Rhytms to encounter

Studio report

Ecologies of inclusion
Advanced housing

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Title page

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Part 1
Research

Rhytms to Encounter

Shaping social infrastructure to encourage synergies between working and living

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Abstract

Social infrastructure is crucial in repairing the fractured societies of today. Fragmentation of lifestyles has resulted in limited social networks between people from different backgrounds. A robust social infrastructure is critical to provide social connections and prevent friction between social groups, especially in multicultural settings. This research aims to identify the conditions that contribute to a robust social infrastructure when combining residential and manufacturing spaces.

The focus is on the social infrastructure within a neighborhood, a mixed-use building block, and a residential building. The research is divided into three parts, developing a theoretical framework, investigating the neighborhood of Kralingen West in Rotterdam, and analyzing mixed-use and dwelling case studies. The neighborhood investigation contains participant observations. The participant observation gives insight into the spatial and programmatic qualities that resonate with social interaction.

The research supports a design assignment in Merwevierhavens Rotterdam, which involves a mixed-use development combining urban manufacturing, residential settlements, and public facilities. The findings are translated into design strategies for the project.

Public amenities are essential in promoting social cohesion in multicultural neighborhoods by providing opportunities for social interaction between different social groups. The layout of dwellings, where the dwellings are connected with the pubic environment, and specific spatial conditions also significantly stimulate social interaction and build trust between residents.

Mixed-use development promotes social inclusion by encouraging public contact between different social groups. Transparent manufacturing and a common architectural language can contribute to a shared identity and promote a sense of belonging. At the same time, a central pedestrian area with spatial conditions that encourage social interaction is essential for encounters between user groups.

Promoting social encounters and interaction in residential developments is essential for community building. An open circulation system and shared spaces provide these opportunities. The cooperative model allows for incorporating a generous circulation system and shared spaces by being user-oriented. Efficiently designed dwellings compensate for generously designed circulation and shared spaces.

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Glossary

Rhythm
The rhythm takes place when there is a repetition of movement in space and time. Each movement is unique.

Casual public contact
Casual public contact refers to encounters and interactions between people in a public space.

Clock-time pacemaker
Clock-time pacemakers contain specific beginning and end times.

Event time pacemaker
Event-time pacemakers are unbounded to beginning and end times.

Pacemaker
Pacemakers are a stable source of particular rhythms. They constitute the regular movement of people in space and time.

Polyrhythmicity
A diverse combination of rhythms is polyrhythmicity. Multiple pacemakers at a single location result in polyrhythmicity.

Social infrastructure
Social infrastructure is the sum of places where people encounter, interact and gather. The social infrastructure can be approached from the neighborhood scale, building block, residential building, and dwelling unit scale.

Social cohesion
Social cohesion is the extension of connectedness and solidarity among groups in society.

Social capital
Social capital is the value individuals and groups derive from their social connections, facilitating cooperation and collaboration for individual and collective well-being.

1 Introduction

1.1 Social Polarisation and Fragmentation

"Social infrastructure is the missing piece of the puzzle, and building places where all kinds of people can gather is the best way to repair the fractured societies we live in today." – Klinenberg, 2018

Societies are becoming more fragmented, divided, and conflicted (Klinenberg, 2018). Fragmentation of lifestyles is something I experience as well. I interact socially with people in my own 'bubble,' but I rarely meet unfamiliar people, let alone people who belong to another social group. I do not know my neighbors; my social network lies beyond my neighborhood. Even social encounters are barely part of my everyday life. As a result, my social network is limited to friends, family, and people with similar lifestyles. The lack of face-to-face interaction with people with different lifestyles, who have other cultures, political preferences, and social relations, leads to a fragmented and divided society. The fragmentation of societies can result in conflicts because people do not understand each other and do not have empathy for each other (Tersteeg, 2017).

Several aspects cause the fragmentation between different income and interest groups. One of them is the preference of people. People with similar lifestyles prefer to live with each other (Musterd, 2020). People with similar lifestyles often form urban communities and develop a sense of social cohesion. Social cohesion can be understood as an extension of connectedness and solidarity among groups in society (Mouratidis et al., 2020). The research of Forrest et al., 'Social cohesion, social capital, and Neighborhoods,' where they studied Great Britain neighborhoods around the year 2000, shows that strongly cohesive neighborhoods get sooner into conflict with 'outsiders' than less robust communities (2001). They see outsiders as a disruption to their community.

A sense of social cohesion is essential for residential settlements. It is crucial to prevent friction between social groups as it benefits residents' well-being (Mouratidis et al., 2020). Neighbors play a significant role in building and maintaining social connections. They provide social support, safety, and security and can enrich individuals' social capital (Klinenberg, 2018). A robust social infrastructure is critical to provide such connections and social structures. The social infrastructure in the context of dwelling is approached from different scales. Firstly the scale of the neighborhood to build resilience between different social groups (Musterd, 2020). Furthermore, the scale of a residential building provides close social relations.

Rotterdam is a multicultural city with a wide range of diverse social groups. By 2009, 46% of Rotterdam's residents were of immigrant background (Council of Europe, 2009). According to Tersteeg, who analyzed the policy strategies regarding diversity in Rotterdam, Dutch policies pay little attention to social cohesion between diverse social groups (2014). Nor do policies focus on the encounter between people with different lifestyles. They rather prevent a mix of lifestyles by developing neighborhoods for specific lifestyles than to mix lifestyles. They do not promote positive interactions between different lifestyles.

1.2 Social infrastructure and mixed-use development: a design assignment

This research supports a design assignment in the Merwe-Vierhavens area (M4H). M4H is a former industrial area located west of Rotterdam and is the starting point for a new urban district. The plans focus on a mixed-use development combining living, working, and recreation. Mixed primary use in neighborhoods can help build social trust and foster a sense of social cohesion (Jacobs, 1961). Mixes of use provide opportunities for a vibrant and diverse community. These two conditions, mixed-use development in combination with the multicultural demography of Rotterdam, provide an opportunity to be part of the solution towards preventing fractured societies.

The given task is to develop a mixed-use project alongside Keilehaven. The project contains 27.000 m² living area, 17.000 m² working area, and 3000 m² for public facilities. M4H is part of the 'Makers-district,' which focuses on innovative and pioneering manufacturing industries. The area should become a hub for innovation and creativity for startups, makers, and other businesses to grow and collaborate. A clothing recycling company is envisioned for the design assignment's manufacturing program.

The program is shaped into a volumetric composition, see figure 1.1. The masterplan is divided into three parts. This research is supportive of the design process of the highlighted volumes, see figure 1.2. The typologies of these volumes, two residential towers, an industrial slab, and the work-live courtyard on top, is the starting point for the design.

This research aims to determine the programmatic and spatial conditions contributing to a robust social infrastructure when combining a residential complex with a manufacturing space. Social infrastructure is the sum of places where people encounter, interact and gather (Klinenberg, 2018). This research is divided into three scales: a neighborhood scale, a mixed-use 'plot,' and a (residential) building. The neighborhood provides the first needs of daily living. The social infrastructure on the neighborhood scale exists of public institutions, public environment, events, and third places. All these parts contribute

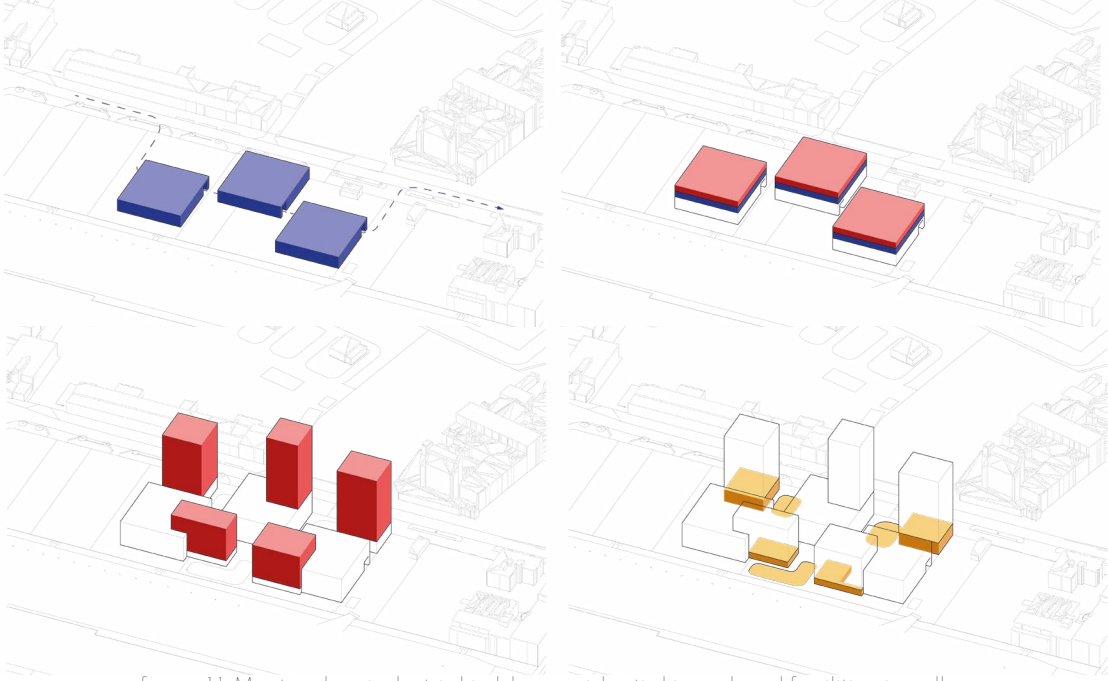


figure 1.1: Masterplan, industrial in blue, residential in red and facilities in yellow

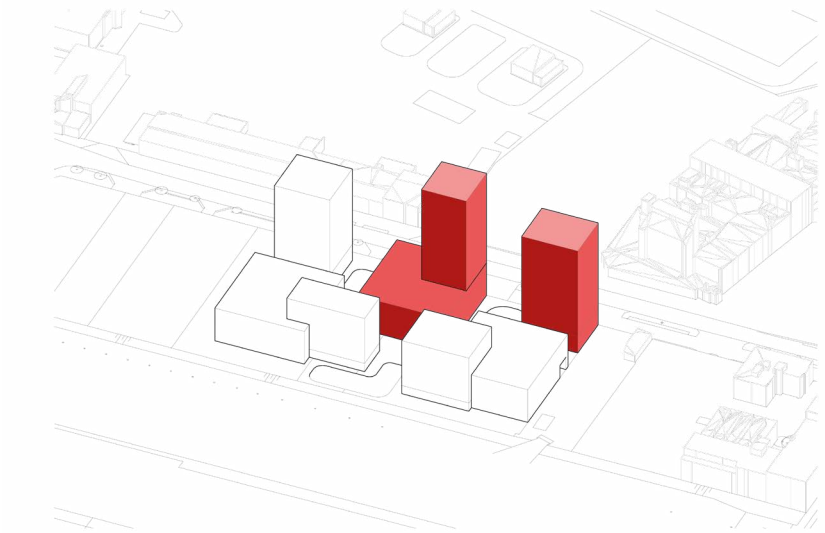


figure 1.2: Highlited part for the design, tower A left and tower B right

to the social life of the residents. How they are organized is crucial to the functioning of a neighborhood, where a sense of trust is necessary for sharing a neighborhood between different social groups. The following part of the research focuses on how the combination of living and working (manufactu-

ring) benefits daily social life on the scale of a building block. The third part of the research zooms in on the role of social infrastructure within a residential building. Therefore, the research focuses on the organization of the circulation spaces and the role of shared spaces towards community building. These different scales are chosen to get both a complete understanding of social infrastructure and to integrate the findings into the mixed-use design question to combine manufacturing and living alongside the Keilehaven.

"… Architects are not really good at creating communities, and that is because they have been trained to create individual buildings and we call it affordable housing. Lets change the affordable to housing, and lets change the housing to homes…" – Norman Foster (Norman Foster Foundation, 2022)

The overarching design goal is to shape communities. Social infrastructure plays a crucial role in the social connections between people. Each part of the research is supportive of the design process. The social infrastructure on the neighborhood scale is not one-on-one translatable on the design, which is on the scale of a building block. However, the mixed-use development is part of the future neighborhood. The research gives insight into how mixed-use development can add value to the neighborhood by being part of the social infrastructure of the entire neighborhood. The given plot and program result in a relatively dense development—the dense development results in small-sized high-rise buildings. Conventional high-rise structures often result in individual and anonymous living, which negatively affects the quality of life and has a high potential for social isolation. The research part of the neighborhood focuses on low-rise development, aiming to identify the qualities that exist in low-rise development and translate these qualities into small-sized high-rise development.

The second part of the research, social infrastructure between working (manufacturing) and living, influences the design by organizing spaces that connect both parts and how these 'in between' spaces benefit a healthy living environment.

The third part of the research, social infrastructure within a dwelling complex, directly supports the design of the circulation space and how shared spaces promote social connections.

The mixed-use development aims to be part of the solution towards preventing social fragmentation and polarisation within the new urban development of the Merwe-vierhavens.

1.3 Theme

Social infrastructure

As Klinenberg argues, social infrastructure is the missing piece of the puzzle (2018). Social infrastructure refers to the physical spaces and organizations that shape how people interact. A robust social infrastructure is critical for promoting public trust and community resilience (Klinenberg, 2018; Jacobs, 1961).

Klinenberg discovered a correlation between social infrastructure and the number of deaths during Chicago's heat wave (July 1995 (2018). He compared demographics and death statistics between neighborhoods. Multiple poor and segregated neighborhoods were among the higher death rates. At the same time, three of the ten neighborhoods with the lowest death rates were poor, violent, and predominantly African American. Based on fieldwork, Klinenberg argues that these death rate differences during the heat wave clarify the social infrastructure difference (2018). In the neighborhoods with lower death rates, people looked after each other. The social infrastructure is the catalyst of social relationships between neighbors. An excellent social infrastructure fosters social cohesion, promotes inclusion, and reduces social isolation by providing opportunities for interaction (Klinenberg, 2018).

Klinenberg divides social infrastructure into public institutions, public environment, events, and third places (2018)—examples of public institutions are libraries, schools, and after-school care. The public environment contains places like sidewalks, squares, and parks. Examples of events are sports matches or facilities which support religions. Third spaces are, according to Klinenberg, neutral places between work and home, like a market or café.

Semi-public places are excluded from this definition. When seeing the circulation space within residential complexes, as an example of a semi-public place, as opportunities for encounter, interaction, and potentially gathering activities (in the case of shared spaces), semi-public spaces are part of the social infrastructure that belongs to the daily life of its residents. Even single dwelling units can be approached through the lens of social infrastructure by dividing home activities into two parts, social activities with family members or visitors (such as dinner) and individual activities (such as reading). In this research, social infrastructure is approached from the scale of a neighborhood, a building block, and a building to a single dwelling unit, as visualized in figure 1.3.

Promoting solidarity through social infrastructure

Rotterdam contains a variety of lifestyles that live with their communities. The social infrastructure plays an essential role in social cohesion between these communities. There is disagreement among social scientists about the association between diversity and social cohesion (Tersteeg, 2017). Some sociologists argue that diverse communities can coexist peacefully. They recognize that

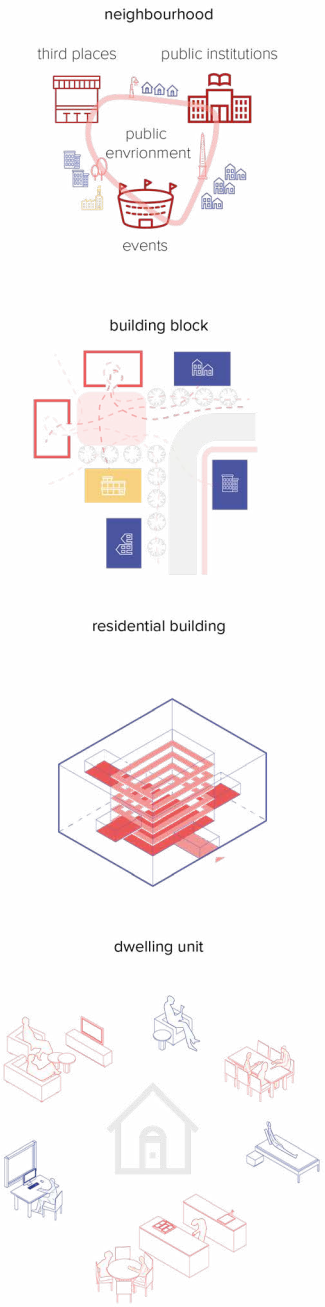


figure 1.3: Social infrastructure on different scales

balancing diversity and solidarity is a complicated endeavor. Other sociologists argue that diversity and heterogeneity challenge or hinder social cohesion. They see cultural homogeneity as a fundamental source of social cohesion (Musterd, 2020).

Communities of lower incomes generally have a strong sense of social cohesion. They spend relatively much time in local areas compared to wealthier neighborhoods. That is because of high unemployment and lone parenthood (Forrest et al., 2001). The social network of lower-income groups is often relatively located in their neighborhood. They benefit from the proximity of social networks. When the social network of people lies beyond their neighborhood, their sense of local social cohesion among their neighborhood is weaker.

Mixed-use development and social encounters

A sense of social cohesion is crucial to prevent tension and conflicts between lifestyles. Social cohesion applies to different scales, the city, neighborhood, and street (Tersteeg, 2017). Klinenberg argues that social infrastructure is the foremost solution to bring people from different income brackets and lifestyles together (2018). He argues that relationships inevitably grow when people engage in sustained, recurrent interaction, particularly while doing things they enjoy. A healthy social infrastructure provides these conditions. The proximity of facilities to provide typical routines of everyday life and walkability leads to higher chances of local social interaction and fosters social cohesion (Forrest, 2001; Mouratidis et al., 2020; Jacobs, 1961). A well-organized social infrastructure multiplies the opportunities for social encounters. The encounter between different lifestyles encourages interaction and brings different people together.

This research focuses on the conditions that support and provide opportunities for social encounters and interaction in a mixed-use dwelling project.

“The district, and indeed as many of its internal parts as possible, must serve more than one primary function; preferably more than two. These must insure the presence of people who go outdoors on different schedules and are in the place for different purposes, but who are able to use many facilities in common.” Jacobs 1961

Jacobs states that mixes of primary use are essential for neighborhoods and many of their internal parts as possible because of social and economic aspects (1961). Mixes of primary use ensure that the public environment is used fairly continuously. The presence of people is the main reason for a safe public environment. Users and ‘street watchers’ can intervene when necessary; their presence reduces the potential of any possible conflict. A purely residential settlement takes up much space. However, it does not drive the daytime population (Jacobs, 1961). According to Jacobs, it will only account for 1 percent of the number of persons in the daytime population. That is not succinct to

sustain commercial activities and lively streets.

In addition, lively streets promote public contact on local levels. Single casual public contact on local levels contains little value to public trust, but the sum of these contacts is essential for a healthy public environment (Jacobs, 1961). It bears a feeling for the public identity of people, encourages public respect and trust, and is a resource in times of personal or neighborhood need (Jacobs, 1961). The mix of primary use is essential for diversity as well. Public space used by various social groups ensures that people do not feel like a stranger (Jacobs, 1961). A sense of belonging is critical for preventing tensions and conflicts. Mixed-use development can positively contribute to the solution of fragmented societies.

Casual public contacts are thus crucial to the liveability of a neighborhood. Therefore, the rhythm of daily life is an important term within this research. “Everywhere where there is an interaction between a place, a time, and an expenditure of energy, there is rhythm” (Lefebvre, 2004). Rhythm takes place when there is a repetition of movement in space and time. However, each movement is unique. Something new and unforeseen always introduces itself to the repetitive (Lefebvre, 2004). The rhythm of life can be understood by daily cycles, where the cycles exist of repetition; every repetition is unique. There is repetition within space, difference by time. An encounter can happen by an intersection of rhythms, where repetitive encounter finds a place at the same place, at different times. Each encounter is unique. By finding and designing for these intersections, social encounters can be encouraged.

Within the mixed-use design assignment alongside the Keilehaven, the intersection between the rhythms of the residents and workers are opportunities for casual public contact. However, people spend most of their time inside their homes, during a workday on average, approximately two-thirds of the day (Sociaal en Cultureel Planbureau, 2017). Encounter is most likely to happen during the ‘peak moments’ at the workday cycle’s beginning and end.

1.4 Designing for diverse user groups

The dwelling program of the mixed-use development along the Keilehaven contains different living typologies. First, work-live dwellings, these dwellings are in line with the vision for the Makers District. The work-live studios suit small-scale production, repairing activities, artists, and other creative businesses. The second typology is cluster living, and the third living typology contains private living with a focus on flexible use and the opportunity for working at home. A clothing recycling company occupies the manufacturing space.

Bringing the daily cycles of work and life together in one building creates the opportunity of encountering lifestyles. To imagine the encounter of lifestyles, different characters that live in and use the building are considered.

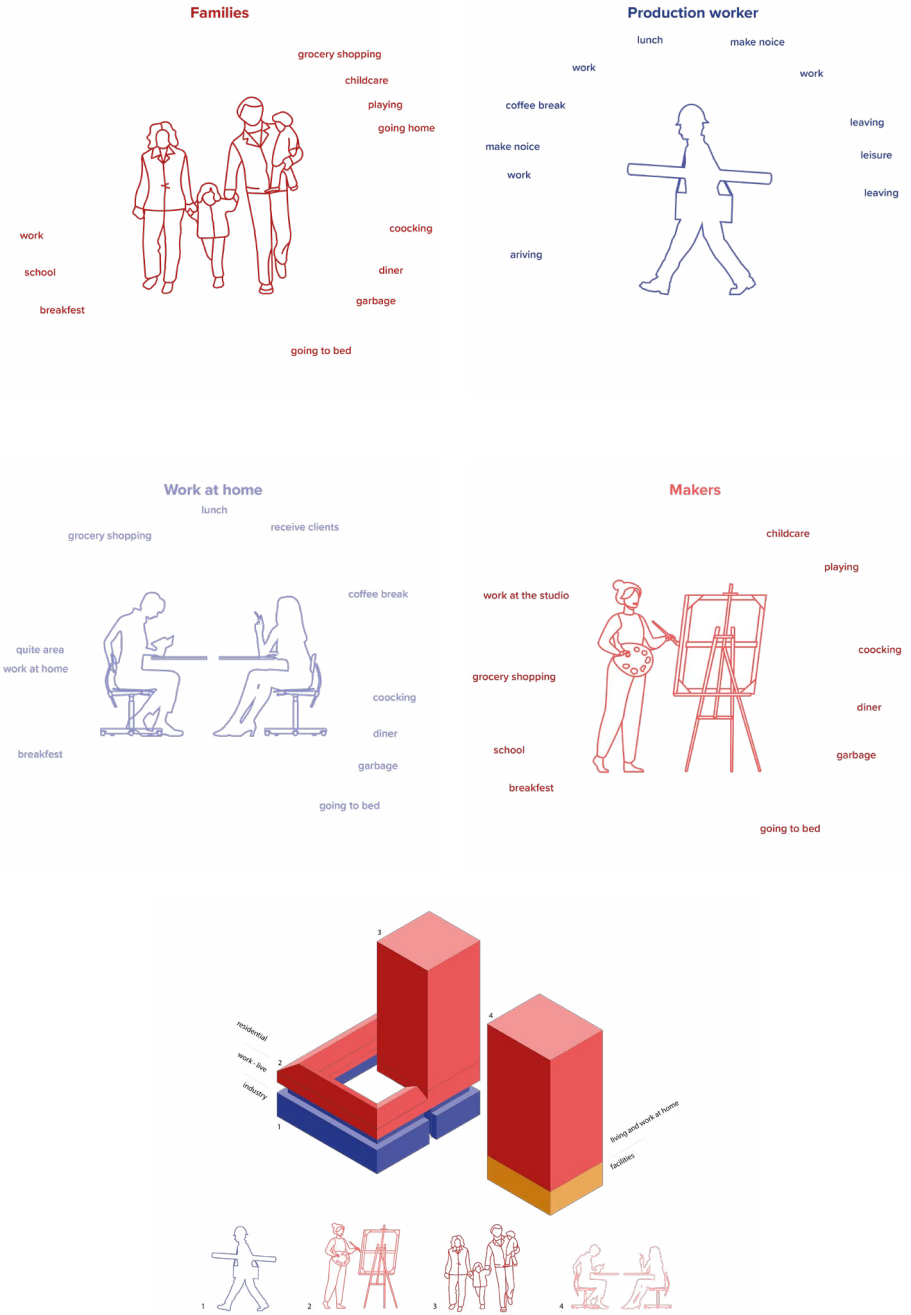


figure 1.4: User groups

The user groups consist of the residents and the manufacturing workers. The production workers are the people who work in the factory and make use of the place during the day. The facilities of the project should support the activities which belong to the production. A typical workday starts in the morning and has a break during lunchtime. During lunch, the project should provide a place to rest, eat, and socialize. That can happen internally in the canteen, but external facilities, like a deli, provide an extra opportunity to recharge. The deli facilitates the residents as well.

The different living types target different groups of people. First are the makers (work-live dwellings), people with small businesses living and working in the same place. The small businesses are manufacturing-oriented, and nuisance during the day is accepted.

The cluster dwellings are suitable for lower-income households who can benefit from close social connections, mainly focussed on families and 1- and 2-person households. The clusters contain communal spaces like a shared kitchen. Within a cluster, multiple households form a community together. Living in a cluster is suitable for lower-income groups. This typology provides people to build close social connections. They can help and support each other with things such as taking care of the children and cooking.

The third residential group targets people who benefit from flexible dwelling use, households working remotely, or service-oriented businesses. That could be a mix between families, 2-person households, and possibly single households.

This constellation of different user groups shares the place. Public facilities, like a library, food court, café, and child care, provide opportunities to bring them together.

1.5 Research questions

Main question

How can social infrastructure within a dwelling complex, and between residential and productive use, foster community building among various user groups?

Sub questions

What is the role of public amenities in the neighborhood, and which spatial and programmatic conditions resonate with places for social interaction?

How could overlapping daily rhythms between workers and residents and place identity play a role in encouraging a sense of social cohesion?

What design strategies encourage community building within residential housing, focussing on circulation as opportunities for encounter, the role of shared spaces, and the social adaptability within a dwelling unit?

1.6 Research Framework

The research is divided into three parts, theoretical framework, neighborhood investigation, and case studies (see figure 1.5).

Theoretical framework

This research is substantiated by literature and studies about social structures in urban settlements. The main themes for the literature study are social cohesion, social infrastructure, daily rhythms, mixed-use development, shared spaces, and the role of place identity.

Investegation of Kralingen West

The second part of the research is the neighborhood investigation in Rotterdam. Therefore, the neighborhood Kralingen West is chosen because of the high level of social cohesion compared to the city, measured on a subjective basis by the municipality of Rotterdam ("2022 | Wijkprofiel Rotterdam," n.d.-b). Figure 1.6 shows the level of 'bonding' residents feel towards Kralingen-west. Bonding refers to how residents experience their connection to their neighborhood. The connection to the neighborhood reflects how residents take pride in their neighborhood, feel responsible for its livability, and trust the district committee. Kralingen West has a relatively high level of bonding towards their neighborhood, compared to other neighborhoods and the level of bonding the average resident feels towards the city.

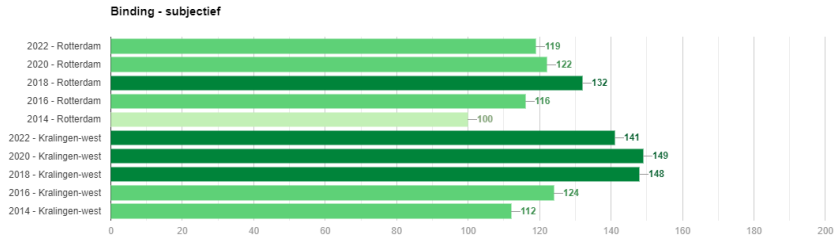


figure 1.6: Bonding of residents towards Kralingen West compared to Rotterdam ("2022 | Wijkprofiel Rotterdam," n.d.-b)

The neighborhood's historical context and current profile are analyzed to understand the background and current context. The historical research gives insight into the development of the neighborhood and how the neighborhood came to be what it is now.

The second part is the analysis of the social infrastructure within the neighborhood. That is done by participant observation. The aim is to discover the social structures and rhythms in daily life within the neighborhood and determine which programmatic and spatial conditions encourage social encounters and interaction. Spotted encounters are analyzed based on programmatic and

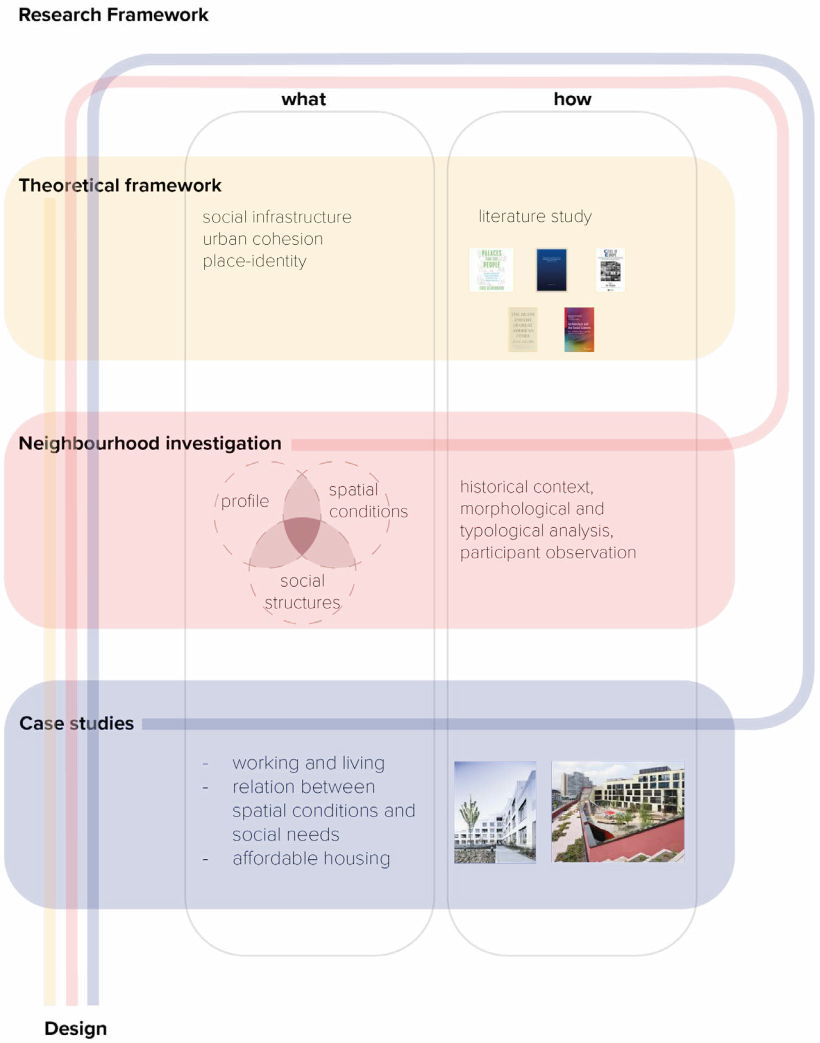


figure 1.5: Research framework

spatial conditions. This analysis gives insight into the conditions contributing to social interaction and gathering between people.

Case studies

Besides the neighborhood investigation, three case studies are analyzed, two housing case studies and one case study where working and living are combined.

The first case study is Wick Lane, developed by Taylor Wimpey and designed by dRMM studio. The construction was completed in 2022. Wick Lane is a mixed-use development in Hackney Wick, London. The project contains light industrial workspaces, retail, and 175 homes. Wick Lane is designed to provide a strong identity and foster neighborhoodliness (Hole, n.d.). Analyzing this project gives insight into how industrial space can be combined with living, how identity plays a role in developing a mixed-use project, and how a sense of belonging can be encouraged between different user groups.

The second case study is Kalkbreite, developed by Kalkbreite Cooperative. Müller Sigrist Architecten designed Kalkbreite. The construction was completed in 2014. Kalkbreite is interesting to analyze because of its social structure on the scale of the building. The building consists of a 'social route' through the building that connects all homes. Collective spaces around the 'social route' allow residents to interact and encounter each other. These qualities of the building contribute to creating a sense of social cohesion on the scale of the building and clusters. The analysis of Kalkbreite gives insight into how the cooperative model can benefit the users and how this translates into social and spatial relations.

The third case study is Unité(s) developed by Grand Dijon Habitat. Unité(s) is a residential building in Dijon, France. Construction was completed in 2018. Sophie Delhay Architecture designed Unité(s). The dwelling complex is designed for affordable living, with flexible floor plans to give freedom to the inhabitant on how they use the apartment. The analysis of Unité(s) gives insight into how homes can be efficiently designed with high quality for the user and how social rhythms within dwellings can adapt around the users.

Challenge of scale

Social infrastructure and social cohesion on the neighborhood scale are more significant than the scale of a building. It is considered as the scale of the neighborhood. Therefore, the findings of the neighborhood investigation can not one-on-one be implemented into the design of the urban development along Keilehaven. The findings of the neighborhood should precisely be interpreted by scale. Does the finding affect the scale of a building block, cluster, or multiple clusters? Could the finding be scaled down to a building with apartments? The findings are put into perspective by comparing the neighborhood investigation with the other case studies.

1.7 Personal interest

What interests me is how different lifestyles with different needs impact the social structure of daily life. For instance, the difference between lower-class social groups is strongly reliant on their local network and other social groups with a weaker sense of an urban community. Because of digitalization and modern infrastructure, people are not reliant on their local community. It is

easy to have your social network outside your neighborhood. That is a missed opportunity in current society. Local communities could have multiple benefits, not to replace but in addition to the 'distant' social network. I would like to learn more about how design influences the social aspect of daily life regarding the local social structures.

2 Conditions for a robust social infrastructure

The necessity of a robust social infrastructure has been discussed previously. But what makes a robust social infrastructure? How does this translate to daily life? What are the programmatic and spatial conditions for a good social infrastructure? To answer these questions, Kralingen West, a neighborhood in Rotterdam, is analyzed as a case study. Kralingen West contains, on a subjective basis, a high level of social bonding, see figure X ("2022 | Wijkprofiel Rotterdam," n.d.-b). The residents of Kralingen-West have high levels of bonding towards the neighborhood. In addition, the neighborhood is home to a variety of cultural groups, 46% of the residents are native, 15% have a western migration background, and 39% have non-western migration background ("Buurt Kralingen West (Gemeente Rotterdam) in Cijfers En Grafieken | AlleCijfers.nl," 2023). These numbers are similar to the numbers of Rotterdam ("Woonplaats Rotterdam in Cijfers En Grafieken| AlleCijfers.nl," 2023). The high level of bonding and the diverse population makes Kralingen West suitable to investigate, with the aim of social inclusive living in Rotterdam's multicultural city.

In order to gain an understanding of the neighborhood, it is necessary to analyze its contextual factors, including its historical background and current demographic information. The neighborhood is analyzed through participant observation to understand the social infrastructure and how that influences daily life. In addition, the physical infrastructure and notions of daily life are analyzed through mapping.

2.1 Background Kralingen-West

Kralingen-West is a neighborhood in the city of Rotterdam in the Netherlands, located in the eastern part of the city, on the banks of the Nieuwe Maas river, see figure 2.1.

Kralingen-West is older than Rotterdam. Kralingen was originally a separate village settled by farmers. In the 20th century, Kralingen began to urbanize and grow as a suburb of Rotterdam. During World War II, Kralingen-West was bombed, and much of the neighborhood was destroyed. The western wind helped the fire to spread across Rotterdam. Figure 2.2 shows the destroyed parts of Kralingen-West. The neighborhood contained a mix of different uses. The area was home to different activities among living, working, and leisure. According to Platform Wederopbouw Rotterdam, at least 5663 dwellings, 229 companies, 17 schools, 418 stores, and 18 cafés were burnt down (Kralingen, zd). The rebuilding of Kralingen West was an opportunity to implement modern principles of urbanism and planning (Kralingen - De wederopbouw in detail, z.d.). That also meant that the area was rebuilt into a meanly residential district. It

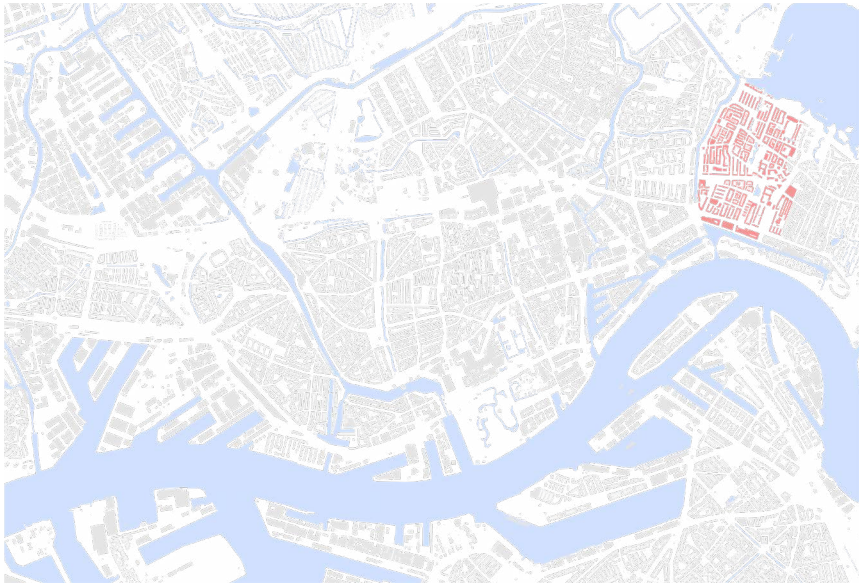


figure 2.1: Kralingen West

figure 2.2: Destruction kralingen west

was part of a broader plan to reconstruct the city of Rotterdam.

The rebuilding was primarily done during the 1950s and 1960s, characterized by the construction of modern apartment buildings. During the 1960s and 1970s, Kralingen-West became a popular area for students because of the arrival of Erasmus University. (Kralingen, zd)

Kralingen is divided between East and West. The eastside (Oost Kralingen) consists of avenues with luxurious houses. West Kralingen consists more of workers' houses (Kralingen, zd). That correlates with the rebuilding after the war. The modern housing blocks are currently home to lower-income households, whereas the houses alongside the avenues (also located in parts of West Kralingen) are home to middle- and higher-income households.

2.2 Current demographics

The neighborhood has a diverse population of various ethnicities, cultures, incomes, and ages. Kralingen West is home to 15.860 residents and 9.065 households. Around half of its houses are rented through corporations, focused on social housing. A quarter is a rent-by-market price, and the other is owner-based. 92% of the residential buildings are multi-family, and the rest contains solo dwellings. ("Buurt Kralingen West (Gemeente Rotterdam) in Cijfers En Grafieken," 2023)

The leading age group of residents in Kralingen West is between 25 and 45 years old, about a third of the population. One-fifth is between 15 and 25 years old, and another fifth is between 45 and 65 years old. The area is also home to 2050 children between 0 and 15 years old, and 2140 people who are older than 65 ("Buurt Kralingen West (Gemeente Rotterdam) in Cijfers En Grafieken," 2023). The group between 15 and 25 years old is relatively large compared to Rotterdam ("Woonplaats Rotterdam in Cijfers En Grafieken| AlleCijfers.nl," 2023).

A little more than half of the people do sports regularly weekly. 71% of adults drink weekly at least an alcoholic glass and 22% smoke. About four in ten people are overweight. 8% of people need informal care. ("Buurt Kralingen West (Gemeente Rotterdam) in Cijfers En Grafieken," 2023)

In 2022, about 50% of the residents of Kralingen West is native. About 10% of the residents have a Western migration background. People with a Western migration background include people with at least one parent born abroad. Furthermore, about 40% have a not western migration background, containing Marocain, Antillean, Surinamese, Turkish and other nationalities ("Buurt Kralingen West (Gemeente Rotterdam) in Cijfers En Grafieken," 2023). These numbers resemble Rotterdam ("Woonplaats Rotterdam in Cijfers En Grafieken| AlleCijfers.nl," 2023).

Most people in Kralingen West are highly educated, around 45%. Approximately 30% are secondary educated, and the rest is low educated. (“Buurt Kralingen West (Gemeente Rotterdam) in Cijfers En Grafieken,” 2023). These numbers are significantly higher than average Rotterdam, where 32,4% are highly educated, 36,5% are secondary educated, and 31% are poorly educated.

Kralingen West is thus a relative high educated neighborhood, despite the same levels of migration background as the city of Rotterdam. People with a migration background have, on average, still an educational disadvantage compared to native Dutch people (Maslowski, 2020). The averages of educational levels can be sustained by the university graduates who choose to stay in the neighborhood where they lived as students.

These rates show that Kralingen West is diverse. Diversity does not mean that all groups are evenly distributed throughout the district. The elections municipal council in 2022 gives insight into the division of user groups within the city. see figure 2.3. VVD was the favorite at most places. The southwest area was burnt down during the second world war and is home to modern residential complexes. These complexes are currently home to lower-income households.

figure 2.3: Election results Kralingen West

The map of elections shows that there are concentrations of like-minded people, most likely people with similar backgrounds.

2.3 Movements Kralingen-West

The social infrastructure within a neighborhood can be divided into public institutions (schools, libraries, etc.), public environment (sidewalks, squares, parks etc.), events, and third places. These places are mapped in figure 2.4. In addition, other facilities, such as stores, barbers, and supermarkets, are mapped because these facilities drive movement in the public environment. These

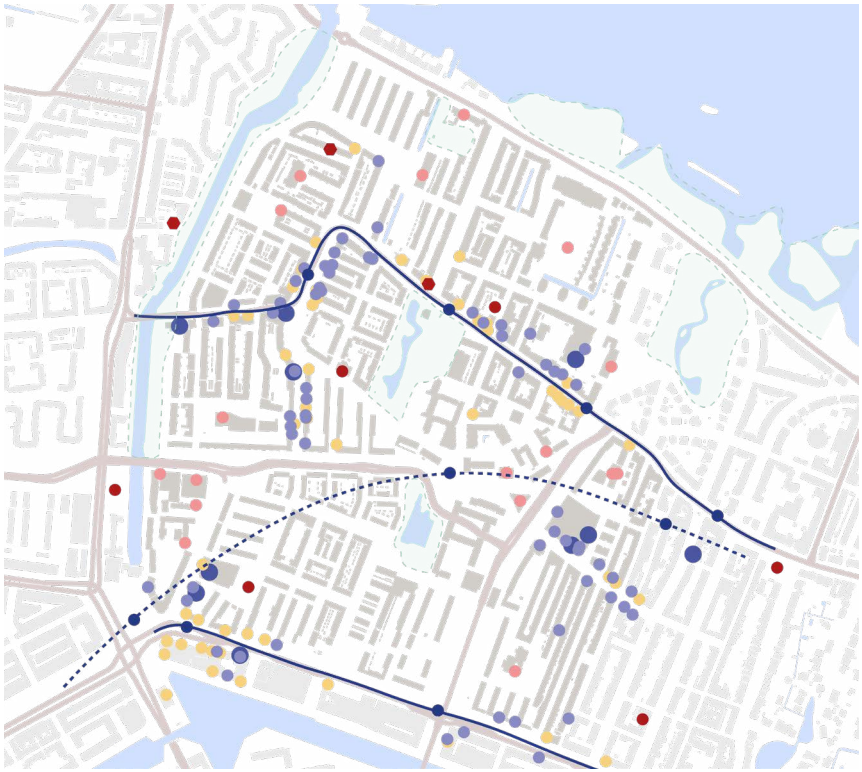


figure 2.4: Social infrastructure Kralingen West, public environment (top left).

- stores or service
- supermarket
- public transport
- school
- sports
- religion
- recreation
- café, restaurant or bar

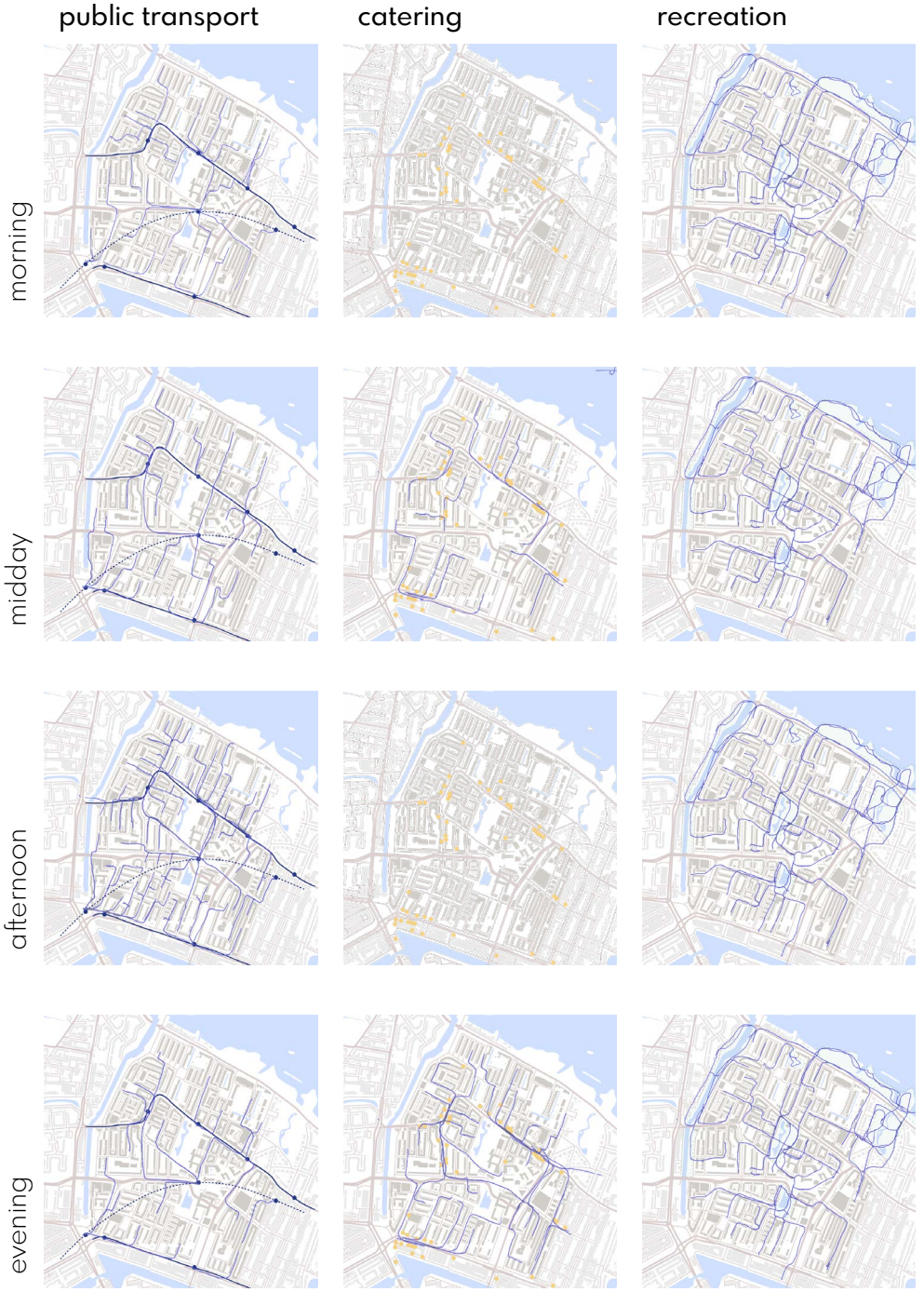


figure 2.5: Movements Kralingen West

figure 2.5: Movements Kralingen West

stores and services

figures show that the third places and facilities are concentrated along the main streets in the neighborhood. The public institutions, mainly primary schools, are more located in the quieter residential areas. In the middle of the neighborhood are two green areas for recreational use as part of the public environment. The neighborhood borders the Kralingse Plas, a lake surrounded by a small forest.

The movements and daily rhythms within the neighborhood are analyzed by looking at the rhythms of the social infrastructure (public environment, institutions, and third places) and the facilities. The places that produce rhythms within the neighborhood are specified per categories to be more precise about the daily rhythm. The categories are public transport, catering, recreation, religion, schools, sports facilities, and stores and services. For each category, possible movements during specific periods are mapped. The periods are morning, midday, afternoon, and evening. That is done with the indication Google Maps gives about how busy a place is during which time of the day. Figure 2.5 shows the movements per category and moment of the day.

Through the main streets goes most movements within the neighborhood. That is because these streets are the most logical route between the neighborhood and other parts of the cities and because of the facilities that are located along the street. These facilities attract residents from all parts of the neighborhood. These places can be seen as the center of the neighborhood, where encounter and interaction between different social groups are most likely. The public transport stops are located alongside these streets as well. The schools and sports facilities ensure the movement and presence of people during the day within the residential areas. The recreational places are evenly used throughout the day and are a constant driver of activity on the streets in the neighborhood.

figure 2.5: Movements Kralingen West

2.4 Role of spatial and programmatic conditions in facilitating public contact

The movements within neighborhoods result in casual public contact, which is essential for the liveability of the neighborhood. The public contact within Kralingen West is analyzed by participant observation to understand what conditions facilitate and sustain the social structures within a neighborhood. The participant observation focused on social encounters and interactions in the neighborhood. That was done during wintertime on a sunny day. The analysis focuses on how spatial and programmatic conditions can support casual public contact and whether those qualities can translate into semi-high-rise residential development.

The spotted public contacts are mapped in figure 2.6 and shown in figure 2.7. The first three interactions are on playgrounds, where children play and adults encounter each other because of bringing and picking up their children. The following two interactions are along the neighborhood's main streets, driven by its facilities. Public contacts six and seven are located in the neighborhood's residential areas. Public contact eight is an encounter at the edge of the neighborhood.

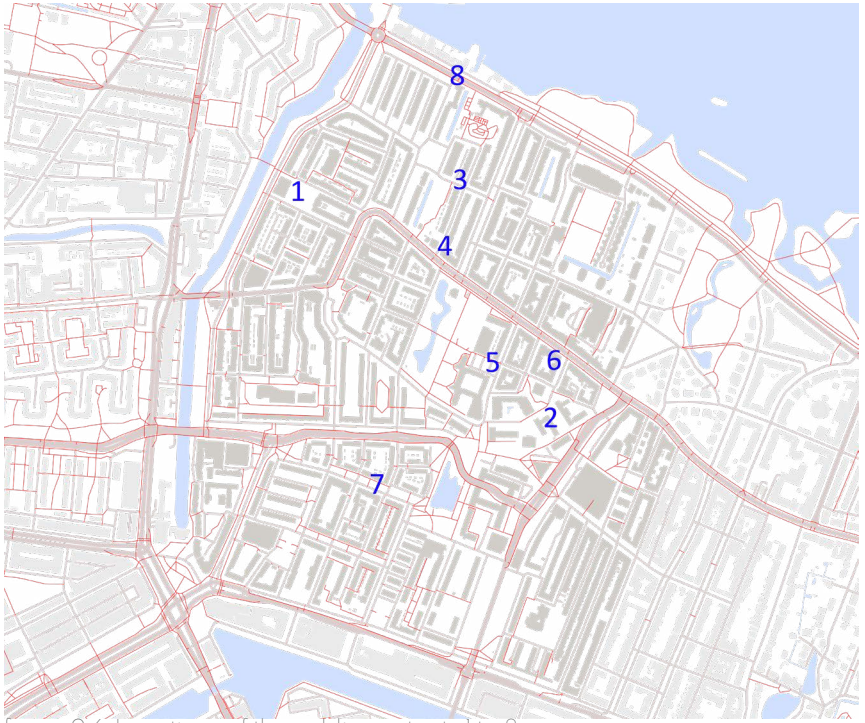
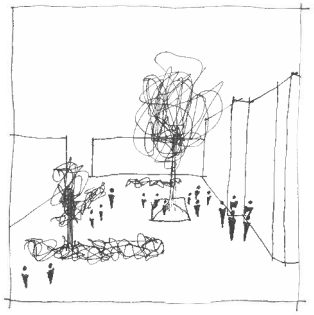
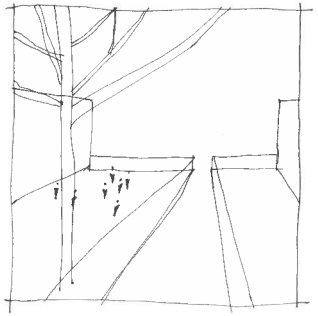


figure 2.6: Locations of the public contacts 1 to 8

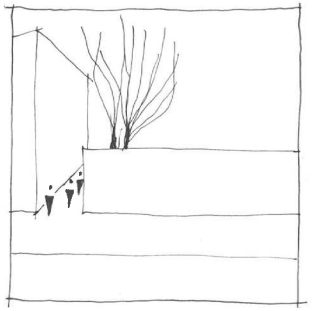
1. Public playground



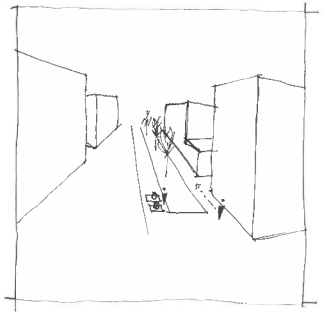
2. Primary school



3. Rear entrance high school



7. Garbage point



8. Intersection between routes

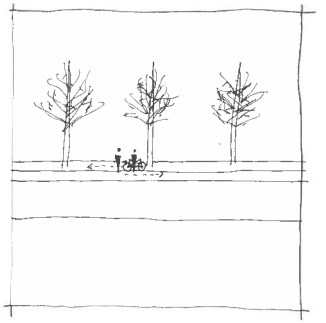
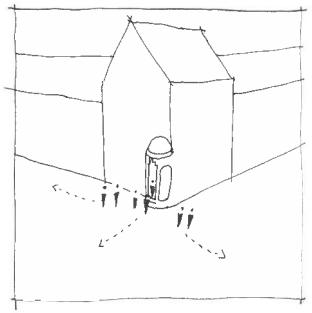
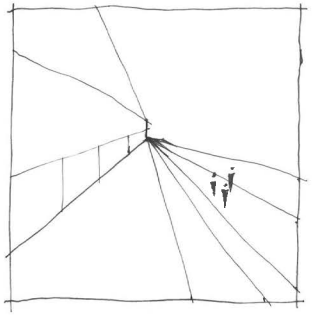


figure 2.7: Public contacts 1 to 8

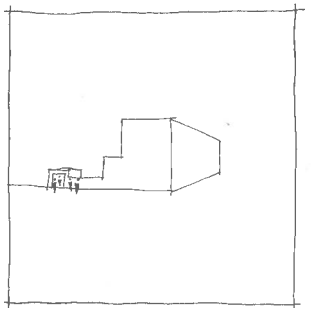
4. Mosque



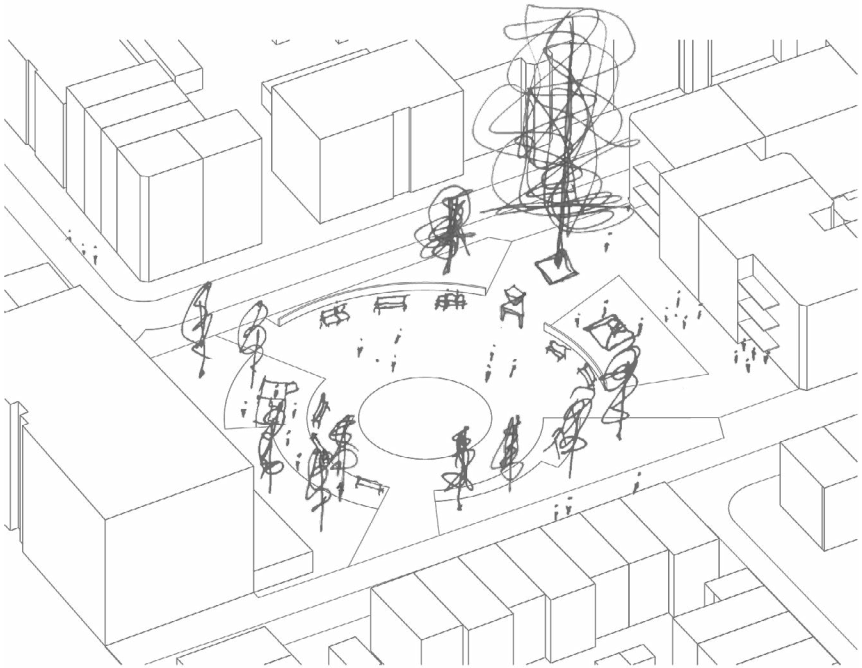
5. Commercial street



6. Rechtstreex pick-up point



1. Public playground



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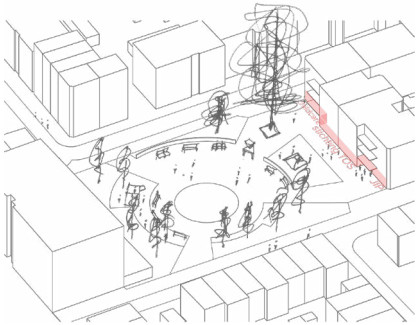

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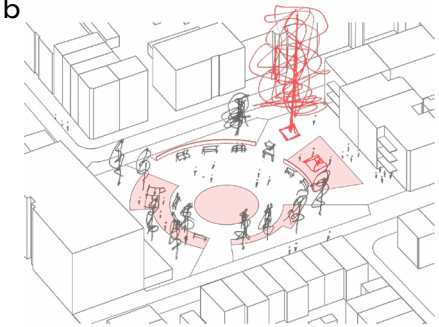

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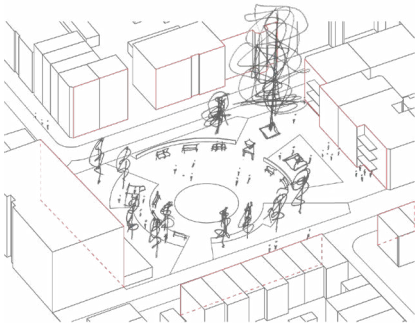

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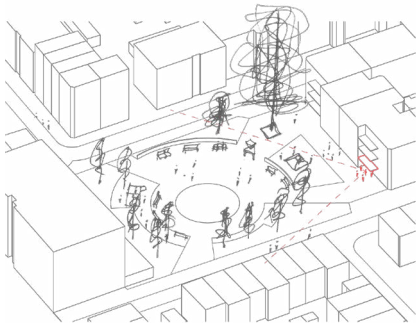

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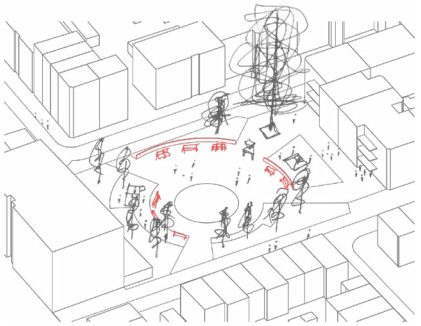

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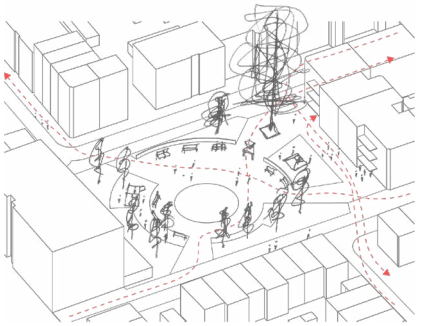


1. Public playground

This public square, designed as a playground for children, is surrounded by residential settlements. Children played on and around the playground together, and some parents participated in the children's ballgame. At one of the corners, adults gathered and talked with each other.

a. childcare facility

The childcare facility supports the use of the playground. Because of the childcare facility, the playground becomes a meeting place between parents during the pick-up moments of the children.

b. space dividing elements

The playground contains several elements that operate as space-dividing elements. That makes the playground suitable for children to play. It allows children to choose to play at their 'own' spot. Children also use these elements, for example, to run around them when playing tag.

c. eyes on the street

The playground is located in the middle of a residential area. The surrounding homes are the eyes on the street, which is essential for safe public places (Jacobs, 1961).

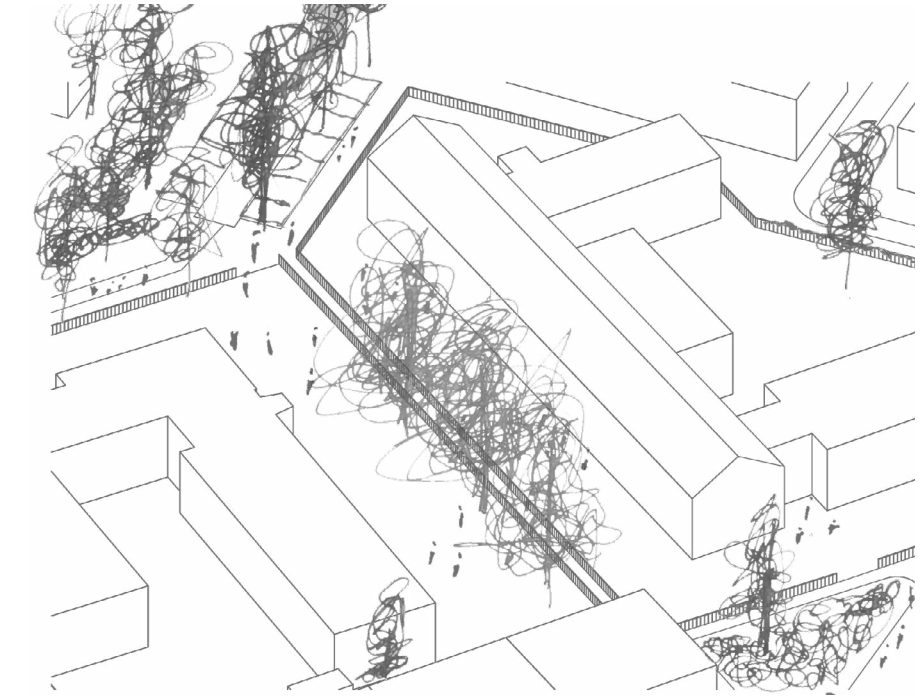
d. shelter

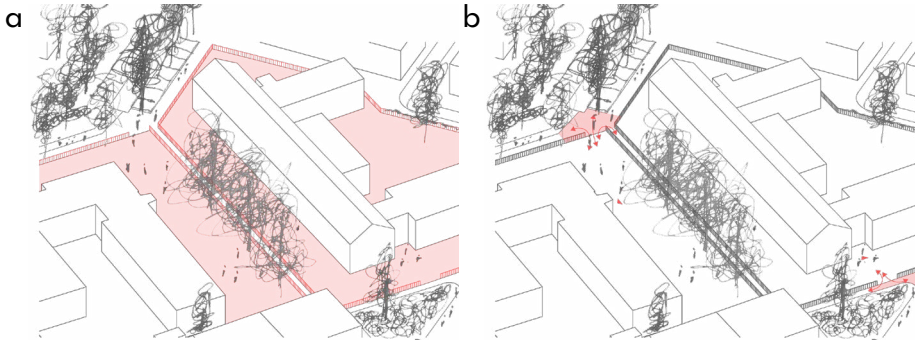
Under the balcony, a group of adults gathered and had a conversation. The balcony above them provided shelter, and the playground corner gave them an overview of the place. These conditions are suitable for the adults to interact with each other and simultaneously look at the children playing.

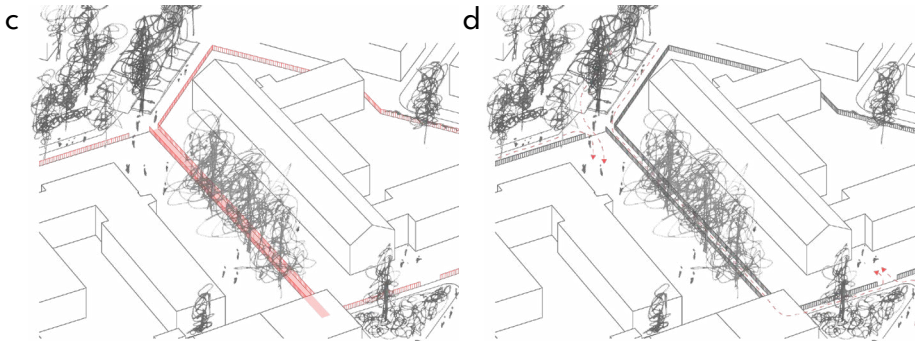
e. inviting to stay

The benches in the middle part of the playground invite the adults to stay. The benches are strategically placed around the center of the playground and with a low wall in the back to prevent activities outside their view.

2. Primary school







f. presence of people

The playground can be on the route of people who pass by—the presence of people during times of low activity help to keep the place safe.

The playground is part of the neighborhood and provides a place to play for the childcare facility and children who live nearby. At the same time, this playground functions as a meeting place for parents. Specific spatial conditions (number x, x, and x) support the activities of playing and gathering. When integrating a playground like this into a high rise building, it is important to consider specific conditions. The eyes on the streets, the constant presence of passers-by, and the activities around the facilities (mainly the childcare facility) ensure the presence of people. These conditions are essential for a good working public space. An integrated playground into a high-rise building (elevated playground) does not have the ability of regular passers-by. The 'eyes on the street' that can be arranged around an elevated playground will always be on a smaller scale. In addition, the playground does not function as easily for an entire area inside the neighborhood.

2. primary school

When passing by, children were playing on the playground of the primary school. Each day parents bring and pick up their children to primary school. During these times, the area around the school becomes a place for encounter and interaction between adults.

a. public- private

The demarcation between public and private is clear. The playgrounds around the school are gated. The playground is thus only for use during the school's opening hours.

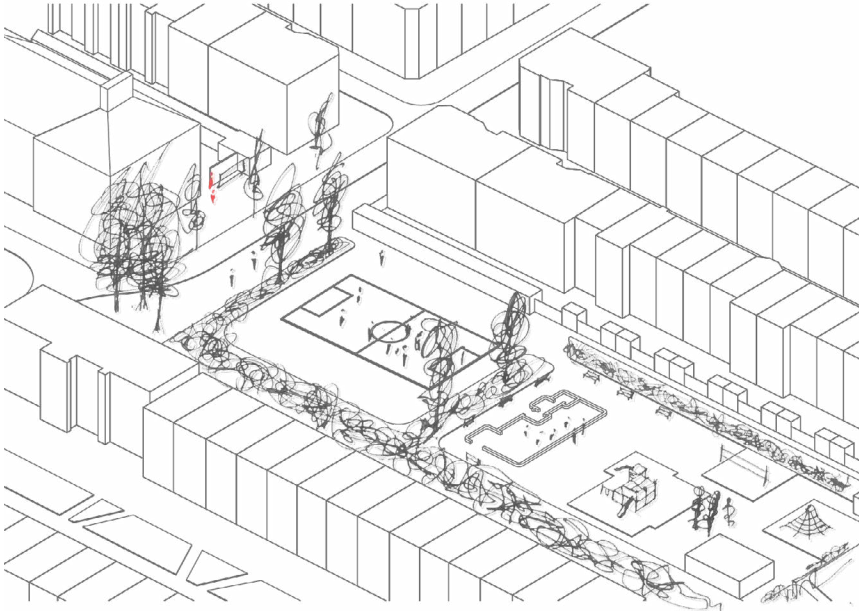
b. entrances

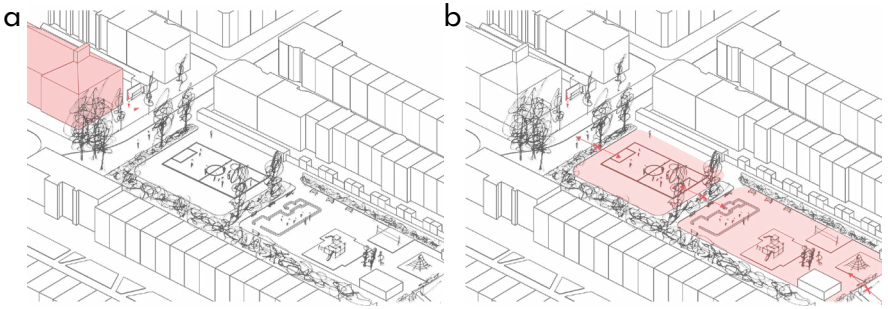
The entrances of the playgrounds are transitional zone between public and private. A transitional zone is a place of encounter and interaction between adults. The primary school contains two buildings. There is little public space in front of entrance A. This does not support interaction between adults who bring or pick up their children. Entrance B does contain some space in front of the entrance. Extended conversations are more likely to happen when the place is suitable for people to stand still and not be in the way of others.

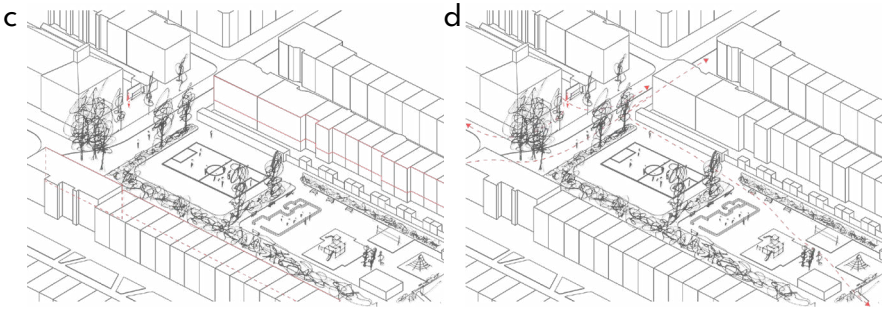
c. narrow path

The narrow path between both school buildings is part of a pedestrian route. The narrow path can be an opportunity for public contact. The chances of encounter are higher because there is only one obvious way to go from A to B. The narrow path does not promote interaction, and it becomes difficult to stand still during peak hours without obstructing others.

3. Speeltuin Oudedijk (playground Oudedijk)







d. presence of people

The playground can be on the route of people who pass by—the presence of people during times of low activity help to keep the place safe.

The design of transitional space can either promote or discourage interaction. That is also relevant for high-rise residential buildings. The entrance, for example, can be seen as a transitional zone between public and private where people arrive and leave and is thus an opportunity for an encounter. It is important to design such places with the ability to stand still and not be in the way of others in order to promote social interaction.

3. Speeltuin Oudedijk (playground Oudedijk)

The third place is a regulated playground. This playground is gated and has specific opening hours during the day. During the opening hours, it is open to everyone. On the other side of the road is a secondary school, with the back entrance facing the playground.

a. secundary school

The secondary school is the driver of activity around the playground during school times. After school, the playground can be used by children who live nearby.

b. introverted charachter

The playground is split into two parts, a football cage and a playground for younger children. Both parts have an introverted character because of the vegetation and bushes that surround them.

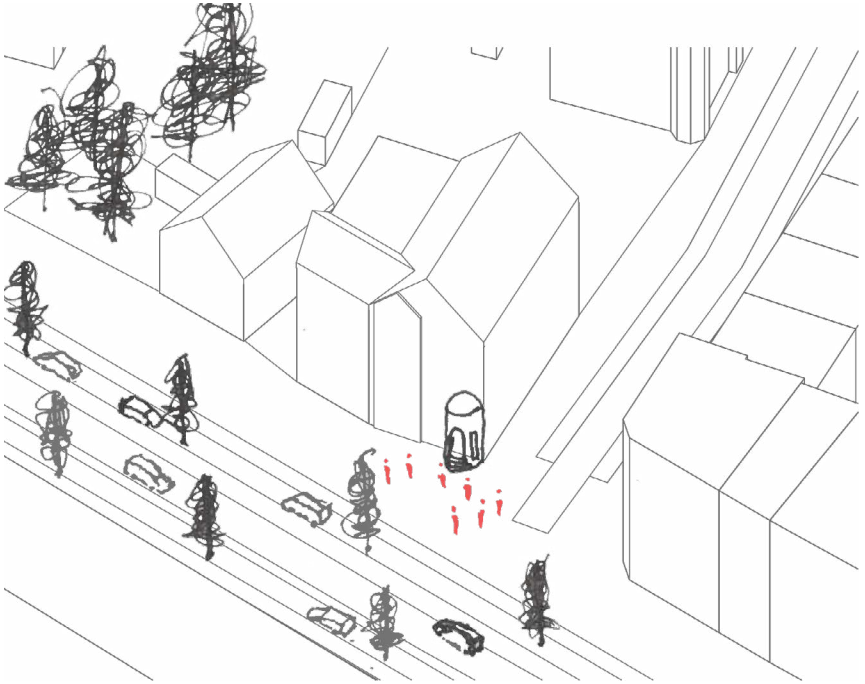
c. eyes on the street

The ‘eyes on the street’ are ensured by the back facades of residential terraced houses.

d. presence of people

The pedestrian path along the playground is not a main route for passers-by. The constant presence of people is restricted to the road in front of the secondary school.

A playground in a high-rise residential building cannot be open to the public all day. That is the case for this playground as well. A playground with regulated opening hours can be applicable to a high-rise residential building. That prevents nuisance during dark hours. The same conditions, as explained in social interaction 1, must be considered when including a playground in a high-rise residential building,



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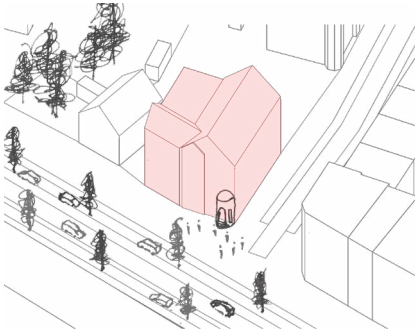

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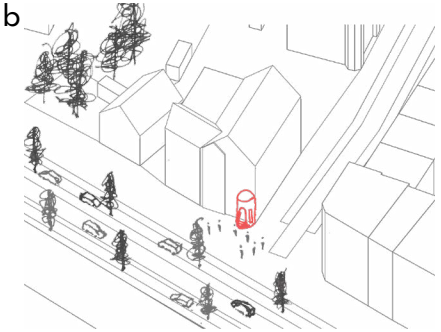


c

4. Mosque

After prayers, a group of people conversed in front of the mosque. The mosque is located along a main street in the neighborhood.

a. mosque

The mosque is the driver behind this social interaction. The prayers are at set times during the day.

b. sign

The characteristic dome above the entrance reveals the function of the building to the public. That attracts people who are interested in going to the mosque.

c. pedestrian zone

The pavement in front of the buildings along this street is broad. The broad pavement gives people the opportunity to interact easily with each other without standing in the way of others.

d. buffer zone

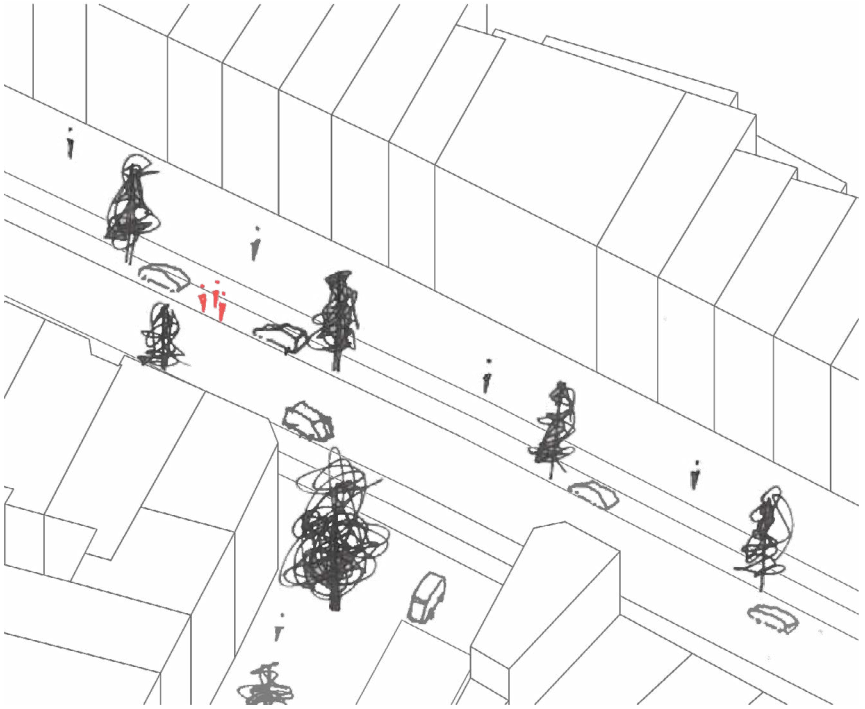
The parking lane and the bicycle path form a buffer between the main car road and the pedestrian zone. This buffer makes the pedestrian zone more friendly, an essential quality along a main car road.

The mosque is a clock-time pacemaker. At regular times people make use of the mosque. This regular rhythm ensures the presence of people at specific times. When designing the mixed-use project, certain functions will work as clock time pacemakers, which can be an opportunity for social encounters. That is in the next chapter more elaborate discussed.

A sign, in this case, the dome, can attract the public. For the facilities in the high-rise building, or other public features such as a playground, this can be a strategy to get people's attention.

This conversation happened along a main traffic road. However, the pavement is pedestrian friendly. When designing the mixed-use project, where car and truck traffic passes by, it is key to create a pedestrian zone where the traffic nuisance is reduced. A buffer zone can do this.

5. Commercial street



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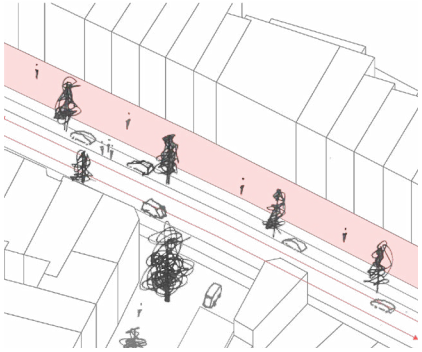

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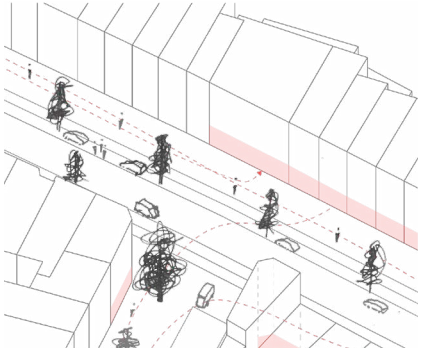


5. Commercial street

Down the same street are several stores located. Three men had a little talk on the parking lane along the street. They came out of a DIY store, were most likely familiar with each other, and ran into each other by coincidence. Instead of conversing on the broad pedestrian pavement, they stood still on the parking lane along the car road. People do not always use the public environment as intended. Social interaction happens everywhere, not only in places designed to interact and gather. However, a designer can encourage and promote social interaction by multiplying opportunities for social encounters and making specific places suitable for interaction.

a. pedestrian zone

The space in front of the shops is pedestrian friendly, as discussed in public contact 4 mosque.

b. commercial facilities

Multiple stores drive the movement of people on this place. That facilitates the opportunities for casual public contact.

A concentration of facilities that drive the movement of people encourages public contact and provides opportunities for social interaction. This strategy can be used when designing the mixed-use development. To not only concentrate facilities but to concentrate all kinds of places that produce movements of people. For example, the location of bicycle parking, garbage point, the main entrance of the residential building, the main entrance of the manufacturing hall etc.

a

b

6. Rechtstreex

Rechtstreex is an organization that sells groceries from local farmers, with pick-up points spread throughout Rotterdam. In a residential setting in the Kralingen West is a pick-up point of rechstreex. One time a week on Wednesday between 4 and 7 pm, the pickup point is open for people to get their orders. When walking by, two residents from the neighborhood arrived at the same time to pick up their food. The narrow timeframe raises the opportunity for encounter between residents. The activity for people to pick up their food is a moment of social interaction with the food distributor and possibly with other residents.

The food distributor is important to the neighborhood as a public character. Neighborhood social infrastructure partly depends on these public characters (Jacobs, 1961). A public character talks to many different people, and local news can spread through public characters. Public characters link people from the neighborhood together. Public characters are also a source of local trust. Jacobs gives an example in neighborhoods in New York, where people leave their keys at nearby stores for family and friends (1961). The residents trust the storekeepers. As Jacobs describes, ‘public figures combine a feeling of goodwill with a feeling of no personal responsibility about our private affairs’ (1961). Public figures are, therefore, crucial to the neighborhood. The food distributor of Rechtstreex functions as a public figure by having regular contact with people from the neighborhood.

a. overview

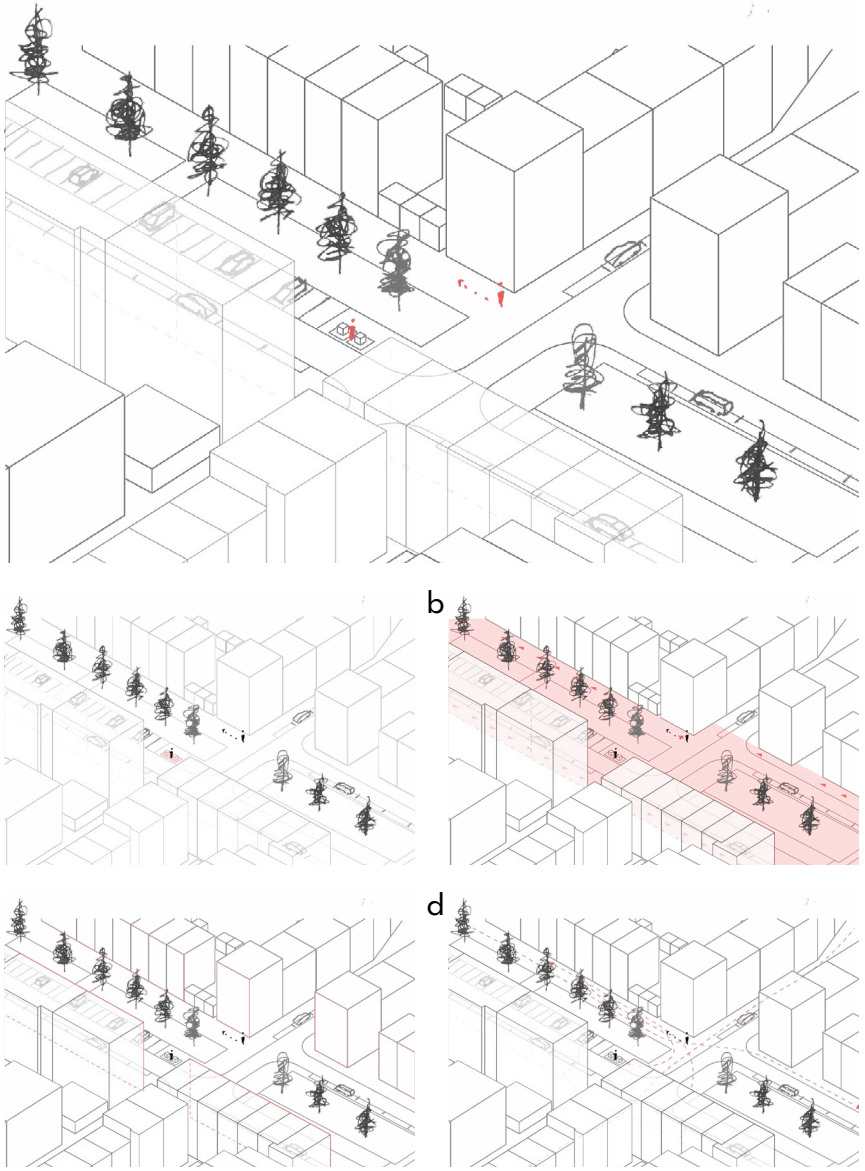
The pickup point is located in the middle of a residential area, at a storage unit in the backyard of a terraced house at the corner. In front of the shed is a parking place located. The open character of the space makes it feel comfortable and safe.

b. exposure

The open character also gives exposure to the passer-by, which can have a positive effect on attracting new customers.

The overview makes the place comfortable to use. That is, in general, an important feature of designing public or collective spaces. Providing overview for places for social interaction has to be considered when designing the mixed-use project. The tight timeframe multiplies the chance of social interaction between residents. Awareness of time-dependent opportunities for social encounter could help when designing the mixed-use project. These places and moments should provide a comfortable feeling to invite interaction. In addition, it helps to think about how public characters play a role in the mixed-use development along the Keilehaven.

7. Garbage point



7. Garbage point

Another encounter was happening in the middle of a residential area. A regular daily life activity turned into a moment of social encounter. A woman was throwing away the garbage. Another woman was walking by. They had a short conversation on distance.

a. daily life activity

The intersection between the presence of a daily life activity and the pedestrian route drives this encounter. The open street profile with broad pavement makes the street attractive. The end of the street is connected to a small park, which people use for a recreational walk.

b. facing public environment

The front doors and entrances of residential buildings face the open public area. That multiplies the chance of encountering neighbors when going out the door.

c. eyes on the street

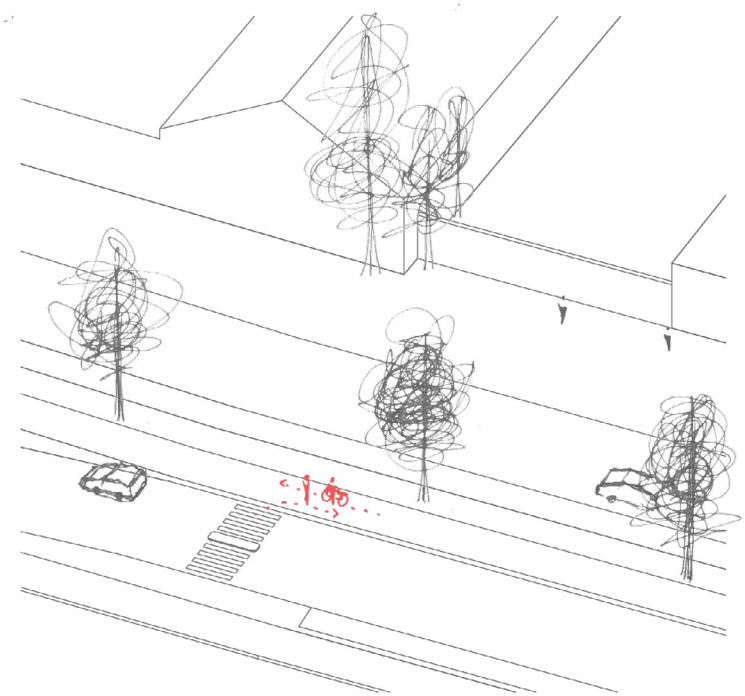
The front facade function as ‘eyes on the street’ but also plays a role in the social connections with neighbors. Seeing neighbors arriving and leaving makes them familiar. It reduces social distance and is beneficial for the possibilities of local social connections.

Daily activities such as throwing away garbage can be opportunities for social encounter. The garbage point in the residential high-rise can also be designed as an opportunity for social encounter. That can be done by strategically placing the garbage point inside the building, on an intersection between multiple rhythms, to multiply the chance of encounter.

The circulation space inside a residential building can be seen as the street in a neighborhood. Facing front doors to the street with visual connections to neighbors is beneficial for the social structures between residents. It provides opportunities for public contact and multiplies the chances of social encounter. A quality such as a visual connection from inside the dwelling to the public area to stimulate familiarity between neighbors is hard to achieve in high-rise buildings. The patio typology provides this opportunity, which is only possible when having enough space.

Visual connections between dwelling units and circulation spaces raise a privacy question as well. There is relatively little distance between the dwelling unit and circulation space compared to the dwelling and the street.

8. Intersection between routes



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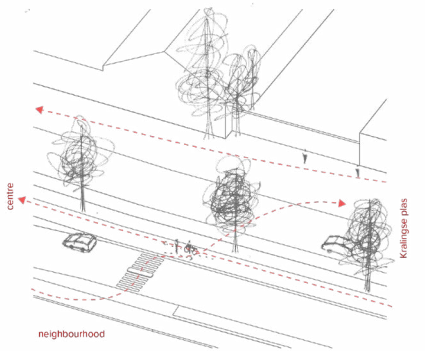

8. Intersection between routes

Along the neighborhood's edge, a cyclist and a pedestrian ran into each other. They were most likely familiar with each other.

a. intersection

The interaction happened because of the intersection between the recreational route (pedestrians who headed to Kralingse Plas) and the main bike route connected towards the center (cyclist).

An intersection between routes is an opportunity for social encounter. When translating this to the design of the mixed-use project, an intersection can be found between leaving and arriving. The chance of an encounter can be multiplied when leading multiple rhythms over the same route. A possibility can be having one entrance for cyclists and pedestrians, instead of separated entrances, which is often the case for residential buildings.

2.5 Translation to design

These interactions took place in the setting of a neighborhood. The design task contains a relatively dense residential development. This density is not comparable with the residential setting in Kralingen West. However, similar qualities are desirable to achieve a sense of social cohesion between the residents. This section is devoted to translating urban qualities into the tower typology development alongside the Keilehaven.

Playgrounds in neighborhoods provide a place for children to play, allowing for encounter and interaction between adults. Figure 2.8 is a spatial configuration

1. playground
2. playground younger children
3. roofop garden
4. 'eyes on the street'
5. sign to reveal the function

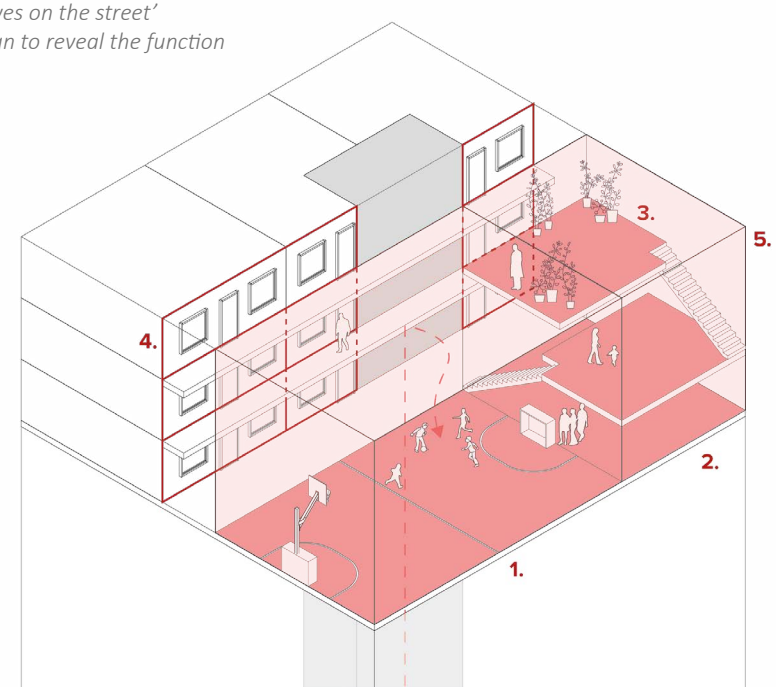

figure 2.8: Incorporating playground into high-rise typology

of a playground incorporated on the top of a residential tower. This playground provides a place to play for diverse age groups, with an informal field (1) and a place for younger children (2) (like place 3. Speeltuin Oudedijk). On the top floor (3) is a rooftop garden to attract adults and make the place inviting for all ages. The dwelling units on the opposite side provide social surveillance (4), an essential quality to prevent misbehavior. This elevated playground functions for the residents of this particular building, in contrast to the public playgrounds in neighborhoods. However, being open for the public during set times is arguable, a similar construction as Speeltuin Oudedijk maintains. Exposure to the environment can play a role in attracting people (5), as a sign that reveals the function similar to the mosque's entrance.

An essential quality of the neighborhood is transparency between neighbors. When residents can see their neighbors arriving, leaving, or throwing away their garbage, people become familiar with each other. That is essential to build trust and lower the threshold for residents to interact with each other. An open structure multiplies the opportunities for contact between residents, see figure 2.9. This is not equal to the level of transparency in place 7 Garbage point. Adding a window between the circulation space (see figure 2.9, 2) and the dwelling raises privacy questions.

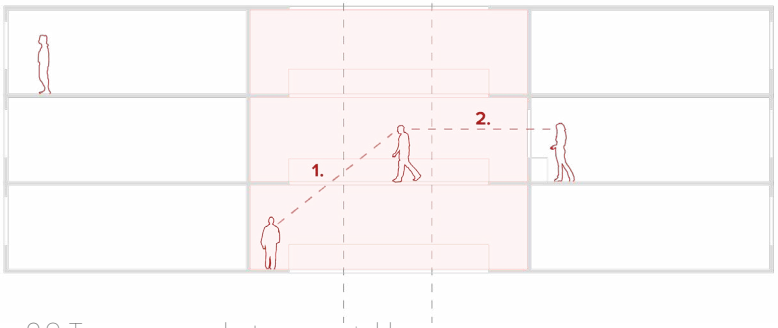

figure 2.9: Transparancy between neighbors

Daily life activities (such as throwing away garbage) provides opportunities for encounter. Concentrating daily life activities on the ground floor, with visual contact between them, multiplies the change of social encounters and promotes social interaction. That also stimulates residents to get familiar with each other, see figure 2.10.

These design configurations aim to promote a sense of social cohesion, which is essential to form a resilient community.

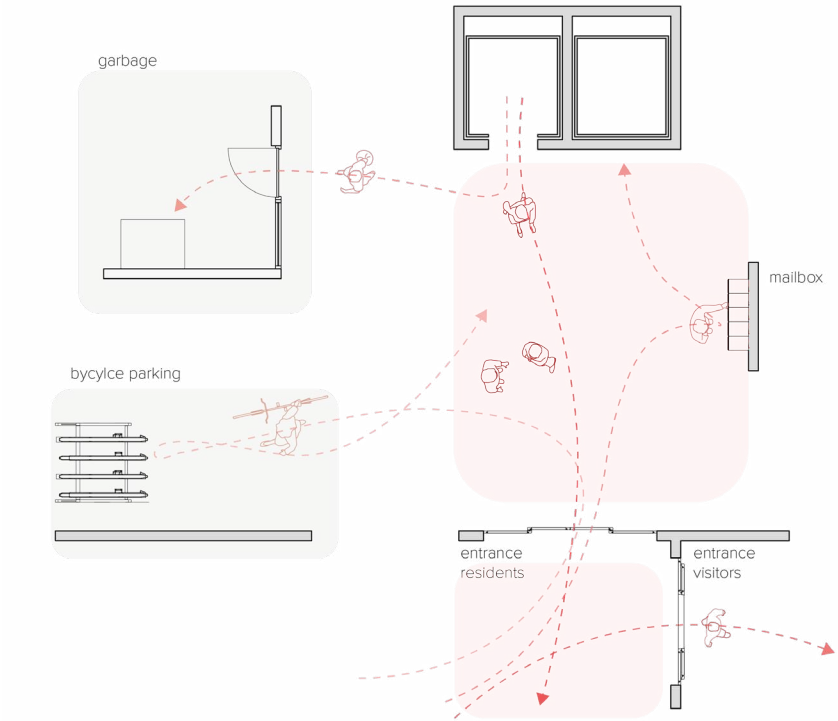

figure 2.10: Multiplying oppertunities for encounter between residents

3 Urban mix for a healthy public environment

3.1 Overcoming social-spatial inequalities for inclusive cities

Social-spatial inequalities can be problematic for cities because of their negative impact on the possibilities for fostering social cohesion among different social groups (Cassier et al., 2012). That is important to Rotterdam due to the multi-cultural context. Social-spatial inequalities are caused by segregation. According to Cassier et al. (2012) segregation should not be reduced to the spatial separation of different ethnic groups. A sense of social cohesion and belonging between different social groups is necessary to prevent tensions and aim for inclusive societies with equal opportunities. Casual public contact is critical to solidarity between different social groups. Cities must therefore contain a network of places for encounters between different social groups to create hybrid cultures and cultural heterogeneity (Miciukiewicz et al, 2012). Primary mixes of use can be the driver for public contact between people from different social groups, thus contributing to a sense of social cohesion among different groups.

Spatial segregation is not only a topic that counts for residential settlements. The segregation of labor markets in Western European cities also contributes to social polarization (Pratschke et al., 2012). For example, the core of Western European cities involves mostly high-paid knowledge-based jobs. Manufacturers, distributors, and several other industries, which generally contain lower-paid jobs, are simultaneously driven to the periphery of cities. That is partly a consequence of reducing nuisance in the city centers. Labor market segregation plays a role in social polarization through the concentration of social groups. In other words, bringing lower-paid labor markets back into the city and mixing primary uses is an opportunity for social inclusive living and cultural heterogeneity.

3.2 The 15-minute city: creating sustainable and inclusive urban fabric

The 15-minute city concept is in the philosophy of chrono-urbanism. It prevents urban sprawl, a current problem for many Western cities (Moreno et al., 2021). Urban sprawl is caused by the wide availability of cars, which negatively impacts biodiversity and the quality of life (Moreno et al., 2021). Car-dependent urban planning is linked to adverse outcomes such as increased traffic congestion, which translates to psychological and social tolls, time, and economic loss (Moreno et al., 2021). Carlos Moreno, a professor of urban plan-

ning and scientific director of entrepreneurship and innovation at Sorbonne University in Paris, introduced the 15-minute city, where social functions are accessible within a 15 minute walk or bike ride (2021). These social functions include living, working, commerce, healthcare, education, and entertainment. Urban fabrics should therefore comply with four main components; proximity, diversity, density, and digitalization.

Density should be viewed in terms of people per square kilometer and strive for the optimal number of people a given area can comfortably sustain (Moreno et al., 2021). That requires local-specific solutions, depending on available space and the number of people in the area. Public space with an optimal density should be designed for multiple uses. School playgrounds can be used as parks (Cervero, 2001). That has become a norm in Paris, where school playgrounds transform into public parks after opening hours (Moreno et al., 2021).

Proximity is seen as the accessibility of social functions within 15 minutes. That reduces commuting time and the environmental impact and benefits social structures of daily life by increasing opportunities for social interaction (Moreno, 2021). Promoting micro-mobility encourages the development of parks, squares, and green spaces. It benefits the quality of public space (Gehl, 2013).

Diversity focuses on two aspects, the diversity of functions and people. Neighborhoods should be a healthy mix of residential, commercial, and entertainment components. That is key for sustaining economically vibrant urban fabrics (Moreno et al., 2021; Jacobs, 1961). They ensure the presence of people who go outdoors on different schedules for different purposes but can use the public facilities in common (Jacobs, 1961). Diversity of cultures and social groups contributes to social inclusion and equal opportunities. Services and goods are equally accessible, and public contacts encourage a sense of social cohesion. Homogeneous settlements are, in general, preferred by people (Musterd, 2020). In the suburbs, the mix of primary use drives the mix of social groups in these places (Jacobs, 1961). It ensures that cities do not act as a collection of isolated parts but as a cohesive network of the urban fabric.

Promoting local accessibility of public services also promotes an age-inclusive public space (Moreno, 2021). The age segregation that undermines current society is the consequence of the centralization of same-aged people into institutions and the homogenization of public life by age-specific typologies, like playgrounds (Stahl, 2020). Promoting walkability and designing public spaces for all age groups encourages age-inclusive public spaces.

Following these components should result in more closely knitted urban fabrics. Residents will spend less time traveling, which results in increased free time and more opportunities to interact and participate in activities that strengthen social bonds and promote public trust (Moreno et al., 2021). The

traveling mode via micro-mobility (through walking or cycling) provides casual public contact that promotes public trust (Jacobs, 1961).

3.3 Social Benefits of Urban Manufacturing

The M4H district plans a mix between living and working, where working is specified in the manufacturing sector. This aligns with the philosophy of the 'productive city,' a recent topic in urban planning to bring manufacturing back into the city (Novy, 2022). Manufacturing in cities can bring multiple economic, environmental, and social benefits (Croxford, 2020). This research mainly focuses on the social benefits of urban manufacturing. Manufacturing provides various jobs requiring both knowledge and practical-oriented jobs. Urban manufacturing brings several social groups together and contributes to diverse people.

Transparency and visibility

Urban manufacturing can contribute to the local identity. Making production processes visible and tangible can make urban spaces more attractive and exciting. That brings uniqueness to local places and plays a significant role in the place's identity (Croxford, 2020).

Evidence suggests that urban residents embrace urban manufacturing (Manufuture, 2018). Most individuals are no longer involved in the manufacturing processes. Urban residents seem to enjoy the chance to observe how others create things. In addition, studies on consumer preferences show that there is rising demand for high-quality, locally-made products. Being transparent about the manufacturing processes founds a basis for the acceptance by residents of urban manufacturing.

However, the acceptance of residents cannot be taken for granted (Novy, 2022). Profit-oriented companies are attracted to low rents and costs of manufacturing space. Suppose this correlates with neighborhoods mainly home to lower income households, and urban manufacturing focuses on high-priced goods and serves the wealthier consumer market. In that case, it should not surprise that residents are not always receptive to these changes. Disbalanced mixes on an economic basis are a possible threat to urban manufacturing.

Community-oriented businesses

Community-oriented urban manufacturing, for example, businesses that work together or share manufacturing spaces, can be the foundation of interaction, learning, and sharing goods and skills (Novy, 2022). Being open and transparent about manufacturing activities can open opportunities for collaboration between businesses.

As shown in figure 3.1, a courtyard typology supports community-oriented manufacturing. Entrances located in the central courtyard and transparency

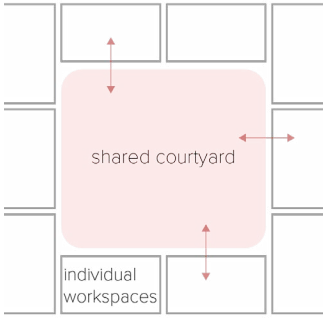

figure 3.1: Courtyard typology for community oriented businesses

between the courtyard and the business units ensure contact between the businesses—the shared space and transparency of each other support sharing and working together.

The approach of Wick Lane

Figure 3.4 shows the functional mix between working and living in Wick Lane. The program is broken down into several volumes. Two pedestrian streets split the volumes on the ground floor, and provide access to the dwelling units, see figure 3.5. The working spaces are located on the ground floor along the main street. The other side of the main street is industrial-oriented as well. Placing the residential volumes to the back creates a buffer zone between working and living to reduce nuisance.

The main street is activated and enlivened by various light-industry spaces; see figure 3.5 with the highlighted entrances. The landscaped areas, the pedestrian zone on the ground floor, and the elevated residential yards are designed to foster neighborliness (Hole, n.d.). The pedestrian zone in the front functions for the working people and the residents, and to the back, the pedestrian zone functions mainly for the residents. This pedestrian zone provides social encounters between the residents and the working people during the beginning and end cycles of the working day. That encourages a sense of belonging to the place. In addition, when residents arrive and leave, they walk past the working spaces. Being in contact with the production activities gives uniqueness and a sense of identity to the place, which fosters a sense of belonging between the residents and the working people.

figure 3.2: Render of Wick Land on street level (Hole, n.d.)

figure 3.3: Different materializations of Wick Lane (Hole, n.d.)

light industrial
residential

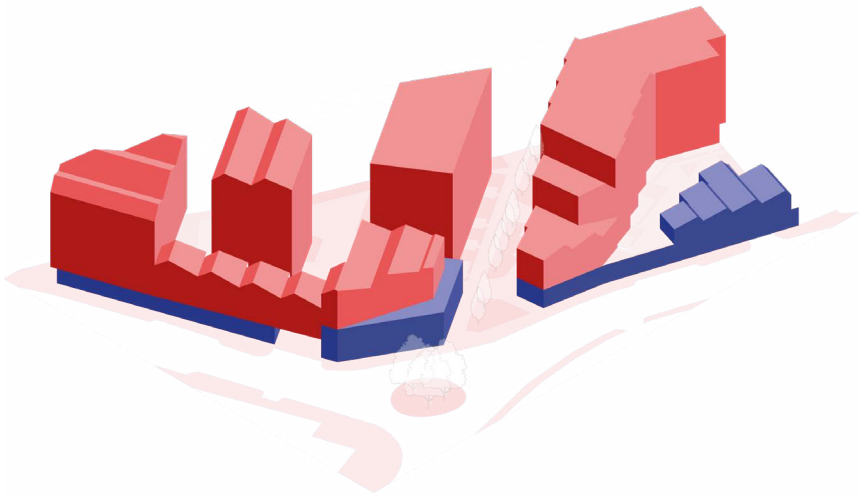

figure 3.4: Programmetic mix Wick Lane

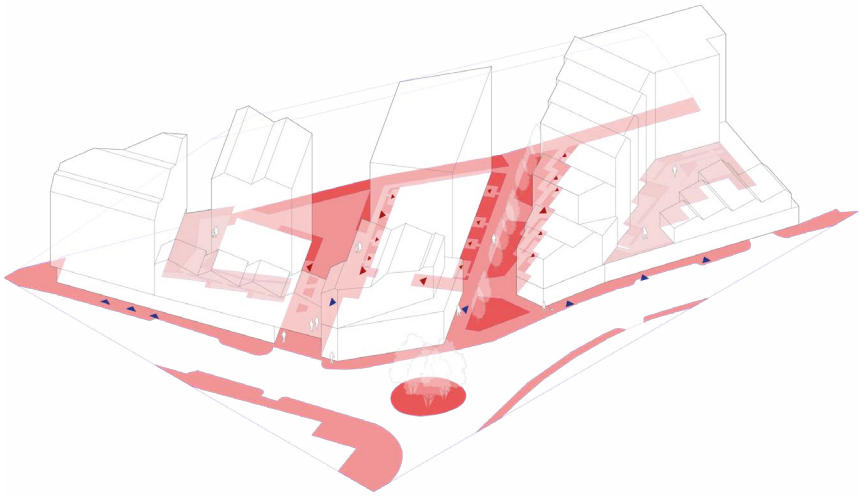

figure 3.5: Pedestrian zone Wick Lane

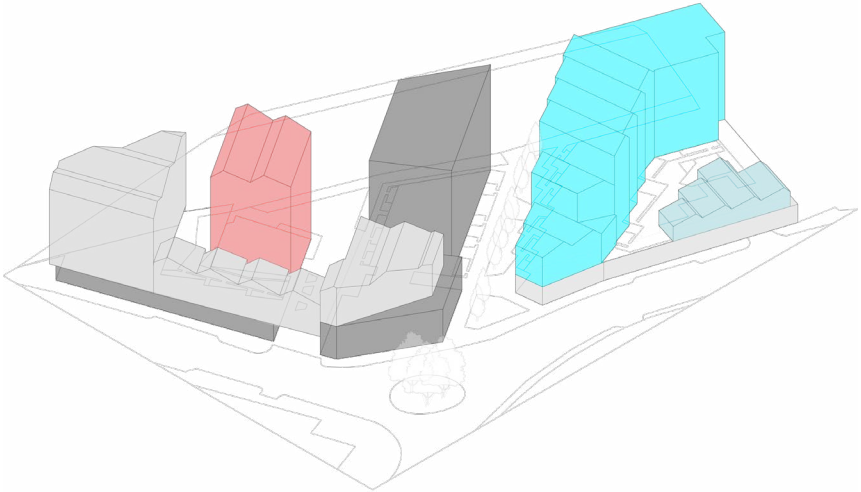

figure 3.6: Materialization Wick Lane

3.4 Place identity as a social connector

Lynch argued that a strong sense of place identity is essential for creating a positive image of a city and enhancing its residents' sense of belonging and attachment to their community (1960). It helps to differentiate a city from others by having a unique character. The uniqueness can be expressed through the city's cultural, social and physical aspects. That reflects the history, traditions, and values of the people and the environment (Lynch, 1960). A strong sense of place identity helps foster a sense of pride and ownership among residents. Place identity is important for the image of the city and neighborhoods. Neighborhoods should be recognizable and reflect the unique character and personality of those living there (Lynch, 1960). That, for example, can be achieved through a particular architectural style or a cultural identity that reflects its residents' heritage. A strong sense of place identity on the neighborhood scale is key in fostering a sense of attachment and belonging among its residents. It promotes a sense of social cohesion.

The place identity depends on multiple aspects, historical context, subjective factors, and external factors (Parente, 2015). Places change over time. The historical context is characterizable for places. Places are the scene of memories as well. This gives a subjective dimension to the place identity. The collective memory forms a source of place identity. External factors, accidental events, or unforeseeable circumstances can change place identification. They can change the way people approach a place.

Wick Lane contains a distinctive look. The volumes are different from each other materialized, see figure 3.2, 3.3 and 3.6. That gives each volume its own unique identity. The materializations refer to the vibrant history of the neighborhood:

“The qualities and characters that have defined the area have been celebrated within four building typologies that evoke the areas proud industrial heritage: a red brick 19th century mill building, 1930’s warehousing in black brick, a late 20th century cast glass aesthetic and a contemporary corrugated industrial shed. “ Philip Marshh (Hole, n.d.).

The different volumes’ architectural expression does not correlate with the mix of functions. That functions as a gesture to the different users to share the space instead of a clear distinction between working and living.

The different volumes form a coherent ensemble, which the shed roofs suggest. The feeling of belonging to the same place promotes a sense of social cohesion and supports the mix between working and living.

3.5 Pacemakers & rhythms

Rhythms take place when there is a repetition of movement in space and time. Pacemakers are a stable source of particular rhythms (Mulíček, 2015). They constitute the regular movement of people in space and time. Pacemakers include institutions, structures, and activities that set the timing for a given urban environment. There are two types of pacemakers, clock-time pacemakers, and event-time pacemakers (Mulíček, 2015). Clock-time pacemakers contain specific beginning and end times. Examples are working hours, train departures, and office and restaurant closing and opening hours. Event-time pacemakers are unbounded to beginning and end times. They are bounded to the duration of activities, like shopping sessions or a recreational walk in the park.

A diverse combination of rhythms is polyrhythmicity (Lefebvre, 2014). Multiple pacemakers at a single location result in polyrhythmicity. The intersection of rhythms is an opportunity for social encounters, contributing to the sum of casual public contact and is thus beneficial to public trust.

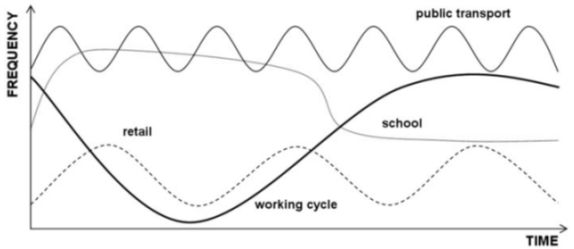

figure 3.7: Schematic representation of the diffusion of various rhythmicities (polyrhythmicity) of a given place. (source: (Muliček, 2015)

3.6 Translation to design

Making urban manufacturing visible is the principle for the mixed-use development along Keilehaven. A clothing recycling business is envisioned as an urban manufacturing business. Figure 3.8 and 3.9 shows the process of recycling used clothes into fibers. The fibers are raw materials for new garments. The masterplan contains three industrial halls, which are via the basement connected. Each hall takes part in the clothing recycling process, the first hall sorting, the second the process of clothing into raw materials, and the third hall making new garments of recycled fibers. Making this process visible contributes to the identity of urban development. Clothing recycling is a step toward the circular economy and replaces clothing production under dire conditions in underdeveloped countries (Bhardwaj et al.,2010). The clothing recycling industry brings a sustainable pioneering image to urban development. Sustainability is a reason for residents to be proud of urban manufacturing, strengthening the sense of place identity.

figure 3.8: Clothing recycling process

Most of the recycling process is machine work that happens under human surveillance. When making the process transparent, it is essential to show the in- and output of the several processes. This way, people can understand the overall recycling process.

Figures 3.10 shows the ground floor with the strategy to make the manufacturing process visible. The central transparent spine reveals the manufacturing process. The in- and output of the different processes are located near the central spine.

Smaller-scale businesses are located on the top of the production halls. The spatial configuration of the smaller-scale businesses is shown in Figure 3.11. It follows the courtyard typology to encourage sharing and working together. To be able to share and work together, the business must be in the same industry. The smaller-scale business units focus on the clothing industry, which aligns with the vision of making but also provides an opportunity for fashion artists. The Merwehaven district is known for its artist-oriented character. Businesses in this industry can be clothing repair, fashion designers, or second-hand shops.

The appearance of the development should strengthen the urban mix while still providing uniqueness to the different volumes to give the residents a fee-

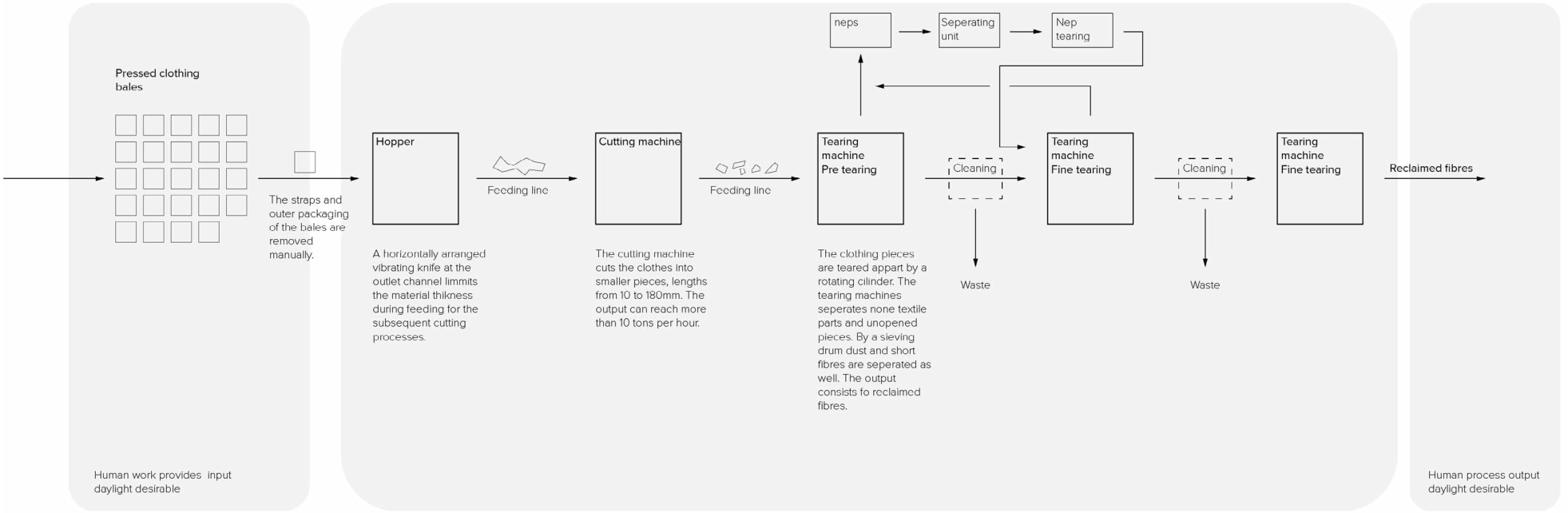

figure 3.9: Detailed clothing recycling process

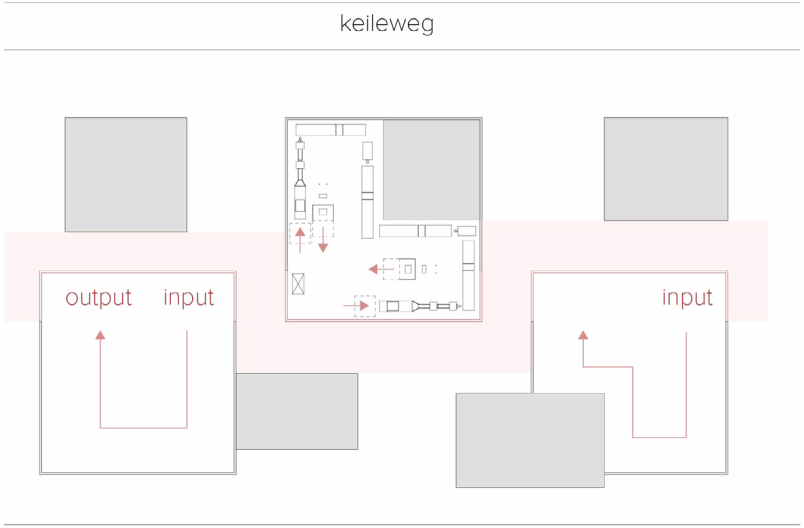

figure 3.10: Transparancy clothing recyling process ground floor

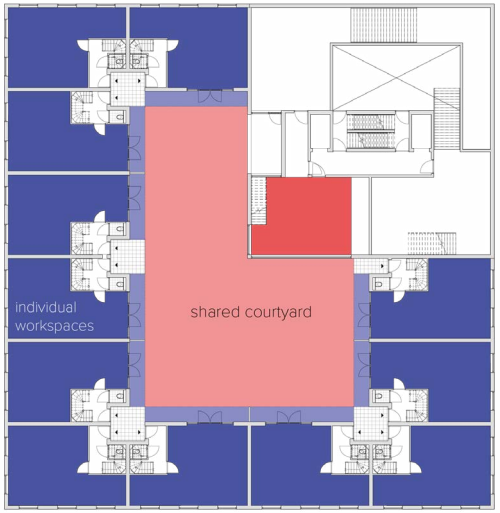

figure 3.11: Courtyard level with community oriented businesses

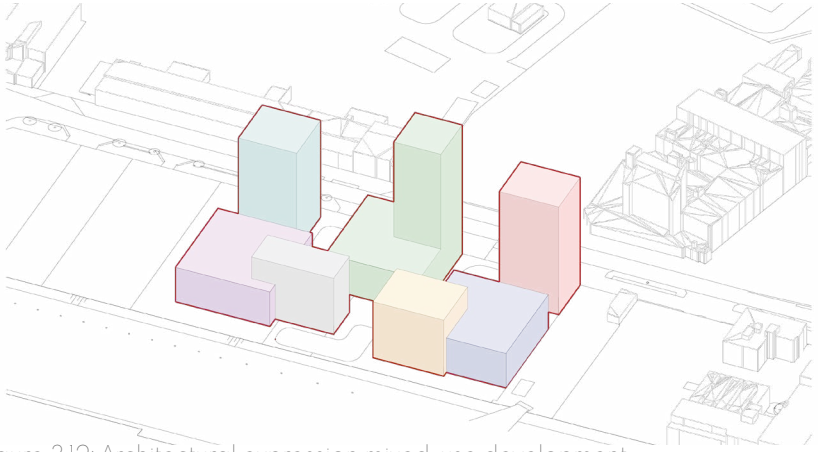

figure 3.12: Architectural expression mixed-use development

ling of home. A common architectural language is a connecting factor, where each volume materializes this language differently. The common language will be achieved by a similar approach to the composition of the façades, for example, by a clear distinction between plinth, body, and top. Common gestures between the residential and industrial volumes can bring the two different functions together to signify that they share this place.

Figure 3.13 shows an assumption of the daily rhythms driven by the different functions during a workday. The assumption is made with the help of the rhythm analysis of the Neighborhood Kralingen West and the research done by Mulíček (2015). Throughout the entire workday is, the presence of people expected. The morning and the late afternoon are the most opportunities for encounters between user groups. Letting them use the same pedestrian route, like Wick Lane, encourages public contact between users. As concluded in the previous chapter, this pedestrian route should contain spatial qualities to encourage and provide a place for social interaction.

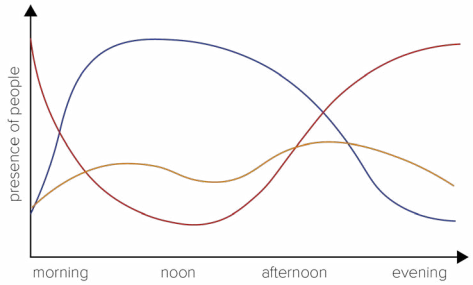

figure 3.13: Polyrhythmicity mixed-use development

4 Encouraging community building between residents

Multiple parts of residential development contribute to the social structures of the building, from the circulation of the building to collective spaces to the design of the entrance. Rotterdam's municipality promotes encounters between residents in high-rise residential development (Rotterdam, 2019). They acknowledge that encounter between residents is essential to prevent loneliness. This chapter elaborates on how residential buildings encourage community building. Kalkbreite is, through this chapter, used as a case study, as an example designed to promote social encounters and interaction between residents. In addition, the dwelling configuration of Unité(s), designed by Sophie Delhay, gives insight into a dwelling unit's social flexibility.

4.1 Sharing with the cooperative model

Dwellings should foster community building among residents (Block, 2009). A sense of connection is essential to lead a fulfilling and meaningful life. It benefits well-being and can reduce isolated and disconnected feelings that lead to loneliness and depression (Block, 2009).

The lack of building relationships between neighbors also limits learning from people with different cultures and backgrounds. Learning from people with different backgrounds could broaden the scope of each individual's bubble. Limitations in the interaction between residents can also adversely affect people's trust. When people do not know their neighbors, they are less likely to trust someone, which could hinder cooperation and collaboration (Klinenberg, 2018).

Sharing can be the driver to bring people together and encourage a sense of belonging, and form communities. Sharing property, labor, resources, and governance is the foundation of cooperative enterprises (Hirschberg et al., 2023). Shared spaces provide opportunities for people to connect. Residential buildings developed by cooperatives, such as Kalkbreite (Zurich), incorporate spaces that are only used occasionally as shared spaces (Genossenschaft Kalkbreite, 2020). These shared spaces benefit efficiency by minimalizing individual space in favor of common areas and function as the connector between residents. Shared spaces, such as playgrounds, shared gardens, and shared rooms, play an essential social role in residential settings. They provide opportunities for gathering and social interaction between residents. With those opportunities, it is more likely for people to build relationships. (Block, 2009)

The cooperative model is a type of business owned and run by its participants, who share resources to accomplish common goals. The cooperative model

provides economic stability. The rental prices do not compete with the market prices. Cooperatives prioritize people and the community and can therefore focus on sustainable and resilient communities compared to for-profit housing development.

Because cooperatives are community-oriented, it can be challenging for people to join cooperatives (Hirschberg et al., 2023). Members of cooperatives select new residents. They do not have to justify their selection. Jo Williams, professor of Sustainable Development at the Barlett School of Planning, mentions that communities can be diverse regarding interests, ages, religion, and household types but will mainly be homogeneous regarding affluence, race, and education (2005). Closed homogenous communities can lead to conflicts with other communities (Forrest et al., 2001). That can strengthen the polarisation of societies. The exclusiveness of cooperative communities is especially sensitive for places with diverse cultures, such as Rotterdam.

The objective of Kalkbreite is to aim for a social mix that correspondents with the mix of the Swiss population (Genossenschaft Kalkbreite, 2020a). The social mix includes a mix of age and life phases of income classes. Various dwelling types provide the opportunity for a social mix. The Kalkbreite Cooperative gives disadvantaged Households in the free housing market special consideration. Through a partnership with the Domicil Foundation, they sold five apartments to tenants who are disadvantaged in the housing market. The social mix does not focus on people with different cultural values.

Sharing space can be applied on different scales, at the neighborhood scale, the building, and the apartment (Hirschberg et al., 2023). The following sections outline the role of shared space for each scaling, starting with the neighborhood scale.

4.2 Adding value to the neighbourhood

Residential development adds value to the neighborhood by providing and supporting opportunities for casual public contact to encourage social interaction between residents (Hirschberg et al., 2023). Ideally, the open area around buildings becomes more than circulation routes or undefined open space. In addition, residential development can make functional space for its residents publicly accessible as places where residents can meet and gather. Playgrounds and community gardens are examples of spaces that can benefit the residents of both the building and the neighborhood.

Figure 4.1 shows the relation between Kalkbreite and the public environment. The plinth is mainly for commercial use, with restaurants, cafés, and a cinema. The commercial use extends over the street. Kalkbreite counts six residential entrances.

The elevated courtyard above the tram depot is open to the public during the day through the open staircase. The courtyard contains a children's playground, greenery (trees, shrubs, and other plants), and long benches. On the courtyard level is a childcare facility located. The playground can be used by the childcare facility, residents, and residents from the neighborhood. The residents can use the courtyard for various activities such as gardening, outdoor dining, and social events. The courtyard is designed to be an inviting space that encourages residents to gather and interact with each another. The courtyard adds value to the neighborhood by being publicly open during the day. It is a place for children from the entire neighborhood to play. The courtyard is a place for social interaction between residents of Kalkbreite and the neighborhood residents. This quality is driven by the childcare facility (similar to place 1 playground chapter 1).

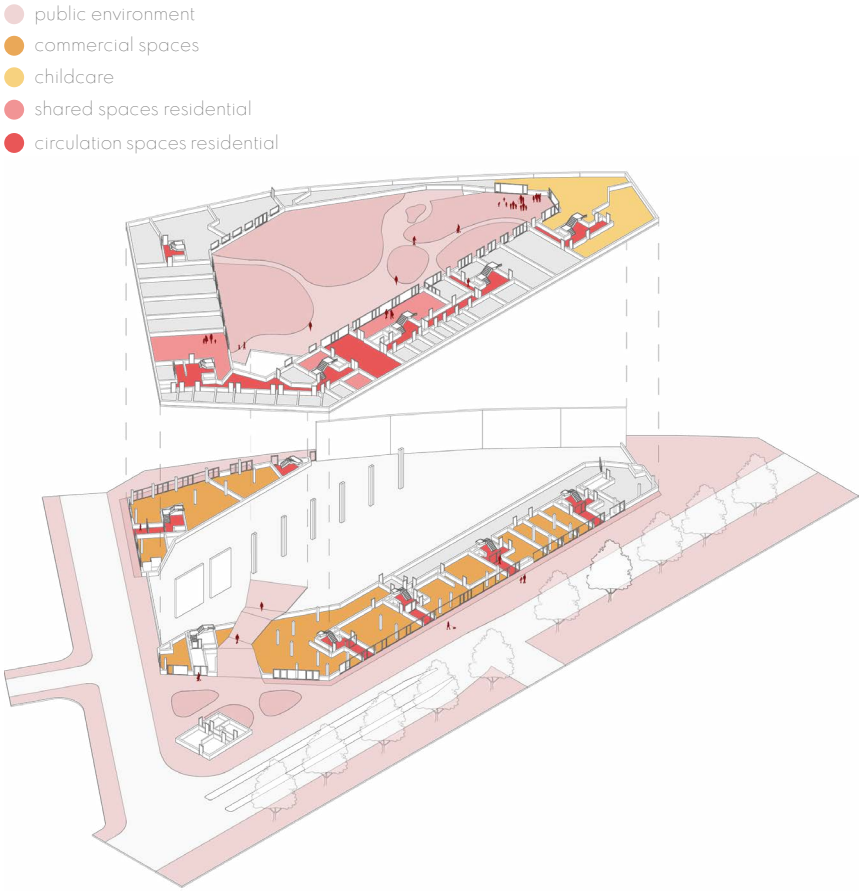

figure 4.1: Ground floor and courtyard level Kalkbreite

images Kalkbreite, by Martin Stollenwerk, Archdaily (Caballero, 2022)

4.3 The role of the circulation system and shared spaces

Williams researched how neighborhoods can be designed for social interaction (2005). She compared two contrasting cohousing case studies in California with key differences in design, personal characteristics, and the age of the community. One cohousing community (A) contained 31 residents (high-density development, row layout), and the other community (B) contained 67 residents (low-density development, clustering). Both residential developments are ground-based. These conditions differ from the higher-density development along the Keilehaven. Based on the case study Williams concluded several design aspects which affected the social structures (2005). These are, in combination with other literature, discussed in the following paragraphs.

Size of communities

The size of communities affects the willingness to social interaction. In large communities, people are less likely to interact with each other because they are unknown to each other. Tiny communities can result in other problems because of a lack of privacy (Williams, 2005). The clustering of community B into three smaller communities helped to increase interactions. However, there was no reasonable connection between the clusters. That resulted in tensions and conflicts between them. Williams argues that spreading different facilities to each cluster prevents tensions between clusters by facilitating regular contact between residents from different clusters.

Shared spaces and surveillance

A wide range of shared spaces and amenities provides gathering and social interaction opportunities between residents. These spaces include sewing ateliers, laundry rooms, party rooms, workshop rooms, and a sauna (Hirschberg et al., 2023). Cooperatives can provide these spaces by shrinking the size of apartments down. Smaller apartments mainly focus on basic needs and encourage residents to use communal space (Vestbro, 2000). An example is the laundry room (Hirschberg et al., 2023). The space for washing machines can be abandoned from the apartments. A shared laundry room becomes a central space within the building as a source of encounter and interaction between residents. That can be strengthened by spatial qualities as centrally located with visual connections to the main routes of the building.

After comparing the two cohousing settlements, Williams concluded that flexible indoor communal spaces, which were generally used for dining and socializing, were more used than designated shared spaces. Williams argues that opportunities for surveillance between residents are critical to the functioning of the community (2005). The ability to see others in communal spaces promotes a sense of community and allows them to observe others. It gives them a choice with whom to interact.

These spaces must contain strict rules governing their use regarding time slots, cleaning agreements, and the disciplinary actions to follow when these rules are violated. (Hirschberg et al., 2023) Communities must understand what is and is not permissible. A different point of view between residents can lead to conflicts. Situating shared spaces along the central circulation with visual connections facilitates surveillance and encourages a drop in participation (Vestbro, 2000; Williams, 2005).

Circulation space

The circulation space plays an essential role in the connection between residents. Cooperatives have given the example of designing circulation spaces that promote opportunities for encounter and interaction (Hirschberg et al., 2023). Different spatial conditions achieve this, for example, wide corridors with daylight coming in or expressive exterior galleries.

Kalkbreite's approach

One of the key factors that make Kalkbreite successful is the combination the circulation typology with the variety of shared spaces. Figure 4.2 shows the circulation spaces in combination with the shared spaces of Kalkbreite.

The building contains six vertical shafts with stairs and elevators. The six different staircases give the residents a sense of uniqueness to their part of the building. They can relate to a specific entrance that connects their home with the public environment. That is strengthened by the way the stairs are materialized. Each staircase has a unique color. It gives the staircases their own identity.

The different staircases are connected by a wide corridor that evolves over different stories. The wide corridor can be seen as the 'social spine' of the building. It connects the residents with the shared spaces throughout the building. The corridor runs through the entire perimeter of the building. It leads past the cafeteria, mailboxes, laundry room, library, and other shared spaces such as community offices, multifunctional rooms (for hobbies, workshops, meetings etc.), and the shared gardens on the rooftop. The walk between a dwelling unit and a shared space is an opportunity for social encounters. Residents walk past other shared spaces. The shared spaces are transparent to the corridor. The width of the corridor resonates with the social character. It invites social interaction when encountering other residents. The corridor thus functions as a social element between all residents, as an opportunity for social encounters. It encourages a sense of belonging among all residents.

When arriving and leaving the building, residents do not have to walk through the entire 'social spine.' A large number of staircases provide this opportunity. That allows residents to search for or avoid social interaction with other residents. The ability to choose for social interaction is essential for residents.

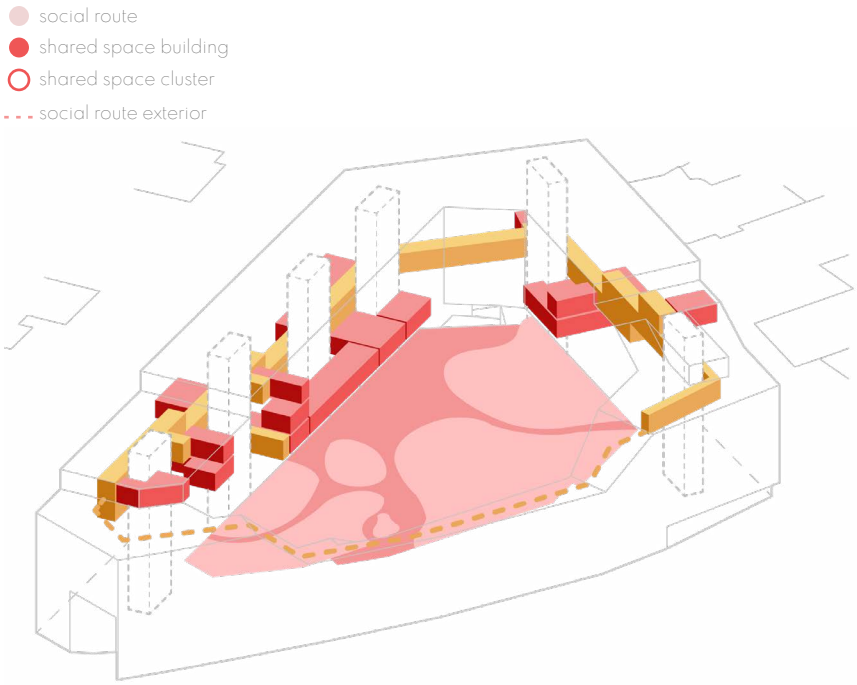

figure 4.2: Circulation and shared spaces Kalkbreite

Forced interaction can lead to tensions and conflicts.

The variety of shared spaces fulfills the different needs of different user groups. That resonates with the social mix Kalkbreite pursues. Kalkbreite is broken down into multiple smaller communities. The clustering is done by concentrating similar dwelling typologies with each other. The dwelling typologies differ from family apartments and flat-sharing communities to large households (around 50 residents share a common infrastructure). When households change, residents can switch apartments within the cooperative. That prevents under-occupancy and allows staying part of the community of Kalkbreite. (Genossenschaft Kalkbreite, 2020a)

4.4 Cluster living

Cluster living is a typology where a small group of households forms a community by sharing spaces, such as a living room and a kitchen while having their own private bedroom and basic facilities. This typology is mainly for people who seek close local connections with others. The shared living rooms and a shared kitchen require precise regulation and responsibility for their share of domestic tasks (Hirschberg et al., 2023). That counts from cooking and cleaning to mail distribution.

Cluster living in Kalkbreite

Kalkbreite contains different cluster living typologies. One of them is shown in figure 4.3. This cluster is designed for single-person households. Each studio contains a kitchenette, bathroom, and living space. The private dwelling units provide a place for the residents to retreat. The shared kitchen-living room serves the small community of nine studios and allows for gathering and interacting with other residents. In addition, two other shared rooms are attached to this part of the corridor. These are rooms that all members of the building can use.

This living typology aims for a mix of residents, with a balance between men and women, various ages, and people with different interests.

Cluster living is an important part of the overall Kalkbreite concept. It offers residents the possibility to live together and still be able to retreat to an individual private room. Each small apartment with a bathroom and kitchen is bigger and more spacious than a pure apartment room and offers sufficient possibilities to retreat. The kitchen-living room is shared with nine other one-person. The kitchen-living room allows people to cook and share meals, have dinner together, or socialize. The nine households can bond and form relationships. Kalkbreite aims to achieve a good mix of residents with various interests, ages, activities, and more, as well as a balanced number of men and women (Genossenschaft Kalkbreite, 2018).

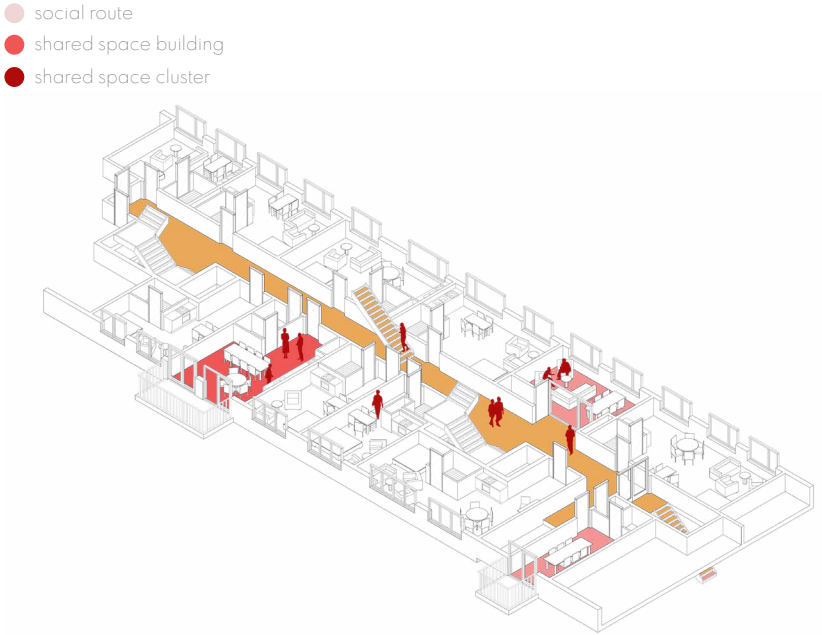

figure 4.3: Cluster Kalkbreite

Clustering is essential to break large groups of residents into smaller communities. These smaller communities are in Kalkbreite formed by the cluster living typologies. The more individual dwelling units, the bigger apartments for multiple-person households are also concentrated around each other but are not intended to form close communities. These households have less need to live in a close community with other residents. They have each other. The shared spaces that serve everyone bring all residents together, and all members of Kalkbreite form a community together.

4.5 Social flexibility within a dwelling unit

The social infrastructure can also be approached from the perspective of the dwelling unit, in particular for multiple-person households. The freedom for the users to choose to interact with their family members, or to retreat, gives people flexibility about their daily life activities at home. That is especially important for lower-income housing with limited available space. A flexible approach to activities in a room also benefits the users. It gives users the freedom to adapt their homes to their needs.

Conventional dwelling plans contain labeled rooms. That takes the freedom away from the user. The rooms are designed specifically for determined activities (Schneider, 2007). An alternative approach is eliminating room labels and designing the rooms for flexible use. This strategy starts with equal-sized 'neutral' rooms. The user could specify these neutral rooms. To achieve this flexibility, the rooms must fit different activities (living room, kitchen and dining room, bedroom, etc.). Therefore the standard-sized living room is slightly reduced while the size of the kitchen and bedroom increases. The dwelling layout of Grieshofgasse, designed by Helmut Winner, shows a possible dwelling configuration with 'neutral' rooms. With the responsibility of the configurations of activities by its users, apartments become multifunctional. Households

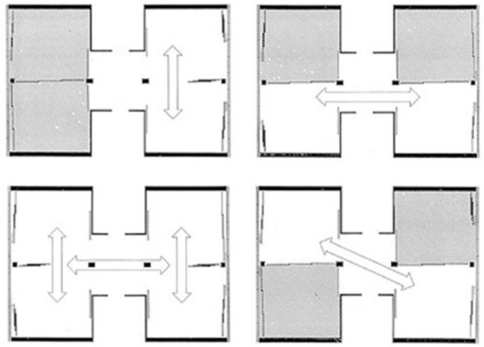

figure 4.4: Example of spatial configuration with 'neutral rooms' Grieshofgasse, Helmut Winner, 1996 (GmbH, z.d.)

with different needs can fit in the same apartment.

Dwelling unit of Unité(s)

The dwelling units of Unité(s) follow the neutral rooms principle. Figure 4.5 shows the standard dwelling configuration. Each dwelling contains a middle room that connects to the other rooms. The kitchen is in an open connection with the middle room. The surrounding rooms have the same sizes, 3,6m by

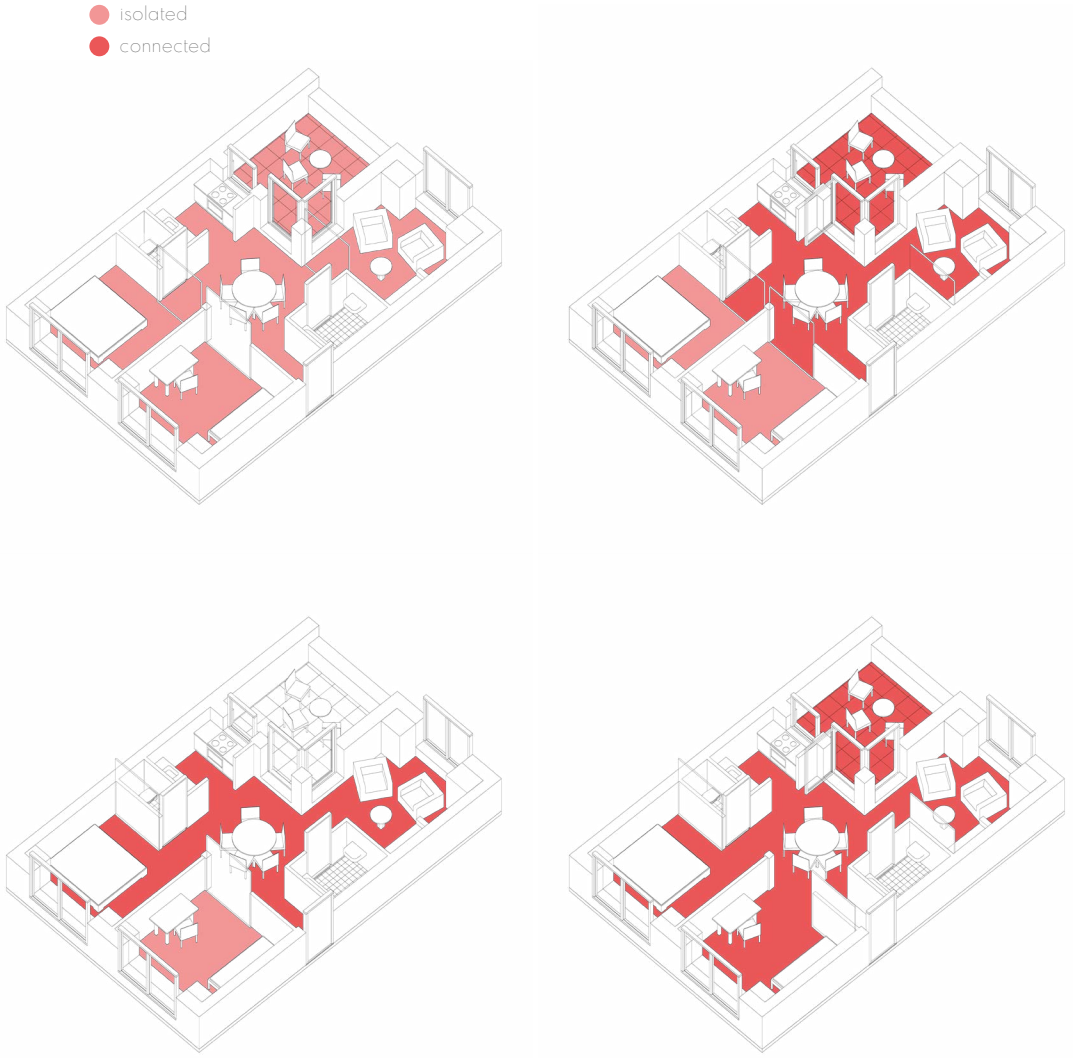

figure 4.5: Flexible dwelling unit Unité(s)

Unité, designed by Sophie Delhay, images by Bertrand Vernay Photographe, Archdaily (Luco, 2022)

3,6m. The rooms can be furnished as living room, bedroom, workspace, etc.

A sliding door can open and close the surrounding rooms towards the middle room. The users have the freedom to involve each room separately to the middle room, to be able to interact or disconnect with each other. When reading a book, someone can retreat to the living room and disconnect themselves from the rest of the dwelling. When cooking and watching tv, the living room can be opened up to interact with each other. When working, the user can close the sliding door. The sliding door, combined with the configuration of spaces, makes this flexibility possible.

4.6 Translation to design

The cooperative model has several benefits for the residential development alongside Keilehaven. However, it is essential to consider that the cooperative model will result in exclusive communities, most likely with people from similar backgrounds. It is important to consider for which social group the cooperative will function. The sharing characteristics benefit people with less economic and social capital the most. Cooperatives can provide social benefits and spatial needs that were otherwise out of reach.

Adding value to the neighborhood can be done by incorporating space that is publicly accessible, like the courtyard of Kalkbreite. The urban development of Keilehaven contains an elevated courtyard as well. However, this courtyard is surrounded by community-oriented businesses. Tower one contains a library. The library is an institution that is of value to the residents of the entire neighborhood. It works simultaneously as a connection between the employees and the residents of the residential development. The library can become a place that connects residents and fosters a sense of trust on a bigger scale. The freestanding tower contains an elevated playground. If the cooperative makes it publicly open during the day, it adds value to the neighborhood. That requires a form of regulation.

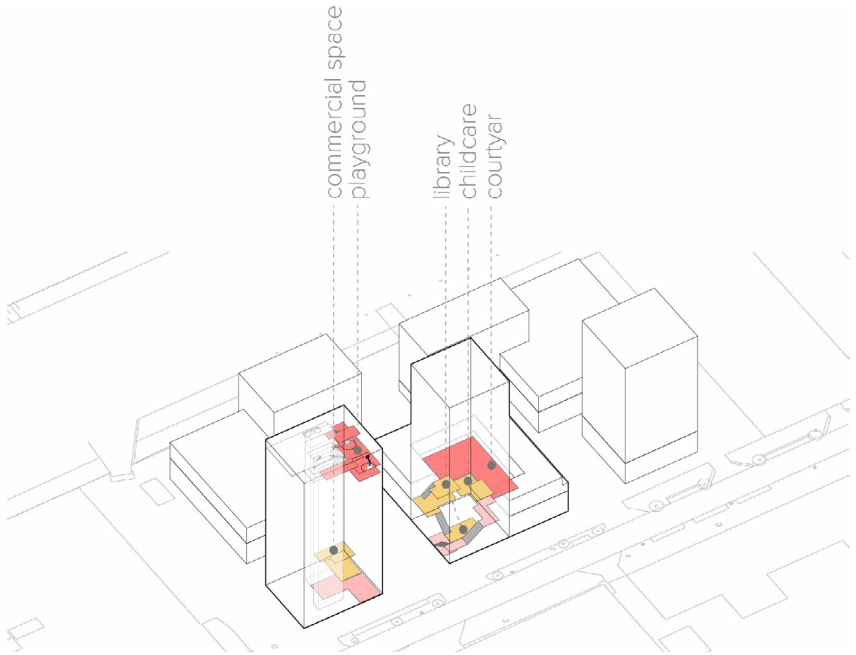

figure 4.6: Value to the neighborhood mixed-use development

Community building is the starting point for designing residential buildings. Tower A aims for lower-income households who benefit from close social connections. In particular, single-parent families could be other households needing close social connections. The cluster typology is suitable for this specific user group. With efficiently configurated basic dwelling configurations, shared facilities are encouraged. Each floor contains two shared spaces, one functions as a shared kitchen that serves the households on that particular floor level, see figure 4.7 and 4.8. The other is multifunctionally oriented and is two stories high to serve the households on two floors. That creates communities consisting of six to eight households.

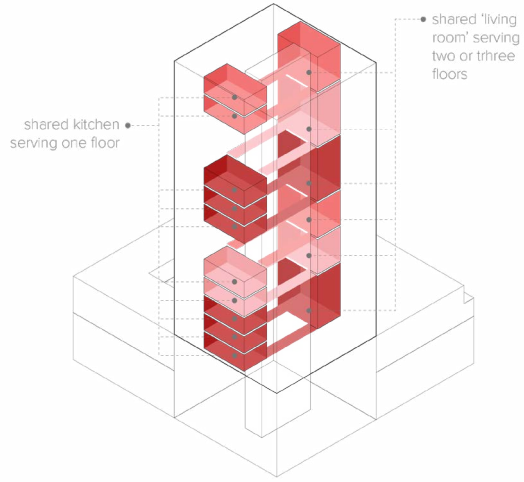

figure 4.7: Shared spaces of cluster living tower A

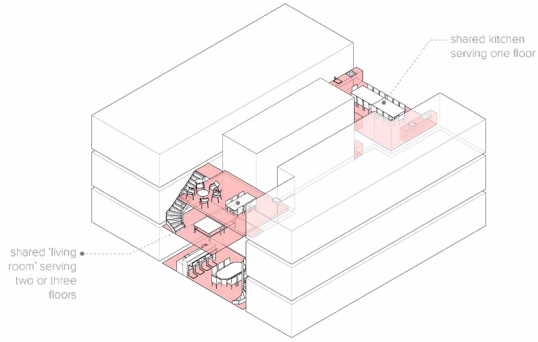

figure 4.8: Shared spaces cluster tower A

Tower B focuses on a diverse individual household living typology. The building contains an open circulation space with lofts. This openness promotes encounters between residents. The building is split up into smaller clusters to form smaller communities. Each cluster contains multiple-use shared spaces, specifically for the households within the cluster, see figure 4.9 and 4.10. In addition, shared spaces for specific functions, such as a laundry room, are spread throughout the building. These functions are accessible from the open circulation space. The open circulation space provides surveillance for shared spaces to function correctly. These shared spaces encourage social encounters between residents from different clusters. The different clusters are focused on specific households, such as families, starters, retired couples, or mixes of types that fit each other.

figure 4.9: Schematic section tower B

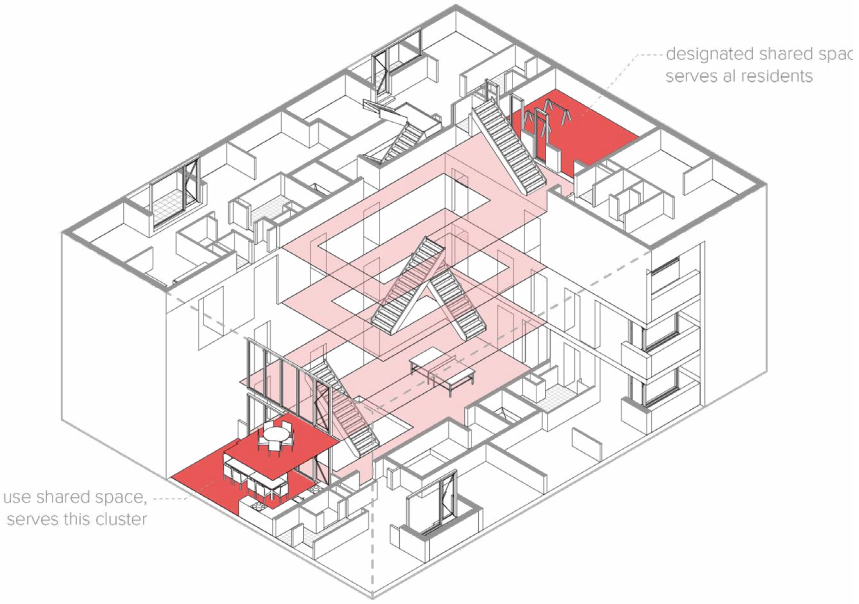

figure 4.10: Shared spaces with open circulation tower B

The configuration of the apartments provides flexibility for the user—the flexibility of use but also social flexibility during the different daily activities, see figure 4.11 and 4.12.

socially flexibel spaces
connecting spaces

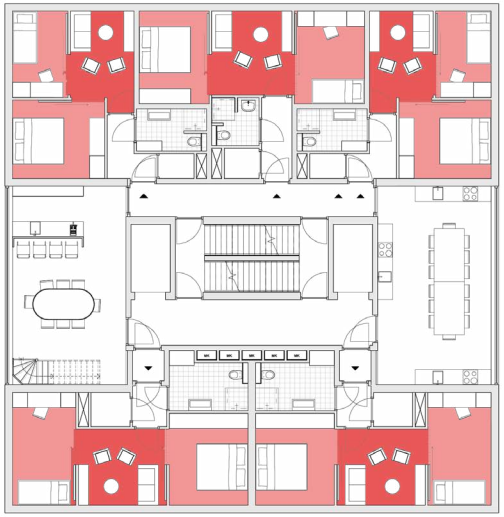

figure 4.11: Floor plan tower A

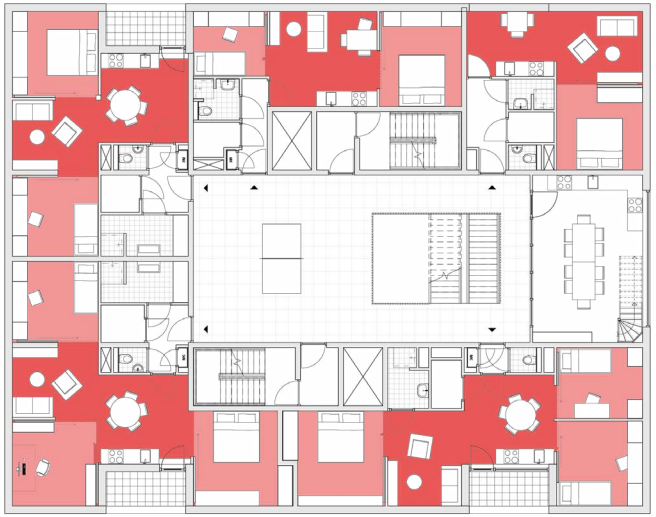

figure 4.12: Floor plan tower B

5 Conclusion

The social infrastructure, seen as the sum of places where people encounter, interact and gather from the scale of the neighborhood to the residential building, is essential in building resilient communities. That is especially important in multicultural contexts, where a lack of solidarity between people leads to tensions and conflicts. Different aspects of the scale of the neighborhood, building block, and residential building play a crucial role in fostering a sense of social cohesion among various user groups.

Fostering social cohesion through public amenities

The public amenities in Kralingen West provide a connection between residents. They are the connector between different social groups who share the same neighborhood. That is especially important for a neighborhood home to a multicultural neighborhood. Several types of public amenities promote a sense of social cohesion.

Playgrounds are critical for residents' social interactions, especially playgrounds that a childcare or primary school supports. These playgrounds provide a suitable place for children to play and for adults to interact. The playgrounds mix cultures, and children from various backgrounds play together. That encourages social encounters and interaction between their parents and thus plays an essential role in the sense of belonging.

The layout of dwellings is important to foster a sense of social cohesion. When residents can see their neighbors arriving, leaving, or throwing away their garbage, people become familiar with each other. That is essential to build trust and lower the threshold for residents to interact with each other. Front doors and facades facing the street and an open public area provide transparency between households.

Public institutions and facilities are a driver for casual public contacts. It is important for public institutions (for instance, the mosque) to provide suitable space for social interaction. These are places where people regularly go and form social connections with each other.

Public facilities play a minor role in facilitating social interaction. It can happen by coincidence (social interaction 5, for instance). However, public facilities are essential for casual public contact. They attract the entire neighborhood and are thus crucial to building trust between different social groups.

Specific spatial conditions resonate with social interactions. People like to have an overview and shelter and do not want to stand in the way of others. Places with these qualities tend to be more successful in providing opportunities

for social interaction. Another critical quality is a sense of safety. Eyes on the street and the presence of people (by being part of a route) are essential to the public environment's safety.

Encouraging a sense of belonging in mixed-use developments

When mixing functions in an urban setting, it is essential to encourage a sense of social cohesion between the different user groups. Tensions will otherwise build up by every form of nuisance. That is especially important when combining light industrial functions with living. Residents have to be resilient to the living conditions that industrial activities bring to the place. Smart design decisions cannot (and should not) mask away the presence of industrial activities to prevent any form of nuisance. In addition, it is important to prevent imbalanced mixes on an economic basis. Lower-income residents are most likely not to accept urban manufacturing serving wealthier groups. Multiple strategies can promote belonging and encourage social cohesion between different user groups.

Showing the activity of urban manufacturing strengthens the place identity. It is important to make the manufacturing process transparent. The manufacturing should be environmentally friendly, and residents will otherwise not accept urban manufacturing. Urban manufacturing has a large share in the image of the urban area. A sustainable urban process provokes goodwill and is the foundation of the urban mix.

The architecture has to strengthen the urban mix. It has to promote and embrace sharing the place between different user groups. A common architectural language can do that as a gesture to promote a sense of belonging and being part of the same community. The architecture should, at the same time, provide uniqueness to each part of the development. That gives users the ability to distinguish their parts.

The sum of public contacts between the different user groups is essential to promote a sense of social cohesion. A central pedestrian area, where the different user groups encounter each other during the intersections of the daily rhythms, provides the opportunity for an encounter. Designing the main pedestrian area with spatial conditions that resonate and encourage social interaction is essential.

The sum of encounters between the different user groups, sharing a common place identity that is strengthened by the activity of urban manufacturing and recognizable in the architectural expression, provides the foundation for the urban mix by promoting a sense of social cohesion.

Designing for Community Building in Residential Settlements

With different design strategies, community building within residential settlements can be encouraged. Shared spaces provide opportunities for residents

to gather and interact. Shared spaces can fulfill different functions. Daily activities, such as cooking or having dinner, are suitable for smaller groups. Designing shared spaces for multiple uses benefits the intensity of use. The multiple-use shared spaces can be attached to specific households as a cluster. More specific activities, such as a laundry room, can function for larger groups of households. These kinds of shared spaces can bring households from different clusters together. That is essential to prevent closed communities, which could lead to conflict between communities.

In order for shared spaces to function, social surveillance is necessary. Shared spaces being transparent to the main circulation system is therefore essential. The circulation system becomes a place for social encounters when it functions as the connector between the dwellings and the shared spaces. Designing the circulation system as a pleasant and open space, which correlates with socializing with neighbors, encourages and promotes social interaction.

The social infrastructure can also be approached on the scale of a dwelling unit. Designing flexibility for users, when to socialize and when to retreat, is essential for lower-income households with limited dwelling sizes. A space configuration where spaces can be opened to each other to work together as one space and spaces can be closed with the help of big openings and sliding doors provide the desired flexibility to the user.

Publicly accessible spaces provide value to the entire neighborhood. Residential developments can incorporate shared spaces in the form of a playground, shared garden, or other spaces collectively used by the neighborhood. Places like these have the opportunity to bring residents from the entire neighborhood together, which promotes a sense of social cohesion on a bigger scale.

A cooperative model is supportive of residential development to build communities. They can incorporate shared spaces, generous circulation systems, and composite smaller dwellings. The cooperative model gives this ability because its participants own it. They have the main common goal of qualitative living, compared to for-profit organizations with the primary goal of earning money.

Mixed-use: the driver for social inclusion

The mixed-use development along Keilehaven positively contributes to the aim of social inclusion. The development brings different social groups together. Encouraging public contact by a shared pedestrian area, including public amenities where people encounter and interact, and transparency of urban manufacturing to strengthen a shared place identity are all essential strategies to build resilient communities. By utilizing these strategies, urban areas can bring people of different backgrounds together and create a sense of belonging and trust among residents, ultimately leading to a more resilient and harmonious society.

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Part 2
Design

Rhytms to Encounter

Shaping social infrastructure to encourage synergies between working and living

Siem Kos

MSc Architecture
TU Delft

20 June 2023

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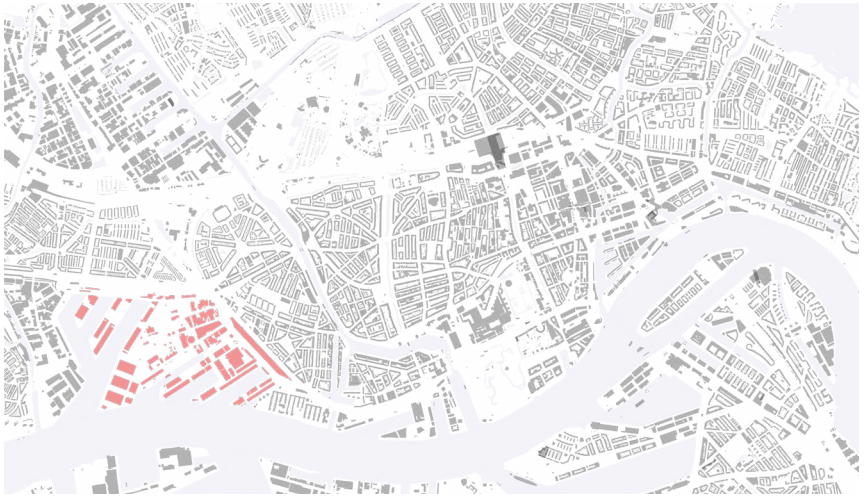


figure: Merwehavens

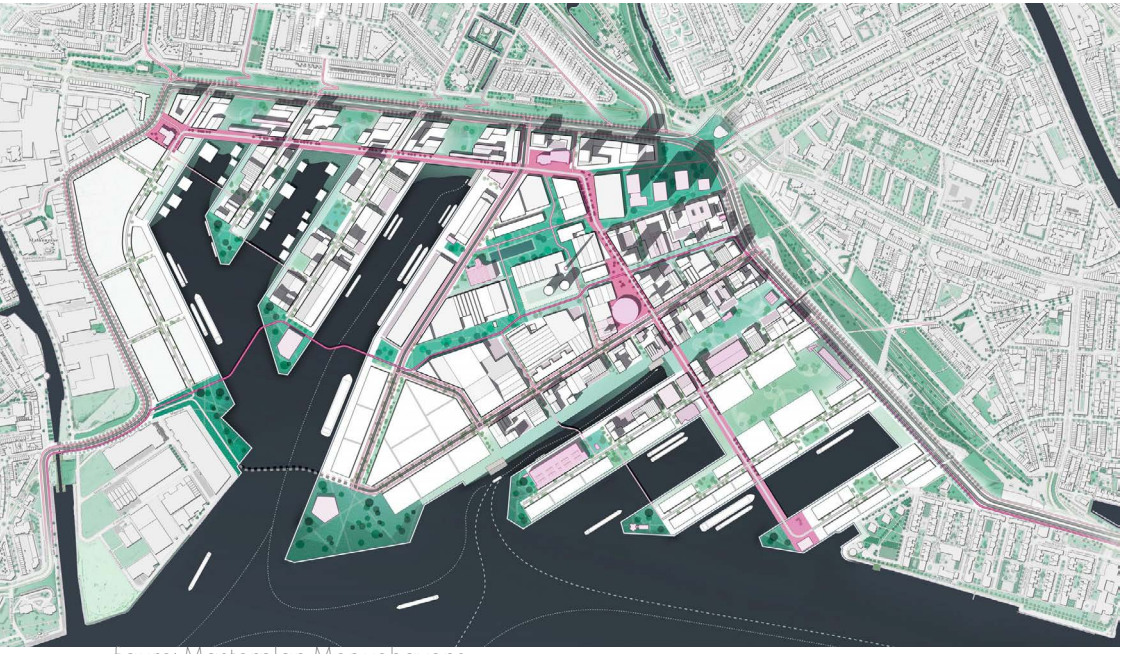


figure: Masterplan Merwehavens

1 Context

M4H is a former industrial area located west of Rotterdam and is the starting point for a new urban district. The plans focus on a mixed-use development combining living, working, and recreation. The harbours are not in use as it was before, as place for transfer of goods between water and land. M4H was mainly known for the transfer of goods, it was also called fruitport.

The area currently contains warehouses for long term storage, DIY store, retail, nightlife facilities, and small businesses. The area does not contain residential settlements. The masterplan visions a combination of the making industry with residential settlements, an urban mix. The urban mix has several benefits. First it is part of the solution towards spatial segregation. Labour markets are in most western European markets driven to the peripheries of cities, while service oriented businesses are concentrated in and around the city centres. In addition, an urban mix contributes to a healthy urban fabric. An urban mix follows the chrono-urbanism principle, where all functions of daily life are in a range of walking and cycling distance. This encourages the use of improbability and decreases the use of cars. People spent less time traveling and public contacts between residents will rise. This is beneficial for the public trust and a sense of social cohesion. The presence of manufacturing businesses contributes to the place identity and encourages a sense of social cohesion. However, this could not be taken for granted. A disbalanced mix on economical basis could result in conflicts. A disbalanced mix could for example be the production of higher end consumer goods and lower income households. Mixes like

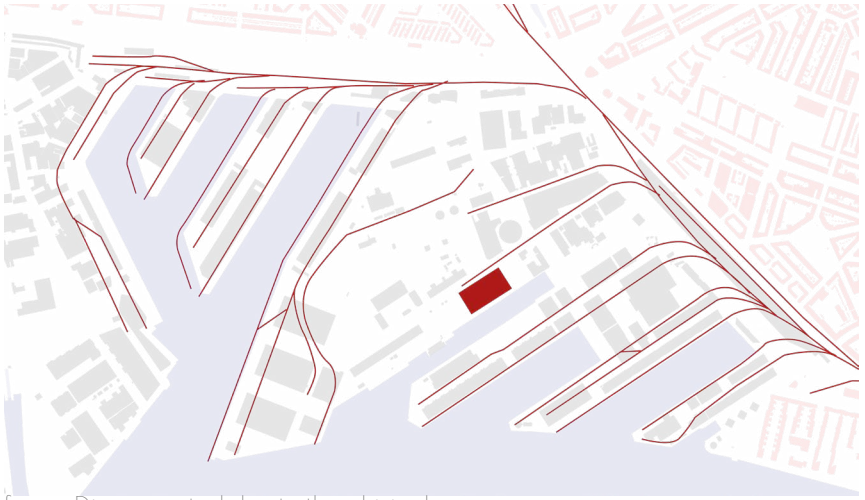


figure: Disconnected due to the phisical gap

this are vulnerable to conflicts. The presence of urban manufacturing can not hide its presence and will contain forms of nuisance. Transparency of sustainable manufacturing processes is key to for the acceptance by its residents.

The area feels disconnected from the surrounding neighbourhoods. Wide open spaces, which previously contained railway tracks, creates a physical border between M4H and the surrounding neighbourhoods. This is can be used as an opportunity, to strive to a place with a micro-environment and its own identity. Mixed-use contributes to the micro-environment, with all daily needs on walking and cycling distance. The second primary use, working, contributes to the identity of the place.

The masterplan does not contain improvements on public transport. A threat could be that the area will become car dominated. To prevent that, human powered transport should be encouraged. Mixed use with daily needs on cycling and walking distances is therefore a starting point.

figure: Hubs for car parking

M4H has currently a lack of green spaces. Green spaces helps to make the area attractive for users, and is especially important for residents who use the area most intensively. There is planned to add a green veins in the area. Within the Keilehaven is a tidal park planned. The residential settlement could be an extension of this park. To contribute to the biodiversity of the area and to make the area more attractive for its users.


figure: Green spaces Merwehavens

This map shows the difference between scale of M4H and the surrounding residential settlement. The dwellings are small compared to warehouses and industry (making) oriented functions. The masterplan asks to combine both functions. The difference of scales is a challenge when combining both functions. In particular when both functions benefit from being related to the ground floor. When residential functions are detached from the street life, it will be a threat to the liveability of the street. The streets will most likely become unpleasant and dangerous.

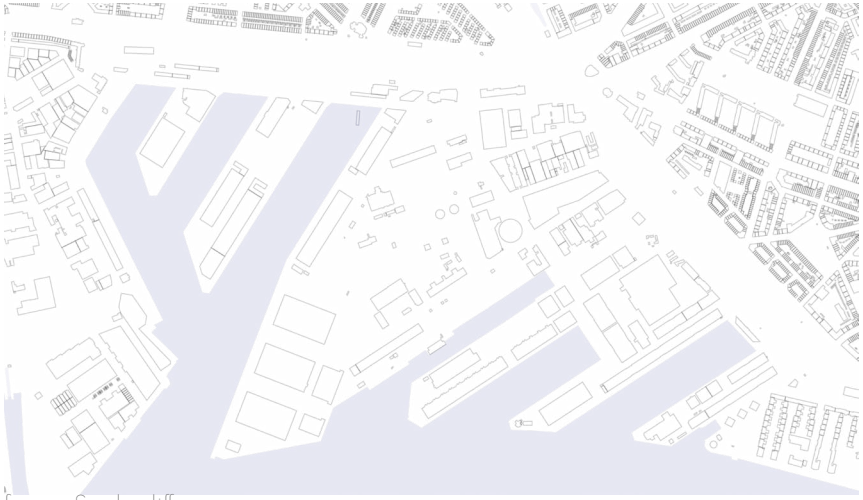
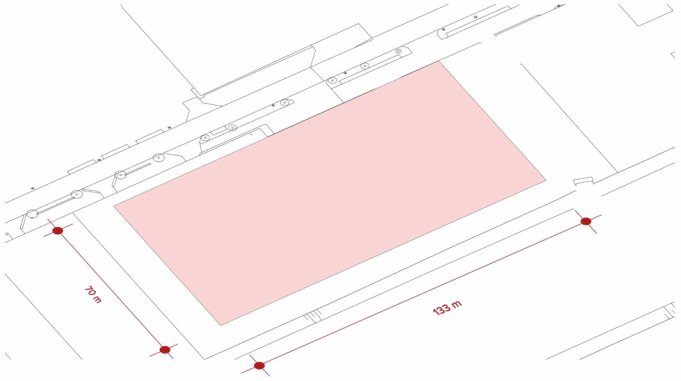


figure: Scale difference

2 Masterplan

The plot is located along the Keilehaven. The programme exists of production space, residential development and facilities. The volume of the programme combined approximately equals 5 times the size of the plot. All functions need to be related to the ground floor. The manufacturing business needs the ground level for the supply and export of goods. And the residential functions in combination with the facilities are needed to be related to the ground floor to create lively and safe streets. To achieve this people need to be present throughout most parts of the day. In addition the manufacturing spaces have to big, to be suitable for larger scale manufacturing activities. This clashes with the residential settlement.



27.000 m² residential
17.000 m² production
3.500 m² facilities

47.500 m² total

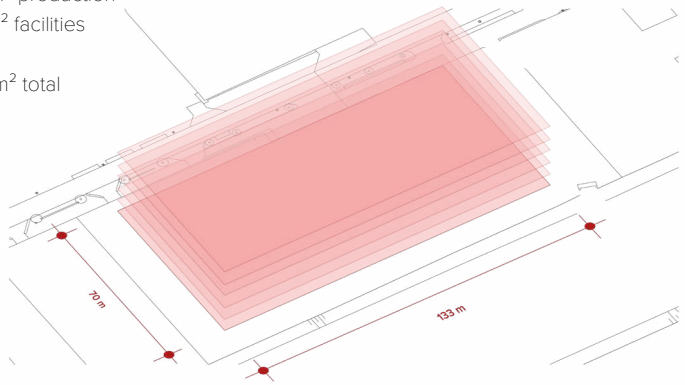


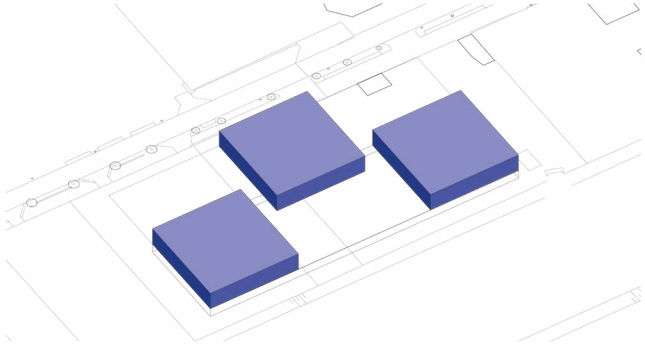
figure: plot and scale of the programme

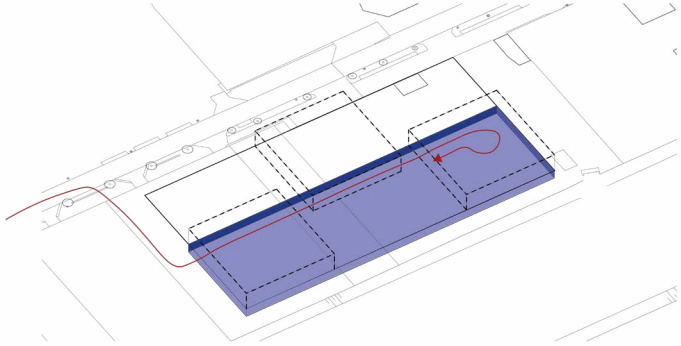
The manufacturing space is divided into three medium sized boxes, in between these boxes there is space for the required street life. The manufacturing boxes are combined by a basement. The participated manufacturing spaces could function combined and separate for each other. On top of the boxes work-live dwellings are located, which functions for small scale businesses.

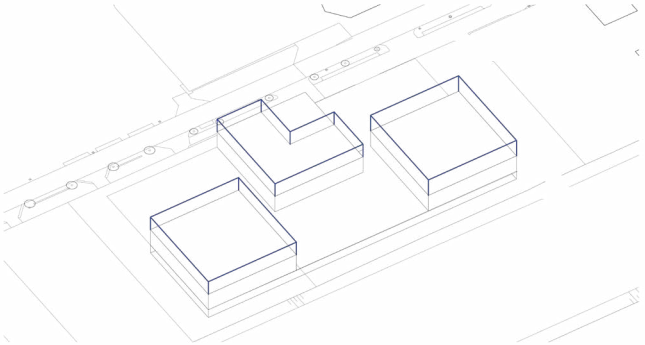
In and around the manufacturing boxes are the residential volumes placed. The residential volumes contain three higher towers towards the Keileweg and two smaller volumes along the harbour.

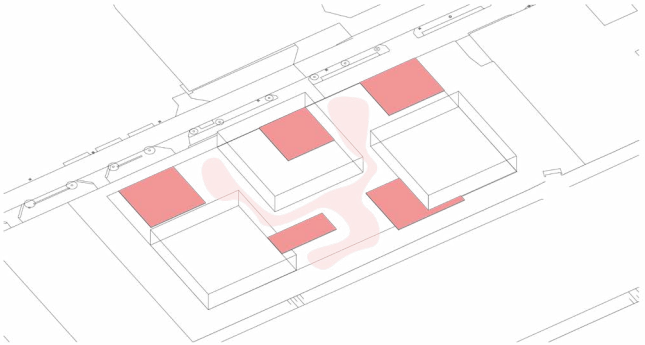
The facilities will be located in the plinths of the residential volumes to activate street life on the open areas in between the volumes. With this configuration three main open areas appear which are connected by narrow open spaces.

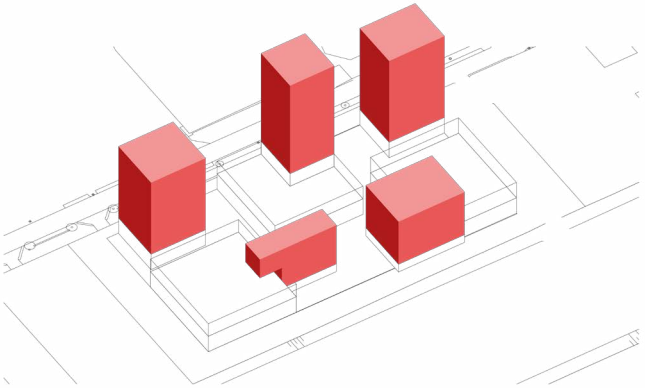
figure: Masterplan step by step

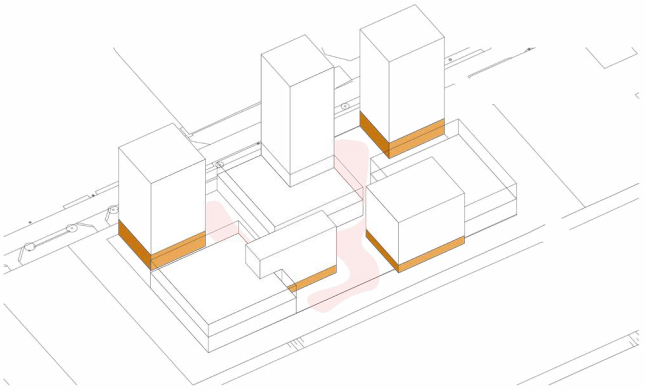


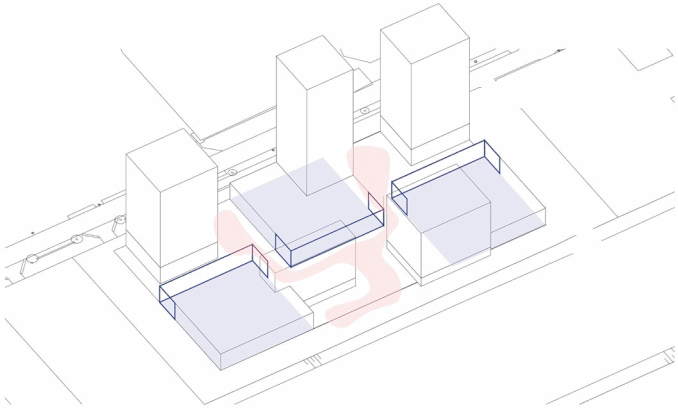








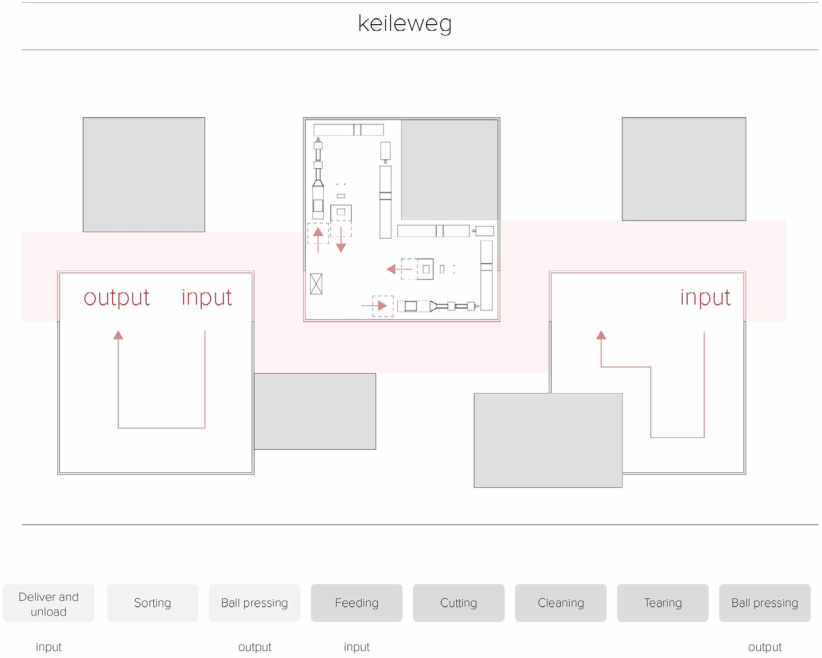




Transparency of the manufacturing activities is key for the acceptance of the urban mix. Therefore the masterplan contains an open axis. An axis that is transparent to the street, from where people can see and understand the manufacturing activities.

An unbalanced mix could result in tension and conflicts. An urban mix requires a careful mix between household groups and industry activities. The masterplan envisions a clothing recycling industry. Clothing recycling industry has a sustainable character by reducing waste, but at the same time replaces the clothing industry in developing countries which happen under poor circumstances where human rights are violated. The smaller businesses are as well oriented to the fashion industry. These activities contribute to the place identity and encourage a sense of place attachment.

figure: Ground level scheme with transparancy of the manufacturing process



3 Research translation

The research focused on how the social infrastructure could contribute to a sense of social cohesion among residents. The research contains different methods, investigations and analysis on different scales, from the scale to the neighbourhood to the scale of a single dwelling.

The neighbourhood Kralingen West in Rotterdam is analysed to get insight into the social infrastructure on the scale of the neighbourhood. The social infrastructure can be divided into pubic institutions, public environment, events and third places.

During participant observation in the neighbourhood I spotted several encounters in the public environment. Those encounters happened on different types of places, public squares, street/sidewalk, and around public institutions/facilities.

The public squares and playgrounds are central spaces within the neighbourhood that attracts children to play. The public playground in Kralingen West with a childcare facilities attracts both children and adults. The playground is an age-inclusive space where people encounter, gather and interact. It functions as a central space within the neighbourhood where all kind of residents connect.

The streets within the neighbourhood generate public contacts between residents. People who encounter make eye contact, may say hello or get into a conversation. The sum of these casual public contacts encourages public trust and contributes to a sense of social cohesion between residents. The sidewalks plays an important role in shaping a robust and healthy community.

Public facilities and institutions are the driver for social encounters and interaction between residents. Facilities activate street life and therefore contribute to vibrant streets. Public facilities are also a source of public trust. The people who run these facilities come in contact within a wide range of residents of the neighbourhood, the function as a public figure. Public figures are people who can be trusted by the residents and function as spreader of local news. Public figures contribute to a sense of belonging to the neighbourhood and encourage a sense of social cohesion.

These different aspects operate on the scale of the neighbourhood. Kalkbreite is analysed as a good example of a building where a sense of social cohesion among residents is encouraged by its social infrastructure. The building contains a public courtyard with a childcare facility, which functions similar as the public square in Kralingen West. Encounters, interaction and gathering be-

tween residents of Kalkbreite in encouraged by the implementation of a social route in combination with shared spaces. The social route, which is an circular route, connects the different shared spaces. The shared spaces vary from shared kitchens, living rooms, multifunctional boxes to designated spaces such as a sauna. The quality of the social route can be compared with the qualities of the sidewalks in the neighbourhood. It is a place where residents encounter. The shared spaces can be seen as the equivalent of public squares in the neighbourhood, as a place where people gather and interact with each other. This combination is key to a high sense of social cohesion between residents on the scale of a residential development.

Wick lane is analysed to get insights into synergies between working and living. The ground level functions as the meeting point between both functions. This encourages a sense of sharing and contributes to a sense of social cohesion between both functions. The architectural expression plays with the urban mix, the mix of functions do not correspond with the different facades. Both functions sharing the same architectural expression is a sign for sharing. This contributes to the acceptance of the urban mix.

The social infrastructure can also be approached from the scale of a single dwelling unit. The central rooms of Unité(s) functions as a divider between the surrounding spaces. The surrounding spaces can be opened to the central space to form one space and can be isolated from the dwelling by the sliding door. The central space can be seen as a tiny square within the dwelling unit, a place for social interaction and gathering between the family members. The ability to connect the surrounding spaces to the central spaces gives the user the freedom to interact with or isolate from their family members depending on the rhythms of daily life.

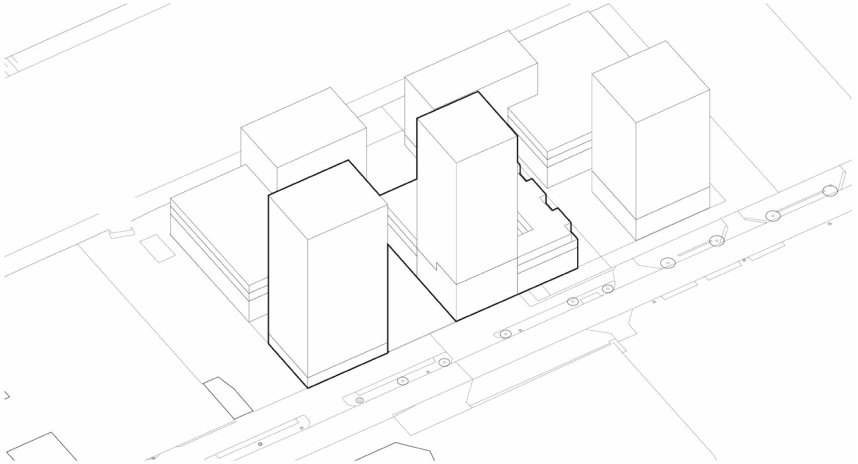


figure: Part of masterplan

Part of the masterplan that I design consists of residential towers. Howe could the social qualities of the neighbourhood and the case studies implemented into the tower typology? Which is traditionally an isolated form of living with an efficient core and individual dwellings around. Where residents are most of the time are not familiar with each other.

The analysis on different scales are contain the similar types of places. Those are squares, places where people meet and interact, streets, places where people encounter and public facilities which drive street activity and are important for the role of public figures.

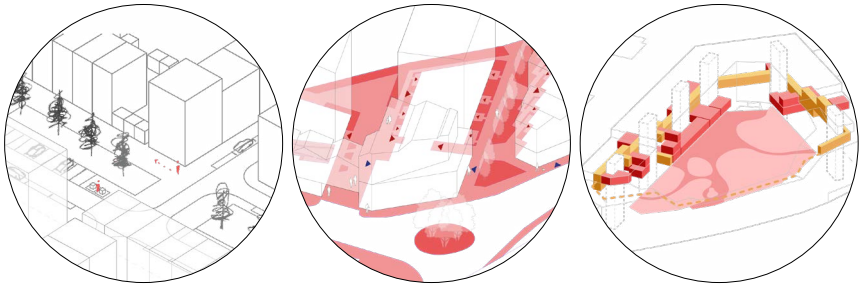
Square

Street

Public facilities

The street can be seen as a place where people encounter and may interact with each other. The circulation system is the equivalent of the street on the scale of a residential complex. To translate this into a tower typology the core can be opened op to have an open vertical circulation system. To encourage encounter between people. This could work in combination with shared spaces like combination in Kalkbreite. A second strategy can be to concentrate daily life activities on the ground floor. A daily life activity, like throwing away garbage can become a social moment.

Street



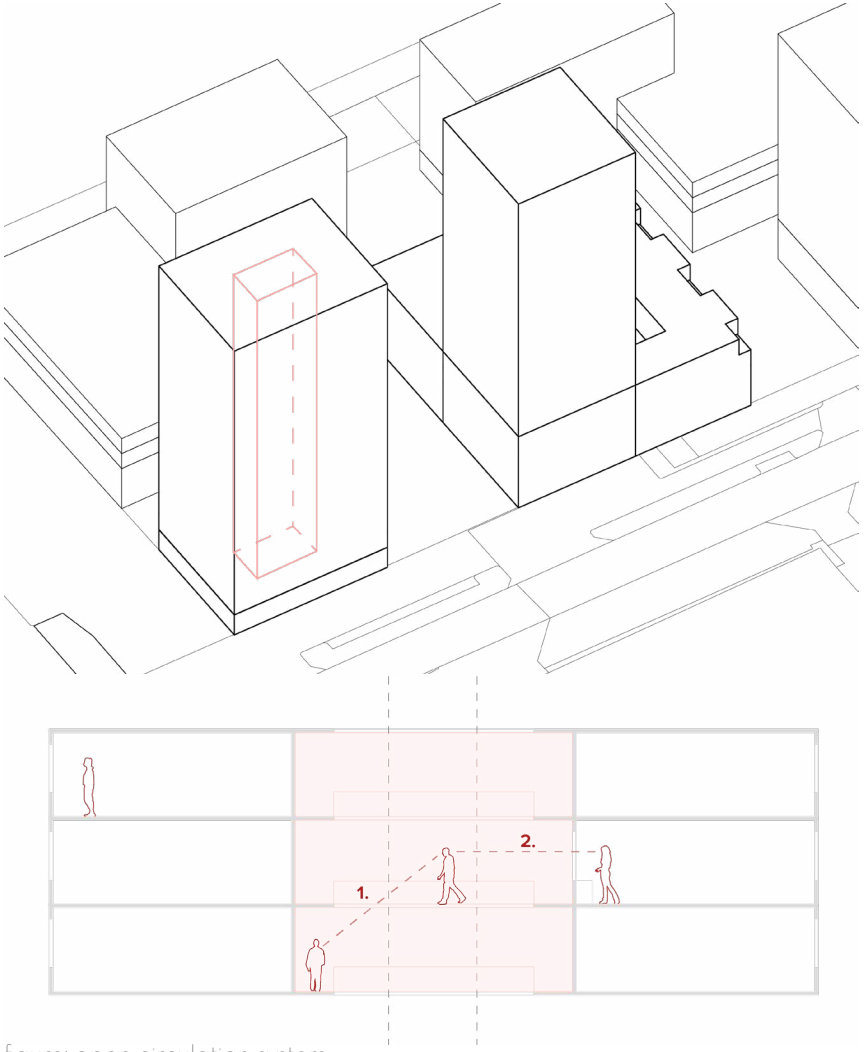


figure: open circulation system

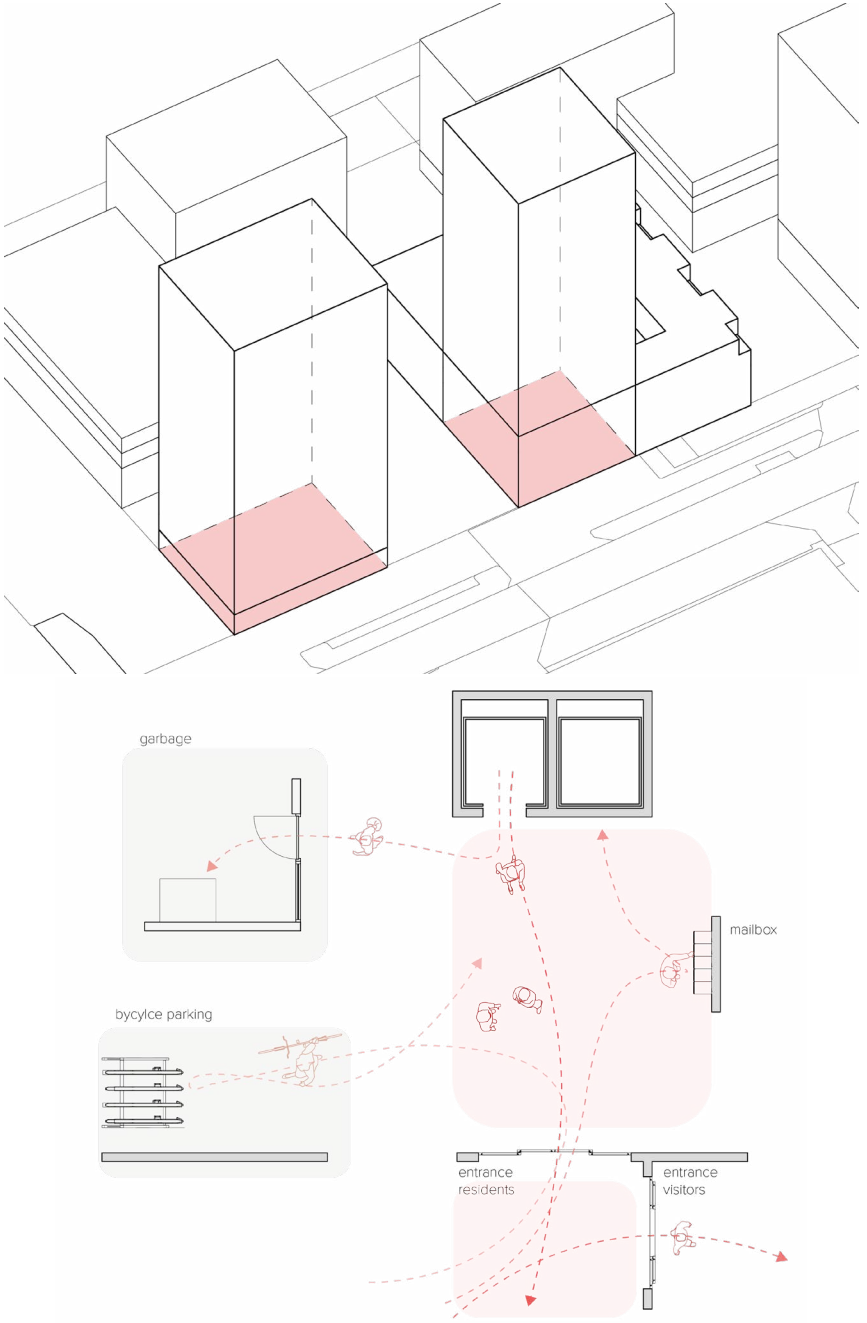
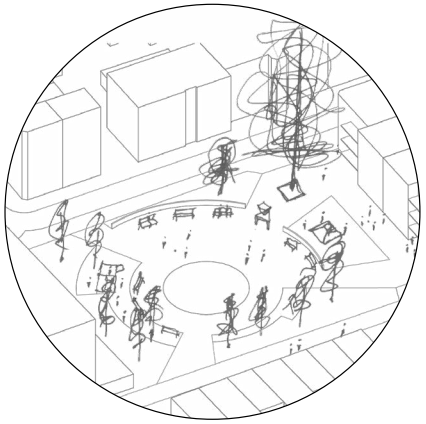
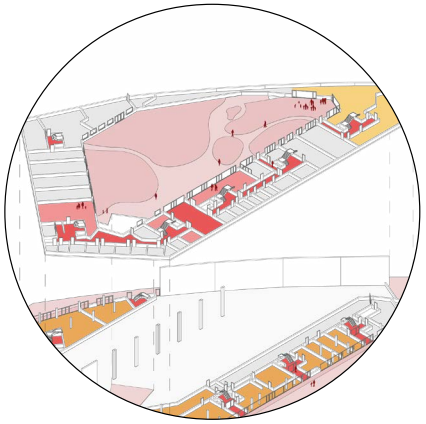


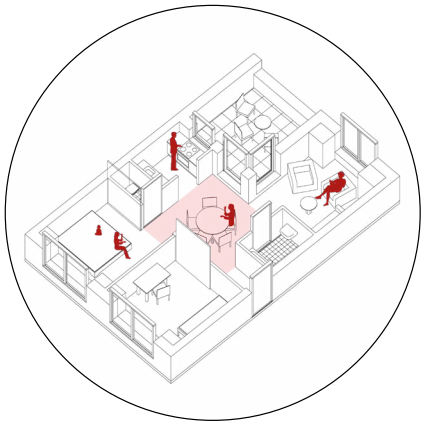
figure: concentration of daily life activities

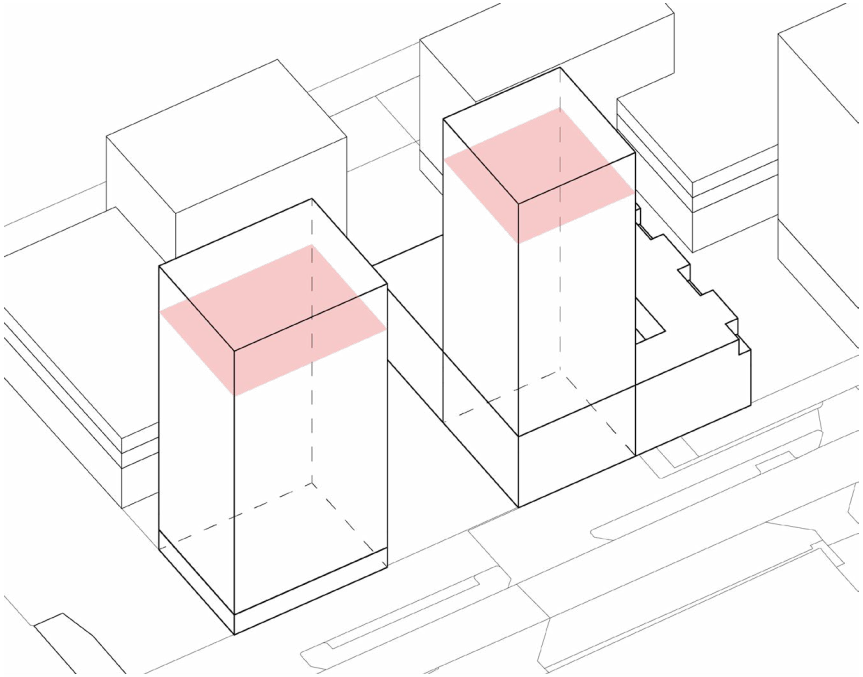
The square is a place where people gather and interact. A public playground within a neighbourhood functions as a connector between residents. A playground could be integrated into the tower typology. Social surveillance is therefore important, to keep the playground safe and prevent misbehaviour. In additions, shared spaces can be seen as the equivalent of a square on the scale of a residential complex and could be integrated into the tower typology.

Square









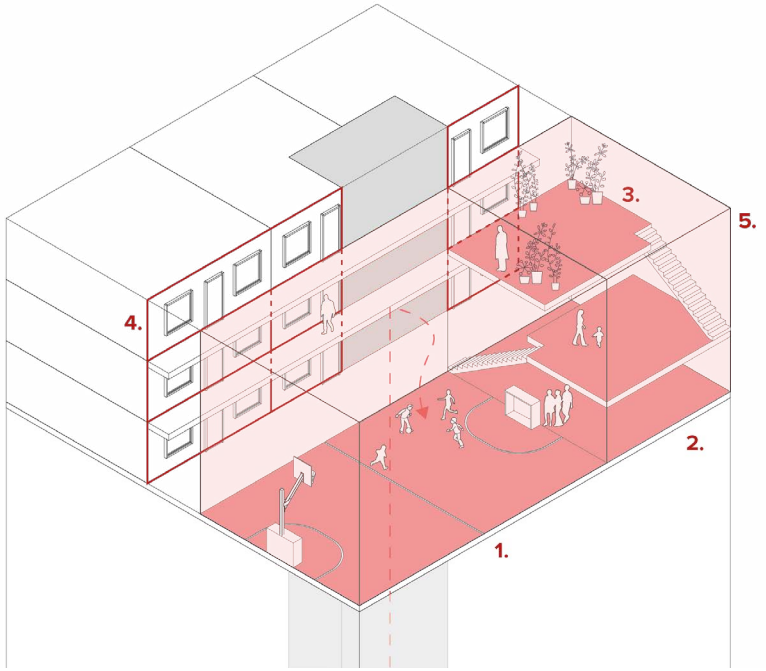
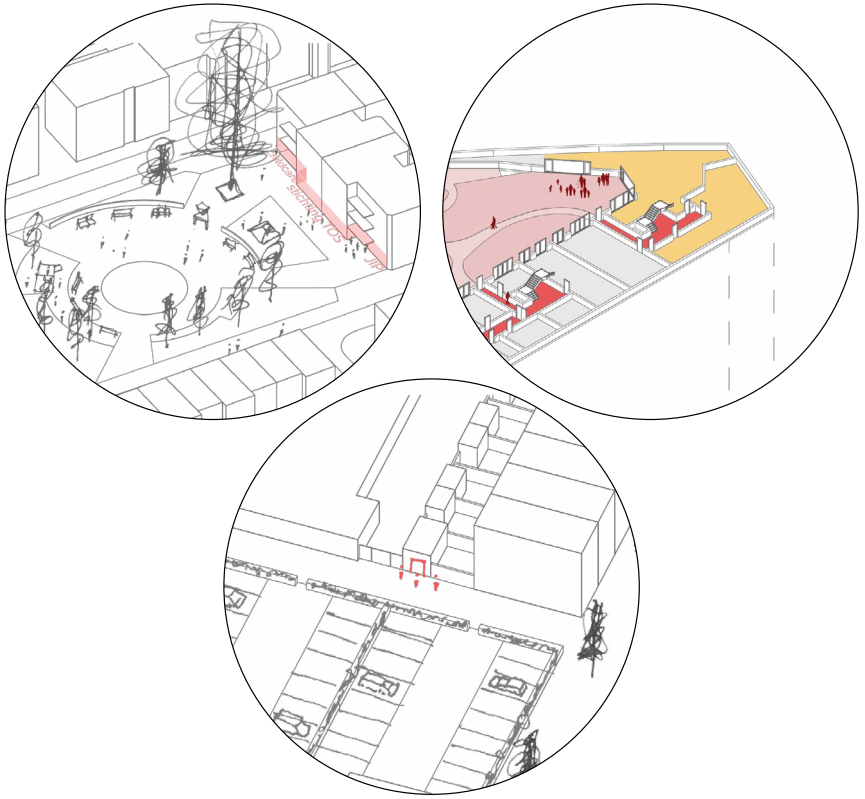
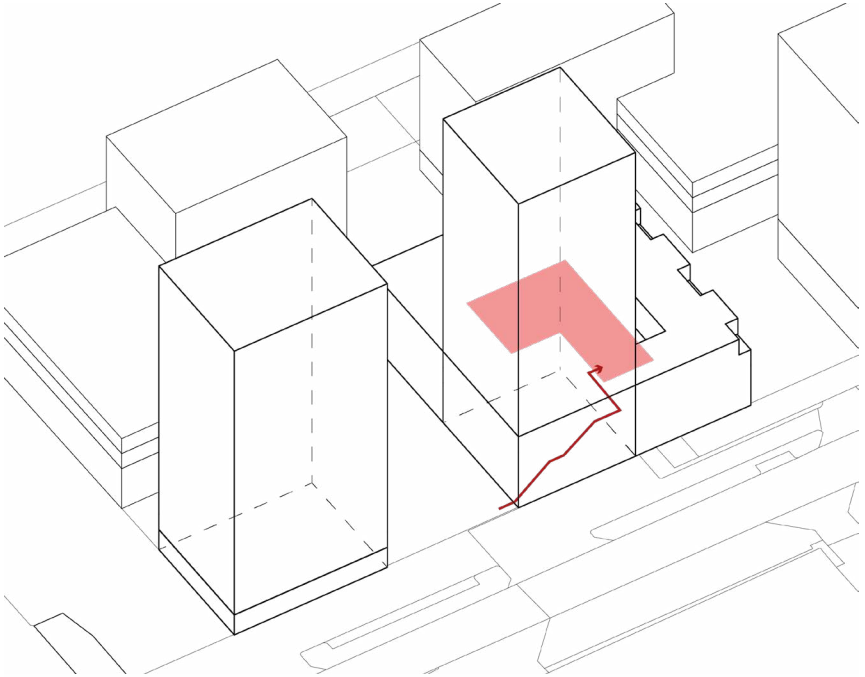


figure: Elevated playground

Public facilities are the driver between encounter between residents from the neighbourhood and can with a public figure a source of public trust. The facilities integrated into the mixed use development could have these qualities. The route to these public facilities is an extension of public space. The small scale businesses, which are located on top of the manufacturing boxes and which sells services and goods to residents, drive movement and encounters. Therefore the route to these businesses should be an extension of the sidewalk. This can in combination with facilities among this route stimulate encounter and interaction between people.

Public facilities





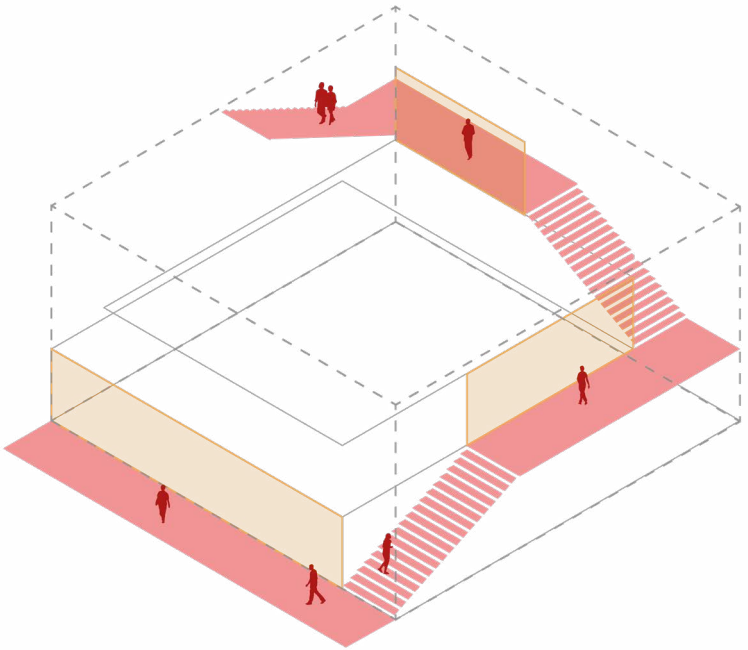
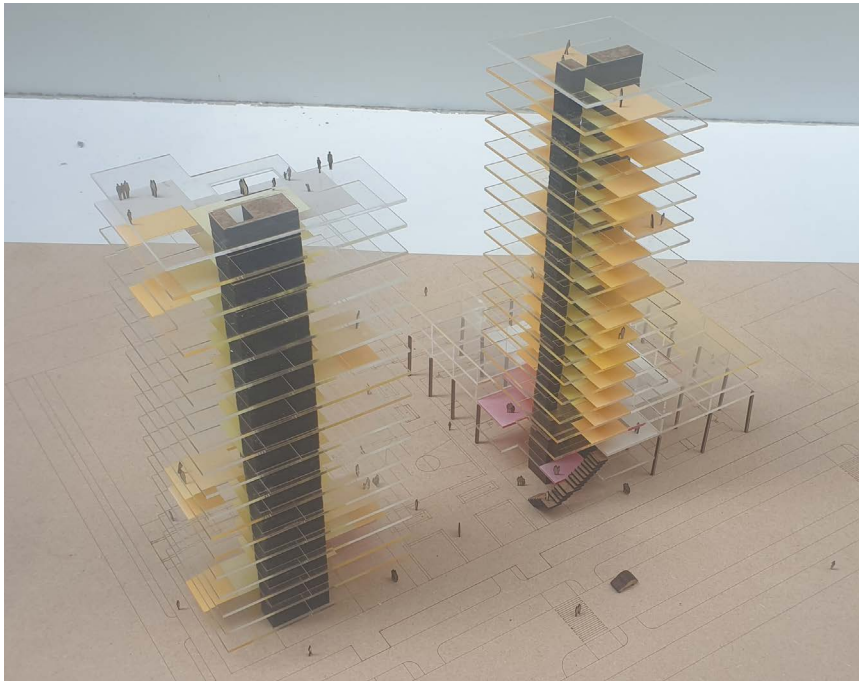


figure: Public route



4 Design

User groups

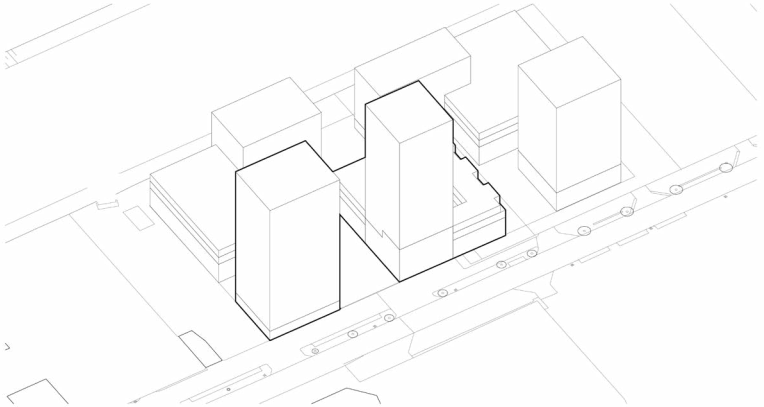
The part of the masterplan for my graduation project consists of the two towers on the north- east side of the plot and the middle located production hall. For the different parts of the design different users groups are taken into account.

To start with the production workers, the people who work in the manufacturing hall. These people use the place on workday basis and could benefit from the nearby facilities during their breaks and after work.

Second are the people with their own businesses at home. These businesses are clothing related, could be fashion designers, clothing repair shop, second hand shop, clothing reuse business and other clothing related small scale businesses. These are most likely to follow the business to consumer model, thus these businesses must be open to public.

Third are the residents of the residential tower which land in the manufacturing hall. This tower focusses on households who benefit from close social relationships. Households types could be lonely parent families, single dwellers and lower income households.

The freestanding tower focuses on a variety of households and ages, families, retired couples and starters.



Public programme

The facilities should sustain both the working and living program, for this specific masterplan but also for the neighbourhood. This part of the masterplan contains three facilities/ institutions. First is a restaurant on the ground floor. The restaurant is focused on the affordable segment, so it is an accessible place for both the working people and the residents to have lunch or diner. Second is the library, which is located in between the ground floor and the elevated small scale businesses. The library is a place which can be used by the residents from the neighbourhood, but is also an accessible place for the working people for leisure during their break or after work. Third is the childcare facility, the childcare facility functions for the children of the residents from the neighbourhood and the workers from the neighbourhood.

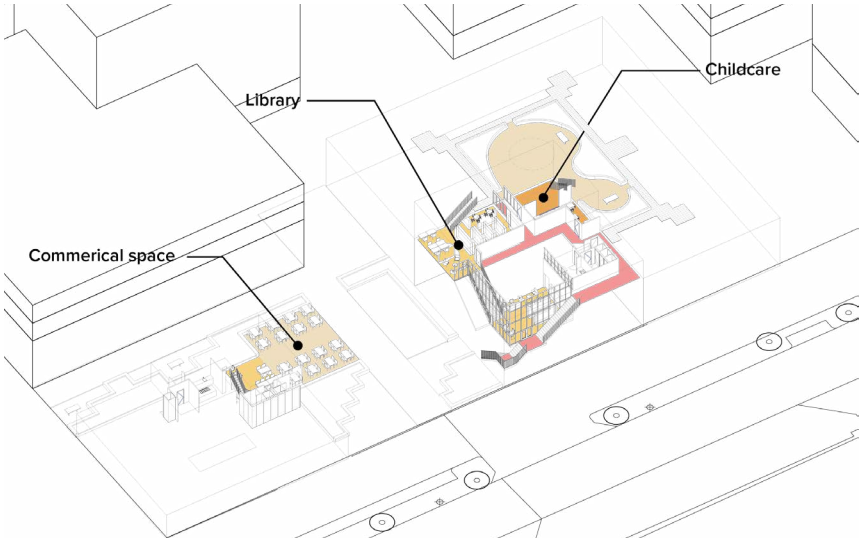


figure: public programme

Concept

The design for these user groups within this masterplan resulted in this social infrastructure. The buildings are designed to multiply the opportunities for social encounter and to encourage social interaction. These places are shown in the model, with distinction between the equivalent of the street, and the equivalent of central public places; squares. The residential towers for different user groups resulted in different design solutions.

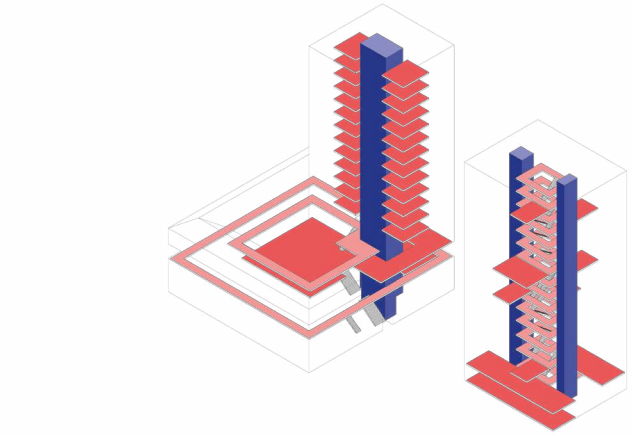


figure: Social infrastructure (diagram during the design process)

Ground floor

The ground level functions as the connection between the buildings and the public environment. All user groups share the exterior space on the ground level. It is therefore an area where encounter between residents, workers and people from the neighbourhood takes place. The ground floor contains a main entrance for all user groups and functions as the connector between the different user groups. The main entrance of the exterior space ends upon a wide open square, which is activated by the restaurant. The entrances of the buildings are designed with an open character, with overview to the surroundings, to be attractive for social interaction between the users.

The manufacturing activities are on the ground level open to public along the central axis. The transparency of the sustainable manufacturing process helps with the acceptance of urban manufacturing. In contributes at the same to the place identity which encourages a sense of place attachments and belonging between the users.

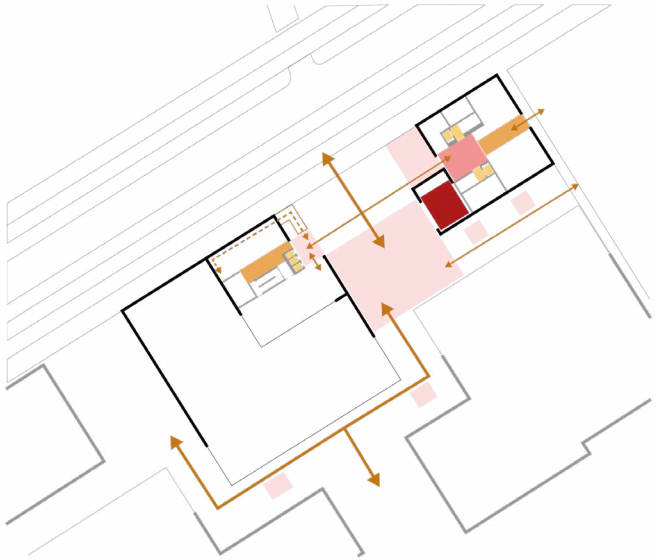


figure: Scheme ground floor

figure: Impression of entrance

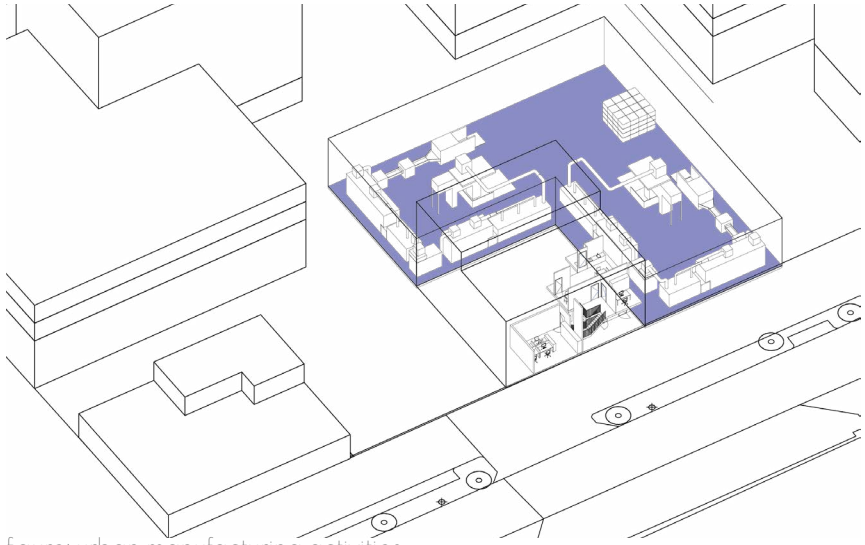
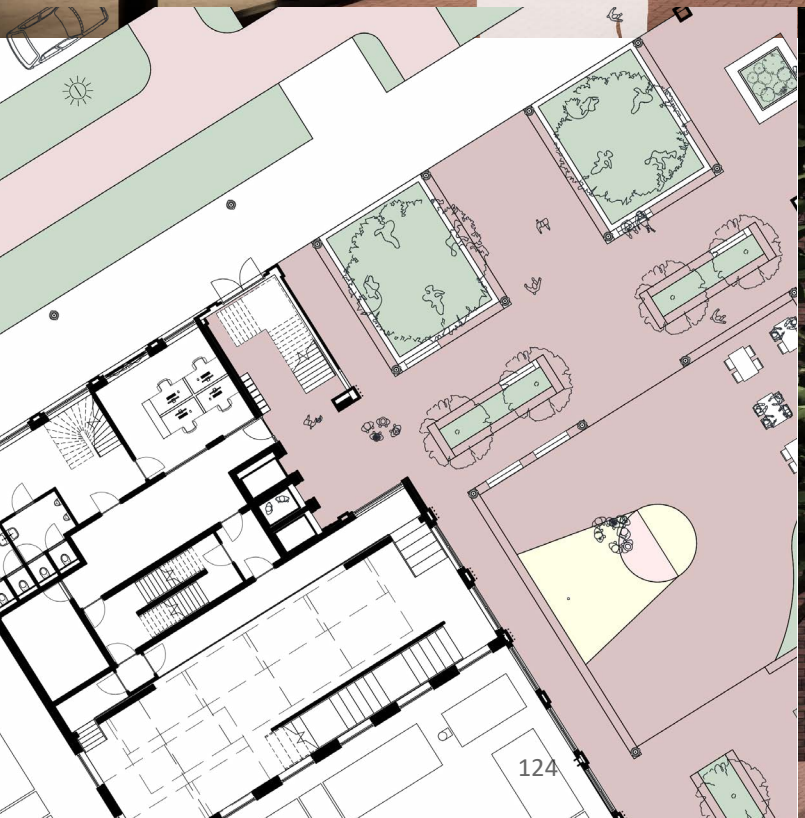


figure: urban manufacturing activities

figure: Ground floor



Extension of public environment

The library is located on the first an second floor and is accessible through the open exterior stairs towards the small scale businesses. The canteen of the clothing recycling manufacturer is located against the library, and is directly accessible through the canteen.

The library extends to the second floor. On the second floor across the library is the childcare facility located. The childcare facility brings similar qualities as in Kralingen West and Kalkbreite. As a central space where people encounter and interact with each other. The library has similar qualities, both institutions strengthen each other.

The small scale businesses are located on the second floor on top of the industrial box. The courtyard typology in combination with transparency encourages collaboration between the different businesses. Through this typology people become familiar with each others activities, this lowers the barrier for collaboration.

The courtyard is multifunctional. It functions as a playground for the childcare facility and is an exterior space which can be used by the residents.

figure: Scheme first floor

figure: Impression library

figure: First floor

figure: Scheme second floor

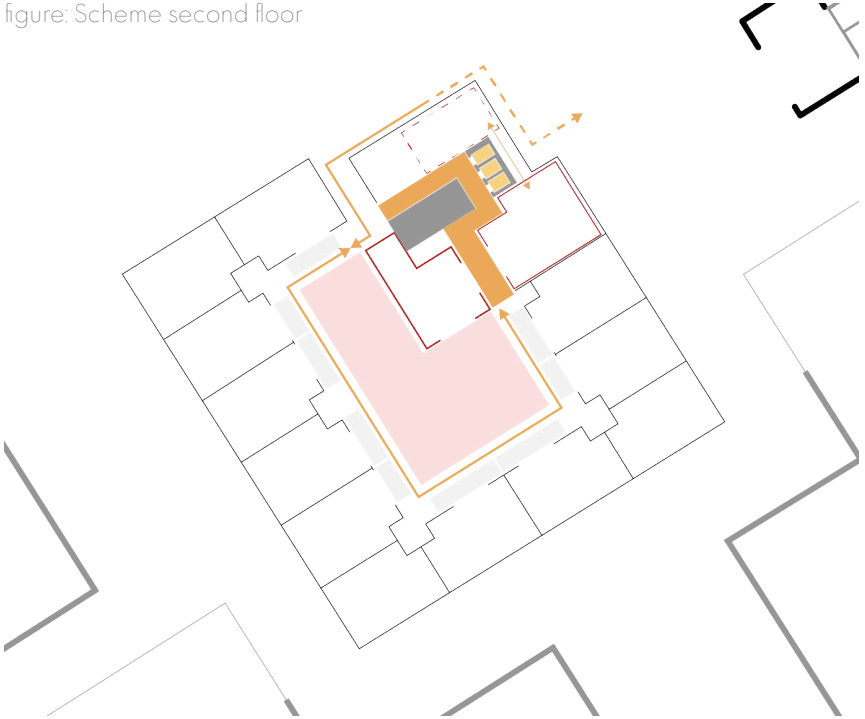
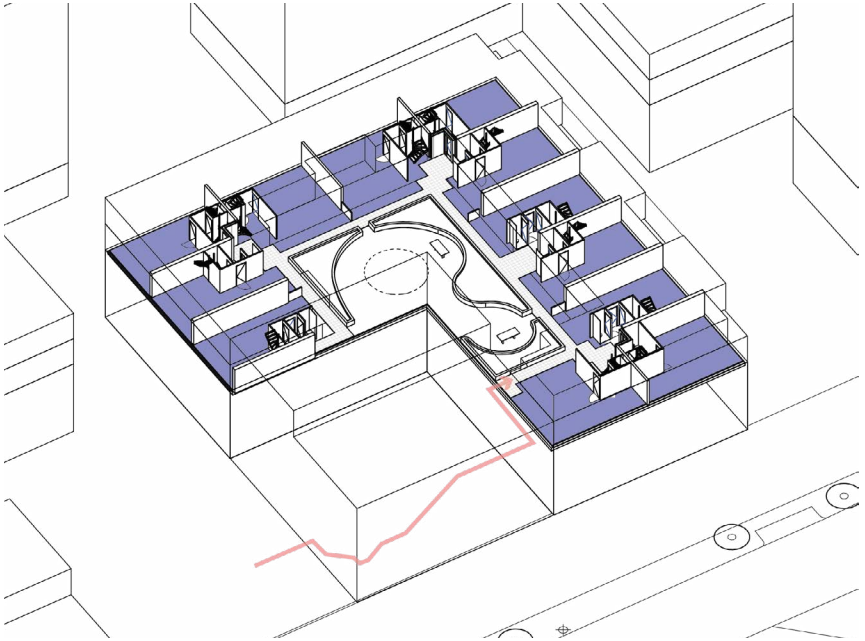


figure: Scheme public route to the courtyard



Public facilities

figure: Second floor

figure: Third floor

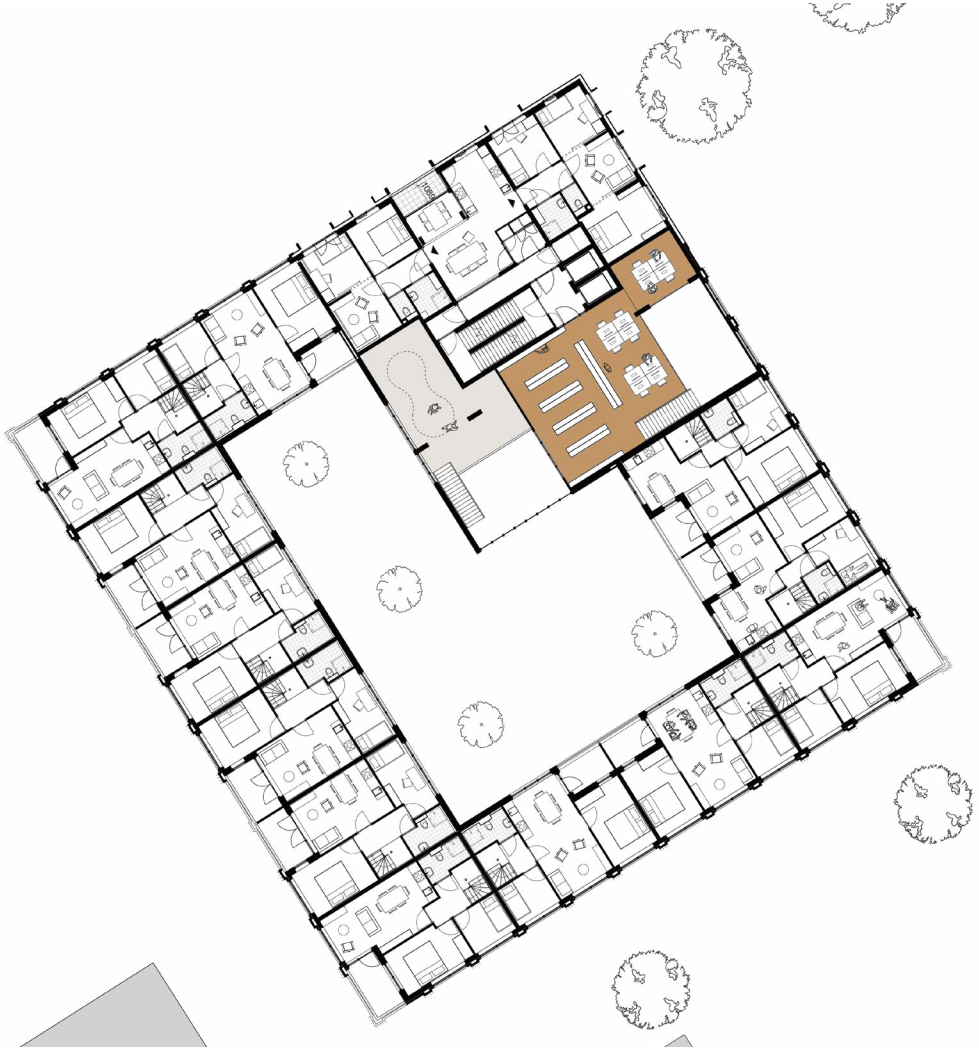
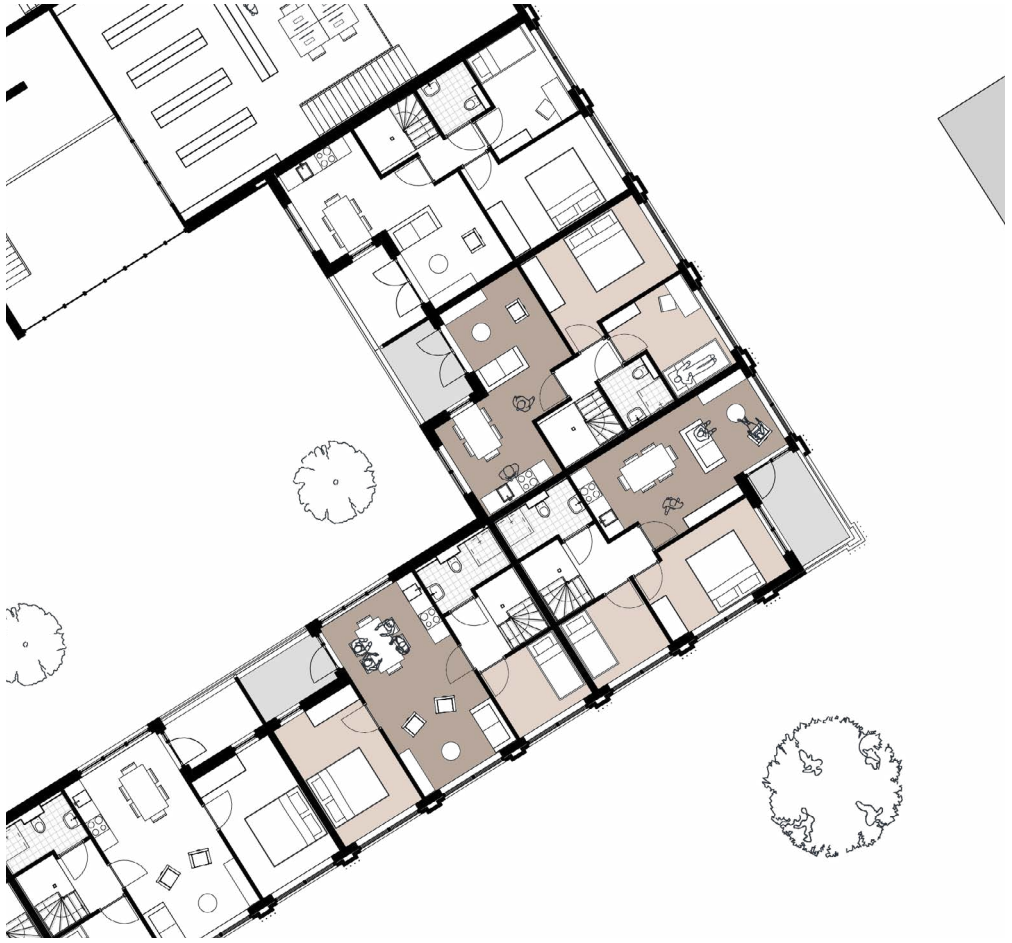


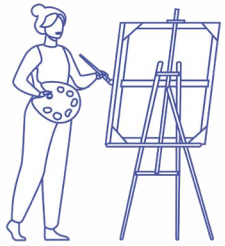
figure: Impressioin courtyard

figure: Second floor

figure: Third floor



Makers



Stacked collaborative clusters

This tower targets people who benefit from close social relations. The cluster living typology provides opportunities for multiple households to build these relationships. Each level contains two clusters, each clusters contains a shared kitchen, dining area, living area, loggia and laundry closet. The individual dwelling consists of bedrooms and a living room. The minimal dwellings encourages to use the shared spaces and to build relationships with other households.
The shared space is therefore a place where residents gather and interact. The central space can be seen as the equivalent of a public square within a neighbourhood.

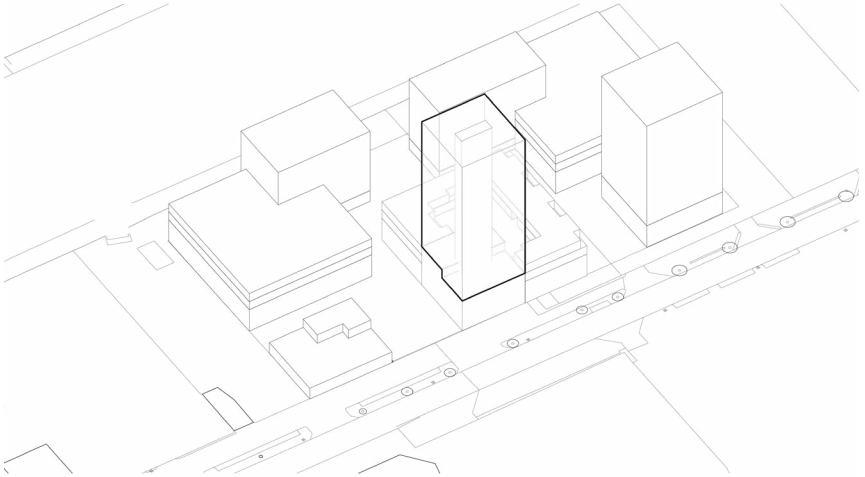


figure: Volume cluster living

figure: User groups

The core of this tower efficiently designed to be able to target lower income households. The core contains on each level an open axis between the two clusters. This open axis, from entrance to entrance and the elevator in between magnifies the change of social encounter between different clusters. It can be seen as the equivalent of the sidewalk on smaller scale. The open axis is ended by laundry closets on both sides, to prevent privacy concerns and to multiply the opportunity for social encounter while doing daily life activities.

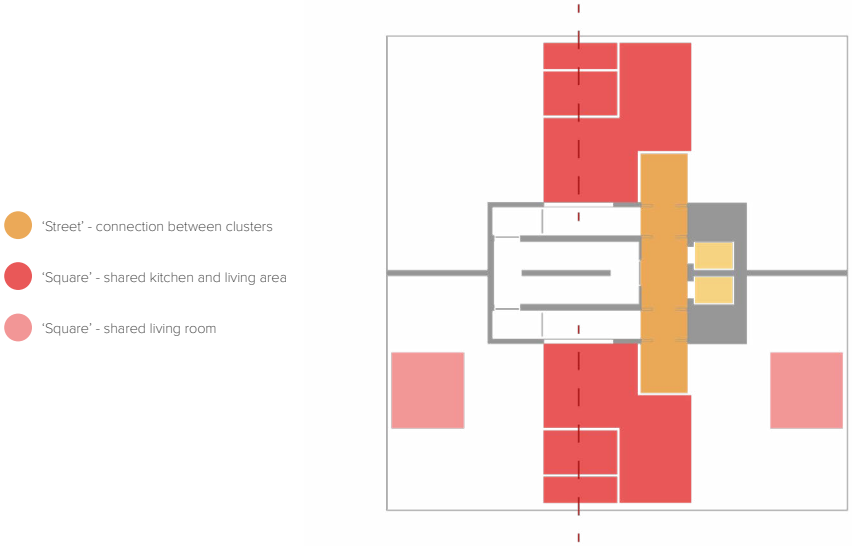


figure: Scheme typicla floor plan

figure: Typicla floor plan with dwelling configuration 1 and 2

The first dwelling configurations is designed for solo dwellers and couples. Each dwelling unit contains a bathroom, bed and living area.

The second dwelling configuration is designed for solo dwellers, with two sub-clusters. The sub-cluster contain a shared living area with individual bedrooms for each solo dweller.

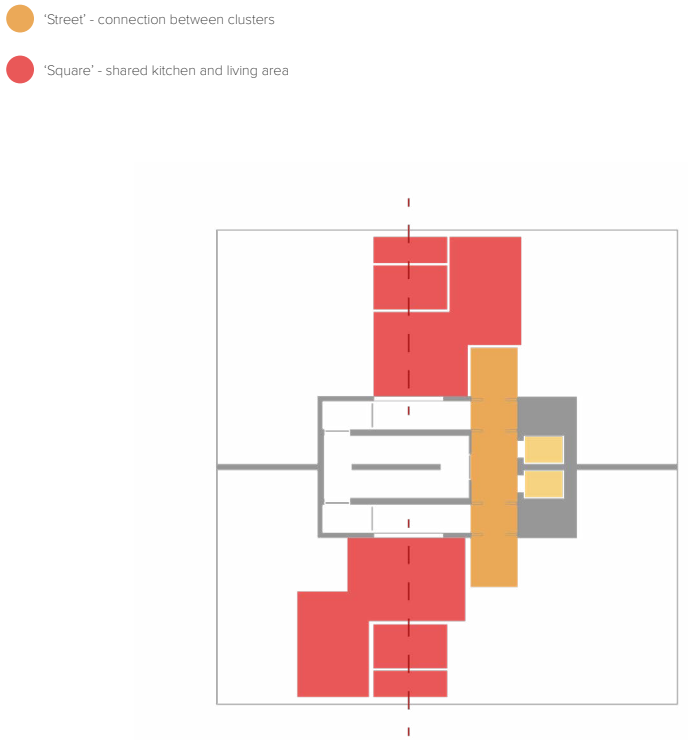


figure: Scheme typicla floor plan

The third, and fourth configuration focusses on families of different sizes, where each dwelling contains a central space, living area, and bedrooms.

These different dwelling configurations can also be mixed. For example a retired couple with a lonely parent family who could help each other.

figure: Typicla floor plan with dwelling configuration 2 and 3

Impression shared space

Vertical neighbourhood

The freestanding tower focuses on a variety of households and ages, families, retired couples and starters. The aim is to shape a sense of community between the residents. The tower is therefore divided into four clusters, to break down the size of a community. Each cluster contains a multifunctional shared space, which can be used by the residents to gather, and can be reserved for occasions.

The building also contains other shared spaces such as, three laundry areas in combination with space for interaction, hobby space, fitness area, and a shared playground in combination with a shared interior space, exterior kitchen and a rooftop garden. This encourages interaction between the clusters and prevents enclosed communities.

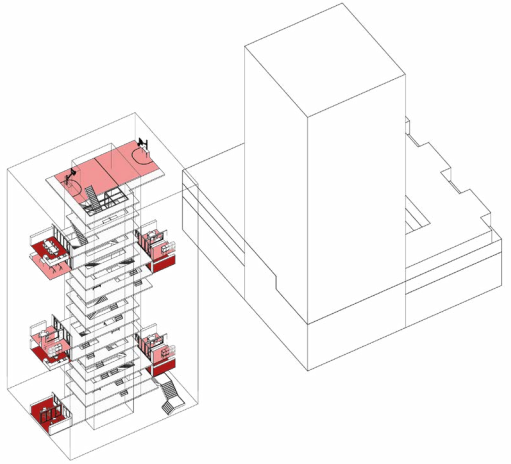


figure: scheme shared spaces

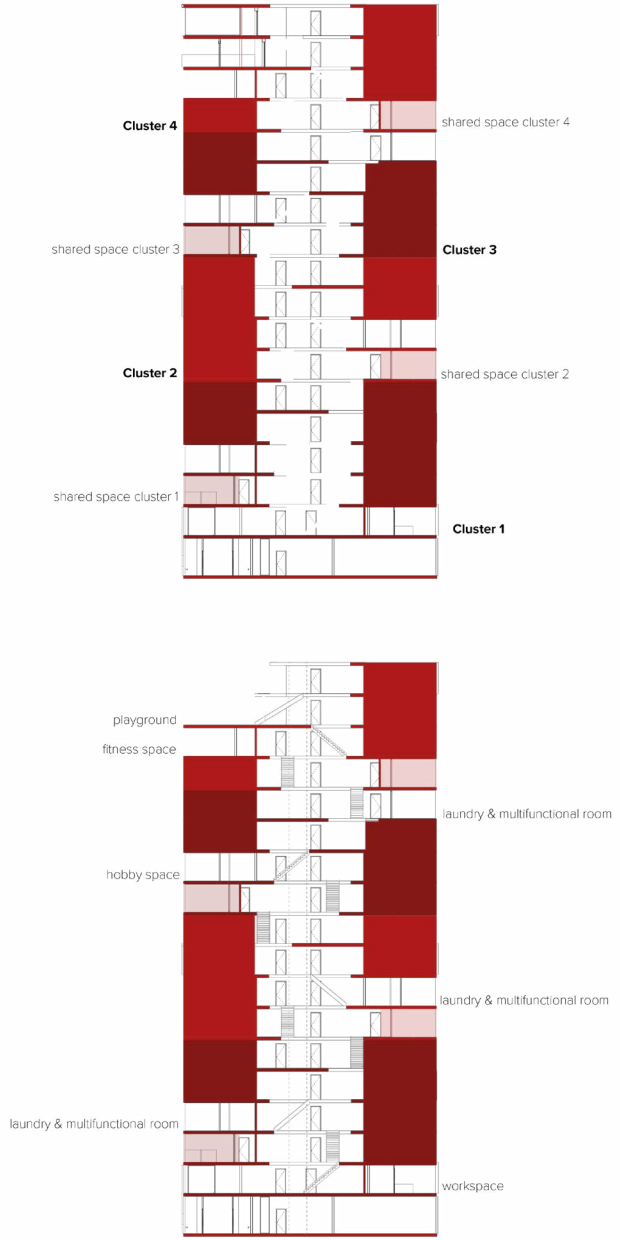


figure: scheme clusters

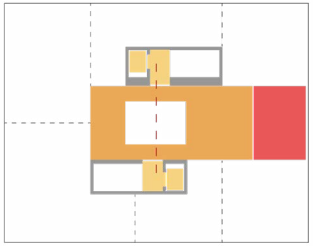
The open circulation is the connection between the shared spaces and the dwelling entrances. The vertical open circulation multiplies the opportunities for social encounter and can be seen as the equivalent of the street. The shared spaces are a central spaces for residents to gather and interact and can therefore be seen as the equivalent of a public square. The open circulation system and transparency to the shared spaces ensures social surveillance. The laundry area is open to the circulation space. Doing laundry can become a moment of social encounter.

Each cluster is given a specific colour to strengthen the identity of the different clusters.

The tower contains a variety of dwelling typologies, for a variety of household types. The different dwellings follow the principles applied by Sophie Delhay. The neutral space connects the surrounding equal sized spaces by sliding doors.

The tower contains a cluster of shared indoor and outdoor spaces, playground, indoor gathering space, exterior kitchen, and rooftop garden. This area in aimed to attract all ages. This area can therefore be seen as the equivalent of the public playground with childcare facility in Kralingen West, as a place where multiple age groups encounter and interact.

figure: typical floor plan with shared space



‘Street’ - open circulation system

‘Square’ - shared space

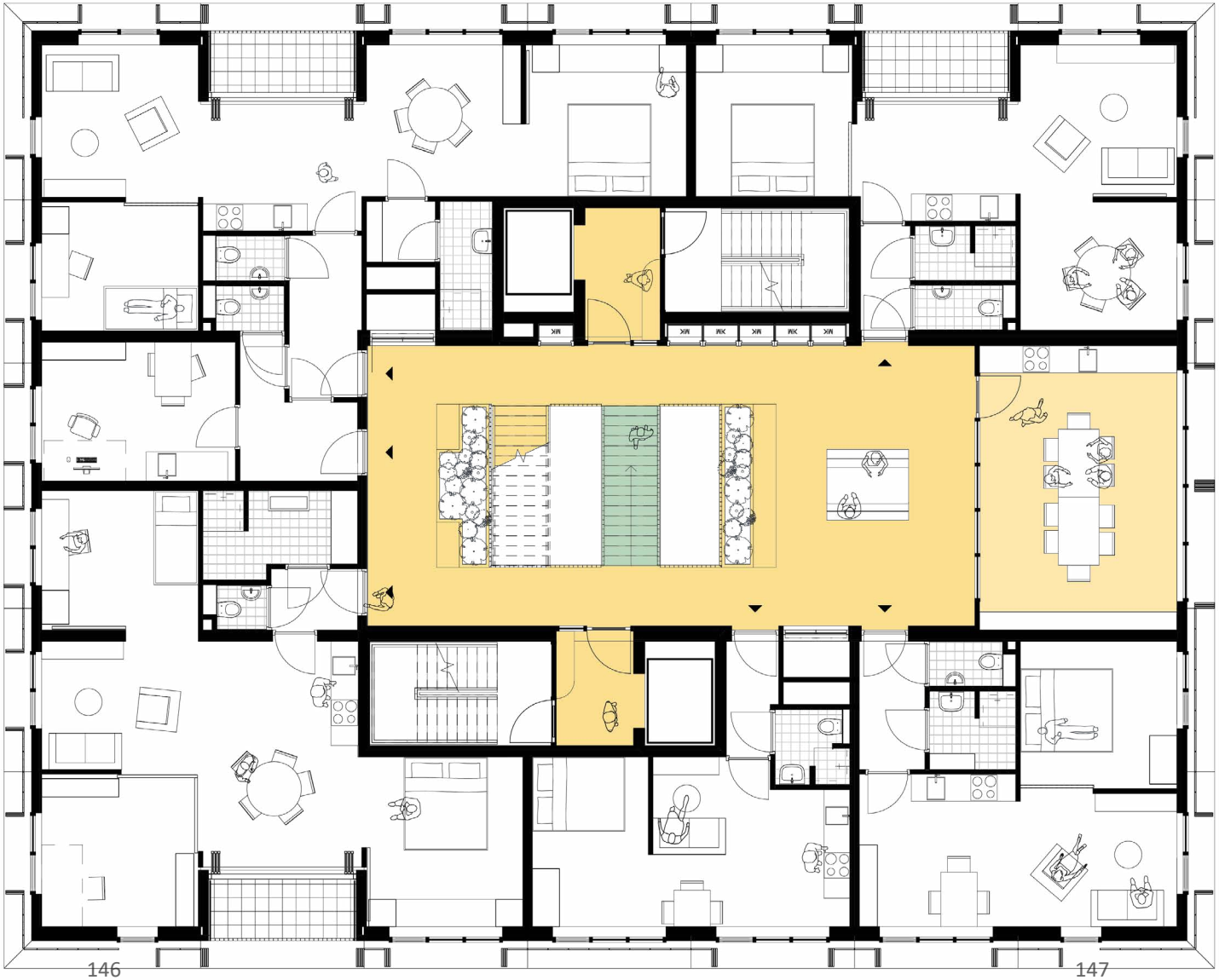
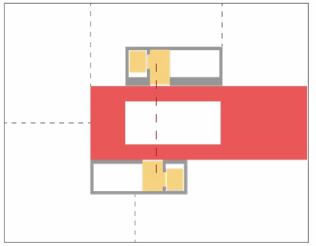


figure: typical floor plan with laundry room



‘Street’ - open circulation system

‘Square’ - shared space

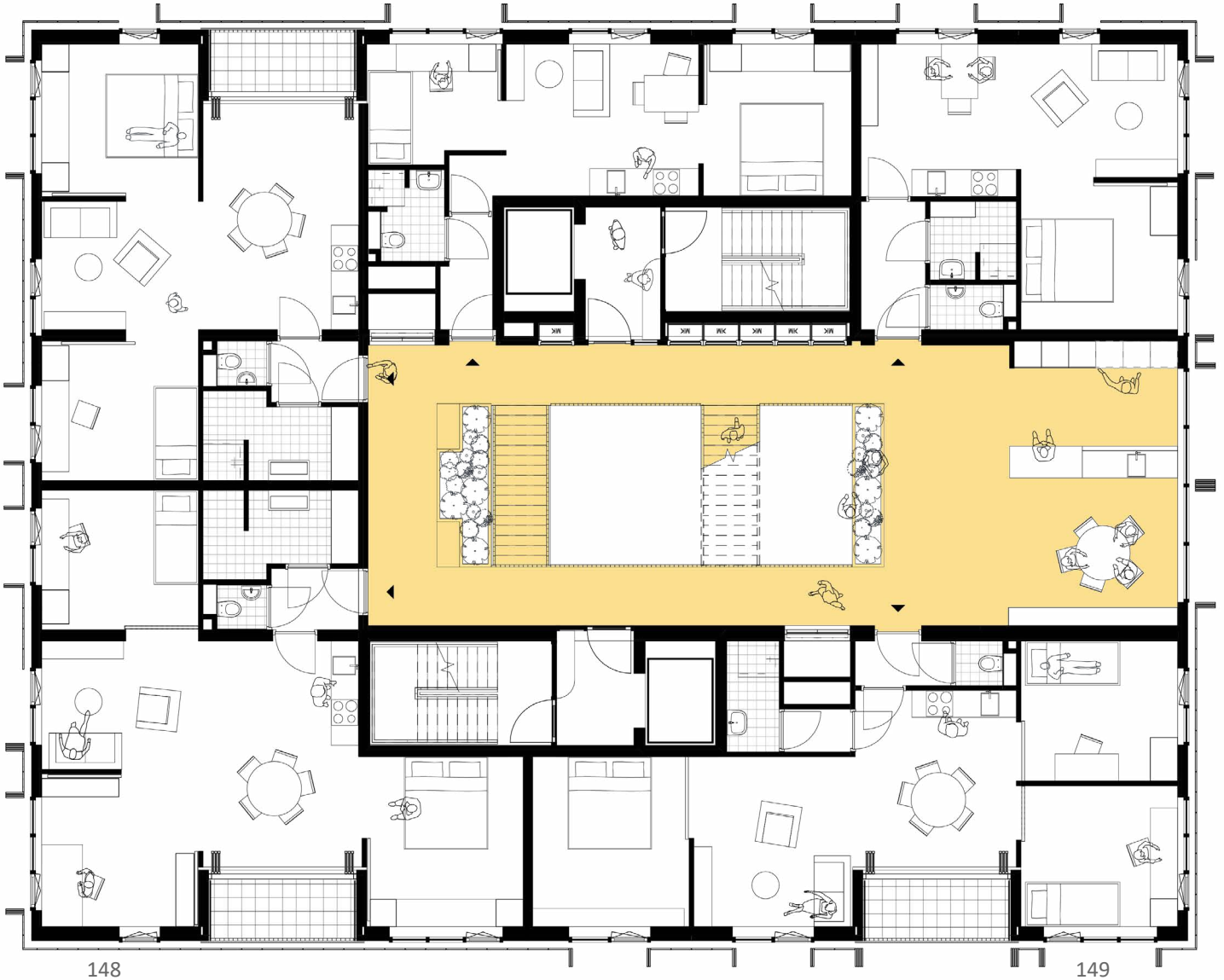
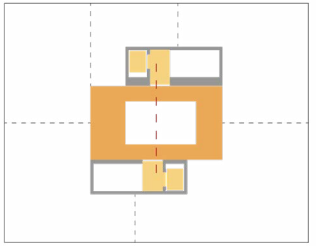


figure: typical floor plan



‘Street’ - open circulation system

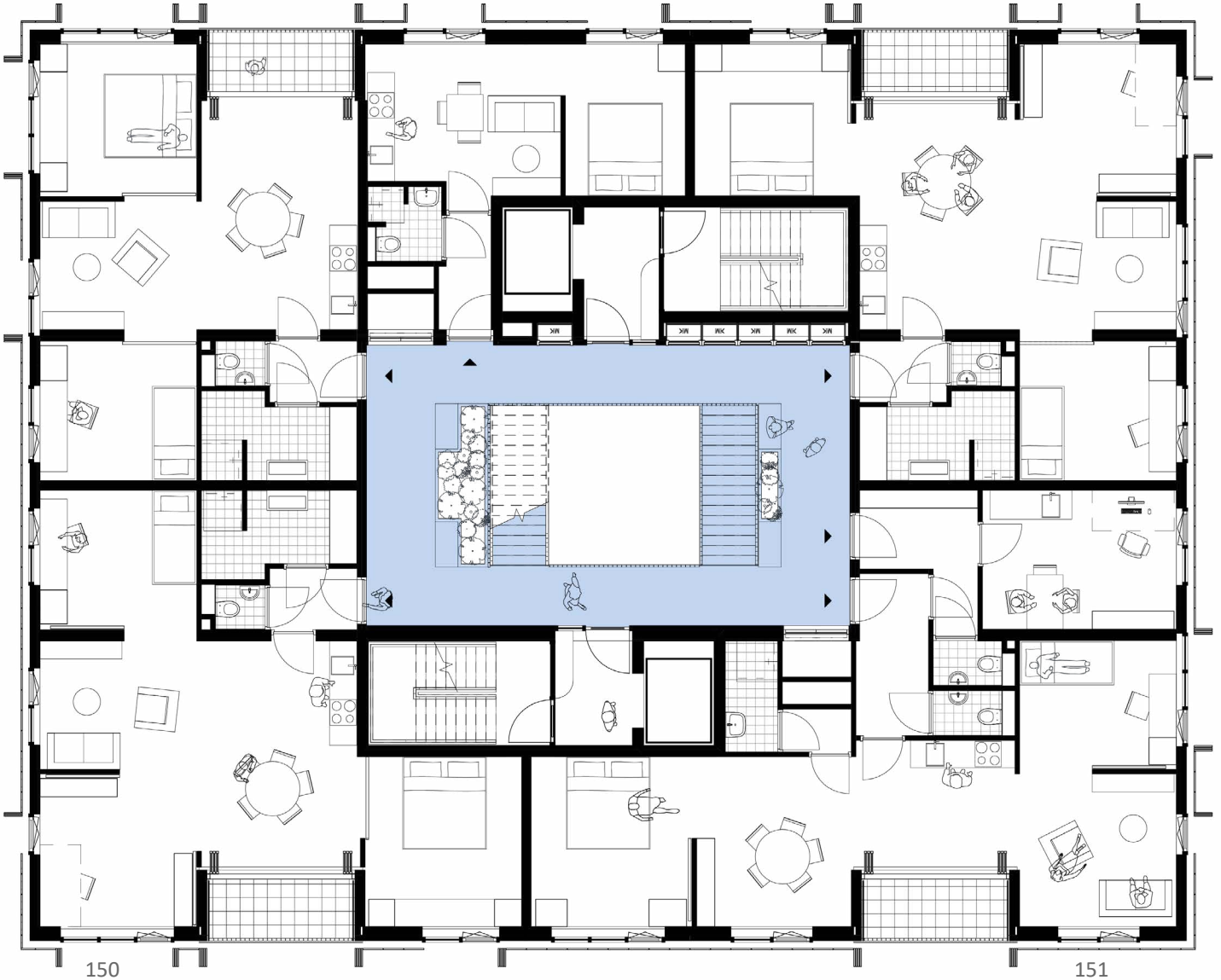


figure: section cluster

figure: Impression open laundry area

figure: Top floor with shared space for all ages

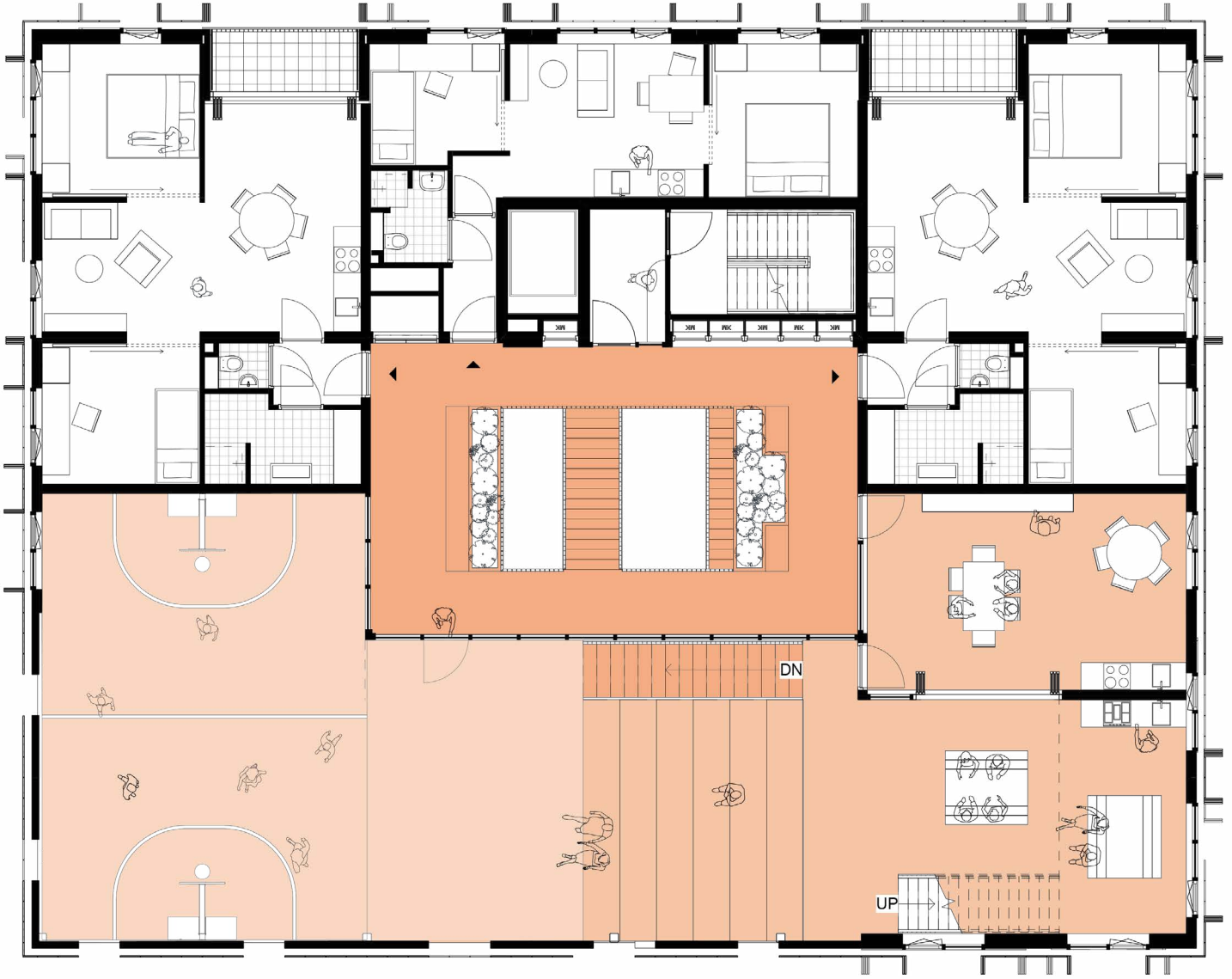


figure: Top floor with shared space for all ages

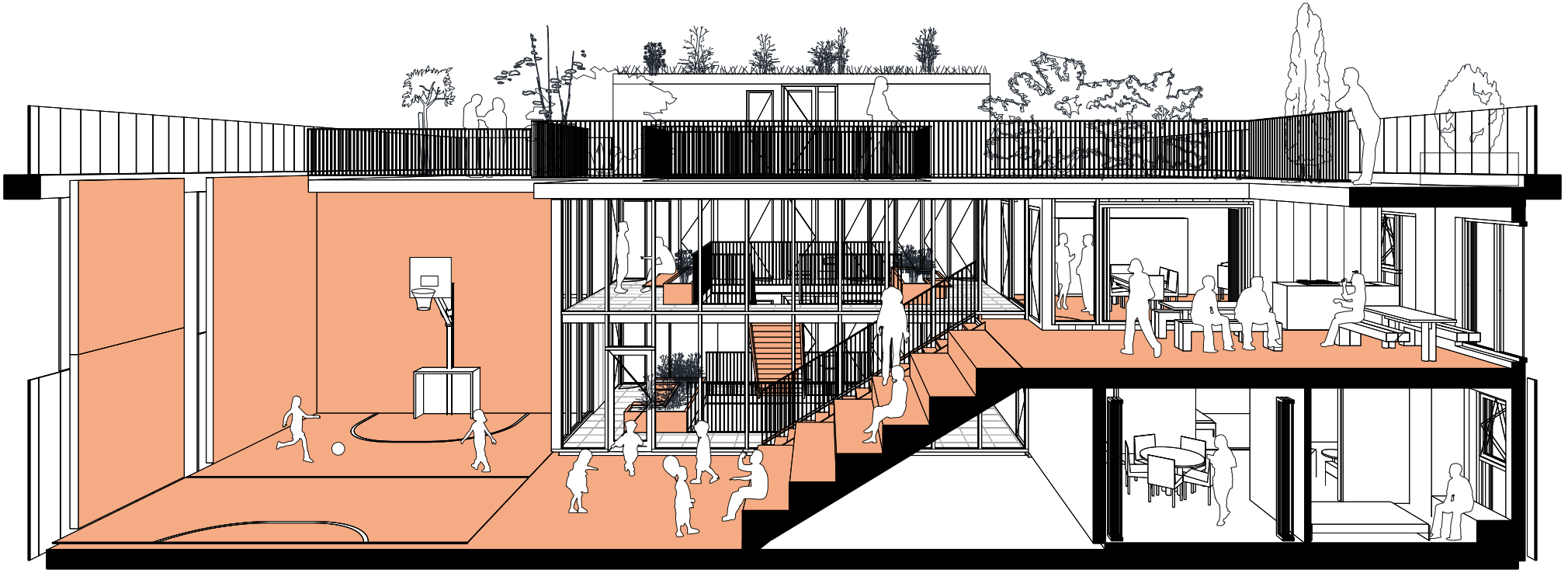
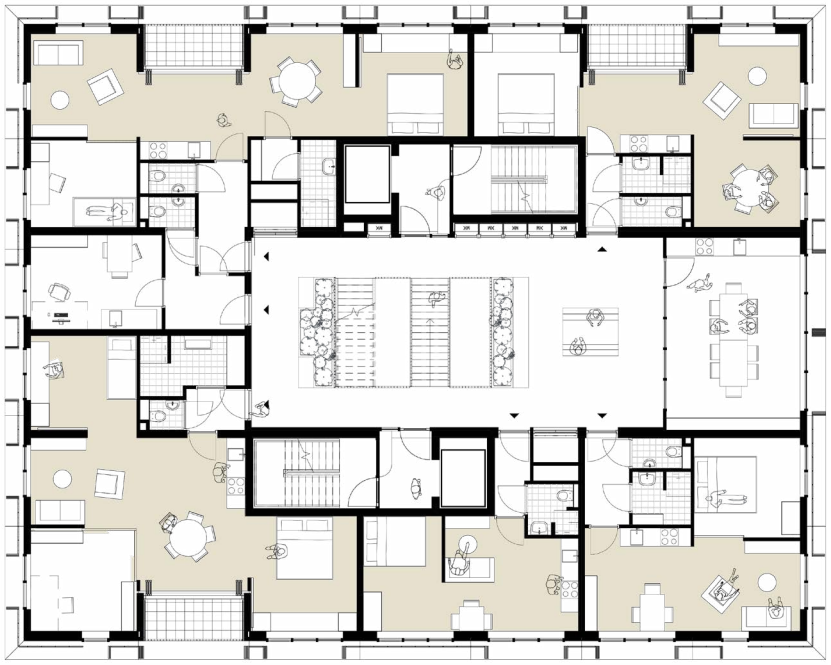
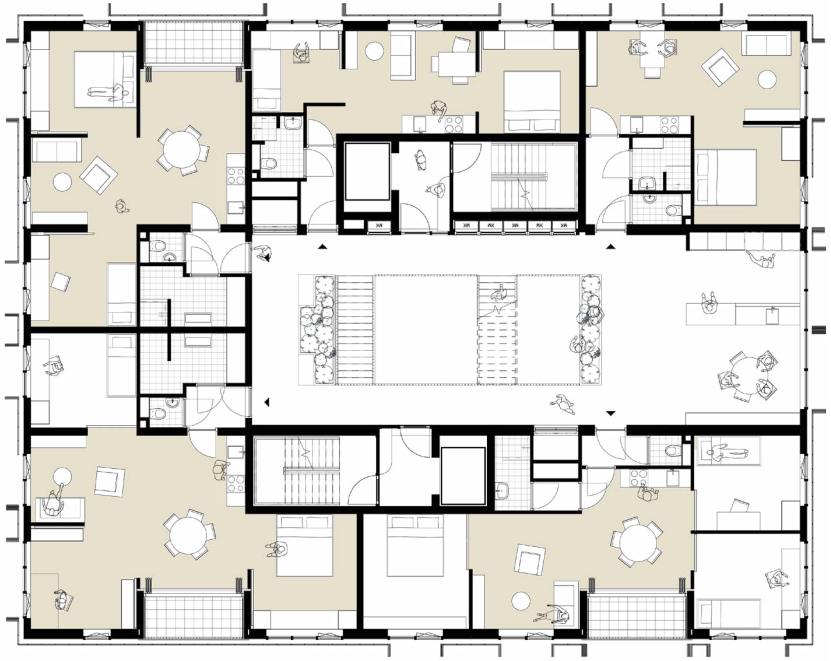
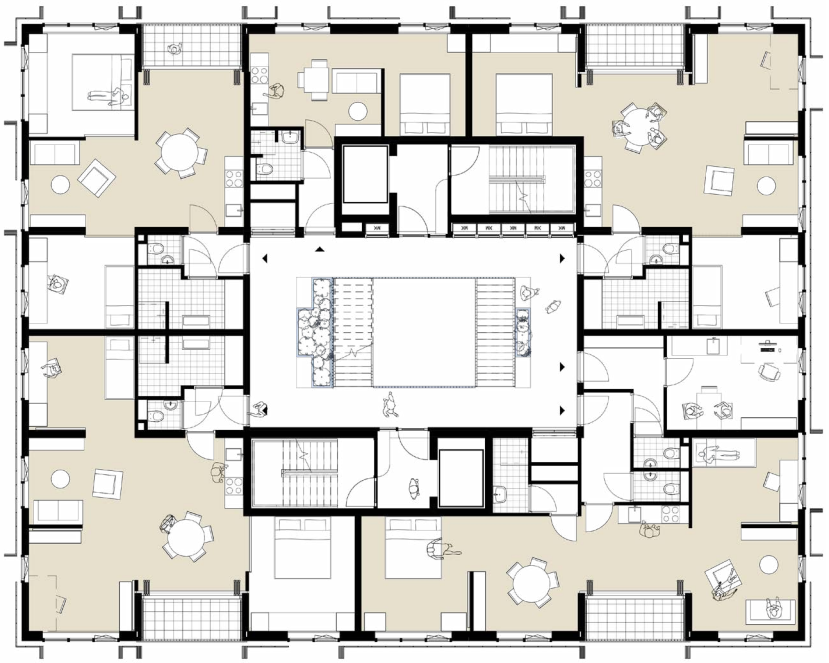


figure: Dwelling configurations for a variety of houshold types



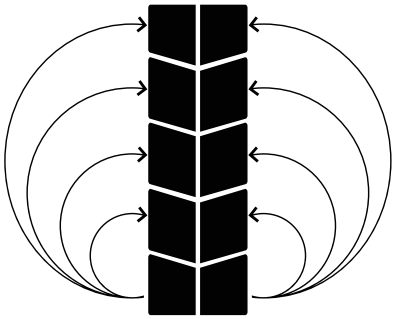




Structure

The building aims to be part of a circular economy, which means that they life-cycle of materials and products take place in a closed cycles. The closed loops can take place within the technical or biological cycle.

Both buildings have a concrete basement which is resistant to the conditions and could therefore have a long lifespan. The construction of the manufacturing hall contains a demountable steel construction. The steel elements are reusable after there lifespan. The construction on the production hall consists of hollow timber frame elements. These elements are relatively lightweight, and thus suitable to place on the steel structure. The Residential towers contain a CLT construction. The CLT elements are a sustainable solution which storage CO2. The CLT elements are demountable and can be reused for a second life. The CLT slabs contribute to a pleasant living environment. The mass is beneficial for there warmth accumulating abilities and the interior walls do not have to be finished with other materials. The wooden look gives a warm feeling to the dwellings.



circular economy

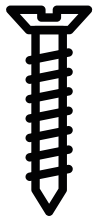


figure: structure foundation (top) and steel construction manufacturing hall (bottom)

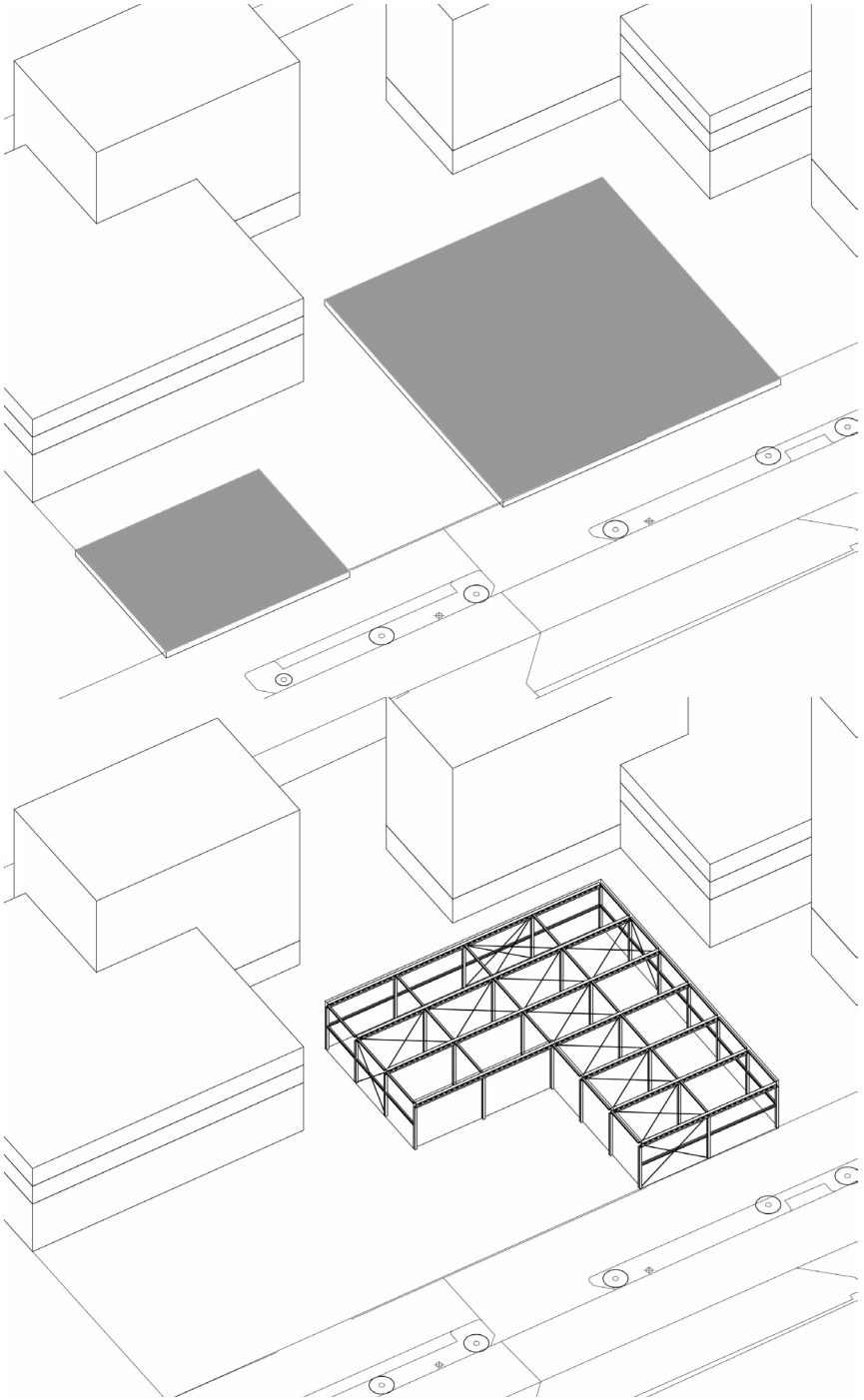
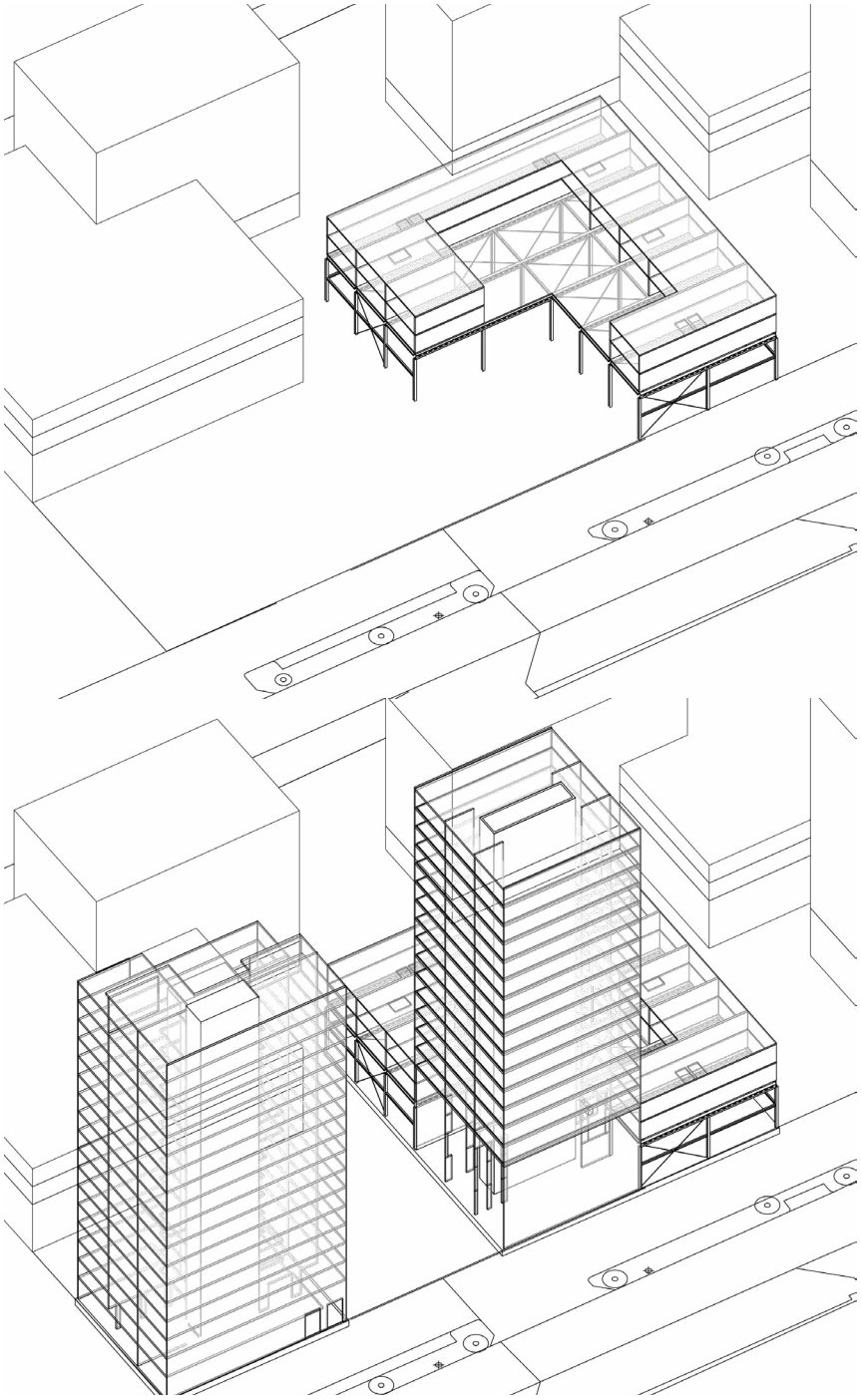


figure: structure courtyard (top) and towers (bottom)



Façade

With the design of the façade several elements are taken into account regarding architectural expression and climate.

The façade is split into two parts, the plinth and the residential towers. The plinth of both volumes consist of a demountable ClickBrick system. The stone plinth conveys a common identity which resonates with the heritage of the area, with former brick warehouses for short-term storage. Having both the manufacturing space and the public facilities with small scale businesses in the plinth encourages a sense of sharing between residents and workers.
The towers contain both folding sliding shutters. The vertical neighbourhood consist of zinc shutters and the stacked cluster tower contains galvanized steel shutters. Both tower therefore have the same kind of architectural expression, while they can still be distinguished. When the shutters are opened the colour of the cluster is revealed in the façade, where each dwelling unit within the cluster has their own tint of the cluster colour. This gives each dwelling a sense of uniqueness and results in a playful façade which 'moves' throughout the day. The 'modern' metal towers are in contrast to the traditional plinth. This strengthens the urban mix.

The interior facades contain green façade elements on both the plinths and the towers. The green elements are placed at the places where a façade faced another façade of the masterplan. This results in a cold and hared exterior of the masterplan, and resonates with the harbour identity. The green elements in the 'interior' facades give the area a residential friendly environment. The green elements are beneficial for mental health and reduce the urban heat island effect. The towers in addition contains solar panels on the south and west side to generate electricity.

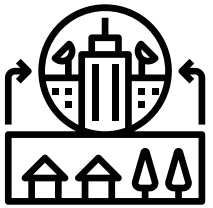


figure: plinth

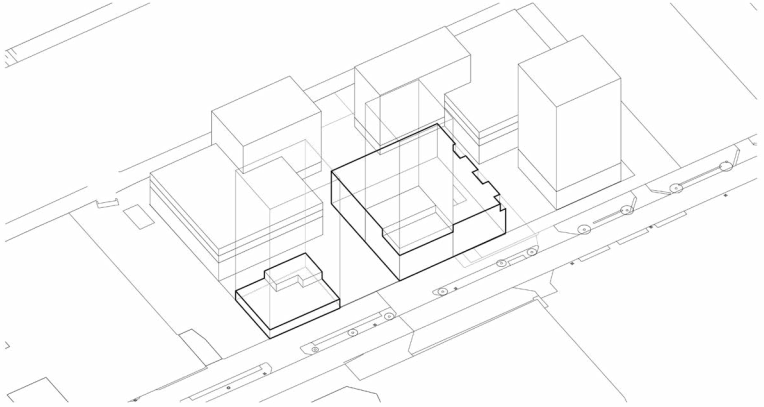


figure: green facade surfaces

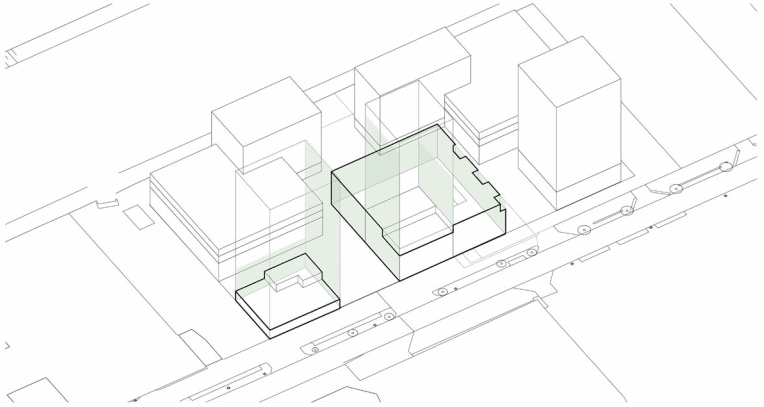


figure: solar facade surfaces

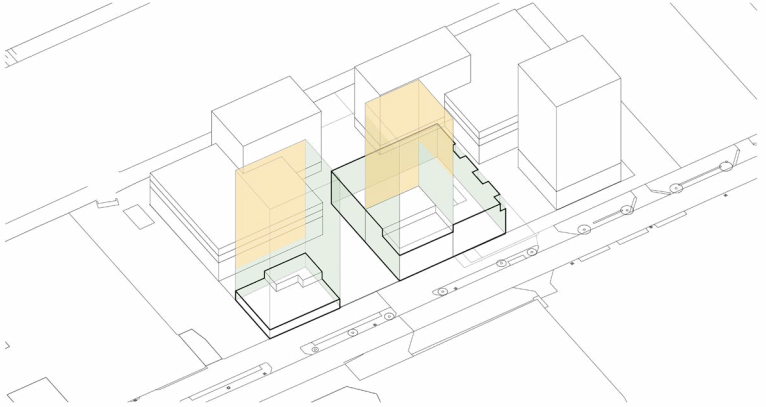


figure: Towers with shared and unique identity

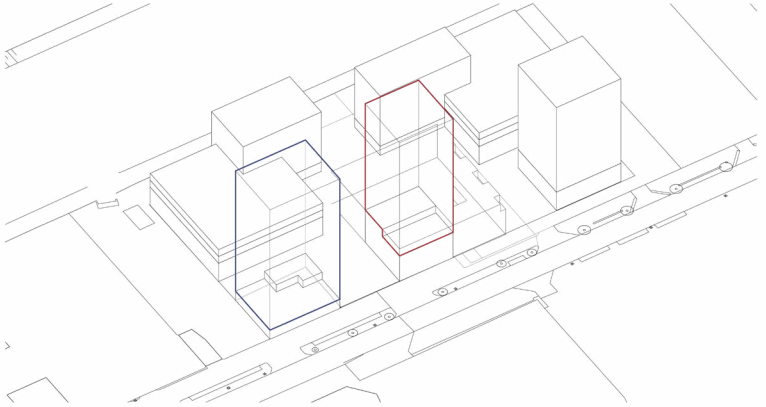
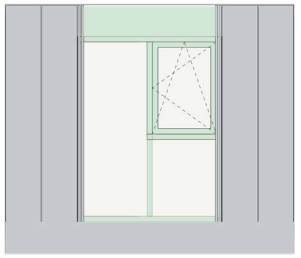
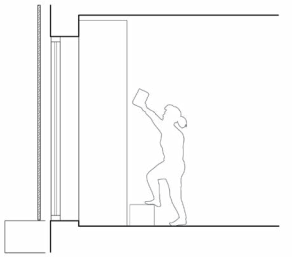
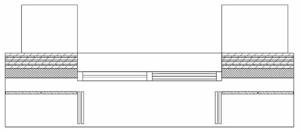
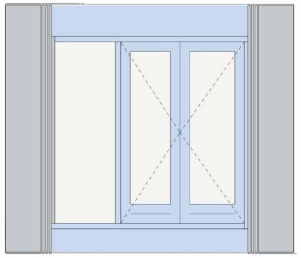


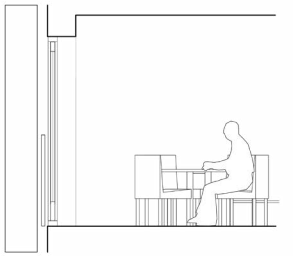
figure: Facade principle tower

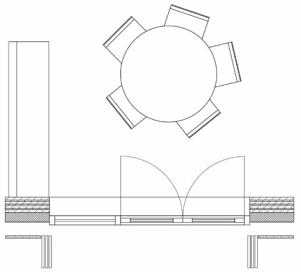


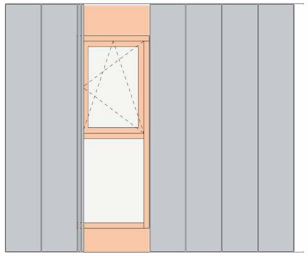


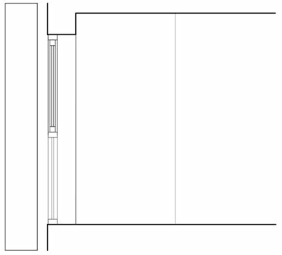


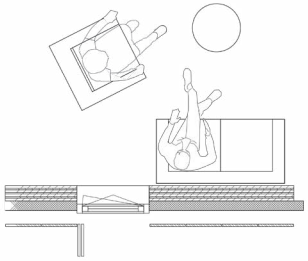


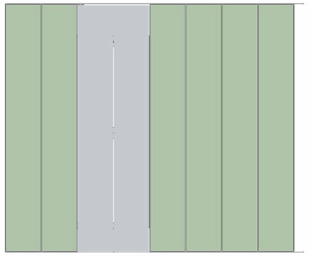


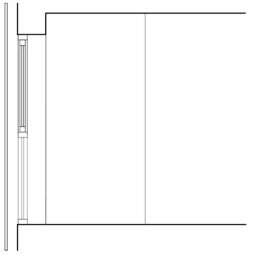


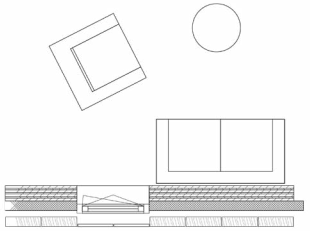


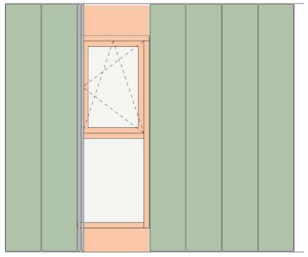


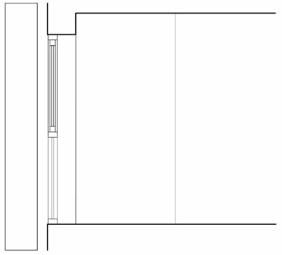


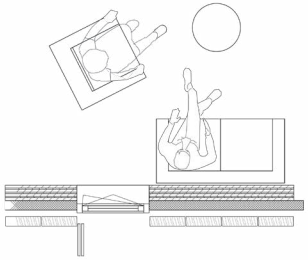


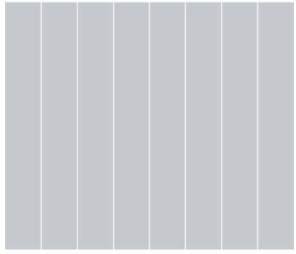


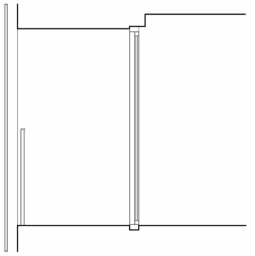


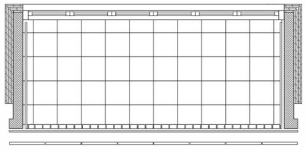


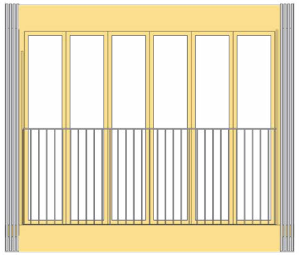


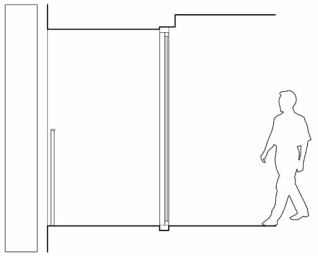


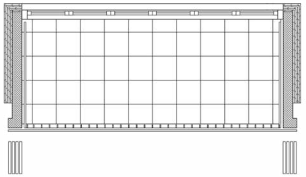


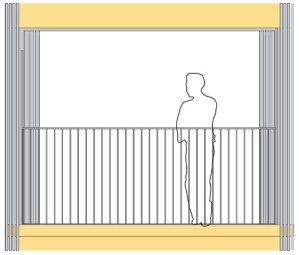


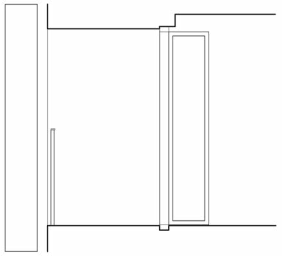












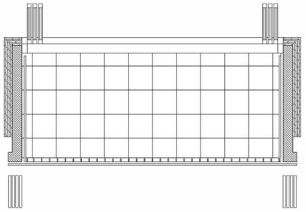


figure: Front facade

figure: South facade

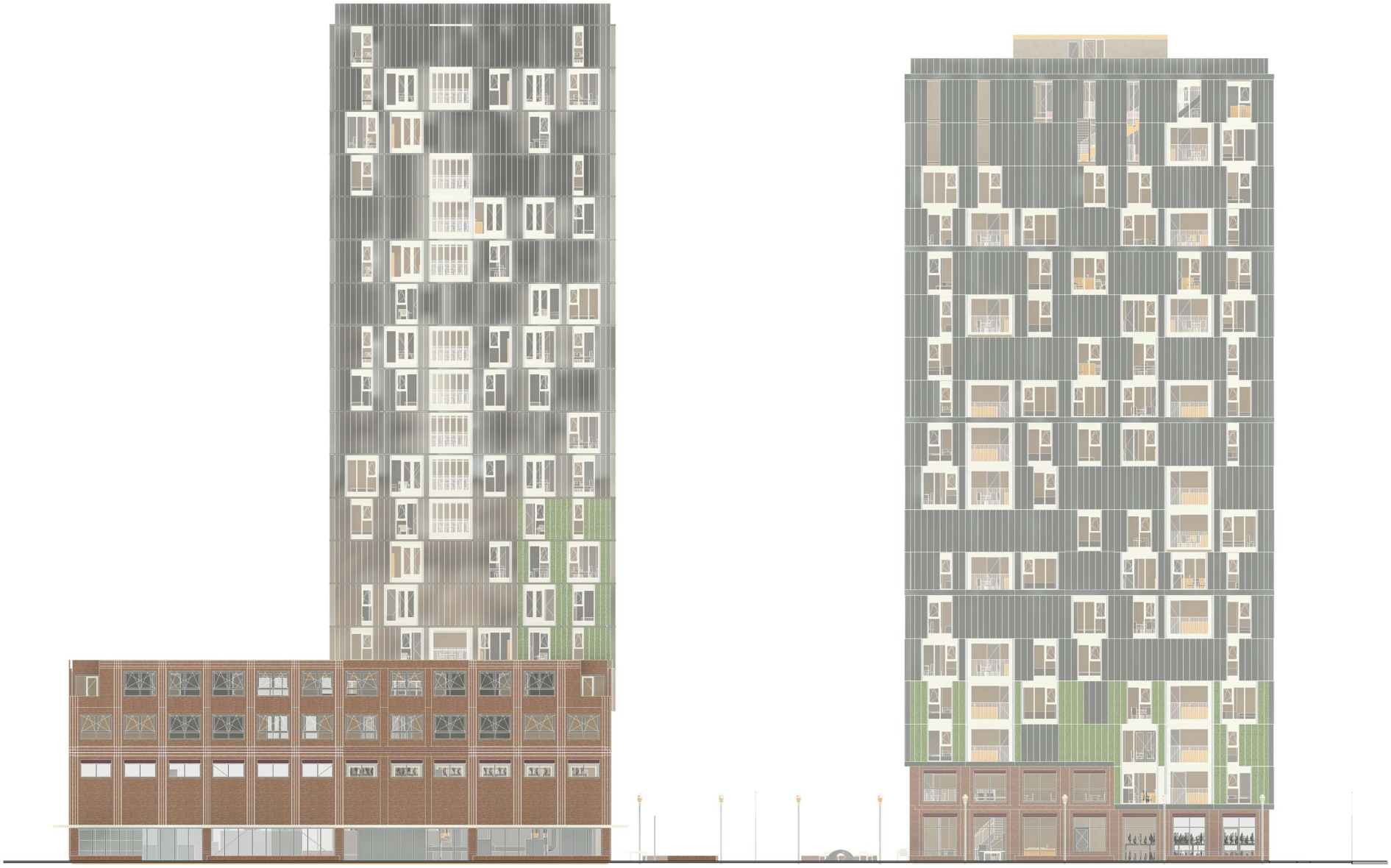


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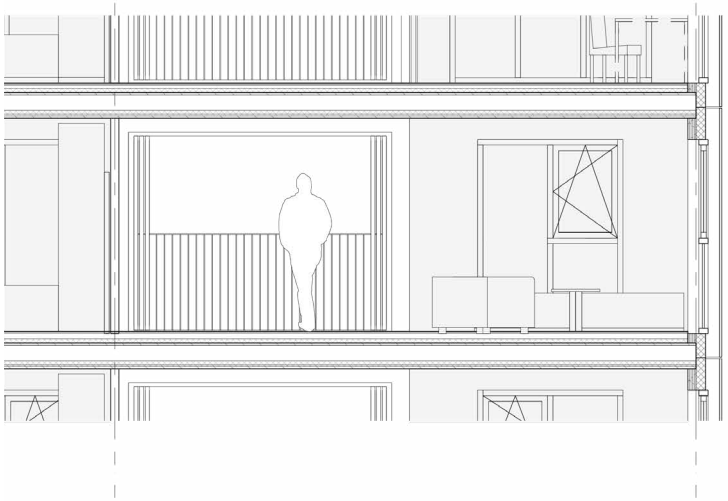
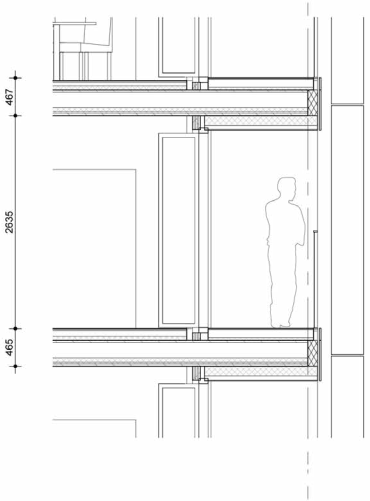
figure: Interio facades (towers face each other)

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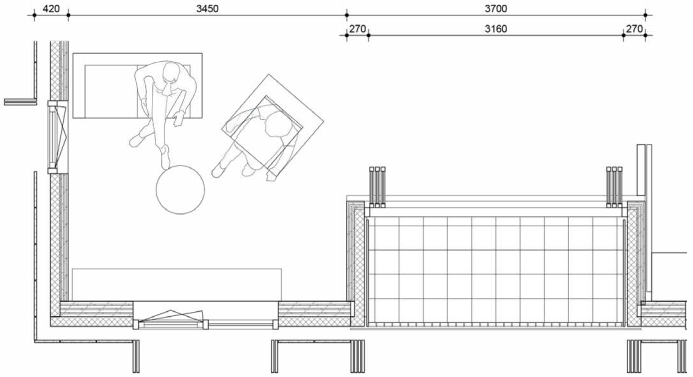
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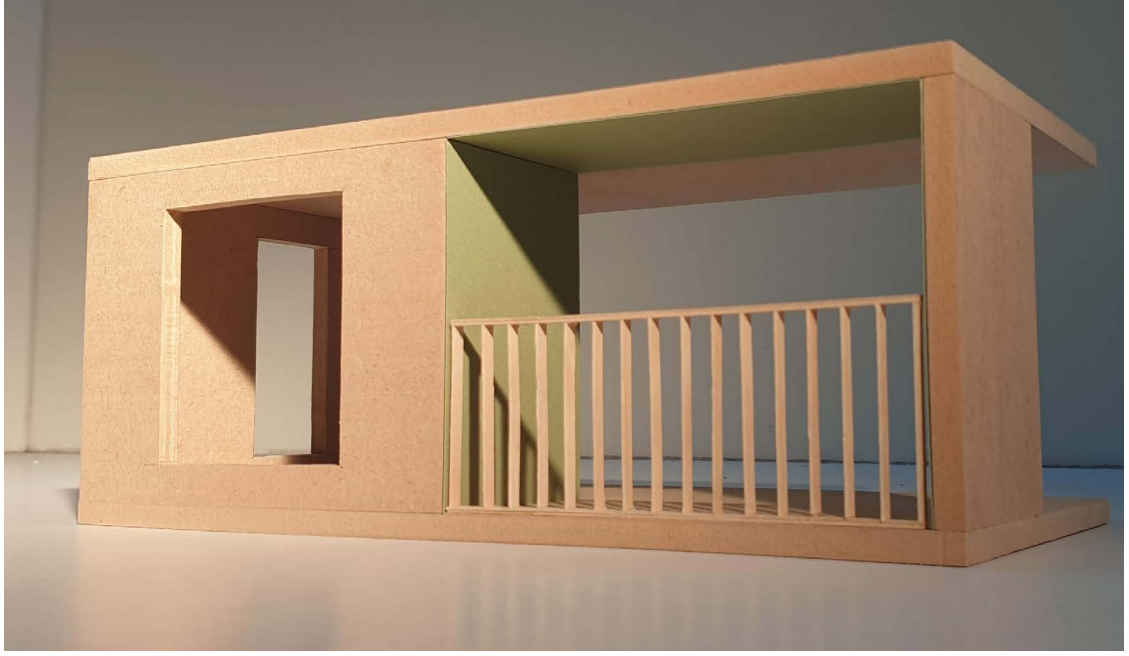
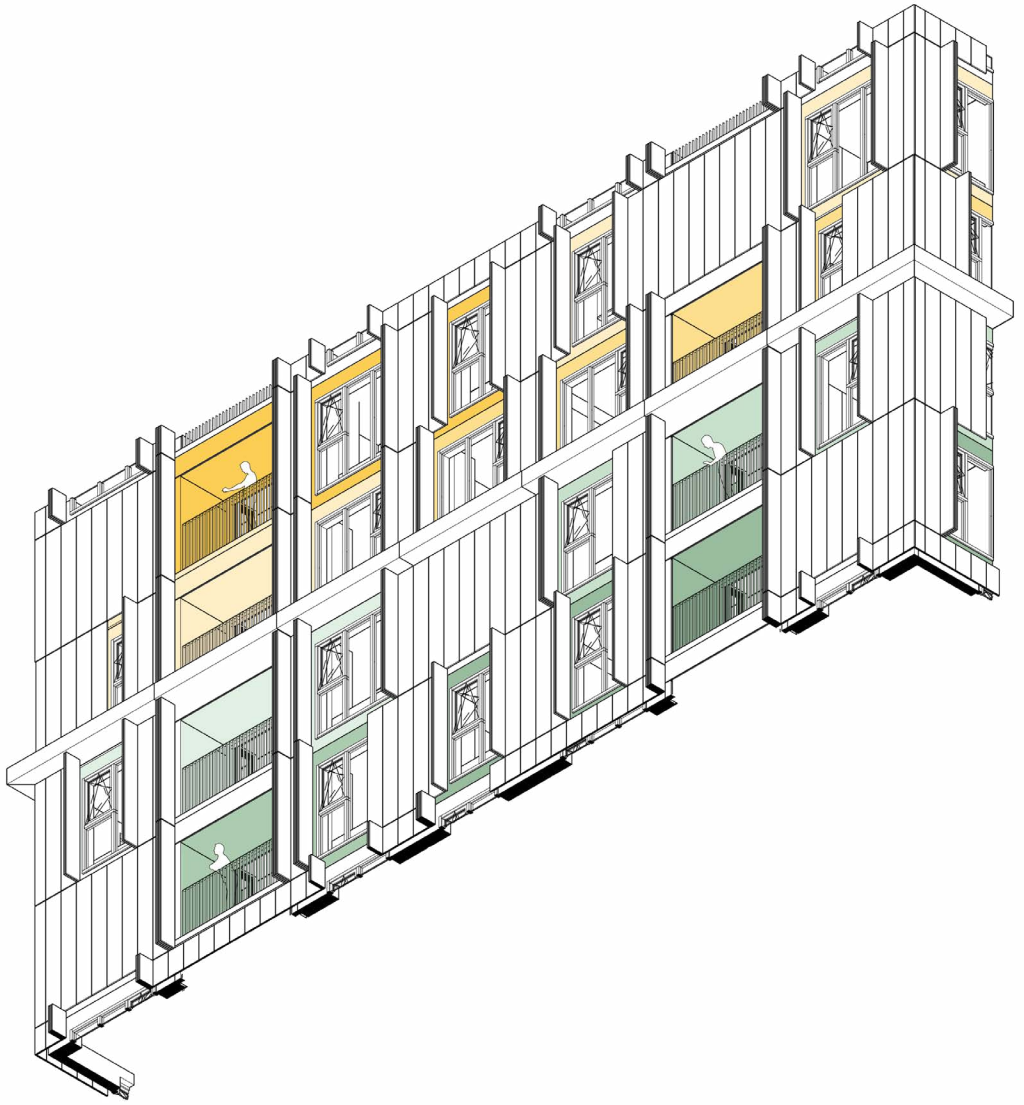


figure: loggia model with coloured surfaces



Detailing

The construction requires as little as possible wet connections to encourage a second life for the different products and materials in the building. The building is isolated with vapour-permeable biobased insulation to naturally regulate humidity and prevent moisture accumulation within the construction.

figure: loggia detail

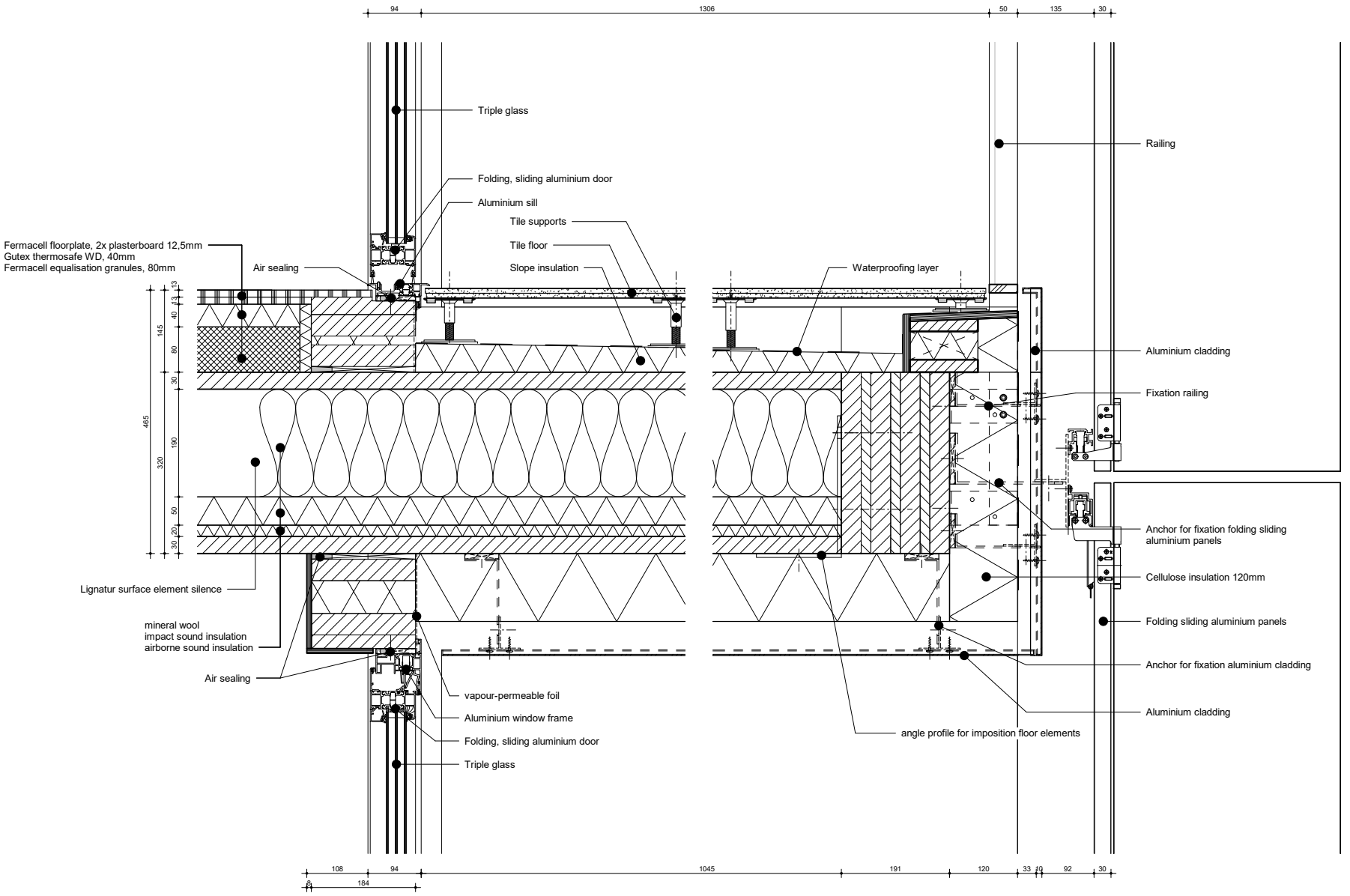


figure: horizontal detial loggia

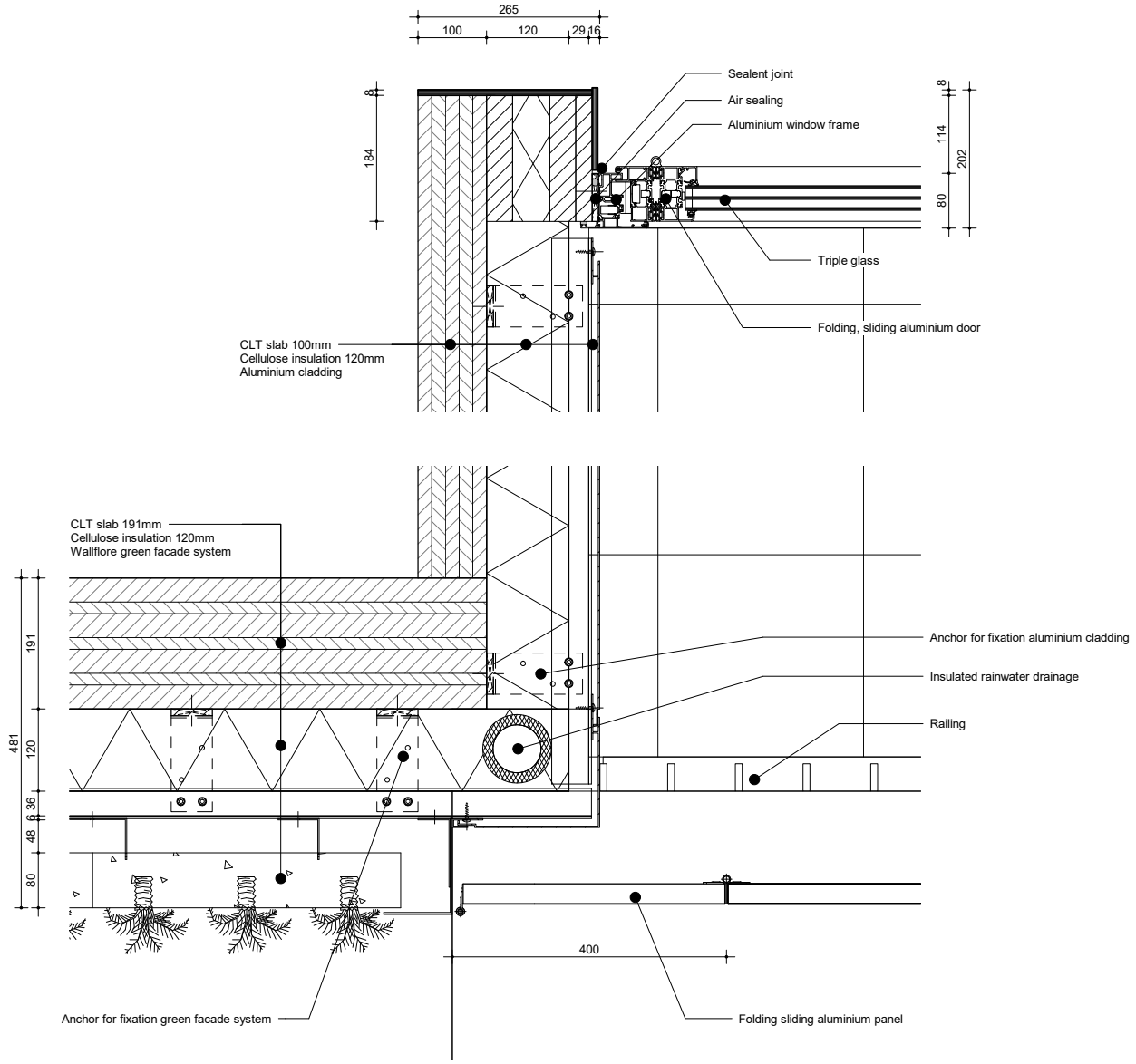


figure: vertical detail foundations

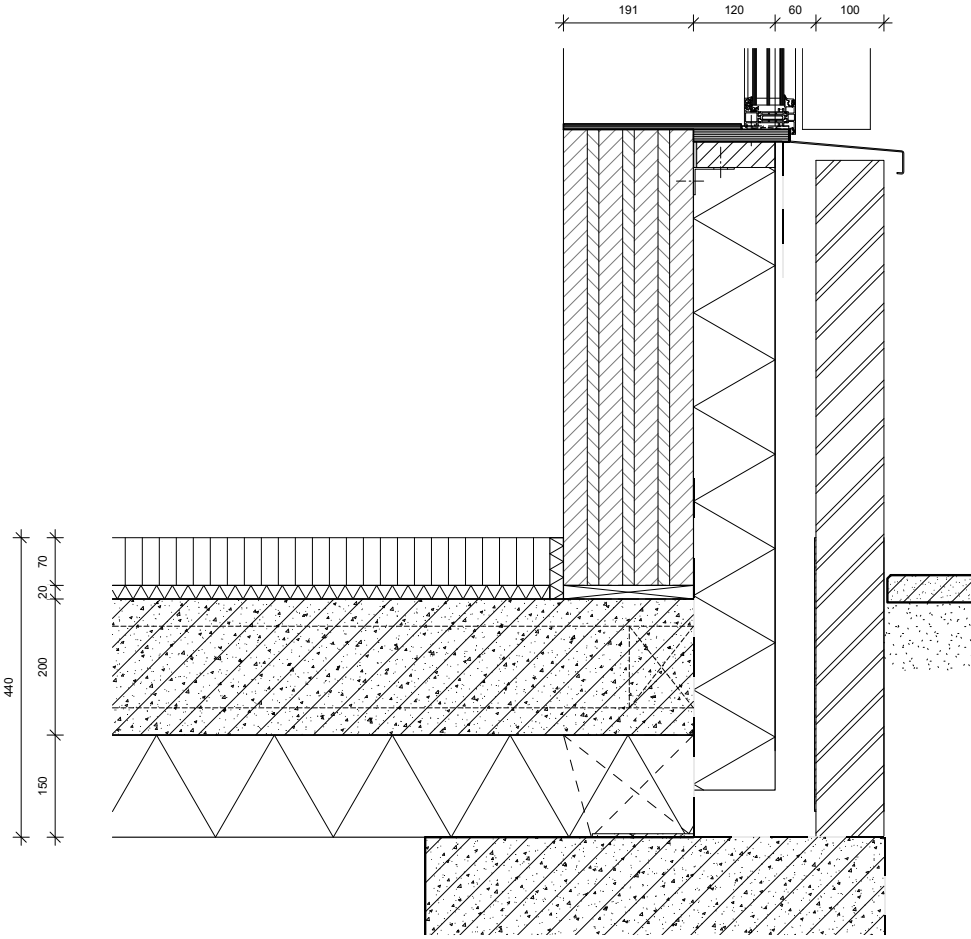


figure: vertical detail green facade

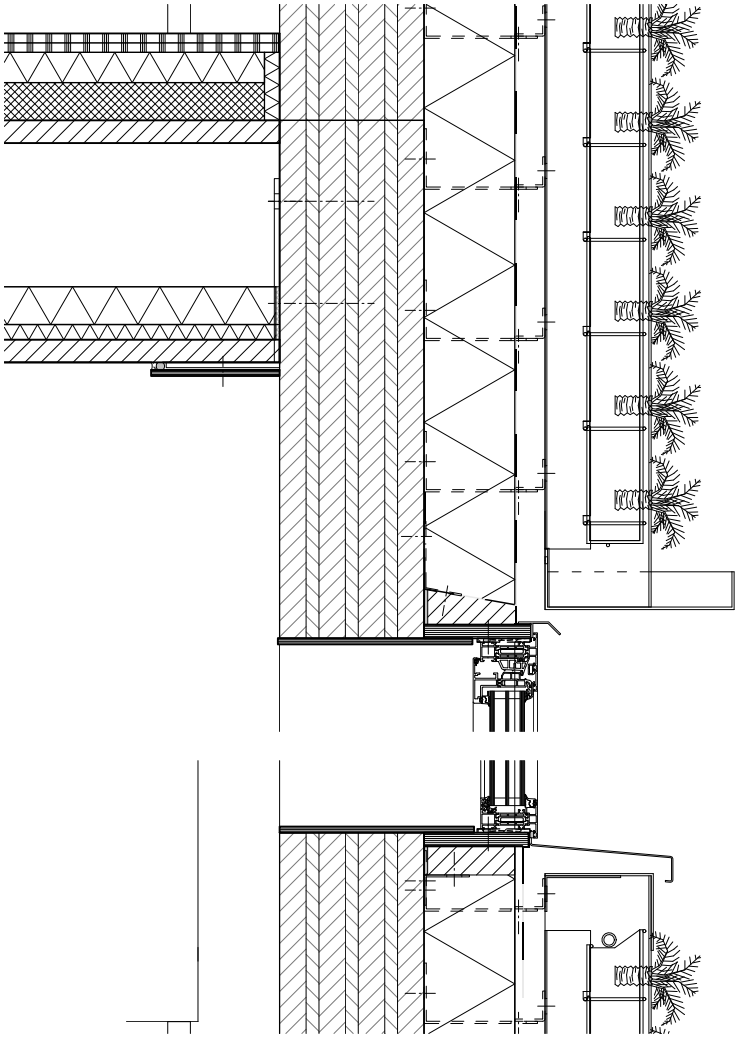
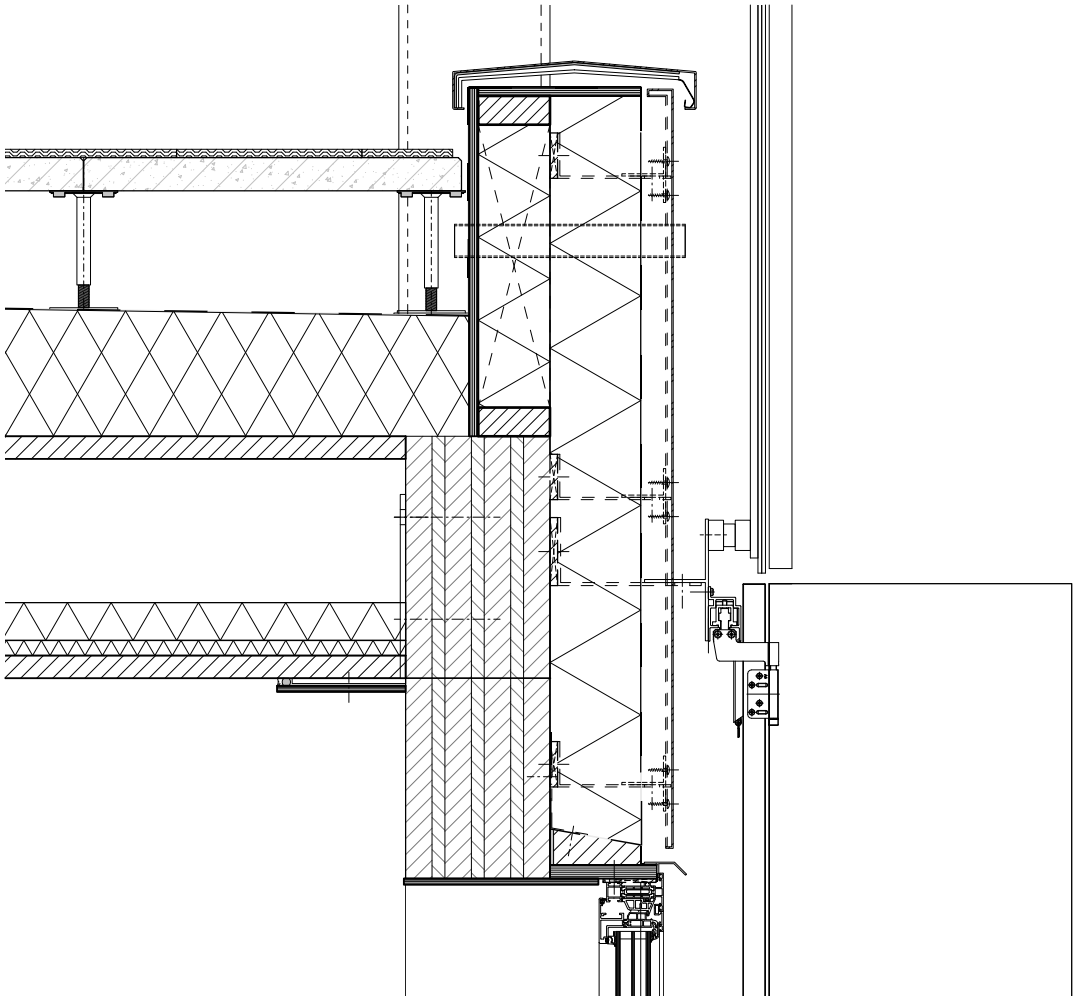


figure: vertical detail rooftop playground



Climate

The building contains the following climate principles:

Solar energy - solar panels on the facades gains electricity for the residents

The heat pump (water-water) - the water-water heat pump gains heat from the harbor to heat the building.

Floor heating - the accommodation rooms are heated by underfloor heating, and the piping is included in the leveling granules. The floor heating system cools the building during the summer by running cold water through the piping.

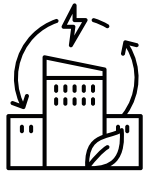
Heat and cold are stored via a heat exchanger in an aquifer of sand in the ground. The building is during the summer cooled by cold water. During the winter the building is in combination with the heat pump heated with ground-water from the heat source via the heat exchanger.

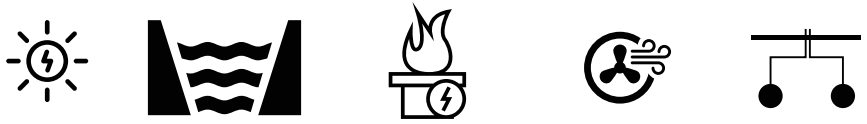
Water collection – Rainwater is collected and used for the watering of green facades and roofs.

Green facades and roofs – green surfaces are beneficial to reduce the urban heat island effect. In addition, green surfaces contribute to a healthy living environment. Green surroundings are beneficial for mental health, improve air quality and reduce noise pollution.

Sliding folding shutters – the sliding folding shutters are controlled by the re-sidents. When the shutters are closed they work as sun-shading to reduce the heating of the rooms.

Ventilation type D – Mechanical ventilation with heat recovery supplies fresh air to the building and extracts polluted air. The heat exchanger regains heat for the outgoing and transforms it into fresh air.





freedom for the user

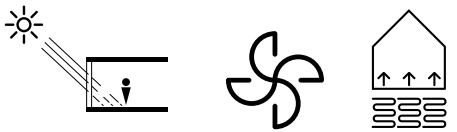


figure: Climate diagram winter

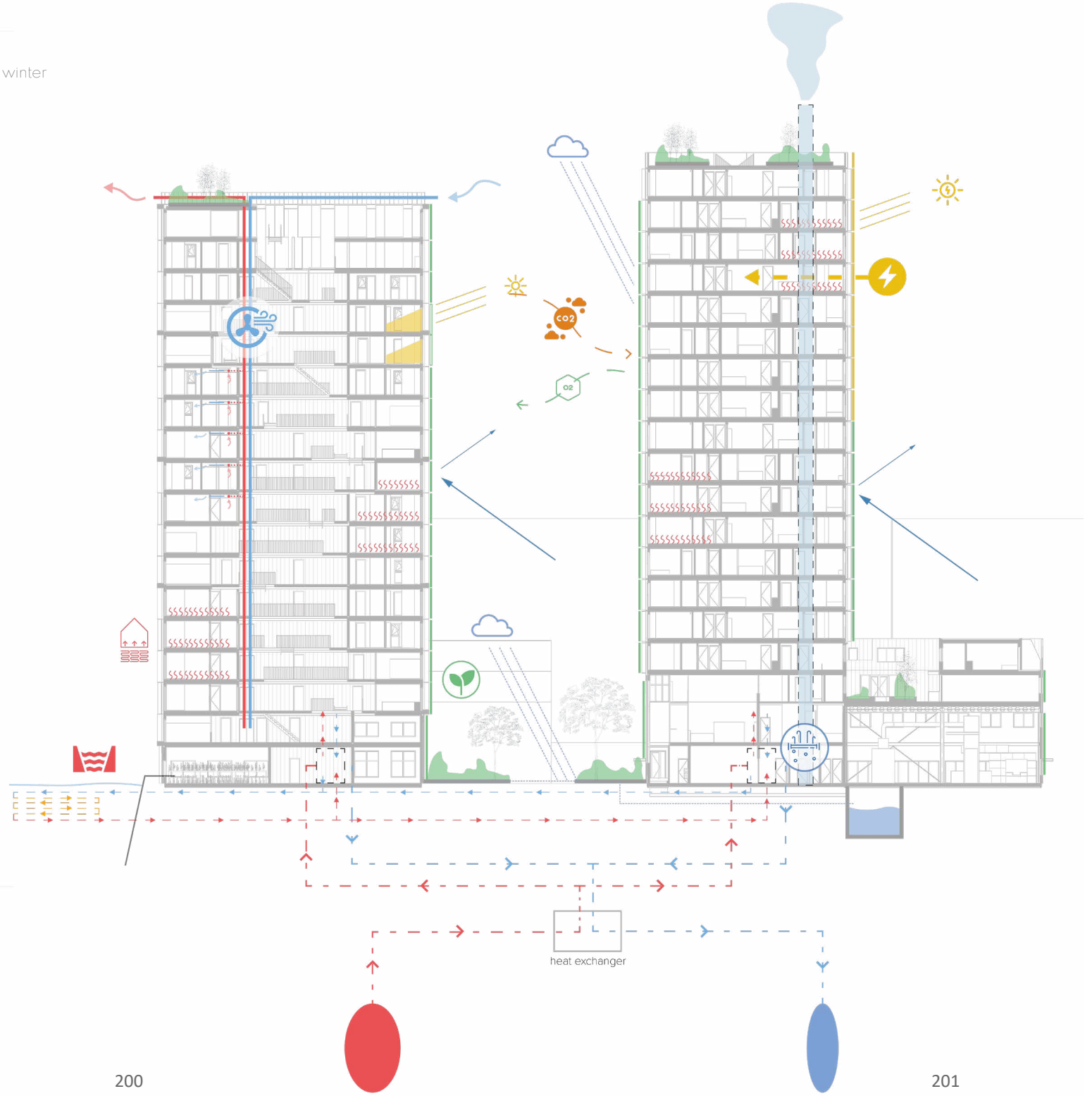


figure: Climate diagram summer

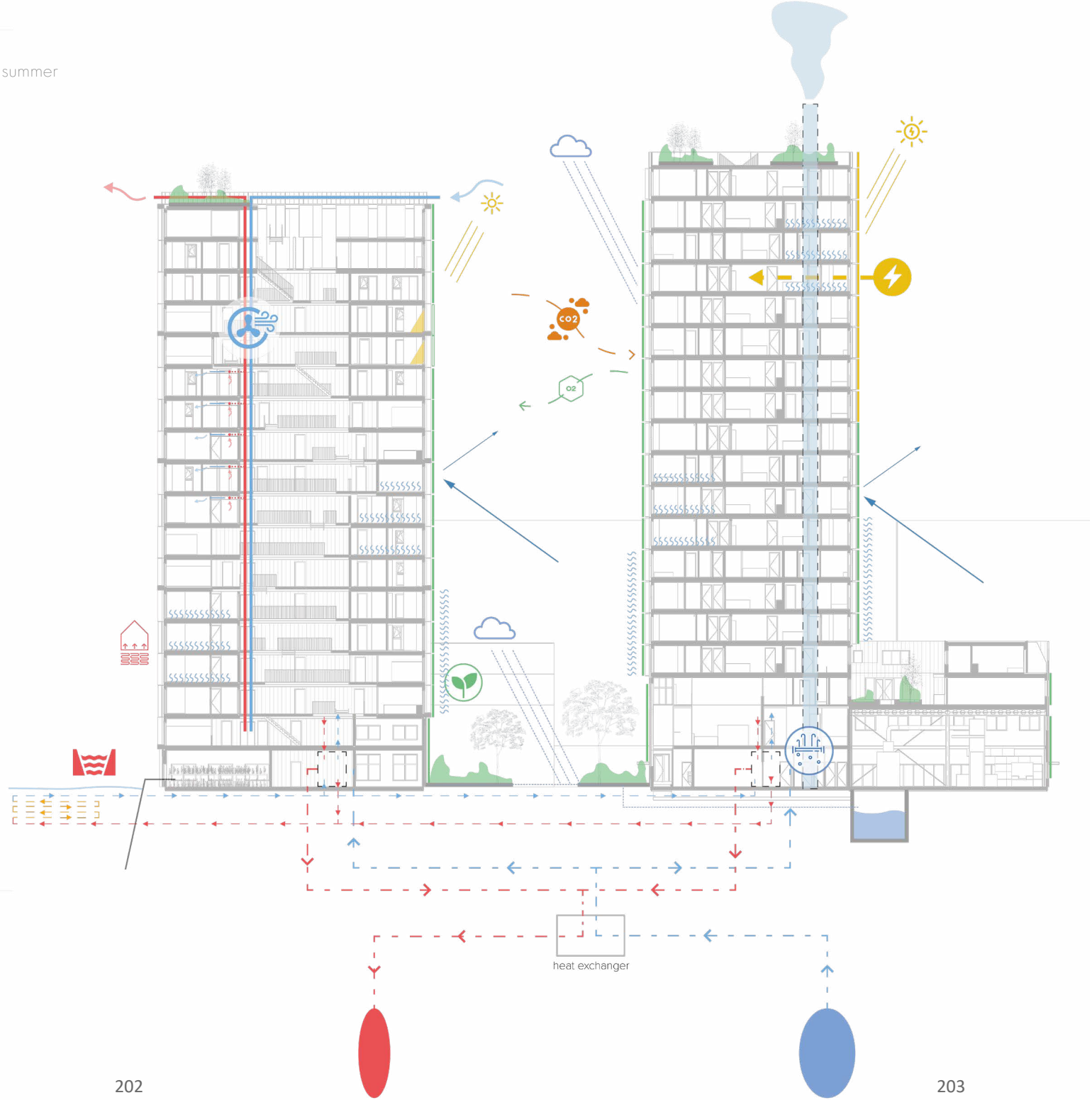
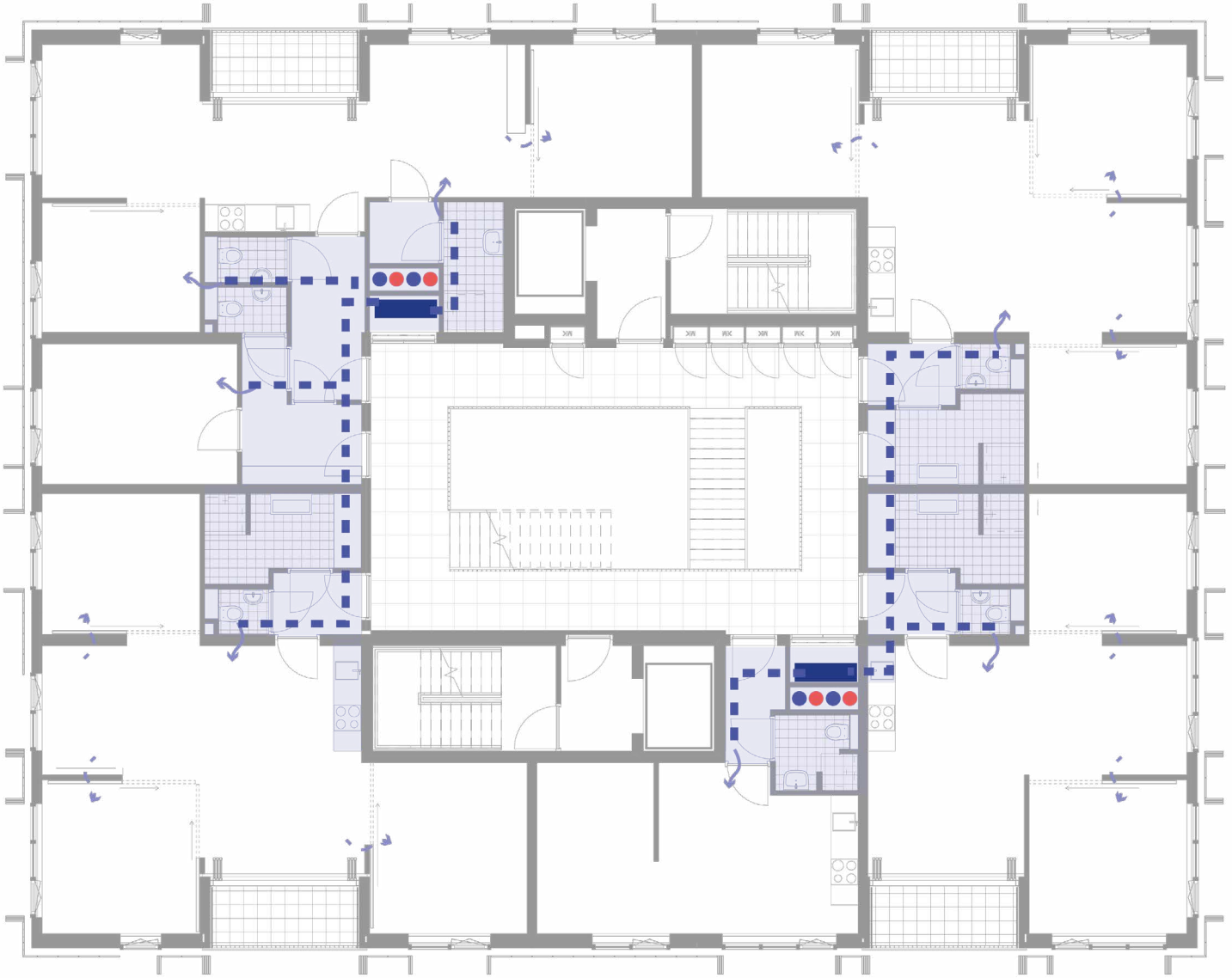


figure: ventilation plan



Ownership

The cooperative model has several benefits for the residential development alongside Keilehaven. However, it is essential to consider that the cooperative model will result in exclusive communities, most likely with people from similar backgrounds. It is important to consider for which social group the cooperative will function. The sharing characteristics benefit people with less economic and social capital the most. Cooperatives can provide social benefits and spatial needs that are otherwise out of reach.

Part 3
Reflection

Rhytms to Encounter

Shaping social infrastructure to encourage synergies between working and living

Siem Kos

MSc Architecture
TU Delft

9 May 2023

Aspect 1

The relationship between graduation (project) topic, the studio topic, the master track (Architecture), and master programme (MSc AUBS)

The studio topic is ecologies of inclusion, where housing is approached as a social practice. My graduation topic focuses on social inclusion, designing social infrastructure as part of the solution towards fragmented societies within a mixed-use project. The approach towards design through the lens of social infrastructure aligns with understanding housing as a social practice. The topic is elaborated on different scales, from the neighborhood, building block, and residential building to a dwelling unit. My graduation project aims to shape opportunities for social engagement between the different user groups and between residents.

Aspect 2

The relationship between research and design

The research helped the design process on two main subjects, the configuration of the dwelling typology and how the relation between dwelling and production is shaped.

Living typologies

The first part of the research is based on participant observations in Kralingen West Rotterdam. The observation of social encounters and interactions in the neighborhood gave insights into the social dynamics in the public environment, which is not one-on-one translatable into the design assignment on the scale of a building (-plot). The social encounters within the (low-rise) neighborhood happen naturally. The participant observation gave insight into possibilities of where and when people encounter and interact. Designing for social encounters and interactions within the residential building is the starting point for the assignment in M4H.

The analysis of Kalkbreite helped to understand how the design of the building can promote social interaction between residents. The findings of Kalkbreite can not be implemented one-on-one into the tower typology. However, the analysis of Kalkbreite helped to put the neighborhood qualities into perspective. The combination of the neighborhood investigation and the analysis of Kalkbreite were the drivers behind the design decisions made during the design. The social 'spine' of Kalkbreite consists of similar qualities as the urban' street.' The shared space network is comparable to the network of public places within a neighborhood, for example, a playground or a park. I tried to integrate those qualities into my design, particularly in the freestanding residential tower. The open loft, which is playable placed above each other, combined

with the shared spaces, promotes encounter, interaction, and gathering between the residents. This design strategy transfers the neighborhood qualities into a residential building. The shared spaces can be seen as the equivalent of public places, and the open circulation system can be seen as the equivalent of the public environment. However, there is a significant difference which could not be unmentioned. The public environment is a place where people, most of the time unfamiliar people, travel through. This gives the public environment an anonym character which is different to the smaller communities in residential high-rise developments.

The tower's design integrated into the manufacturing hall asked for another typology. An open circulation system is economically not desirable due to limited space. This part is designed for families who benefit from close social relations. Cluster living provides the opportunity to achieve extra social capital. The analysis of one of the clusters in Kalkbreite is a practical example where multiple households share a communal space but can still retreat into their homes. This quality is transferred into the cluster typology in the tower.

In both residential buildings, the dwelling units are designed for social flexibility. The dwelling units of Unité(s) give this flexibility to the users by sliding doors, which are half-width of the rooms. Rooms can be socially connected when the doors are opened. That gives, in combination with equal room sizes, flexibility to the use of the dwelling. This concept is implemented in the design of all dwelling units.

Urban mix

Encouraging a sense of belonging when mixing residential settlements with urban manufacturing is essential for shaping resilient communities. Which is vital for a vulnerable living environment. Transparency is one of the key elements to encourage a sense of belonging, visibility of the (sustainable) production process helps with the acceptance of the urban mix. In the design, transparency is a key element for the industry, implemented with the visible backbone within the master plan.

Another critical element for the urban mix is sharing. Sharing encourages a sense of togetherness, which helps build a healthy living and working environment. Sharing starts with the pedestrian zone. The pedestrian zone in Wick Lane functions for residents and workers. It becomes a place where both user groups encounter. The sum of casual public contacts contributes to a sense of social cohesion. In addition, facilities and institutions which both groups can use strengthen the sense of sharing. These qualities are integrated into the design along the Keilehaven. The pedestrian zone is designed with an open character where the different entrances of the residential program, the manufacturing program, and the different facilities and institutions (commercial space, library, and childcare) are located around the same pedestrian square.

The architectural expression of the exterior can promote a sense of togetherness as well. Fading the functional mix by sharing the same architectural expression is a sign to the users of sharing the place. This strengthens a sense of belonging, as seen in Wick Lane, where the light industrial plinth shares the same façade as one of the residential volumes. This approach, blurring the distinction between both functions by the architectural expression, is used in the design.

Aspect 3

Research method and approach

My research consisted of three main methods which complement each other, literature study, neighborhood investigation, and the analysis of case studies.

The literature study is the foundation of this research, with the key readings Palaces for the People by Eric Klinenbeg and The Death and Life of Great American Cities by Jane Jacobs. These books gave the research a clear focus point. The literature study also helped to touch on a wide range of aspects, from the importance of public contacts and the crucial aspects of the urban mix to essential conditions when integrating shared spaces.

Participant observation in Kralingen-West was the main part of the neighborhood investigation. The observations gave insight into dynamics within a multicultural, low-rise neighborhood with a good sense of social cohesion. The encounters were analyzed by decompensating the moments into the different elements that played a role in the encounter, spatially and programmatically. This resulted in valuable insights into the key conditions behind the social structures in the neighborhood. Interviewing residents was not part of the research. That can be of value to clarify and substantiate the findings of the participant observation.

Three case studies were analyzed. Firstly Wick Lane, is analyzed to review the qualities of the urban mix. That gave insights into the function of the pedestrian zone and how the architectural expression can strengthen the urban mix. The second case study is Kalkbreite, which gave insights into how a cooperative can design for the user instead of the main focus of profit-making. Analyzing Kalkbreite played a key role in putting the findings of the neighborhood investigation into perspective. It helped to translate urban qualities into a residential high-rise building. The third case study, Unité(s), is analyzed for the social aspects on the scale of a dwelling unit. It resulted in understanding the value of social flexibility. Connecting and disconnecting spaces is particularly important for affordable housing with limited space.

The case studies were reviewed by architectural analysis. Social aspects could,

therefore, not be clarified. Assumptions of the social aspects could be made with the help of literature. Interviews with residents and participant observations on location would add an extra dimension to the research. That is of value to clarify and substantiate the findings of the case study analysis.

Aspect 4

Academic and societal value, scope and implication of the graduation project including ethical aspects

The Netherlands have a housing shortage, which means that many new homes will be realized soon. Poorly designed residential developments could have negative social impacts, contributing to fractured societies, loneliness, and other disbenefits. Designing for social inclusion is especially important in a multicultural context like Rotterdam. That is key to reducing and preventing inequality. My graduation project is designed to achieve social inclusion through the lens of social infrastructure. That is done by providing opportunities for encounters and interaction. Providing such social contacts is crucial to building trust between residents and is critical to play a role in social inclusion. In addition, designing to provide opportunities for social encounters is key to preventing loneliness. With social media digitalization of services and home delivery of goods, it is easier than ever to isolate yourself. However, there is a sidenote that could not be unmentioned. Not everyone benefits from public contacts. It could have a contractionary effect on introvert-oriented people, who instead avoid contact than possibly encounter ‘strangers.’ It is, therefore, essential to provide the social freedom of avoiding or encountering contact.

Aspect 5

Value of the transferability of the project results

The transferability of my graduation project can be discussed on two topics, the urban mix, and the living typologies.

When combining a residential and manufacturing program, the question of acceptance can be raised. Design strategies, like making the manufacturing process visible and promoting a sense of sharing through a shared pedestrian zone, sharing facilities, and a shared architectural expression, encourage a sense of belonging to shape a resilient living environment. These strategies can and should, be transferred to other urban mix developments. However, other elements play a role as well. A social-economical mismatch will negatively impact the acceptance of the presence of manufacturing activities. It is, therefore, essential to control which manufacturing company will take place in the urban mix and to understand their intentions. A cooperative model helps

to achieve this. They can choose which company will use the industry space and are less bounded to economic dimensions.

The location of this project is M4H in Rotterdam, a former industrial suburb. An urban mix will not work if space for the industry has to be made first. This will most likely result in conflict between the two functions. Transferring an industrial area into a vibrant living and working environment is suitable for industrial suburbs of cities.

The two residential towers have different living typologies. One of the towers is focused on cluster living. Cluster living is for specific user groups who benefit from close social relationships. Transferring this living typology can only be done when the needs of the user groups match the cluster living typology. The other tower contains a relatively more individual living typology, which shares multifunctional and designated spaces. The combination of open circulation with the network of shared spaces provides social qualities not present in traditional high-rise developments. However, integrating this raises the question of costs. A cooperative model is needed to integrate this with reduced dwelling sizes. In addition, openness raises questions for introvert-oriented people who avoid contact with ‘strangers.’ When transferring this living typology, it is essential to include a level of individuality where people can avoid encounters with others.