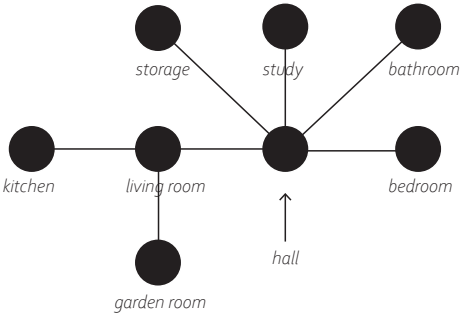


Social interaction diagrams and experiance of public life, from A pattern language Cities, buildings, construction (Alexander, et al., 1997). Based on the house of Martha. .

Upon analyzing the relationship diagram (see the next page) of the dwelling, it becomes evident that the house primarily caters to families. Flow through the rooms is limited, mainly occurring in the corridors and the living room. This suggests that many areas are designed for individual use. However, the couple notes that interactions also occur in other spaces. A more suitable design should foster such interactions by establishing greater connectivity in the shared areas.



Floorplan the home of Martha, Den Haag. (Own work)



relationship diagram based on the house of Martha, based on sociologic of space. (Own work)

Shared space
Martha

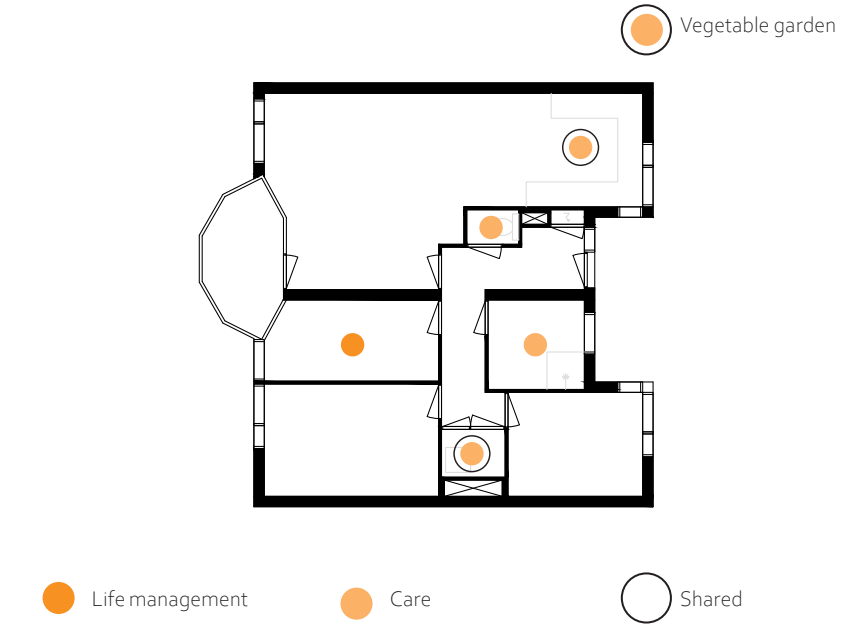
This segment aims to explore whether residents are receptive to sharing spaces or currently have more space than they require.

The Sharing of Space

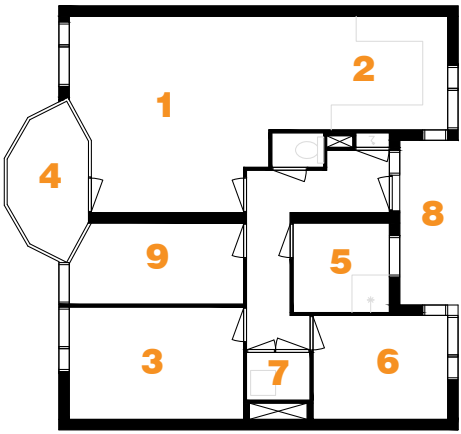
The initial part of this section delves into their perception of caregiving and sustaining their livelihood. Following this, they are queried about their willingness to share space with individuals beyond their household. Martha, having spent a considerable time in Africa where communal living is commonplace, expresses readiness for this arrangement. However, she stipulates the necessity for maintaining personal spaces, such as the bathroom, toilet, bedroom, and sitting area. Additionally, Martha expresses a desire to participate in a communal vegetable garden with the neighborhood.

Important spaces

In this segment, participants were tasked with ranking the significance of various areas within their living environment. They prioritize the living spaces (living room and kitchen) as the most crucial, followed by the bedroom, and then the garden room. The bathroom also holds significant importance. Subsequently, the ranking declines in importance, with laundry rooms occupying the fifth and sixth positions. Outdoor space is underutilized due to privacy concerns, and lastly, Martha's friend's room is mentioned. While the room belongs to him, Martha harbors disdain for it due to its untidiness, preferring to avoid it whenever possible.



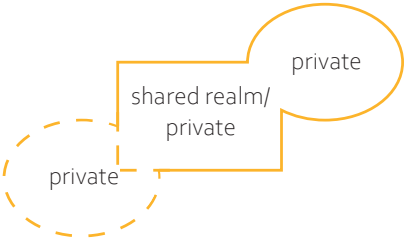
Floorplan the home Martha, Zoetermeer. (Own work)



Floorplan the home of Martha, Zoetermeer. (Own work)

Conclusion The house

Martha



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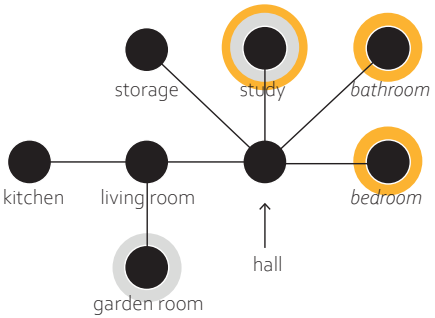
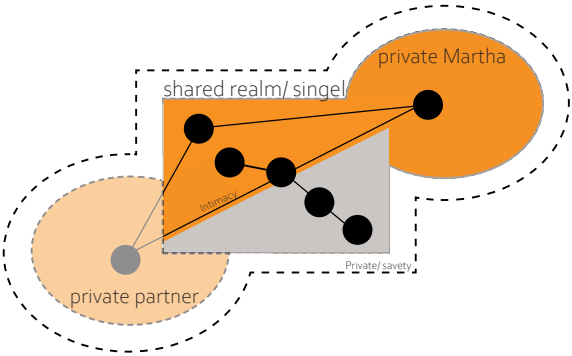


Relationship diagram based on the house of Martha, based on sociologic of space; Hillier and Hanson (1984). orange are the most intimate spaces and grey the most free spaces based the private spaces of one of the couples. (Own work)

This scheme represents the culmination of both theories, integrating the highlighted patterns identified by the residents. The design emphasizes enhanced continuity throughout the living space. As we proceed, a more private domain is crafted by amalgamating the distinct private aspects of both couples. This not only enriches the intimacy of specific areas but also facilitates increased access to each other's domains for the couples. The overarching goal is to imbue the home with a palpable sense of privacy and security towards the outside world.

Although similar in many ways to the previous pattern, a notable difference arises from the intermittent presence of the partner in the home, making it alternately a single-person household or a two-person household. Consequently, shared spaces often cater solely to the resident's needs.



Relationship diagram based on the house of Martha, based on sociologic of space and pathern langues. (Own work)

The sizing of the spaces has not been taken into account in the scheme; further examination is needed in this regard. This scheme will act as the groundwork for the new design. Specific spaces are not labeled as ongoing studies are being conducted to determine the necessary areas. Additionally, alternative spaces may emerge based on residents' preferences, such as dressing rooms or relaxation areas.

The house use

Lidy

This is Lindy's home, nestled within a renovated building in the heart of The Hague. Retired and fond of the outdoors, Lidy purchased her residence based on the architectural blueprints. The complex consists of a common outdoor garden surrounded by a mix of adapted housing for both seniors and young families.

Lidy resides along a tranquil canal, reminiscing about a past relationship that once flourished within these walls. Although the initial design boasted two bedrooms, Lidy, now navigating life solo, opted for a more expansive living area over an additional sleeping space. While cohabiting with her former partner, the extra room might have proven convenient, but in her present single state, Lindy cherishes the spaciousness of her living quarters.

Privacy holds paramount importance for Lidy within her abode, fostering a sense of solace amidst the bustling city surroundings.

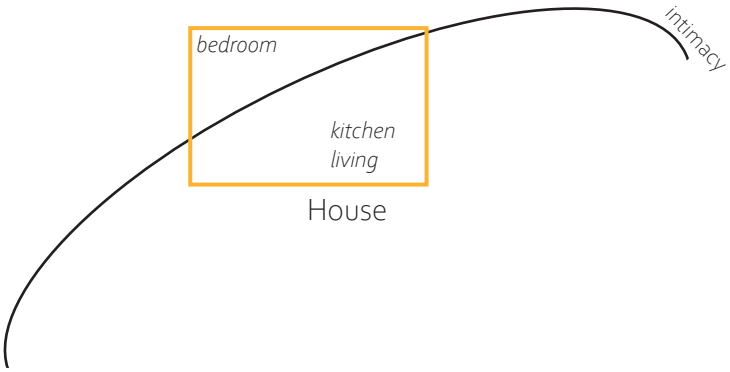
Floorplan the home of Lidy; 1.100, Den Haag. (Own work)

Perception of Space

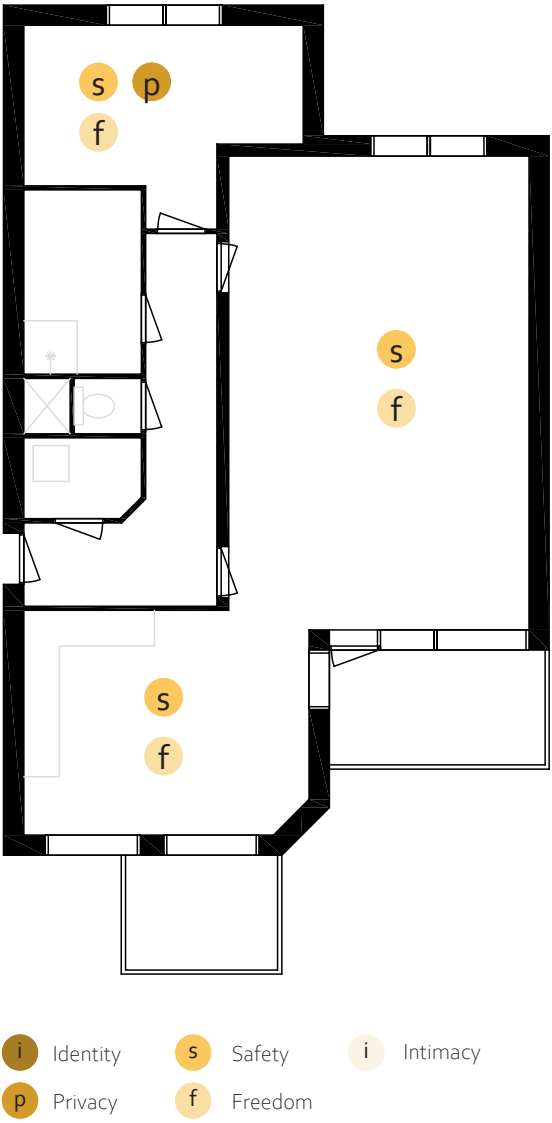
Lidy

As they clarified the functions of the homes and the spaces for interaction, they were prompted to articulate their experiences with each space. This was aimed at achieving a deeper understanding of what specific rooms signify for the residents.

Key themes include freedom and safety. Within the household, freedom entails the ability to express oneself without external influences, while safety is primarily perceived in terms of physical security. Privacy is another recurrent theme, particularly associated with the bedroom. Furthermore, during the conversation, it becomes evident that she values one balcony more due to the enhanced privacy it offers.



Perception diagram of Lidy's home. (Own work)



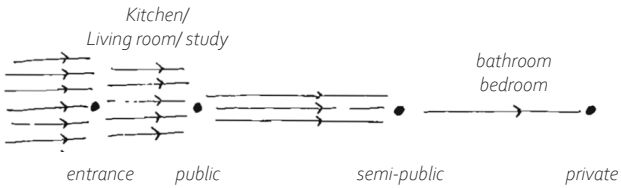
Floorplan the home of Lidy, Den Haag. And perception diagram. (Own work)

Public life

Lidy

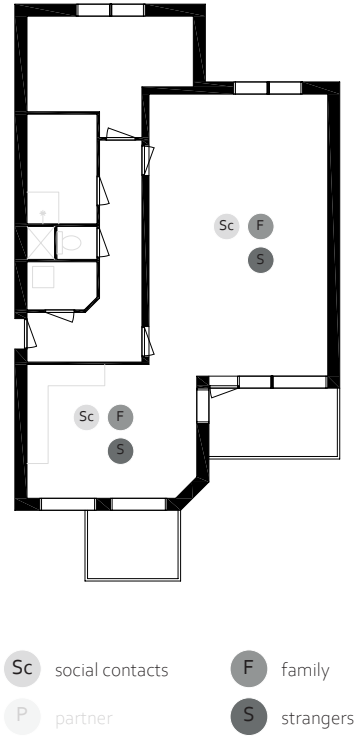
When questioned about interactions with individuals in different areas of her home, Lidy mentions that she welcomes many people. She specifies certain spaces where guests are permitted. However, there's a clear demarcation between areas accessible to visitors and those that are not.

The diagrams below illustrate the perceived levels of public access and privacy within these spaces. Due to the distinct separation between permitted and restricted areas, there's no transitional space within the house bridging the public and private spheres.

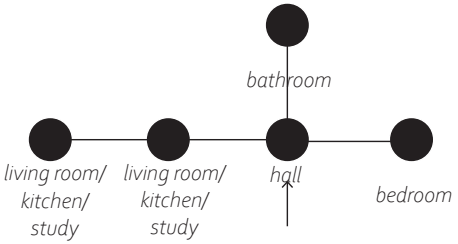


Social interaction diagrams and experiance of public life, based on A pattern language Cities, buildings, construction (Alexander, et al., 1997). (Own work)

Upon analyzing the relationship diagram of the residence, it becomes evident that the house is intentionally designed to make this distinction. This design ensures clear differentiation and facilitates easy maintenance of privacy and public access.



Floorplan the home of Lindy, Den Haag. (Own work)



relationship diagram based on the house of Lidy, based on sociologic of space. (Own work)

Shared space

Lidy

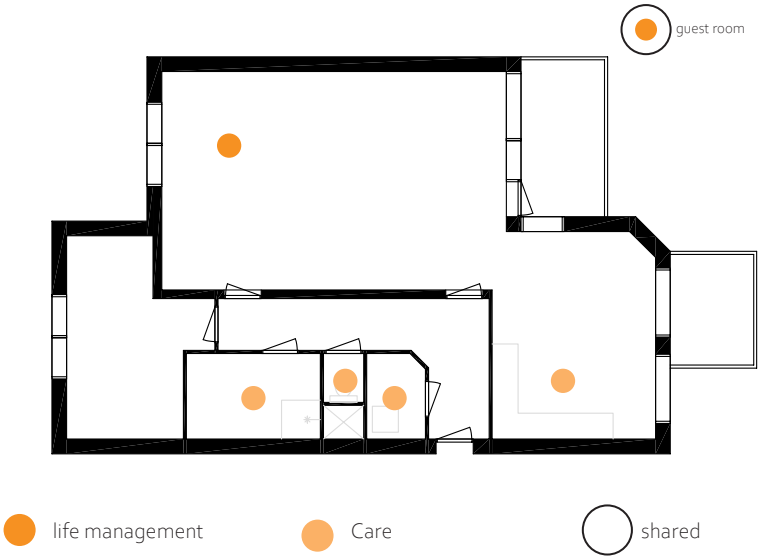
This segment aims to explore whether residents are receptive to sharing spaces or currently have more space than they require.

The Sharing of Space

In the first part of this section, we delve into their perspectives on caregiving and sustaining their livelihood. Following this, they are questioned about their willingness to share space with individuals outside their household. Lidy expresses reluctance to share space. Although there have been discussions with other residents in the complex about a shared kitchen, she believes that in practice, it is rarely utilized. She mentions that due to the absence of a guest room, she often accommodates guests on the couch, thus indicating openness to sharing a guest room, as she infrequently uses it but would find it convenient.

Important Spaces

In this segment, participants were tasked with ranking the significance of various spaces within their living environment. They prioritize the living areas (living room and kitchen), as well as the balcony where Lidy experiences greater privacy. The bedroom holds considerable importance. The other balcony is ranked fifth, followed by the bathroom, and finally the laundry room. Lidy mentions that she would prefer to have all these spaces in another house.



Floorplan the home of Lidy, Den Haag. (Own work)

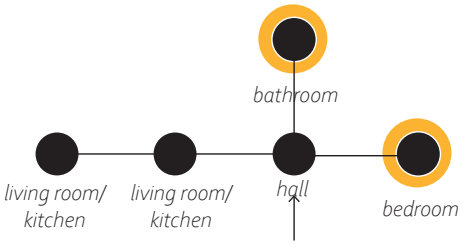
Floorplan the home of Lidy, Den Haag.(Own work)

Conclusion The house

Lidy

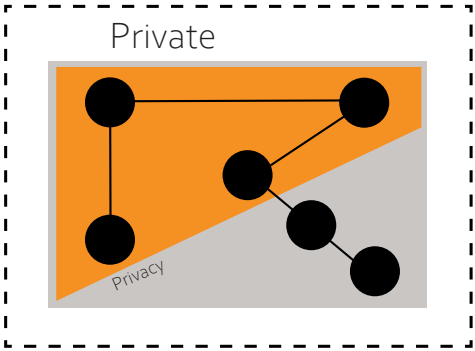
Individuals seek a space that offers shared functionalities (Alexander, et al., 1997). Furthermore, each person requires their own space to safeguard their individuality within the relationship and to express their identity. Model from pathern langues.

When examining Alexander's pattern (above) alongside Hillier's ideas on space and sociology (pattern below), numerous spaces exhibit a private character due to their descriptive nature. This is also how Lidy uses the home in practice. The rooms are private and not intended for others; a home with less continuity works well.



relationship diagram based on the house of Lidy, based on sociologic of space; Hillier and Hanson (1984). orange are the most intimate space. (Own work)

This scheme encapsulates the integration of both theories, along with the patterns emphasized by the residents. Unlike the previous two designs, this one necessitates less continuity, facilitating a quicker establishment of a more private domain. The overarching intention of the house is to exude a feeling of privacy and security to the outside world.

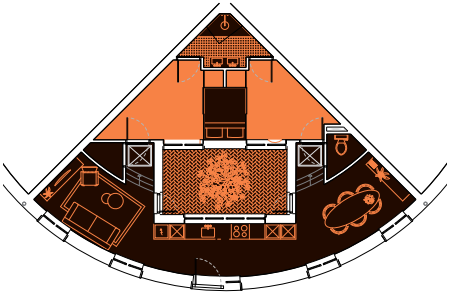


relationship diagram based on the house of Lindy, based on sociologic of space and pathern langues. (Own work)

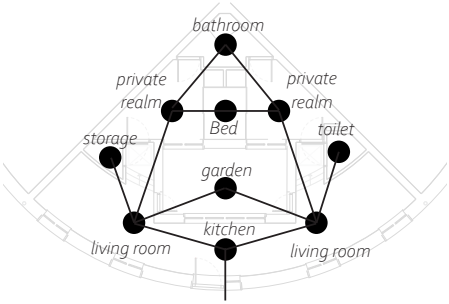
The sizing of the spaces has not been taken into account in the schema; further examination is needed in this regard. This scheme will act as the groundwork for the new design. Specific spaces are not labeled as ongoing studies are being conducted to determine the necessary areas. Additionally, alternative spaces may emerge based on residents' preferences, such as dressing rooms or relaxation areas.

7. House floorplan

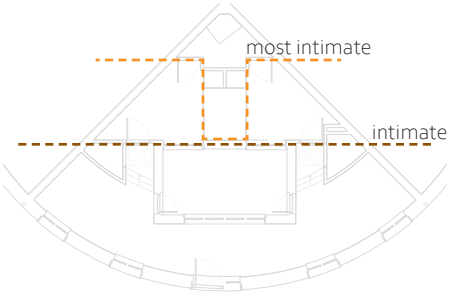
intimate couples



Shared (black) and private realm (orange). (Own work)

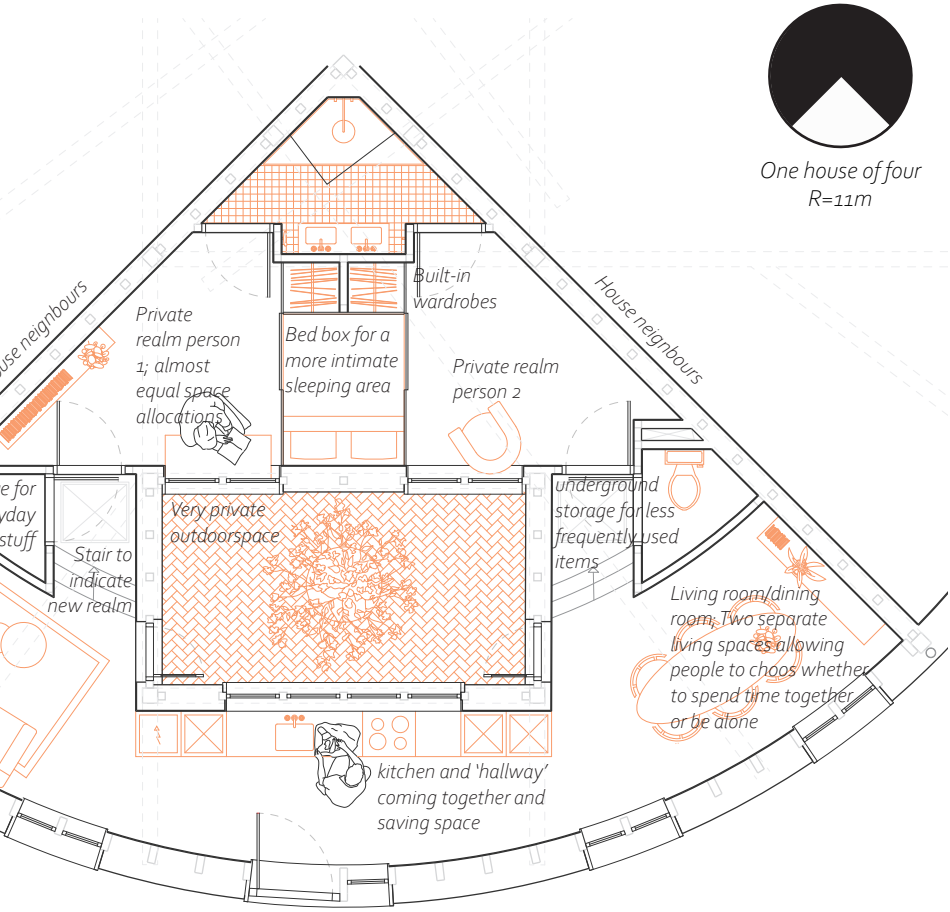


Space syntax, based on sociologic of space (Hillier and Hanson, 1984). (Own work)



Relationship diagram, based onA pattern language Cities, buildings, construction (Alexander, et al., 1997).(Own work)

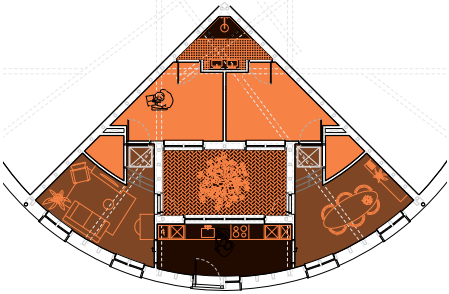
The more public functions are located on the street



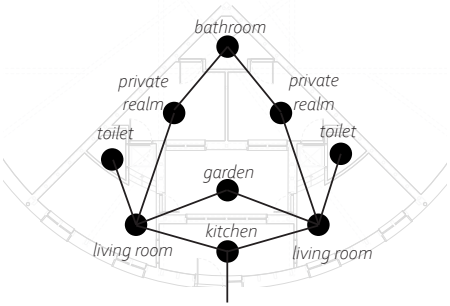
Design intimate coupels 1.100. (Own work)

House floorplan

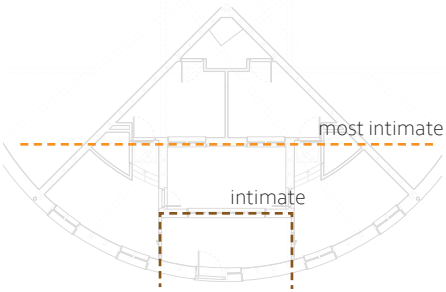
Non-intimate couples



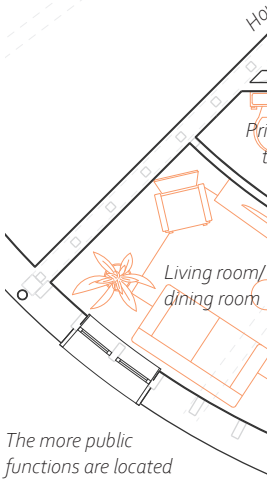
Shared (black), shared or private (brown) and private realm (orange). (Own work)



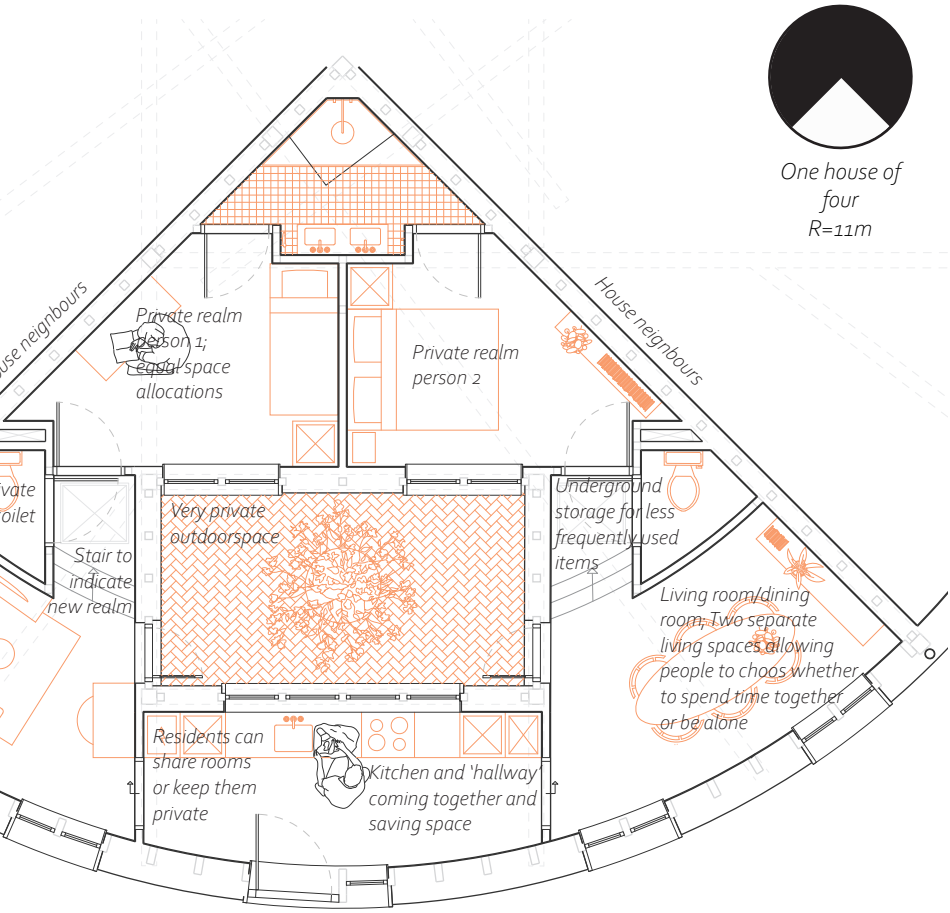
Space syntax, based on sociologic of space (Hillier and Hanson, 1984). (Own work)



Relationship diagram, based onA pattern language Cities, buildings, construction (Alexander, et al., 1997).(Own work)



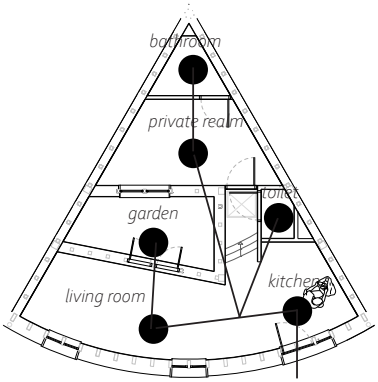
The more public functions are located on the street



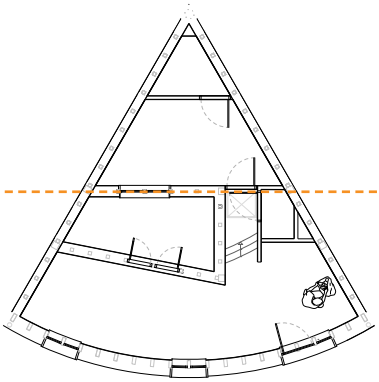
Design intimate coupels 1.100. (Own work)

House floorplan

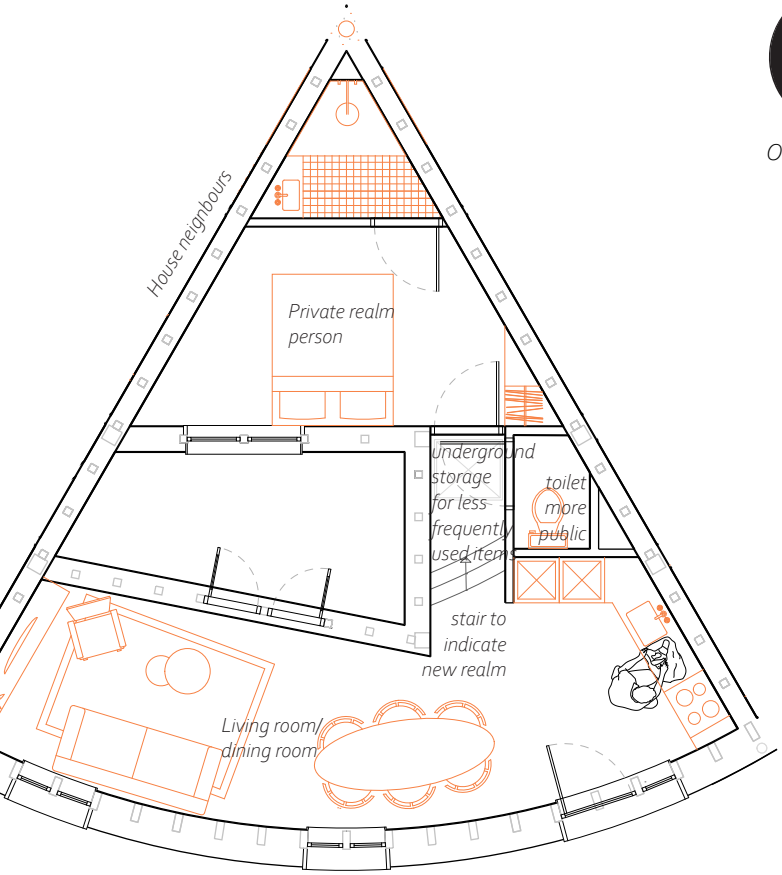
singels



Space syntax, based on Sociologic of space (Hillier and Hanson, 1984). own work



Relationship diagram, based on A pattern language Cities, buildings, construction (Alexander, et al., 1997).own work



The more public functions are located on the street

One house of six
R=11m

Design Singels 1.100. (Own work)

GAIA

Set in a productive post-war neighborhood Westwijk.

Design

Towards a social productive landscape

Content

1. Briefing
2. site analysis
3. vision
4. Design

Biefing

De wooncrisis is veel meer dan een tekort aan betaalbare huizen

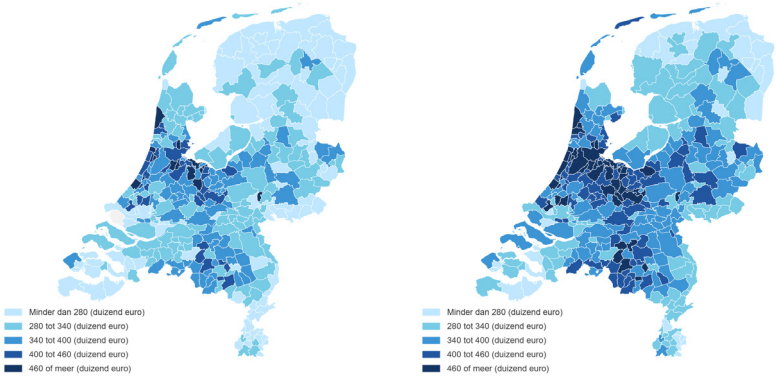
(De Correspondent)

(Annemijn Groeneveld)

"De wooncrisis lossen we niet op door bouwen 1 miljoen woningen"

NIEUWS - 07 APRIL 2023 - COMMUNICATION BK

(TU Delft)



(CBS)

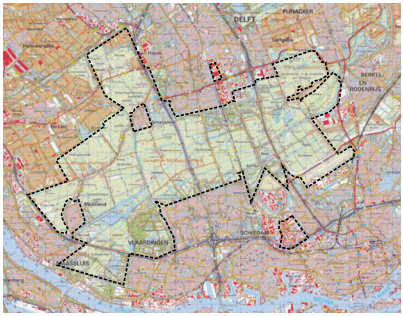
So, an individual housing crisis can be grounded in human rights. The inevitable next question is when to identify a collective housing crisis. While there isn't a single, definitive definition, from my perspective, the housing crisis encompasses the extreme housing challenges faced by a growing number of individuals, spanning from homelessness to soaring housing prices. It serves as a framework to underscore that all these diverse challenges are not isolated incidents but rather symptoms of the same underlying crisis.

The current housing crisis resembles an expanding oil spill, contaminating an ever-expanding portion of the ocean, coastline, and marine life. This surge notably began around 2013 when housing prices resumed their ascent after years of economic decline, coinciding with housing minister Stef Blok intensifying his policies targeting the social housing sector.

Furthermore, the housing crisis profoundly disrupts society as a whole. A well-functioning society hinges on people's ability to afford and enjoy suitable housing. (Uitgewoond)

Midden-Delfland (zus)

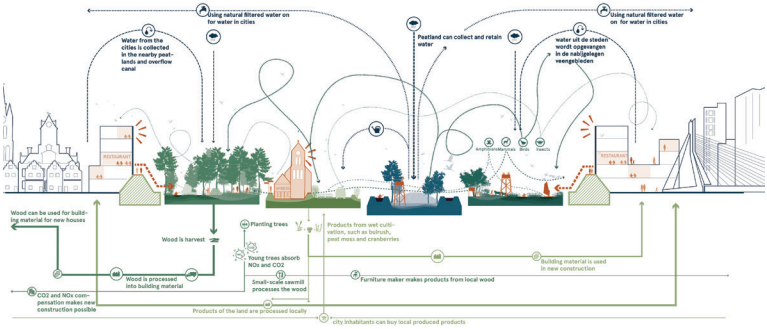
1950 (topo tijdreizen)



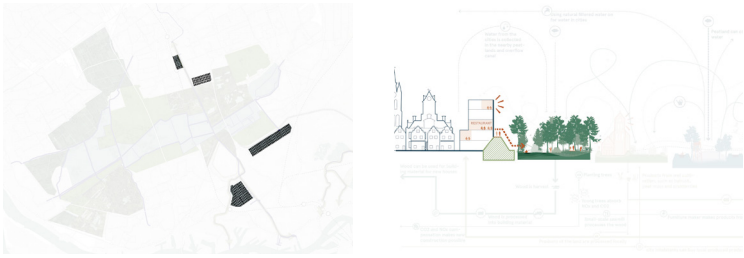
2020 (topo tijdreizen)

This graduation study builds upon the ZUS plan, envisioning a productive landscape in Midden-Delfland. Given the extensive urbanization surrounding the area, there's a scarcity of space for both natural and cultural landscapes. Preserving the existing landscape from further urbanization is crucial, allowing for alternative utilization such as raw material production, recreational areas, and conservation of natural habitats.

However, addressing the pressing housing shortage necessitates densification. The proposal advocates for high-density development at the city peripheries, pinpointing four specific locations. Yet, initial research delved into several potential sites for densification before focusing on these select areas.



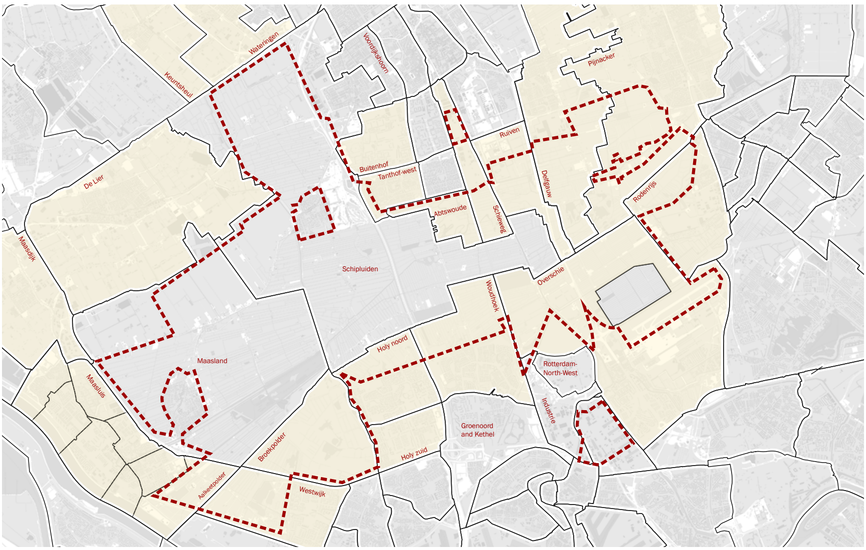
Section productive park (ZUS)



high-density development sugested by (ZUS)

NATIONAL PRODUCTIVE
PARK DELFTLAND

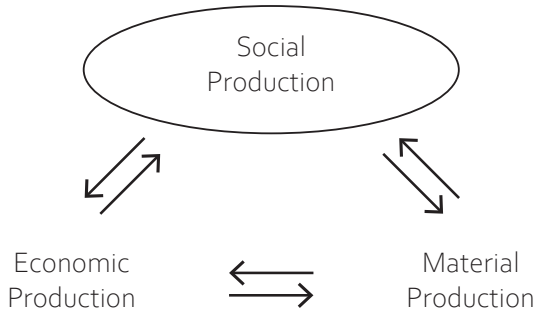
Cover page 'National productive park Delfland' (ZUS)



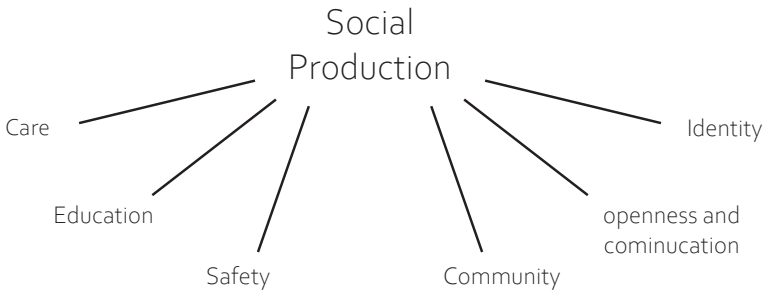
Wijken around Midden-Delfland (Groupe work)

The plan by ZUS is termed the 'National Productive Park Delfland.' However, the plan primarily discusses production in the context of economic and material aspects, neglecting the crucial facet of social production. Yet, social production stands as a pivotal aspect of overall productivity. This form can be implemented in the outskirts of cities, fostering social production through enhancements in areas such as healthcare, education, safety, communication, and identity.

In selecting the location, various 'wijken' around Midden-Delfland were considered. The final decision was based on identifying areas where this form of production could be nurtured.



Types of production (Own work)



Social production (Own work)

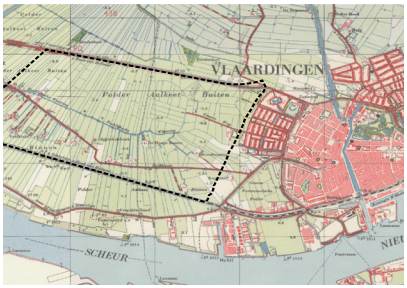
Site Analysis

Neighborhood Design

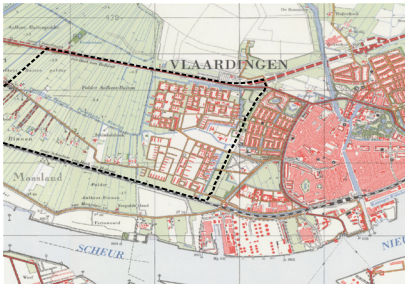
Collage of Westwijk (Own work)

Westwijk (Vlaardinngen) emerged as the district from the earlier research. This is due to its intriguing neighborhood structure, social issues, and excellent accessibility.

Westwijk holds a unique historical background. The land was inhabited as early as around 3500 BC and later transformed into a cultural landscape during the Middle Ages. This landscape persisted until the execution of the Westwijk plan in 1960. Little consideration was given to the existing structure at that time. A layer of sand was deposited, allowing the ground to be utilized for housing. Westwijk stands as a post-war district with a master plan designed by Maaskant and Van Tijen.



1950 (topo tijdreizen)



1960 (topo tijdreizen)

Photos of Westwijk after completion

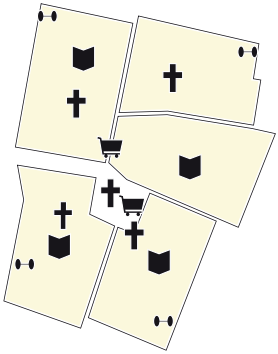
Westwijk consists of five 'buurten': Hoogkamer, Lage Weide, Wetering-Noord, Wetering-Zuid, and Zuidbuurd. The neighborhood was structured around the concept of pillarization, where each area had its own distinct religious affiliation.

As part of the 1960 master plan, each neighborhood was designated with its own church, school, and sports facilities, centralized around a shopping area. A green belt, known as the 'green arm,' was created between these facilities, providing a safe passage for residents to navigate the neighborhood without interference from traffic. This strip was intended for green spaces and community amenities. The buurt thrived as children and women predominantly stayed within, while men commuted outside for work.

Today, the neighborhood is more diverse, altering the buurt scale. Facilities are now more dispersed, and residential areas are encroaching into the green arm, disrupting its structure and diminishing its quality. Moreover, societal patterns have shifted, with more women in the workforce, resulting in a neighborhood that seems dormant during the day. Residents feel less connected due to unfamiliarity, leading to increased incidents of crime.

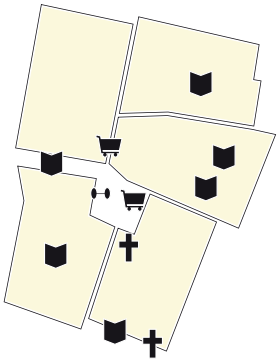
'Buurten' Westwijk (Own work)

1960

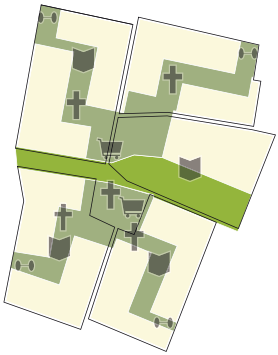


Pillarisation of facilities

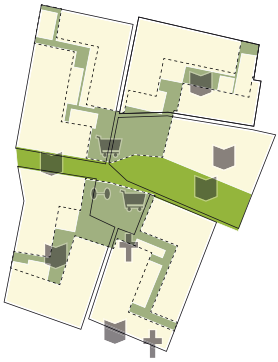
2020



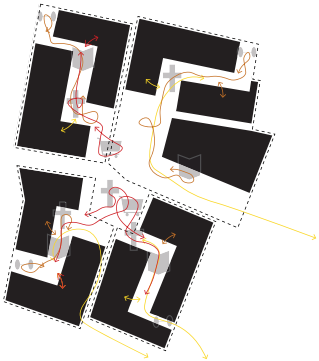
Spread out facilities



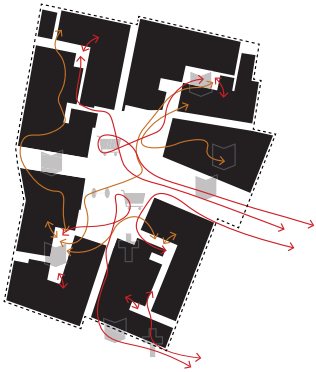
Green structure



Green structure obscured

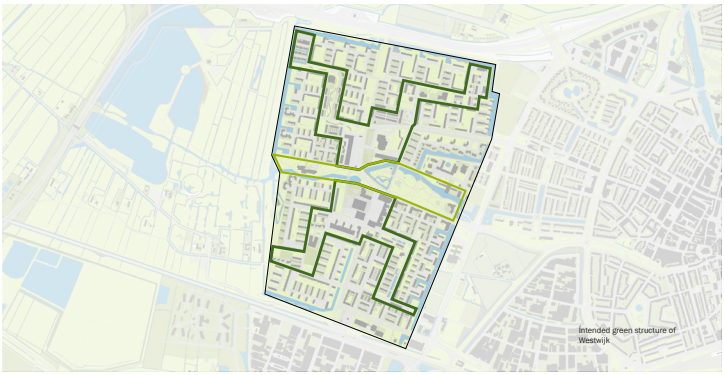


Intended user patterns



Shift in user patterns

Westwijk (Own work)

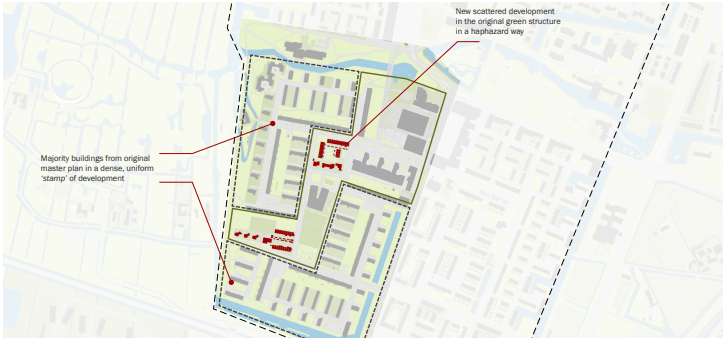


Arm structure (Own work)

Houses in green arm (Own work)

When looking at a less abstract form of the neighborhood, the green arm is also visible. The neighborhood consists of different scales: neighborhood, 'buurt' , residential field, stamp, street, and house. In the Hoogkamer neighborhood, there's a missing stamp, and the residential field remains the same, resulting in a missing scale. Additionally, within the green arm, various houses have been built, leading to an obscured structure. Therefore, the location addressed in the research will focus on the green arm in the Hoogkamer neighborhood.

The residential plots will remain as they are. this is because these work as a structure, they are owned by local residents and because of the use of new materials. In addition, obcuren objects are less likely to enter this structure.



Hoogkamer (Own work)

Project site (Own work)

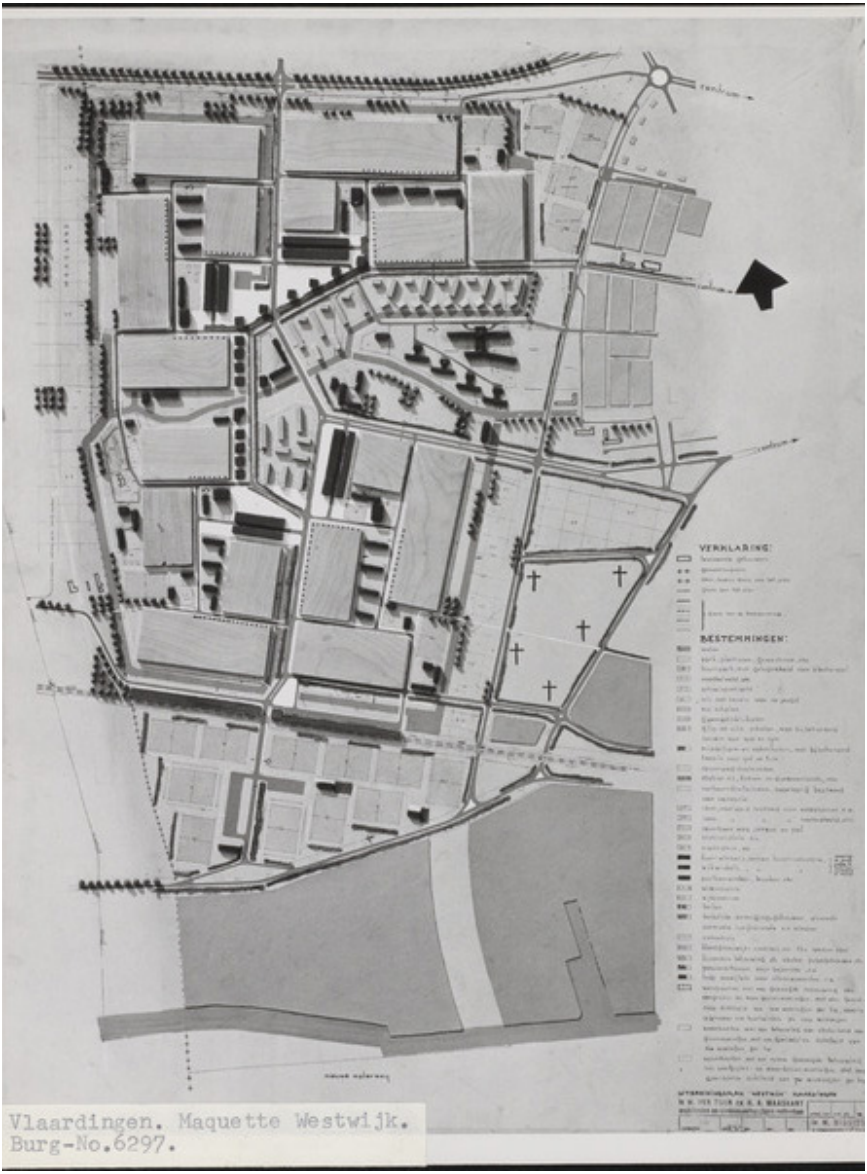
Westwijk public buildings 1960(Own work)

Westwijk public buildings 2005 (Own work)

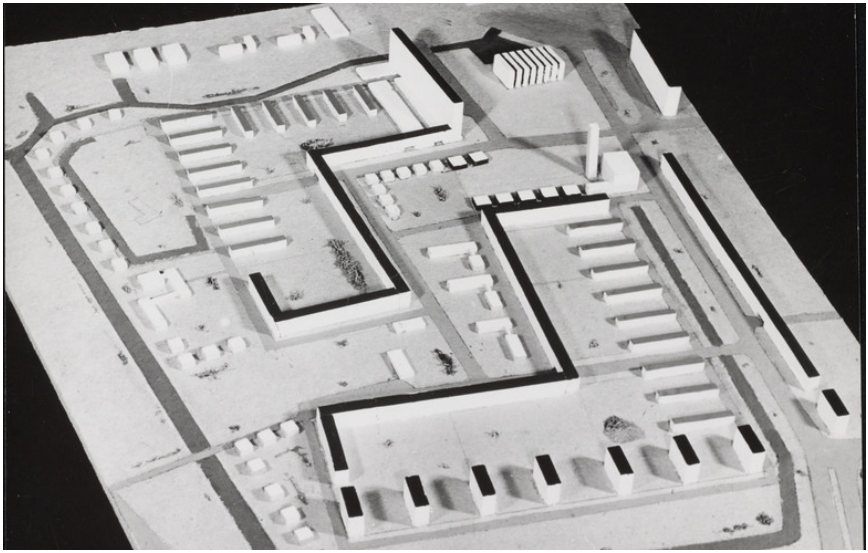
Westwijk public buildings 2020 (Own work)

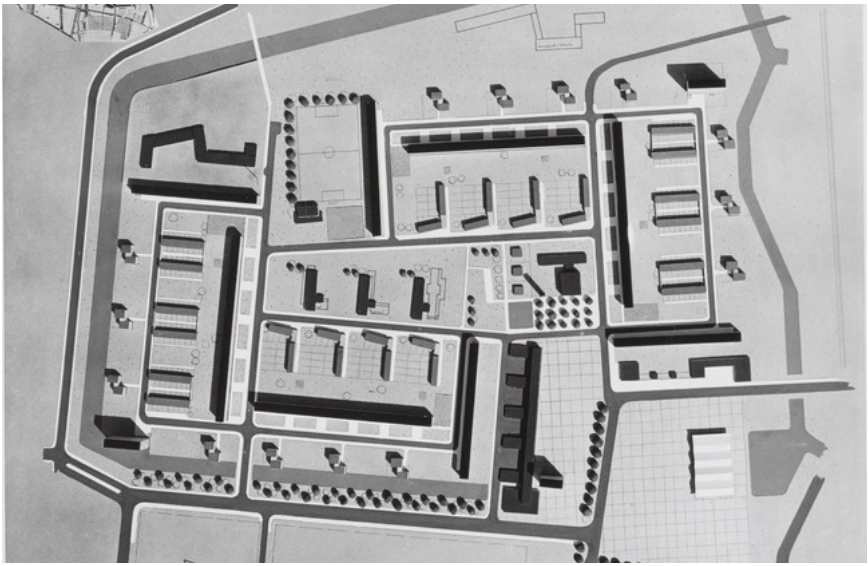
In the initial design, the arms were primarily intended for the public functions of the neighborhood. Over the years, the importance of these functions diminished as the community diversified. Around 2005, new buildings began to emerge in the neighborhood due to available development space. Subsequently, more structures were added as the functions traditionally associated with churches waned. Consequently, the arm has evolved, losing its identity as a purely public space. Presently, a distinct central hub has taken shape, amalgamating various functions, including sports and retail. With these functions gone, there is little social cohesion and, according to research, this creates insecurity.

social cohesion and nuisance and insecurity (Leefbarometer, 2020)



Design Westwijk (Archive Nieuwe Instituut)





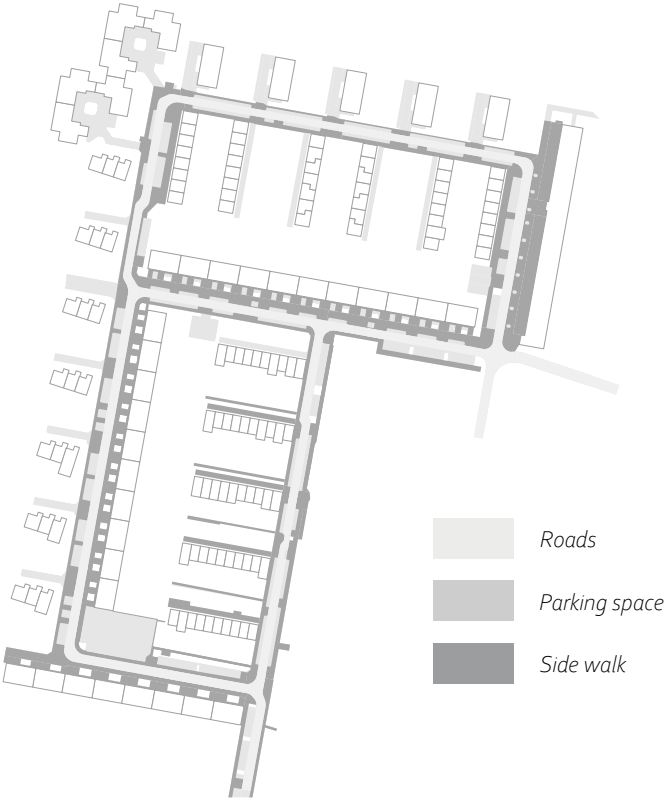
Design Hoogkamer. (Archive Nieuwe Instituut)

Mobility

Car

The 'Buurt' within the district are divided by the main road that ensures people can leave Westwijk the residential fields are reached by a road attached to the main road. When a design is made for the arm, these roads must remain intact so that the residential fields can still be easily accessible.

Hoogkamer with the main road and road to the residential fields (Own Work)



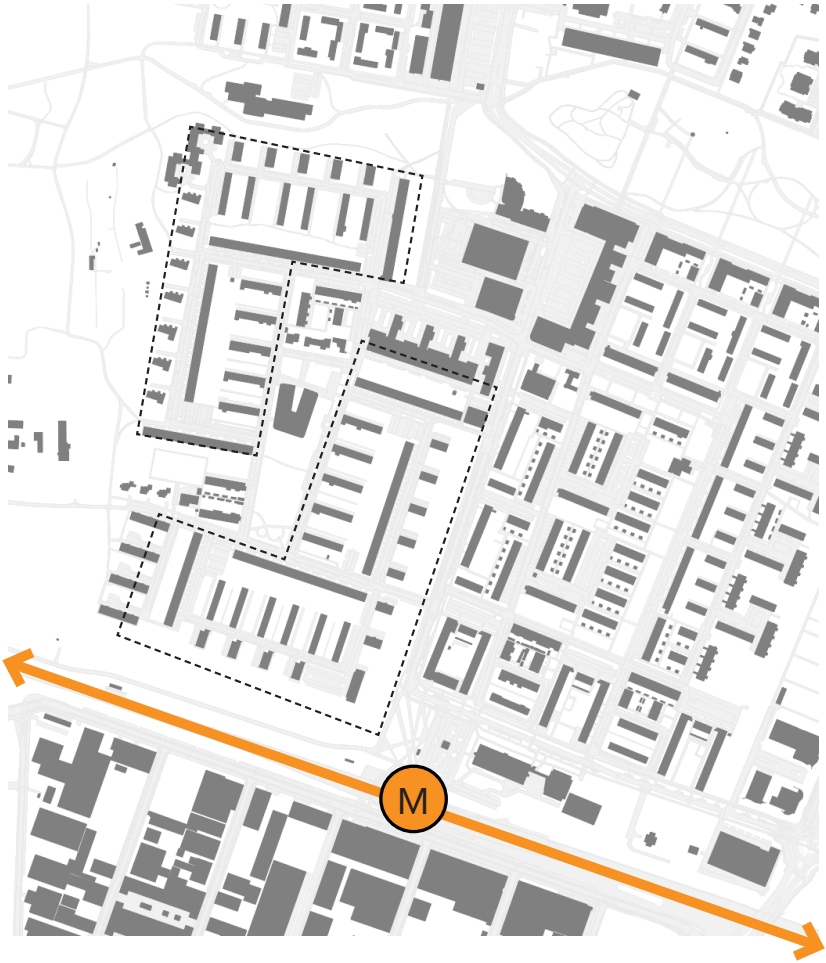
Mobility in the residential fields (Own Work)

Looking at one of the residential plots. It becomes clear that there is almost as much space for the car as there is for pedestrians. One way to reduce the car in the street scene is to use shared traffic. In addition, other means of transport like public transport, cycling or walking should be encouraged.

Metro

The RET metro network runs along the neighborhood. At Vlaardingen West station, metro B stops consistently, while metro A stops only during rush hours. This ensures a reliable metro connection between Rotterdam and Westwijk. Additionally, Schiedam Station is just a 9-minute metro ride away, offering extensive train services to numerous cities across the Netherlands.

Metro network Rotterdam (Own Work)



Metro station Vlaardingen West (Own Work)

Buildings

There are several buildings in the arm. The functions of the buildings and when they were built are discussed here.

The green arm Hoogkamer (Own work)

1. Villa

The three villas were built in 2007. The initial design is the same but several additions have been made over the years. One of the house (2A) is 193 m2 living area and has a plot size of 577 m2 (Funda, z.d.). Before the villas, this was part of sports facility.

2. Dog school woef

Dog School Woof is in a building which was built between 1985 and 1995 built and was part of several sports complexes. The dog school only teaches on Saturday mornings and Sunday afternoons (Hondenschool Woef, z.d.). The grounds are enclosed so the premises cannot be used otherwise.

3. Dura Coignet

This building was conceived at the original design. The complex includes an assembly building project. There is room for 64 dwellings and there are storerooms on the ground floor.

4. Rowhouses
The terraced houses were built in the same year as the villas. The houses have been extended at the back and at the top.

5. Park
The park is messy, many of the paths are overgrown and there are many plant species taking over the park such as brambles and nettles. This is one of the few places in the district where nature can take its course, though. The park was built in 2011.

6. IKC Prins Willem Alexander
This in a child centre which is an established one in a new building (2011). Here there is room for children aged 0 to 13. There is childcare, primary school and after-school care.

7. Villa

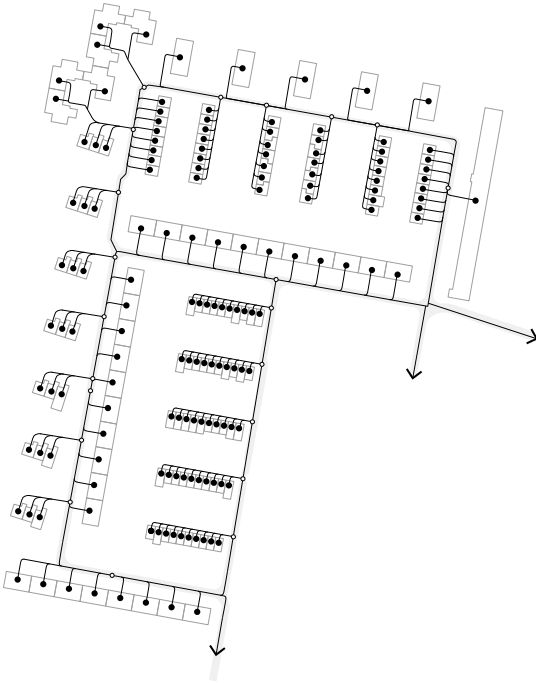
The villas were built in when the district was completed. One of the villas was demolished and an office replaced it. The surrounding villas are quite overgrown, making them hard to see

8. Rowhouses

A church used to stand here but I 2015 houses were built here. The houses consist of row houses of two and three storeys. Behind the houses is a lawn where the church's bell tower can still be seen.

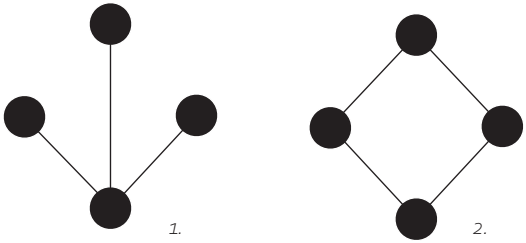
Continuity

When examining the layout of the neighborhood, it becomes evident that there are many dead-end streets (Hanson & Hillier, 1989). This results in fewer passersby who do not need to be in those streets, leading to reduced interaction between residents and their surroundings. A design with more thoroughfares would enhance connectivity and encourage social interaction. The benefits and mechanisms of such a design are explored in greater detail in the research. In addition, tall buildings create anonymity, making people less likely to seek interaction with neighbours living in high-rise buildings. This is also evident in the diagram where flats are seen as one dot.



1. Discontinuous configurations in Westwijk, Vlaarding based on The Social Logic of Space" (Hanson & Hillier, 1989), (Own work)

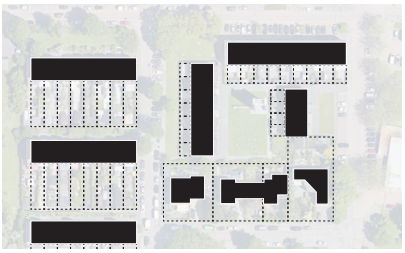
1. Discontinuous configurations in Westwijk, Vlaarding based on The Social Logic of Space" (Hanson & Hillier, 1989), (Own photo)



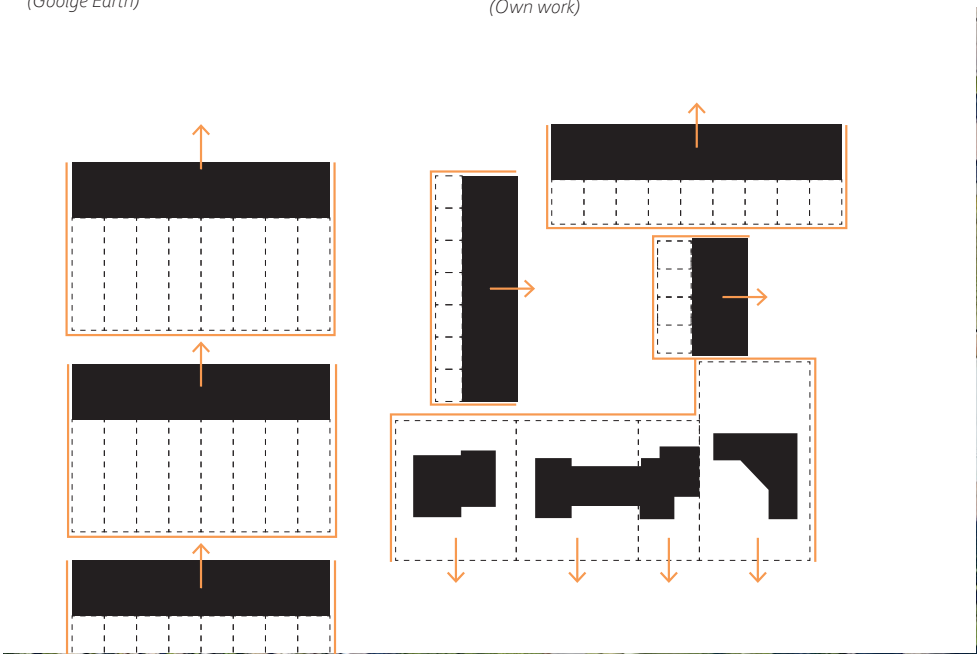
1. Discontinuous configurations and 2. Continuous configurations fram "The Social Logic of Space" (Hanson & Hillier, 1989)

Orientation

Hoogkamer Residential fields and Green arm (Goolge Earth)



Hoogkamer Residential fields and Green arm; owners (Own work)



Hoogkamer Residential fields and Green arm; borders and orientation (Own work)



Fences as demarcation which means there is no connection between the neighbourhood and residents but also between residents and landscape. (Own photo)


Hard boundaries of buildings provide little interaction between inside and outside. (Own photo)

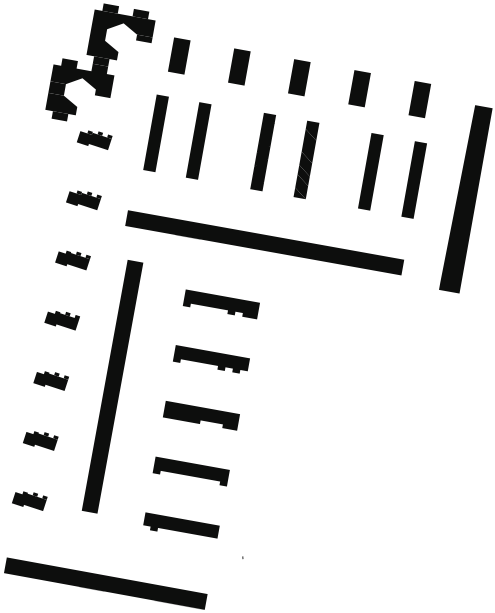
When examining the layout of the arm, as well as the arrangement of the residential blocks, it's noticeable that all edges are strongly defined and oriented towards each other's closed sides. this creates less interaction between residents and the street (Alexander, et al., 1997). As a result, there is less social control.

Open space

The outdoor space is what remains between buildings (Alexander, et al., 1997). Unfortunately, it is often underused. There's a crucial distinction between negative space and positive space. Negative space lacks shape, while positive space is formed by surrounding buildings, creating a defined area. Positive spaces with clear boundaries tend to make people feel more comfortable and are more frequently utilized. On the contrary, negative spaces are often overlooked and can feel uncomfortable. It's ingrained in our instincts to seek out positive environments. For example, a person is less likely to choose an open field but would prefer to sit under a tree for shelter.

negative and positive space between buildings. from A pattern language Cities, buildings, construction (Alexander, et al., 1997)

When observing the architectural layout in the residential districts of Westwijk, a considerable amount of negative space is evident. Numerous elongated blocks stand isolated in space, contributing to an undefined spatial experience that is not perceived as pleasant. To transform the space of the arm into more of a living area, there need to be expored how the urban pattern can create more positive spaces



Residential fields negitive space (own work)

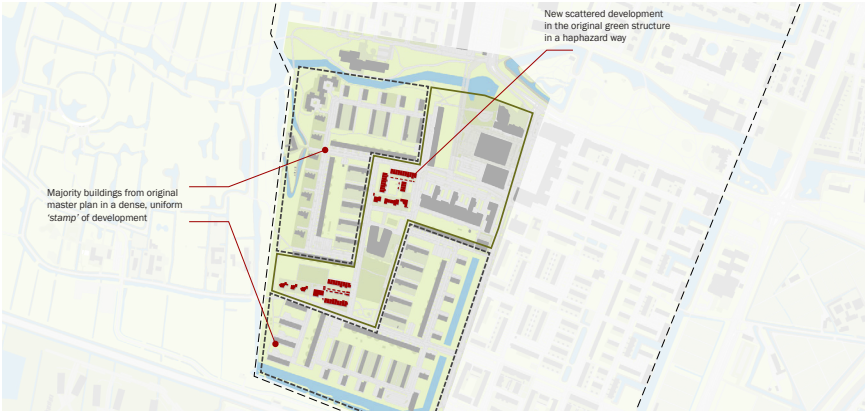
Nature

Within the district, there is plenty of outdoor space. However, short-cropped grass has often been chosen instead of diverse greenery. This ensures that there is little biodiversity Aghina et al (2023). More biodiversity ensures that the district is climate adaptive, and can serve as a habitat for more species.

Vision

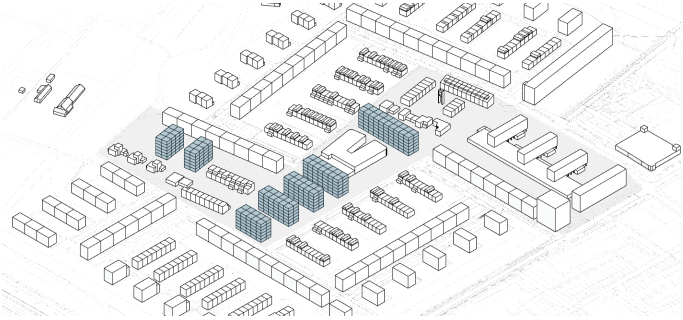
Density studies

As mentioned earlier, within the graduation case study, the focus is on the green arm. This is done because many developments are taking place in the arm that do not provide much cohesion between neighbourhood residents and are strange structures that stand on their own. The arm is no longer legible and hardly serves as a 'Neighbourhood strip' for shared functions. By building more in the arm, there is less room for poorly planned designs. Besides, there is room for new structures here and it is better to compact a neighbourhood than build a new one when looking at existing facilities.

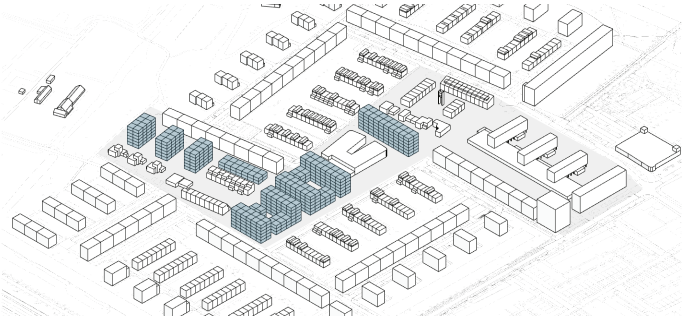


Hoogkamer developments in the arm (Group work)

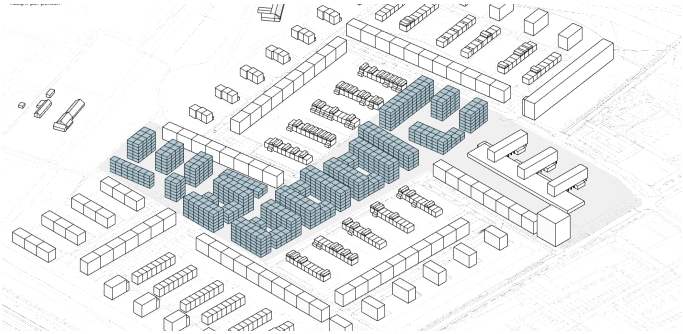
For an initial investigation, the group conducted a study on the maximum capacity of the area, based on the average living space of a resident of Vlaardingen (Centraal Bureau voor de Statistiek, 2018). However, this closely resembles previous developments where the context was not taken into account.



Low density development proposal = 500 people (46m3 per peron), (Group work)



Medium density development proposal = 1000 people (46m3 per peron), (Group work)



High density development proposal = 1500 people (46m3 per peron), (Group work)

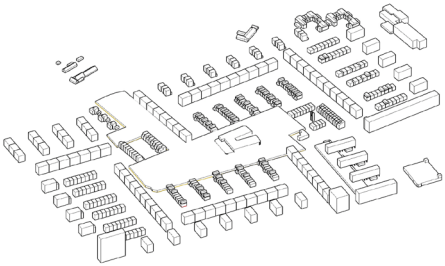
When examining the layout of the arm, strange structures have been built, which have little to do with the context just like the density study. This raises the question of whether these are truly quality spaces or rather a density strategy based on numbers. Additionally, a building is part of a larger whole and should be considered within the context of the new structure. When creating a new design, it is essential to carefully consider the quality of the space.

quantity

quality

?

Hoogkamer Residential fields and Green arm; owners (Own work)



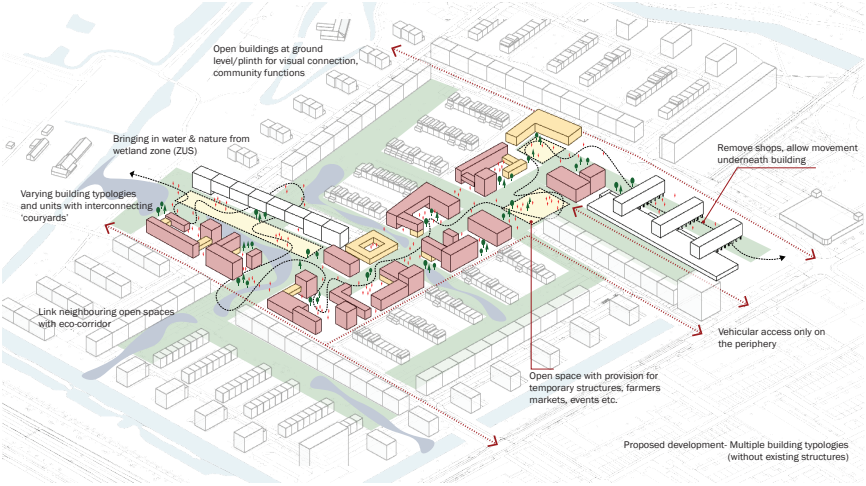
Hoogkamer Residential fields and Green arm; empty space (Own work)

By fully occupying the available space, there's no room left for projects initiated by developers. Consequently, it becomes challenging to erect structures that are not interconnected. Nevertheless, we still have intermediate spaces, and as highlighted in the book 'Tabula scripta,' it's crucial to utilize these open areas for meaningful purposes; otherwise, they remain underutilized. when other projects are built, they will have to contribute something within the neighbourhood and not just be a numbers project.

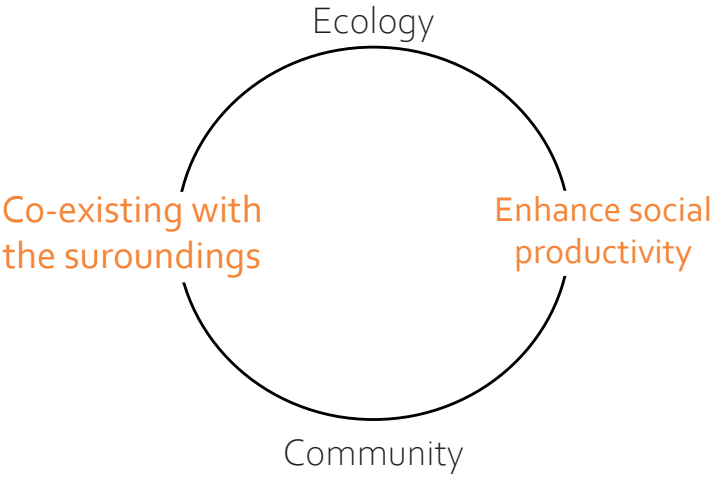
Hoogkamer Residential fields and Green arm; owners (Own work)

Vision

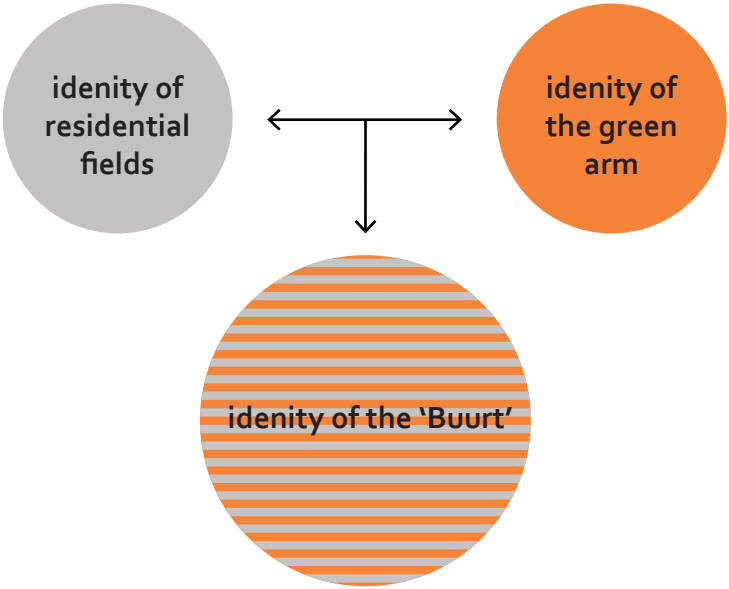
For the redesign of the green arm, a vision has been crafted focusing on two main aspects: coexisting with the existing environment and promoting social productivity. This entails responding to the ZUS plan and the post-war neighborhood design. Additionally, ensuring safety and diversity within the neighborhood is also a priority. For P1, an initial sketch of the plan has been created, accompanied by a density study so based on quantity.



Vision P1 (Group work)


Ecology
Co-existing with
the suroundings
Enhance social
productivity
Community

The neighborhood is divided into residential fields and the green belt. Considering that the residential fields possess their own identity and remain unchanged within the plan, the treatment of people, nature, water, etc., there will be tailored to each specific aspect. To amplify diverse perspectives, the identity of the green belt will take an opposite approach to these voices, allowing space within the neighborhood for different viewpoints. (See the various voices in the residential fields and the green belt alongside.)



nature

human-oriented nature	⟷	nature-oriented nature
water extraction	⟷	water conservation

social

homes for traditional families	⟷	homes for diverse lifestyles
individual	⟷	collective
car-oriented	⟷	slow traffic-oriented

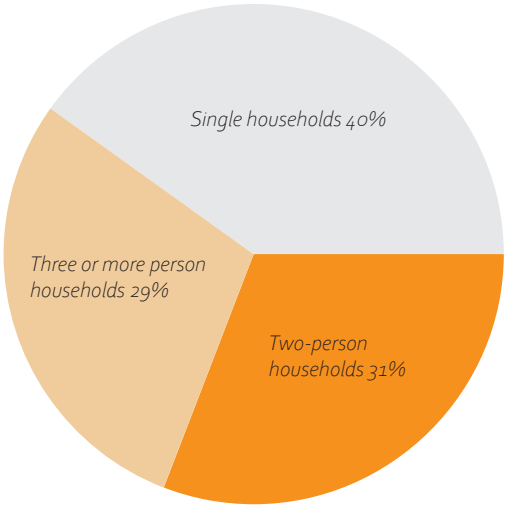
design

permanent	⟷	temporary
discriptive	⟷	non-discriptive
negative space	⟷	Positive
Top-down	⟷	bottom-up

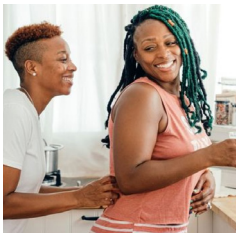
Target group
Humans

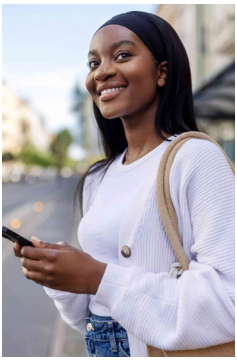
40% of households consist of one person, and 32% consist of two-person households (Central Bureau of Statistics, 2024). These compositions are only expected to increase. The average household consists of 2.1 people.

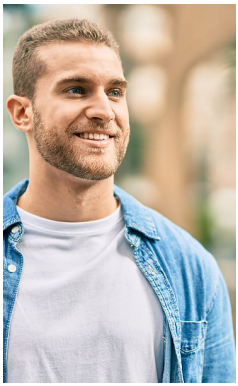
Conversations with residents in the neighborhood have revealed that many people want to live in Westwijk, but their current housing does not fit their situation. Many are not interested in large communal housing, especially if they are used to privacy in their older age. Therefore, more homes need to be created for one- or two-person households, which will be the target group.



Household compositions (Centraal Bureau voor de Statistiek, 2024)







Target groups

Target group
Non-humans

Within the neighborhood, space must be allocated for various types of plants. This should be done to improve biodiversity and thereby better withstand climate change.

Animals need places for reproduction, shelter, food, safety, connection to the environment, and variation (Aghina et al., 2023). An example of this is the House Sparrow. It typically sleeps in dense shrubs and climbing greenery (shelter). A House Sparrow seeks refuge in dense greenery when threatened (safety) and uses a nest box facing northeast for breeding (reproduction). Food must be very close by, and variation is important because a House Sparrow needs to find food year-round, and the young eat different things than the adults. This varies for each species. Since the project will not be a high-rise development, space must be made for the encircled species shown below.

Birds

- K *Titmouse*
- P *Blue tit*
- M *Blackbird*
- H *House sparrow*
- Zr *Black redstart*
- Sp *Starling*
- Gz *Swift*
- Hz *House swallow*
- S *Peregrine falcon*

Mammal

- D *Common dwarf bat*
- T *Bicoloured bat*
- L *Late-flying bat*
- Ee *Squirrel*
- E *Hedgehogs*

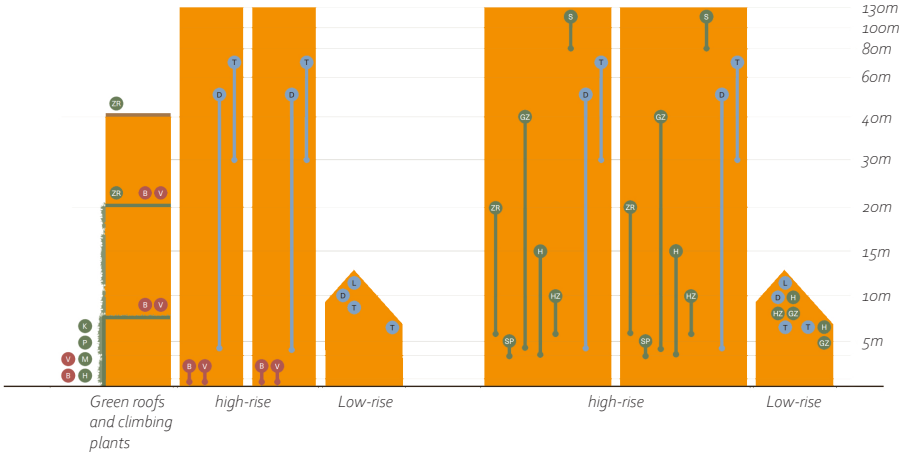
Insects

- B *Bees*
- V *Butterflies*

Mammal

- P *Pool frog*
- R *Natterjack toad*

What is needed in the environment of the target species? (Aghina et al., 2023)



Which species can stay where in and on the building? (Aghina et al., 2023)

Design

Water

The way we deal with water is often defensive. We build dykes to keep the water out and we discharge rainwater through the sewer system only to clean it at a treatment system.

The aim of the design is to embraces the water. It looks at the space that water needs. Water can create this space itself. There is sand on the site for raising the neighbourhood and through erosion processes, water itself can create the space it needs.

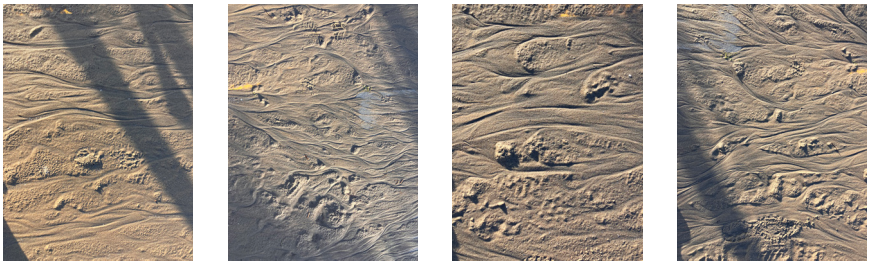
To research these processes, a model was made after which the water made roads in addition to looking at different erosion structures and a toolbox was made to simulate these processes in the district. It forms the starting point for the redesign of the arm. Westwijk is locaded next to the wedland for birds.

National productive park Delfland' (ZUS)

Model before water (Own work)

Model after water (Own work)

While creating the model, other streams found at the site were also studied. These are further used to predict flows. These can be seen below. Alongside is a conclusion based on the study.

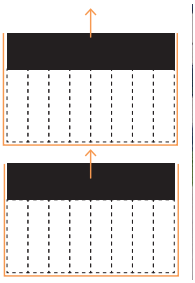


Sand in Scheveningen (Own picture)

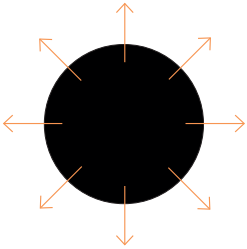
The water would become too narrow in the proposal because of this it has not returned to the neighbourhood in this way. However, this has been a start for nature-inclusive building.

Design Pricepals

As previously mentioned, the orientation of the buildings is very one-sided and often lacks connection with each other. When back-to-back houses are designed, a building is oriented towards more sides, creating a stronger connection with the surrounding area.

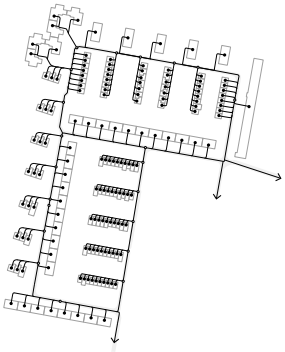


Borders and one-point orientation

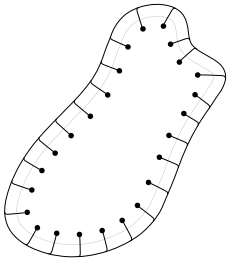


Less borders and more orientation

The neighborhood has many dead-end streets. A pathway with a more organic shape is more inviting for people to pass through. This creates more movement and a more pleasant outdoor space.

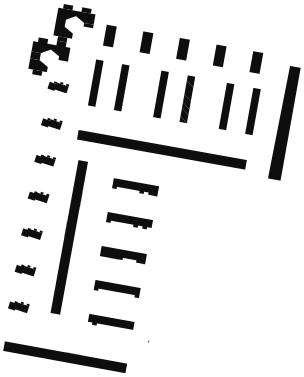


Discriptive space



Non-discriptive space

Negative space is often perceived as unpleasant. People tend to feel more comfortable in sheltered areas. Therefore, having more positive space is better.

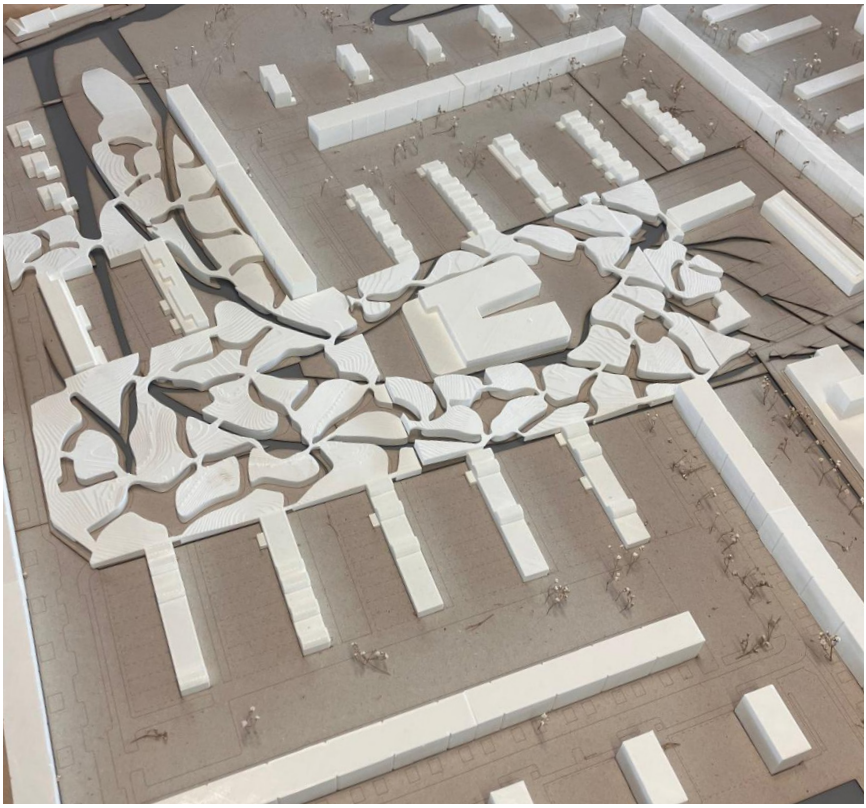


Negative space

Positive space

Design P2

The design created for P2 is based on the structures that make the water and the contradictions mentioned earlier. The design is therefore very organic and opening into different squares. However, this is very site-specific and therefore difficult to repeat in other places.



Model P2

Green arm positive space (own work) first concept (02-2024)

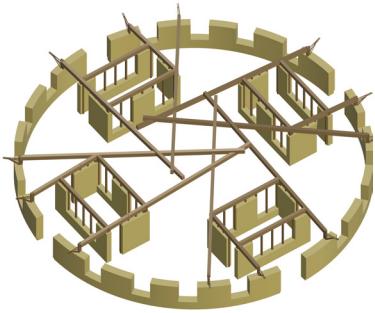
square with shared and social functions, orange marks the different squares throughout the plan. (own work)

square with shared and social functions (own work)

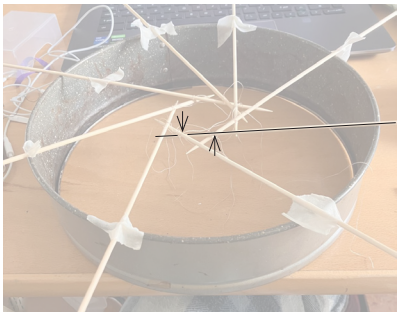
Construction

In P2, the shapes were very organic, and the design principles discussed earlier were applied. However, the shapes were made very specific, making repetition difficult. Therefore, a basic round shape was devised that is easily reproducible, making the design useful in other locations for addressing the housing crisis.

The supporting structure is designed for the circle, with the roof beams supporting each other in the center (see model below). These models are commonly used in permaculture. The structure is made of wood to create a biobased construction. The hempcrete serves as a diaphragm, maintaining the stability of the structure.



Test with self-supporting structure..(Own work)

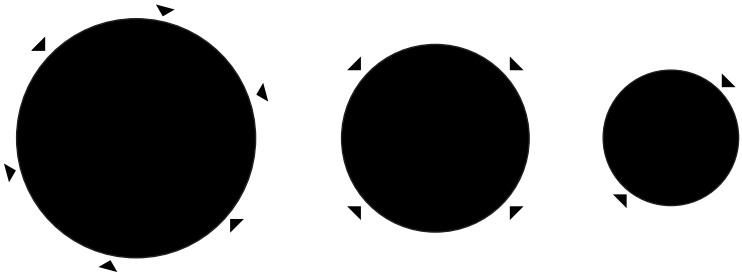


Forces acting on the structure in the test.. (Own work)

Axonometry of the supporting structure. (Own work)

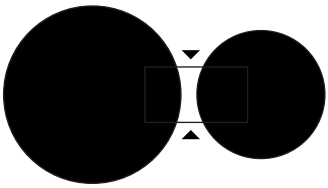
Urban design

Three dimensions have been created based on common sizes in the neighborhood. The large diameter R=14 is based on the dimensions of a terraced house with a garden in the original design. R=11 is based on the dimensions of the garden and house in the new developments. R=8 is based on small homes to add another typology.

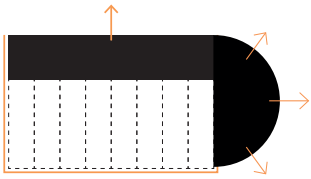


Houses; R=14m (6 houses), R=11m (4 houses) & R=8 (2 houses) (Own Work)

In addition to housing, shared spaces will also be created. Housing types R=11 and R=8 will be linked as they have the most facade surface. Additionally, the housing units can be halved, which helps address strict boundary issues.

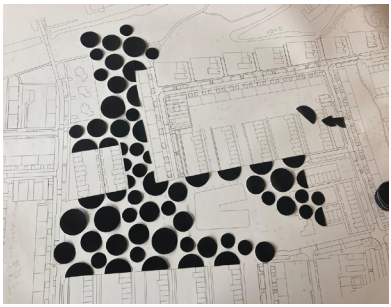


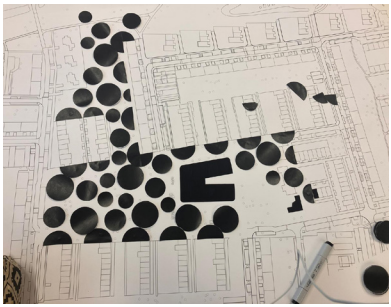
Shared spaces (Own work)



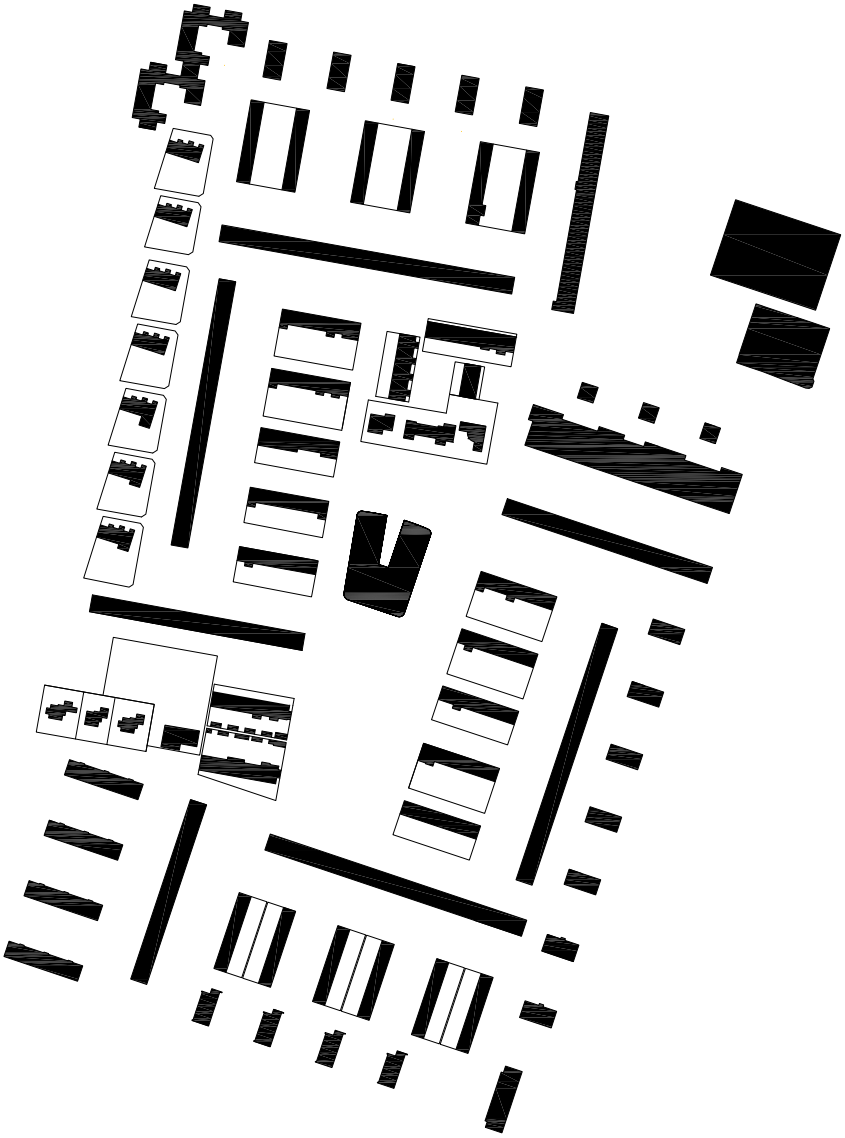
Orientation (Own work)

Various tests were conducted for the creation of the neighborhood, ultimately leading to the interlinking of housing types R=11 and R=8.

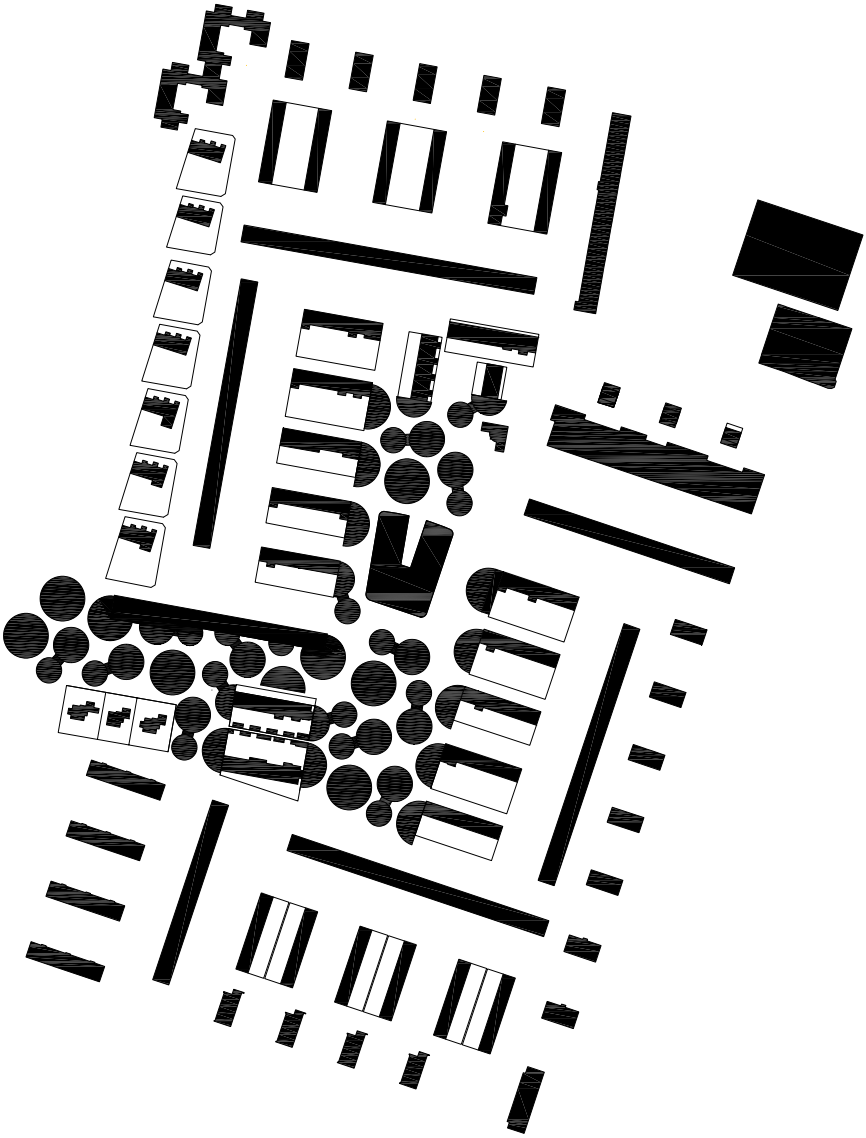




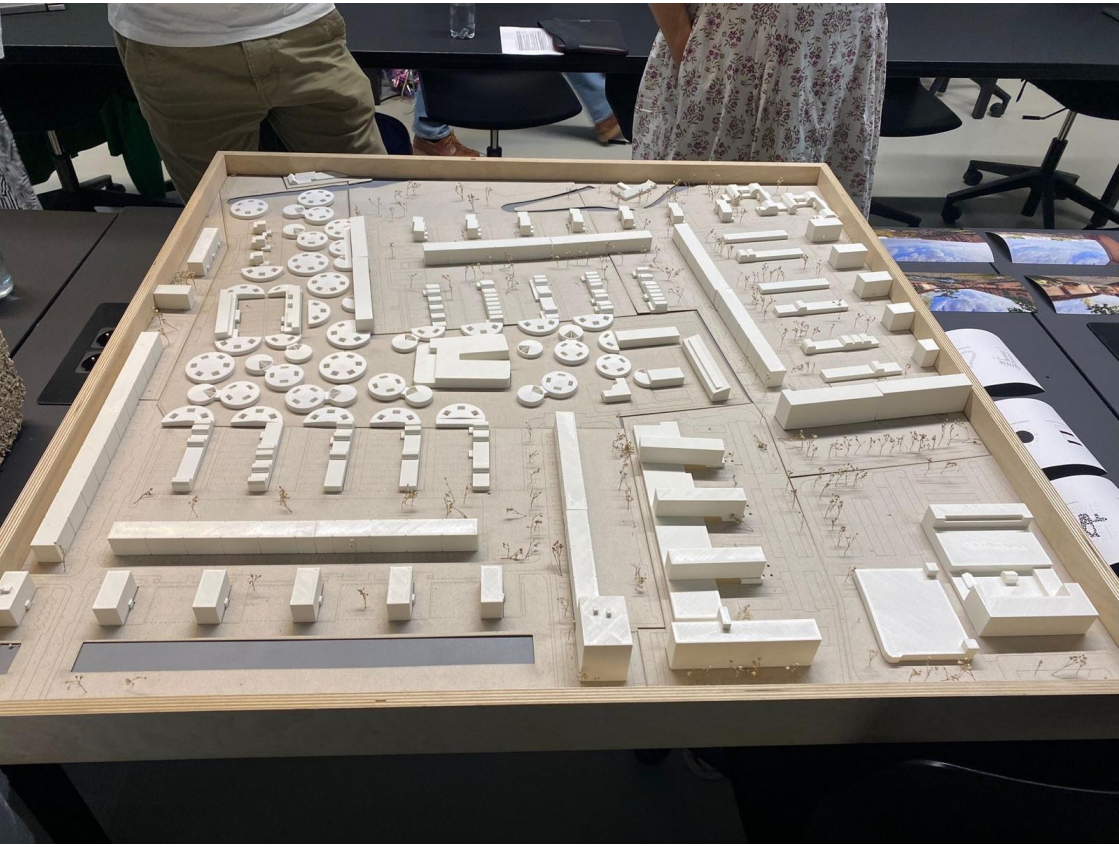
teste urbanplan (own work)



Buildings 2024 (Own work)

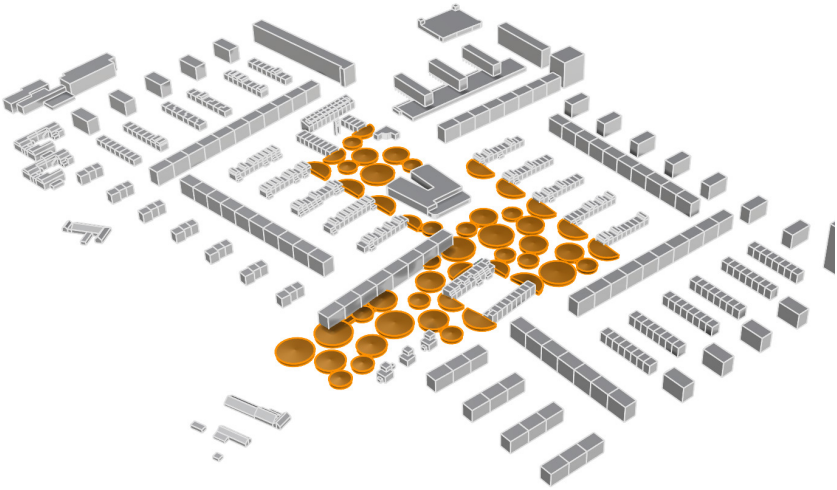


Buildings design (Own work)



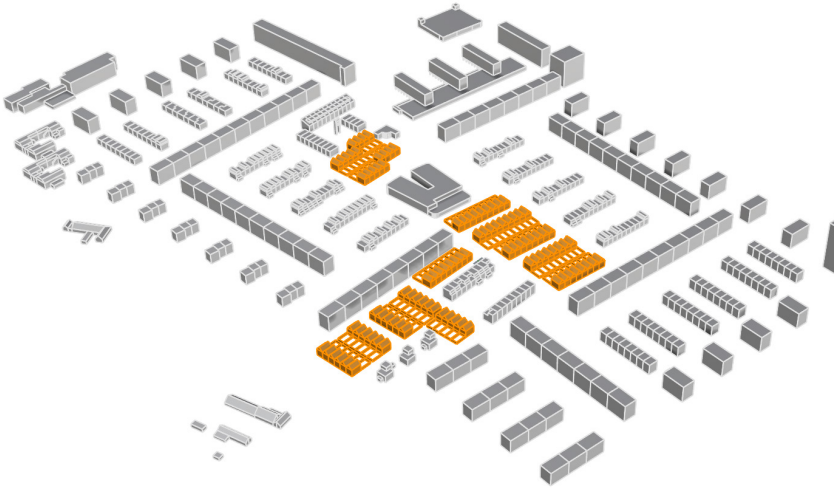
Traditional building

When we fully develop the area with traditional houses, fewer houses can be built. This is because these houses are taller and therefore need to be spaced further apart. However, a redesign offers a new perspective on urban planning and provides space for new target groups.



155 houses
82 ground surface BVO

Design (Own work)



93 houses
54 ground surface BVO

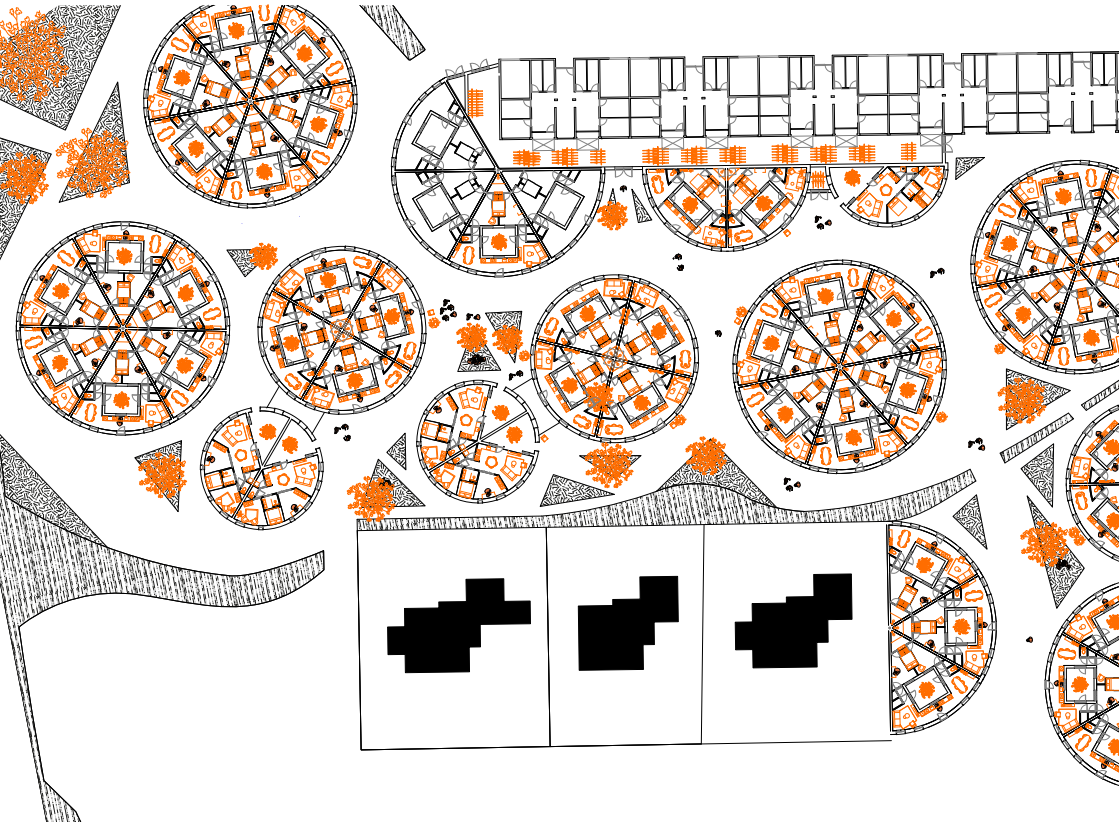
Design (Own work)

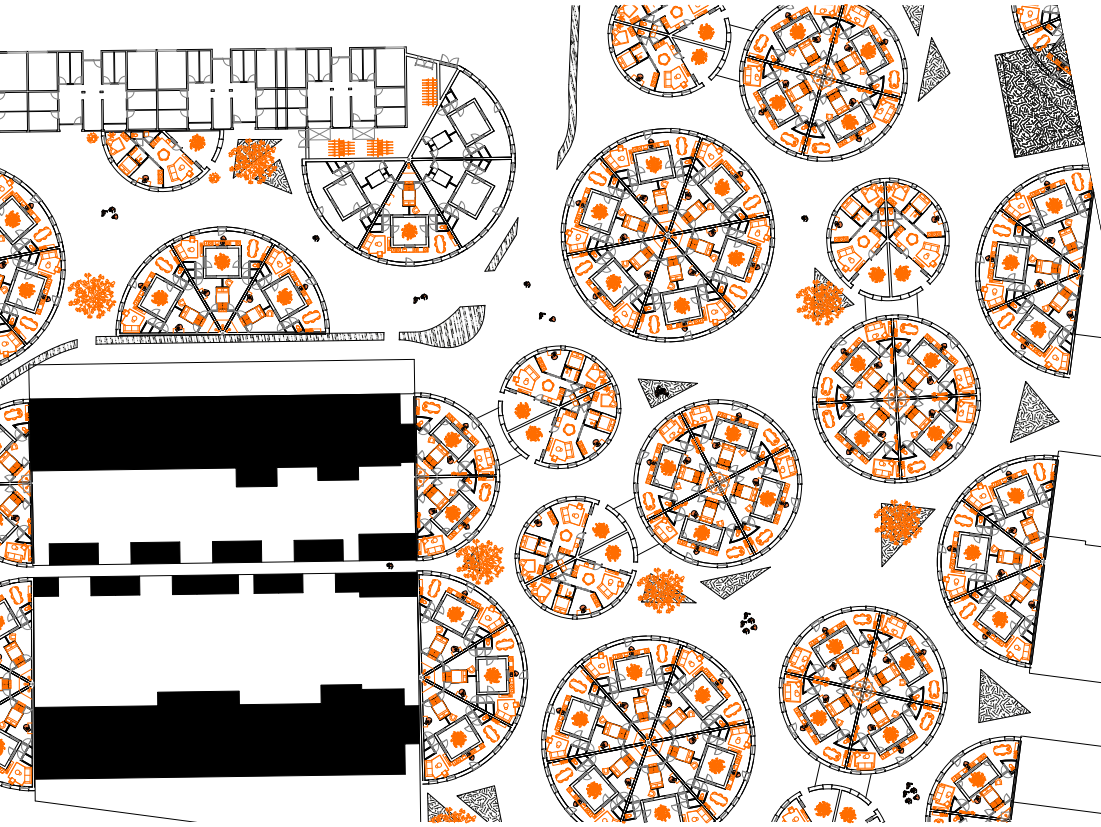
Urban design

Because the house is so simple and based on construction principles, it is easy to replicate. Therefore, this is not only applicable to the area in Hoogkamer but also to other locations. This house provides a solution to the waste problem by being bio-based in design. Additionally, it offers a new typology for a target group that is common but often overlooked.

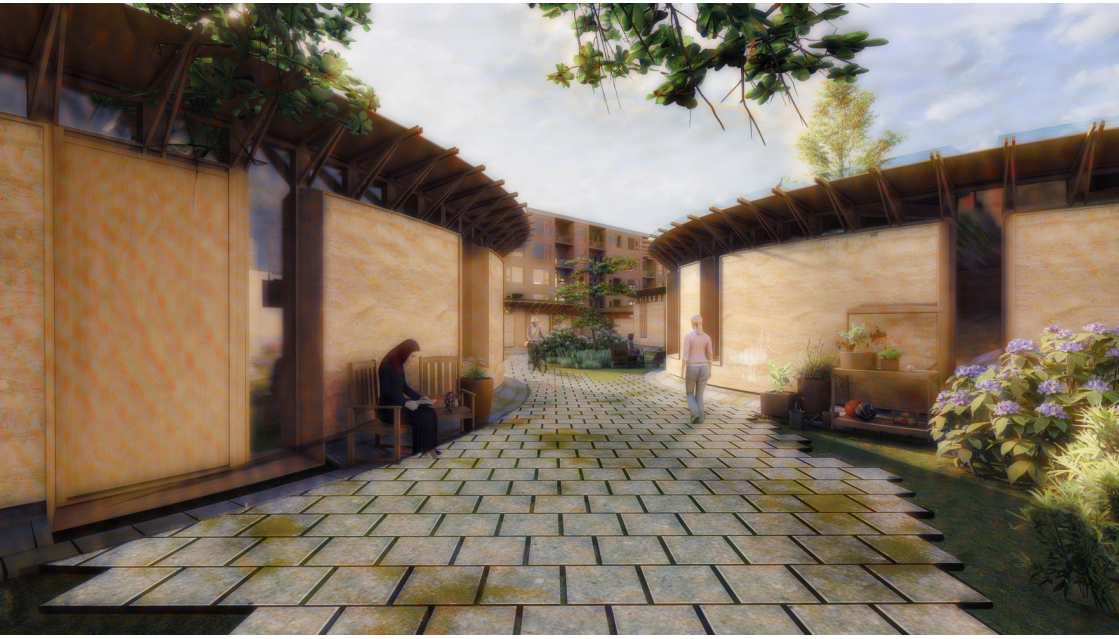
Urban design (Own work)

Urban plan





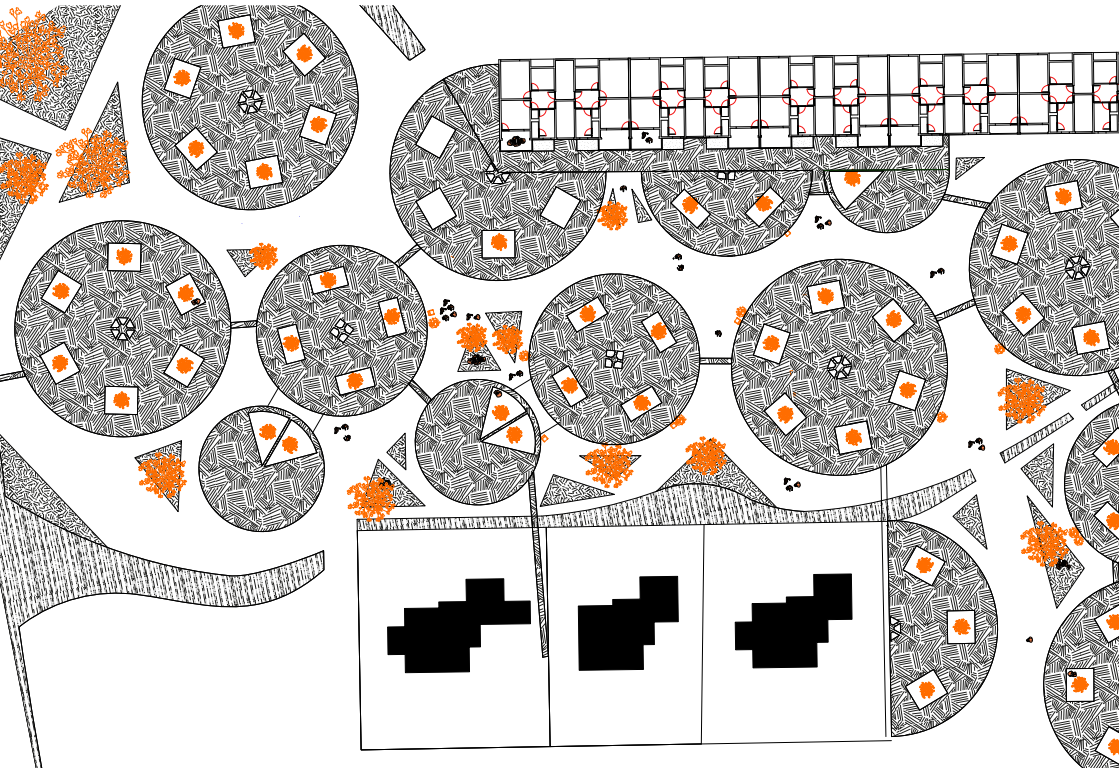
Urban plan 1.1000 (Own work)

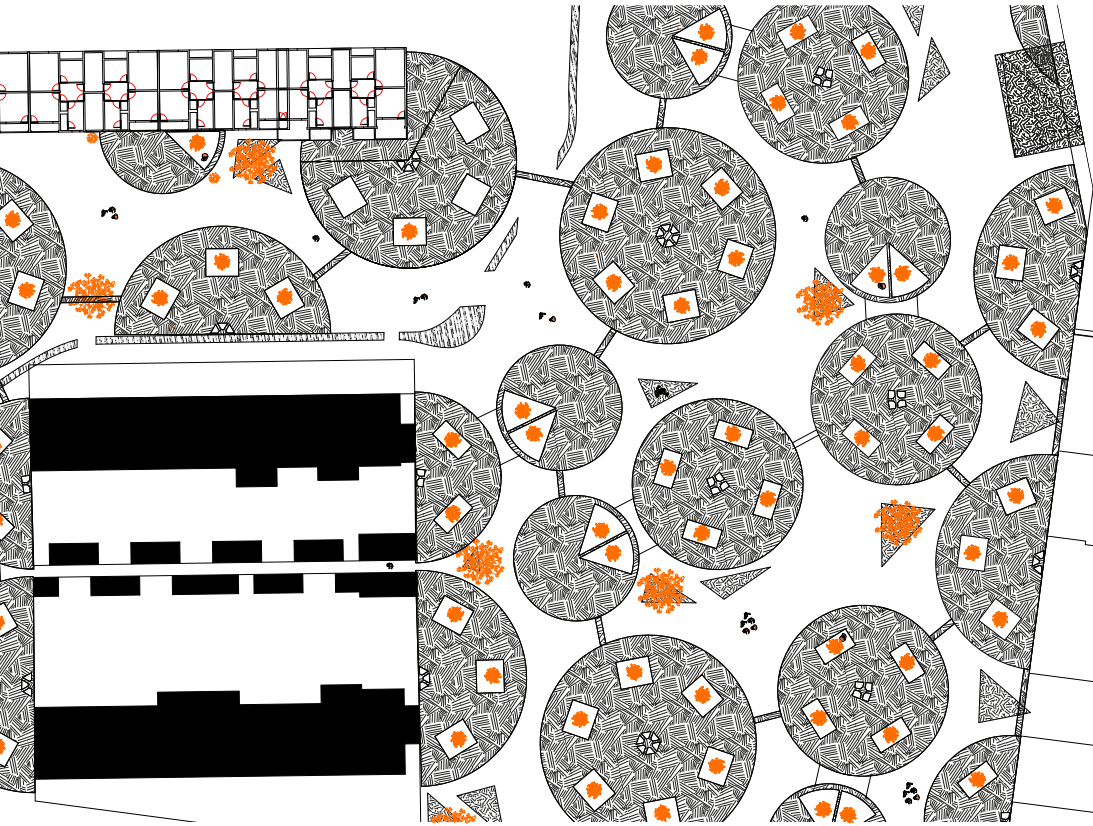


Small street (Own work)

squire. (Own work)

Urban plan





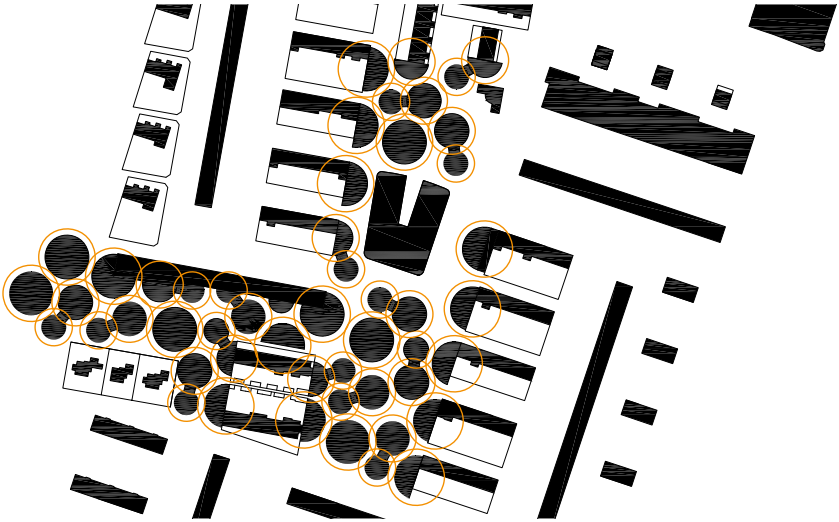
Urban plan 1.1000 (Own work)

Insite the existing building (Own work)

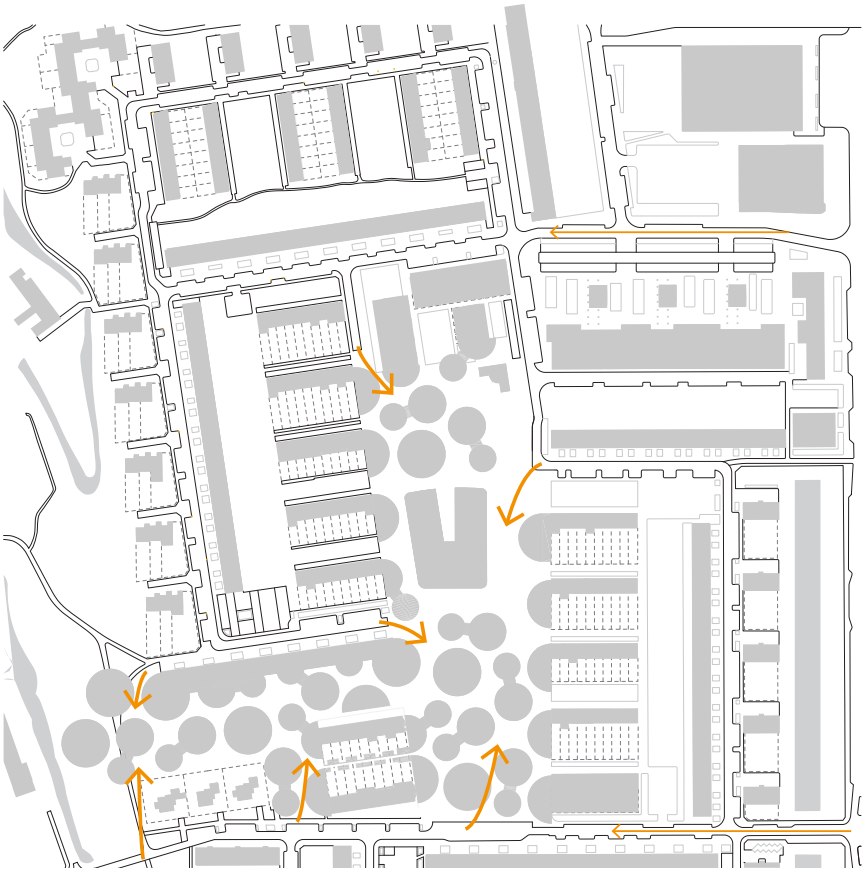
Roofs (Own work)

Emergency services

The roads have a minimum passage of 4 meters, allowing a car to pass through and people to walk alongside. The main roads are still connected, allowing emergency services to easily reach the homes (see the image on the next page). Additionally, an emergency service can be 40 meters away from the house ((Bereikbaarheid Voor de Brandweer - Brandweer, 2024), ensuring that the homes are sufficiently accessible.

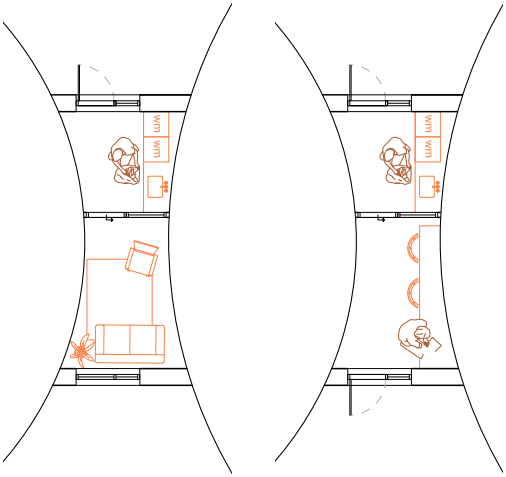


4m offset between buildings (Own work)

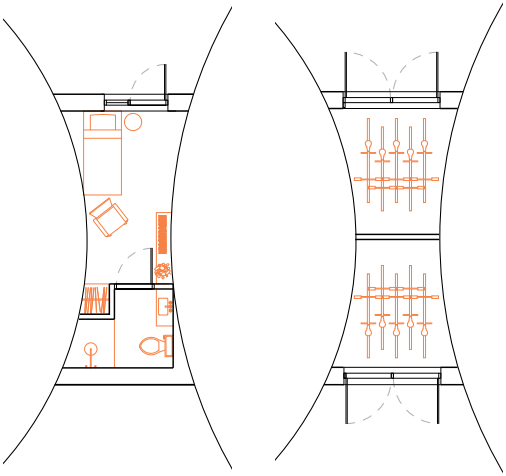


Connection whit the road (Own work)

Shared spaces



Laundery places, with meating spaces or workplace

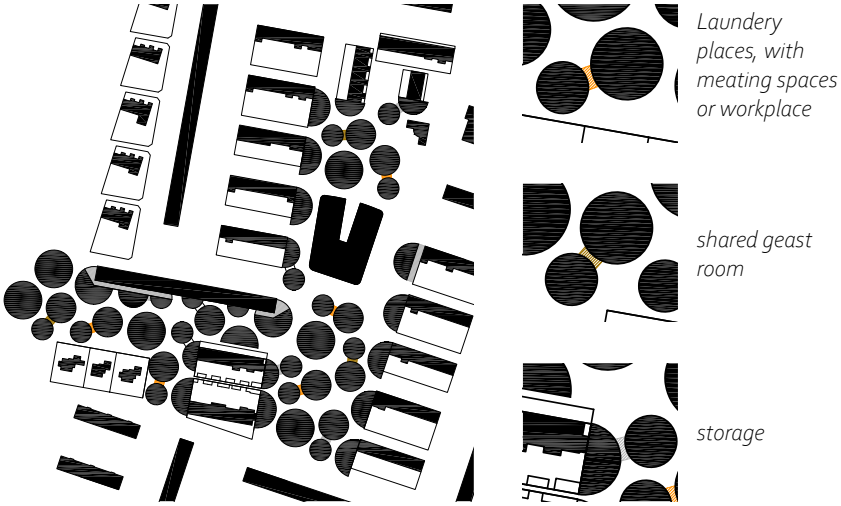


shared geast room

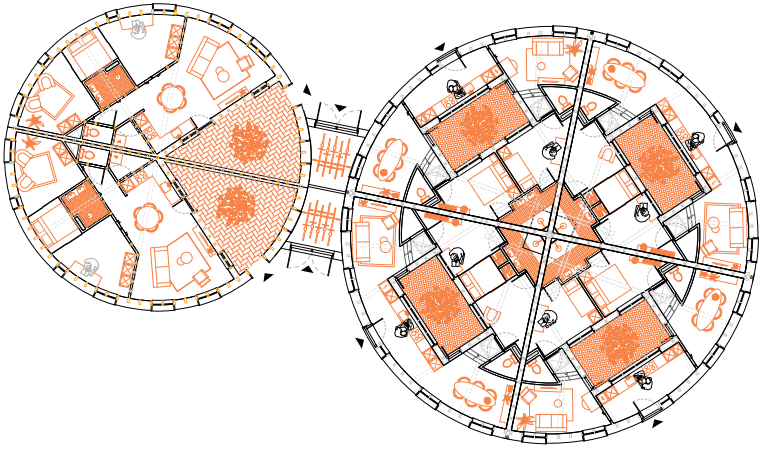
storage

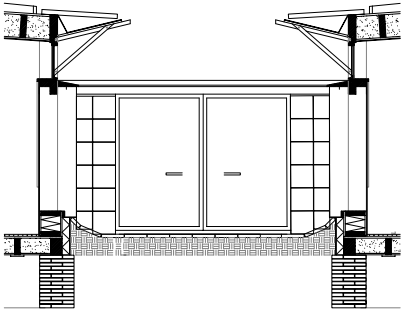
Shared spaces 1.100. (Own work)

As previously mentioned, establishing diverse communities is valuable not only for social cohesion but also for the equitable distribution of domestic tasks. Examining urban structures, the nucleus of a community often resides in a square where people converge and community activities unfold. Following Alexander et al.'s insights (1997), central hubs thrive when accessible through multiple means, with each hub serving a unique function, facilitating connections among like-minded individuals. This approach allows everyone to cultivate their subculture and a dedicated space for gathering and visibility. Consequently, various squares have been designed as focal points for communal interactions. Each square can shares essential functions, such as a laundry room, and a guest room. Yet, interviews also reveal spaces with unique functions, occurring only once, like shared workspaces, workshops, communal childcare areas, vegetable gardens, and shared storage spaces.



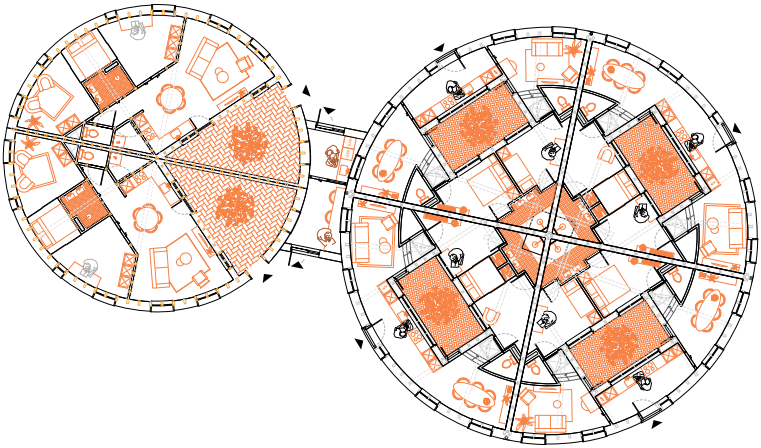
Shared spaces

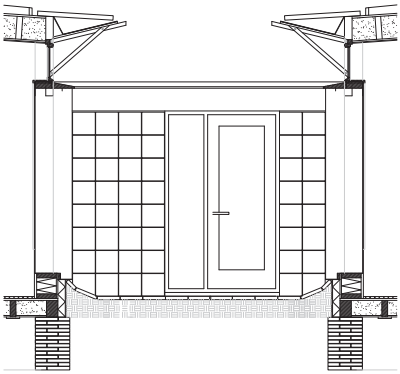




Facade 1.100. (Own work)

Design 1.200. (Own work)





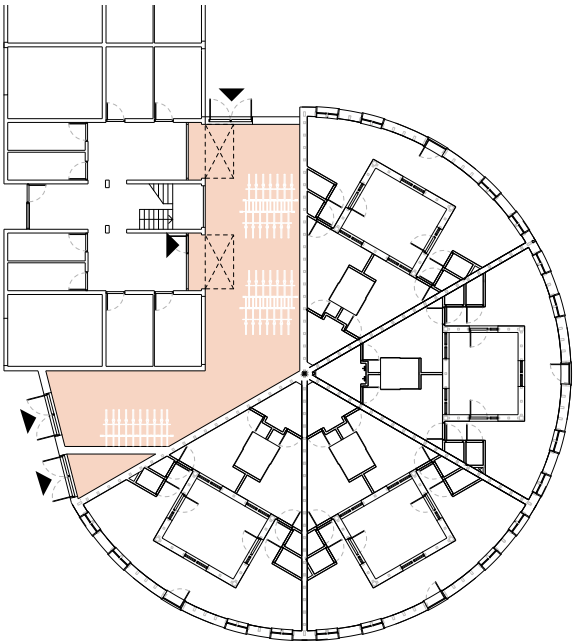
Facade 1.100. (Own work)

Design 1.200. (Own work)

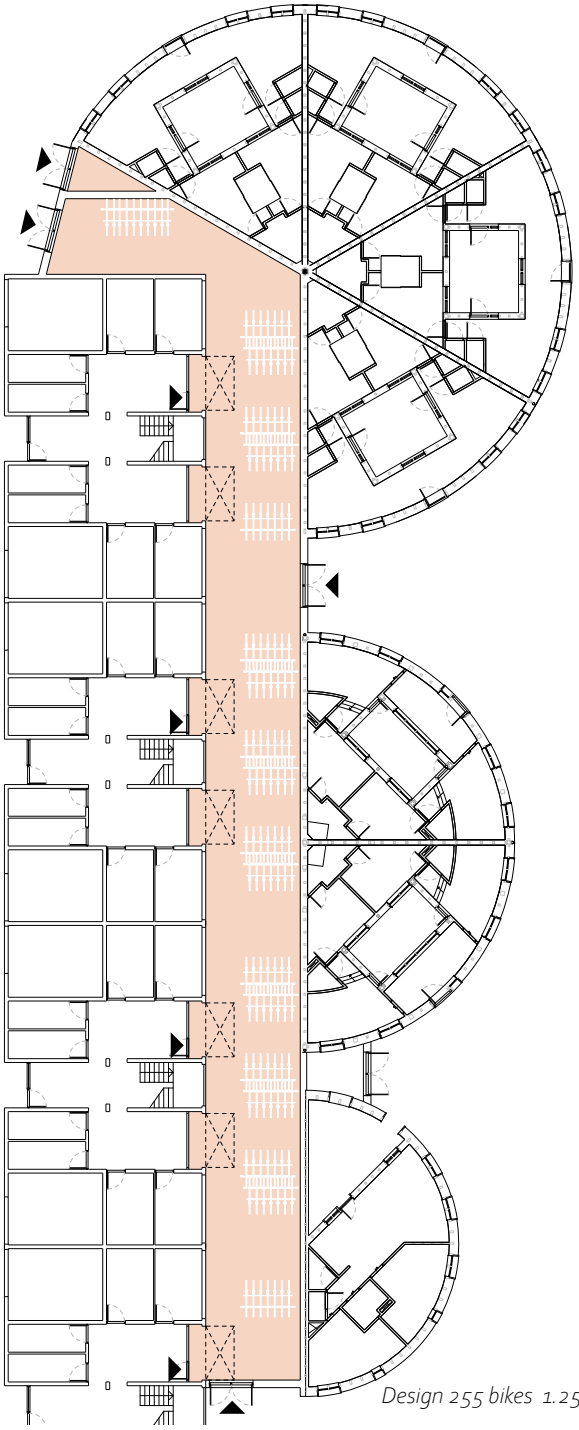
Shared spaces

Bike storage

The average cyclist prefers to park their bike as close to their destination as possible. Bike parking spots more than 50 meters away are less attractive for cyclists (Gemeente Vlaardingen, 2019). Therefore, bicycle parking facilities will be created at various locations within the neighborhood. Furthermore, it is stipulated that there should be 1 bike per room and 1 bike for visitors. There are 155 homes with 3 rooms, meaning that 4 bikes are needed per home, resulting in a requirement for 620 bike parking spaces. Two examples of locations where this will be implemented are provided. To meet the required numbers, station racks will be used.

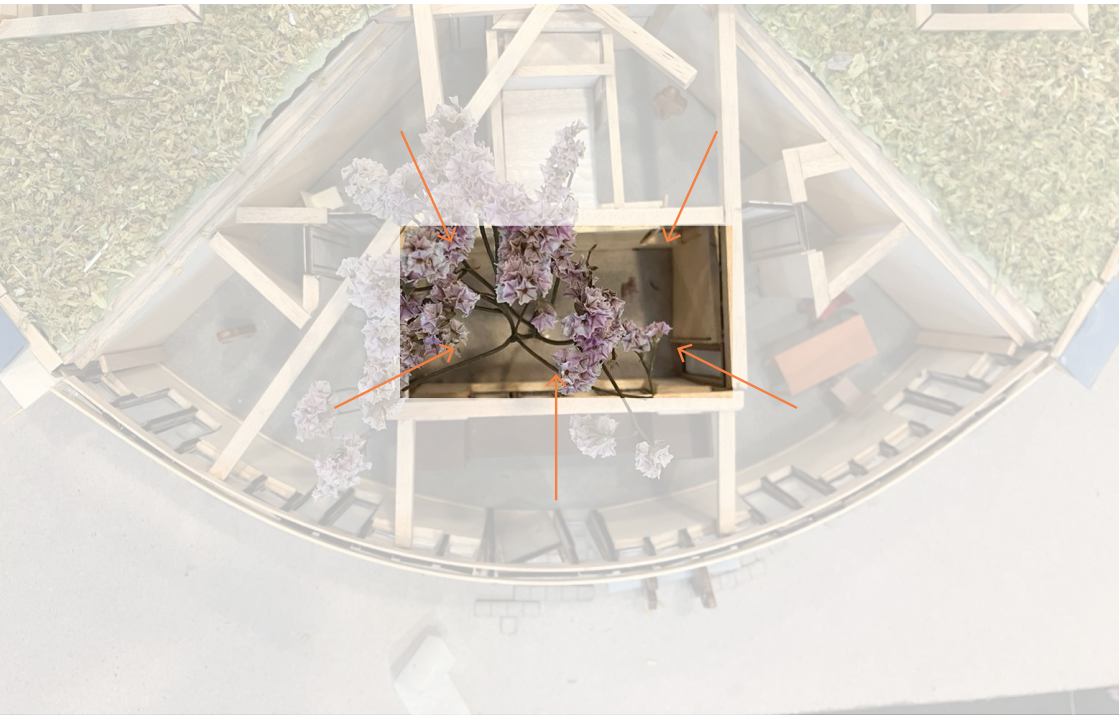


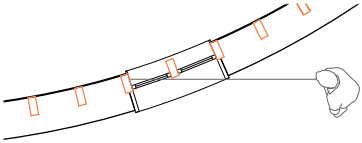
Design 70 bikes 1.250. (Own work)



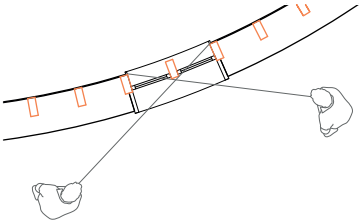
Design 255 bikes 1.250. (Own work)

Outside to inside

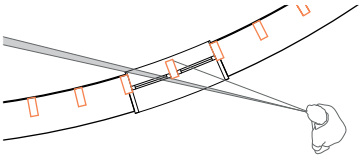




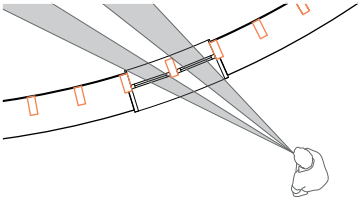
No visibility along the façade (Own work)



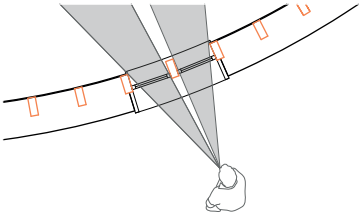
Maximum standing space without overlooking the house (Own work)



Minimal intrusion into the home (Own work)



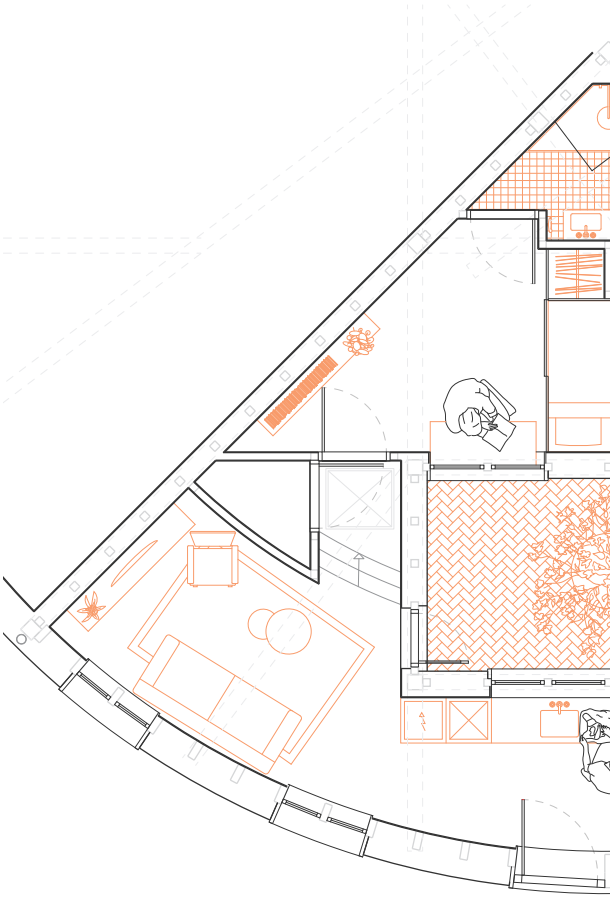
More intrusion into the home (Own work)

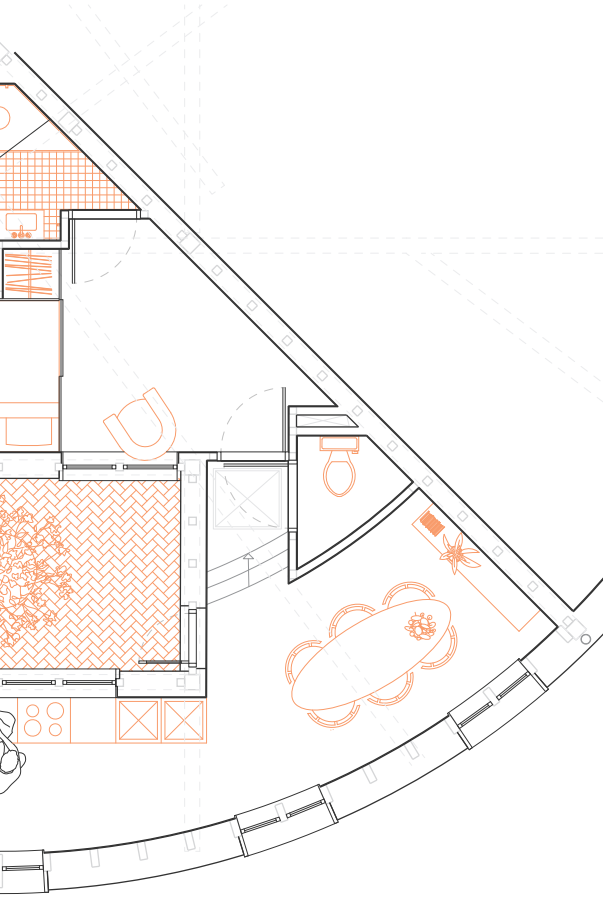


Maximum visibility into the house (Own work)

House floorplan

intimate couples





One house of four
R=11m

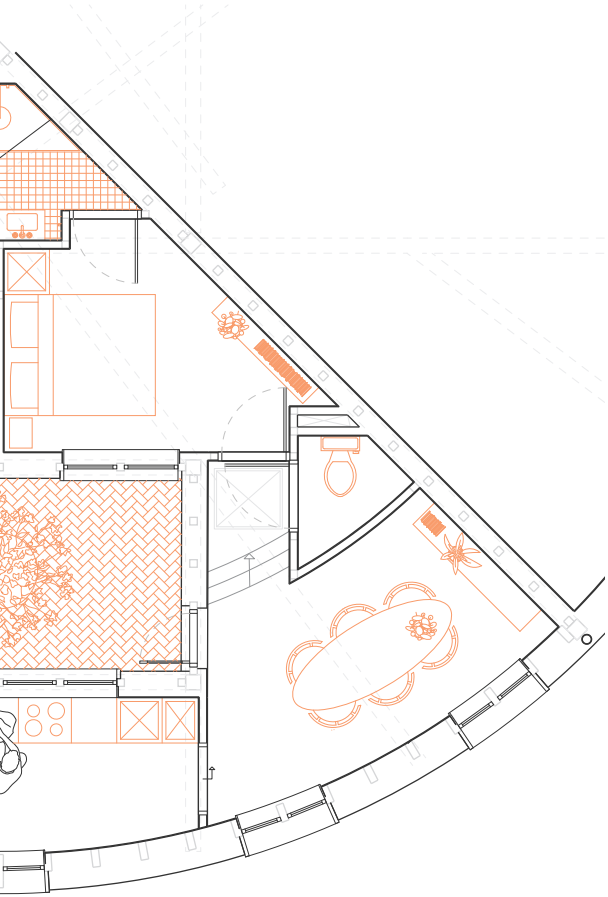
Design intimate coupels 1.100. (Own work)

Kitchen and patio (Own work)

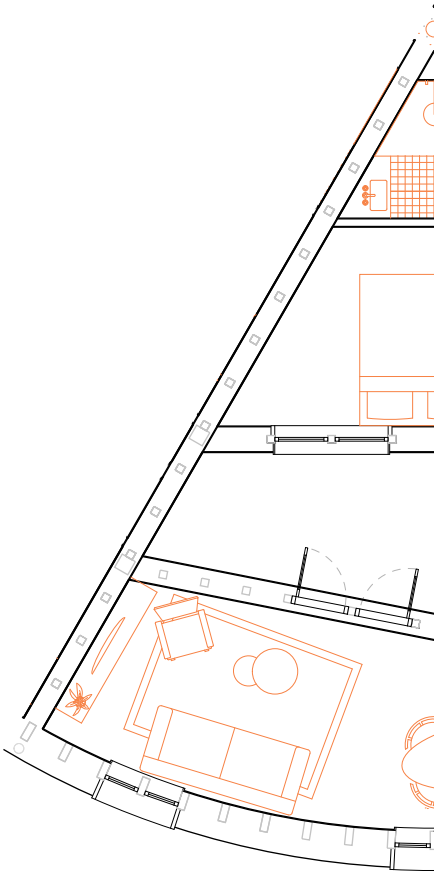
Living room . (Own work)

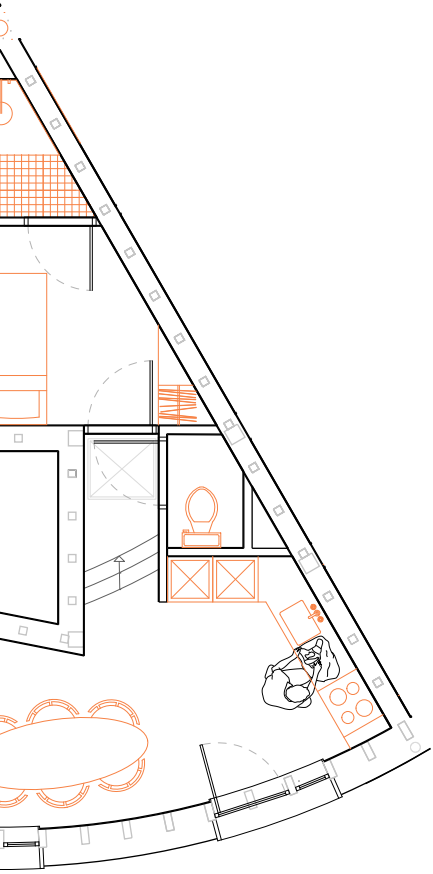
House floorplan

Non-intimate couples



One house of four
R=11m

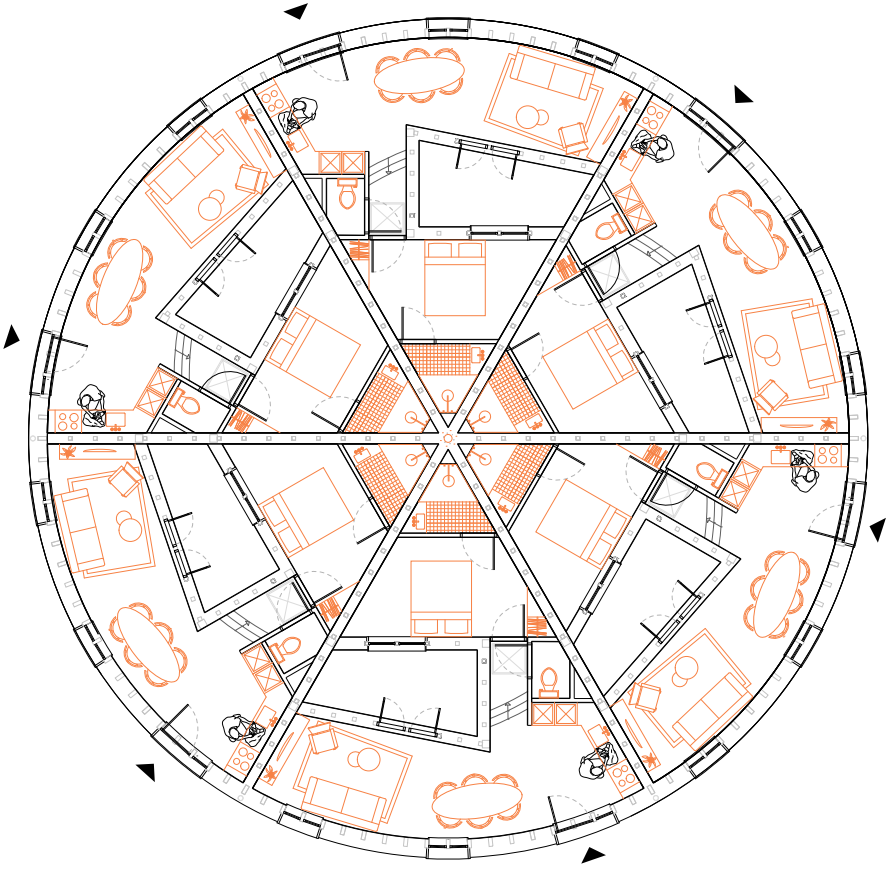




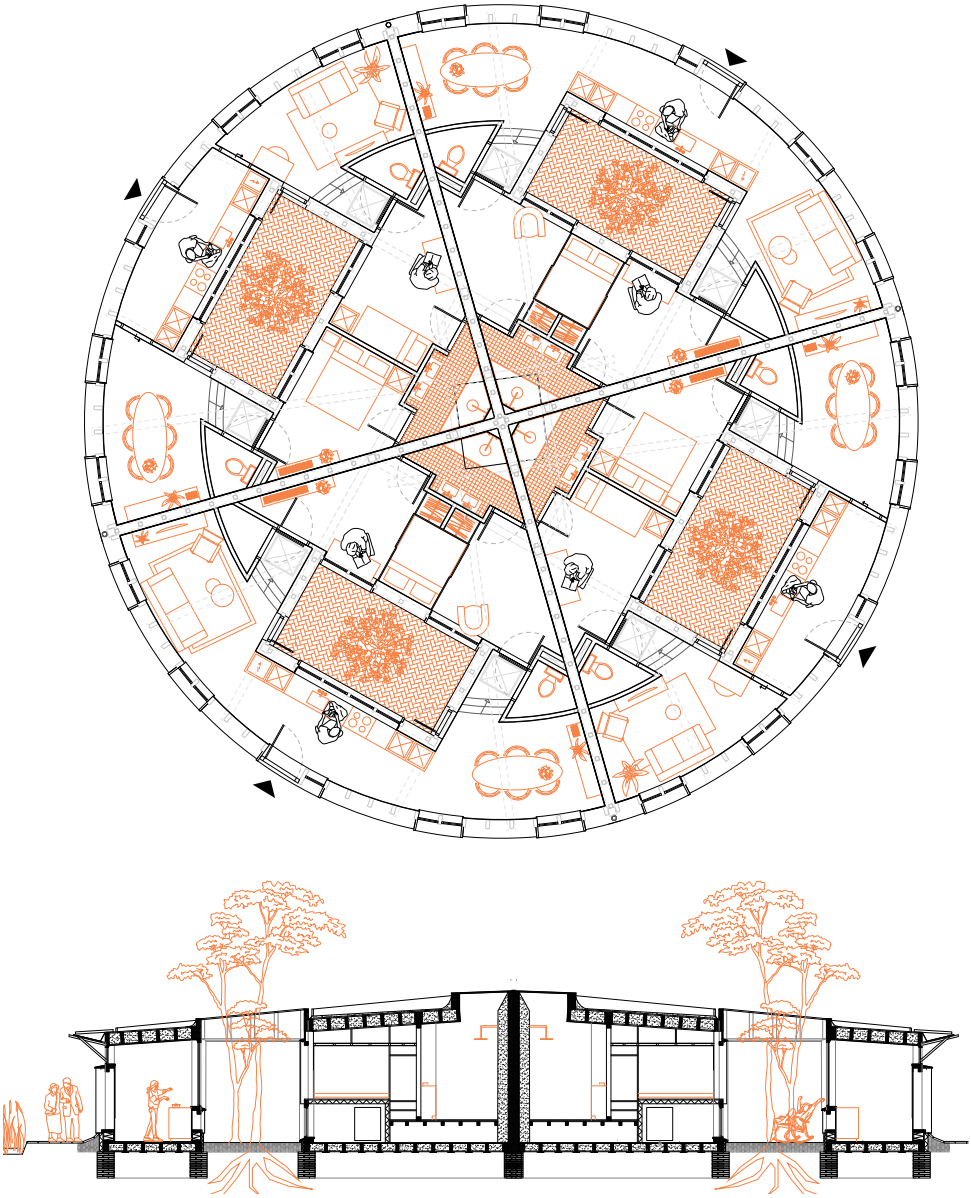
One house of six
R=11m

House floorplan

R=11m



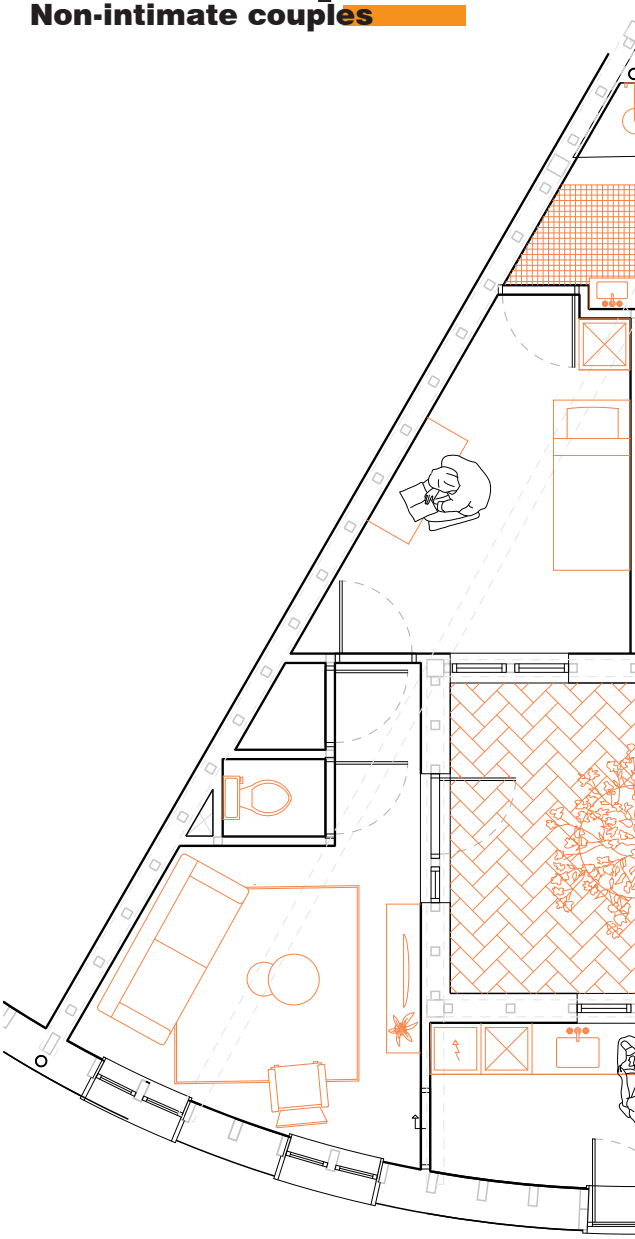
Design Singels 1.200. (Own work)

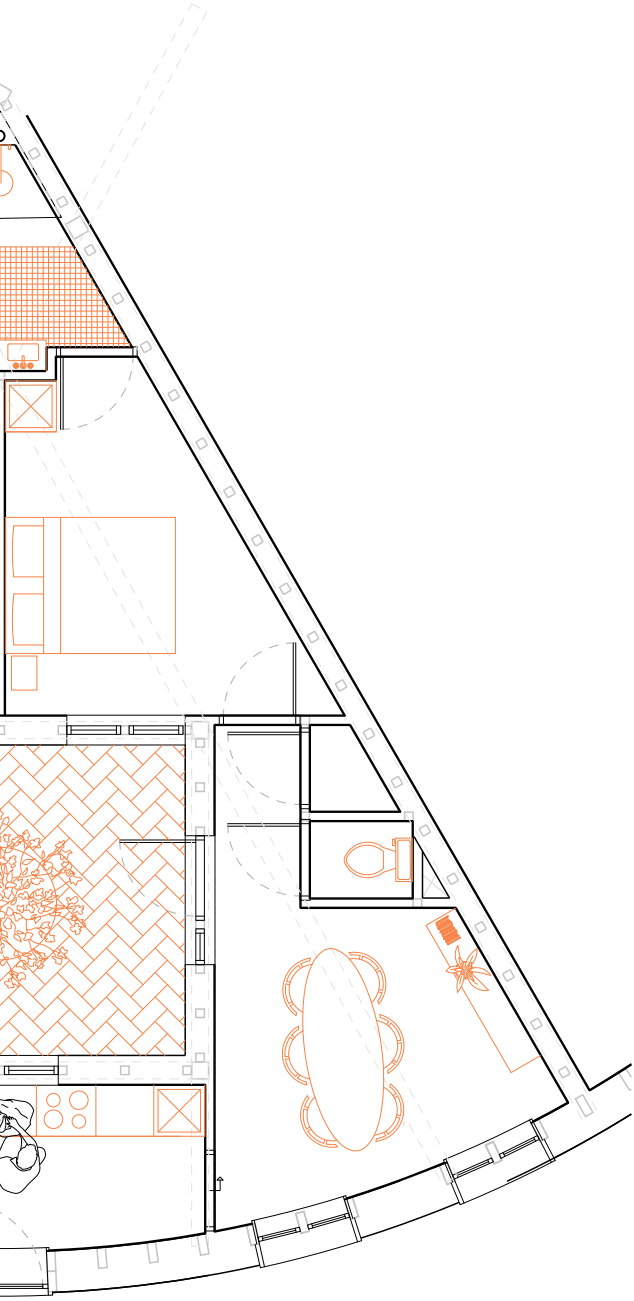


Design coupels 1.200. (Own work)

House floorplan

Non-intimate couples



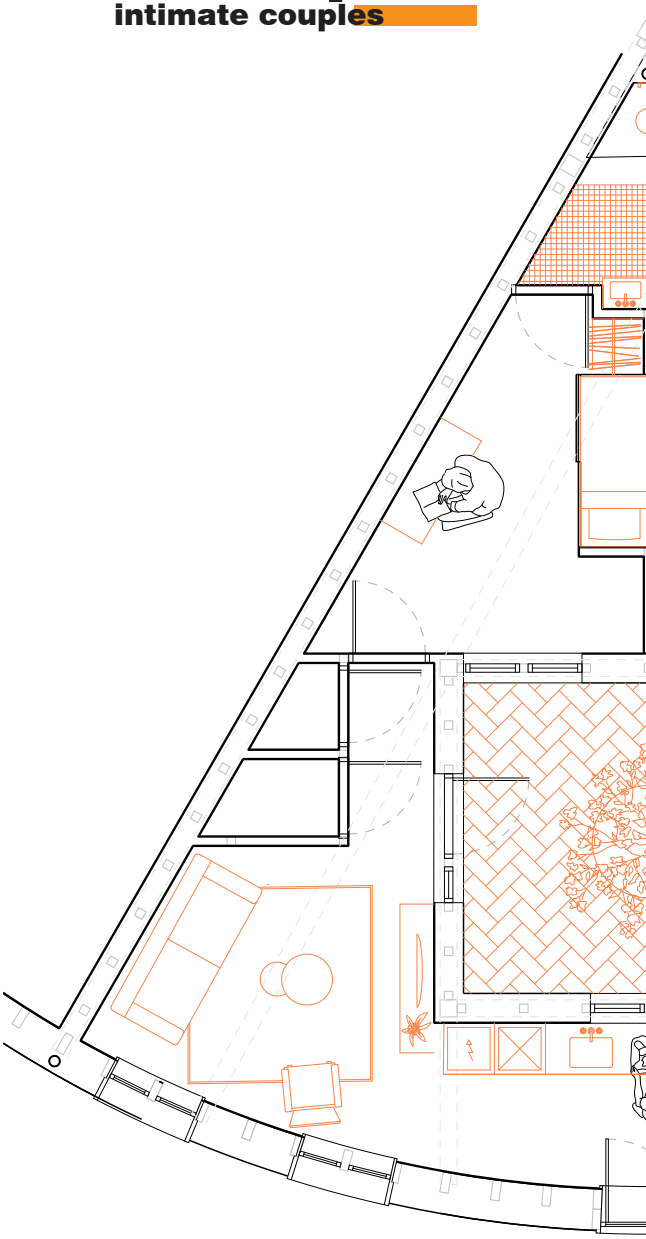


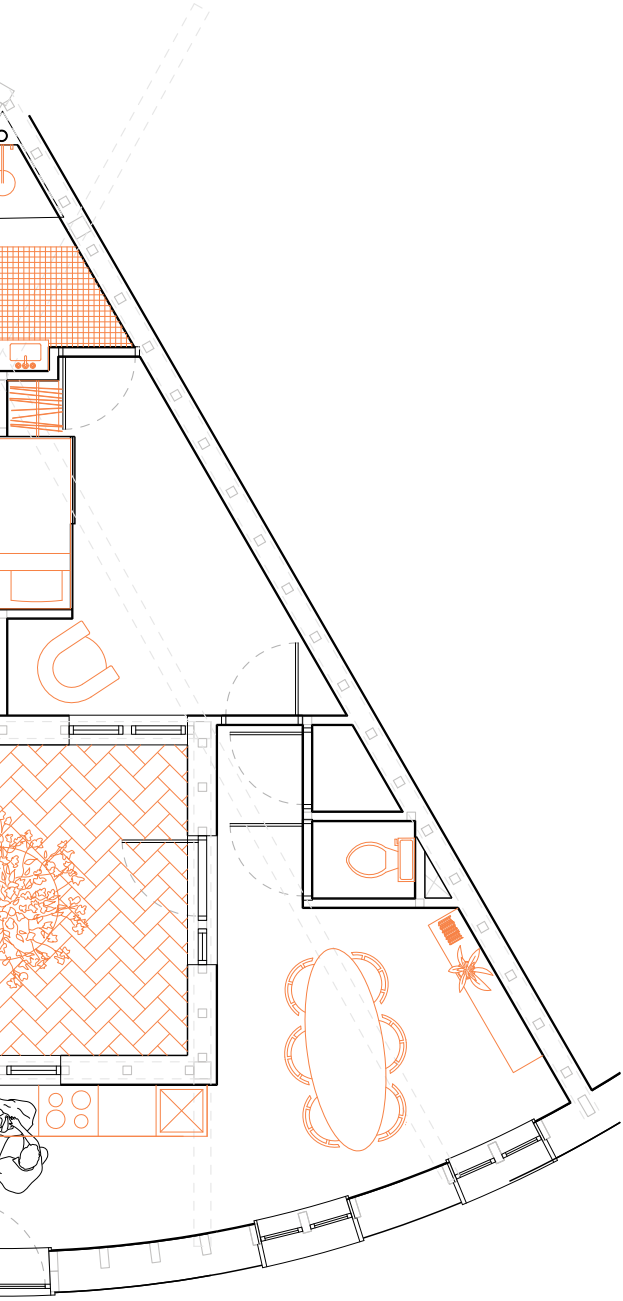
One house of six
R=14m

Design non-intimate couples 1.100. (Own work)

House floorplan

intimate couples



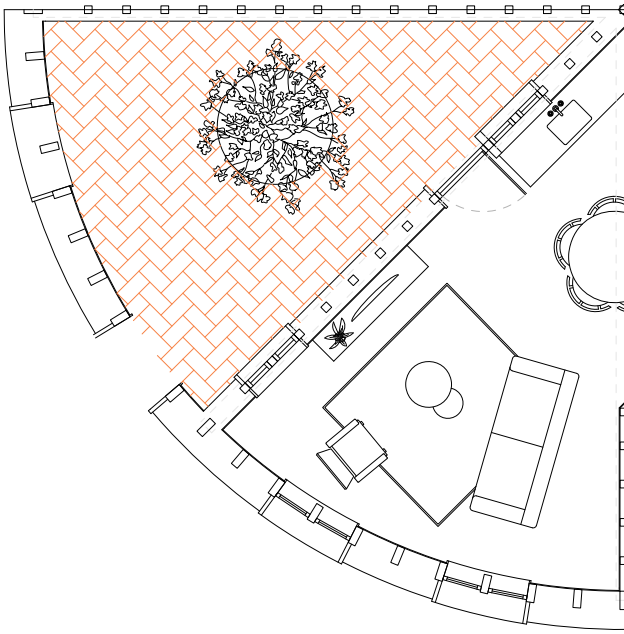


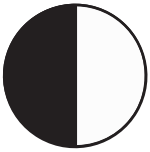
One house of six
R=14m

Design intimate couples 1.100. (Own work)

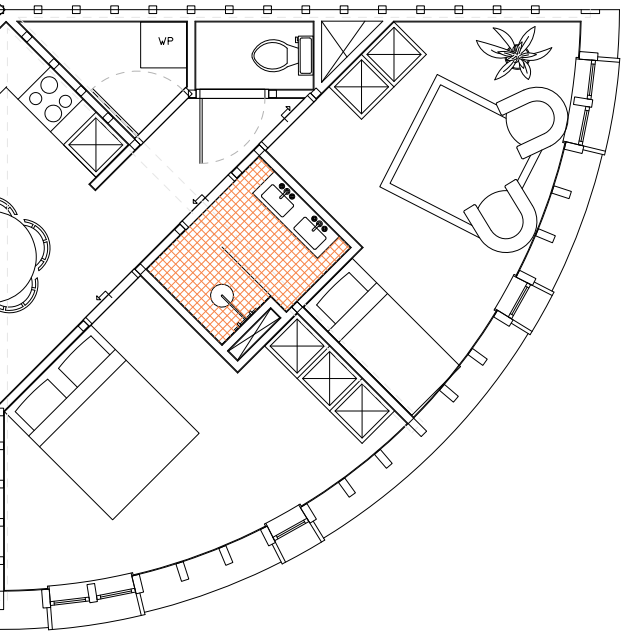
House floorplan

Non-intimate couples





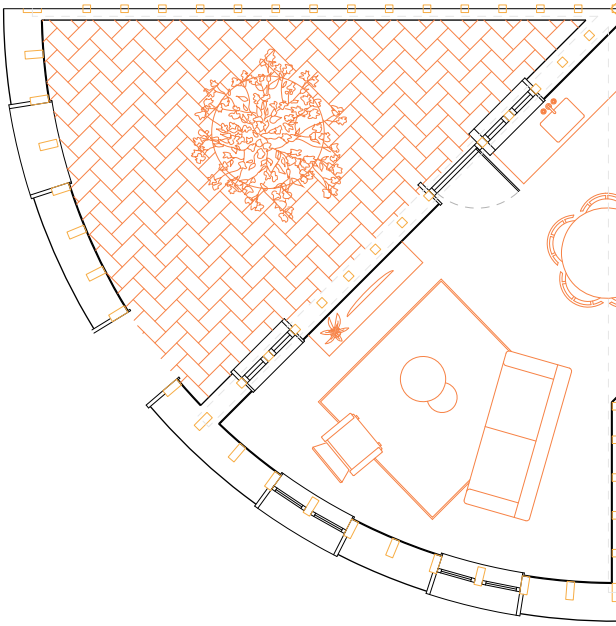
One house of two
R=8m

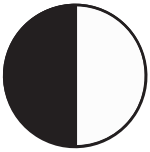


Design non-intimate couples 1.100. (Own work)

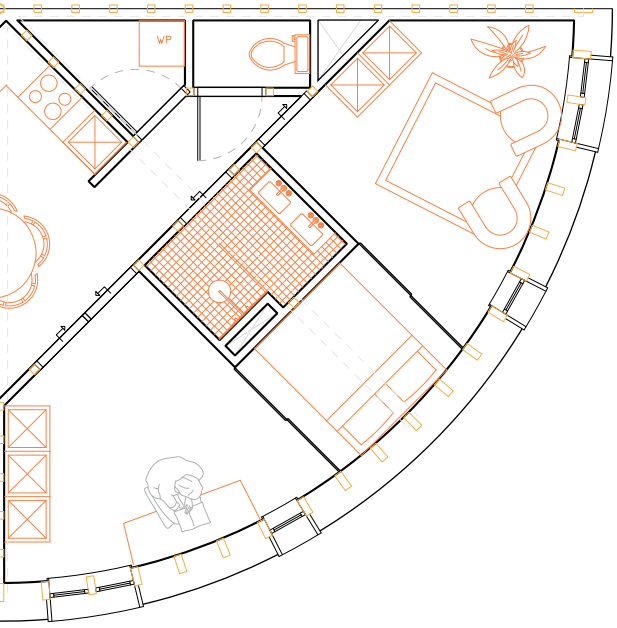
House floorplan

intimate couples





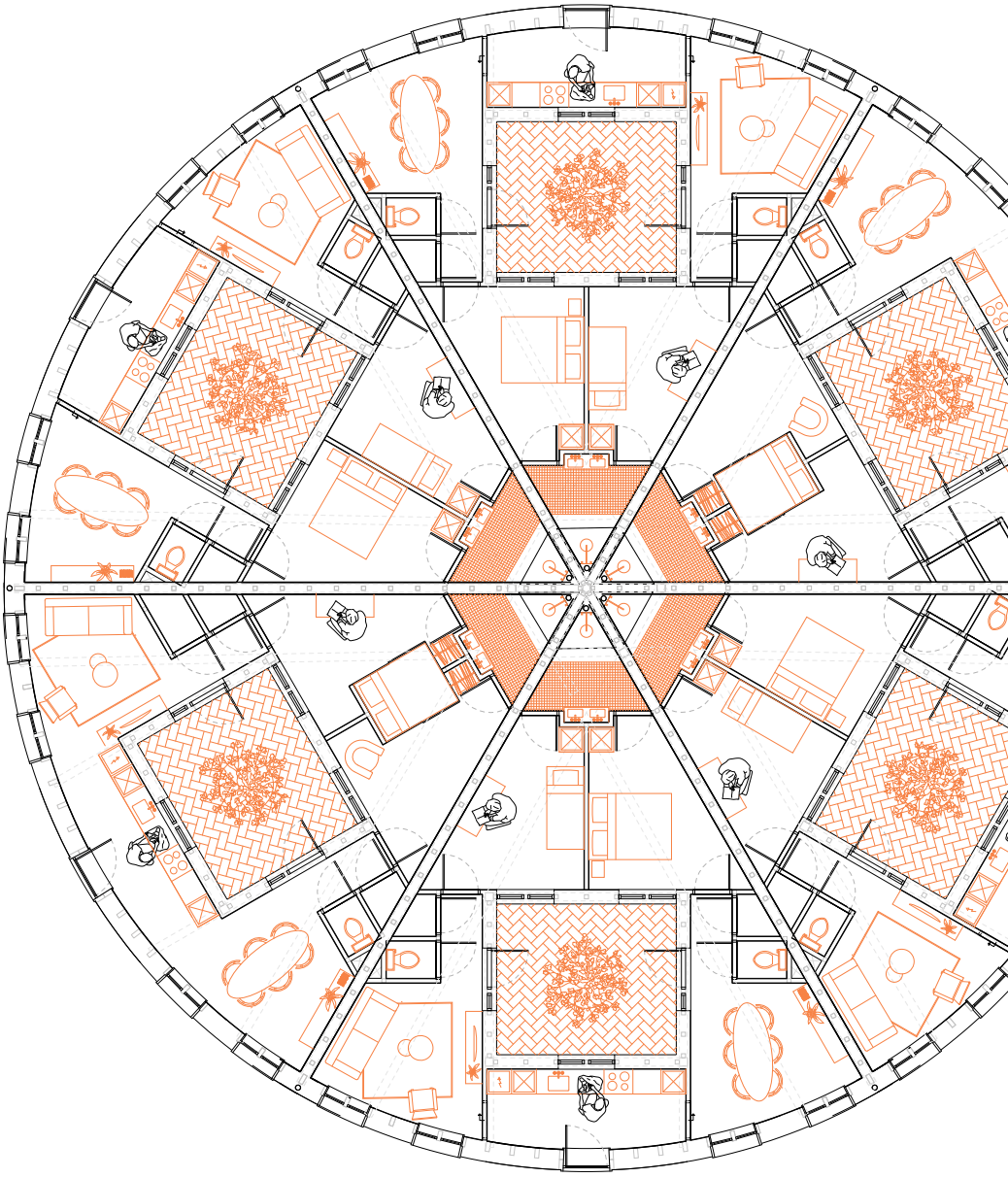
One house of two
R=8m

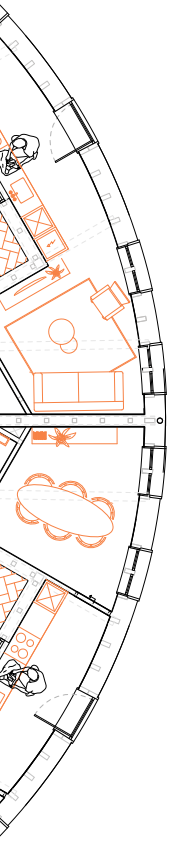


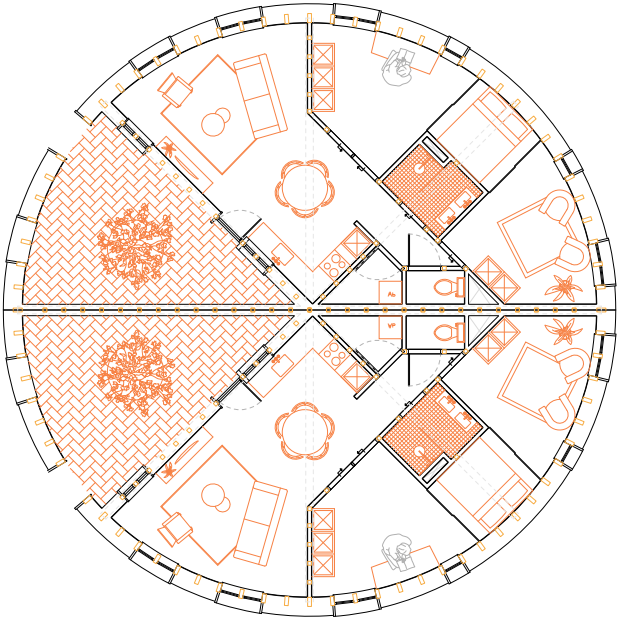
Design intimate couples 1.100. (Own work)

House floorplan

R=14m and R=8





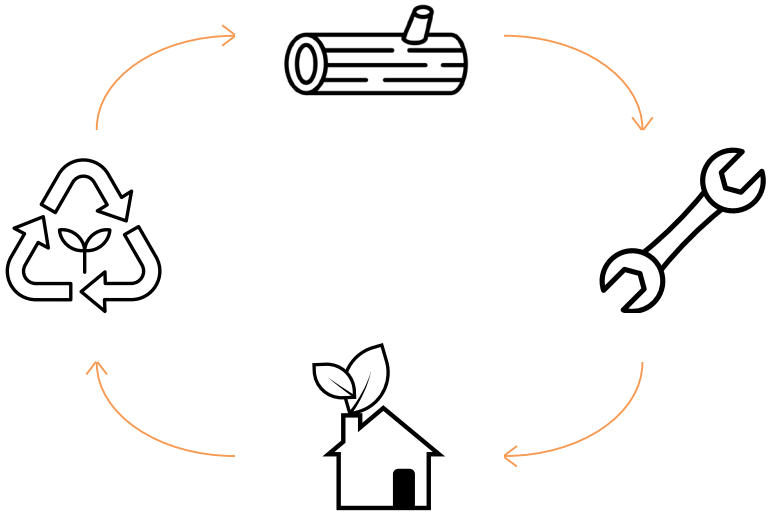


Design coupels 1.200. (Own work)

Biobased

Household compositions have changed significantly in recent years (Central Bureau for Statistics, 2024). This means that the houses no longer fit the current social composition (NOS, 2023). As a result, the future of some houses is uncertain. These kinds of changes happen frequently, so it's important to be mindful of materials and the waste they can create if they are no longer needed.

A solution to this problem is to build bio-based structures. As mentioned earlier, the main structure is made of wood, the facade is made of hempcrete, and old paving stones are used for the elements that can get wet.



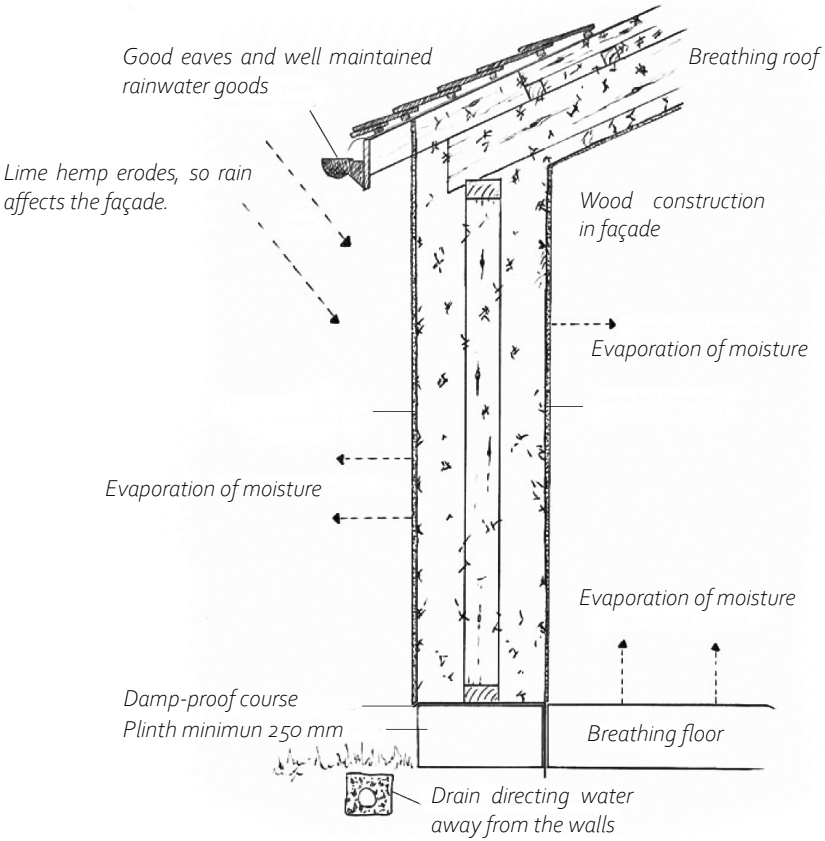
Biobased (Own work)

Test hempcreate blocks (Own work)

Test hempcreate blocks at home.(Own work)

Facade

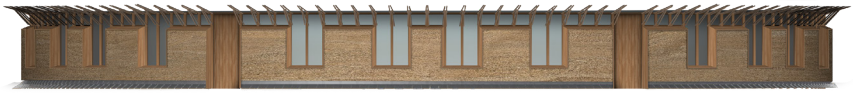
The facade and roof and floor insulation is made of hempcrete. Using The hempcrete book, the design was created. Below is what to pay attention to when using hempcrete. On the right is how this created the façade.



The hempcrete book (Stanwix and Sparrow, 2014)

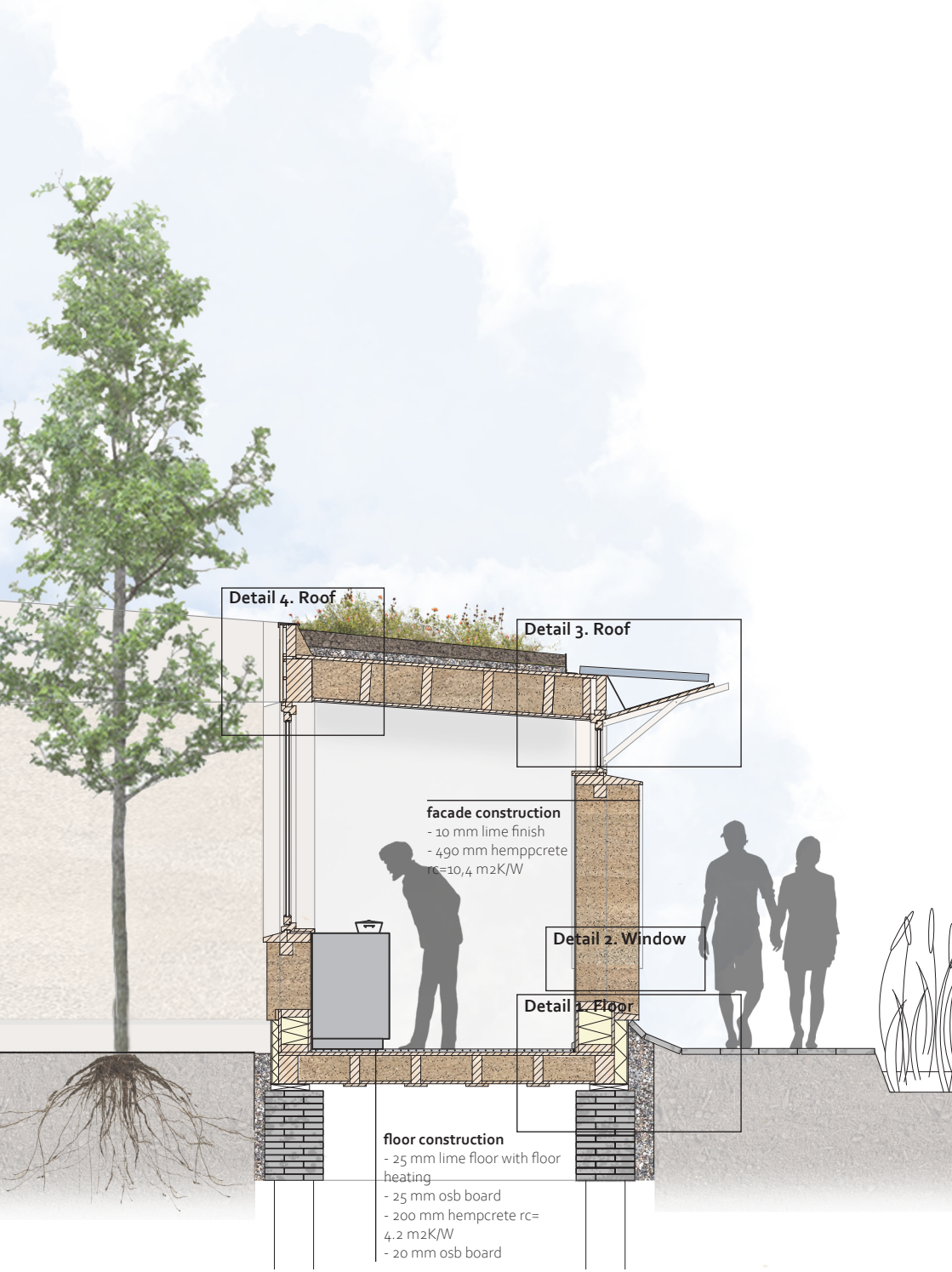
Timber constuction for the facade with a plinth of paving stones on site. (Own work)

Hemp with a wooden frame for drainage. (Own work)

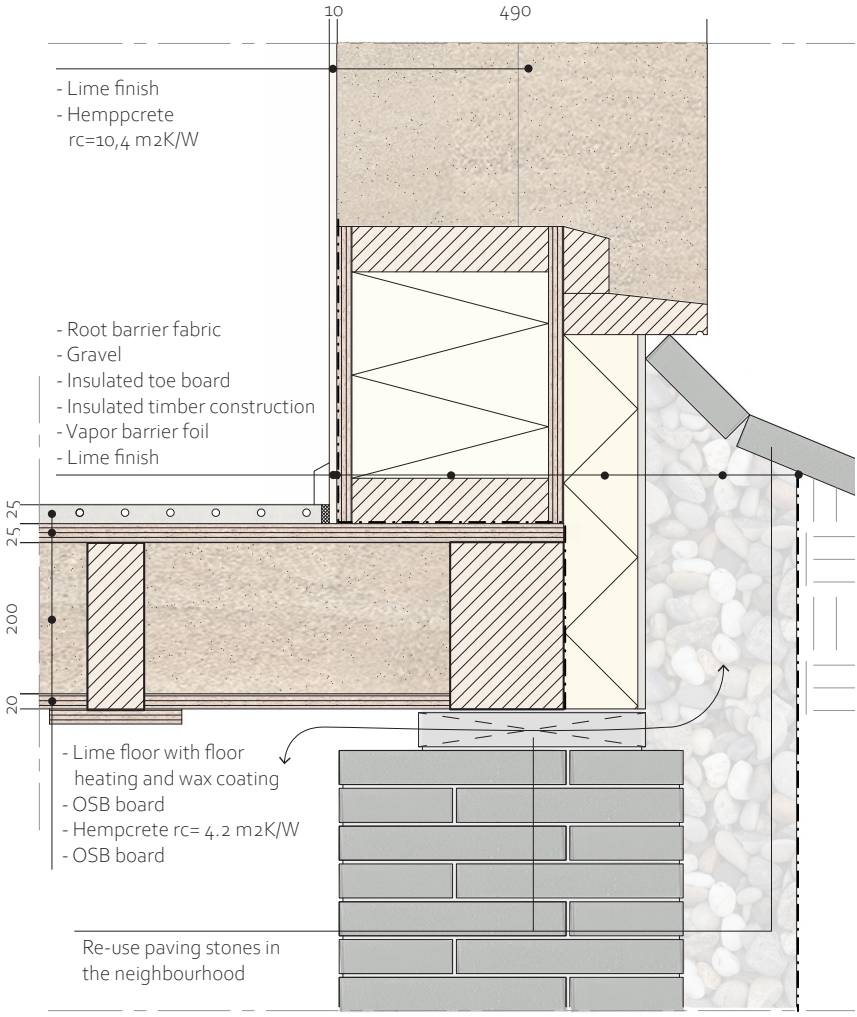


Glass over hemp because hemp is not a load-bearing structure. (Own work)

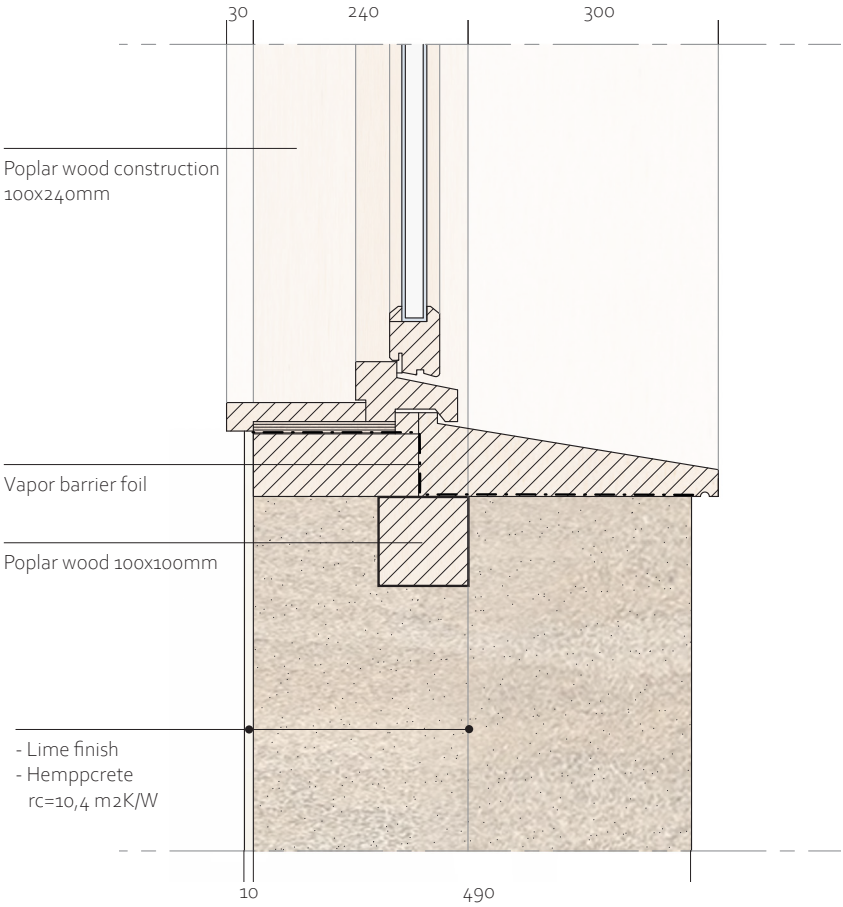
The complete facade with an overhang to hold back the water. (Own work)


Detail 4. Roof
Detail 3. Roof
facade construction
- 10 mm lime finish
- 490 mm hemppcrete
rc=10,4 m2K/W
Detail 2. Window
Detail 1. Floor
floor construction
- 25 mm lime floor with floor heating
- 25 mm osb board
- 200 mm hempcrete rc= 4.2 m2K/W
- 20 mm osb board

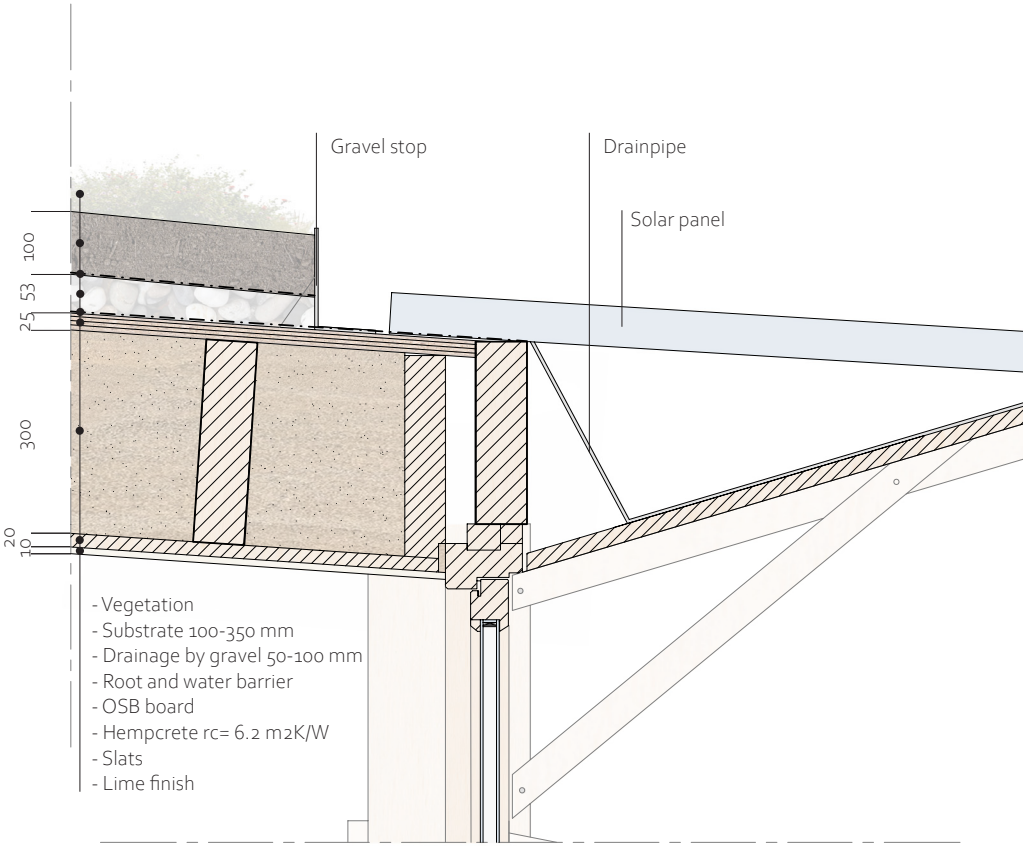
Detail



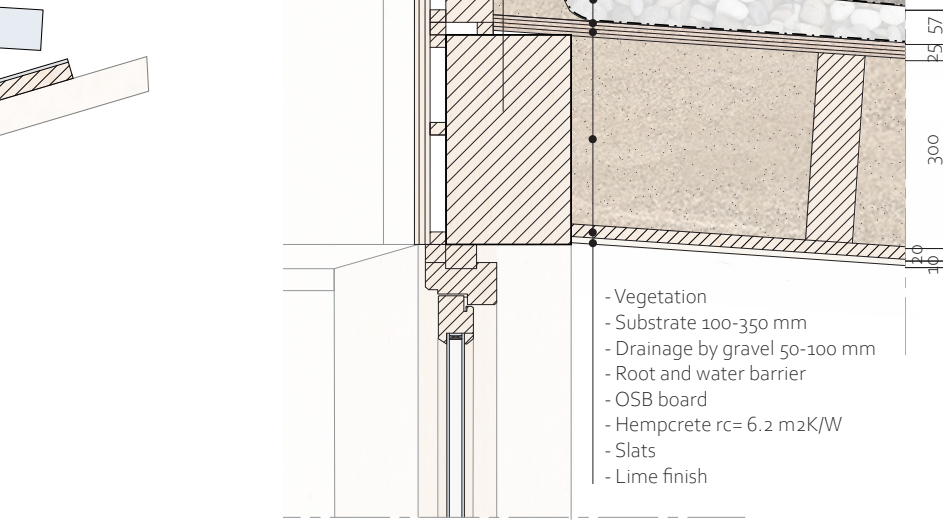
1. Floor detail 1.10


30
240
300
Poplar wood construction
100x240mm
Vapor barrier foil
Poplar wood 100x100mm
- Lime finish
- Hemppcrete
rc=10,4 m2K/W
10
490

2. Window 1.10


Gravel stop
Drainpipe
Solar panel
100
53
25
300
20
10
- Vegetation
- Substrate 100-350 mm
- Drainage by gravel 50-100 mm
- Root and water barrier
- OSB board
- Hempcrete rc= 6.2 m2K/W
- Slats
- Lime finish

3. Roof 1.10


Poplar wood construction
Hempcrete
122
57
25
300
20
10
- Vegetation
- Substrate 100-350 mm
- Drainage by gravel 50-100 mm
- Root and water barrier
- OSB board
- Hempcrete rc= 6.2 m2K/W
- Slats
- Lime finish

Materials

The productive landscape can be used to grow crops. Within the study of the materials needed and the landscape required for this, the house R=11m was used. This is the middle size.

Lime hemp

For 1 dwelling (1/4 of a whole building), a total of 79m3 of lime hemp is needed. For facade, 11.2 m3 of lime hemp is needed, for patio facade 9.7 m3, 1 dwelling partition 9.7m2 interior walls 9.2 m3 and 44m3 for floor and roof insulation. The density of lime hemp is 275 kg/m3 (Abbott, 2023). As a result, 21,714 kg of lime hemp is required.

Making hemp requires mixing in the ratio 4:1:1 (hemp:binder:water) (Stanwix & Sparrow, 2014). 90kg of hemp (2 x 180-litre bales) + 90kg of 'HLC Binder' (3 x 30kg bags) + 90 litres of water. As the water evaporates, half is lime and half is lime. So 10,857kg of hemp fibre is needed for the brew.

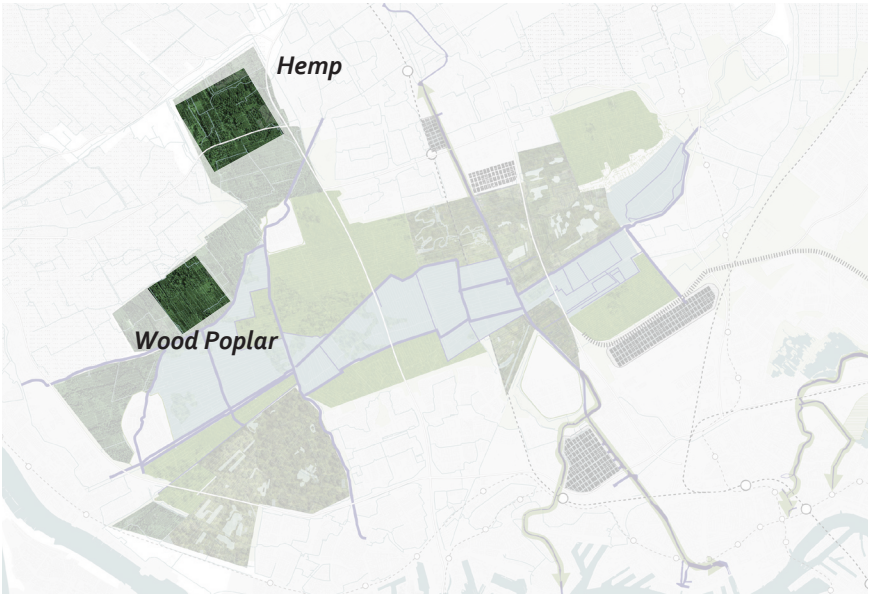
.

In canada, research has been done on plant growth. In this, they indicate that one acre of hemp yeild provides 1,300 pounds of fibre (Johnson, 2014). 4050m2 of land gives 590 kg of hemp fibre.
So for 1 dwelling, 74,527m2 is needed. Hemp grows very fast and takes 4-5 months to grow in England) (Stanwix & Sparrow, 2014).
The figure opposite shows how much this is in the landscape. If this plot is repeated another 5x, when the wood is fully s grown there is enough fibre to build the whole arm.

Timber

For 1 dwelling (1/4 of a whole building), a total of 16m3 of wood is needed. Poplar wood is assumed for the house. This is wood that grows quickly and can be used outdoors after cooking (Oldenburger et al., 2020).

The cutting efficiency is 54%. 29.6m3 of poplar wood is needed when the yield is taken off (Oldenburger et al., 2020). The yield of poplar is 6.45m3/ha/year. And poplar needs to grow between 10-15 years so for the calculation we take 12 years. So this becomes 29.6/12=2.47 m3/year and 2.47/6.45=0.38ha par year. 0.38ha*12=4.6ha. So for one dwelling, 4.6ha is required. 1/3 of the arm can be realised with the plot in the landscape.

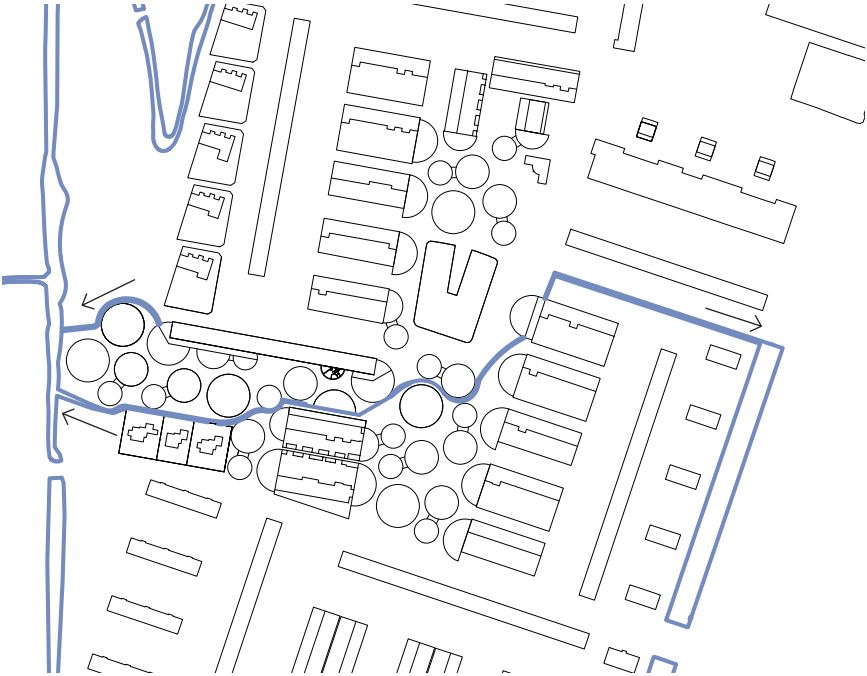


Cover page 'National productive park Delfland' (ZUS)

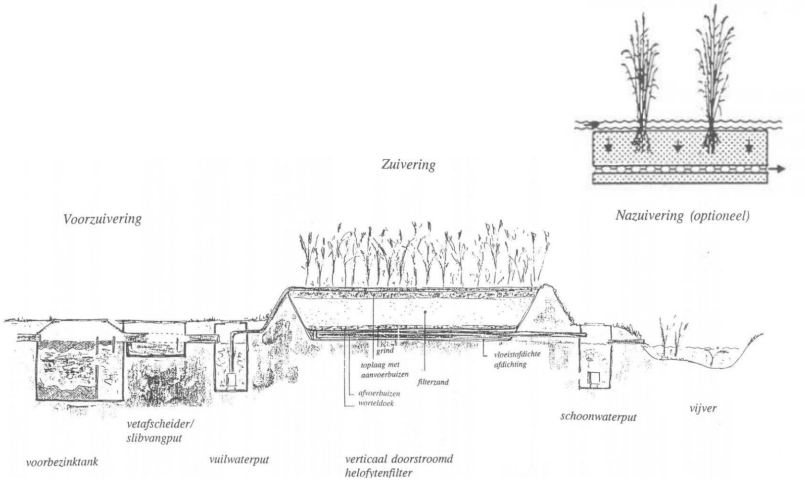
Materials

Helofytenfiltsers

The reed bed filtration system has been installed in the neighborhood. A vertical system is used. The black wastewater is directed to the settling tank. The greywater is filtered through the filters and then discharged into the existing ditches around the neighborhood. This is done to initiate a low-tech method of water purification in the neighborhood, as all the homes are also bio-based.



Helofyten filters in the arm connecting with existing water bodies (Own work)

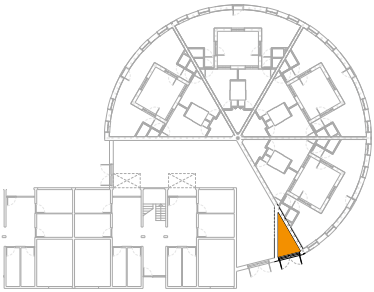


Vertical helophyte filter system (VROM & Kiwa, 1998)

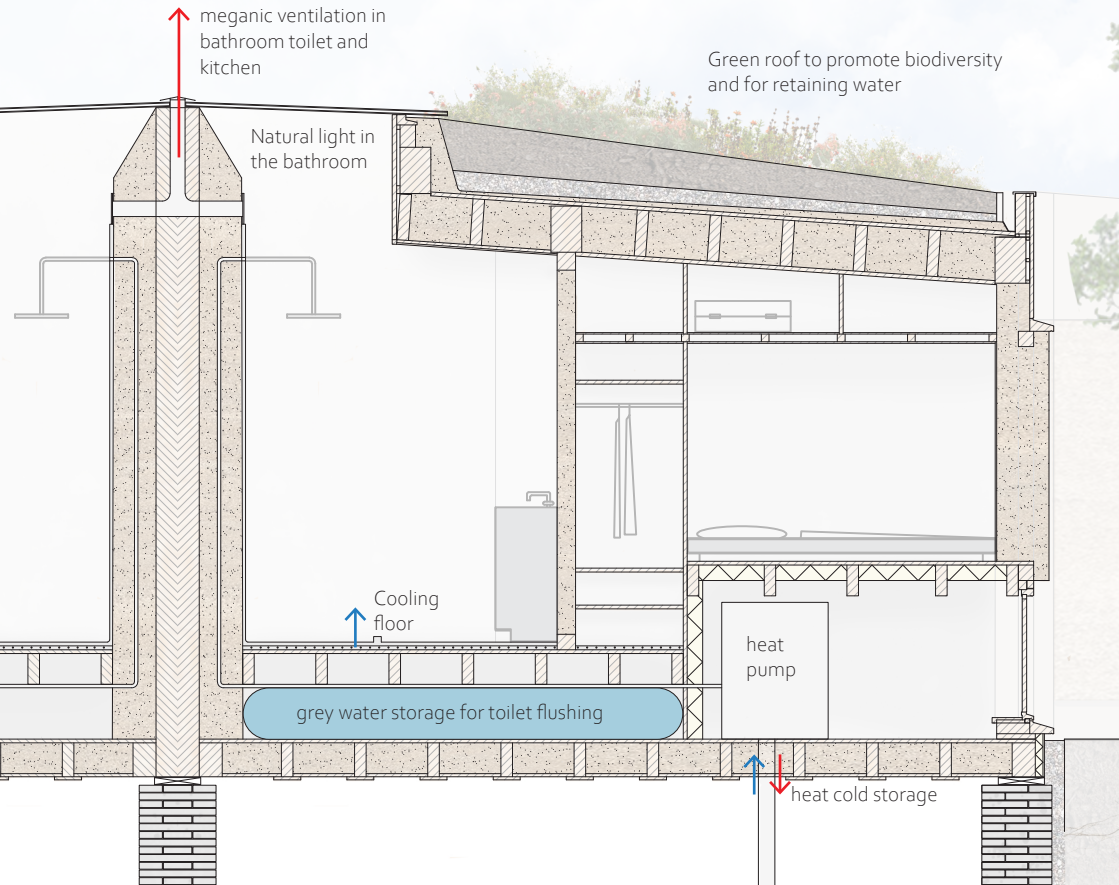
settling tank

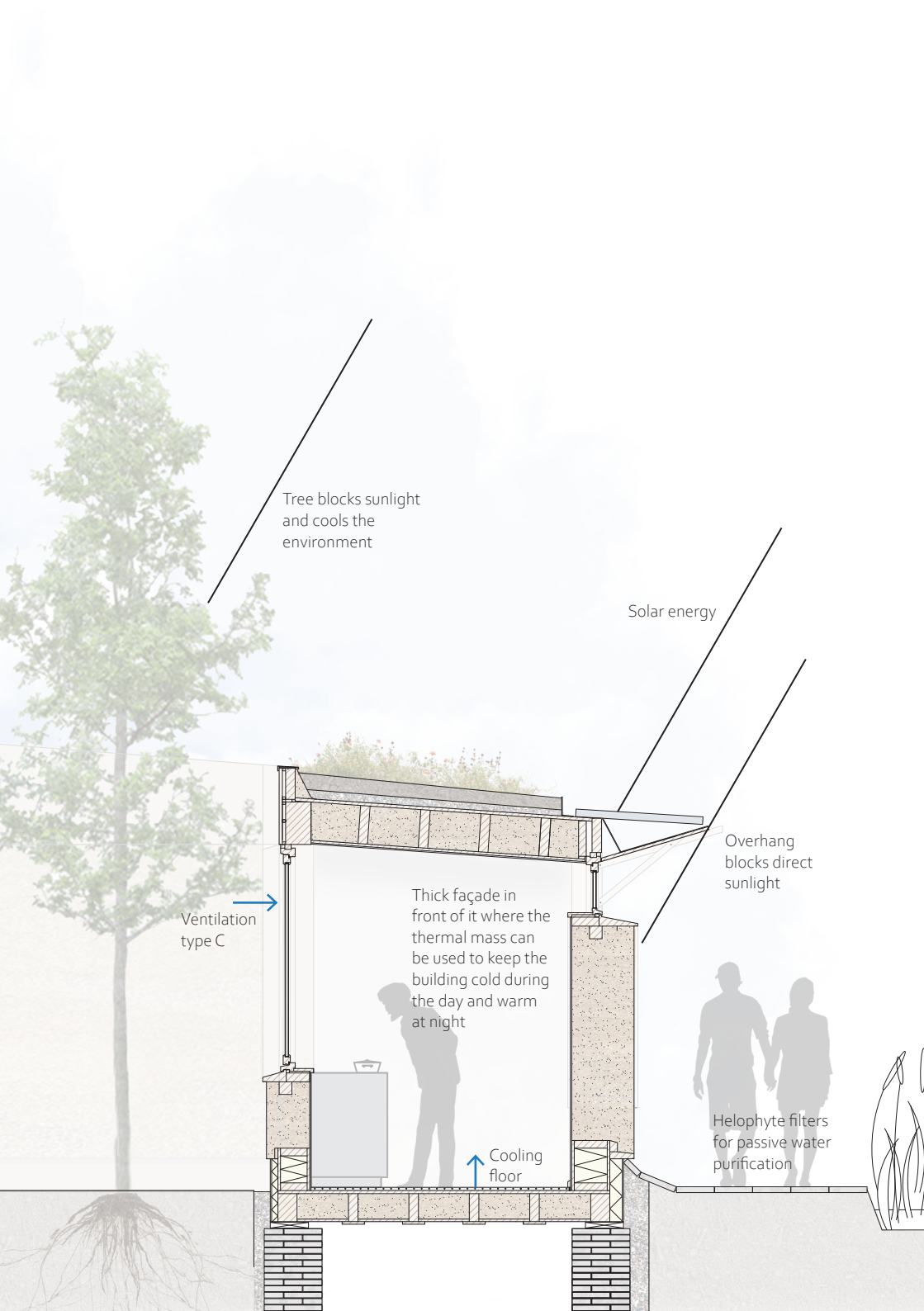
For the contents of the primary settling tank for standard households of 4 people, this amounts to approximately 0.8 - 1.0 m3 (4 people x 4 days x 50 liters per person per day) (VROM & Kiwa, 1998). In the case of an existing septic tank, there is usually at least 1.0 to 1.5 m3 of tank volume available, which is sufficient as a pre-treatment for a reed bed filter. So for 155 homes there is around 25 m3 of settling tank needed.

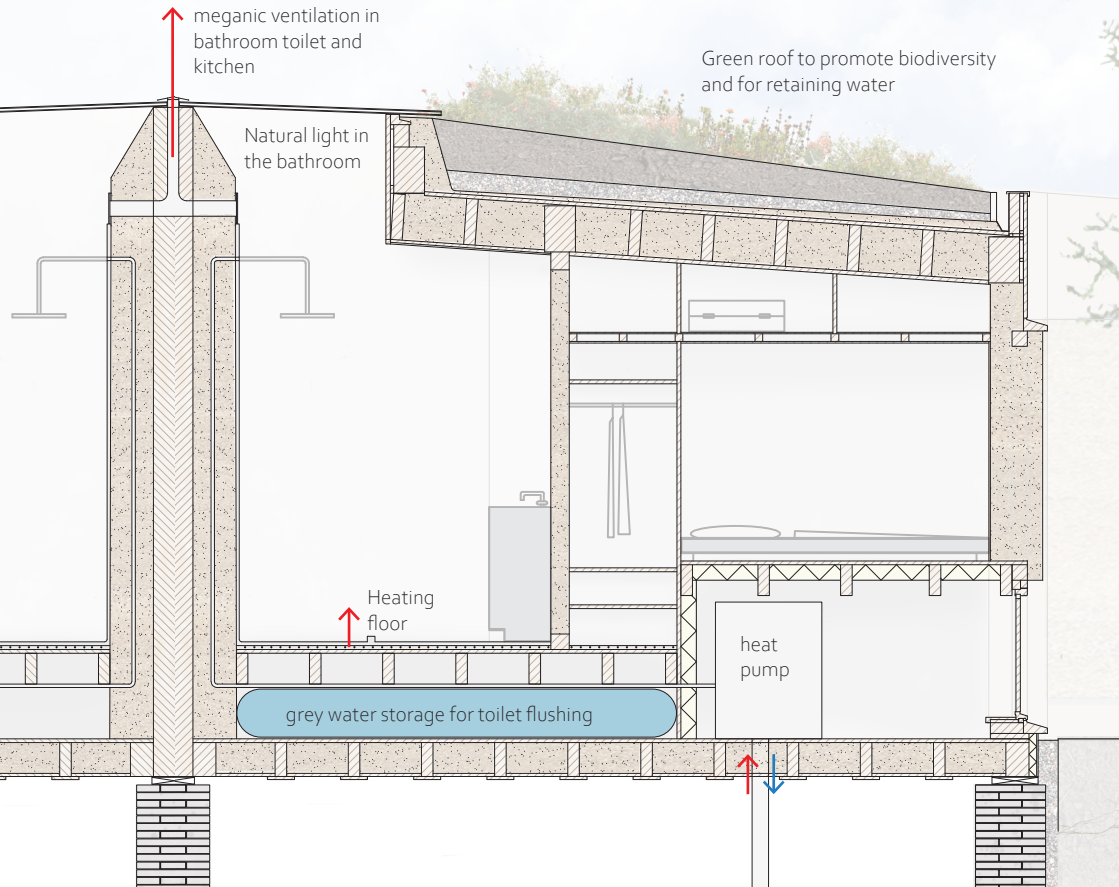
The tank is underground but needs to be emptied. These are in the bike racks so they can be emptied easily.

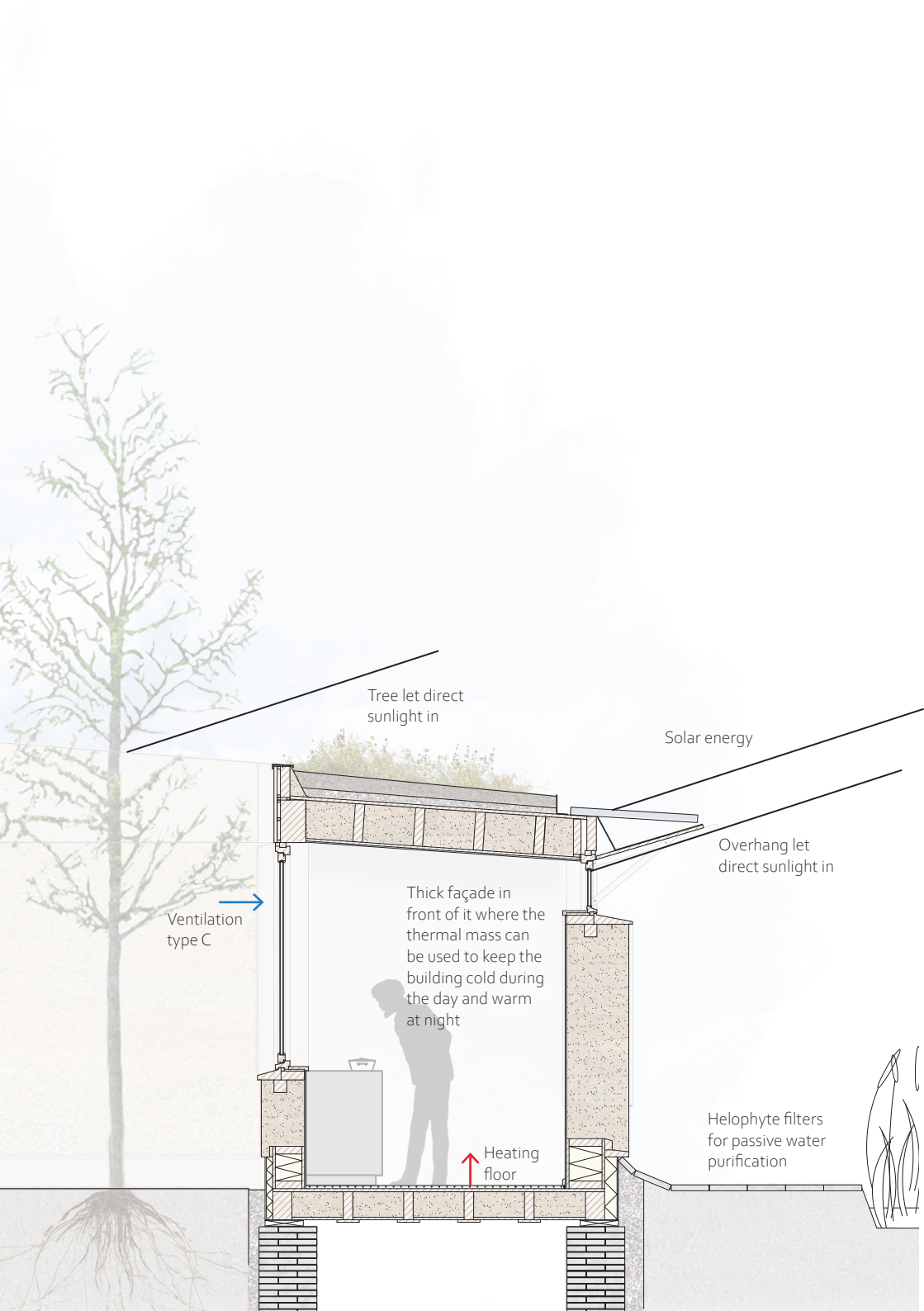


settling tank (Own work)


meganic ventilation in bathroom toilet and kitchen
Green roof to promote biodiversity and for retaining water
Natural light in the bathroom
Cooling floor
heat pump
grey water storage for toilet flushing
heat cold storage


Tree blocks sunlight and cools the environment
Solar energy
Overhang blocks direct sunlight
Ventilation type C
Thick façade in front of it where the thermal mass can be used to keep the building cold during the day and warm at night
Cooling floor
Helophyte filters for passive water purification


meganic ventilation in bathroom toilet and kitchen
Green roof to promote biodiversity and for retaining water
Natural light in the bathroom
Heating floor
heat pump
grey water storage for toilet flushing


Tree let direct sunlight in
Solar energy
Overhang let direct sunlight in
Ventilation type C
Thick façade in front of it where the thermal mass can be used to keep the building cold during the day and warm at night
Heating floor
Helophyte filters for passive water purification

Phases

Because it is bio-based, the neighborhood can be built and dismantled. This can happen in different phases, allowing the buildings to be used in interim phases. The following series of images shows how this is done.

The neighborhood starts with an end phase (image 1), then the roof and windows can be removed, and with a small adjustment, the structure can be transformed into a playground (image 2). When the facade is removed and the floor remains, the structure can serve as an elevated platform for meetings between neighborhood residents (image 3). When the floor is removed, space is created for vegetable gardens, and the main structure can be used for climbing plants (image 4).

Image 1 (Own work)

Image 2 (Own work)

Image 3 (Own work)

Image 4 (Own work)

Design urban

Reflection

This reflection was prepared for the P4 presentation, with the aim of clarifying the preliminary findings and the process towards them. The research began within the Advanced Housing studio, prompted by the urgent housing crisis and my personal interest in housing environments. Joining the gender equity group was a crucial moment from the start, although initially challenging due to my preference for sustainability and resource management over social dynamics within architectural contexts. By delving into additional literature, such as 'Counter-planning from the kitchen: For a feminist critique of type' and 'Making Space: Women and the Man-Made Environment,' I gained a better understanding of historical gender inequalities and their lasting impact on contemporary housing conditions. Thus, my research question for this thesis project evolved: which housing typologies are best suited to meet the diverse needs and preferences of individuals with different lifestyles?

Using a multifaceted approach of literature review and stakeholder interviews, I aimed to unravel the subtle preferences of different demographic groups, including couples, singles and solo residents with occasional partners. If I had spent more time on the interviews, I could have asked more people within these categories, which would have increased the accuracy of the results on a broader scale and reduced the influence of individual responses. The insights gained not only shed light on the prevailing mismatches between standardized housing typologies and individual preferences, but also led to the creation of a relationship diagram, which provides a schematic representation of the interaction between public and private spheres within domestic environments. Interestingly, the discussion often revolved around the connection between privacy,

intimacy and social engagement, highlighting the importance of a delicate balance between these elements to promote harmonious living environments.
Delving into the dynamics of urban spaces and neighbourhood interactions, informed by Hanson and Hillier's 'The Social Logic of Space,' brought out compelling insights on the role of spatial configuration in shaping social encounters and community cohesion. This realisation led to a reappraisal of urban planning paradigms, emphasising the need for adaptable housing solutions that can adapt to the changing composition of society and foster inclusive communities.

However, in finding this literature, I initially blinded myself to housing and urban design plans, thus taking less notice of the context. As a result, I researched many options that were not all equal, which took up a lot of time. If I had considered these parameters earlier, a better design would have come out. In a new design process, I should consider these parameters earlier. In addition, I did not include things like car usage. Within this graduation project, it was possible to omit this, but I am aware that I have to include such issues in my designs when I am a practising architect. For me as a learning architect, it would be good to get better at urban design issues and the transition between scales.

The mismatch between housing and social composition has shown that society can look very different tomorrow, which is why we need to create homes that are adaptable in the future. This is why I started using bio-based construction early in the design phase. I also think this is the best way to connect the landscape of ZUS (Redesigning Deltas) and the plan in Westwijk. Still, I think designing with water should have been given more space within the design as we respond

to the plan. Within the master, I did several projects related to designing with water, but water only came into play later within this design. I started the design process by creating a model to measure water and its behaviour, but after P2 I did not use it anymore. I regret removing a nature-inclusive choice from the design. I tried to bring it back several times, but it always remained a weaker version. Nature has no voice, and I feel I should be more aware of this as a designer who can include it.

In conclusion, the journey through the P4 project has been one of deep discovery and growth, focusing on the interconnectedness of social dynamics, spatial configurations and urban design paradigms in shaping the built environment. As I face future ventures, I am determined to harness these insights to create more inclusive, adaptable and sustainable living environments that resonate with the diverse needs and aspirations of contemporary society.

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