

AR3AD100
ADVANCED HOUSING DESIGN GRADUATION STUDIO



BRIDGE GENERATIONS

Collective intergenerational living community

Graduation Booklet

Bridge generations

Collective intergenerational living community

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AR3AD100
Advanced Housing Design Graduation Studio
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Preface

This document is a research report made for the Advanced Housing Design Graduation Studio. It is a part of the graduation trajectory of the MSc in Architecture at TU Delft. The goal of this research report is to present the research that is conducted during the graduation studio and to show the architectural design that comes forth from this research.

Our site is located in the countryside between the cities of Delft and Rotterdam. My group selected an existing village to improve. There are few original residents here, and most of the land is used for agriculture. My intervention in building a residential project on this site started with an analysis of the existing problems. The residents here are generally old and they live in an island-like village, which made them experience the problem of residential loneliness more or less. Is there any way to improve their current situation? I started research with this question in mind and tried to find a design solution after that.

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1

Introduction

1.1 Problem Statement

1.1.1 Single living trend

Judging from the age composition of Delfland, the elderly population will increase in the future. Apart from this, the number of people living alone also grows significantly in the Netherlands (Figure1, Statistics Netherlands, 2023). As of 2023, the number of one-person households has reached 3.27 million, and the rate exceeds 39.5% among all private households (Figure2, Statistics Netherlands, 2023). Those who live alone in the Netherlands mainly consist of three groups of people: one is young adults who are usually in their 20s to 30s and just completed their education or starting their careers; middle-aged and older adults who live alone due to divorce, widowhood, or remaining unmarried; and the other is senior citizens who are widowed or considered as empty nesters.

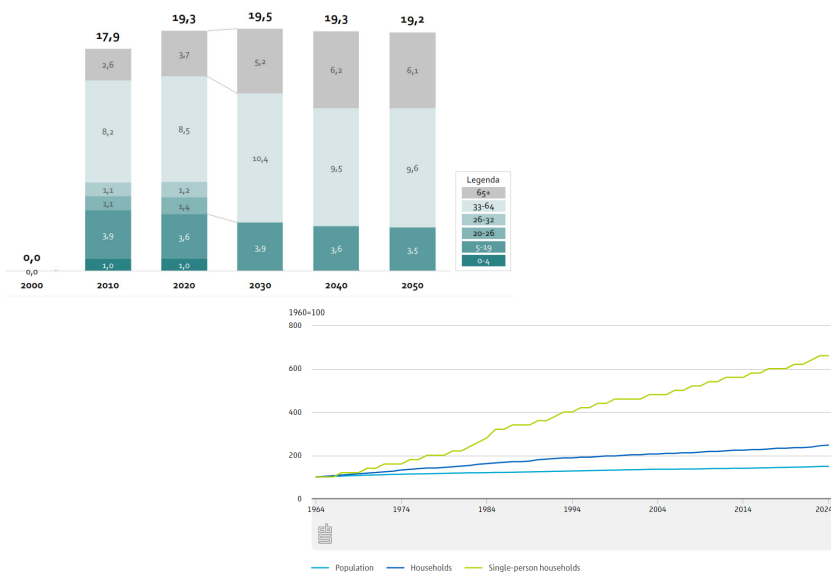


Figure1: Number of inhabitants (x 1,000) by age group (Centraal Bureau voor de Statistiek, 2021)

Figure2: Single Households in the Netherlands (Centraal Bureau voor de Statistiek, 2023)

Living alone physically means fewer cohabitation opportunities or close contact and more apparent boundaries between people. Some studies have shown a potential link between living alone and low positive mental health. For instance, living alone for a long time may cause mental health problems (Tamminen et al., 2019). This problem is more prominent among the old people. Due to the lack of intergenerational support and social roles with a sense of participation, their family atmosphere is more deserted than those accompanied by children, lacking vitality and a sense of belonging, thus causing symptoms such as depression and loneliness. At the same time, they are more cautious and insecure because they are afraid of being hurt (Zhang, 2019). In this case, even if they do not live alone physically but with their partners, it is still considered "living alone" in intergenerational contact.

1.1.2 Students housing shortage

The shortage of student housing in the Netherlands is not a new issue. Before I came to the Netherlands, I missed out on the limited accommodations provided by the school because I didn't see the acceptance email in time. Subsequently, it took me a long time to find a room that could accommodate me. I found that the student housing market in the Netherlands is challenging, requiring not only a lot of effort to constantly refresh websites but also the willingness to pay higher prices due to the shortage. As early as 2017, protests erupted in a student city over accommodation issues (figure3).

According to DutchNews, the overall shortage of student housing in the Netherlands has reached 27,000 units as of August 2023. In 2018, students could find accommodation within 10 months on average after registering an account on a certain rental platform. However, this data has exceeded more than 25 months since 2022 (figure4). Many students are no longer concerned about the size and quality of living space but simply need shelter, which is not a good trend.



Figure3: Student housing protests (Emily, 2023)

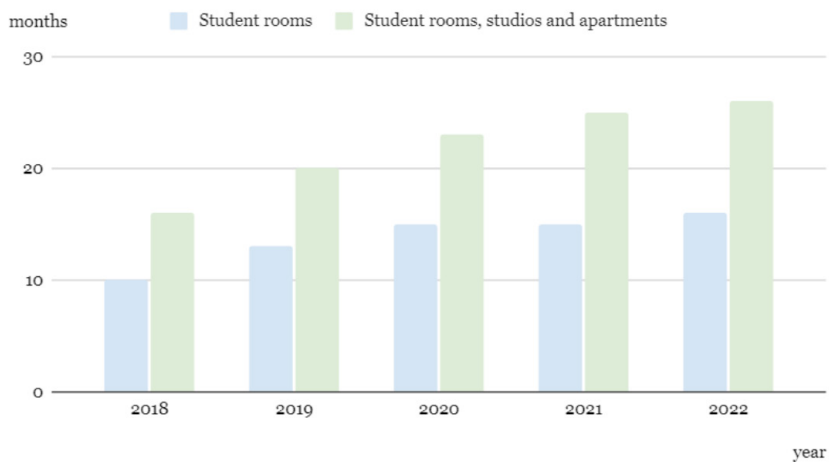


Figure4: Average registration duration before housing is acquired at Stadswonen (author, adapted from Elmer & Feba, 2023)

1.1.3 Site observation

a. Demography

The site chosen by our group is in the village of Zweth. And the part of my design site: the southeastern part of Zweth belongs to the edge of the Schieveen community. This area is sparsely populated and agricultural sites account for the majority. The only several existing houses are located along the streets Delftweg and Zwethkade.

The locals' ages are concentrated between 45 and 65 according to the current population of the two streets. Theoretically, in the next decades, the population of people over 65 will increase significantly. This is consistent with the development trend of Midden-Delfland and the population situation of the Netherlands as a whole.

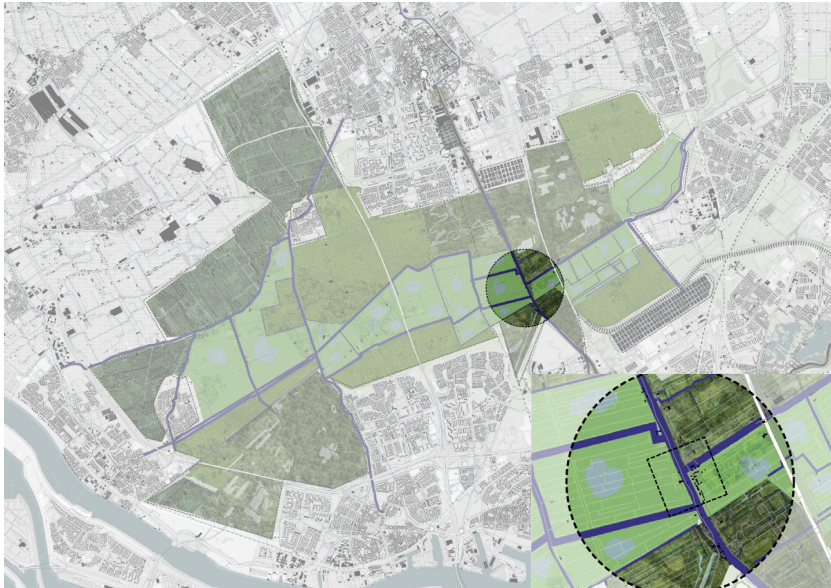


Figure5: Group Site within Midden-Delfland (by group)

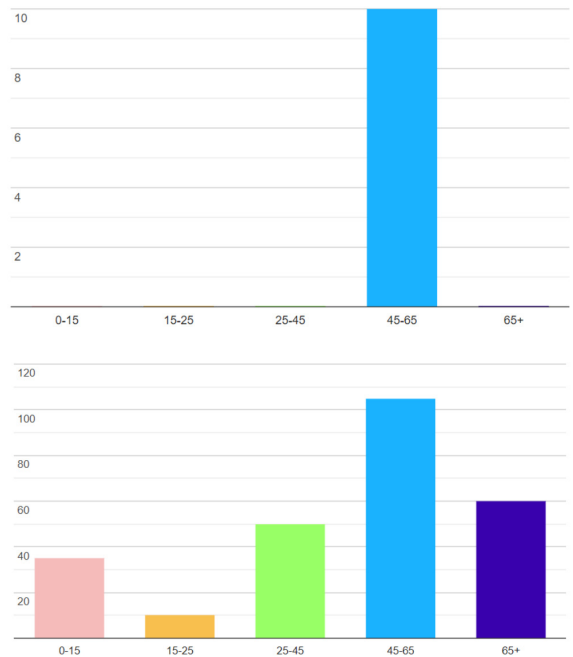


Figure6: Number of inhabitants by age group in Zwethkade (above) and Delftweg (below) (AlleCijfers, 2022)

b. Homogenisation

In addition to the problem of living loneliness caused by ageing and living alone, housing types in our site fall into homogenisation. Almost all houses in Schieveen communities are detached houses, and zweth is no exception. Given that traditional farming remains the primary industry in my site in the future, the existing conventional housing types should be maintained. They should be partially continued to accommodate and perpetuate the need for low density housing around the farm. However, this type of independent housing reduces the opportunities for intersections between neighborhood in the community, which is not conducive to the occurrence of connection. Therefore, designing a more inclusive collective community that can accommodate different groups can be an improvement measure.

c. History

De Zweth is a hamlet located on the Delftse Schie and the old road from Delft to Rotterdam. Until around 1900, there were hardly any buildings on the Delft side of the De Zweth hamlet. The inn, later Café Zwethheul, was located here from 1685, which was a household name for many passers-by. The son of the former café owner turned 'De Zwethheul' into a renowned restaurant, where culinary delights are prepared. The old building has been expanded significantly in recent decades and given a contemporary interior. The original inn 'De Zwethheul' was also used as a post house for a long time. The horses of the stagecoach between Delft and Rotterdam were changed at this location. Opposite the building on the other side of the roadway were a horse stable and a carriage house. Later there was also a handball court and tea garden here. The Bierhuizen ladies came to live here around 1870. They converted the old country estate into hotel 'De Zweth' with a tea and playground on the other side along the Schie. Additionally, the large building of the 'De Hoop' beer brewery was built here in 1853; there was also a



Figure7: Zweth Village (Google Earth)



Figure8: Café De Zwethheul, 1685



Figure9: Land-en Schiezicht, 1900

gin distillery and a sawmill. In connection with this industrial activity, workers' houses were built and several shops were opened where bread, vegetables, yarn, tape, petroleum and picture postcards could be purchased.

This location was an important attraction for many Delft residents around 1900.

The completion of Rijksweg 13 (A13) in 1937 caused a major blow on 'De Zweth'. As a lot of transportation is taken away, the number of passers-by in the hamlet decreased sharply. The hotel 'De Zweth' lost customers and had to cease operations a year later. The building was subsequently demolished. The arrival of Rijksweg 13 made it quiet on the road through the hamlet. The activity and shops also disappeared. In recent years, the quality of the hamlet 'De Zweth' has greatly improved due to the new drawbridge, the reputation of restaurant 'De Zwethheul' and the restoration of a number of buildings.

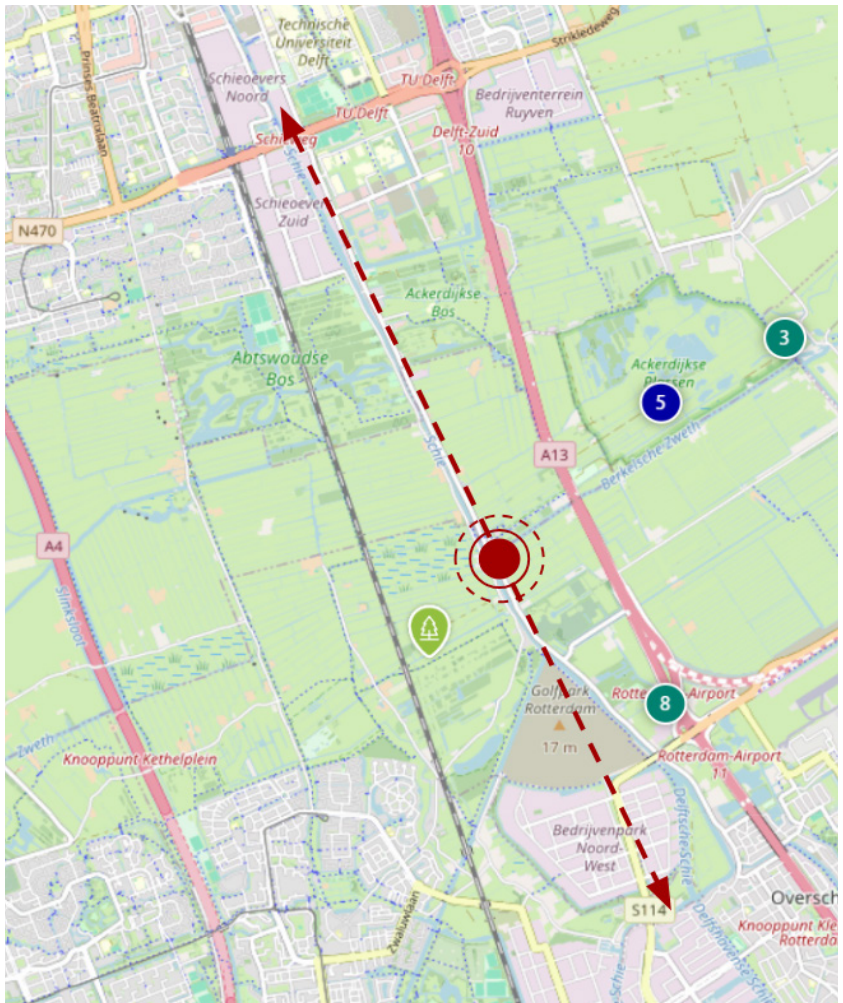


Figure10: The crucial location between Delft and Rotterdam
(by author)



Figure11: Moodboard of current Zweth (by author)

1.2 Research questions

According to all the factors mentioned above, Zweth has lost its public transportation advantage and has gradually fallen into desolation after experiencing its former glory. The population in the village is aging and suffering from living loneliness. My intention is to inject some fresh blood, which in my case is the students from surrounding cities to the existing village as one of the target groups to cohabit with the local elderly to form an intergenerational community. Based on this, I proposed the following main research question:

What can architects do for intergenerational communities to alleviate living loneliness?

Establishing a community that promotes intergenerational contact is a complex issue. Usually, the operation of a community after its establishment relies more on spontaneous connections between residents. A simple collective building allowing different groups to live in is not an ideal community for intergenerational contact since studies show that even in full-age communities, intergenerational communication is often limited, with peers preferring to form friendships with people of a similar age (Sherman, 1975). Moreover, older respondents pointed out that the younger generation prefers to socialise with peers rather than participate in activities with older people, whether older relatives or older neighbours outside the family (Lau, 2023). So, more detailed design elements should be considered from an architect's point of view. We can think about public spaces and how these space could be utilized to encourage people of different age groups to meet. Additionally, the design could also focus on diverse housing types, which are able to enrich the community dynamic. Flexible housing structures with the potential to change may increase affordability by reducing construction and maintenance costs. So I refined the main issues

into the following three issues related to architectural elements:

- Is there a relation between built environment and living loneliness? What kinds of environment features can help alleviate living loneliness?
- What are the housing needs of different age groups? How to balance different housing the differences?
- How to design shared spaces to facilitate different interaction?

1.3 Relevance

The premise of this study is to alleviate the issue of living loneliness caused by the population and geographical location of the site. The primary approach is to establish a collective community composed of both elderly residents and students. Intergenerational cohabitation communities is a relatively new practice in the field of architectural design, emerging as a response to the aging trend and aims to adapt to the new lifestyle of home-based elderly care. Many existing intergenerational community practices focus on the integration of older adults and children or families. The combination of elderly individuals with students represents another innovative approach, seeking to maximize the mutual assistance between these two vulnerable groups within the community. Therefore, this study aims to fill this gap by exploring how to integrate the elderly and students within a single building, identifying which functions they can share, and examining how community formation can be facilitated. Zweth has the potential to serve as a bridge connecting surrounding urban areas, while its intergenerational community can serve as a bridge connecting the two generations.

1.4 Research wapproach

Literature Review

The research will extensively collect literature with different focuses to help sort out the construction process of a mixed-age community that promotes intergenerational communication. Living loneliness is a starting point for raising research questions, so I obtained theoretical support on the built environment's effect on living loneliness through literature reading, and summarized the environmental characteristics that can provide guidelines for the design. Another part of the literature will focus on the theory-building part. The ultimate goal of building an intergenerational community is to promote social inclusion and enhance affordability. Therefore, I also read literature about the community operating mechanism for social inclusion, social rules and cooperation methods. For the practical suggestions, part of the literature survey also focused on the living needs and preference types of these two groups, including their unique psychological needs.

Case studies

Many countries with a relatively high ageing population and serious living loneliness problem have completed many relevant designs, which is initially designed for multigenerations. So I learned from their successful cases for practical experience.

The case study also includes two parts. The first part is about housing and community types targeting the different needs of the elderly and young people, including sharing units, typologies, and collective modes. The analysis would be concentrated on how they are different from ordinary residential units and what are the effective ways of shaping public spaces. The other part includes the structural construction of the different houses. To increase affordability and consider the sustainability of the community, for example, where some residents may expand (or downsize) their homes in the future,

some flexible structures should be considered. In addition, there are many local materials available on our site. How to use them rationally in house construction is also worth looking for relevant cases for reference.

Interviews

In many existing designs for intergenerational communities, the focus tends to be on age-friendly design. After all, the precursor to intergenerational communities, the full-age community, is an initiative based on the needs of the aging population, serving as a solution from the perspective of older adults. Additionally, many studies indicate that the improvement of elderly welfare and quality of life is more prominent in intergenerational communities than that of younger individuals (Petersen, 2023). Therefore, it's essential to consider the needs of younger people as another integral part of the community. Before finalizing the proposal for an intergenerational community, I briefly interviewed several young friends to gauge their willingness to participate in such a community.

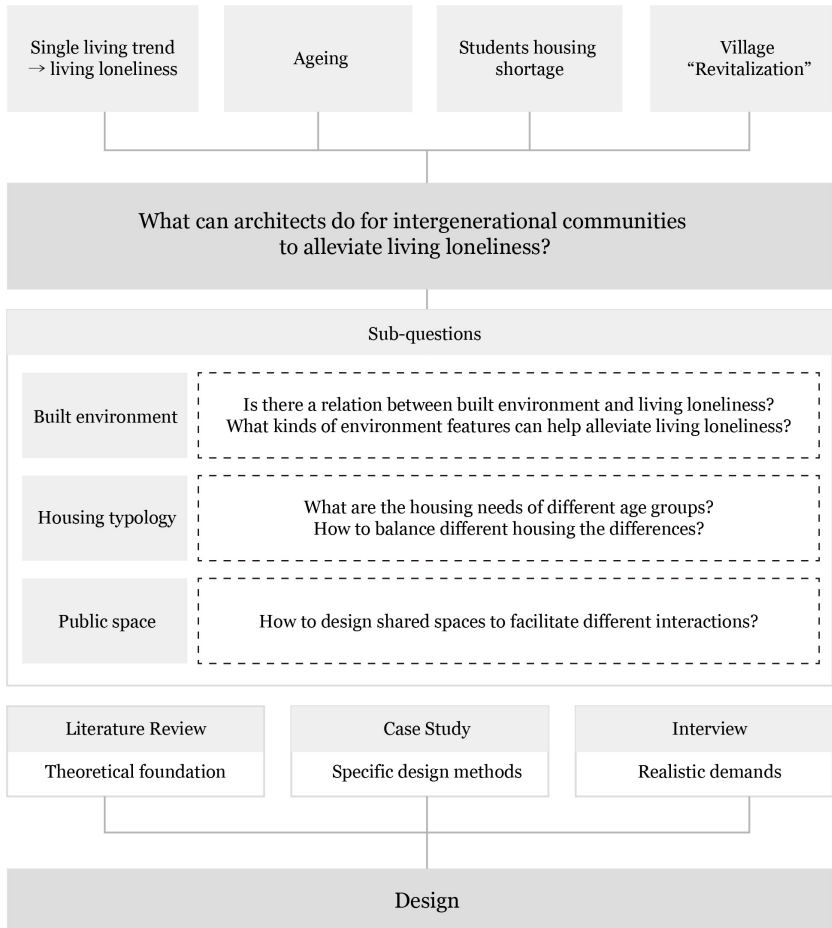


Figure12: Research framework (author)

2
Loneliness
&
Intergenerational living

2.1 Built environment and Living loneliness

Loneliness is a universal human experience with a long history, and its intensity is greatly influenced by various social and cultural factors such as family structure, gender, age, etc. (Figure13). It can specifically be defined as self-recognition of the pain of separation. In this regard, it is important to emphasize that "separation", which means being alone or living alone in the physical sense does not necessarily bring suffering. Because some people enjoy the process of being alone or care about privacy. However, some research shows that this kind of objective alone-ness often evolves into loneliness. The reason is that physical distance will lead to reduced opportunities for social contact, thus making people develop loneliness. (Savikko et al, 2005; Snell, 2017; Ojembe & Ebe, 2018)

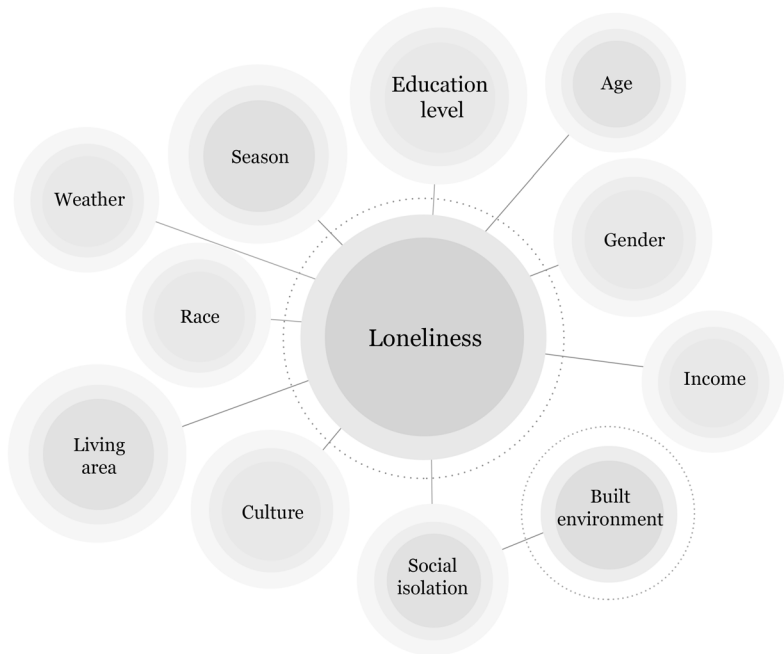


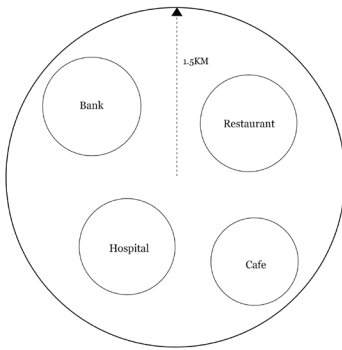
Figure13: Factors affecting loneliness (author)

When delving into the relationship between this kind of loneliness and the built environment, I'm exploring the potential of external, human-created physical surroundings in facilitating social connections, temporarily setting aside individualized factors. Although this is an idealized exploration process, it is also the humanistic care that architects can provide for social issues.

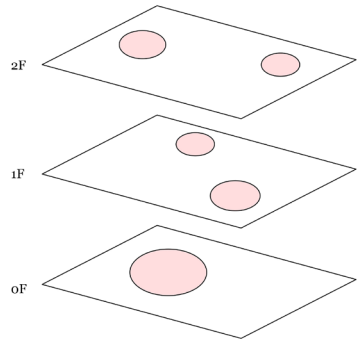
Existing research indicates that the building environment is associated with residents' living loneliness (Kleeman et al., 2023; van den Berg et al., 2019; Domenech-Abella et al., 2020; Gijsbers, 2023; Reed & Bohr, 2021), and their relationship is progressive.

Some studies have found that walkability significantly affects residents' active and purposeful use of public spaces, as well as their cycling habits and visits to green spaces. Residents who perceive their community as unsuitable for walking are less likely to use public spaces (Bergefurt et al., 2019). This is understandable, as comfortable walking paths may encourage people to leave their homes more often or travel to destinations more frequently, which can potentially lead to social activities and a reduction in residential loneliness. Conversely, the deterioration of certain public facilities, such as sidewalks and transportation infrastructure, can cause inconvenience or discomfort, reducing residents' willingness and ability to move around, which may have negative impacts on their independent living, and sense of well-being (Rosso et al., 2011).

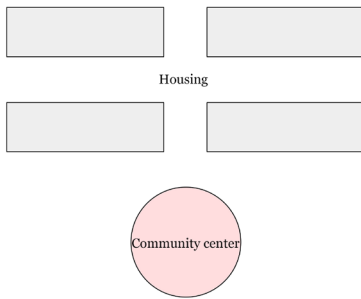
Correspondingly, this finding leads to the development of design guidelines. For example, enhancing walkability can be achieved through higher residential densities, mixed land use, and connectivity with commercial streets (Van Dyck et al., 2013). There are many similar spatial features that may alleviate living loneliness, as depicted in the figure 14.



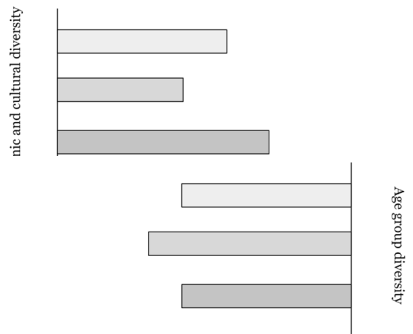
Amenities within walking distance



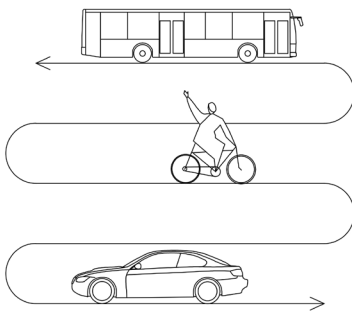
Good distribution of common/public areas



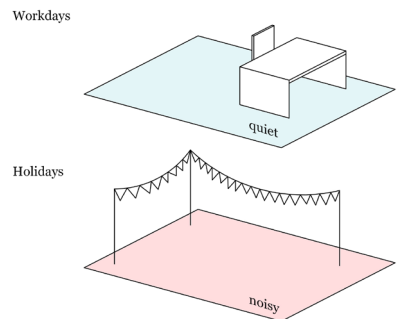
Collective community center



Diverse neighbourhoods

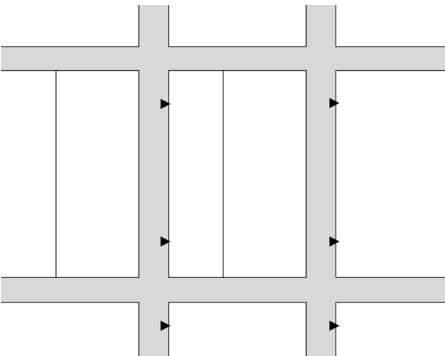


Convenient transportation

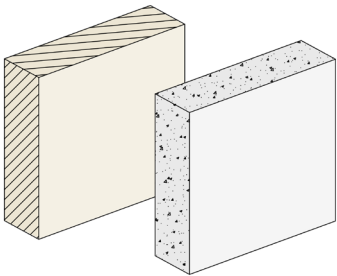


Flexible use of space

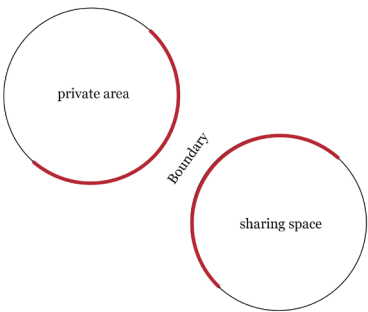
Figure14: Built environment that can alleviate living loneliness (author)



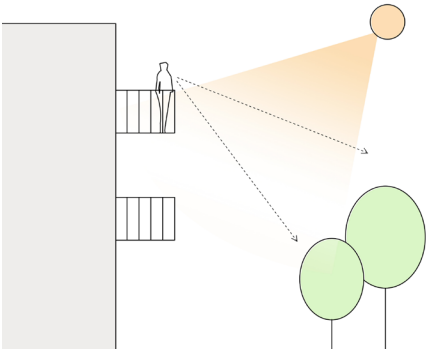
Good accessibility & walkability



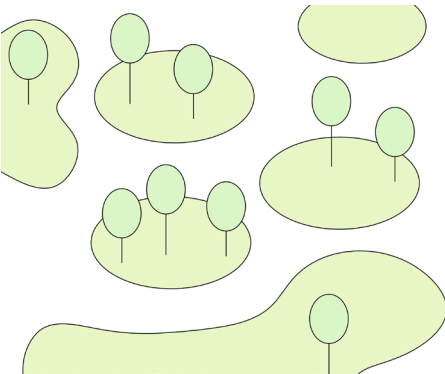
Good-quality housing materials



Clear distinction between public and private



Good view and exposure to natural space



High-density greenspace

Figure 14: Built environment that can alleviate living loneliness (author)

2.2 Origin & Definition of Intergenerational living

Age-based residential segregation is often described as a "natural" consequence of ageing (Vanderbeck, 2007). As the population ages and the trend of living alone increases, the residential isolation of older and younger generations increases. Some scholars believe that residential age segregation is conducive to providing effective services in a targeted manner, such as some well-equipped retirement communities, which can improve older people's physical health and well-being (Golant, 1985; Lloyd, 2014). Nevertheless, at the same time, the separation of age groups has caused psychological problems such as depression and loneliness because they are separated from other age groups. Moreover, many elderly people are dissatisfied with this (Wang, 2011; Liu et al., 2016; Addae-Dapaah, 2008). Apart from that, providing communities for specific ages also reverses the trend of age segregation, giving rise to anxiety about intergenerational relationships and fear of other generations (Zhang, 2020). These findings represent another way to think about residential age segregation: it blocks essential opportunities for individuals to meet, interact, and move beyond "us versus them" distinctions (Hagestad & Uhlenberg, 2005).

To encourage different age groups to communicate more and have more chances to help each other, thus mitigating the adverse effects of residential age segregation. In 1999, UN Secretary-General Kofi Anan proposed the concept of a "Society for All Ages" (Anan, 1999). On this basis, The Communities for All Ages, a national model, was developed by The Intergenerational Center at Temple University in 2002 (Brown & Henkin, 2014) to counter the harmful effects of residential age segregation. Myers (2015) argues that we need a new generational compact which recognises that the younger generation is the future workforce and residence base of our communities, and this should create positive synergies with older adults. A 2008 APA national

survey of planners shows that 90 per cent of planners believe that communities populated with people of every age bracket are more vibrant (Israel & Warner, 2008).

The concept of intergenerational cohabitation communities has evolved from the traditional model of multigenerational households nowadays, where several generations lived together under one roof. Its modern definition extends beyond the confines of family households. It can involve a mix of unfamiliar young and elderly individuals living together in a community setting.

Advantages of intergenerational living

In the context of ageing becoming a global issue, many studies on age discrimination have been conducted in different regions. Research shows that the experience of ageism for older adults is widespread and highly prevalent in Western and Eastern countries (Yaghoobzadeh et al., 2020). Individuals of different ages have negative attitudes towards older people and the ageing process (Meshel & MCGlynn, 2004). Especially during the pandemic, intergenerational threats and related stereotypes appear to be reinforced due to reduced exposure opportunities and the portrayal of older adults as a homogeneous, vulnerable group by the media (Drury et al., 2022).

Positive intergenerational contact has been shown to have a rich potential to improve older adults' physical and mental well-being. Intergenerational cohabitation may protect against increases in depressive symptoms in later life, and face-to-face contact with younger adults may promote feelings of meaningfulness, belonging, and social integration, which are positively associated with older adults' mental health (Tosi & Grundy, 2019). Relying on Allport's (1954) intergroup contact theory, intergroup contact has been highlighted as one of the most promising methods for reducing adverse categorisation reactions and improving intergroup relations. Cross-age

communication constructed from the principles of the contact hypothesis helps promote more positive attitudes among adolescents and older adults (Meshel & MCGlynn, 2004), helps improve the quality of life for all involved, and promotes a sense of purpose and achievement among all generations.

In short, elderly individuals have the opportunity to engage in activities and receive assistance in their daily lives from the younger generation in intergenerational communities. It can effectively address issues such as loneliness and vulnerability. Beyond the positive impact on mental well-being, elderly residents also exhibit a reduced likelihood of incurring additional medical expenses due to the daily care and companionship they receive. For younger residents, intergenerational living has been demonstrated to enhance communication skills, broaden life experiences, and bring a sense of accomplishment (Gurung et al., 2022). Additionally, the students may benefit from reduced rent by providing companionship and assistance to elderly residents, particularly advantageous during the housing crisis.

Thus, whether viewed from a perspective of humanitarian care or practical problem-solving, the intergenerational living model stands as a compelling approach worthy of exploration.

2.3 Housing needs

The old

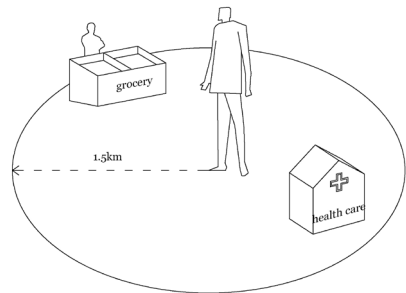
As the elderly age, their declining health can lead to reduced mobility and activity levels, making them increasingly reliant on their community (Kemperman et al., 2019). This trend towards aging in place is not solely determined by physical limitations, as survey results indicate that, under selective circumstances (albeit hypothetical), older individuals still prefer to "stay put" as they grow older (de Jong et al., 2022). Therefore, their residential communities need to be designed with longer periods of use in mind.

Many older adults have negative attitudes about their ability to cope with environmental stress so an age-friendly living environment will play an important role. The natural and built environment plays a decisive role in older people's perception of age-friendliness. Research indicates that older individuals tend to frequent public places more often for leisure activities and are more likely to utilize public spaces within their community (Bergefurt et al., 2019). Among them, greenery, adequate and suitable public open spaces, walkable community environments and high-quality sidewalks are all building elements that older people regard as having a positive effect. Precisely, "nature," green environments and amenities have ecological, aesthetic, and emotional functions for people's active and healthy behaviours. In addition, space and subjective experience are essential ways to perceive the beauty of life. Meaningful spatial experiences include walking, informal chatting, exercise, activities, and travel (Sun et al., 2018; Mulliner et al., 2020).

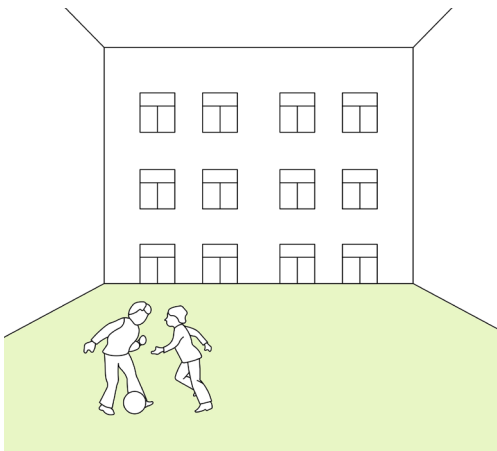
Specifically, regarding housing type, older people are more likely to be willing to live in an apartment compared to a detached home (Abramsson & Andersson, 2016; de Jong et al., 2022). Therefore, collective senior living communities may become a model to promote healthy living for older people. Safe, high-



Apartment VS Detached house



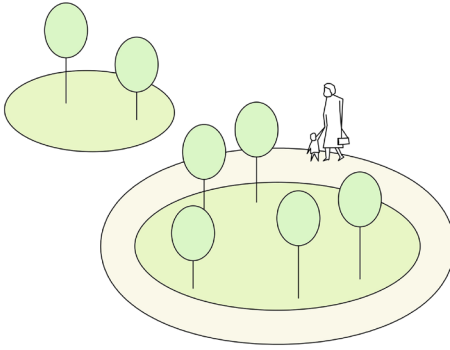
Amenities within walking distance



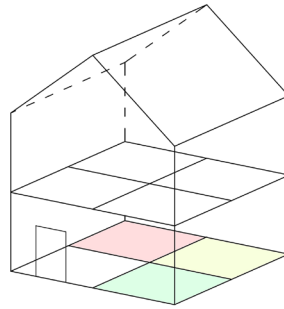
Public areas for recreational activities

Figure15-1: Housing needs for old people (author)

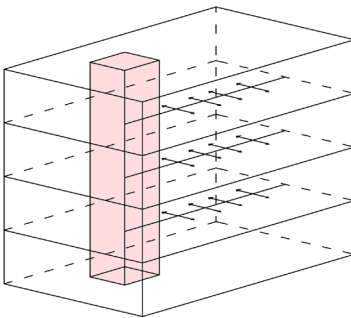
quality facilities and public spaces in communities are essential to supporting an aging population and reducing loneliness (Kemperman et al., 2019). In terms of housing scale, downsizing may be more suitable for older people because the quality of housing is more likely to affect the living experience of older people than the size. There are different strategies for residences of different heights to make them age-friendly. For example, in mid- and low-height houses, floor plan design is crucial. In high-rise residences, the co-living model between neighbors is more critical (Adam et al., 2016). When it comes to housing configurations, older individuals, due to mobility limitations, have a greater need for homes equipped with elevators. Moreover, compared to houses with direct access from the ground floor, they prefer entry through corridors and elevators. Within the residence, they prefer the living room, kitchen, bathroom, and at least one bedroom to be ideally located on the same floor. Additionally, although the number of rooms does not directly impact their living experience, they still desire an area designated for hosting guests.



Green spaces and trails



Living room, kitchen, bathroom, and at least one bedroom located on the same floor



Buildings equipped with elevators

Figure15-2: Housing needs for old people (author)

Students

In an era that advocates for showcasing individuality, young people have a variety of preferences when it comes to housing. As a member of the target group, I think I can serve as a sample. When I first arrived in the Netherlands, I lived in a ground-floor student apartment facing north with an independent entrance. While having an independent entrance was convenient, it also meant missing out on most opportunities to meet neighbors in the hallway. Our building is surrounded by other residential buildings in each direction. Although there is a large central open space in the middle, it is all used for parking without any green space (figure16).

Inside the building, there is not any shared spaces or facilities as well. So on sunny days, I didn't even have a place to catch some sunlight. As a result, I often suffered from living loneliness, and after living there for a year, I found myself feeling very unfamiliar with the neighborhood. Personally, this living experience strongly sparked my desire for sharing space. Even though the living area faces north, a courtyard s would be a supplement for me.

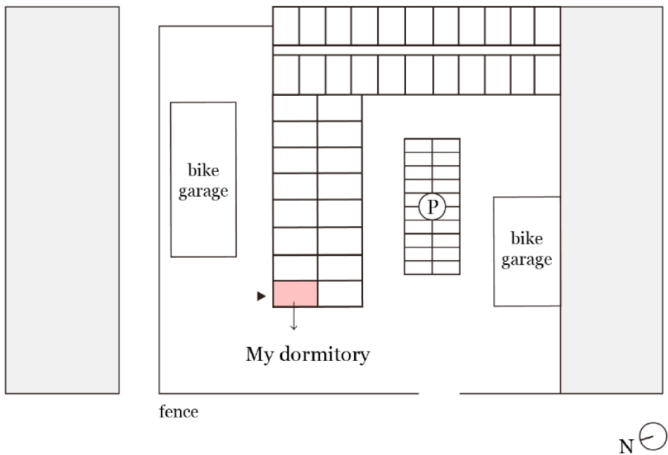


Figure16: My housing community (author)

Additionally, when the research question was raised, I briefly talked to 5 friends who are also students to understand their willingness to live with the elderly and their expected common functions within a dwelling complex. The following is a simple summary (figure 17).

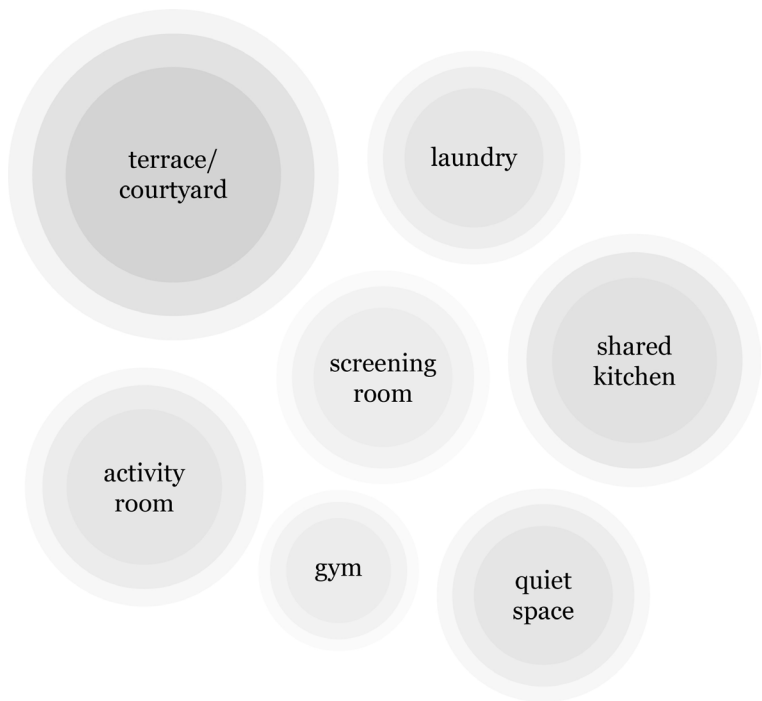


Figure17: Small interview results (author)
*complete interview results are in the appendix

In general, the primary concern for everyone revolves around rental costs. When they were asked about living with stranger elderly people, they worried about the inconvenience caused by different living habits. One of the students told me that he was complained by the elderly residents around because of throwing a party. However, their responses might undergo significant changes when informed that cohabiting with older individuals could potentially lead to reduced rent. Moreover, there were considerable variations in their specific functional requirements. The only thing that is certain is that the desire for open green space is common. To increase the sample size, I sought out more extensive surveys and studies to supplement the evidence.

In a survey conducted among over 1000 students in Antwerp, those currently living in student dormitories exhibited a more positive attitude towards cohabitation and shared facilities. Regarding housing types, the type of accommodation (such as student dormitories or studio apartments) was the most important attribute in the selection process, with studio apartments being more popular but also more expensive. Private facilities ranked high on the wish list (Verhetsel et al., 2017).

Apart from housing types, students consider price to be a crucial factor in their housing decision-making process, followed by commute time to campus, room size, and the availability of a shared kitchen (Nijënstein et al., 2015). From this, it can be inferred that if the price is within an acceptable range, priority for sharing would likely be given to spaces like the kitchen and living room—areas that are not completely private. Conversely, facilities such as bathrooms, which are more personal, are likely less acceptable for sharing.

2.4 Conclusion

In summary, future designs for shared living spaces should prioritize the unique needs and preferences of both elderly individuals and students, aiming to create an inclusive and cohesive living environment. Considering the distinct preferences of these two groups—where students typically have more concerns regarding privacy—the design should emphasize shared elements while accommodating these requirements. This includes specific spatial considerations (shared spaces, informal areas, formal spaces, common areas) and design principles such as efficiency and adaptability. By addressing these factors, shared living spaces can foster happiness, independence, and intergenerational harmony (Nayak et al., 2023).

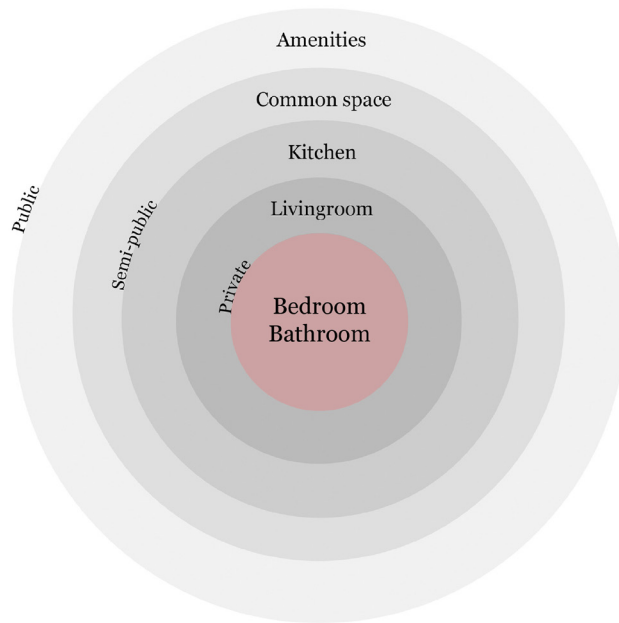


Figure18: Possible shared space (author)

3

Case studies

- 01** Centre de Salut de Campoamor
Alicante, Spain, 2009



- 02** Marmalade Lane Cohousing
Cambridge, UK, 2018



- 03** Zwei+plus Intergenerational Housing
Vienna, Austria, 2018



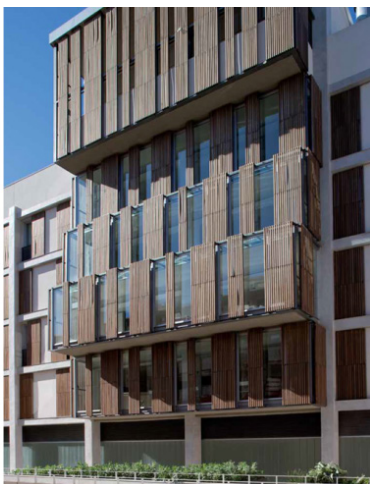
- 04** Two Front Doors - Enfield
Intergenerational Living Competition
UK, 2020



- 05** Bridge Meadows
North Portland, US, 2011



01 Centre de Salut de Campoamor Alicante, Spain, 2009



Source: García & Martí, 2014

Architect: Carmen Pérez Molpeceres

Tenure type: Rent

Target group:

Low-income young (under the age of 35)& old (over the age of 65)

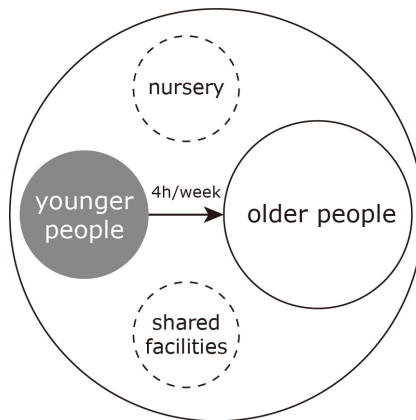
Housing type:

72 small (avg. 40 sqm) single-bedroom apartments

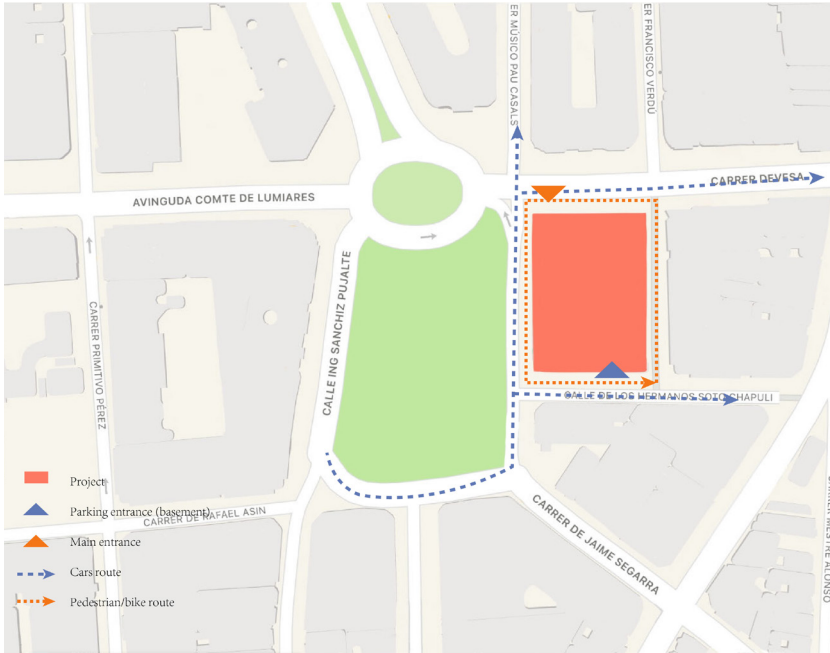
Functions: library, computer centre, areas for social events and workshops, solarium, roof garden, laundry (community centre & health centre)

General information:

Plaza de América building of intergenerational dwellings for non-dependent seniors and supportive young people arises from the progressive ageing of the population and a significant demand for attention and cares on the part of seniors. With these premises, the Alicante Town Hall has developed through the *Patronato Municipal de la Vivienda de Alicante* [Alicante Municipal Housing Board] a new accommodation formula: publicly subsidised homes on a rental basis for seniors and



"intergenerational" mode

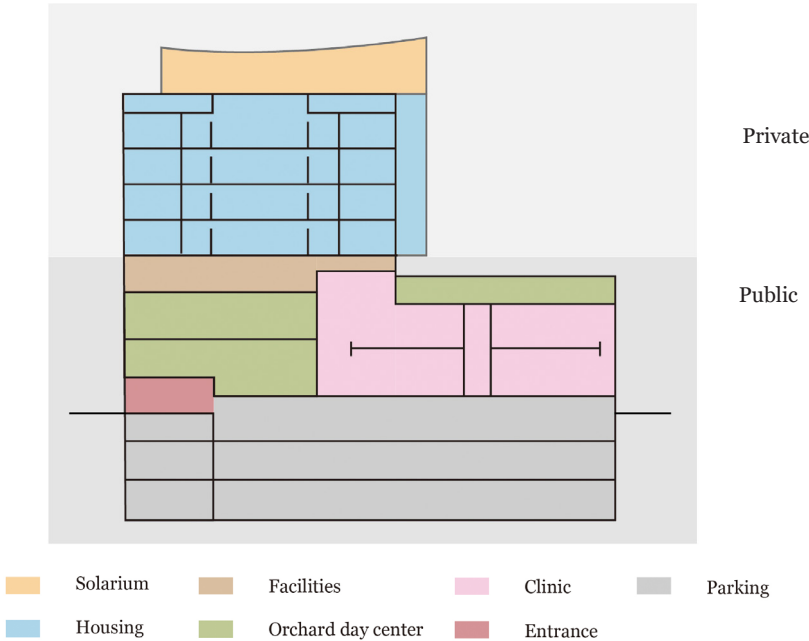


Site information (author)

young people additionally equipped with municipal proximity services.

Younger tenants are committed to carrying out four hours a week of activities and community service as well as being a little more attentive to their older neighbours, as a "Good neighbour".

To be precise, this is not a purely residential project, but a residential complex based on a nursing home. The project is located in the center of the city, close to an open area, surrounded by developed transportation. The building density nearby is high and there are many amenities, leading a convenient life. The entrance to the underground garage is separate from the main pedestrian entrance. The main entrance



Functional distribution section (author)

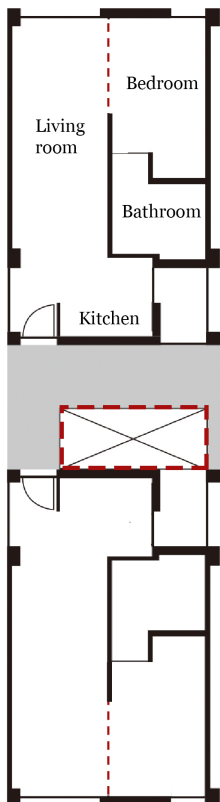
is located at a road intersection and is relatively open. The building is separate where pedestrian paths can go around the complex. According to the section of the function distribution, the most private functions are located on the top of the building while the bottom storeys gather health care functions and a public terrace. The residence is separated from the public areas below by a facility level.



Standard dwelling floorplan (author, illustrated from García & Martí, 2014)

The overall layout of the standard floor plan is very clear. Each floor ensures the existence of a common room, which is integrated with vertical transportation. This can increase the utilization frequency of the common room.

In terms of room plan, almost all homes are the same size, slightly larger at either end. It is worth mentioning that the separation between the living room and the bedroom is a movable "wall". This form can flexibly determine the degree of privacy exposure according to the use scenario. For example, the bedroom can be closed when someone is visiting the house. In the corridor, the small atrium next to the entrance door can increase the lighting for the corridor, and on the other hand, it can increase the possibility of vertical interaction.



Basic housing type
(author)



Sliding wall (García & Martí, 2014)



Corridor (García & Martí, 2014)

02 Marmalade Lane Cohousing Cambridge, UK, 2018



Source: archdaily

Architect: Mole Architects

Address: 9 Marmalade Ln, Cambridge CB4 2ZE UK

Area: 4300 m²

Tenure type: Sell & rent

Target group:

Families with young children

Retired

Young professional couples

Singles (all ages)

Housing type: 42 units in total

- 2-bedroom apartment (75 sqm)

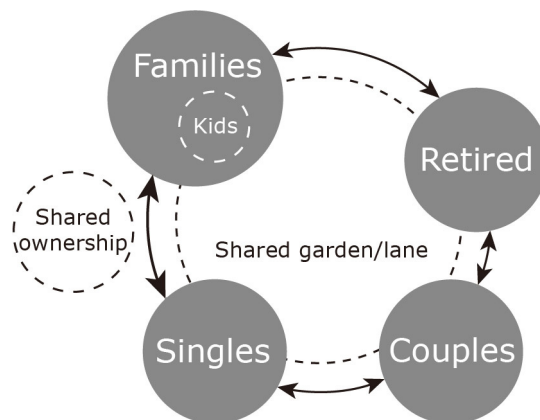
- 2 storey, 3 bedroom house (132 sqm)

- 3-storey, 3 and 4 bedroom house (108 sqm, 123 sqm)

Functions: gardens, playroom, laundry facilities, meeting rooms, a large hall, kitchen, workshop, gym

General information:

Marmalade Lane is Cambridge's first cohousing community. It is a multi-generational community – its residents come from all



"intergenerational" mode



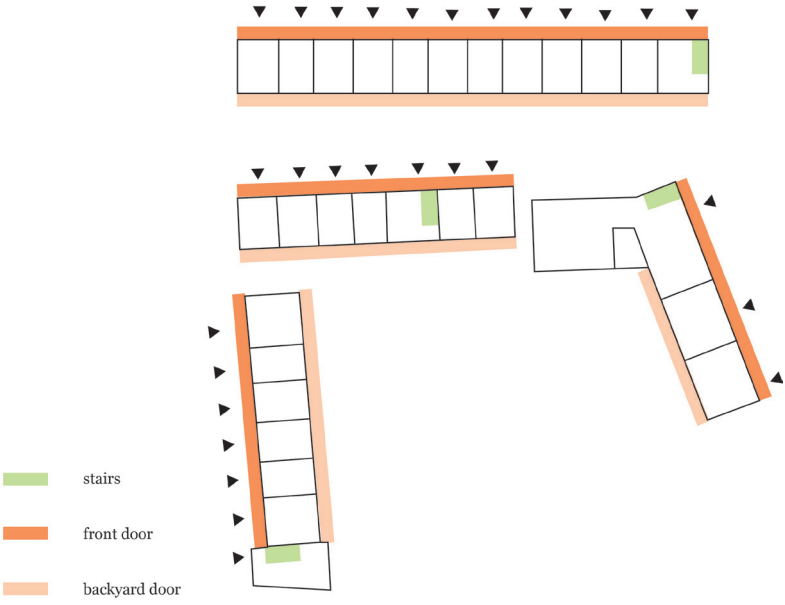
Site information (author)

ages and walks of life and include families with young children, retired couples and young professionals.

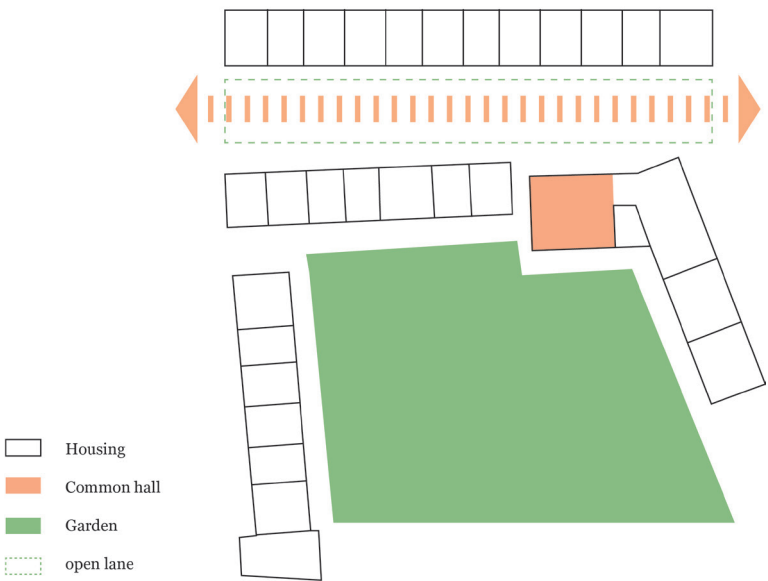
As a cohousing development, Marmalade Lane is the product of an innovative design process in which many residents were involved from the outset. All residents are members of Cambridge Cohousing Ltd, have a stake in the common parts and contribute to the management of the community.

Generally, the community has two types of outdoor shared spaces. One is the "private garden", which is not open to outsiders. A public lane is also built for everyone to pass through.

Their houses are mainly in the form of townhouses and some are multi-storey apartments. Each household has its own independent entrance and exit. They have direct access from the road side and are connected to the rear garden in the form of a rear door.



Accessibility (author)



Ground floor layout (author)

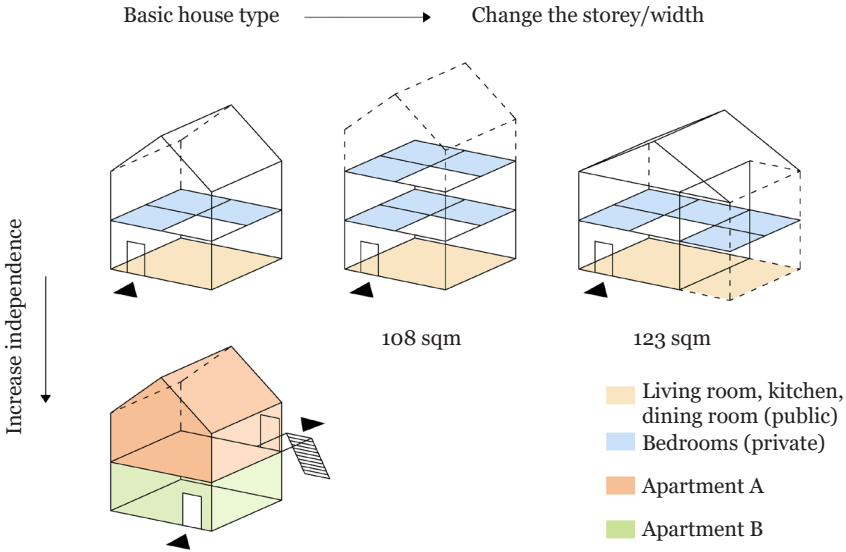
There are many small areas suitable for resting in the public walking lane. In addition to the outdoor public activity area, they also have an indoor common space similar to a community center. This hall is independent of other housing and close to the community courtyard. Sports activities or other leisure activities can be carried out inside.



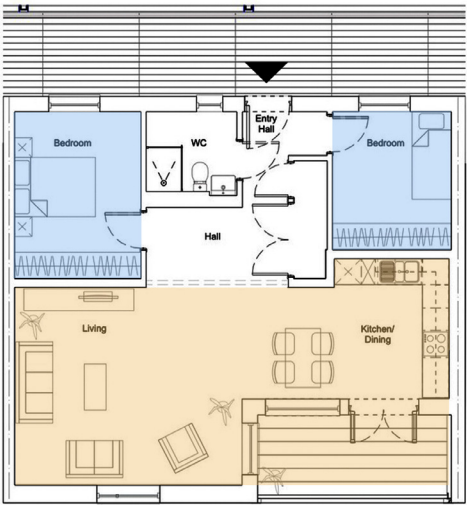
Common lane (archdaily)



Common hall (archdaily)



Housing types (author)



Apartment A/B 51 sqm

Apartment plan (author, illustrated from archdaily)

Regarding house types, a basic family house has living room, kitchen, dining room on the ground floor while all the bedrooms are concentrated above. Adding bedrooms on the first floor or adding more storeys are two methods to accommodate a large family. To ensure the independence of small-sized apartments, some of them adopt the method of adding external stairs to improve the privacy of the entrance. Even in the plan of a single-story apartment, clear boundaries could be seen between the two bedrooms and between the bedroom and the living room.

03 **Zwei+plus Intergenerational Housing** Vienna, Austria, 2018



Source: archdaily

Architect: trans_city TC

Area: 15033 m²

Tenure type: Rent

Target group: Intergenerational families

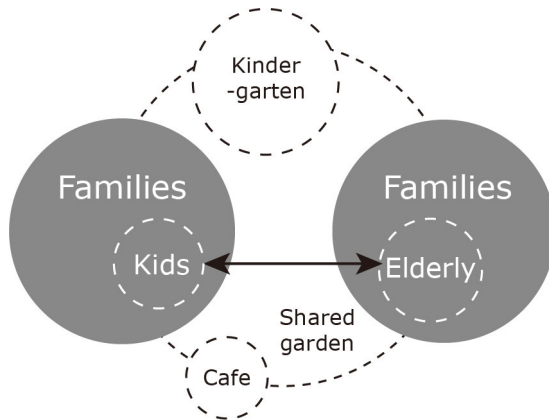
Housing type: 130 units in total

- self-contained apartments
- “all-smart” flexible units (sharing a living/dining room)

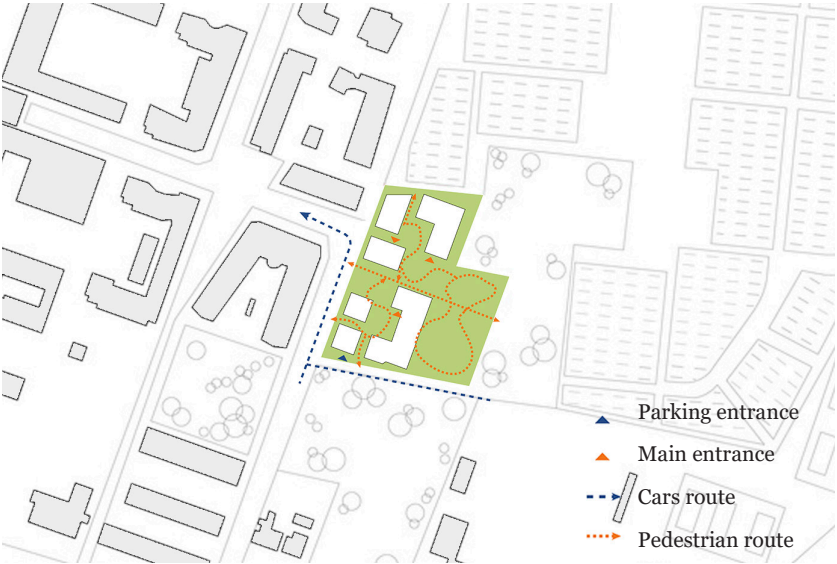
Functions: garden, café , laundromat, playroom for kids, kindergarten, assisted living center

General information:

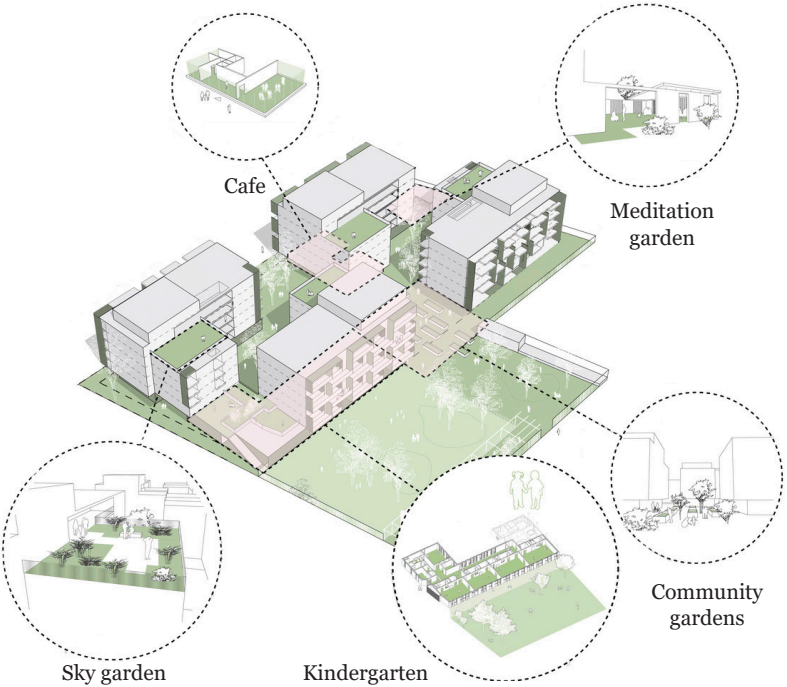
Zwei+plus is an innovative new concept for Intergenerational Living. It is subsidized social housing whose units are let in pairs to two cooperating, intergenerational households. These tandem households can be family or just plain friends, but they must move in concurrently and commit themselves to mutual cooperation and support.



"intergenerational" mode

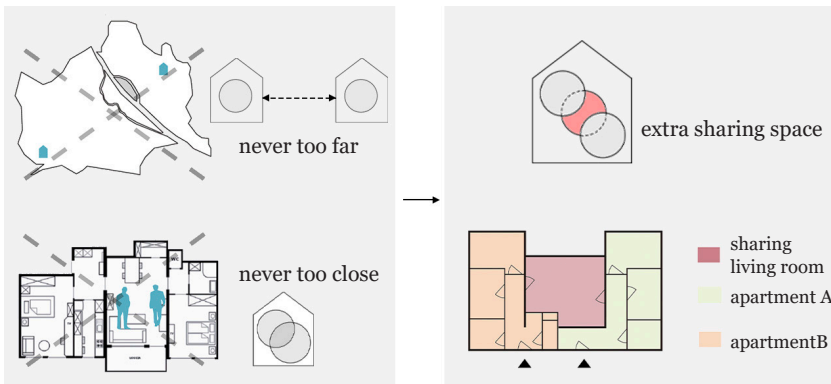


Site information (author)





Standard floor plan (author, illustrated from archdaily)



Sharing housing type (author, illustrated from archdaily)

The standard floor plans of the four buildings are generally the same. The corridors connect five independent apartments that are basically the same. On the other side of the corridor which is the largest type is the sharing apartment. The main purpose of this kind of house is to add a shared living room on the basis of guaranteeing independent entrances for two households. This not only clears the boundaries of private space, but also provides a space for shared activities within a small scale.



Source: archdaily

04 Two Front Doors

Enfield Intergenerational Living Competition UK, 2020



Source: enfield.gov.uk

Author: Adrian Hill Architects

Target group:

- Children
- The elderly with disabilities
- Young parents

Tenure type: Rent

Housing type: 140 units in total

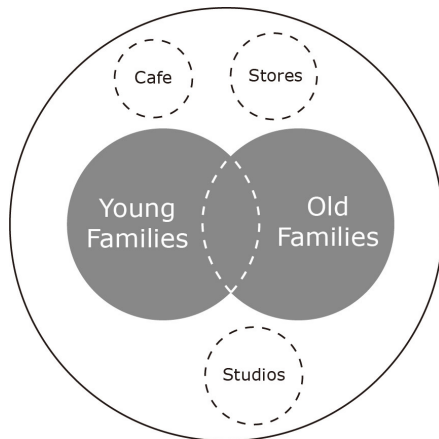
- 1-2bedroom apartment
- 3-4bedroom apartment

Programmatic mix:

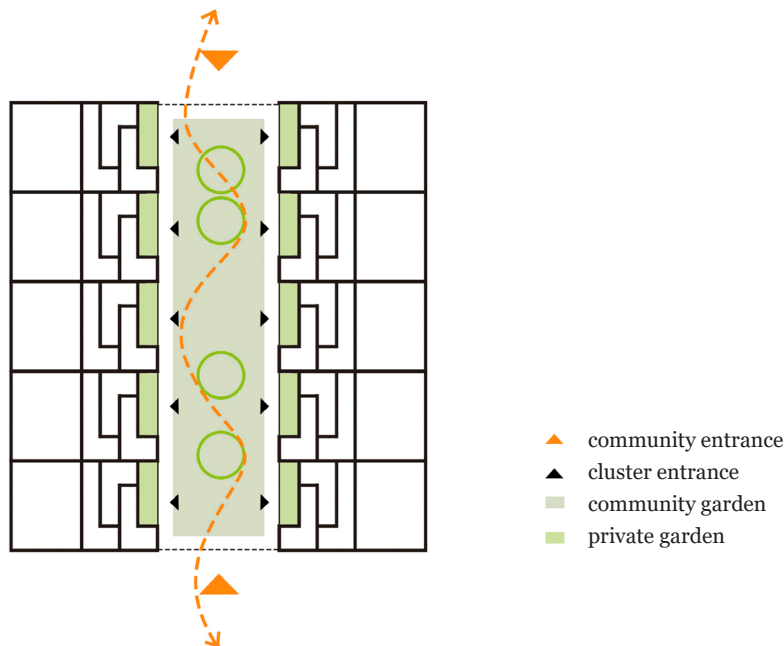
Community facilities, Local business, Event spaces, Cafe, Yoga/
Architects studios

General information:

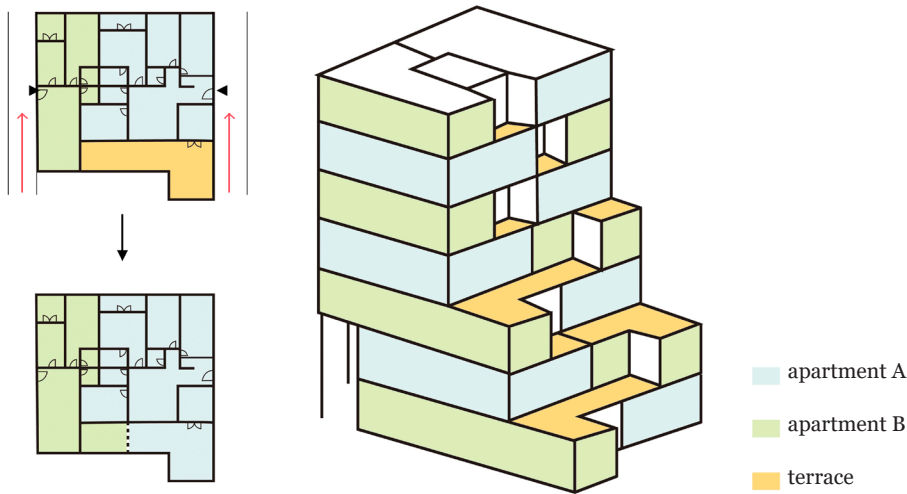
The competition sought innovative thinking of individual homes in order to find ways of building stronger communities, tackle social isolation and bring neighbours together.



"intergenerational" mode



Master plan layout (author)



Housing type and combination (author)

The project also creates two types of outdoor green spaces: community trails and private gardens. The residences are stacked in clusters. There are two households on each floor of each cluster. They enter the house through stairs on both sides without interfering with each other. But they can share a terrace. The solution to “public and private” is similar to the previous case. In addition, this terrace also has a certain degree of flexibility and can be used as their own indoor space.

05 **Bridge Meadows** North Portland, US, 2011



Source: carletonhart.com

Architect: Carleton Hart Architecture

Address: 8502 N Wayland Ave, Portland, OR 97203 US

Tenure type: Sell & rent

Client: Bridge Meadows

Target group: Families & Old people

Housing type: 36 units in total

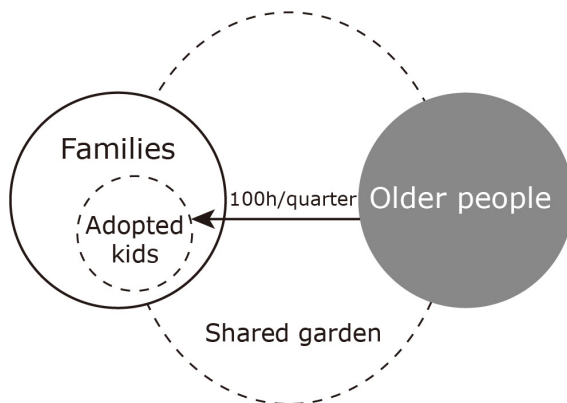
- 9 for adoptive families (4-bedrooms two-story duplexes or single-family homes, over 157 sqm)

- 27 for elders (1 or 2-bedroom apartment, 57-76 sqm)

Functions: community center, multi-purpose community room, library, computer room, art Gallery, rock garden, therapy rooms

General information:

Bridge Meadows is an example of building community across generations. Carleton Hart Architecture was commissioned to design this intergenerational affordable housing development that brings together families and elders. The mix of generations is mutually beneficial with seniors residents offering a sense of



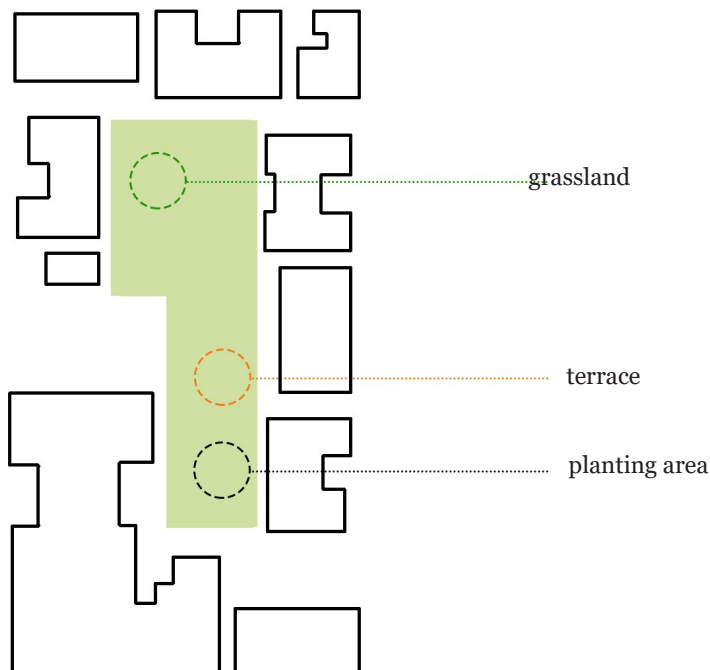
"intergenerational" mode



Site information (author)

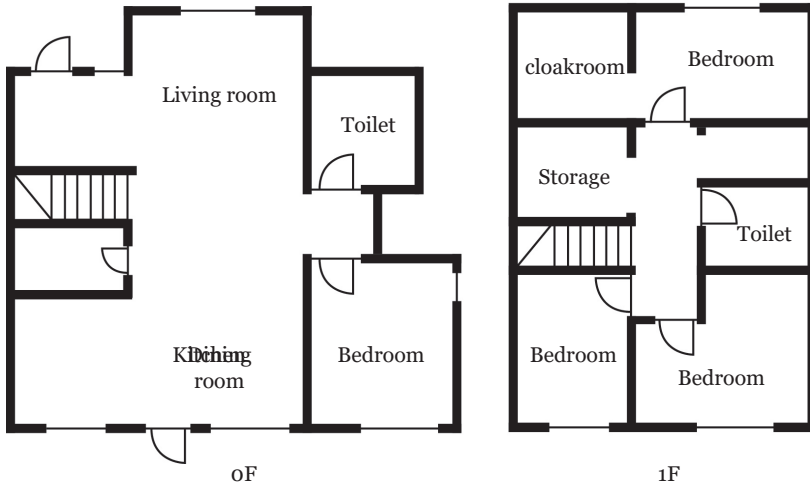
stability to youth and support for parents, while the community involvement replaces the isolation often experienced by elders in traditional housing types.

Each family in the family house of Bridge Meadows must adopt or become the legal guardians of at least three children from the foster care system within five years of moving into the development.



This community is located in a high density residential area. Although they are all detached houses, they also have a unified entrance and parking lot.

Since the target group of this project is mainly foster families, the houses are relatively large. Their house encloses a large green space. This garden contains different types: flower beds for planting trees, solid platforms for community activities, and



House plan (author)

lawns for leisure and relaxation.

Judging from the floor plan of the house, the ground floor has formed a complete living space, including a bedroom. This is consistent with the conclusion drawn from previous literature: the elderly prefer to complete all daily activities on the same floor. Viewed in the context of foster care, it is also a separation of “public and private.” This border is completed by vertical forms.

Conclusion

The five projects are different from scale to specific target group, but they all have in common or similarities in the following aspects:

Programme

Except for the fifth case, which is a purely residential project, the other cases include community-oriented and public-oriented public functions. Among them, the ones with the largest proportion and the highest frequency are those related to the health of the elderly, such as care centers and therapy spaces. Secondly, there are leisure and entertainment places related to daily life, such as restaurants and cafes. This category is more open to residents in the community, which is helpful to enhance community cohesion. Additionally, there are a few workshops and computer rooms focused on fostering creativity or technological skills, offering the elderly a new experience and a break from mundane routines. In the case of the competition, there is also space for sports. This is considered in the Cambridge case as well. Although there is no specific sports space, the community hall is a potential area for indoor sports activities. Personally, the existence of sports facilities will help improve the physical condition of community residents.

Greenery

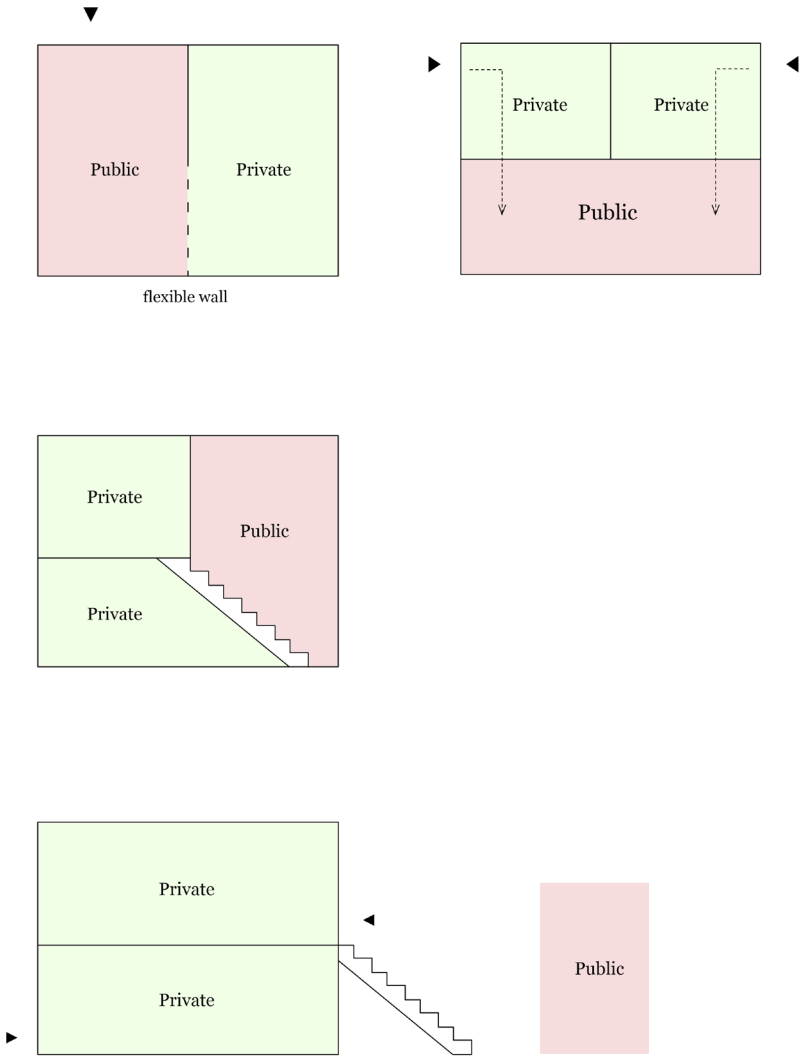
With the exception of the first complex case, which predominantly features an indoor environment, the subsequent cases incorporate significant outdoor open spaces, varying in size. Most notably, most of these outdoor areas have been transformed into green spaces. This aligns with the literature emphasizing the benefits of green spaces for promoting age-friendliness.

Boundary

Whether it is the distinction between the house entrances or the separation between bedrooms, these methods serve to distinguish between public and private spaces. Such delineations are integral to fostering a sense of belonging within an intergenerational community. Given the diverse ages of individuals in such communities, interactions among them can foster closer connections, thereby mitigating feelings of anxiety and loneliness. However, blurring the lines between public and private spaces may exacerbate feelings of anxiety.

Across the five cases, a total of four methods for setting boundaries are employed, with their strictness varying based on the familiarity among residents.

The first approach is the most straightforward: using flexible partitions to separate two distinct spaces. The second involves two private spaces each having independent entrances, both leading to a shared space exclusively for their use. The third method distinguishes between spaces vertically, distributing two private areas across two floors and connecting them with stairs, effectively integrating and dividing them. But in this way, people living on the lower floor may face a higher risk of privacy infringement. The fourth approach is similar to the third, but with the shared space relocated outdoors from indoors. This enhances privacy while increasing the openness of the shared space.



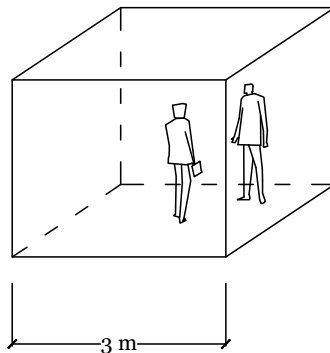
Four methods for boundaries (author)

Shared space

These cases are creating various shared spaces in different ways to provide an opportunity for people of different ages to meet and interact. The public programs mentioned above are actually one type of them. The same is true for the shared terrace within the houses. I divided these shared spaces into three types based on different scales: specifically depending on the number of people sharing, the degree of sharing, the functions shared, etc. They have their own spatial characteristics and are suitable for different scenes.

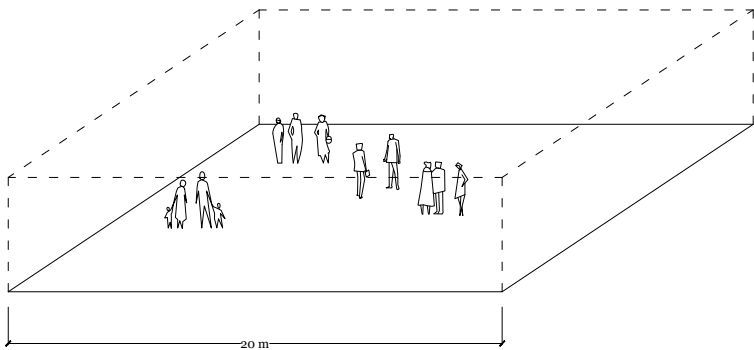
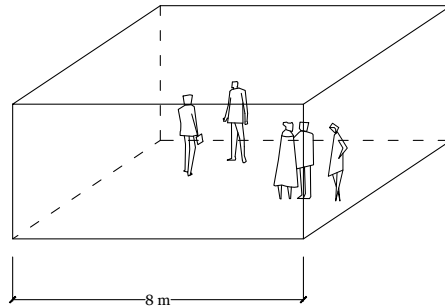
- Tiny shared space

I define a tiny shared space as a small common space for several individual residents. This could be shared workspaces, small outdoor terrace, or any space where shared behavior occurs. The scale of this space is similar to that of a room in an apartment, which means it can become part of a house for several people. This kind of sharing only occurs between the owners of this house (including occasional visitors), which determines that the relationship between them is relatively close.



- Medium shared space

Medium shared space exists between several households. They can optionally share a multi-purpose room or large collaborative kitchen. The scale of this space may be similar to that of a living unit. From a plan perspective, it can be seen as a space parallel to the suite, which can be regarded as the integration and externalization of multiple household living rooms. This shared activity occurs among several households, but it doesn't involve an excessive number of people. For example, it may be limited to one floor or one cluster, indicating that the relationships among them need not be overly familiar, but can be strengthened through such shared spaces.



- Large shared space

A large shared space is situated within a building or a community, accessible to all residents. The extent of this space is not rigidly defined and will vary depending on the size of the community. Interactive activities within this space are characterized by their flexibility and diversity, encompassing large-scale sports events, community gatherings, and more. This sharing model does not necessitate pre-established relationships among users; interactions can commence even among strangers. Ideally, access to such a space is restricted to community residents, thus maintaining a clear boundary between this public space and the external urban environment. Through these restrictions, all community residents coalesce into a unified entity, and this large shared space effectively becomes the "private space" of the community.

In the five cases, most involve the utilization of large shared spaces. These spaces have the lowest entry barrier, as anyone can join in. However, relying solely on these spaces for sharing can present a challenge: Since this kind of interaction does not require existing social connections, the probability of this kind of interaction happening is also lower. If this persists over time, the utilization rate of the space may be unsatisfactory, and the intended benefits of sharing may not be realized. Therefore, I believe that for design guidelines, it's important to fully utilize three different sizes of shared spaces to ensure the probability and frequency of interactions.

4 Urban master plan

4.1 Group analysis

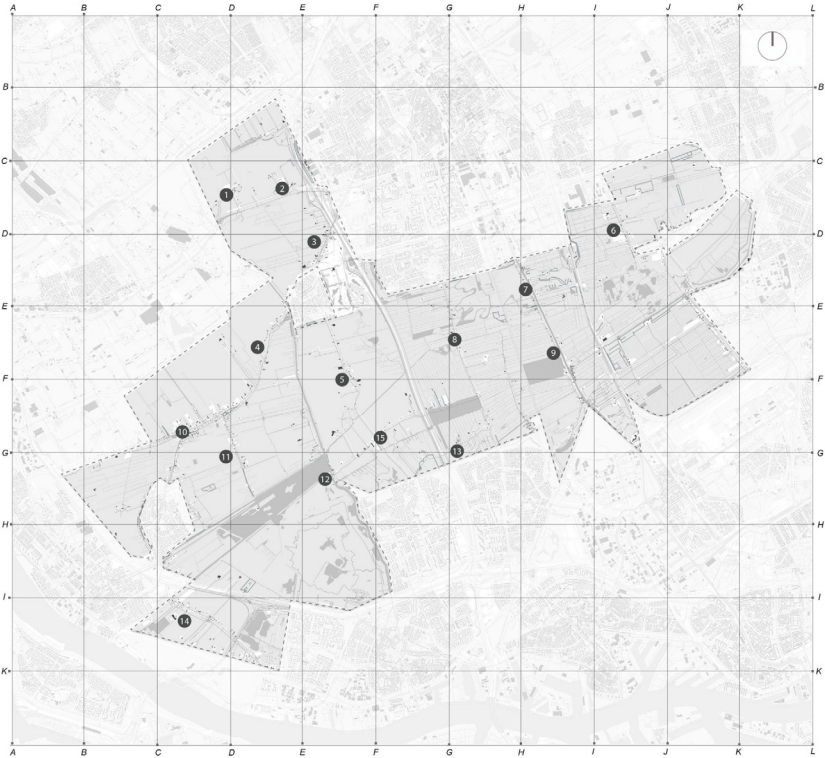
Our site is in midden delfland. ZUS has proposed 4 zones and boezem in midden delfland, which would be a new ecology. On the other hand, this leads to a new, even more water oriented landscape. Therefore, it creates a specific environment that is also more affordable, which leads to the opportunity for introducing attainable housing to that area.



Midden Delfland polder

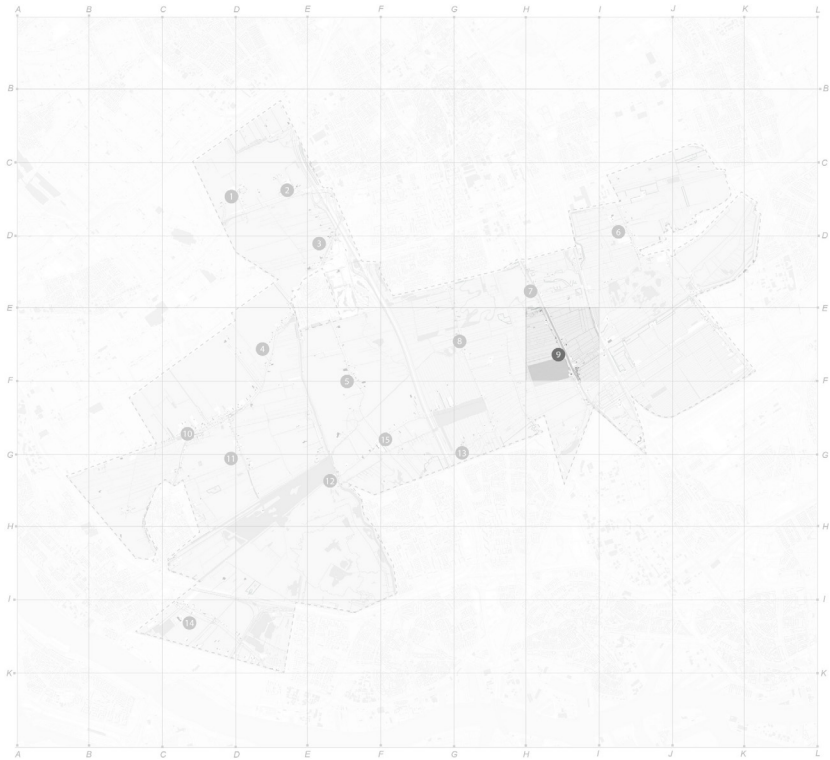


Zones and boezem

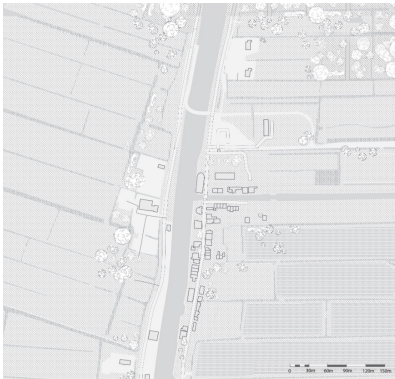


Scattered development in midden delfland (group)

The goal of our site investigation is to find a prototype location in where affordable housing could be an alternative to unattainable housing that is already there. Now, there are a lot of scattered developments in midden delfland. one of such villages is the zweth located along the river Shie.



Location of the Zweth (group)



Group plot choice (group)



Individual plot choice

Our analysis have shown that due to the river access, city connection as well as location in the wetland zone, the Zweth has great potential to become an ecology for development of new work sectors and affordable housing. Our group ambition is to make it into an affordable, sustainable, inclusive and productive area within the new midden delfland plan.

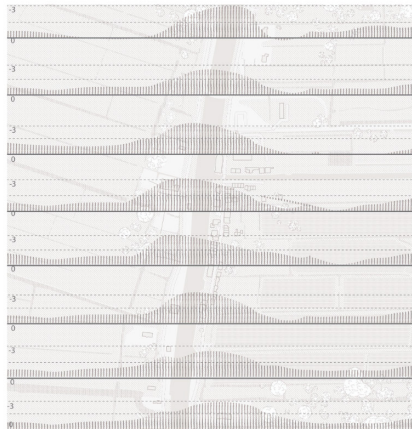
Individually, I chose the plot where the existing village is located since my research question is based on the integration with existing living situations.



Situation in Novermeber 2023



Zones according to ZUS plan



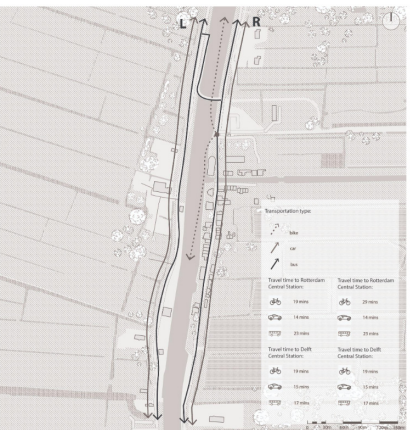
Height [m]



Household types



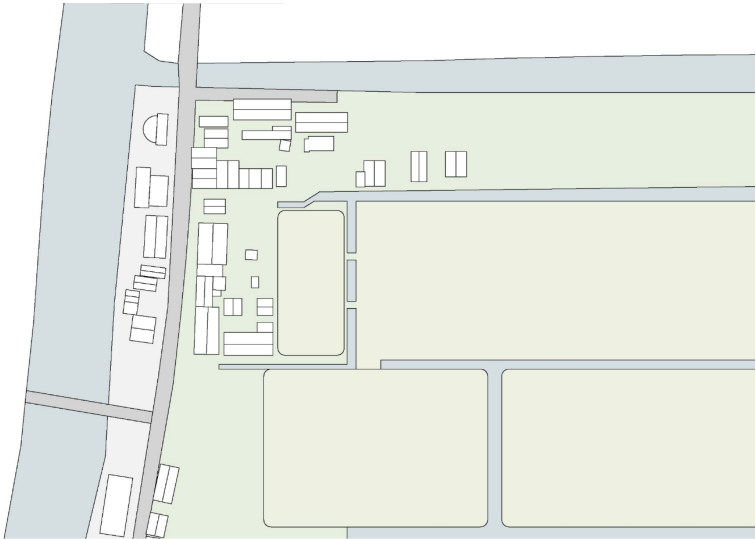
Program



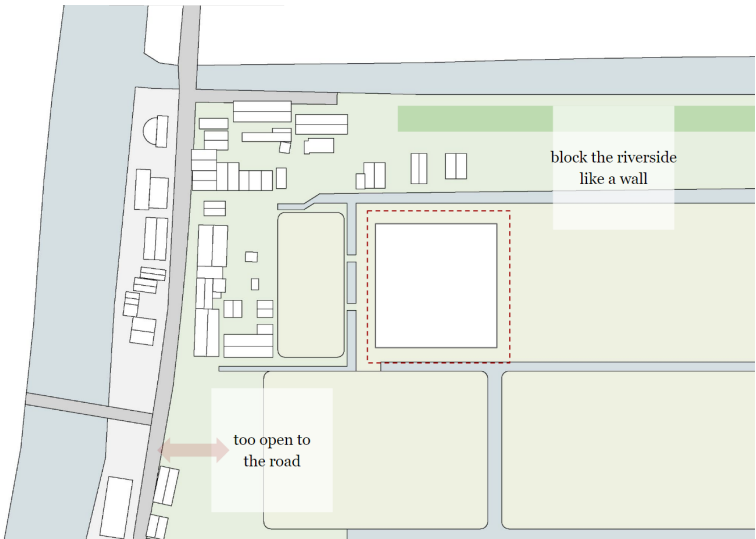
Accessibility

4.2 Urban strategies

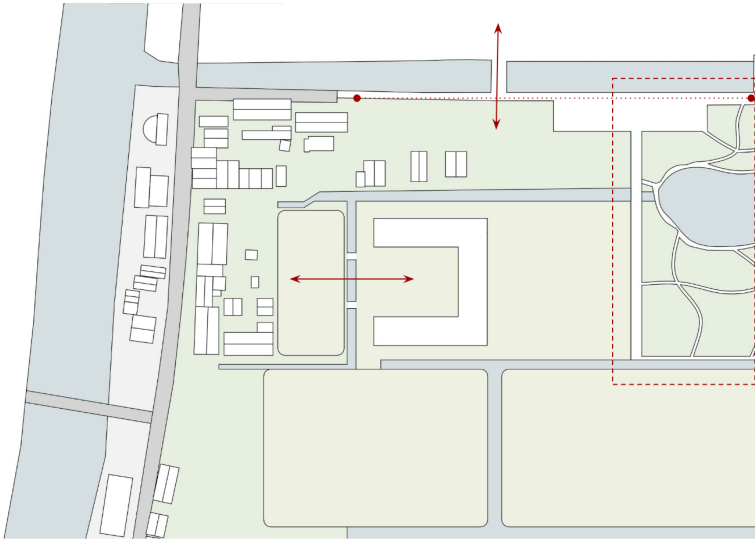
Step 0: Original situation



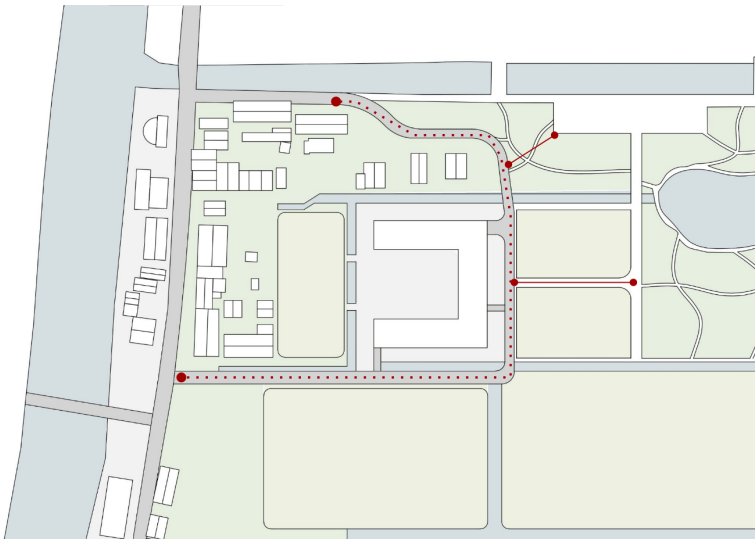
Step 1: Location



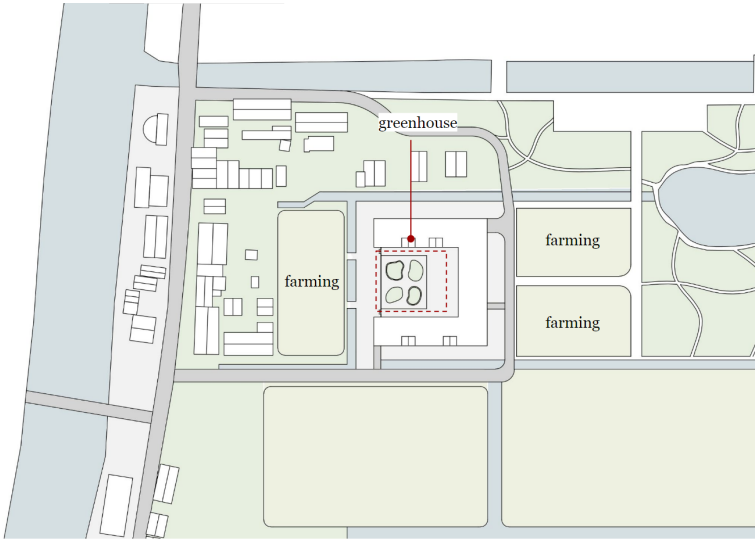
Step 2: Connection



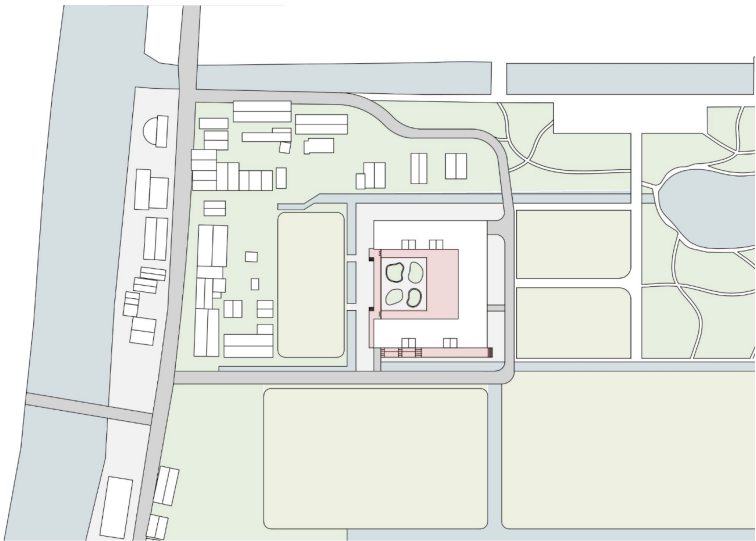
Step 3: Accessibility

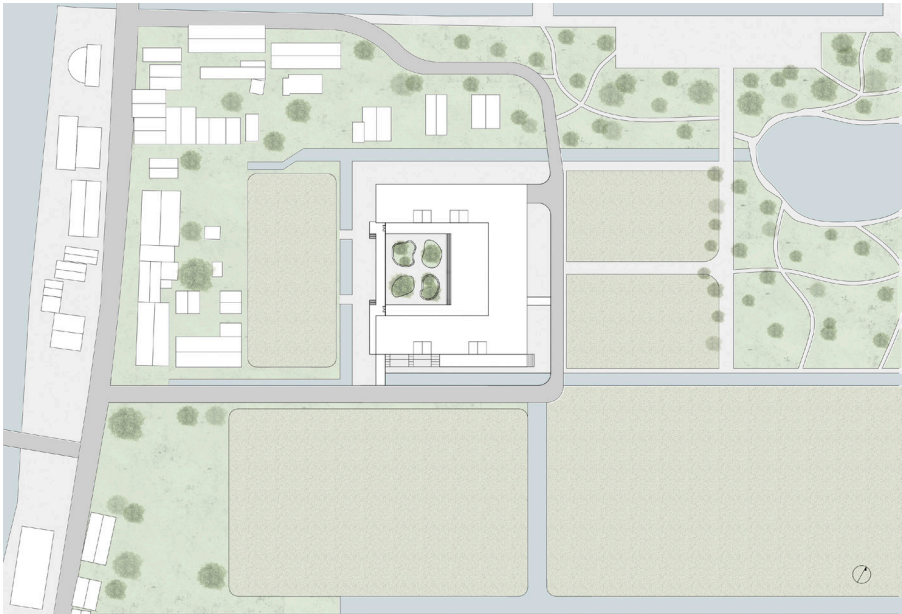


Step 4: Landscape



Step 5: Flood control

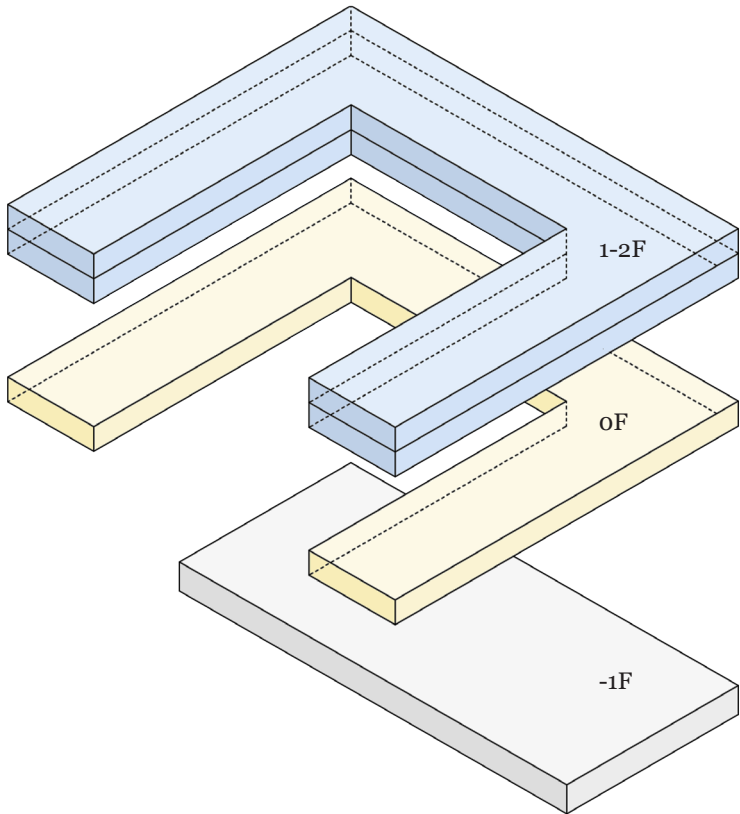




Master plan

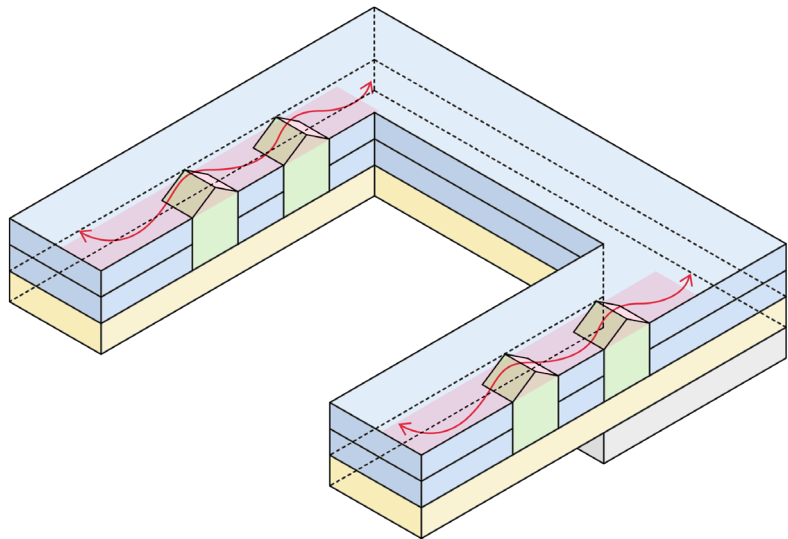
5 Design

Block mass model

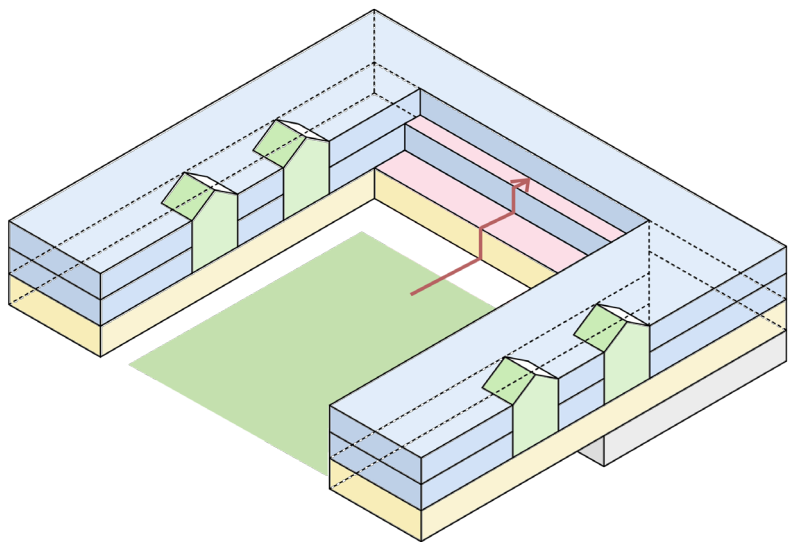


1-2F: dwelling
oF: public plinth
-1F: car garage

Block mass model

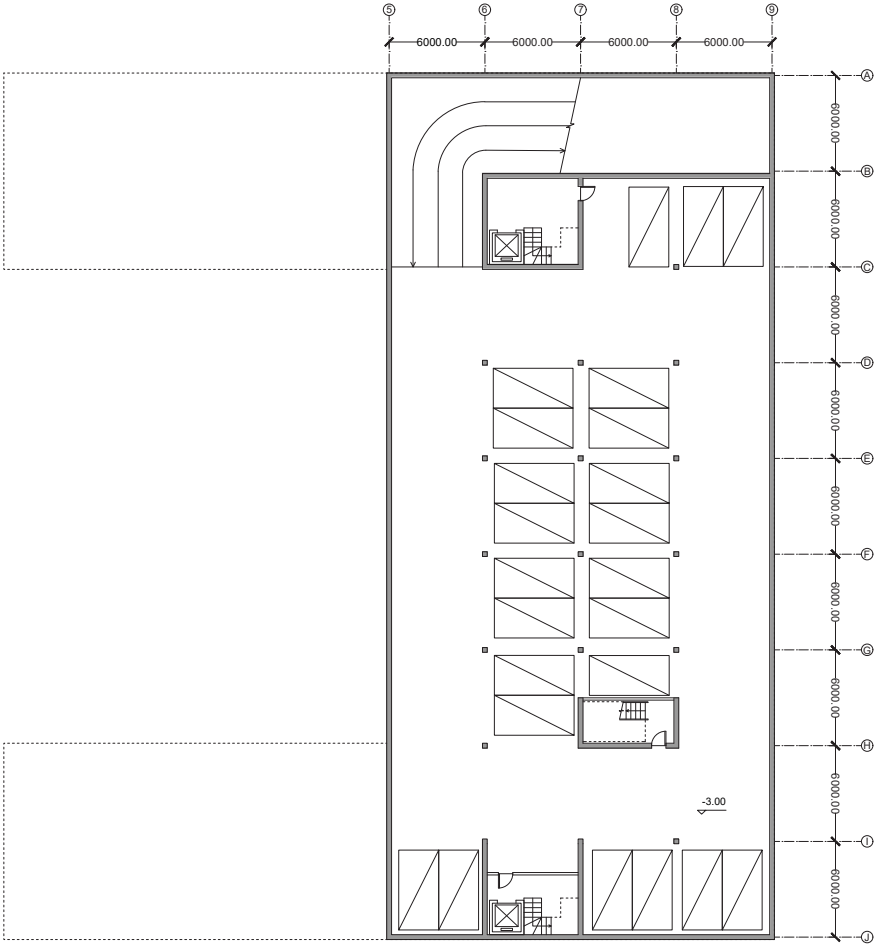


greenhouse in dwelling



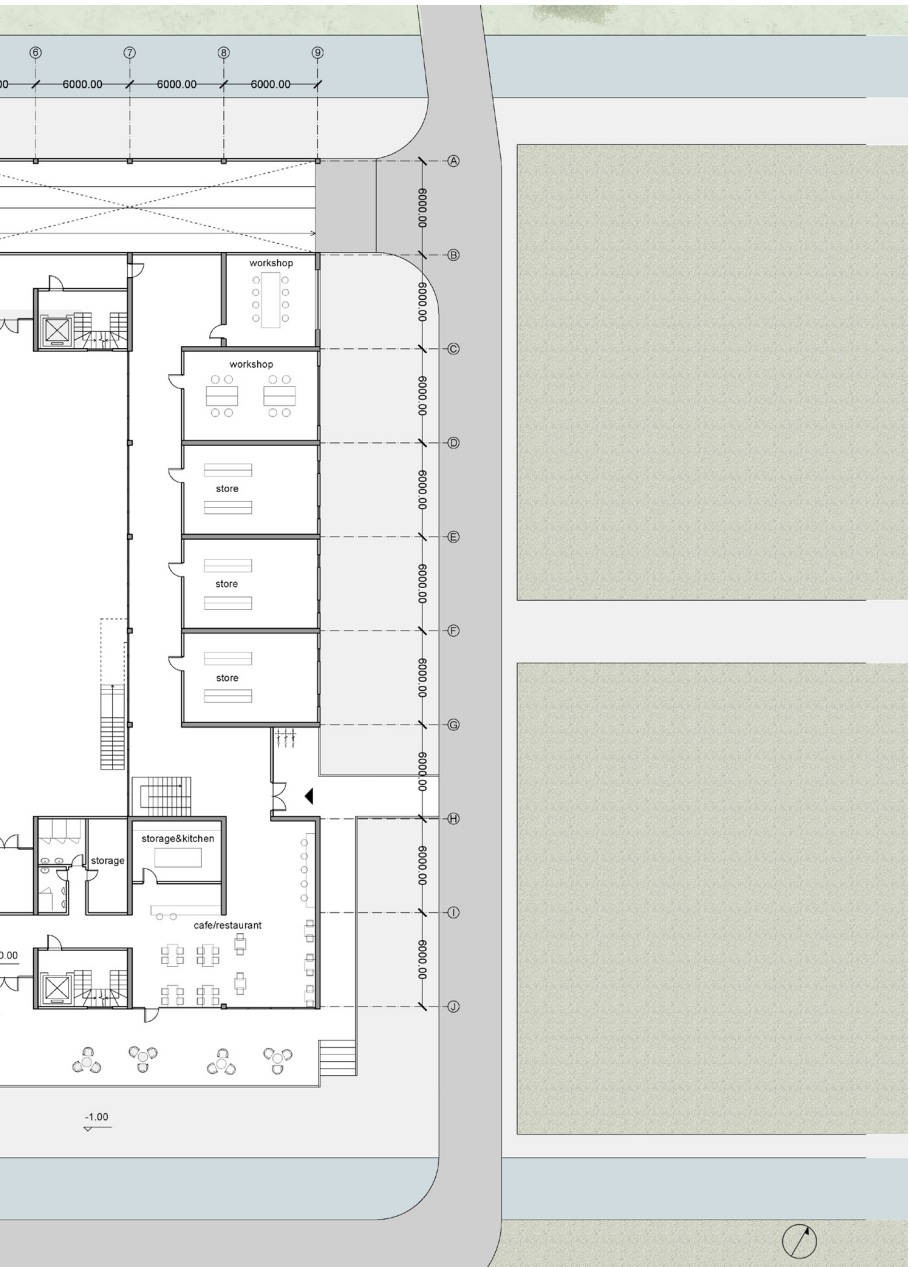
public terrace

Basement floorplan



Ground floor plan

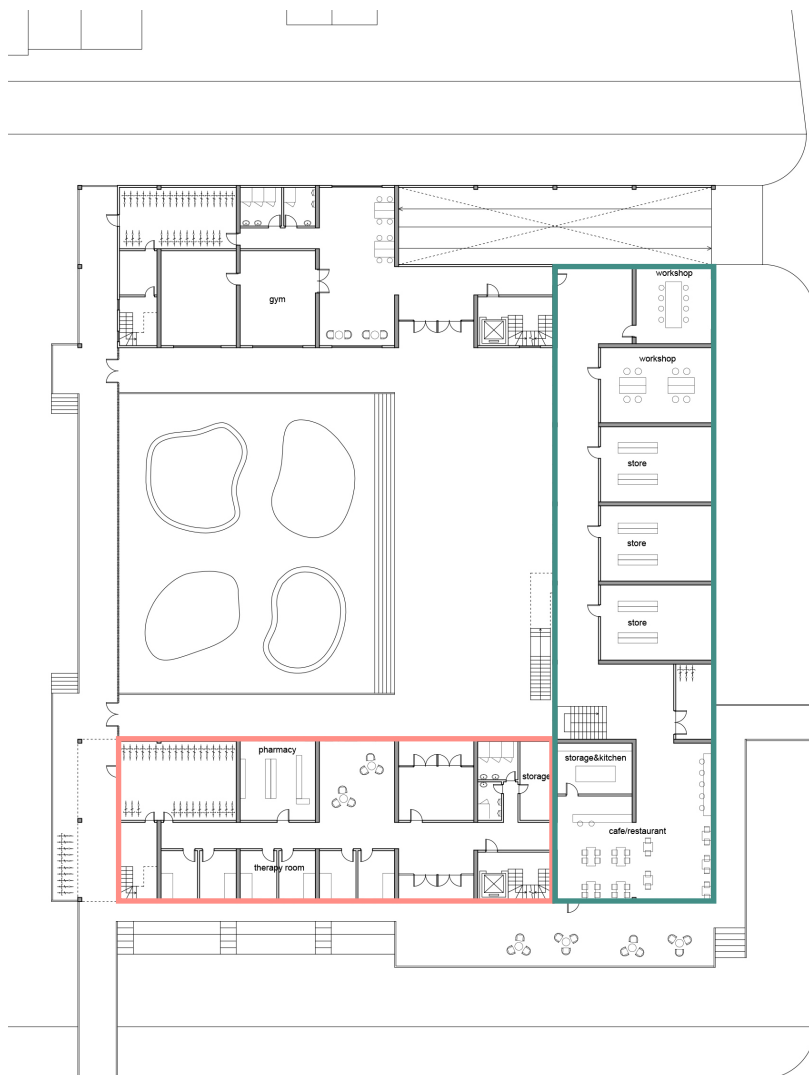




Ground floor programme

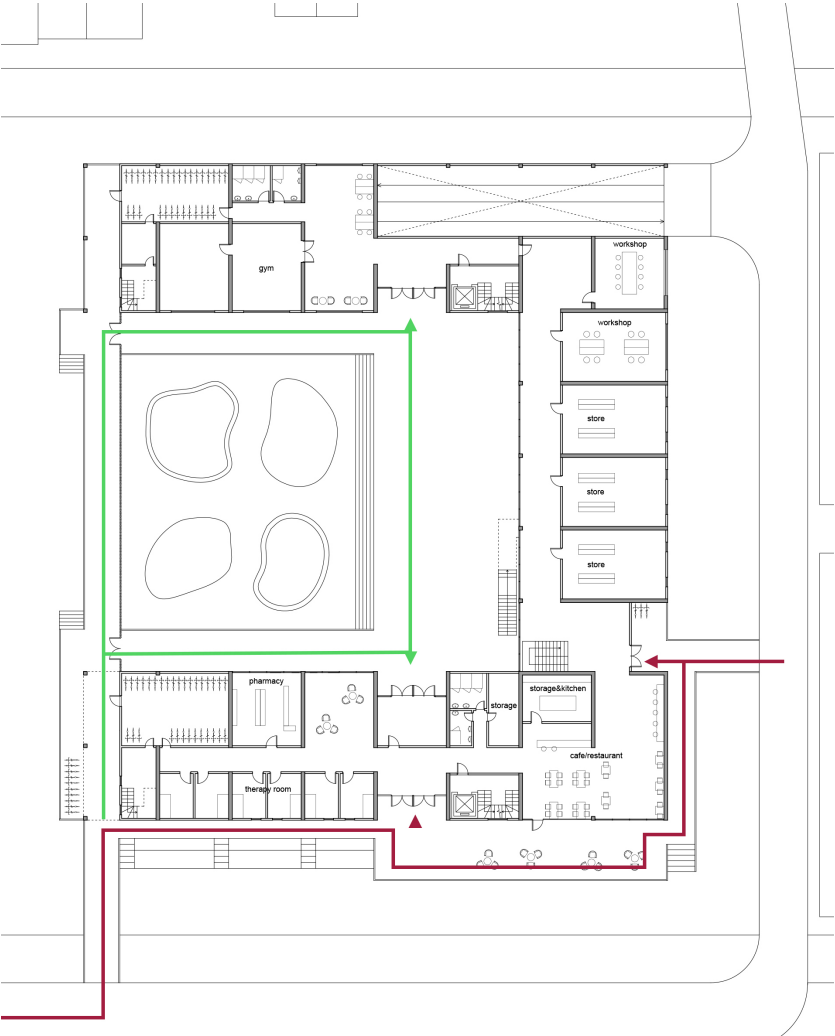


Ground floor programme



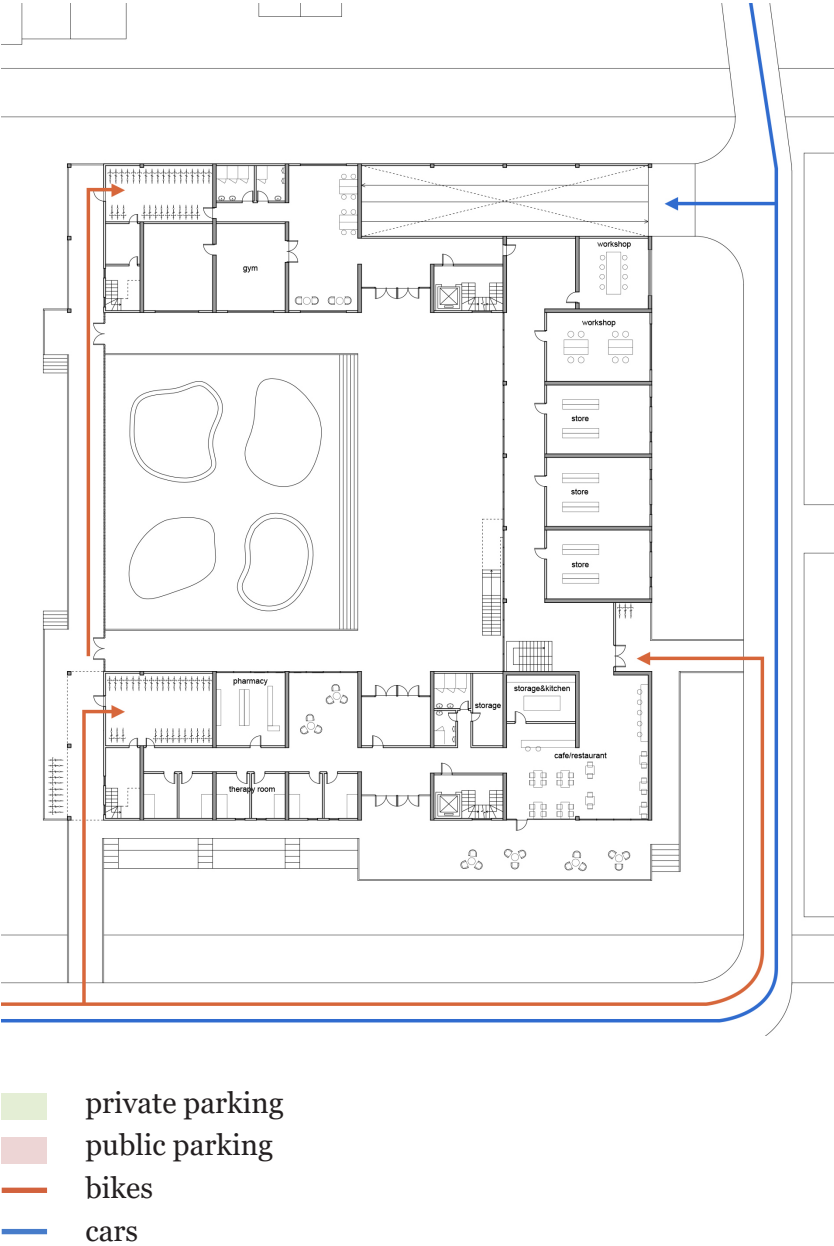
- health care (care center, therapy room, pharmacy)
- leisurement (restaurant, stores)

Ground floor accessibility



- ▲ private entrance
- ▲ public entrance
- public
- residents

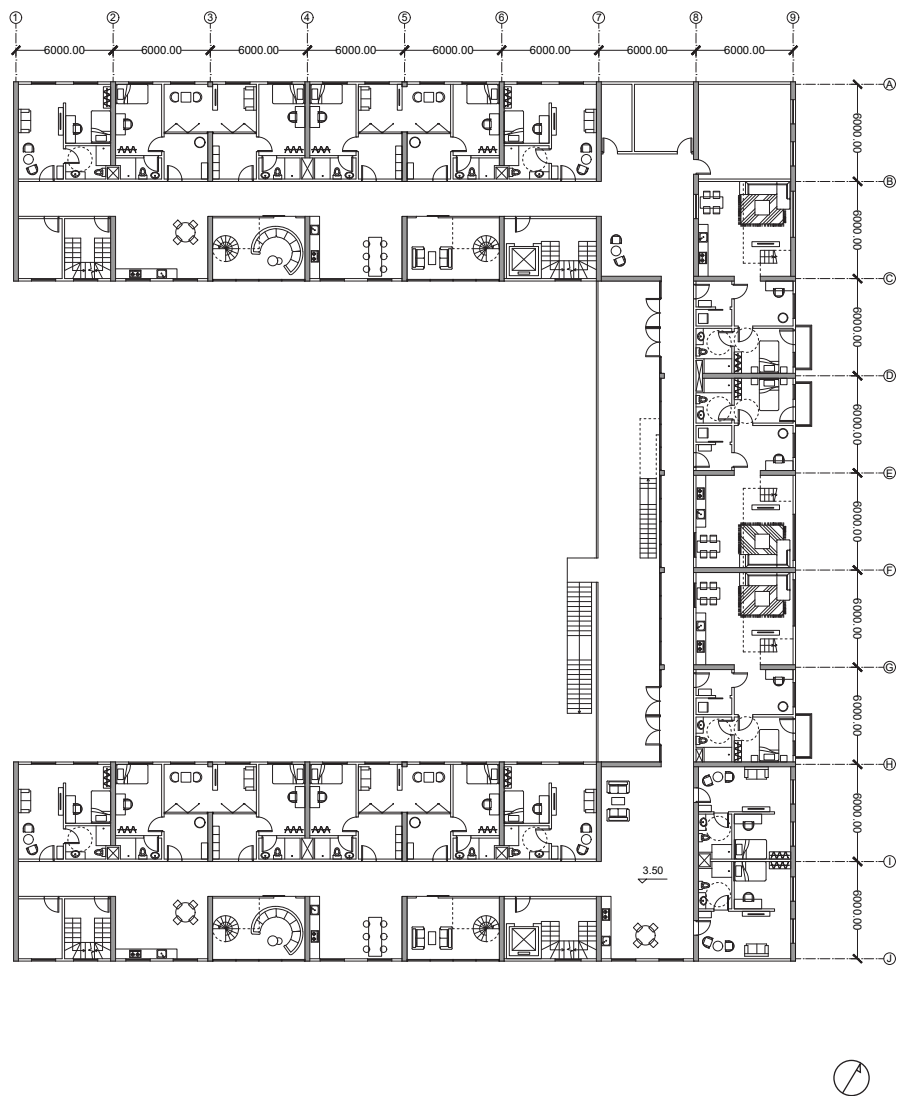
Ground floor accessibility



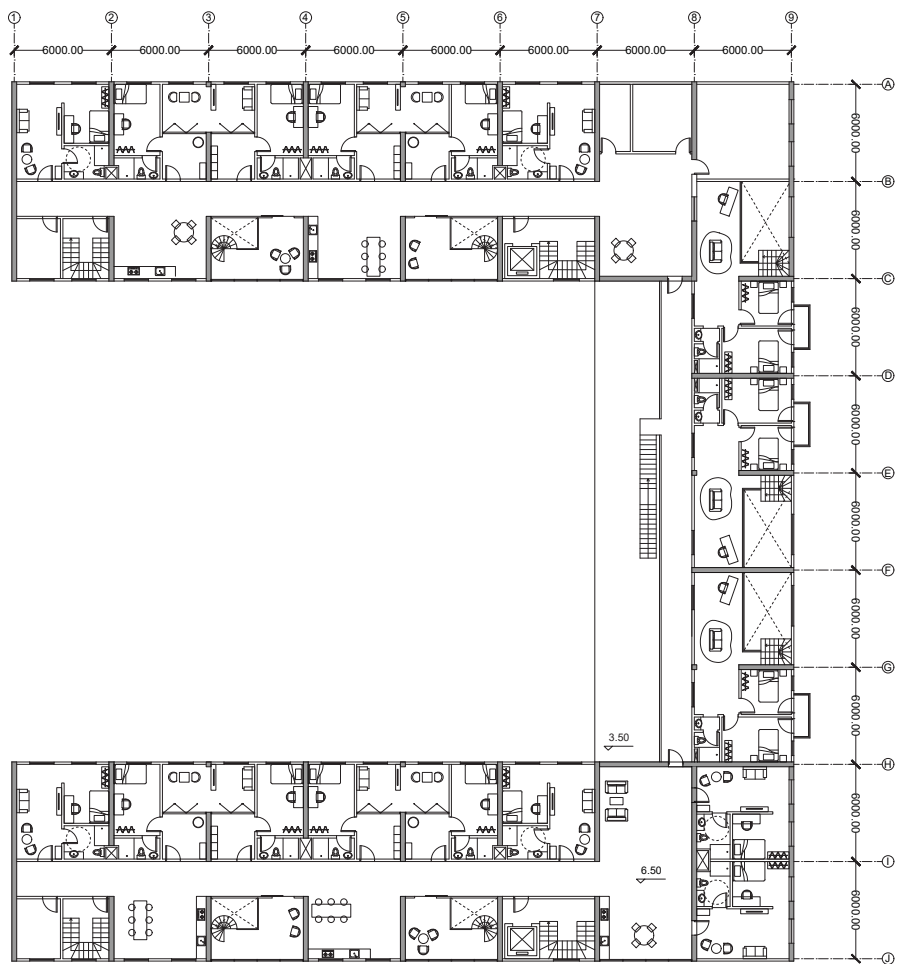




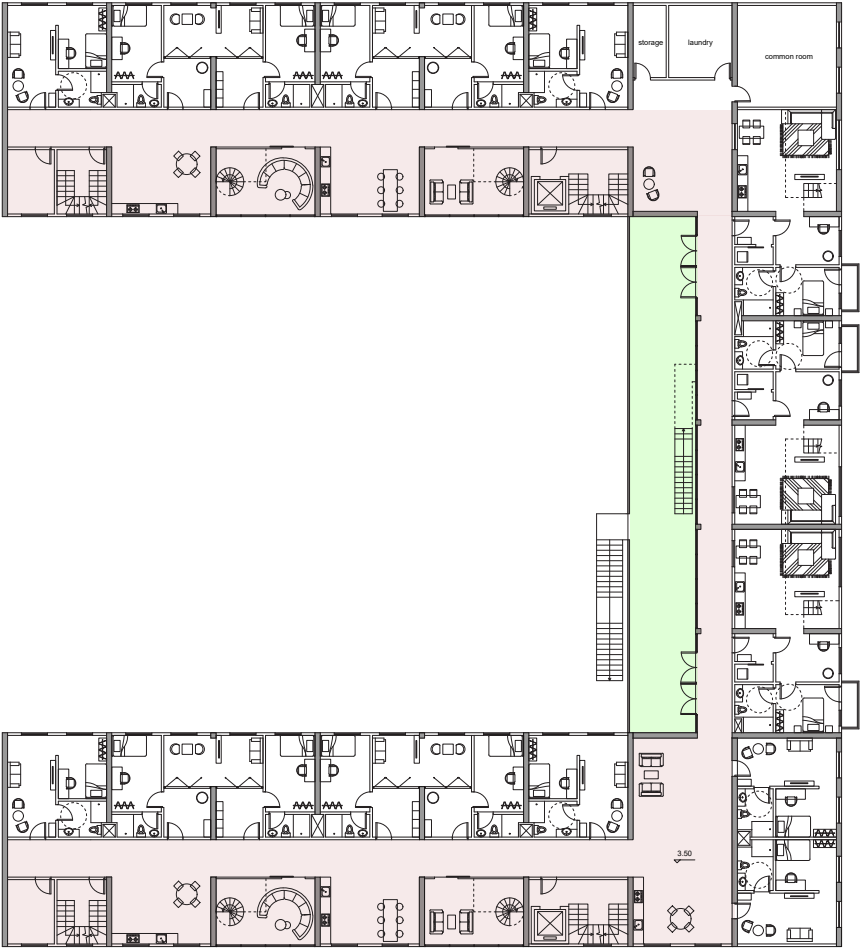
First floor plan



Second floor plan



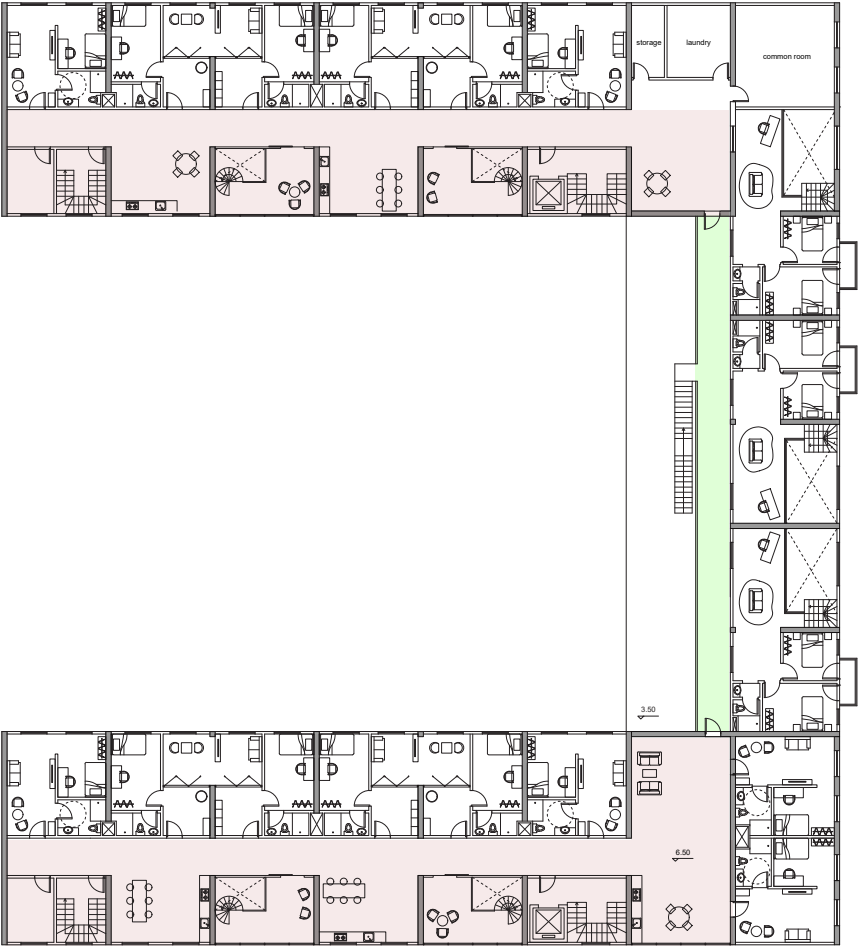
Public area (first floor)



- outdoor terrace
- public area



Public area (second floor)

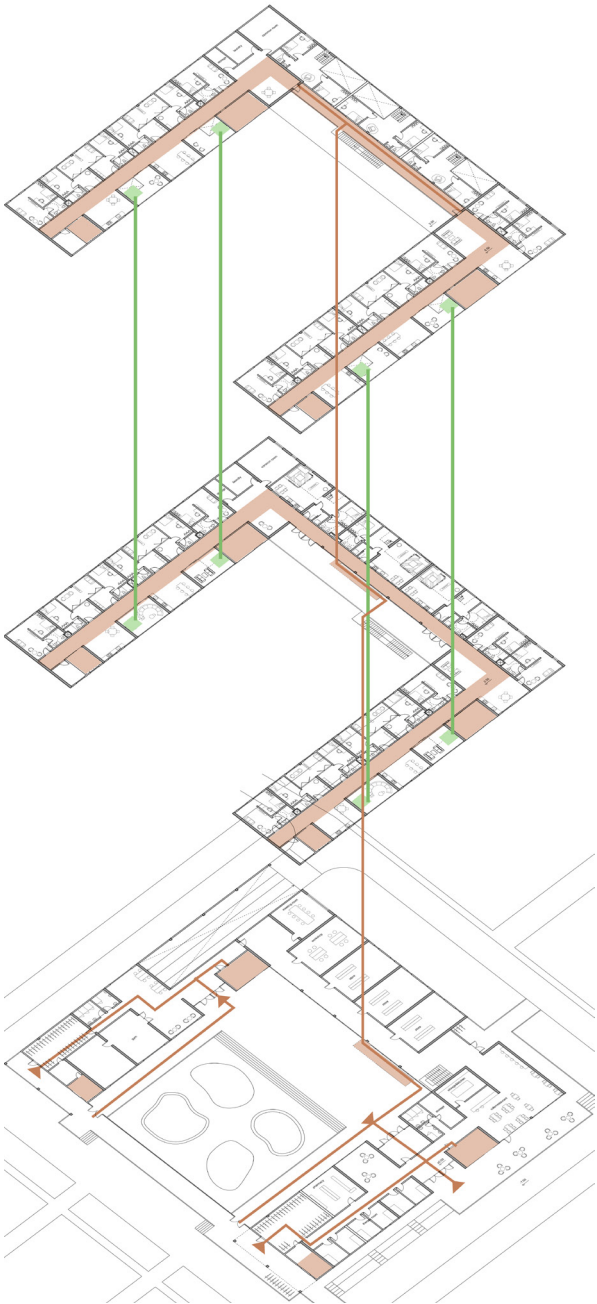


Common area (first & second floor)



- greenhouse (living room)
- shared kitchen

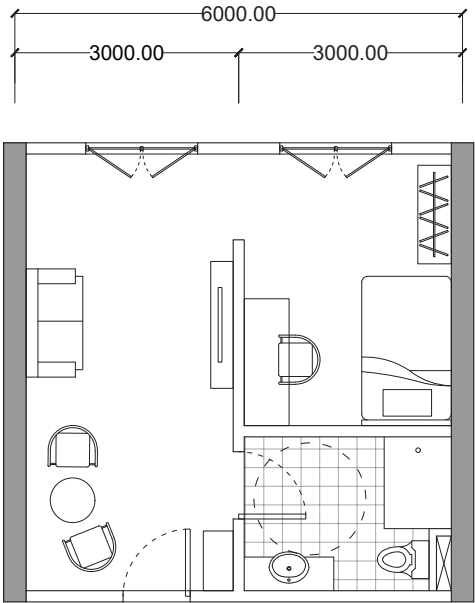
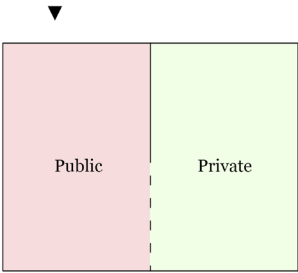
Accessibility



Dwelling typology

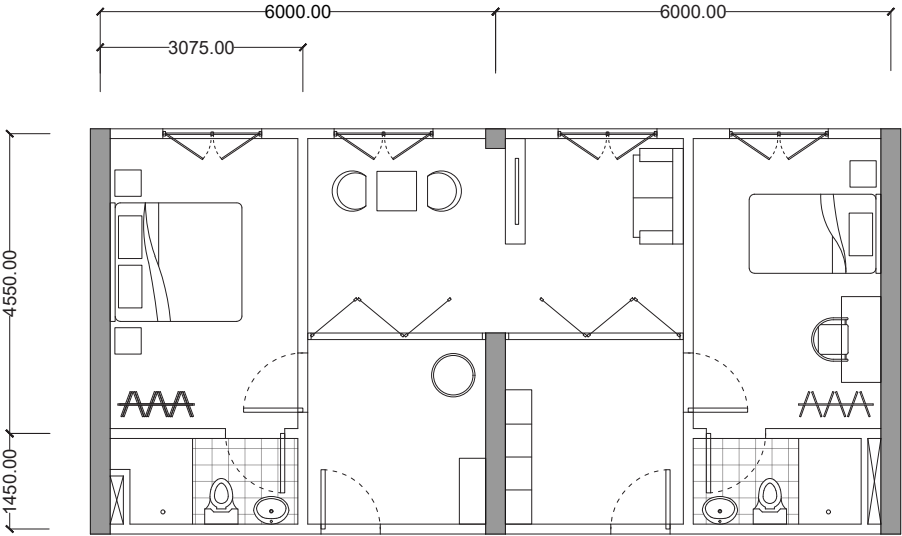
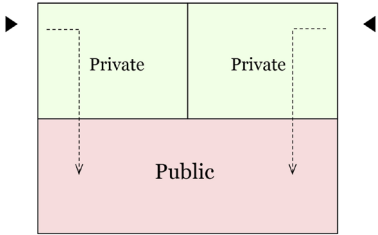
TypeA 36 m²

Single house
1-2 person



TypeB 72 m²

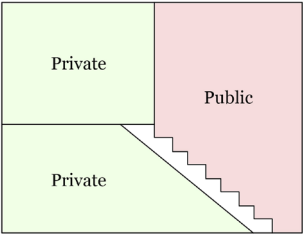
Sharing house
2-3 person

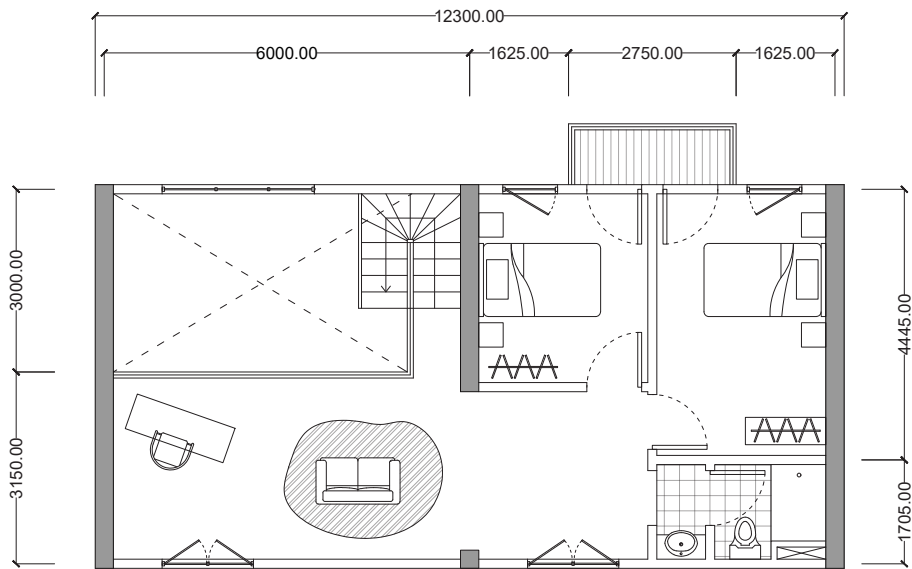
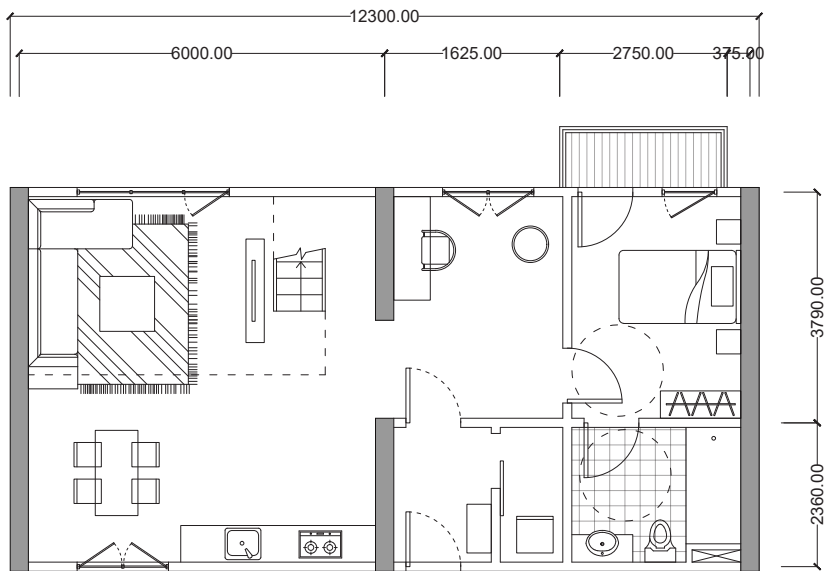


Dwelling typology

TypeC 126 m²

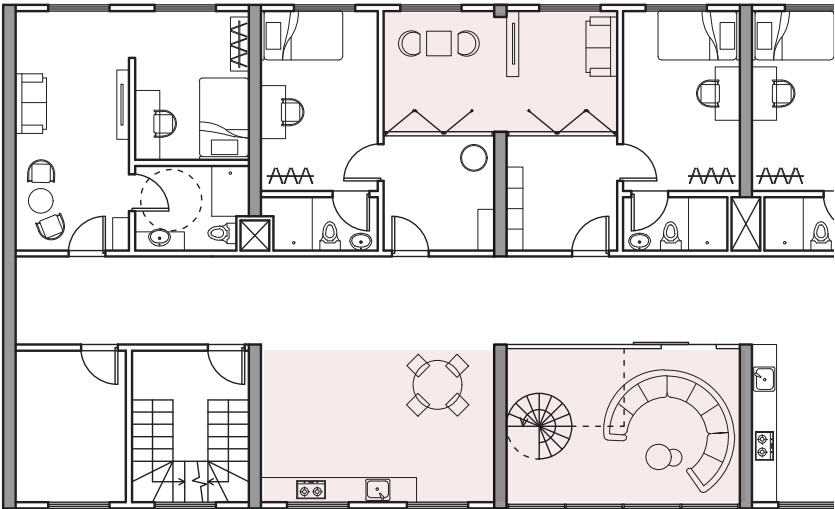
Duplex house
3-4 person





Public & Shared spaces

"Small"

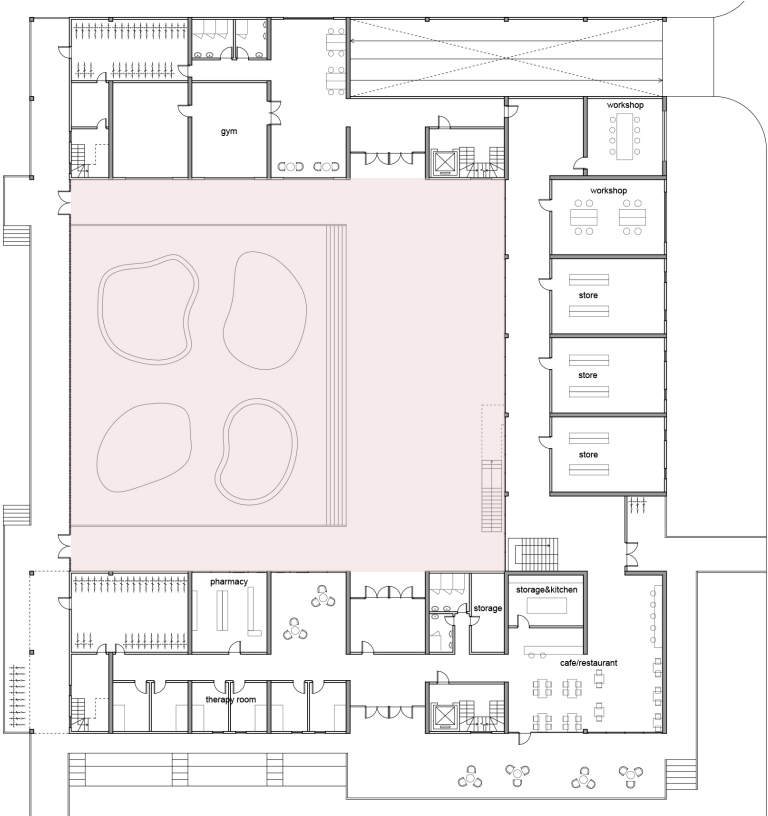


"Medium"



Public & Shared spaces

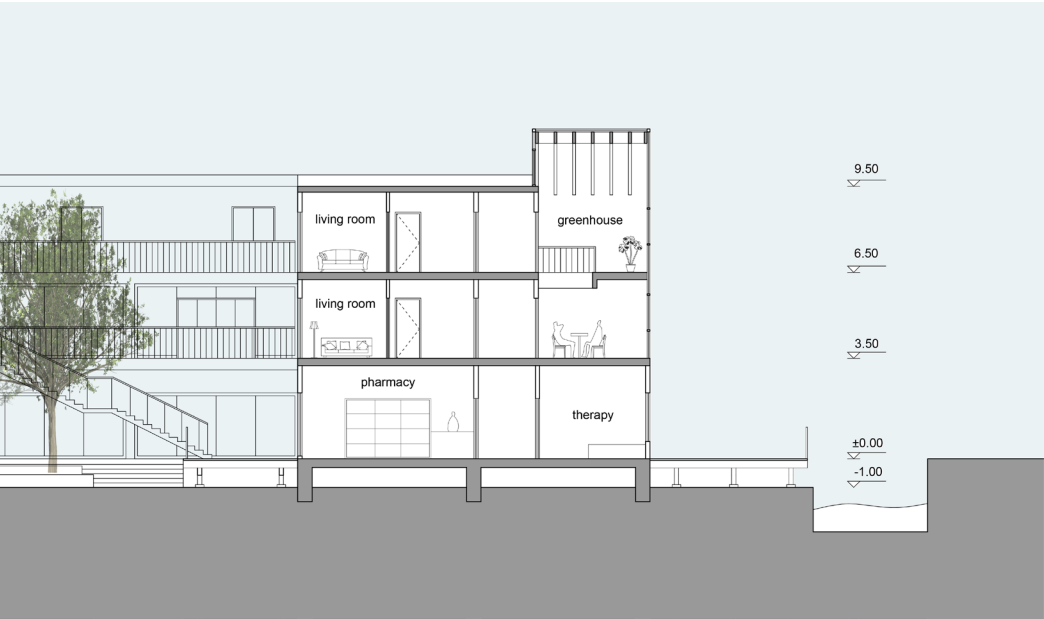
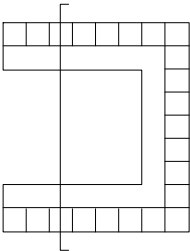
"Large"





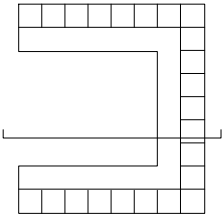
Section





Section





Outer East Facade



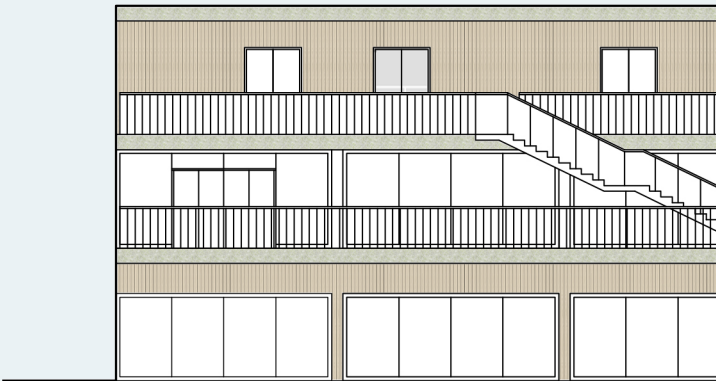


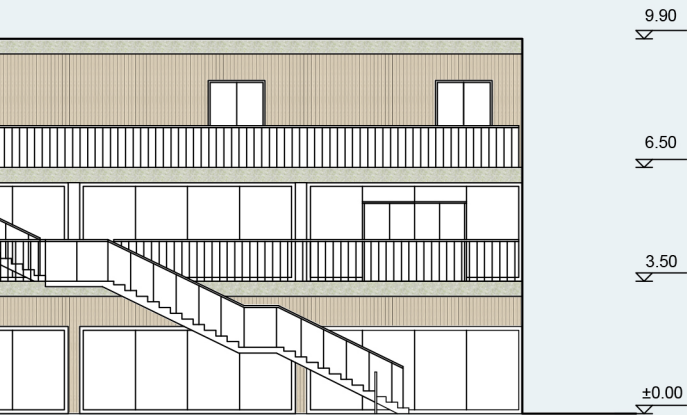
Outer South Facade



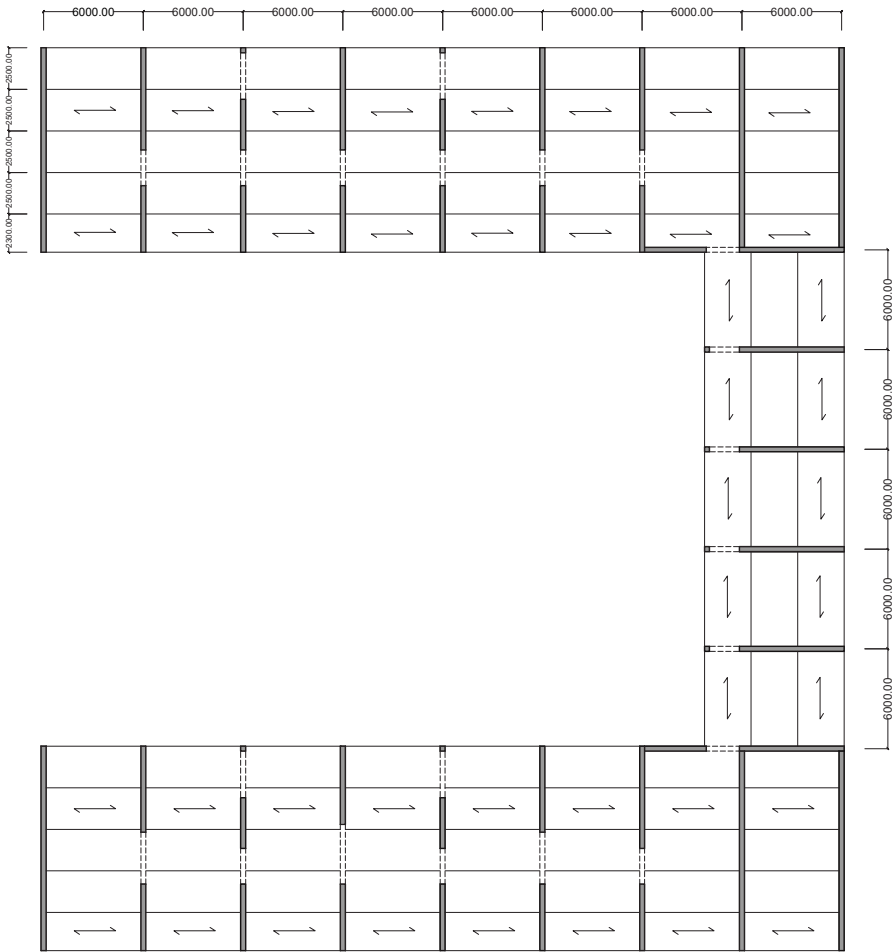


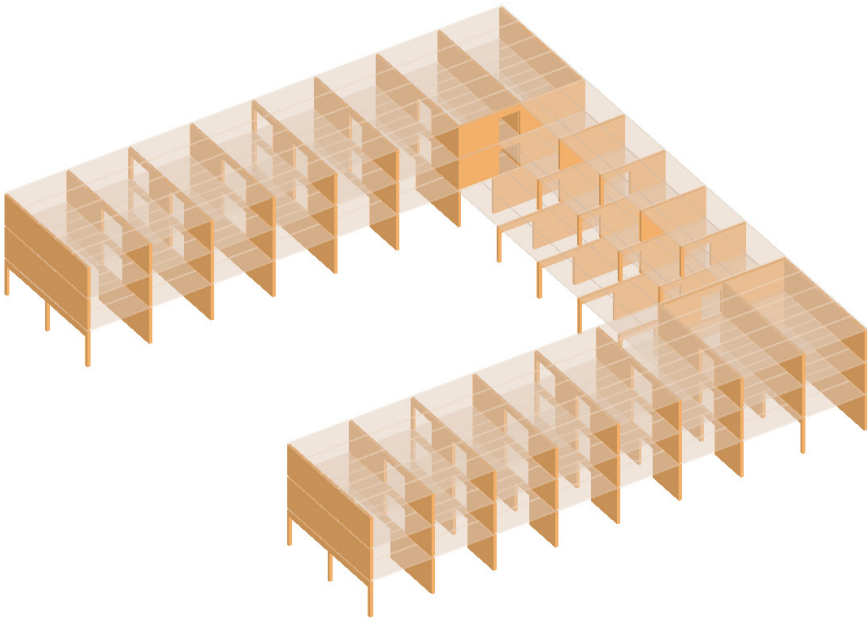
Inner West Facade





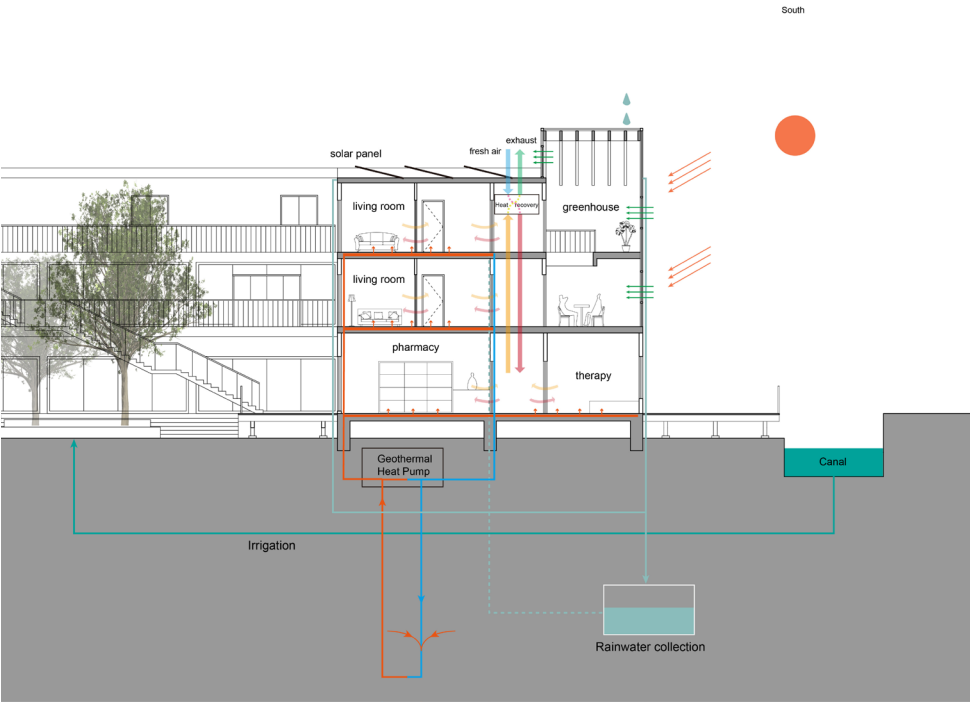
Structure



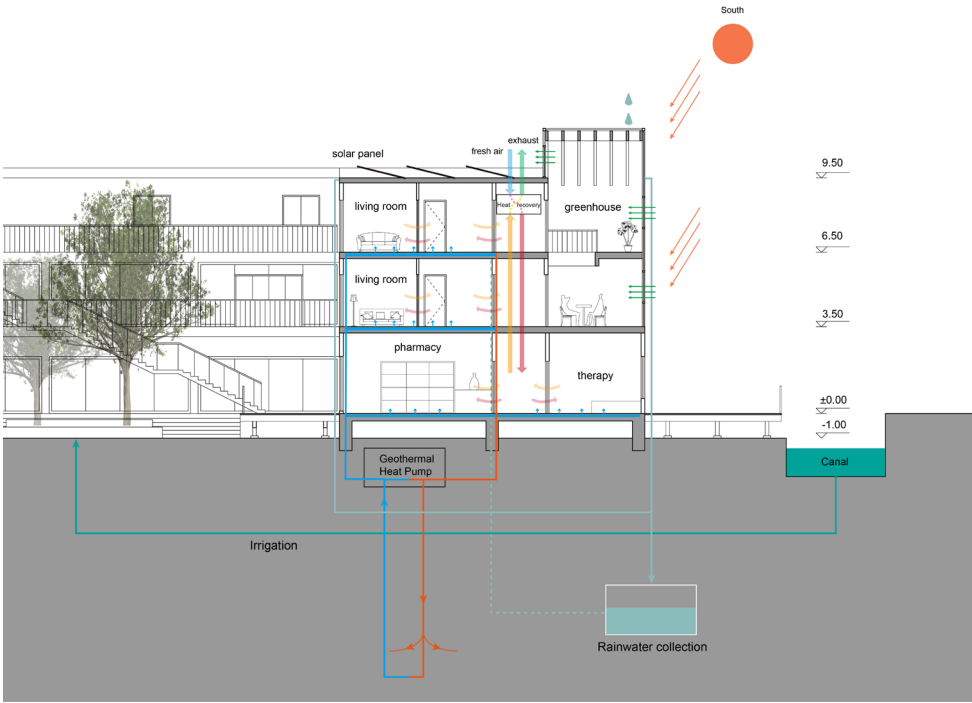


- CLT wall
- CLT floor

Climate Scheme - winter

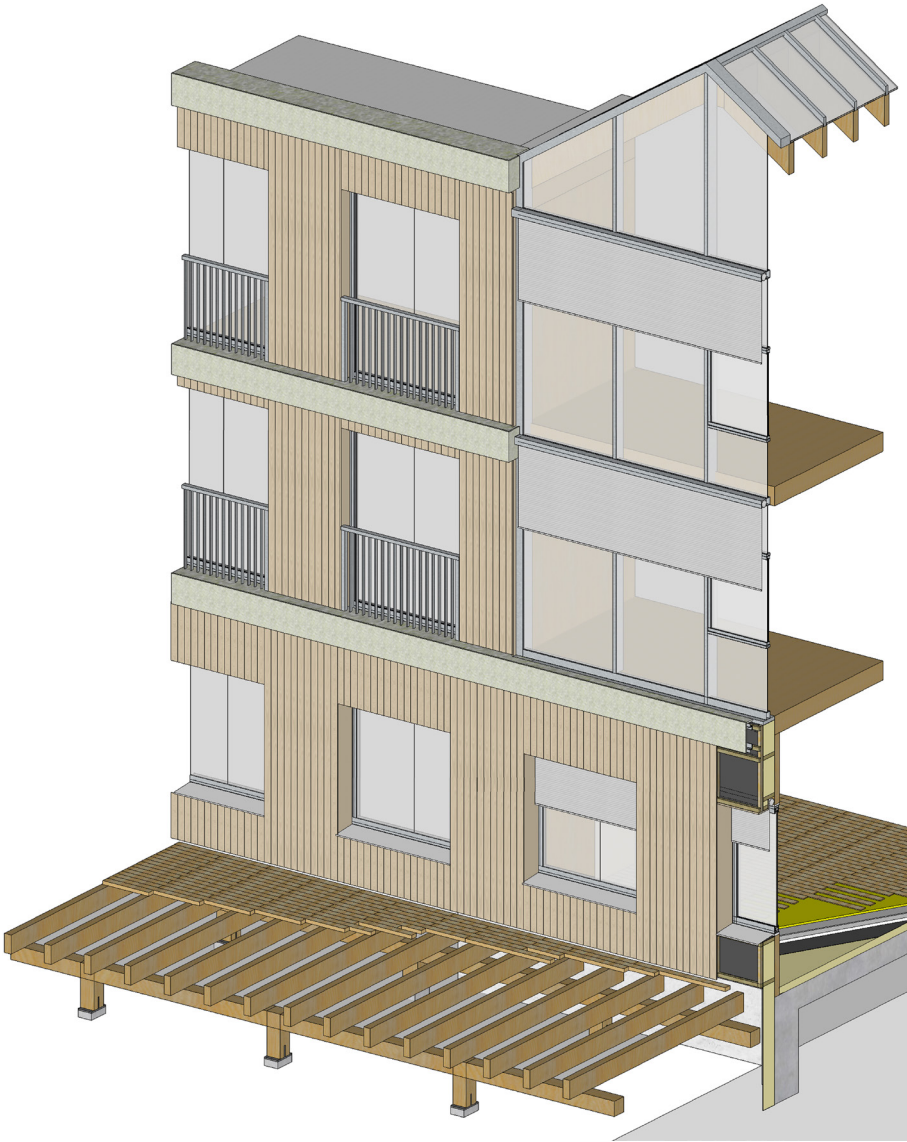


Climate Scheme - summer

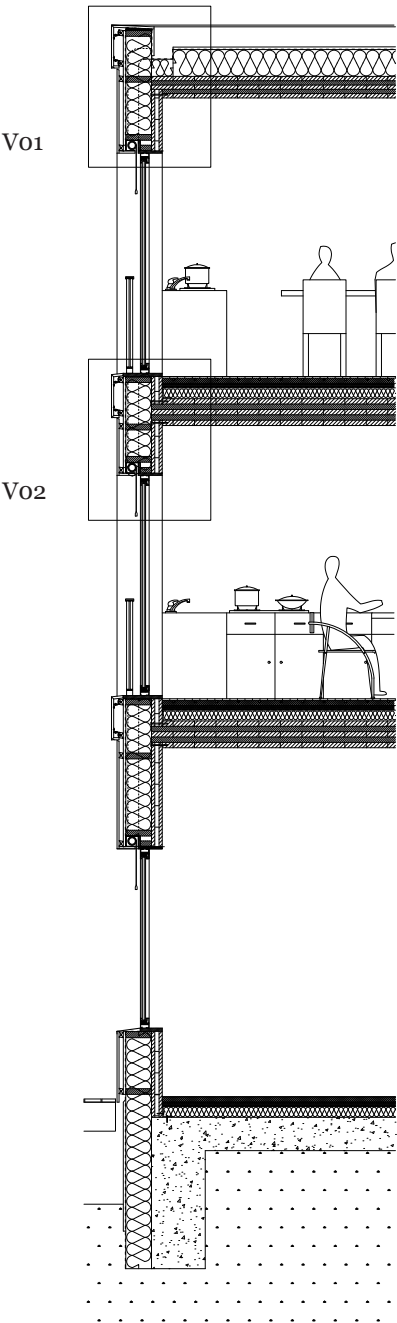


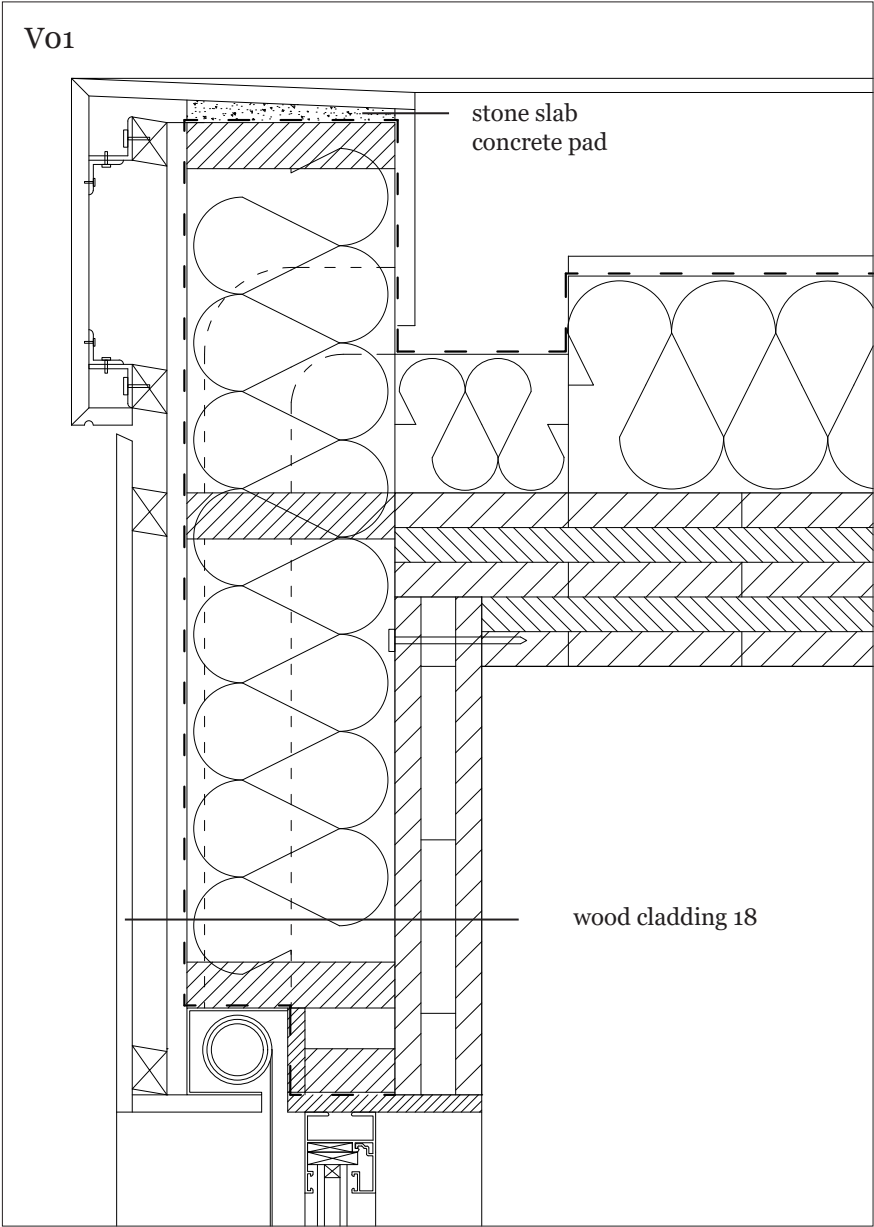
Facade Fragment

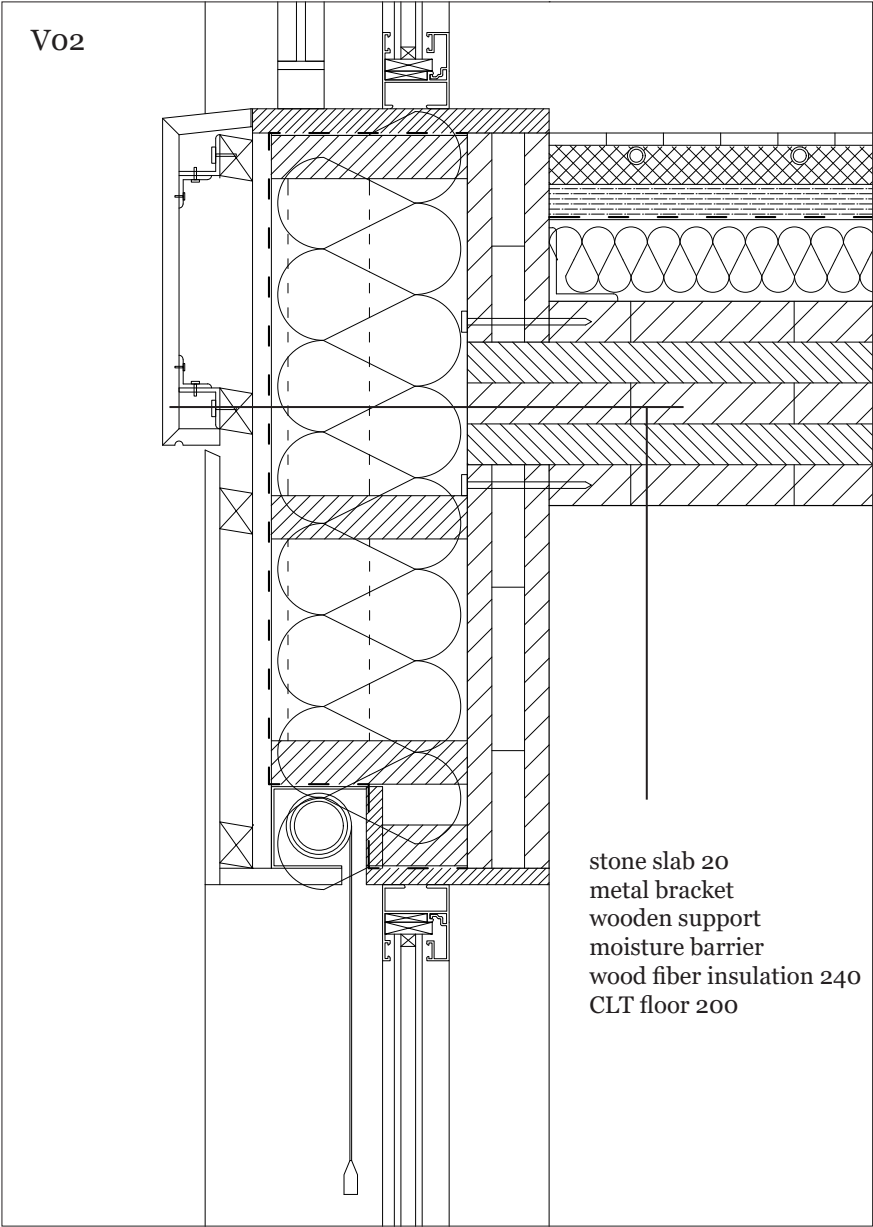




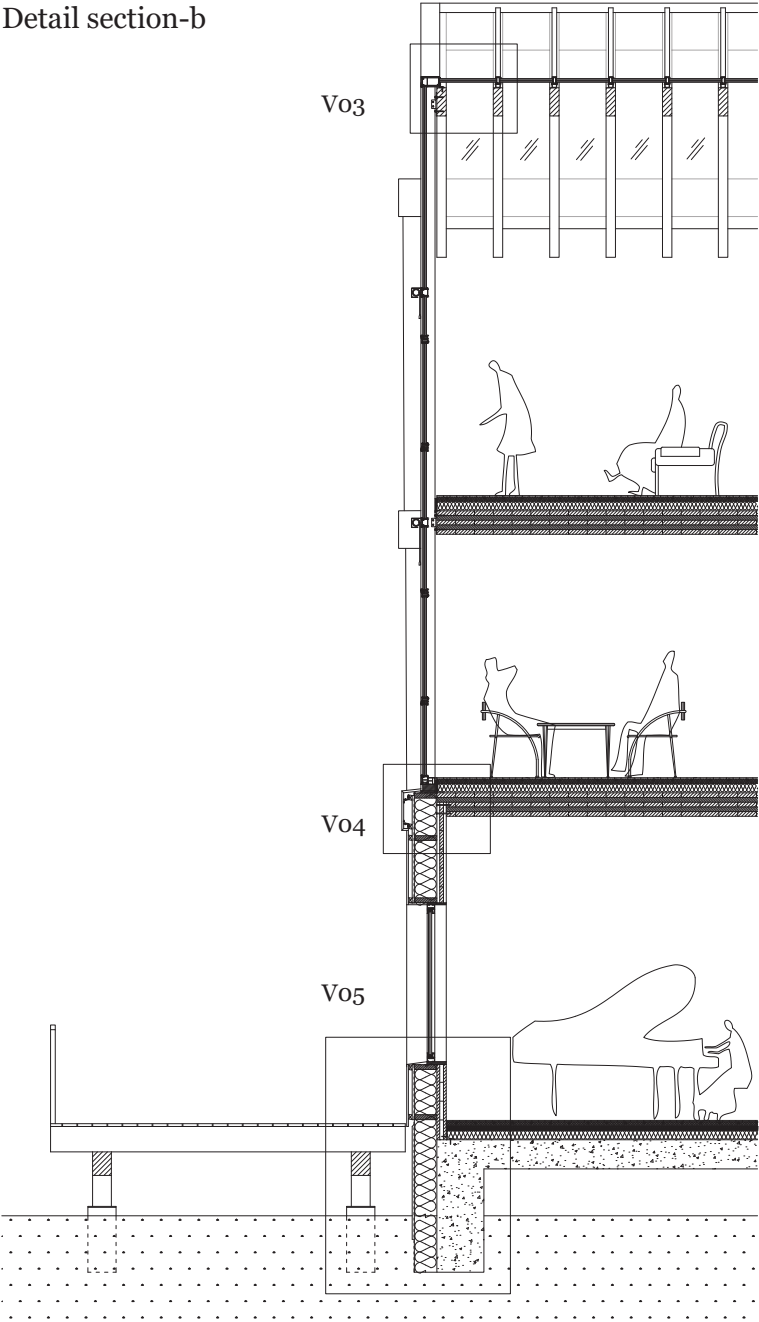
Detail section-a

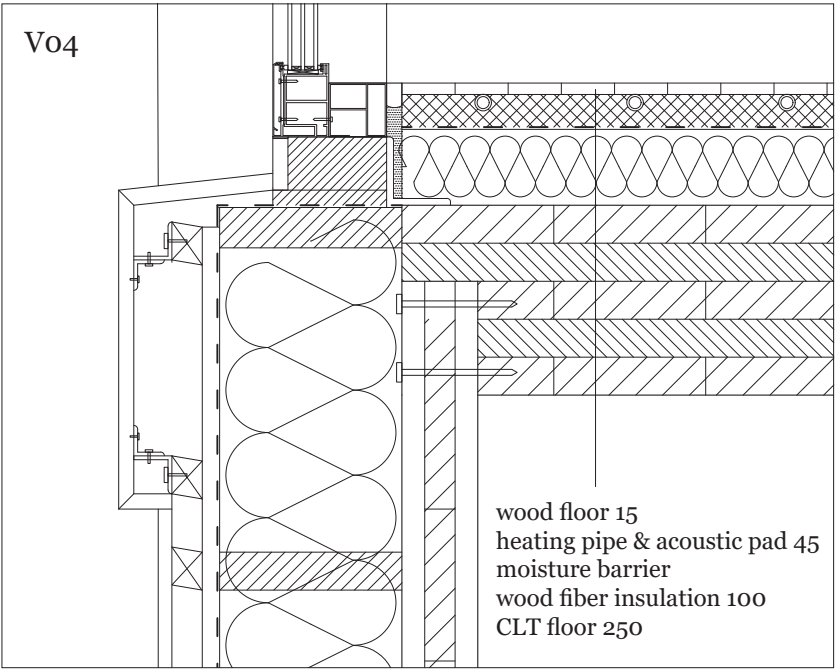
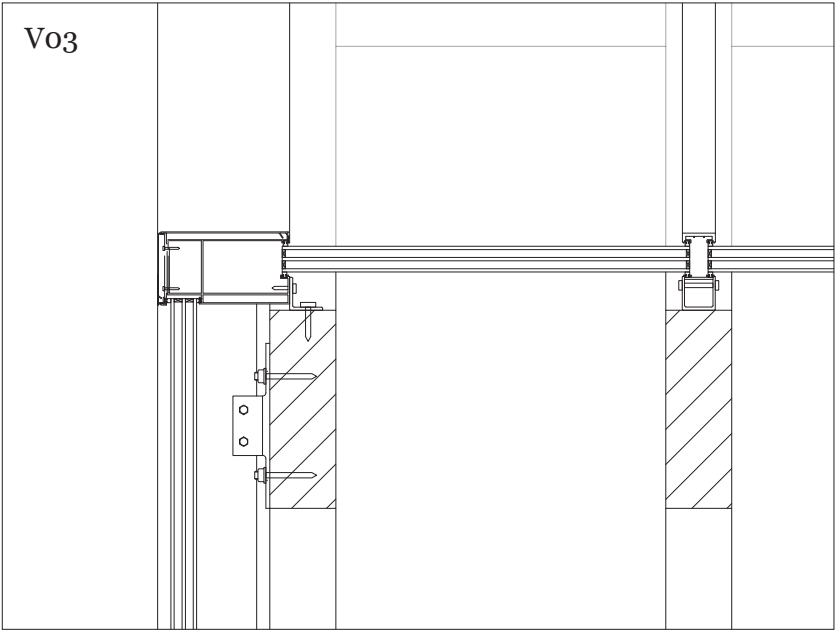


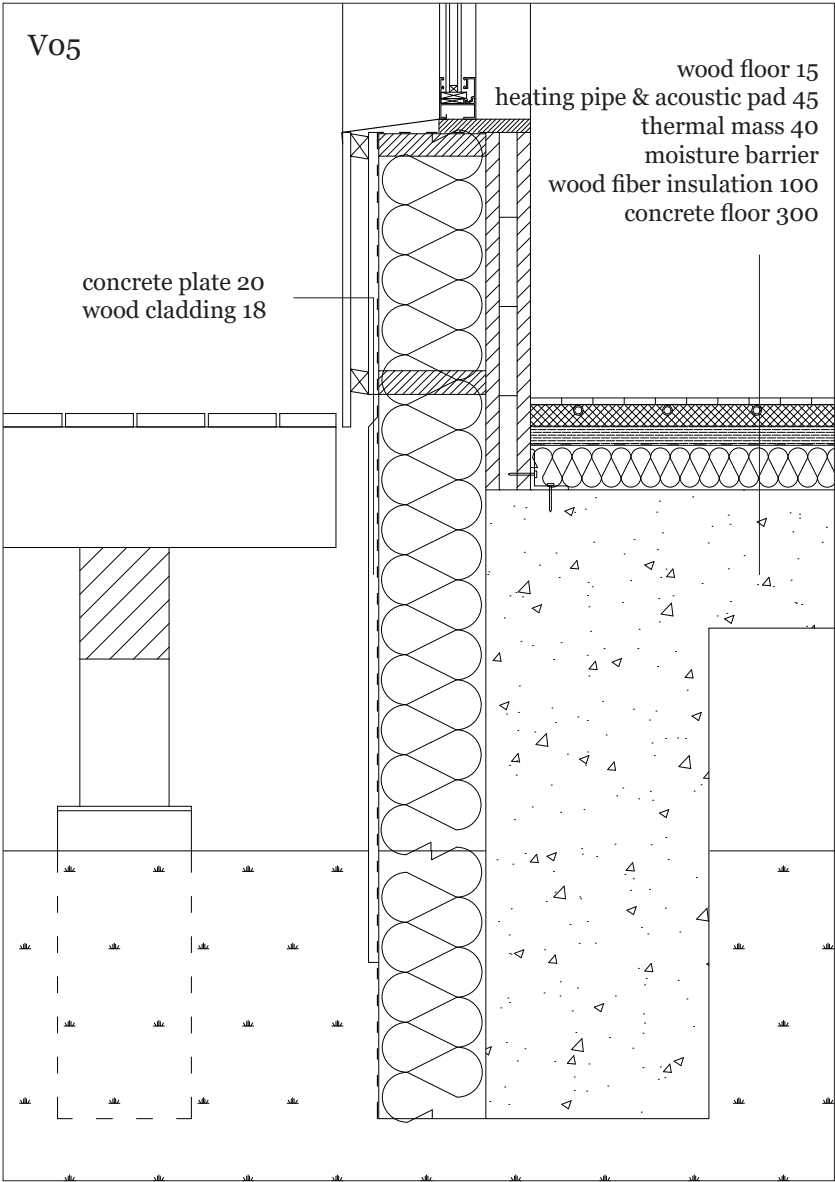




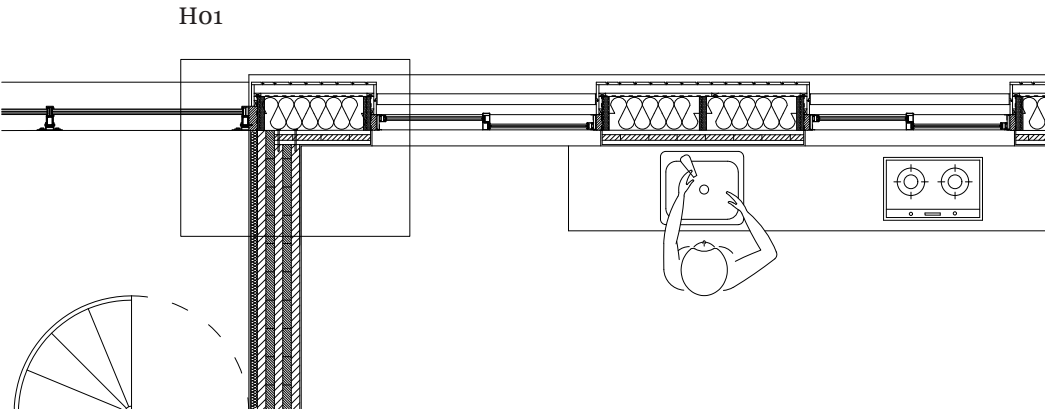
Detail section-b

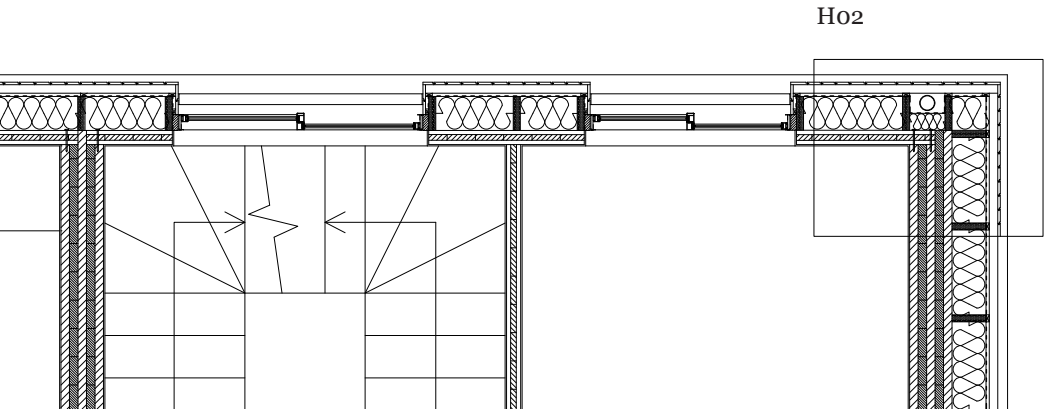


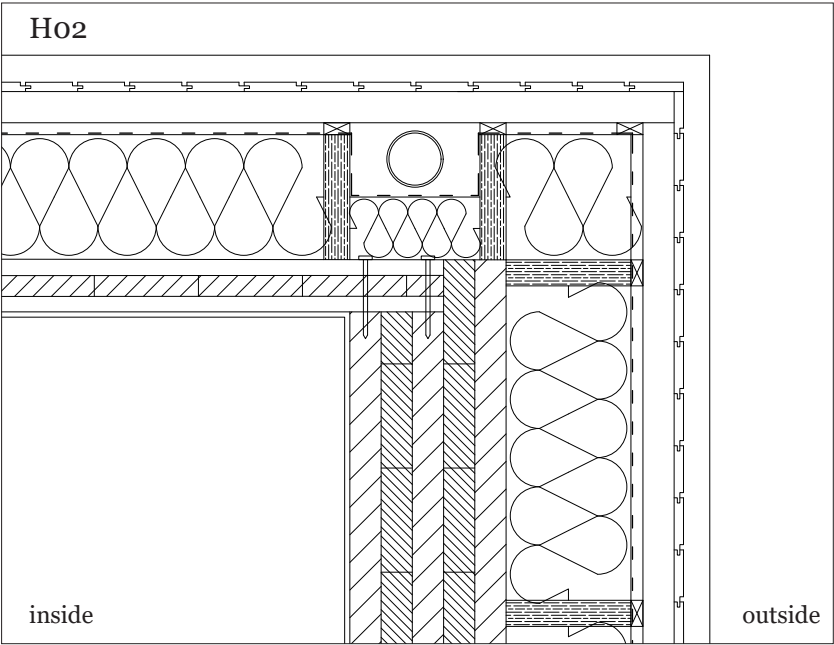
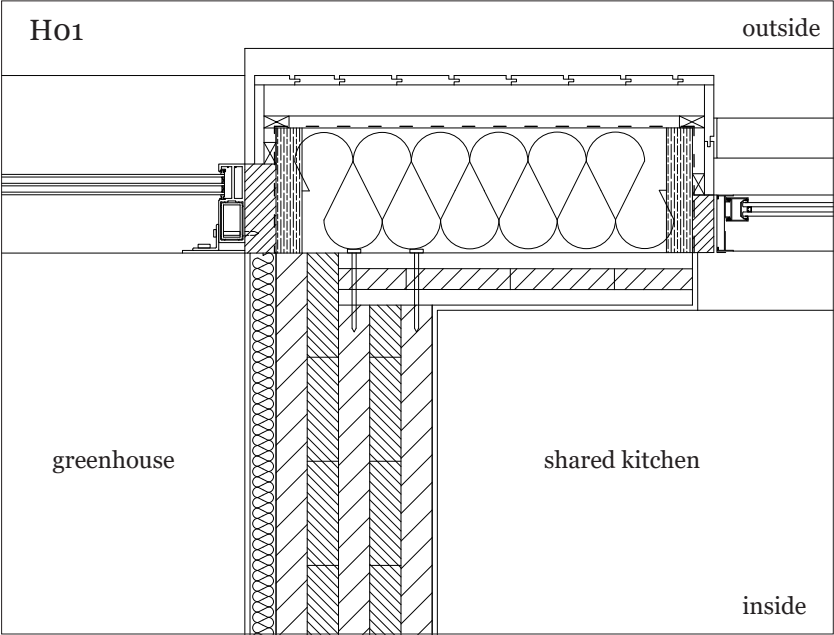




Detail section-c







6 Reflection

Reflection of research-design process

This study encompasses two primary focal points: examining the influence of living environments on experience and specify the concept of "intergenerational living" housing. These areas delineate distinct design needs at both the community/urban and housing levels.

For the first aspect, I mainly summarized how the community environment affects the living experience through literature reading and induction. Furthermore, I have identified those "necessary" functions and elements within the community to inform subsequent design endeavors.

Regarding the second aspect, my analysis centers on analyzing the typologies, similarities, disparities, as well as the merits and demerits of intergenerational housing. Since the target group involved in my project is not a generational group within a family, the research on housing types also involves more about the relationship between public and private, which is closely related to the scale of space and the type of common space.

Both researches mentioned above are foundational framework guiding my design process. At the same time, I have continually validated each modification and refined my understanding of materials and spatial scale through examination. For instance, during my P2 phase, I initially incorporated water elements into the community courtyard as a landscape feature inspired by the site's abundant water features. However, subsequent literature surveys underscored the positive impact of green spaces in mitigating loneliness symptoms. So afterwards, I reconsidered the inner courtyard, transforming it into a garden both for leisure and tree planting. Additionally, this green space concept was further abstracted into a greenhouse integrated within the building, ensuring the optimal utilization of green spaces across varying weather conditions.

What is the relation between your graduation project topic, Architecture master track and Architecture master programme?

The theme of my graduation project is intergenerational living, which is a solution for social inclusion. It is also one of the issues that my studio focuses on. From the initial site selection to the final design, the project embodies a comprehensive process of proposing, analyzing, and solving the problem. It could be seen as an important goal of the architecture master's program.

My theme of combining different groups of people to create an inclusive and vibrant community type is not a new initiative. Apart from the topic proposed from a humanistic perspective, the studio also emphasizes in addressing practical problems such as affordability and climate issues, which in our site is more about how to live with water and flood risk. I suppose this is the expectations and requirements that the Architecture master track puts forward to us: how to apply theory/imagination to the feasibility of practice.

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

Before delving into the design phase, I immersed myself in the historical narrative of my chosen site. Personally, before the new stuff appear in a site, the knowledge of its historical development could give me a basic portrait and a clearer understanding of "how should I intervene" and "what can my design bring to the site". When I realized that the village had experienced decline due to traffic changes, I came up with the idea of "rebuilding" the vitality here to alleviate the loneliness of current residents. The cycling survey we initially held in the studio confirmed the feasibility of this hypothesis. Despite its limited accessibility via public transport, the village proved eminently traversable by bicycle, with a relaxing landscape

conducive to leisurely exploration.

Upon proposing the concept of alleviating loneliness through intergenerational living, I learned from the literature that simply co-locating different types of accommodations within the same building might not enough to foster intergenerational communication. Research revealed that individuals of varying ages naturally interact with peers. Therefore, I shifted my focus towards creating shared spaces—interaction hubs that could bridge generational divides. These spaces, spanning diverse types and scales, demanded a thorough understanding of the unique living needs of both elderly residents and students. Then I did more literature reading and case studies.

In the P2 presentation, insightful feedback from the tutors prompted a reconsideration of the fundamental principles of intergenerational living and the origins of this model. This critique inspired a deeper exploration of the community's essence. Through case analyses, I observed the intricate intersections of different age groups' lifestyles, as well as the layout and dimensions of shared spaces to inform my design decisions.

In short, research is the basis for me to raise questions and guidelines for my design. Throughout the design process, I continuously verify the feasibility of my research findings, while raising more in-depth and detailed inquiries to guide further exploration and analysis of literature and case studies.

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

In my project, I mainly used the methods of literature research and case studies. In the initial stage of raising the question, I briefly interviewed some of my peers towards their willingness and opinions of living in a community with intergenerational

cohabitation. I think I haven't considered it comprehensively enough when using this method. It would be more useful to accommodate more samples to provide as objective data as possible. I only used this small interview as a complement of my research and summarized the common point.

The rest of the theoretical studies, such as the influences of living environment on living loneliness, the nature and advantages of intergenerational contact, were obtained through literature research.

More practical issues such as the needs of different age groups for functions and spaces, also the types of shared spaces were gained through case analysis. Although the target groups of the cases I selected are not specially the elderly and "students", the principle of mutual assistance and sharing is unified. I summarized their common points, intergenerational principles and their distinctive highlights through various cases. Personally, the case analysis provided me with more specific and practical design guidance, while enriching my vision. It played an important role in the whole process.

In general, the whole process promotes and complements each other. As a result, the design principles have certain representativeness and reference value.

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

As far as this project is concerned, it solves the housing problem of some students. Living with the elderly requires them to provide assistance for the old people, which in return reduces the rent of students, is positive in terms of affordability. In addition, the elderly do not need to change their lifestyle too much, such as moving to the nursing homes, hiring professional therapists, etc., to get daily companionship to alleviate

loneliness.

From an academic perspective, this project is more than being a localized housing solution tailored to this specific site. On the contrary, it could be seen as an experimental model of intergenerational living. While the primary focus in my project may be on interactions between the elderly and students because of the site situation, the concept of "intergeneration" can be various group combinations beyond this demographic pairing. It is essentially a means to promote social inclusion, drawing attention to the importance of fostering relationships between neighbors of different ages. Furthermore, it emphasize the significance of adapting spatial configurations to accommodate the diverse needs of different demographic groups.

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

My project presents a housing typology that holds significant potential for broader promotion. By integrating research insights into the design, it emphasizes the importance of sharing while diverging from the conventional co-living model through innovative spatial arrangements. For instance, the inclusion of sliding doors allow for a balance between communal living and individual privacy. This approach ensures that residents still have access to essential personal space while fostering opportunities for social interaction. Moreover, my project offers flexibility and adaptability through its provision of three distinct sharing methods: shared living room/kitchen, greenhouse, and communal gardens. These elements enable residents to choose the arrangement that best suits their preferences and needs.

Furthermore, despite its modest scale, my project's collective form holds promise for application beyond its original context. In high-density residential areas, where space is at a premium, this housing typology can enhance living efficiency while minimizing damage to the spatial quality.

7 Reference list

Abramsson, M., & Andersson, E. (2016). Changing preferences with ageing–housing choices and housing plans of older people. *Housing, theory and society*, 33(2), 217-241.

Adam, P., Friederike, Z., & Sarah, W. (2016). *Designing with downsizers*. University of Sheffield. https://www.housinglin.org.uk/_assets/DWELL_DesigningWithDownsizers.pdf

Addae-Dapaah, K. (2008). Age segregation and the quality of life of the elderly in studio apartments. *Journal of Housing for the Elderly*, 22(1-2), 127-161.

Annan, K. (1999). *Opening Speech at UN International Conference on Ageing*, <http://undesadspd.org/Ageing/InternationalDayofOlderPersons/1998/SpeechdeliveredbySecretaryGeneralKofiAnnan.aspx>

Astell-Burt, T., Hartig, T., Eckermann, S., Nieuwenhuijsen, M., McMunn, A., Frumkin, H., & Feng, X. (2022 ①). More green, less lonely? A longitudinal cohort study. *International journal of epidemiology*, 51(1), 99-110.

Astell-Burt, T., Hartig, T., Putra, I. G. N. E., Walsan, R., Dendup, T., & Feng, X. (2022 ②). Green space and loneliness: A systematic review with theoretical and methodological guidance for future research. *Science of the total environment*, 847, 157521.

Bergefurt, L., Kemperman, A., van Den Berg, P., Borgers, A., van Der Waerden, P., Oosterhuis, G., & Hommel, M. (2019). Loneliness and life satisfaction explained by public-space use and mobility patterns. *International journal of environmental research and public health*, 16(21), 4282.

de Jong, P., Rouwendal, J., & Brouwer, A. (2022). Staying put out of choice or constraint? The residential choice behaviour of Dutch older adults. *Population, Space and Place*, 28(4), e2553.

Domenech-Abella, J., Mundo, J., Leonardi, M., Chatterji, S., Tobiasz-Adamczyk, B., Koskinen, S., ... & Olaya, B. (2020). Loneliness and depression among older European adults: The role of perceived neighborhood built environment. *Health & place*, 62, 102280.

Drury, L., Abrams, D., & Swift, H. J. (2022). Intergenerational contact during and beyond COVID-19. *Journal of Social Issues*, 78(4), 860-882.

DutchNews. (2023). *Student housing crisis continues as new university year starts*. <https://www.dutchnews.nl/2023/08/student-housing-crisis-continues-as-new-university-year-starts/>

Elmer, S. & Feba, Sukmana. (2023). *Students are struggling on the housing market, and the shortage is getting worse*. Erasmusmagazine. <https://www.erasmusmagazine.nl/en/2023/08/24/students-are-struggling-on-the-housing-market-and-the-shortage-is-getting-worse/>

Emily, H. (2023). *The student housing nightmare: a tale of discrimination, fraud, and protest*. DutchReview. <https://dutchreview.com/expat/the-student-housing-nightmare-a-tale-of-discrimination-fraud-and-protest/>

García, S., & Martí, P. (2014). Arquitectura intergeneracional y espacio público. *ARQ (Santiago)*, (86), 62-69.

Gijsbers, D. J. H. (2023). Building Intimate Connections: The influence of the built environment on the loneliness of young adults. *Planning*, 1256874.

Golant, S. M. (1985). In defense of age-segregated housing. *Ageing*, 348, 22-26.

Gurung, A., Edwards, S., Romeo, M., & Craswell, A. (2022). A tale of two generations: Case study of intergenerational living in residential aged care. *Collegian*, 29(6), 809-815.

Hacihasanoglu, R., Yildirim, A., & Karakurt, P. (2012). Loneliness in elderly individuals, level of dependence in activities of daily living (ADL) and influential factors. *Archives of gerontology and geriatrics*, 54(1), 61-66.

Hagestad, G. O., & Uhlenberg, P. (2005). The social separation of old and young: A root of ageism. *Journal of Social Issues*, 61(2), 343-360.

Israel, E., & Warner, M. (2008). Planning for family-friendly communities. *Pas Memo*.

Kemperman, A., van den Berg, P., Weijs-Perrée, M., & Uijtdewillegen, K. (2019). Loneliness of older adults: Social network and the living environment. *International journal of environmental research and public health*, 16(3), 406.

Kleeman, A., Giles-Corti, B., Gunn, L., Hooper, P., & Foster, S. (2023). The impact of the design and quality of communal areas in apartment buildings on residents' neighbouring and loneliness. *Cities*, 133, 104126.

Lau, M. H. (2023). Residential age segregation: Evidence from a rapidly ageing Asian city. *Journal of Population Ageing*, 1-21.

Liu, X., Chen, W., & Wang, S. (2016). Comparison of mental health and well-

being of the elderly at home in urban homes and nursing homes. *Chinese Journal of Gerontology*, 18, 4607-4609.

Lloyd L, Tanner D, Milne A, et al. (2014). Look after yourself: Active ageing, individual responsibility and the decline of social work with older people in the UK. *European Journal of Social Work*, 17(3), 322–335.

Maas, J., Van Dillen, S. M., Verheij, R. A., & Groenewegen, P. P. (2009). Social contacts as a possible mechanism behind the relation between green space and health. *Health & place*, 15(2), 586-595.

Meshel, D. S., & MCGlynn, R. P. (2004). Intergenerational contact, attitudes, and stereotypes of adolescents and older people. *Educational Gerontology*, 30(6), 457-479.

Mulliner, E., Riley, M., & Maliene, V. (2020). Older people's preferences for housing and environment characteristics. *Sustainability*, 12(14), 5723.

Myers Dowell. (2015). "Mutual Benefits and Equity Amid Racial Diversity: A Generational Strategy for Growing a Broader Base of Support for Social Equity." *Journal of Planning Education and Research*, 35(3), 369–75.

Nayak, S. R., Dash, S. P., Amin, P. S., & Priyashantha, K. G. (2023). A review on intergenerational cohousing: a possible living option for elderly and youth. *New Design Ideas*, 7(3), 535-556.

Nijënstein, S., Haans, A., Kemperman, A. D., & Borgers, A. W. (2015). Beyond demographics: human value orientation as a predictor of heterogeneity in student housing preferences. *Journal of Housing and the Built Environment*, 30, 199-217.

Ojembe, B. U., & Ebe Kalu, M. (2018). Describing reasons for loneliness among older people in Nigeria. *Journal of Gerontological Social Work*, 61(6), 640-658.

Petersen, J. (2023). A meta-analytic review of the effects of intergenerational programs for youth and older adults. *Educational Gerontology*, 49(3), 175-189.

Reed, S., & Bohr, J. (2021). The influence of local built environments on social wellbeing: A community's experience with social isolation, social loneliness, and social belonging. *International Journal of Community Well-Being*, 4(3), 393-413.

Rosso, A. L., Auchincloss, A. H., & Michael, Y. L. (2011). The urban built

environment and mobility in older adults: a comprehensive review. *Journal of aging research*, 2011.

Savikko, N., Routasalo, P., Tilvis, R. S., Strandberg, T. E., & Pitkälä, K. H. (2005). Predictors and subjective causes of loneliness in an aged population. *Archives of gerontology and geriatrics*, 41(3), 223-233.

Sherman, S. R. (1975). Patterns of contacts for residents of age-segregated and age-integrated housing. *Journal of Gerontology*, 30(1), 103-107.

Snell, K. D. M. (2017). The rise of living alone and loneliness in history. *Social History*, 42(1), 2-28.

Statistics Netherlands. (2023). *Households today*. Statistics Netherlands. <https://www.cbs.nl/en-gb/visualisations/dashboard-population/households/households-today>

Sun, Y., Phillips, D. R., & Wong, M. (2018). A study of housing typology and perceived age-friendliness in an established Hong Kong new town: A person-environment perspective. *Geoforum*, 88, 17-27.

Tamminen, N., Kettunen, T., Martelin, T., Reinikainen, J., & Solin, P. (2019). Living alone and positive mental health: a systematic review. *Systematic reviews*, 08(1), 1-8.

Tosi, M., & Grundy, E. (2019). Intergenerational contacts and depressive symptoms among older parents in Eastern Europe. *Aging & mental health*, 23(6), 686-692.

Vanderbeck, R. M. (2007). Intergenerational geographies: age relations, segregation and re-engagements. *Geography Compass*, 01(2), 200-221.

van den Berg, M. M., van Poppel, M., van Kamp, I., Ruijsbroek, A., Triguero-Mas, M., Gidlow, C., Nieuwenhuijsen, M. J., Gražulevičiene, R., van Mechelen, W., Kruize, H., & Maas, J. (2019). Do Physical Activity, Social Cohesion, and Loneliness Mediate the Association Between Time Spent Visiting Green Space and Mental Health? *Environment and Behavior*, 51(2), 144-166.

Van Den Berg, P., Kemperman, A., De Kleijn, B., & Borgers, A. (2016). Ageing and loneliness: The role of mobility and the built environment. *Travel Behaviour and Society*, 5, 48-55.

Van Dyck, D., Sallis, J. F., Cardon, G., Deforche, B., Adams, M. A., Geremia, C., & De Bourdeaudhuij, I. (2013). Associations of neighborhood characteristics with active park use: an observational study in two cities in the USA and

Belgium. *International journal of health geographics*, 12, 1-9.

Verhetsel, A., Kessels, R., Zijlstra, T., & Van Bavel, M. (2017). Housing preferences among students: collective housing versus individual accommodations? A stated preference study in Antwerp (Belgium). *Journal of Housing and the Built Environment*, 32, 449-470.

Wang, H. (2011). *The Research of a Senior Care Model in a Hybrid Community in the City of Guangzhou* [Master's Thesis, South China University of Technology].

Yaghoobzadeh, A., Navab, E., Mirlashari, J., Nasrabadi, A. N., Goudarzian, A. H., Allen, K. A., & Pourmollamirza, A. (2020). Factors moderating the influence of intergenerational contact on ageism: A systematic review. *Journal of Psychosocial Nursing and Mental Health Services*, 58(8), 48-55.

Zhang, C. (2020). *Research on Evaluation of Intergenerational Solidarity Performance and Optimization Strategy of Residential Public Space* [Master's Thesis, Harbin Institute of Technology].

Zhang, Y. (2019). *Research on Age-Friendly Interior Design of Living Space for the Elderly Living Alone* [Master's Thesis, Jilin Jianzhu University].

Appendix

Questions for interview

Gender: ☐ Male ☐ Female

Age:

Nationality:

What is your current living arrangement?

- ☐ Living alone
- ☐ Living with family
- ☐ Living with friends/roommates
- ☐ Other (please specify)

Have you heard of the "intergenerational living" model?

- ☐ Yes
- ☐ No

Are you willing to live in a community with stranger elderly people after understanding the benefits of this living model?

- ☐ Totally yes
- ☐ Not really acceptable for me
- ☐ Acceptable but with concerns (please specify)

What facilities and services in a community are necessary for you (café, library, gym, open space, etc.)?

If you need to share an apartment with some old people, what space features do you think is important?

Which space do you think you are not willing to share with others, and which room or space are you willing to share?

Interview 1

Gender: ☐ Male ☒ Female

Age: 24

Nationality: China

What is your current living arrangement?

Living alone

Have you heard of the "intergenerational living" model?

No

Are you willing to live in a community with stranger elderly people after understanding the benefits of this living model?

Acceptable but we may have different living habits, for instance, my grandparents always dislike some of my habits, so we often quarrel... So I'm not sure if it a long-term plan.

What facilities and services in a community are necessary for you (café, library, gym, open space, etc.)?

Community center, grocery store, garden, restaurant

If you need to share an apartment with some old people, what space features do you think is important?

We can have our own entrances so we don't disturb others. Sometimes I go home late but I guess old people go to bed early. And I strongly need my private bathroom.

Which space do you think you are not willing to share with others, and which room or space are you willing to share?

Bathroom is not good to share for me. We can share living room, dining room.

Interview 2

Gender: ☐ Male ☒ Female

Age: 25

Nationality: Malaysia

What is your current living arrangement?

Living with roommates

Have you heard of the "intergenerational living" model?

A bit

Are you willing to live in a community with stranger elderly people after understanding the benefits of this living model?

Sure, it's interesting to me. Reducing expenses is very attractive to me.

What facilities and services in a community are necessary for you (café, library, gym, open space, etc.)?

Café, recreation room, some quiet space for study, courtyard

If you need to share an apartment with some old people, what space features do you think is important?

Nothing special. I was raised up by my grandparents so I think I have good skills to get along with old people. The bathroom for them should be bigger. For me, it ok to share some space with them like kitchen, dining space.

Which space do you think you are not willing to share with others, and which room or space are you willing to share?

Probably bathroom and bedroom. But maybe sharing a bathroom is not bad. So I can find out in time if they have any accidents...(if it is my responsibility) I'd like to share the kitchen, balcony.

Interview 3

Gender: ☒ Male ☐ Female

Age: 25

Nationality: China

What is your current living arrangement?

Living with roommates

Have you heard of the "intergenerational living" model?

No

Are you willing to live in a community with stranger elderly people after understanding the benefits of this living model?

Acceptable if we have our own apartments or different areas.

What facilities and services in a community are necessary for you (café, library, gym, open space, etc.)?

Gym, café, laundry, indoor activity room

If you need to share an apartment with some old people, what space features do you think is important?

Actually it's too close for me to share an apartment with old people. Now I live with other three guys. We have different schedules. It's annoying. But if have to, maybe maximize the distance between our bedrooms.

Which space do you think you are not willing to share with others, and which room or space are you willing to share?

Bathroom maybe. It's hard to keep it clean while sharing with others. We can share a balcony. Or a kitchen. I don't cook often, so kitchen is less important for me. When necessary we can gather in the kitchen. It's nice.

Interview 4

Gender: ☐ Male ☒ Female

Age: 29

Nationality: Netherlands

What is your current living arrangement?

Living with my boyfriend

Have you heard of the "intergenerational living" model?

Yes

Are you willing to live in a community with stranger elderly people after understanding the benefits of this living model?

Sounds nice.

What facilities and services in a community are necessary for you (café, library, gym, open space, etc.)?

Café, garden

If you need to share an apartment with some old people, what space features do you think is important?

I live with my boyfriend now. So we need extra privacy. Maybe we can live as a big family but also keep a distance.

Which space do you think you are not willing to share with others, and which room or space are you willing to share?

Bedroom. Balcony, kitchen, living room.

Interview 5

Gender: ☐ Male ☒ Female

Age: 26

Nationality: South Korea

What is your current living arrangement?

Living with friends

Have you heard of the "intergenerational living" model?

No

Are you willing to live in a community with stranger elderly people after understanding the benefits of this living model?

I don't know. I can have a try.

What facilities and services in a community are necessary for you (café, library, gym, open space, etc.)?

Gym, open space, activity room

If you need to share an apartment with some old people, what space features do you think is important?

I can have my own bathroom. If possible, I prefer our bedrooms not attached directly.

Which space do you think you are not willing to share with others, and which room or space are you willing to share?

Bathroom. If I have a balcony, I want it to be used only by me because I like staying alone when relaxing. I can share living room, kitchen with them.

