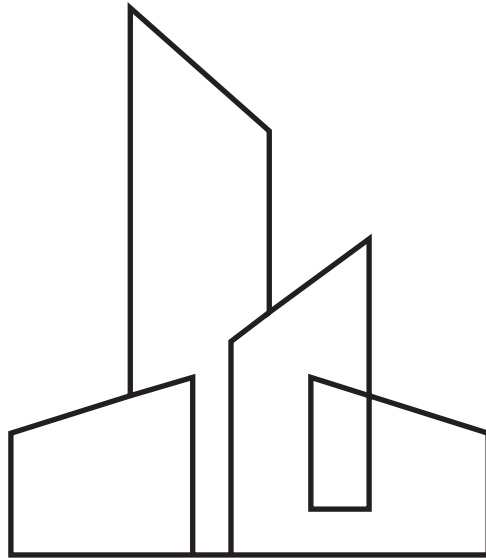


Young professionals in the city

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Designing affordable and suitable dwellings for young professionals

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Introduction

I. Introduction

The housing market in The Netherlands is under pressure, especially in big cities such as Rotterdam. The housing shortage situation is not going to be solved overnight. This creates cramps in the housing market, increases the housing prices to beyond what people can afford, which causes in particular young professionals to fall between two stools. These young professionals earn too much to be eligible for social housing and do not earn enough to be able to own a home in Rotterdam. Many of them, therefore, do not live in a home that would have been their first choice. As the housing shortage is expected to continue, qualitative design choices for affordable housing become increasingly more important. Maximum commitment to achieving housing circulation is urgently needed to relieve the pressure on the housing market as much as possible. More mid-rent apartments are a major contributor to tackle this issue.

Problem statement.

The Dutch free-rental sector (Het vrije huursegment) has attained an increasingly important role in the housing market in recent years. It is often seen as an option for middle-income households such as young professionals. However, in the major cities such as Rotterdam, which experience the highest

pressure on the housing market due to the shortage, house prices are highest and because of the demand for mid-priced rental homes is greatest (between €737.14- €1000). Both elements, high house prices, and high demand ensure that the rents that can be demanded in the market for free-rental sector properties increase sharply. There are cases, especially in popular cities such as Rotterdam, where the rent increases excessively with every new lease. These increases pose a threat to young professionals who cannot find affordable housing and are forced to leave the (inner) cities (ABF Research, 2019). After all, these young professionals fall between two stools because:

1- They earn too much to be eligible for for a social rental homes;

According to a study that has been done conducted by UWV (Employee Insurance Agency;) (Uitvoeringsinstituut Werknemersverzekeringen, 2020a); (Uitvoeringsinstituut Werknemersverzekeringen, 2020b) (Employee Insurance Agency) the average income of the young professionals is between (€43.000 € - €46.000 € per year). Therefore, this salary range is too high to be able to does not qualify them to for renting a dwelling within the social sector. The upper limit annual salary for qualifying for social housing is set to because they earn much more than €39.055

€ per year. (prijsspeil 2020) (Ministerie van Algemene Zaken, 2020). It should be mentioned there is a possibility for the people who earn between €39.055 € - €43.574 € (prijsspeil 2020) to apply for social housing, but, for Rotterdam, there is a wait list of they have to wait at least five years before receiving to receive any sort of response to the application if they live in Rotterdam for example (Rigo research & advice, 2019).

2- They earn too little to be able to purchase a suitable owner-occupied home (home ownership).

In an article by (Rabobank, (2019;), (Rabobank, 2020), it explains the main financial obstacles that preventing the young professionals from purchasing a dwelling. The reason is, mainly, attributed to is their mid-range income which, in turns, does not allow them to get a sufficient mortgage. For example, a young professional who lives in Rotterdam with an average income of €43.000 € will receive a maximum mortgage not more than of €135.000 €, whereas the average houses price in Rotterdam is €265.494 €. As a result the deficiency is 130.000 €. Additional substantial aspect that reduces the mortgage less than 135.000 € is "student loan" (studieschuld)

(Rabobank, 2020). Whereas, more than 51% of the young professionals have at least €20.000 € of student loans (CBS, 2019). Therefore, Such a loan will reduce the mortgage allowed to be received by about €25.000. Resulting a humble mortgage with a sum of 105.000 €. The same thing applies on couples, the maximum mortgage they are able to receive is also lower than would be expected, whereas their final mortgage will be about €217.000 (Rabobank, 2020).

Due to these reasons, young professionals are faced with three options:

A- To rent a dwelling within the middle-rent sector, but due to the mismatch between the supply and demand in this sector the mid-rental segment, the rent increases excessively with each new lease to an extent that if they choose this option the rent would consume about 41% of their income, which is higher than the 33% that Nibud indicates as 'acceptable' (VOGON, 2019).

B- To rent an apartment and share it with several tenants. According to RIGO (2019), this is one of the options that young professionals resort to. However, the odds to become

accepted by the group of people who already live at the shared apartment is relatively low due to the nomination or selection process.

C- To leave the city, for example (back to his/her parental home) (VOGON, 2019).

This unstable housing situation of young professionals who are prone to get lost in the maze that constitutes the rental-housing sector was previously mentioned by Timperley (2019), who referred to the generation of young professionals as 'Generation Rent'. Timperley (2019) writes: "Members of today's Generation Rent who have done everything right - good education, good job - have been priced out of the property market for good.". One consequence of this issue is that people with a median income are forced to move elsewhere in the region when housing options do not fit their needs. This has consequences for the social fabric of urban environments (VOGON, 2019). Thus, as the share of young professionals in Rotterdam is increasing slowly in spite of being an underrepresented proportion of the population (Figure 1), the difficulties experienced on the housing market may lead to an unbalanced social fabric (Gemeente Rotterdam, 2020c).

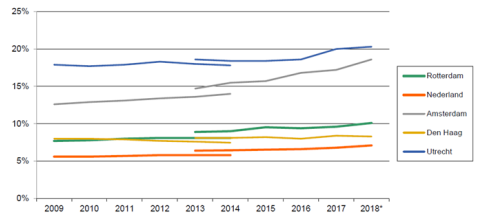


Figure 1: The proportion of Young Professionals in each city of the metropolitan region (Randstad) compared with the national lot.

Research questions.

The main research question as follows:

How to provide affordable and suitable dwelling for the Young Professionals?

The main research question encompasses a group of two sub-questions. The first **sub-question** will focus on what a **suitable** dwelling is for young professionals while the second one will focus on **affordability**. The reason for focusing on suitability is because the design will be targeted to a specific group (i.e. young professionals). Consequently, attention should be given in order to match the design with the lifestyle and the aspirations of young professionals. Thus, the idea is not to look at this issue from a financial lens and then designing affordable dwellings. Their financial problem should not make the humanitarian aspect forgotten.

Sub-questions:

What are the housing needs for the Young Professionals?

What architectural strategies impact the affordability of a residence?

Relevance and position.

Relevance:

The importance of this research stems from its focus on a target group that has a humble representation in the city of Rotterdam. Recently, the municipality of Rotterdam conducted a study which concluded that the percentage of young professionals in Rotterdam as of 2020 is considered too low and has to be boosted to achieve a more balanced distribution of highly-, intermediately-, and lowly-educated residents (Gemeente Rotterdam, 2020c). Therefore, the current study can be considered a continuation of the municipality's research efforts, focusing on dwelling preferences, and lifestyles, and providing design recommendations to the municipality when new residences for young professionals are created.

Position:

As stated, young professionals in Rotterdam face difficulties finding affordable dwellings due to their

median-level income. This problem is well-known throughout the Netherlands and well-investigated. However, with regards to young professionals, there is a lack of insights on what they need and how they would like their affordable dwelling to be designed. It was important for me to ensure this target group would not have to commit to too many concessions. Therefore, the current study focuses on the dichotomy of affordability and suitability and seeks to achieve a balance between them. In this sense, affordability focuses more on the architectural strategies (energy efficiency, construction material, the size of the dwelling), whereas suitability concerns the lifestyle and characteristics of young professionals and on ways to make the (to-be-built) concept meets their aspirations. Another controversial issue that I had to deal with is designing for a whole target group, rather than for a group of 15 individuals. In the literature, it is stated that young professionals have common characteristics, such as not minding shared living. However, do all of them prefer shared living? Note that shared living complies with the concept of affordability. Thus, the current study and housing design explores and focuses on both shared (co-living and cohousing) and non-shared living by keeping in mind the issue of privacy and interaction.

Sources analysis

When I chose the young professionals as a target group, I thought, I would find plenty of sources because, nowadays, this term (i.e. young professionals) frequently used among people, but searching for information about them in the literature is as much difficult as their current problem.

I- Existing information in the literature:

1- 75% of the needed information have been found in the literature such as lifestyle, characteristics, and aspirations of young professionals;

2- Some of the article and the books that have been found are relatively old;

3- Several sources used the term young graduates and attach it with "so-called young professionals";

4- In general, the architectural strategies related-sources "affordability" are plenty while the target group related-sources are limited "suitability". For this reason, the missed information was searched separately.

II- Non-existing information in the literature

1- What is the origin of the term "young professionals"? When it appeared in the literature? Why the range of their age is between 20 – 30 years? Why excluding (MBO) graduates and including (HBO & WO) graduates for example? All these questions are still without unclear and indecisive answers;

2- Regardless of the first 2000s period (the emergence of campus contract), less is written about life after graduation, How do the graduates (young professionals) manage their residential affairs in the city? What is the importance of this phase for them?

3- Because the concept of micro-apartment appeared recently, the Dutch housing law does not contain any law(s) pertaining to it. For instance, what are the minimum square meters for a micro-apartment?

4- During the research, it was remarkable that there is a scarcity of references with regard to young professionals (or even university graduates) while a person can find plenty of books and studies about (students, elderly, etc.).

5- In the studies that I have found (quantitative studies) the age of

young professionals was not clear, they gave general information.

Methodology.

Mainly, the research is characterized as hybrid research and it is divided into two sections:

1- The first section

Within the first section quantitative and qualitative data have been collected through a survey and other existing studies.

A- The quantitative study:

Studying the historical and the current aspect of life after graduation: Here the focus is not dedicated to the target group, but it is more about the importance and the influence of this stage on the graduates. This has been done with the help of three different quantitative studies in addition to my survey (after WWII until the mid-1990s, 2002 until 2012, 2012 until 2019, and currently). The reason for selecting these specific periods due to the existence of certain events that influenced the graduates' life. (Here the word "graduates" refers to young professionals. For example, in the 1970s the literature sources did not indicate the term young professionals). In this step, I have also to conduct a survey (15 respondents in total), with regard to the current dwelling situation of the young professionals who live in Rotterdam

who live in Rotterdam because nothing is found about this issue. Also, to keep the consistency of the collected data in order to have better evaluation.

B- The qualitative study:

Focusing on the qualitative needs of the current young professionals: The fact of designing dwellings for the target group is perplexing because it is not a matter of one or five persons, it is a matter of target group, and it is impossible to ask every young professional about his/her preferences. Here, the focus is oriented towards the common qualitative values that young professionals hold and how these values related to desire, experience, lifestyle, characteristics, and interests. This has also been done with the help of the literature and with the help of the conducted survey (this part helped me to come up with a hypothesis).

The conducted survey has been done also due to "ethical considerations" of the suggested concept (shared living). Although they are 15 respondents, their answers were helpful (see the list of questions and the results in the attachment).

2- The second section

This section is dedicated for (4) case studies and it includes an in-depth analysis of the collected recommendation in step (B).

At the end, the aim is to collect concrete applicable knowledge and to place it within a scientifically informed framework.

Research

Young professionals and housing transitions

1- Who are Young Professionals?

They are the people who finished their higher education in the university, succeeded to enter the labor market, and they are either singles or couples. Thus, it is the stage of life that comes after the stage of the student's life. Also, the Young Professionals are aged between 20 to 30 years, and the future is still open to them. The fact that they were born between 1990 and 2000 makes them part of the "generation Y" which emerged in literature (i.e. the term of generation Y) at the beginning of the 1990s (Fischerová, Půbalová, 2018). Thus, Generation Y as a cohort is also known as, "Millennials", and "Net Gen". The reason behind these terms is due to the fact that part of the millennials is the first adults ever grew up with the technological changes and communications technology (encompassing the internet) which influenced them and become part of their trends. With regard to the socio-economic situation, they grew up in a middle-class milieu. However, their grandparents "Baby Boomers" were more prospering

than their parents (Generation X), which led to characterize them by many commentators as entitled and spoiled. In addition, the number of people in millennials generation who finished their post-secondary education is more if compared with the previous generations, which makes them more open to question and explore everything. Ethno-culturally, they are one of the most diverse generation and more open to other cultures which makes them have higher levels of inclusion and egalitarian positions toward minorities (Ng & Johnson, 2015).

2- Housing transition of young professionals historically

Post-World War II, the age at which young adults leave their parental home to live on their own has been decreasing in the Netherlands. An important reason for this is educational purposes. Mulder and Hooimeijer (2002) studied this phenomenon, focusing on a period of 1946 to 1993. They analyzed in which housing type students lived during and after their graduation, and which factors affected this living situation. The collected data came from retrospective life history studies of the Netherlands Family Survey (NFS), which is a long-lasting study where respondents complete surveys each week, which contain questions about the respondents'

household situation, educational level, labor market activities, and residential history. In total, there were about 3000 respondents aged between 18 and 64.

A- On the national scale (between 1946 and 1993):

Because of World War II, the amount of constructed dwellings was too low. Hence, the shortage regarding the residential sector reached its highest point during the period of post-war. Therefore, the households (on the national level) who lived in sizeable accommodation were forced to share their dwellings with other households even if they were strangers or not family. During the period 1950 - 1975, the colossal amount of the constructed residential premises were beneficial and conduced to repress the high demand, the aggregate shortage attained a share of 2.4% of the whole stock within 1975. However, the situation was not the same within the cities (the urbanized side of land).

One reason for the continued housing shortage in larger Dutch cities is the number of students who move there to start their higher education (HBO - WO). This is because these students often do not leave the city after their studies are done; more students end up staying than there are students that settle elsewhere. This tendency necessitated univer

sities and municipalities of large Dutch cities to initiate projects with dedicated student dormitories and housing facilities, and special programmes that match the dwelling requirements of this group of students, who are mainly either bachelors or in a relationship. By the end of the 1960s, the governmental department responsible for Dutch education subsidized many housing associations in order to start building student housings with the notions of shared living, which constituted housing in which students occupy a room individually, but share facilities such as kitchens and bathrooms. In the 1970s, these specialized housing facilities were transition to the Dutch department of housing and their scope was broadened to accommodate non-students, such as recent graduates. This situation remained the same until the mid-1990s (Mulder et al., 2002).

The housing situation of recent graduates depends on their educational level (see figure 2). The least common type of housing is being a home owner. Most graduates who live in this type of housing received financial aid by, for example, their parents during their time studying and are thus able to get their careers kick started much more effectively. On the other hand, shared living was the most common

type of housing among university students during and after their graduation. The reason for this, is that recent university graduates did not mind sharing accommodations with other tenants (in particular if they were bachelors), were looking for companionship, and/or wanted to save up for purchasing a house. The students and graduates who were living in a rented dwelling mentioned that renting was preferred because they were looking for more flexibility and did not want to be fixed into one place (Mulder et al., 2002).

Generally, highly educated graduates had a higher chance to become a home owner or to rent independently than lowlier educated graduates, in particular after eight years of leaving their parental home and starting their education. This is because after eight years, the overall larger financial means that are at university graduates' disposal start to make a difference in terms of being able to purchase a home. Moreover, graduates who remained in a sharing accommodation after eight years of having left their parental home more often did

not live in a large city, at least during the period that was measured, which was from 1946 to 1993 (Mulder, 2003). Beer, Faulkner, Paris, and Clower (2011) elucidate that the fast, problem-free transition of city-based graduates after graduation to the housing market from 1945 to the 1990s can be attributed to the knowledge of the housing market that was obtained by students over the course of their student life. The acquired experience enhanced their ability to live independently and be able to choose a suitable dwelling.

B- On the polycentric region scale (Randstad between 2000 and 2012)

The cluster of the four big major cities of Amsterdam, The Hague, Utrecht, and Rotterdam (also the small cities in between) is known as Randstad.

By the beginning of the mid-2000s, the new graduates tended to stay in the student housing for more years up to the age of 35, and even sometimes they formed families, mainly, due to economic circumstances and lack of dwellings that they could afford. Therefore, this tendency increased the pressure on the housing providers (Trouw, 2003). Especially, that the

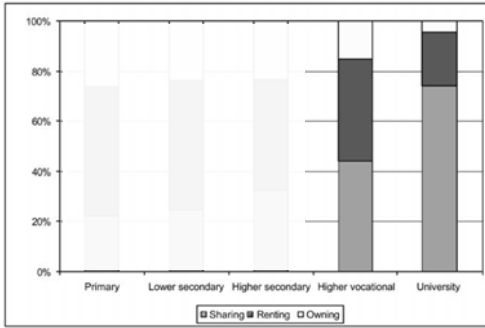


Figure 2: The housing transition differentiated by the level of education until graduation (the sum of all 3000 respondents)

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indwelling of the graduates in their rooms for an indefinite period which is the Campus Contracts (Trouw, 2003). This form of contract is temporary and conditional. Wherefore, this kind of contracts give the tenants (in this case the students in higher education) the chance to rent a student dwelling that related to their educational organization as long as they comply with the requirements in higher education, but once they graduate (or drop their study) they will be given a period of six months to find another accommodation; if they could not succeed to find any other dwelling, then their housing provider can dislodge them (Huisman, 2016). The officials of the housing provider in Randstad Duwo urge the young professionals to find a job as fast as they can, but also to make an extensive research about the possibilities in the housing market that they want to move to even during the six months period. Especially, if they want to stay in the region of Randstad because both of (work and accommodation) are associated with each other and influence each other (Duwo, 2019).

On the Eastern part of Randstad, specifically, in Utrecht. The SSH (Stichting Studenten Huisvesting/ Student Housing Foundation) dealt with this issue of young professionals by offering for them accommodation by extending the indwelling time up to the age of 30 (SSH Long Stay), but here the person must present evidences for his entitlement to stay for a longer time. However, after this age they have to find other type of housing with keeping the option of "campus contract" (Utrecht University. n.d.). By the end of 2012 the municipality of Utrecht in collaboration with SSH made a survey with a group of young professionals (ex-graduates), in order to see the influence of this policy on their housing situation (Gemeente Utrecht, 2013).

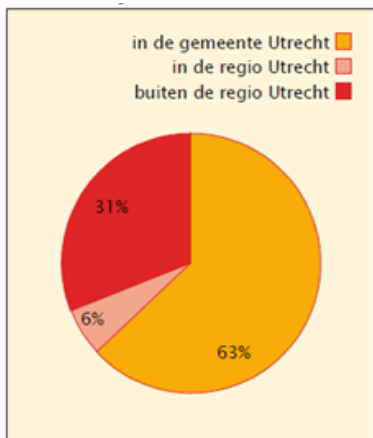


Figure 3: Location of current dwelling

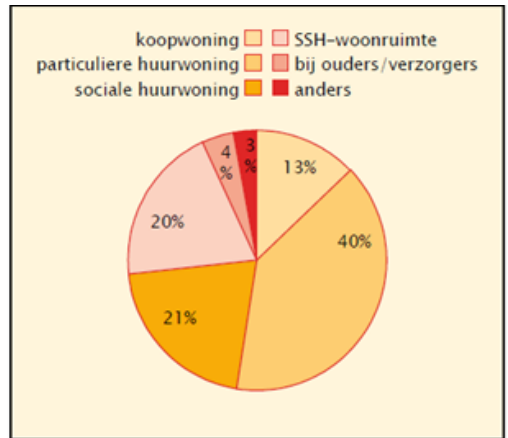


Figure 4: current living situation

Most young professionals that answered the survey (in total 501 respondents) found accommodation in the municipality of Utrecht (63%). A slight proportion (6%) of them succeeded to find accommodation elsewhere in the region and the rest (almost a third) outside the region of Utrecht (figure 3). Two-fifths of the graduates are living in a renting accommodation from a private landlord (figure 4). More than a fifth live in social housing of a corporation, and approximately the same proportion rent an SSH accommodation (without a campus contract). The other young professionals live in an owner-occupied home (13%), with parents (4%), and (3%) have a different living situation (anti-krak house, temporarily moved in with a friend) (Gemeente Utrecht, 2013).

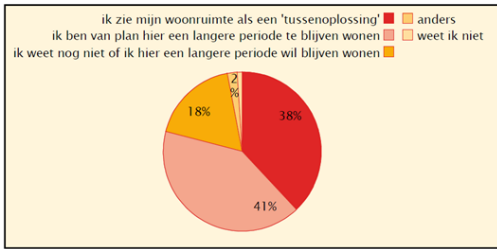


Figure 5: How long do you think you will live in this accommodation?

The current living situation is considered as temporary accommodation for most of the young professionals. Two-fifths of them (38%) indicate that they see the current living situation as an 'interim solution' (figure 5). This applies to all young professionals who currently live with their parents/guardians and to a large proportion of those who have SSH accommodation. About the same proportion (41%) intends to continue to live in their current living space for a longer period of time (Gemeente Utrecht, 2013).

C- In Rotterdam (from 2012 until 2019)

The number and the share of highly educated people in Rotterdam increased slowly but steadily between 2012 and 2018 from 26% to about 30% respectively; this increase mainly coming from young professionals, and to a lesser extent from other educated target groups, and the young professionals form about 33.25% of the total educated inhabitation in Rotterdam

during 2018 (see figure 6 & attachment 3) (Gemeente Rotterdam, 2019). The reason behind this tendency is more young people, especially the highly educated after their graduation, want to live in urban areas such as Rotterdam because of the employment opportunities, cultural and recreational facilities (Sociaal-Economische Raad, 2019) and (Kooiman, Latten, & Bontje, 2018). Also, factors that make a city attractive to this group are, according to Florida, that a city offers these people opportunities to develop both personally and in terms of career (Florida, 2008, p. 19). However the portion of young in Rotterdam is humble comparing with Amsterdam and Utrecht.

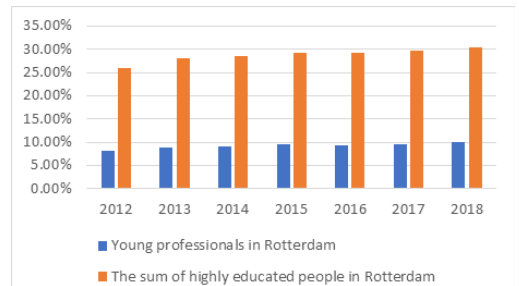


Figure 6: The proportion of Young professionals compared with highly educated residence in Rotterdam.

A recent survey has been conducted by the author by asking 15 young professionals who:

- o Recently finished his/her higher education (HBO or WO);
- o Aged between 20 to 30;
- o Succeeded to find at least part-time job in the labor market;
- o Only singles or couples;
- o Lives in Rotterdam.

The main purpose of this survey is to ask about their current accommodation, and their housing transition. The results show that almost all of the 15 respondents who are between 20 and 30 years old, still live within the circle of the private rental sector, specifically, in small studios or “friends apartment”. The recently graduated students (5 respondents) who lived in student housing had to find an alternative residence hastily due the campus contract in a manner that the new residence is close to their work and to the city center. Therefore, this is their first housing transition after graduation. While the housing transition for the young professionals who are (24 and older) tends to increase up to (2 times). The recent graduated and the single young professionals show a tendency to live in shared living residents such as “friends apartment”. On the other hand, the couples in this survey show a hesitation to live in a shared

shared house and they give the priority to indwell in small studios.

In general, about half of the respondents have moved two times before living in their current dwelling. Although that they succeeded to find a dwelling in Rotterdam but half of them are still confused about whether or not to stay in the same residence whereas the second half considers their current residence as an “interim solution” in the hope to find a dwelling complies with their aspirations and needs. Primarily, all of the respondents related this confusion about their current residence due to price/rent related issues (see survey attachments).

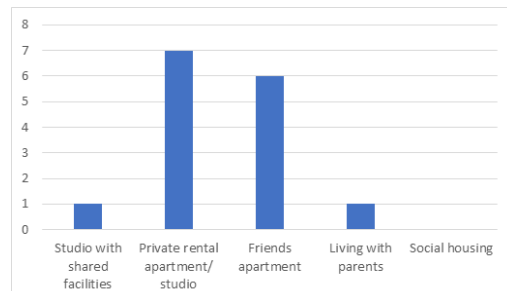


Figure 7: Current dwelling typology of the respondents (created by author)

Lifestyle of young professionals.

Less is written in the literature about the young professionals who are either singles or couples without children, especially how they live or even work in the city. The young professionals are more aware of the dichotomy of work and life. They believe that giving attention to working too much will lead to adverse effects on their mental and physical health. Accordingly, they are conversant with the importance of their career life, but young professionals prefer to enjoy their life a bit more than spending all the time working, which indicates that they have high levels of self-awareness (Nicole, Mary, Amy & Amy, 2012). But the question here is: how do they do that? (Morgan, 2019) and (Schmid, 2019, p. 21) give more elaboration about this issue. The key word in this equation is **Sharing**. The young professionals who refused to live in the suburban and decided to live in the city are aware to the fact and the difficulty of owning a dwelling in the city, but this reality does not preventing them to seize the moment, the moment of experience and exploring. They want to be freed by this life choice, rather than feel limited by it. They prefer to share a dwelling rather than living alone, attending cooking class or going to drink cup of coffee outside rather than just

sitting and watching TV. This inclination brings for them more lasting joyousness if it is compared with expending much money on things. What also they highly value from this willingness is to meet people and making friendships with others which helps them to expand and enlarge their social network (Morgan, 2019). The sharing in this context includes two notions of shared living for young professionals Co-living and co-housing. Whereas, in the (co-housing) the tenants share the facilities within the apartment such as the living room and the kitchen, while in (co-living) the residence share communal rooms/facilities within the building such as laundry rooms (Schmid, 2019, p. 193). However, the topic of shared living in general should be investigated in two aspects. Firstly, it is better to take into account where to implement the notions of co-living and co-housing (Schmid, 2019, p. 193), whereas this issue could be tackled through research by design. Furthermore, the social interaction should be also studied in relation to public/collective and private spaces. For example, the social interaction in the case of shared living is recommended, but the distinguishing between public/collective and private is also substantial. This necessitates during the design process a layout enhances and allows the residents to interact outside the dwelling and maintaining the privacy of the

dwellers within the dwelling (Francart et al., 2020), (Schmid, 2019, p. 15).

What young professionals provide to the city of Rotterdam?

The young professionals have the potentials to enhance the economic balance of the city that is because of their productivity, entrepreneurship, and purchasing power. They lead to an improvement to the economy “*trek in de schoorsteen*” so that every Rotterdammer can ameliorate his or her own position. Likewise, Employers always follow the young professionals, for example, in the Seattle area big tech companies like Microsoft and Amazon have transferred their places of business from suburban to the city center of Seattle in order to be near to young professionals (Cervero, Guerra, & Al, 2017). Young professionals are also generally healthier and more self-reliant. Thus, by the arrival of more highly educated people in, the city will ensure that the pressure on social services decreases because the higher educated are generally less dependent on (local) government. At the moment, the city is already unable to cope with the pressure well, while the withdrawal of the government will mean an increasing call on people’s self-reliance. In addition to positive economic effects,

young professionals are also necessary for a stronger social city. A city achieves its social objectives faster with a sufficient number of highly educated people. The young higher educated are generally healthier and more self-reliant. Wherefore, the social involvement of the highly educated is generally greater: they are more active than average in voluntary work and support social goals in a financial and material sense. And above all, they are articulate citizens, so they can use their involvement and organizational strength for the neighborhood and local residents. Thus, more initiatives will arise and more encounters and fleeting contacts are also important for a good atmosphere (one does not have to tea together, but the street interaction is pleasant). In terms of social impact, it helps if there are strong role models everywhere. That would reduce social problems. The idea is that if you never come into contact with highly educated people, you will not easily get the idea to do that or to arrange it for your children. As an example, Rotterdam South is cited as a place where many children live whose living environment is often limited to their own residential area and where fewer contacts are maintained with people who study or work. Young professionals, therefore, serve as an example (Doff, & Sluis, 2017).

What provides the city of Rotterdam to young professionals?

Young professionals are inclined not to own private cars because the lifestyle that depends on automobile-demand can lead to direct economic consequences on their personal pocketbook. For them, owning a car, at least in the longer-term, necessitate extra charges. Think about paying for parking, maintaining the car, paying for the insurance, etc. Therefore, young professionals trend toward living in neighborhoods within the city that have public transportation & walkable places with mixed uses. For instance, 56% of young professionals in the USA want to live in walkable neighborhoods in a city with mixed uses (Cervero, Guerra, & Al, 2017). The municipality of Rotterdam is already working on this issue. Currently, the municipality working on a traffic plan called 'binnenstad als Citylounge', and one of the outcomes is that the city center of Rotterdam will become car-free in the coming years, such a plan offers a good chance for many target groups to live in Rotterdam such as young professionals (Gemeente Rotterdam, 2020).

Living in a dynamic city with more leisure facilities is also important for young professionals because they are more drawn to spend their free time going to a concert with friends,

eating out, having coffee in cafes and other life experiences, so for them the absence of attractions that stimulate them to spend their free time cheerfully in the city leads to decrease the chances to stick around for (Cervero et al., 2017). According to (Singeling, 2019), the quality of life in Rotterdam center, North, and South is improved in the past three years because of converting a plethora of empty stores into leisure facilities such as clubs, cafes, and restaurants. Also, the multicultural character and the diversity of Rotterdam can be clearly seen and the menus of the restaurants are an example to prove that. These new facilities helped to maintain the liveliness of ambiances until late hours. These factors encouraged many young professionals who live in the polycentric region to come and spend their time in Rotterdam.

Another important aspect that young professionals will take into account is the availability of jobs in the labor market. For them finding a job will contribute to the fact that they can eventually live an independent existence, more security, and self-confidence in order to ensure that they can build their own life (Ng & Johnson, 2015). Currently, the goal of Rotterdam's economic policy is to create "an attractive city with a strong economy" in the city. On the other hand, the municipality of Rotterdam acknowledges

that the number of highly educated people in Rotterdam is around the national average, but compared to the cities of The Hague, Amsterdam, and Utrecht, the city has relatively few higher educated people among its population (36% of the Rotterdam population is highly educated compared to almost 60% in Utrecht and Amsterdam). Rotterdam would like to attract highly educated people (such as young professionals) by providing more job opportunities because it believes that higher educated people can boost the economic development (Doff, & Sluis, 2017). For example, the “maker’s district” that will be established in Nieuw-Mathenesse can provide a promising atmosphere for this golden chance.

What is driven from the previous findings in order to apply it on the design?

Target group-related requirements:

1- It is now clear that there is a severe lack of dwelling that falls between the range of social housing and free rental sector, so the young professionals who have a middle income are totally excluded from the housing market. The maximum rent of the social house in 2020 has been defined by the (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020) as 737,14 €, and the rent in the private sector the rent increases excessively. Buying a dwelling need a permanent contract, redemption of the study debt, and savings deposit. For those reasons there is a drastic shortage of 'middle-class' rental apartments that fall within the following rent range ($737.14 < \text{middle-class rent} > 1000$) (ABF Research, 2019).

2- Beside the rental aspect, also, the social side should also be taken into account. That is due to the lifestyle and the characteristics of the young professionals that promote the sharing aspect in this equation. Here, a distinction between public/collective and private in a manner that enhances the interaction within the building and maintains the privacy to the dwellers in their apartments.

Building-related requirements:

Because the task is also to tackle the issue of affordability, it is fundamental to look at the issue from a different angle. The angle of reducing the cost of the building in order to comply with the affordability. This can be achieved according to (Francart et al., 2020) by keeping in mind the efficiency factor regarding:

1- The material of building construction: here it is crucial to choose the building construction material that responds to the need of the selected theme. According to the model of (Hoyt, 2020) concrete is mentioned as an advisable construction material in case of affordability;

2- Every meter counts: the compactness of the dwelling is also required in order to reduce the cost (Francart et al., 2020). Therefore, the "micro apartment" is a promising option in order to fit the affordability needs (Collective,2018), but what is the size range of the micro apartment? ;

3- Energy efficiency: it is right by sharing the energy uses per person (Francart et al., 2020), but it is better to implement various sustainable energy supply techniques rather than the conventional ones (Tummers, 2017).

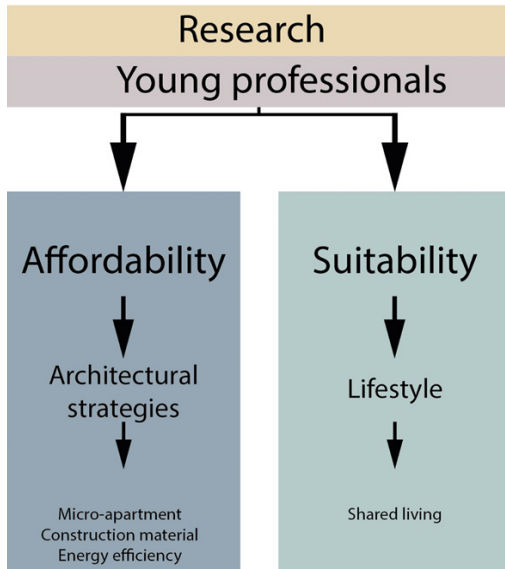


Figure 8: Current dwelling typology of the respondents (created by author)

Shared-living

Shared living as a need to change

Historically, the initial form of housing was shared living. Therefore, Shared Living is defined as “the actual heritage of how we dwell”. However, in the last decades, we have lost our experience with it (Schmid, 2019, p. 10). In the Netherland, after World War II plethora of houses had been built but the Dutch family with children was taken as a norm to build these houses; because the person was expected in the community to form a family and have children at an early age.

Nowadays, these outmoded and aged options of designing the dwellings are still taken into account, new typologies are needed (VROM-raad, 2009), because the norms, taste, lifestyle, are completely different than yesterday due to the information technology (Schmid, 2019, p. 193). As a result, the people who are looking for change have become conscious of this reality (Zapel, 2017, p. 38-39). Thus, the issue with young professionals is that they want to make changes in a manner that matches their needs and away from the outdated solutions, but coming with new living biography needs solidarity and relying on each other. Hence, the importance of sharing comes from the absence of any form of coercion. Values such as justice and solidarity are the basis of sharing. This, in turn, promotes the correlation of exchanged interaction. Which leads to optimizing and consolidating the values of the person and the group as a whole (Schmid, 2019, p. 21), (Zapel, 2017, p. 38-39).

Dichotomy of public/collective vs private

In the shared living it is essential to consider the issue of what private and what public because of the fluctuation of the spaces between them. Thus, a clear distinction between these two poles is required, this distinction can

be implemented, primarily, by the mean architecture design and thus resulting in a clear spatial organization.

The private emerges from the public that is because in the living environment if the public excluded, that will lead to the prevailing of the counter-world which is the private. Also, the degree of accessibility plays a pivotal role in this sense because the space that is accessible by anybody at any time is no longer private while private has limited access levels, resulting in privacy. For example, even within the home, the person needs a private interior space (such as bedroom), because every individual needs a domain to express his/her individuality within, to have a distance from the outside space and societal rules, as Hartmut Haussermann says "Private space, a space for the unfolding of intimacy and individuality, and space protected from the eyes of others must be differentiated from other interior living spaces".

The issue of private space and privacy is crucial, in the case of shared living is also needed because the people who live in shared housing also need a space for seclusion, tranquility. On the other hand, the public space and the transition from public to private are also significant. For instance, the degree of publicness of a hall can, also, be defined through the activity that happens within it, which in turn,

will influence the nature of this hall. This is resultant from the activity that taking place is private or public, so this leads to a point that the hall is neutral, but the action that carried out in this hall specified the level of its publicness. This actually leads to a questioning point about making a spatial hierarchy between private and public.

Aldo van Eyck and Herman Herzberger introduced the semi-private or semi-public especially for the case of shared living. The semi-public/ semi-private is an intermediate zone between public and private or inside and outside. The role of the intermediate zone is "to guide the experience of entering a place". Therefore, the aforementioned points are taken into account in any residential project that goes about shared living (Schmid, 2019, p. 15-16).

Besides the distinction between public and private, The collectiveness is also important, and to consolidate the collectivity among the residence the model PLACES of the Department of Urban Development in Singapore will be also applied in the public spaces (in the elevated inner courtyard and in the site). This model contains six-point, which are the result of research on what makes any public place more interactive:

- **People and Programming:** a public space without attractive programme reduce the attraction chances;
- **Landscape:** the presence of greenery (even few of it) has an significant positive factor to make a public space a destination for recreation and leisure;
- **Accessibility:** ensuring that the access to the public space is convenient and easy;
- **Comfort:** providing urban furniture helps to generate cozy ambiances;
- **Eye for detail:** the excellence in design attracts the people to come and explore;
- **Sense of delight:** the sense of enjoyment that the public space has to provide its users (UDA, 2020). However, these points require more research in order to know how to apply them.

Architectural strategies

Every meter counts:

The housing market in the Netherland is under pressure in both rental and owner-occupied sectors. The prices have risen to record levels, and this led to poor affordability of homes. One of the strategies followed to make the apartments affordable is to reduce the apartment's square meters, which is logical because the larger the apartment a person lives within, the more money he/she will pay to buy or rent it, especially, if its location in the big four major cities (Amsterdam, Rotterdam, Utrecht, and The Hague). As a response to this issue, the idea of micro-apartment has emerged in many cities around the world (VOGON, 2019). Thus, what is a micro-apartment?

A micro-apartment defined as an apartment with a floor area range between 40 m² and 15 m², and it includes all the utilities that any ordinary apartment has such as (kitchen, water cycle, bathroom, etc). Currently, and to make the micro-apartment more affordable, shared facilities have been introduced within the building such as (communal kitchen, laundry room) (VOGON, 2019).

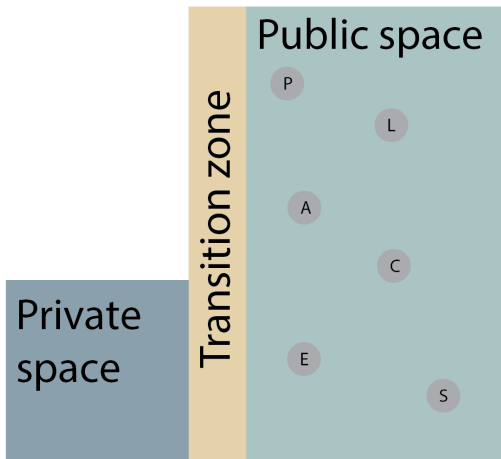


Figure 9: relation between spaces.

Micro-apartment between research and reality:

As stated in the previous paragraph that the compactness is one of the main characteristics of the micro-apartment, which in turns, requires combining between literature research and the micro-dwelling residences (micro-dwellers). Recently, two architecture firms (Synchroon & Shift) have conducted a research about the important aspects that have to be considered by designing a micro-apartment, the research ended up with new typologies (between 24 m² to 48 m²), a conceptual project, and recommendation (Synchroon, 2020). The recommendation are as following, the desire of the architect to design a small living space as efficiently as possible will led to smart spatial solutions; Large window(s) in order to maximize the natural light; positioning the services in the dark side of the apartment; it is preferable to think deeply about the measurements of the furniture and make it moveable; integrate the storage with the furniture (loft bed for example). On the other hand, a YouTube channel called Never Too Small is specialized to show how the micro-dwellers upgraded their micro-apartments (20 m² to 40 m²). After watching dozens of videos and writing their notes, the comment of the dwellers matches with the results of the research of (Synchroon, 2020), however, other extra points

such as privacy and distinguishing between the spaces frequently repeated.

Golden chance:

It is better to look at the affordability from different angles and take advantage of the available opportunities around us. According to the municipality of Rotterdam, the energy costs are becoming more expensive and exceeding the affordability levels, so turning to the alternative and sustainable solutions will reduce the energy bills, but where is the golden chance in this story?

The energy policy of Rotterdam city is to shift towards the sustainable and clean energy and excluding the natural gas as a main source of energy, and the location of the project is part of this policy (Nieuw Mathenesse).

The transition to clean forms of energy is an important spearhead to enhance the affordability and requires considerable choices, measures. So how it will effect on the future-to-be residents of this conceptual project? And what are the alternatives?

To have a clear understanding, it better to see how much single person household and two persons households (because the selected target group consists of singles and couples) spend per year on the electricity and the gas in 2020.

type	One person household	Two persons households
Electricity used per year. 1	900 kWh*22,03 eurocent = 423.7 €	2860 kWh*22,03 eurocent = 637.7 €
Gas used per year / flat, apartment.	990 m ³ * 78,68 eurocent = 779 € per person	

Electricity and gas consumption per household (NIBUD, 2020)

Thus, by eliminating the gas and following the policy of the municipality by depending on the district heating (stadsverwarming) is the suggested solution. The other promising option is shifting to what the municipality calls all-electric. The municipality will subsidize the houses with a sum up to 1500 € to add for example solar panels, and the current or the new projects (whatever the function is) with a sum defined after viewing the project. Therefore, depending on the two methods district heating (stadsverwarming) for floor heating and hot water, solar panels for electricity will make the building more energy efficient.

Micro-apartment/shared living between policy and stakeholders

Each county has its own law restriction in everything. Therefore, it is essential to look at the juridical aspect of housing in The Netherland regarding the compactness of the micro-apartment. According to the Ministry of the Interior and Kingdom Relations (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2012), a residential function has a floor area of at least 24 m² in a residential, but nothing is mentioned in the law concerning the case

of shared living for residential purposes (with an exception to hotels and student housing the floor area of at least 18 m² and the proposed design does not fall within this category). Therefore, the 24 m² will sit as the minimum floor area of a micro-apartment. Also, it is reasonable to see the opinion of the other involved parties about the concept of micro-apartments & shared living. Mainly, one of the involved stakeholders are the municipalities and developers. In 2017 Stec Groep (economic consultancy on real estate) conducted a survey in order to know their willingness to support the concept of micro-dwelling & shared living. The result was that about 35% of the municipalities have a policy with regard to shared living & micro-apartments and they accept it, among them mainly the G32 municipalities (including the municipality Rotterdam) due to the pressure on the housing market. The municipalities that are not open to small housing policy are mainly small municipalities (Stec Groep, 2017). Also the developers will be interested in such concept because of the excellent financial return, according to the research of the Association of Real Estate Research (Vereniging van Onroerend Goed Onderzoek) (VOGON, 2019).

Conclusion

The research gives an understanding of the term young professionals by introducing a definition through a literature review.

Due to the current housing problem facing the young professionals in The Netherlands and in Rotterdam. The research has followed the definition of young professionals and researched the housing situation of young professionals after their graduation from the university (HBO & WO) on three different levels and during different periods of time in:

1- Randstad after World War II until 1993:

the retrospective life history Survey of 3000 individuals who born between 1946 – 1993 shows that the university and higher vocational graduates lived in a shared and rented apartment since their graduation, and it took from them about 8 years (since their first year in the university) to end up with owner-occupied dwelling.

2- In the polycentric region (Randstad) between 2000 and 2012:

The graduates (young professionals) tended to stay in the student housing for more years up to the age of 35 which necessitated the student housing provider DUWO to come up with a new policy called

Campus contract which gives the graduates a period of six months to find another accommodation after their graduation. This policy made the young professionals search for an 'interim solution'.

3- In Rotterdam from 2012 until 2019:

A survey has been conducted by the author due to the lack of data about the housing transitions of young professionals. In general, the 15 respondents live in "friends apartments" or in the private-rental sector. They also consider their current living situation as an 'interim solution'

Lifestyle of young professionals

Young professionals value experience over things, they tend to share with a view to reduce the cost. But this reality does not preventing them to seize the moment, the moment of experience and exploring. They want to be freed by this life choice, rather than feel limited by it. The lifestyle of young professionals gives a direct answer of the first sub-question

Which housing typology is appropriate for the Young Professionals?

A housing typology that promotes the notion of shared living. Both the city of Rotterdam and young

professionals can offer to each other plethora of benefits. While living in Rotterdam provide a magnificent experience to young professionals due to the countless leisure, and the young professionals can add a remarkable impulse the social, economic, and cultural fabric of Rotterdam.

Shared living requirements

The shared living necessitates to enhance the social interaction, but also to make a distinction between public/collective spaces and private spaces in both architectural and urban level. Here the semi-public spaces play a pivotal role. And the model of PLACES will be used to enhance the social interaction.

Architectural strategies

Affordability means to make the dwelling affordable to the tenants, here man should be aware of every meter and reduce the spaces because every meter now is over-priced, and to think about the construction material that complies with affordability. These criteria match with the concept of micro-apartment.

The architectural strategies are not limited to the physical aspects such as reducing the size of the apartment. The energy efficiency can conducive to promising results

that help to reduce the energy cost, and the energy effects on the environment. Especially, that the municipality of Rotterdam encourages and subsidizes these efforts. The intangible affordability can be applied through eliminating the gas and depending on the electricity (solar panels) and using the district heating (stadsverwarming).

The concept of micro-apartment should be investigated from several aspects such as the design requirements, micro-dwellers' needs, and preferences because the compactness of the micro-apartment encompasses several challenges. These three paragraphs are the answer of the second sub-question

Which architectural strategies impact the affordability of a residence?

Micro-apartment/shared living between the policy and the stakeholders:

It is essential to take into account the involved parties in the concept of shared-living/micro-apartment. In the Dutch law, nothing is mentioned with regard, however, the minimum norm for only residential proposes is chosen (24 m²). On the other hand, both the municipality and developers show their interest in this concept. For the municipality, it is accepted and they have a policy for such projects, and

the developers agree because of the excellent financial return. And the main research question is the sum of the first and the second sub-questions

How to provide affordable and suitable dwelling for the Young Professionals?

Recommendations:

Anyone can partly avail oneself of this study, but not entirely because this research complies with a specific geographical context, as it is conducted according to the requirements of Rotterdam city. Therefore, the results may differ from one place to another.

Also, it is advisable to take into account the work needs and requirements of young professionals because this aspect is not covered in this research.

Since the suggested dwellings fall within the category of “mid-rented apartments”, the rent of each typology should be included. Also, it will be beneficial to include the factors that influence the rent such as WOZ-waarde and points system. These factors will be added in the coming stages.

It is mentioned in the research that the municipality of Rotterdam has a policy towards co-living related-projects but without any extra information. Therefore, it is recommended to include the vision of the municipality toward co-living

living projects. Likewise, proving that this project has a good “financial return” for interested developers. The survey that has been conducted contains only 15 respondents, so the results might differ by including more or fewer respondents. However, the position of the researcher plays a pivotal role in this respect.

Case Studies

Plan analysis

Purpose: It is mentioned in the research that social interaction is required in the case of shared living, but a distinction between what the public and what private should be taken into consideration. Therefore, the main focus of the case studies will be on these two aspects.

The main question of this research: How social interaction can be enhanced by maintaining the distinction between public and private (in these four projects)? The focus will be on the designing tools in order to answer this question.

Hypothesis: The collective spaces in a project that promotes shared living function as a transition zone between public and private spaces.

Applicability: The following research sheds the light on the design principles that activate and promote the social interaction between the residents and the surrounding and encourages them to interact with each other and keeping the distinction between what public and what private. These design tools will be beneficial in order to design a project that focuses on co-living for young professionals.

Methodology: Three aspects will be analyzed which are Public-Private spaces & functions, Accessibility, and Dwelling dimensions & typologies.



Tietgen Dormitory

- Public - Private spaces & functions
- Accessibility
- Dwellings : dimension & typologies



Villa Mokum

- Public - Private spaces & functions
- Accessibility
- Dwellings : dimension & typologies



WestBeat

- Public - Private spaces & functions
- Accessibility
- Dwellings : dimension & typologies



The FIZZ Don Bosco (Block A)

- Public - Private spaces & functions
- Accessibility
- Dwellings : dimension & typologies

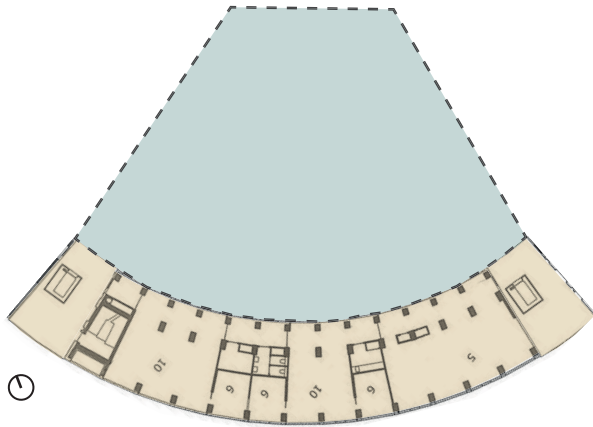


Tietgenkollegiet

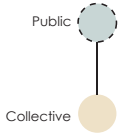
Location :	Copenhagen, Denmark
Architects:	Lundgaard & Tranberg
Client:	Fonden Tietgenkollegiet & Nordea Danmark Fonden
Dwelling typologies:	Rooms/ (360 units)
Target audience:	Students
Status:	In use
Completion:	2005

Public - collective

spaces & functions

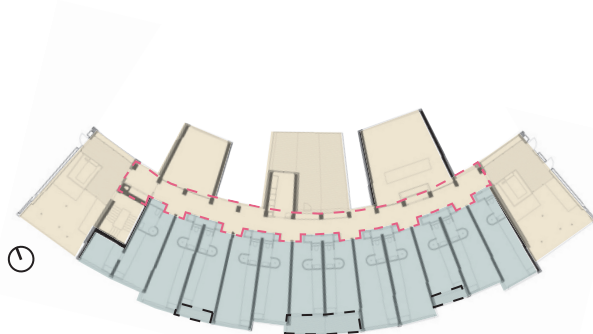


Ground floor

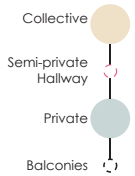


Collective - Private

spaces & functions



Typical floor plan



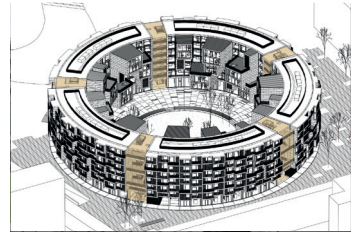
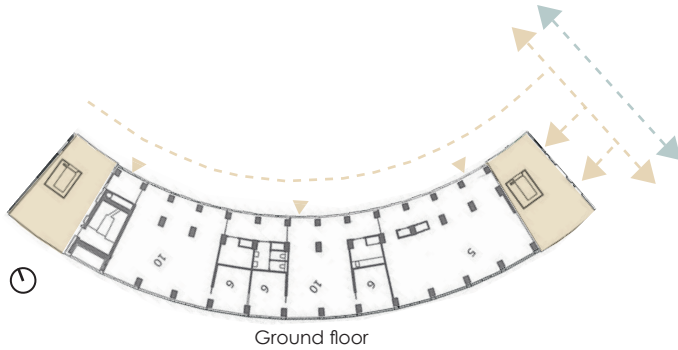
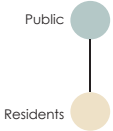
Spaces:

- The public courtyard and communal functions such as (assembly room, meeting room, music room, reception, internet cafe) are located on the ground floor.

- On the upper floors, each group of rooms has its communal functions (kitchen, and living room), and they have a view on the inner courtyard. Also, some rooms have private balconies.

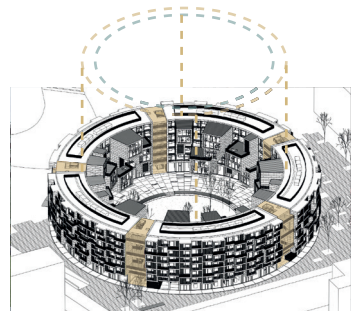
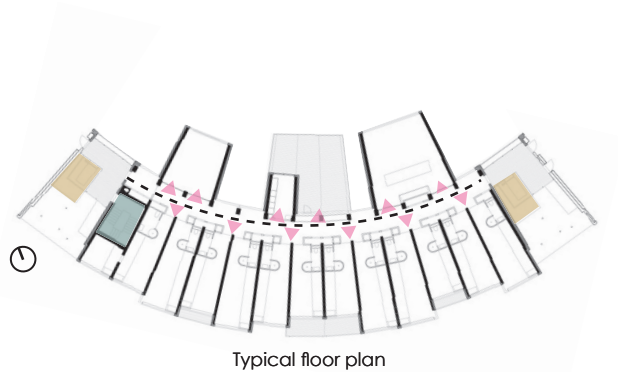
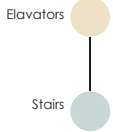
Accessibility

Public vs Residents



Accessibility

Residents

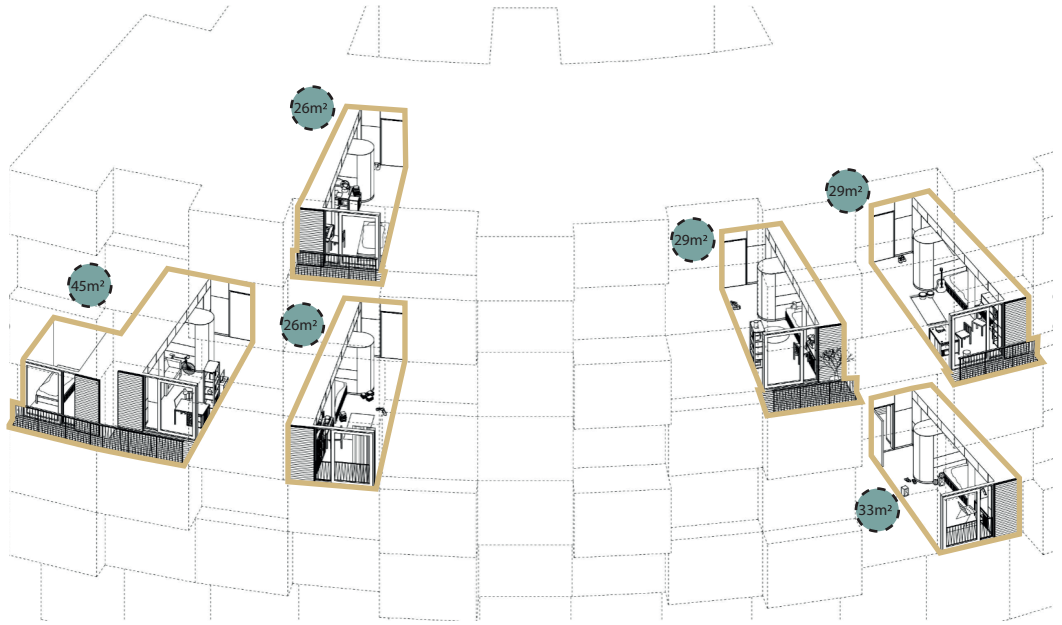


Accessibility:

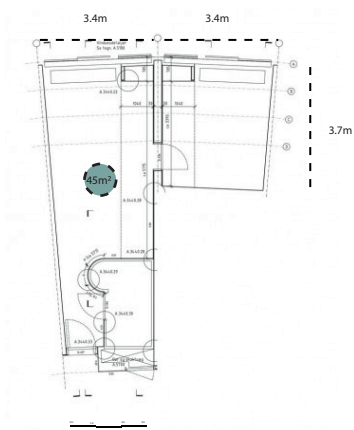
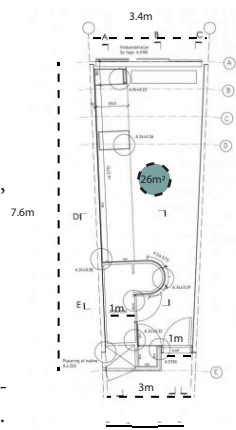
- The communal facilities and the public courtyard on the ground floor have the same access point.

- The entrances of the dwellings and the communal facilities on the upper floors are

located on either side of the hallway (its width about 3m), which is also connected to a group of two stairs.



- 1- Area: 26m²
- 2- Dwellers: single person;
- 3-Facilities: bathroom, W.C, integrated bedroom, and living room;
- 4- Furniture: built-in (moveable & adjustable) furniture;
- 5- Window/s: sliding window;
- 6- Extra: some dwellings have balconies.



- 1- Area: 45m²;
- 2- Dwellers: single person or couples;
- 3- Facilities: bathroom, W.C, separated bedroom and living room;
- 4- Furniture: built-in (moveable & adjustable) furniture;
- 5- Window/s: door and sliding window;
- 6- Extra: this typology has a balcony.



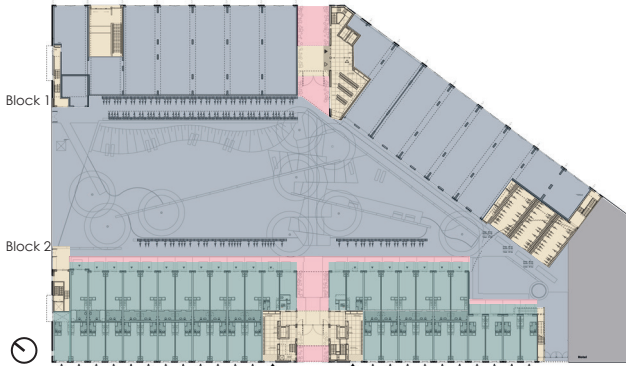


Villa Mokum

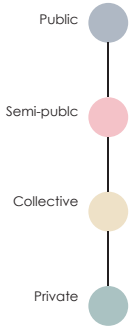
- Location :*** Amsterdam, The Netherlands
Architects: Kampman Architecten
Client: AM & BAM Wonen
Dwelling typologies: Apartments/ (627 units)
Target audience: Students and starters
Status: In use
Completion: 2014

Public - collective

spaces & functions

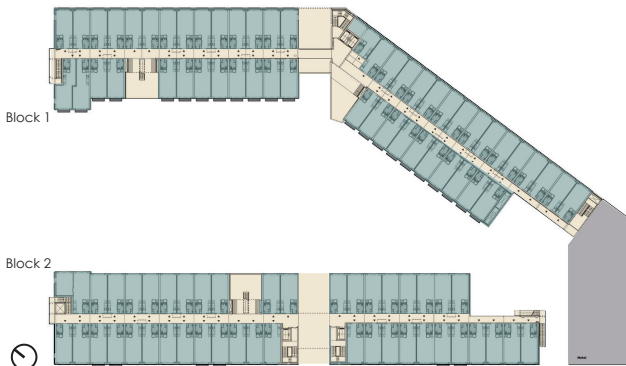


Ground floor

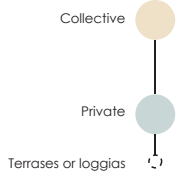


Collective - Private

spaces & functions



Typical floor plan



Spaces:

In block 1, commercial functions have been introduced on the ground floor. Also, the collective facilities such as a big collective balcony (the designers of the project call it Loggia), bicycle storage, and main entrance are positioned on the same level.

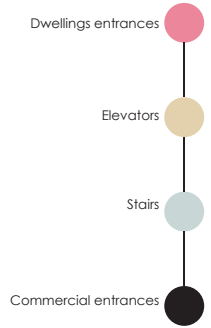
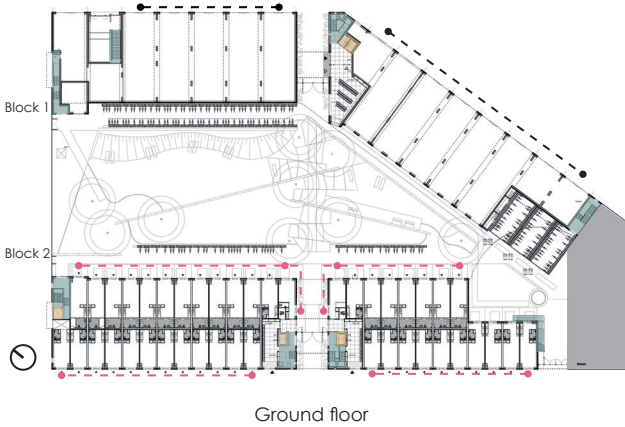
- Block 2, on the opposite side, has no public facilities on the ground floor, there

are dwellings with front gardens towards the inner courtyard or toward the main street but without front gardens, and collective spaces such as (vertical transition elements). Moreover, the presence of semi-public space can be noticed. Both Block 1 & block 2 have the same division, a central collective corridor (2m wide) gives access to dwellings on either side. Also, on each floor, there is a collective loggia.

Moaaz Al Assadi

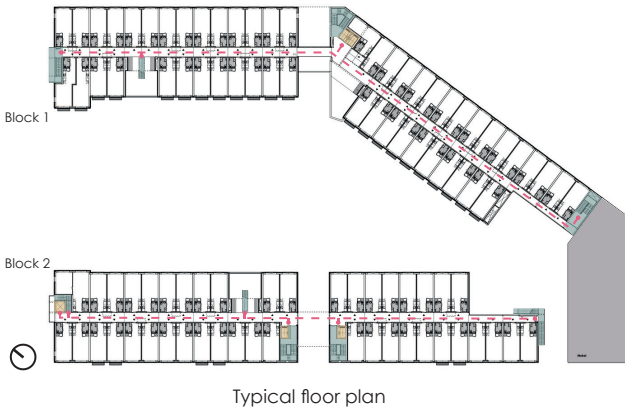
Accessibility

Public vs Residents



Accessibility

Residents



Accessibility:

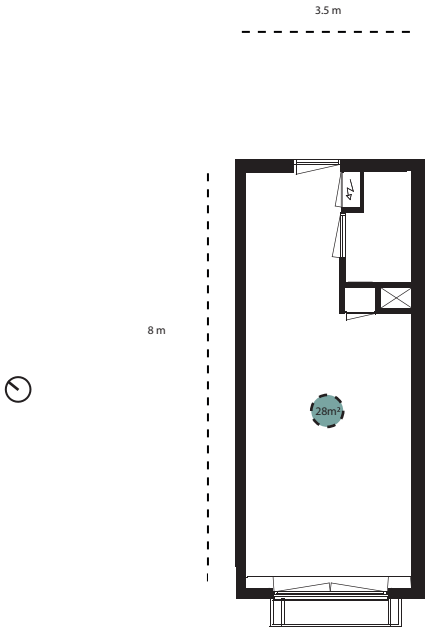
- In block 1, the ground floor is dedicated only to commercial and collective facilities that have separate entrances. Also, the main entrance of the upper floors dwellings is separated from the commercial function. All the dwellings on the upper floors can be accessed from the central corridor

(2m width).

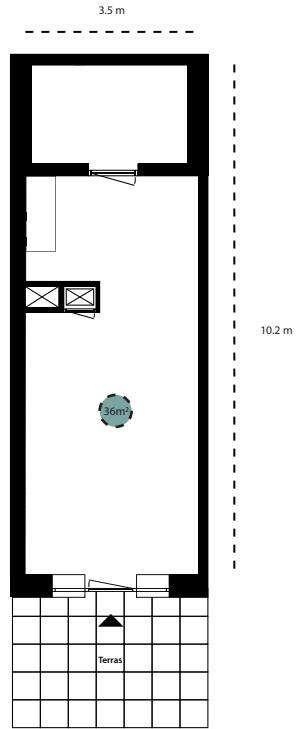
- Block 2, each dwelling on the ground floor has an independent entrance. While the dwellings on the upper floors can be accessed via a corridor connected with vertical transition elements.

Dwellings

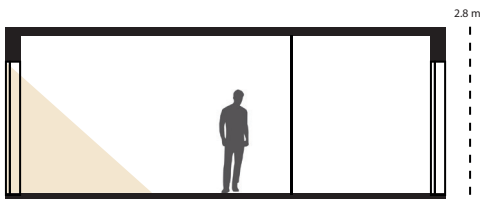
Dimensions & typologies



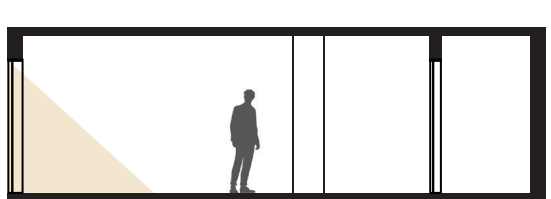
- 1- Area: 28m²
- 2- Dwellers: singles or couples;
- 3- Facilities: bathroom, W.C, integrated bedroom and living room, and kitchen
- 4- Furniture: no furniture;
- 5- Window/s: ground to the roof window;
- 6- Extra: French balcony.



- 1- Area: 36m²;
- 2- Dwellers: singles or couples;
- 3- Facilities: bathroom, W.C, kitchen, integrated bedroom and living room;
- 4- Furniture: no furniture
- 5- Window/s: door in between 2 window;
- 6- Extra: terrsa.



Typical cross-section
MSc 4 Advanced Housing Design Graduation Studio



Typical cross-section
41

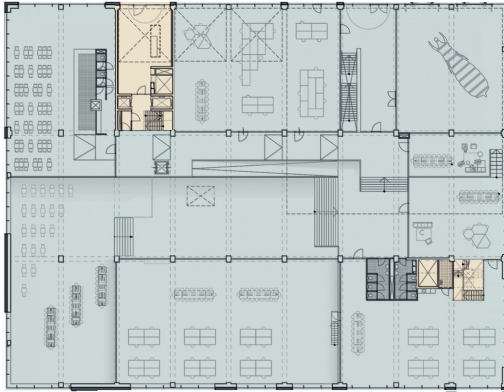


WestBeat

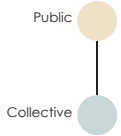
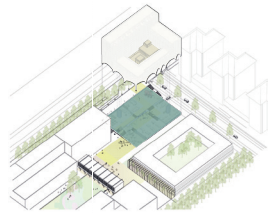
- Location :** Amsterdam, The Netherlands
Architects: Studioninedots
Client: Lingotto Ontwikkeling BV, Achmea
Dutch Residential Fund
Dwelling typologies: Apartments (150)
Target audience: starters
Status: Under construction
Completion: XXXX

Public - collective

spaces & functions

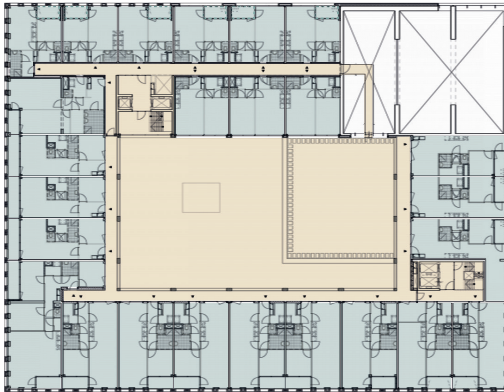


Ground floor

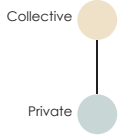
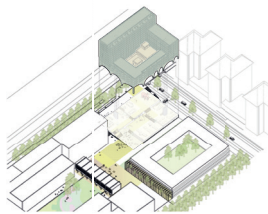


Collective - Private

spaces & functions



Typical floor plan



Spaces:

- The ground floor is totally for commercial and cultural functions such as (music events, exhibitions, workshops, Caffe) and provided with main entrance, while the residents have another main entrance. The cultural and commercial spaces can be used by residents and the public.

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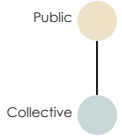
- The upper floors have an elevated collective courtyard and it is visually connected with the ground floor.

Accessibility

Public vs Residents

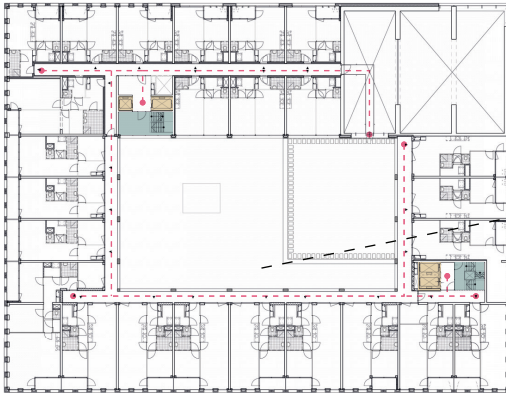


Ground floor



Accessibility

Residents



Typical floor plan

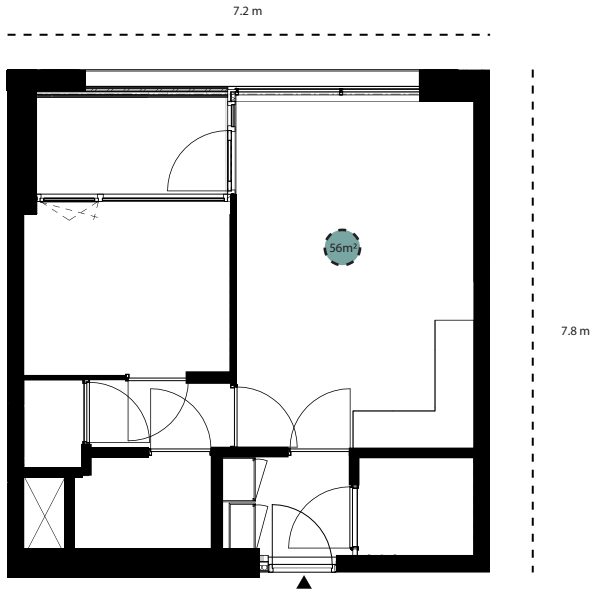


Accessibility:

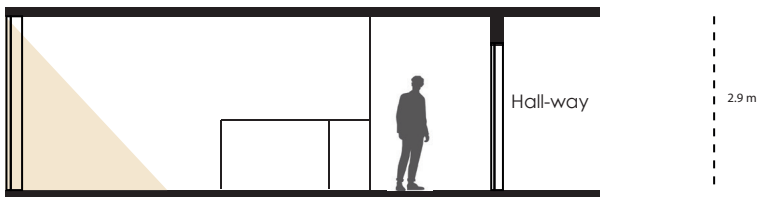
- The ground floor contains two main entrances, one for the public facilities and one for the residents. In total, the residents have two groups of vertical transition elements.
 - Part of the dwellings on the upper floors can be accessed via a corridor (2.2m width) while the rest via a hallway (2.2 m)
- MSc 4 Advanced Housing Design Graduation Studio

Dwellings

Dimensions & typologies



- 1- Area: 56m²
- 2- Dwellers: single person or couples
- 3- Facilities: bathroom, W.C, kitchen, separated bedroom and living room, storage.
- 4- Furniture: no furniture.
- 5- Window/s: big windows.
- 6- Extra: balcony.



Typical cross-section

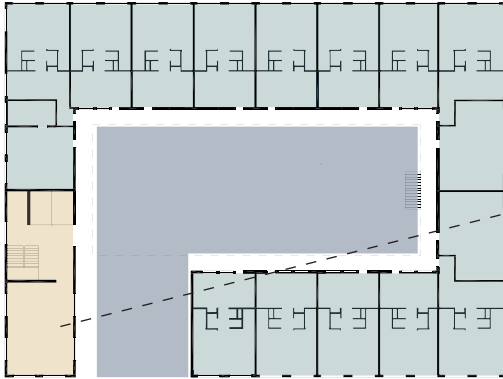


The FIZZ Don Bosco Block A

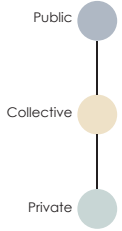
- Location :*** Amsterdam, The Netherlands
Architects: Studioninedots
Client: IC Netherlands
Dwelling typologies: Friends apartments (92 units)
Target audience: Young professionals
Status: Recently delivered
Completion: 2020

Public - collective - Private

spaces & functions

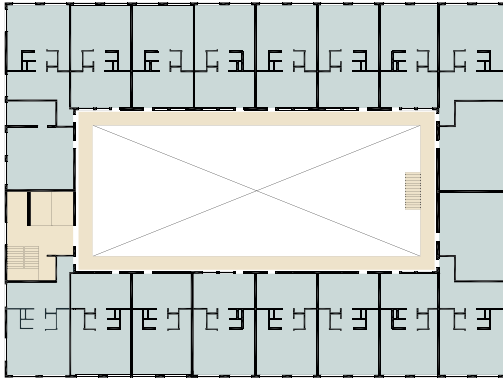


Ground floor

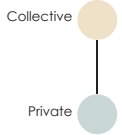


Collective - Private

spaces & functions



Typical floor plan



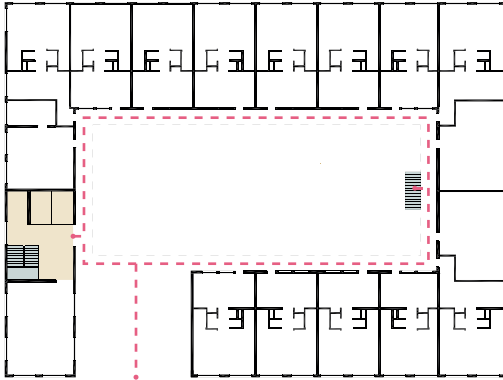
Spaces:

- The ground floor does not contain any public functions except for the inner courtyard which is publically accessible. The main staircase gives access to a multi-purpose room which can be used for (meetings, yoga, celebrating, and cooking)

- On the upper floors, the gallery connects the dwellings with the inner courtyard.

Accessibility

Residents

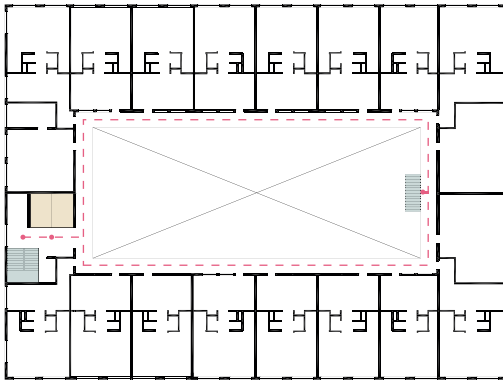


Ground floor



Accessibility

Residents



Typical floor plan

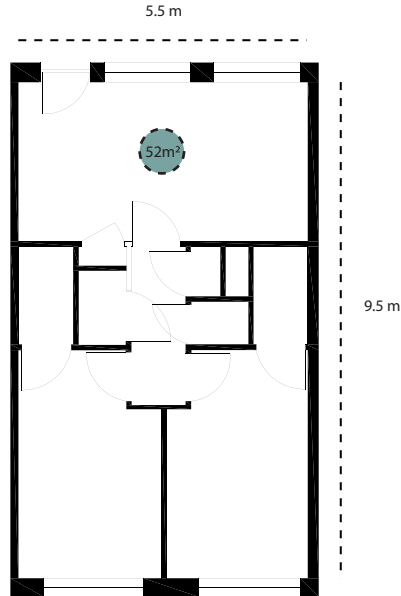


Accessibility:

- The dwellings on the ground floors are accessed through the inner courtyard.
- The dwellings on the upper floors are accessed through a gallery, and its width is 2.1m

Accessibility

Residents



- 1- Area: 52m²
- 2- Dwellers: shared apartment/ two persons
- 3- Facilities: separated bathrooms, shared W.C, shared kitchen, separated bedrooms, storage, and shared living room.
- 4- Furniture: not provided.
- 5- Window/s: big windows on either sides of the dwelling.
- 6- Extra: XXXX



Typical cross-section

Conclusion:

This plan analysis research is focused on social interaction in the case of shared living, and how social interaction can be enhanced by maintaining the distinction between public and private. Four case studies are analyzed by focusing on three aspects: 1- Public-Private spaces, 2- Accessibility, and 3- Dwellings dimensions & typologies.

1- Public-Private spaces and functions:

Three case studies contain only public spaces (Tietgen Dormitory, Villa Mokum, and The FIZZ), while two case studies companies public functions in their programme, and these public functions are located only on the ground (Villa Mokum, West Beat).

All the Case studies have collective spaces and collective functions (only for residents) except for Don Bosco it has only collective functions. In two of them, the gallery has been used as a transition zone between private and collective spaces (Tietgen Dormitory, Villa Mokum).

Private: Among the four case studies dwelling is the private space and not all of the dwellings are provided with private spaces such as (balcony).

2- Accessibility:

With regard to accessibility, different accessibility methods are used in these, such as a gallery, corridor,

or hallway. However, corridor and gallery access system frequently is used and its width is not less than 2m. West Beat combines two access systems, while in Villa Mokum, the ground floor dwellings have access from the front garden.

3- Dwellings dimensions & typologies:

The dwellings in all the case studies are characterized as micro-apartments (between 28m² to 50m²), with an exception of West Beat (56m²). The dwellings in Villa Mokum and Tietgen Dormitory have a big window for more natural light and relatively high ceiling which makes the apartment looks bigger. The "friends apartments" in The FIZZ can be shared by two tenants and each of whom shares only living room, WC, and kitchen.

Discussion:

This study has been done in order to enhance the interaction maintaining the distinction between public and private in the case of a building that promotes shared living and to a certain extend (micro-apartments). Two projects are either under construction (West Beat) or recently opened (The FIZZ). Thus, it would be better to analyze projects that already in use so a person can have a better insight. As a result, the more in-use projects analyzed, the more finding reveals.

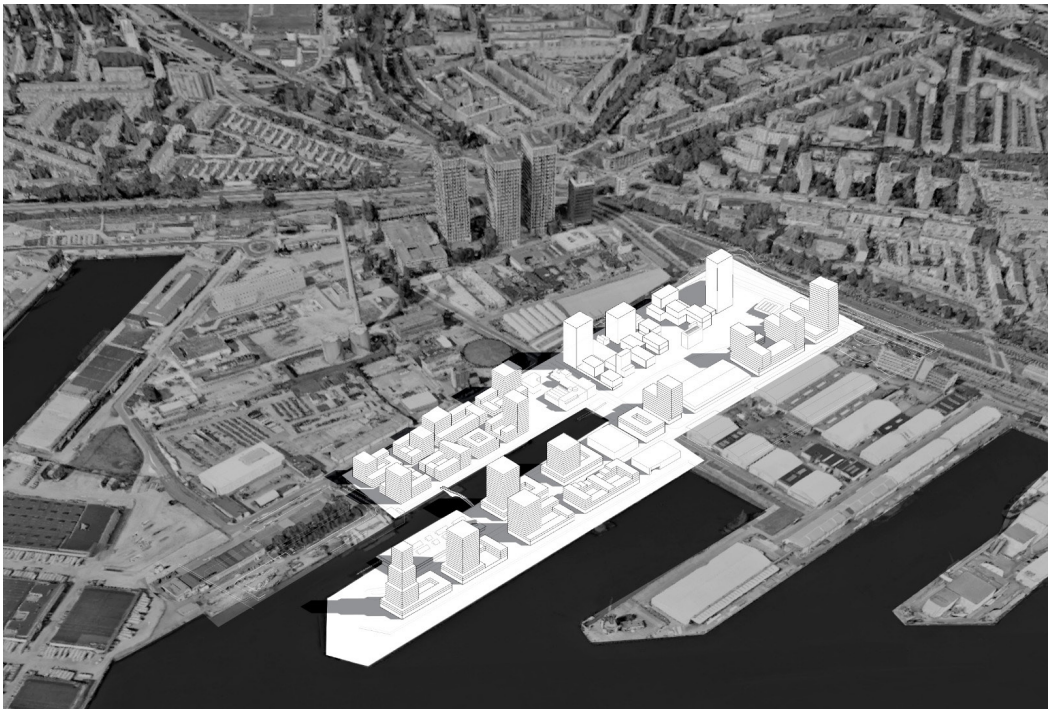
Location

IV. Location and typology transfer

The location of the project is Merwe-Vierhavens (M4H) in Rotterdam. This was also a group research and on a larger scale. First, we were split up into four different groups (also the location of M4H was divided into four quadrants) and each group had to investigate a specific

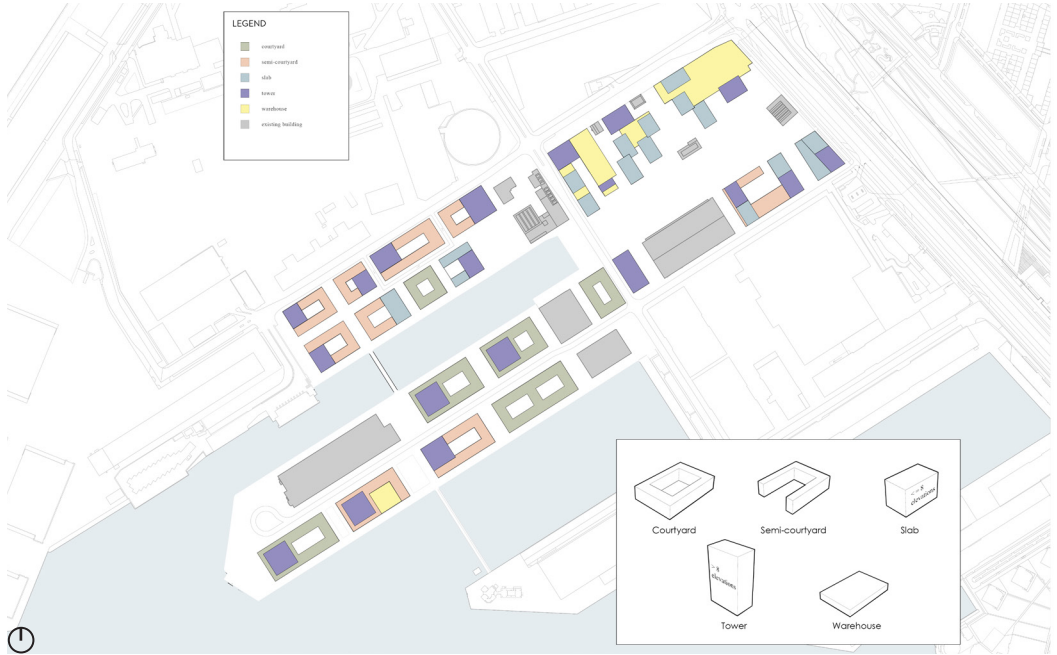
neighbourhood in Rotterdam. Thus, my group analysed and studied most of the important residential buildings in Katendrecht - Rotterdam in terms of:

- Dimensions of the blocks;
- Functions (mixed use/ only residential);
- Building typologies;
- Heights.



LEGEND

- courtyard
- semi courtyard
- slab
- tower
- warehouse
- existing building



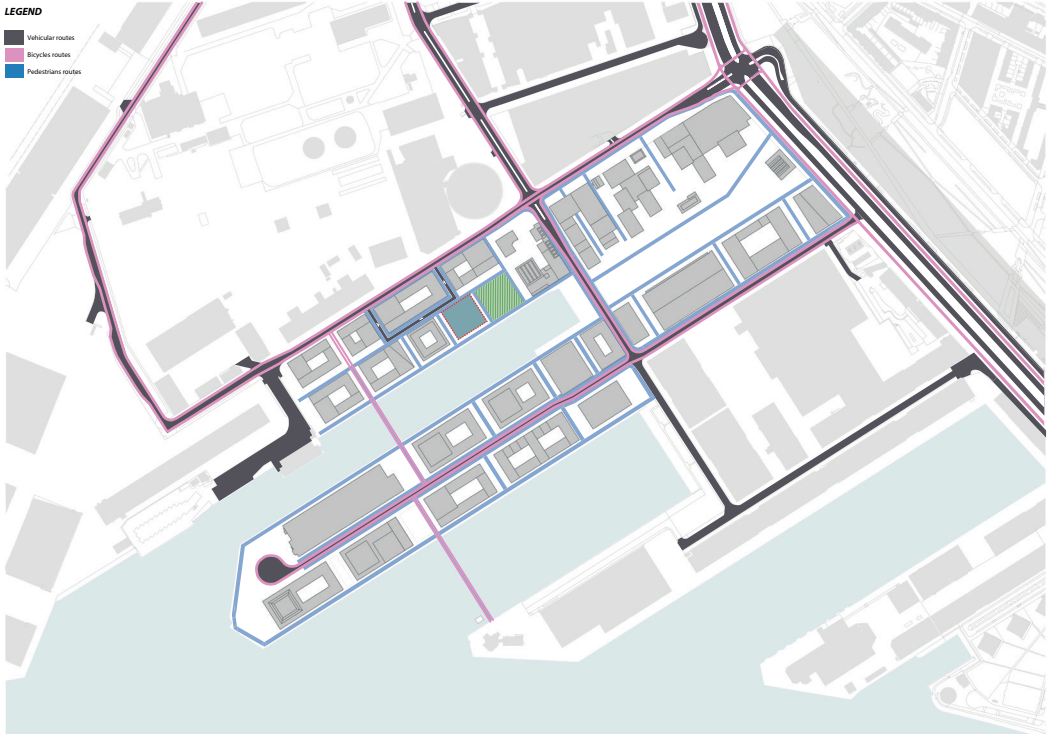
LEGEND

- Water-front
- Park





- LEGEND**
- Vehicular routes
 - Bicycles routes
 - Pedestrians routes



Conceptual Design

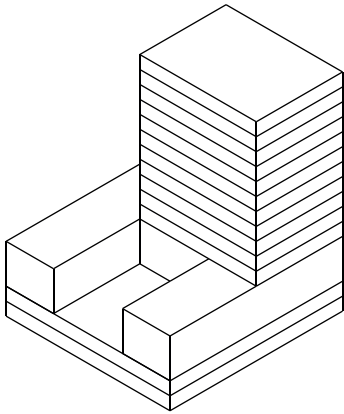
- Block info:**
- Gross floor area: 13.203m²
 - Residential area: 10.038m² (with communal facilities)
 - commercial and parking: 3165m²

- Dwellings:**
- 295 dwellings (18+55+222) divided into three categories
 - 18 Shared apartment 60m² (two persons)
 - 22 dwellings 41m²
 - 222 micro-apartments 30m²

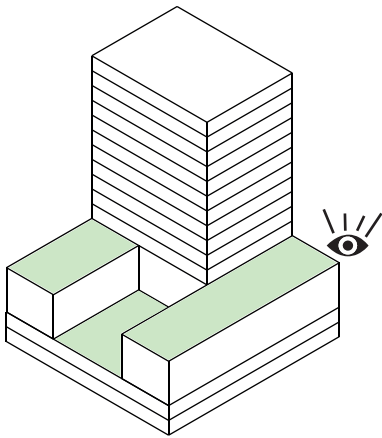
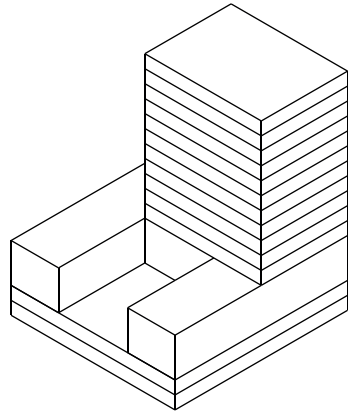
- Collective facilities:**
- Bicycle parking
 - Car parking
 - Communal kitchen
 - Collective space (elevated inner yard)
 - Co-work space

- Public facilities:**
- Restaurant/Cafe with view on the water-front

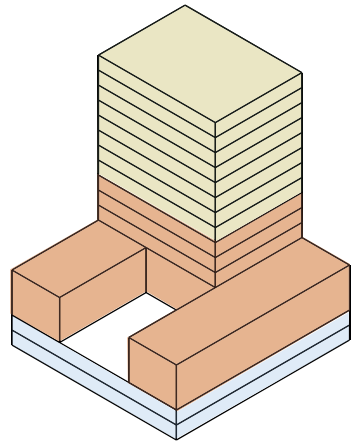
- Energy:**
- Solar panels
 - Ground heat pump (Bodemwarmtepompen)



Original form of the block

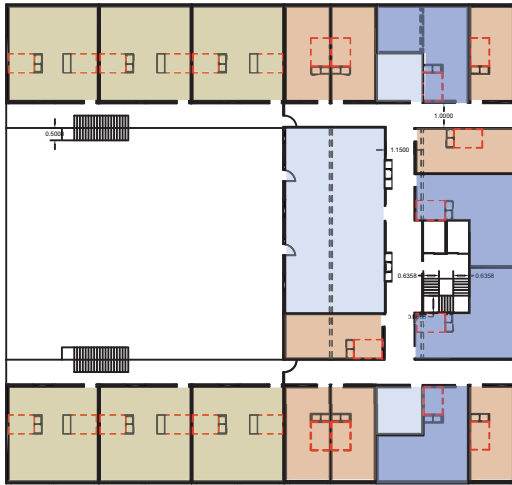


- only apartments
- Co-living



- (30m²) apartment.
- Shared apartment/ 2 persons (60m²).

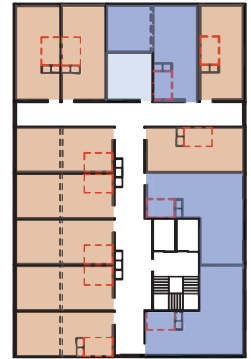
- (41m²) apartments.
- Communal kitchen/laundry.



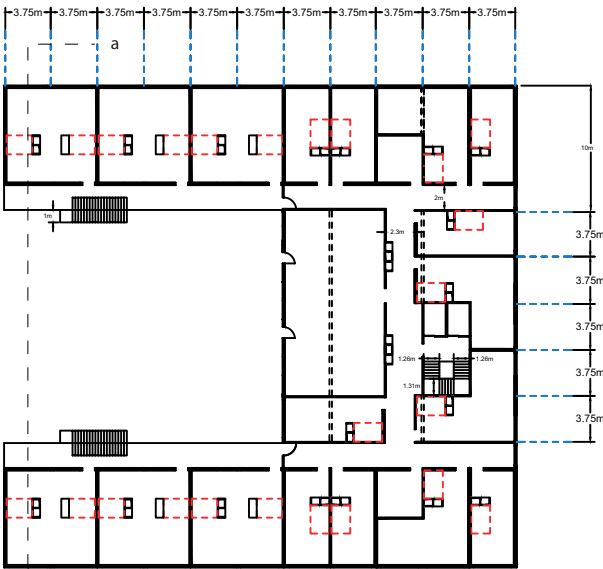
3rd floor to 5th floor



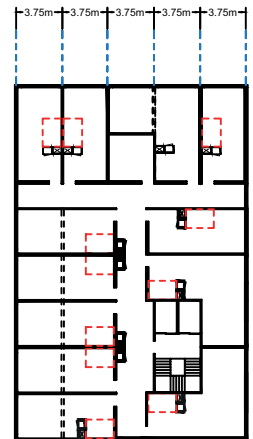
6th to 9th floor



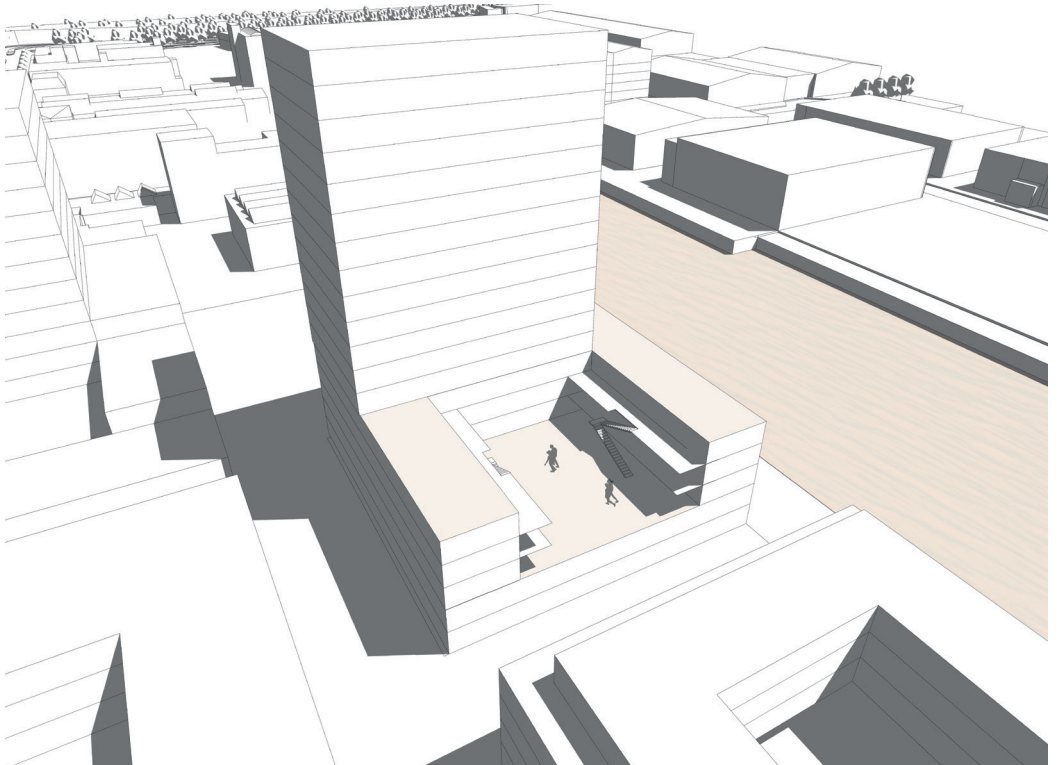
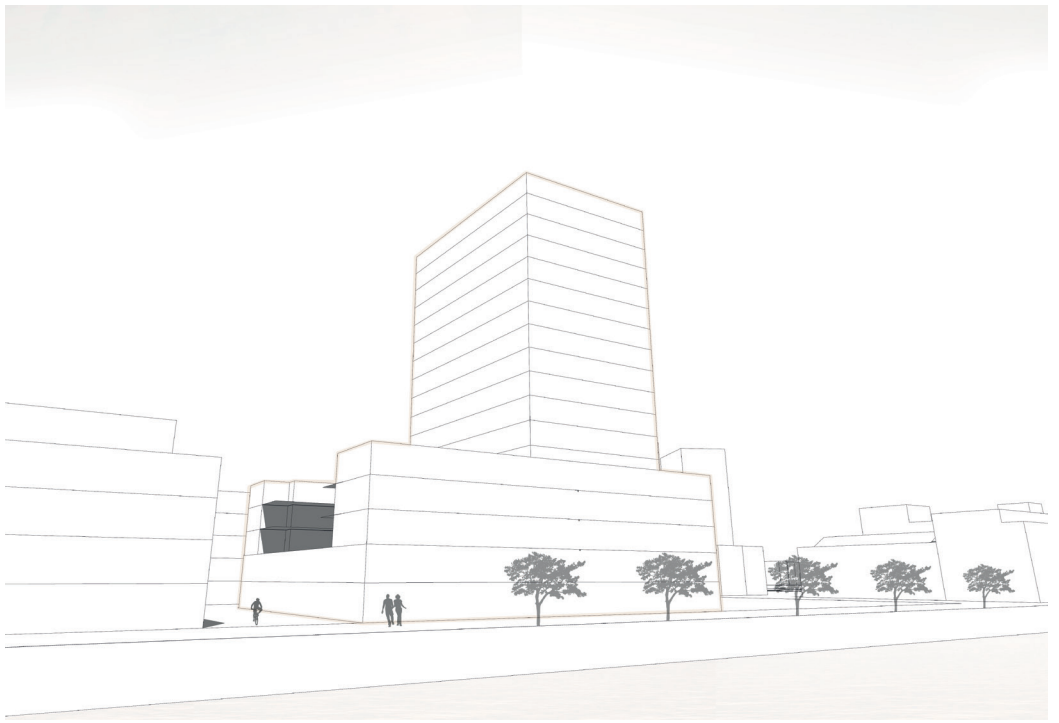
10th to 16th floor



3rd floor to 5th floor



6th to 16th floor



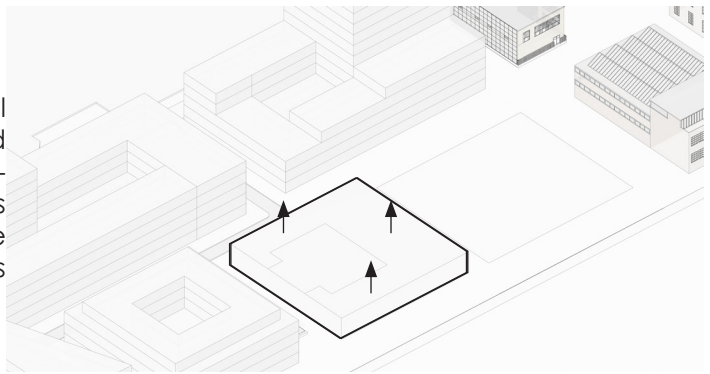
Design



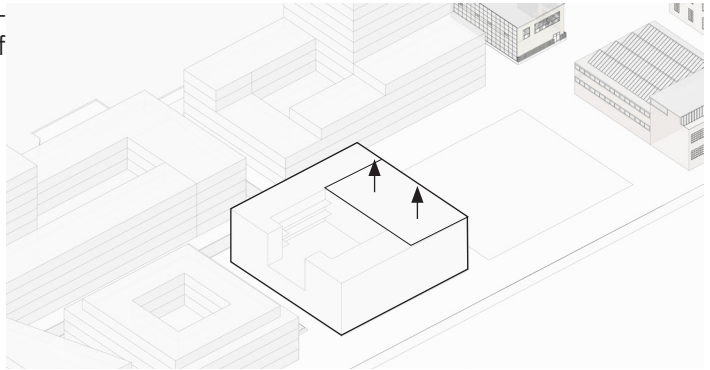
Morphology of the block

Concept

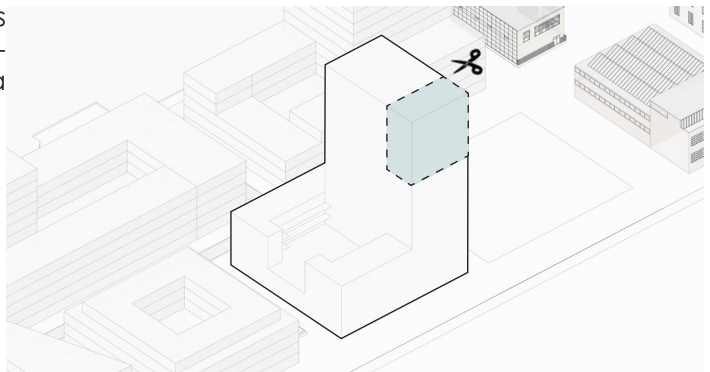
- Adding the commercial function to the ground floor. In addition, the parking for both cars and bikes is in the ground floor. The total height of the plinth is 6m.



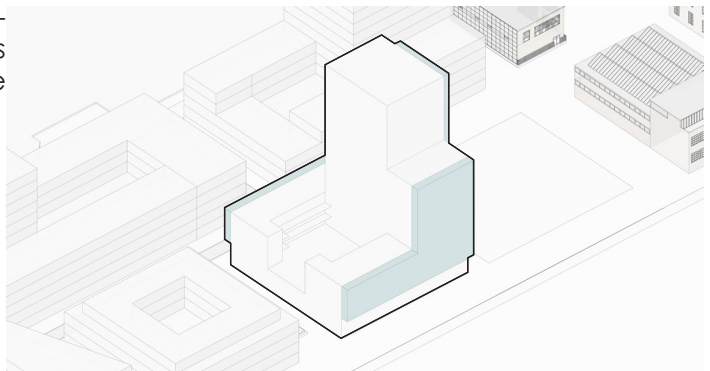
- Densifying the FSI by expanding the expansion of the block vertically.



- Enhancing the dimensions of the upper floor and creating a roof terrace with a panoramic view.



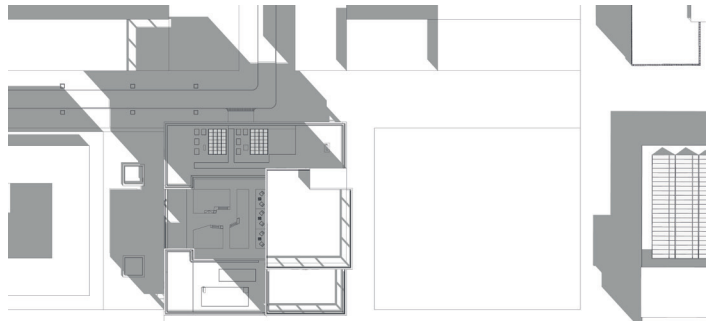
- Adding the private outdoor spaces (loggias & wintergartens) to the dwellings as (overhangs).



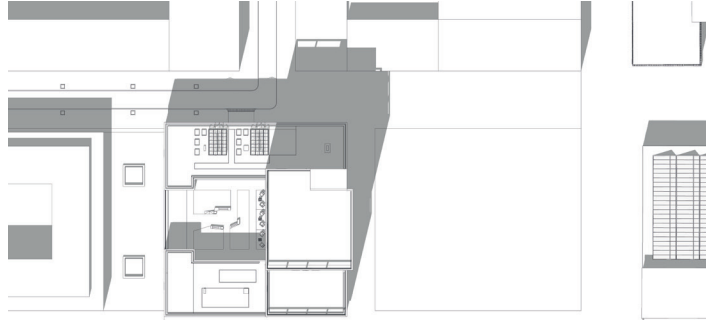
Orientation

Sun and shadows

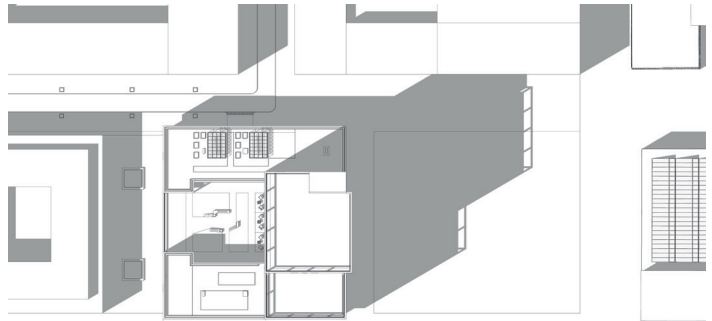
The block is oriented in order to receive the maximum sunlight either by enlarging the glass windows or by designing two-sided dwellings. Also, the building does not drop much shadows on the adjacent blocks or in the inner courtyard during the day (with the exception of early morning hours) because of the wide width of the courtyard and movement axes.



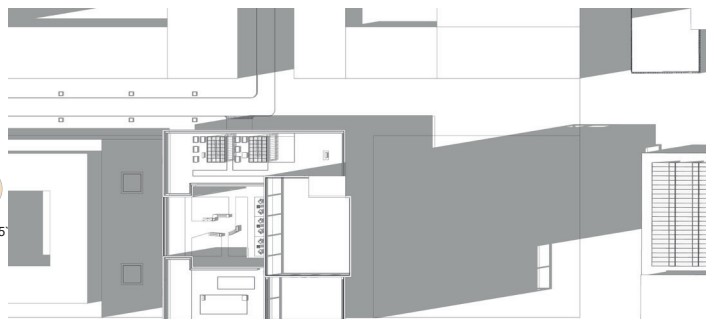
March 21st , 9:00



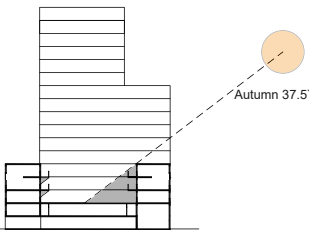
March 21st , 12:00



March 21st , 15:00



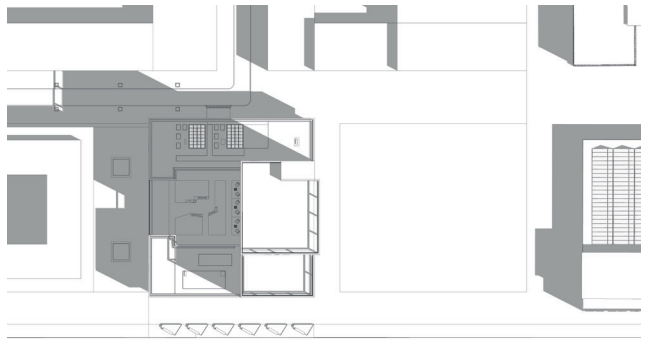
March 21st , 18:00



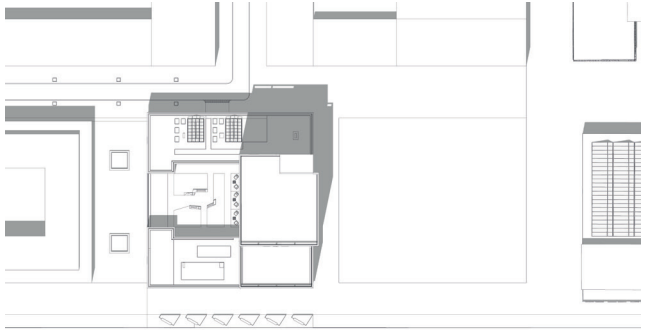
Orientation

Sun and shadows

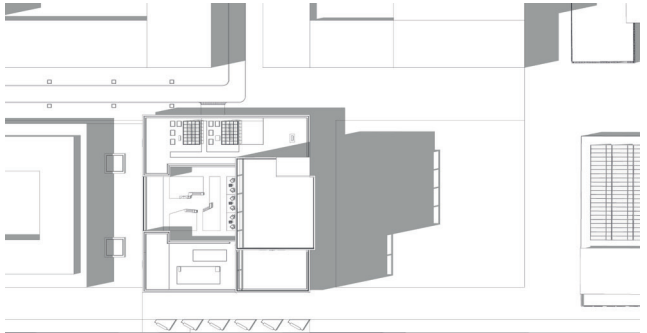
The block receives much sunlight during the summer, therefore, several design decisions have been taken in order to reduce the resulted overheating. The gallery minimizes the direct sunlight. Also, the private outdoor spaces diminish the overheating during the summer (see the Building Technology part).



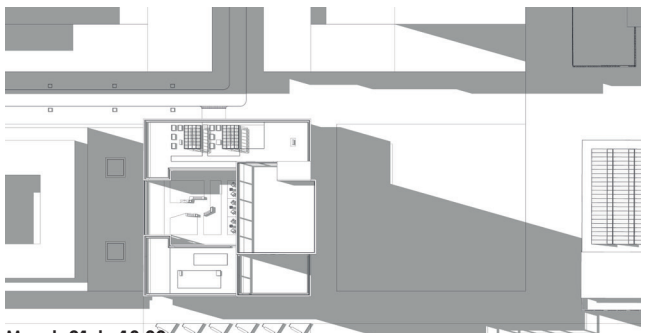
March 21st , 9:00



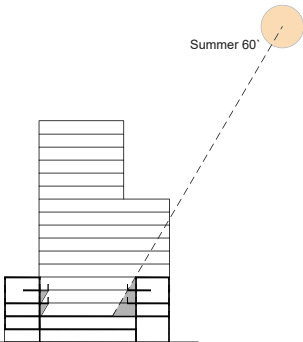
March 21st , 12:00



March 21st , 15:00



March 21st , 18:00



Allocating spaces for solar panels

Roofs

All of the tower's roof and part of the green roof terraces are dedicated to solar panels in order to provide both of the dwellings and communal facilities with electricity. Therefore, the number of solar panels has been enlarged to cover the needed energy.

Roof terraces

Sun and shadows

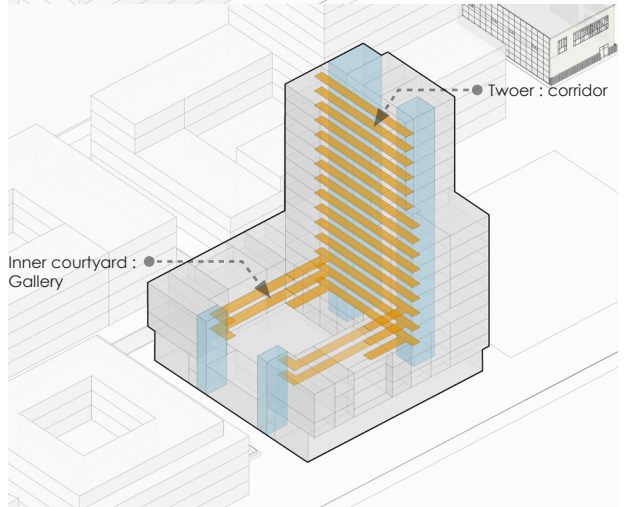
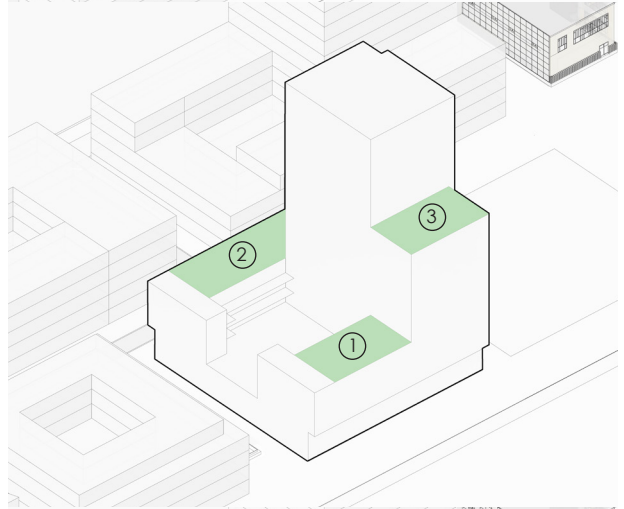
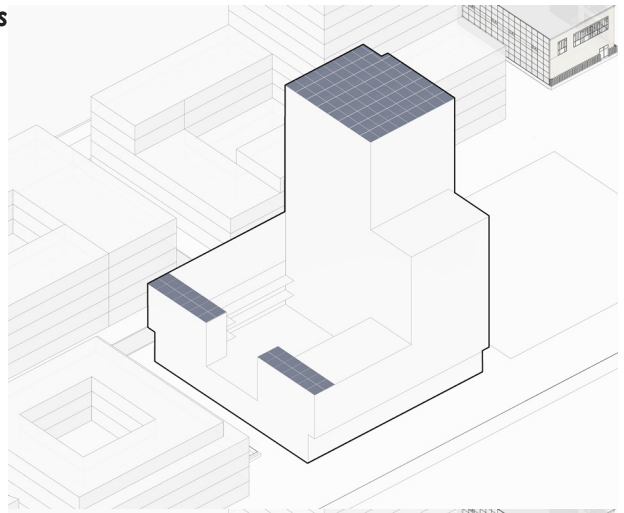
In addition to the elevated inner courtyard, there are three green roof terraces. These roofs differ per theme (see the renders):

- 1- As a "communal balcony" attached with co-work spaces.
- 2- As a green roof garden with greenhouses.
- 3- Communal roof with a panoramic view on the waterfront.

Circulation

Tower & inner courtyard

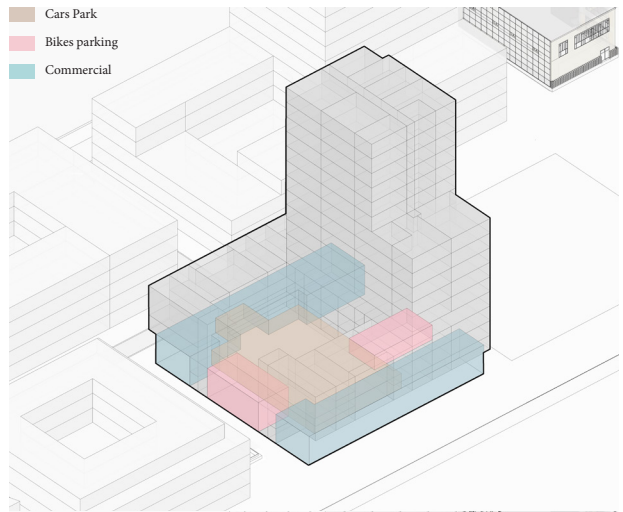
In general, the block combines two types of circulation. In the tower, a corridor typology has been integrated and linked with two staircases in order to fulfill the regulation of fire safety. While the dwellings in the courtyard can be reached by a gallery, and each gallery is provided with an escaping staircase.



Plinth

Function

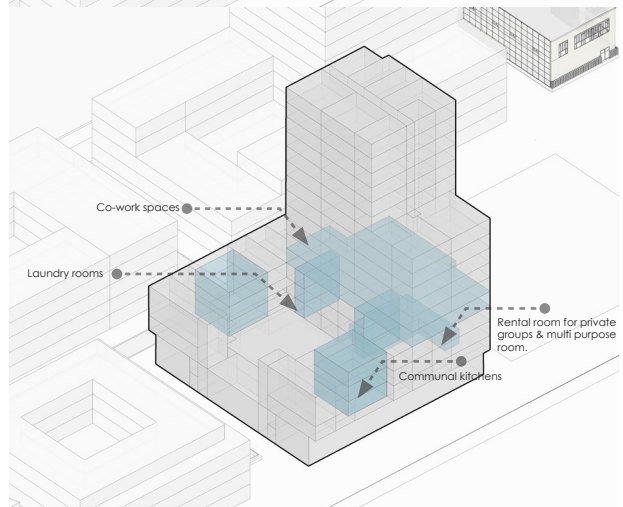
Most of the outer side of the plinth is allocated to the commercial functions in order to avoid any dead-facade and to attribute to the liveliness of the surrounding. Also, the inner part of the ground floor consists of parking for both bikes and shared cars.



Communal facilities

upper floors

All the dwellings of the block have access to the 5th floor which includes the co-work spaces. Only the dwellings on the 2nd, 3rd, and 4th floors have the access to the communal kitchens and laundry rooms. The tuition of these services has been added to the main rent of the dwelling according to the rent commission (Huurcommissie).



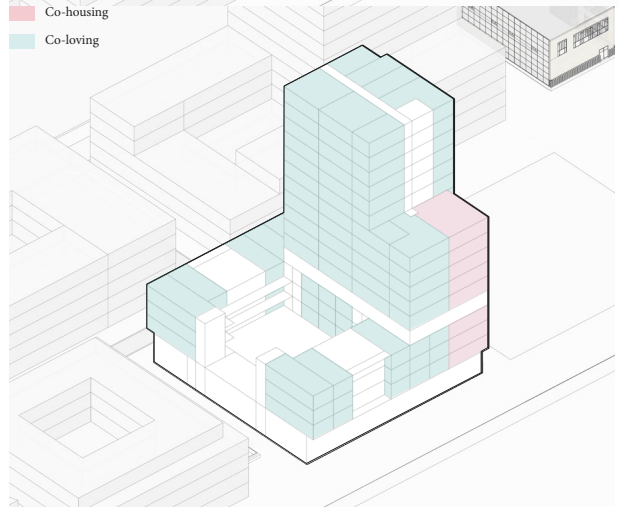
Shared-living

Co-living & co-housing

Generally, the block combines the notion of co-living in its all floors with an exception of "friends apartments" which have the concept of co-housing.

Co-living: when the residents share facilities on the level of the floor or the building.













Co-housing: when the tenants share specific facilities of the same dwelling such as living room and kitchen.

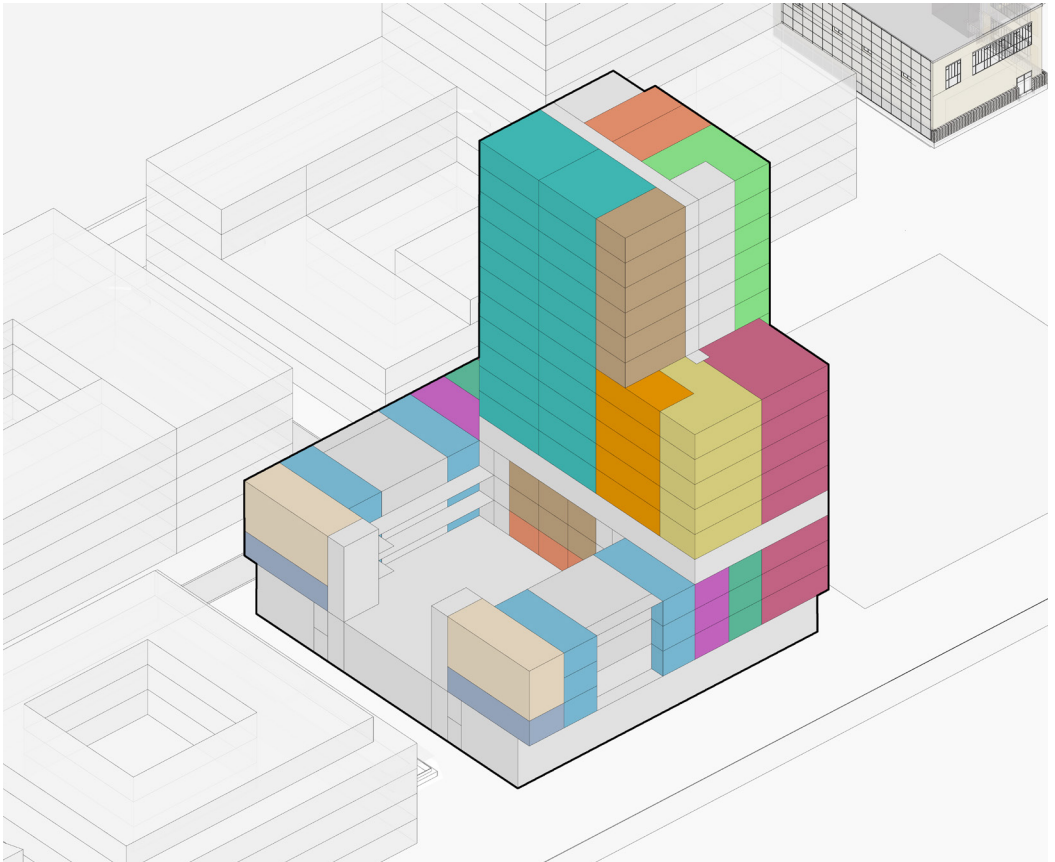


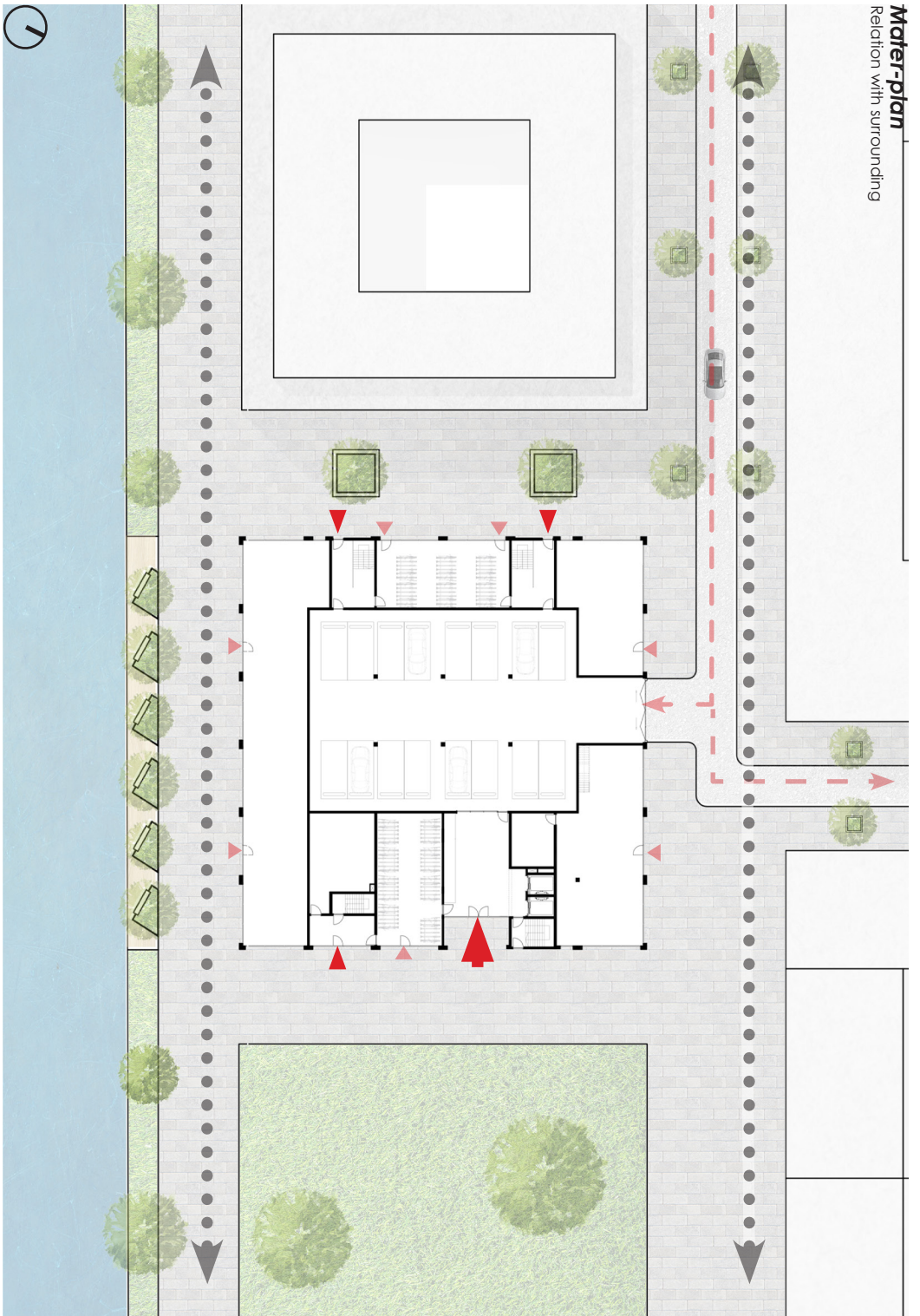
Wdellings

General information

In total, there are 132 rental dwellings in the block, and their size varies from about 33m² up to 84m². The dwellings of the inner courtyard are relatively smaller than the dwellings of the tower because these square meters have been compensated in the communal kitchen.

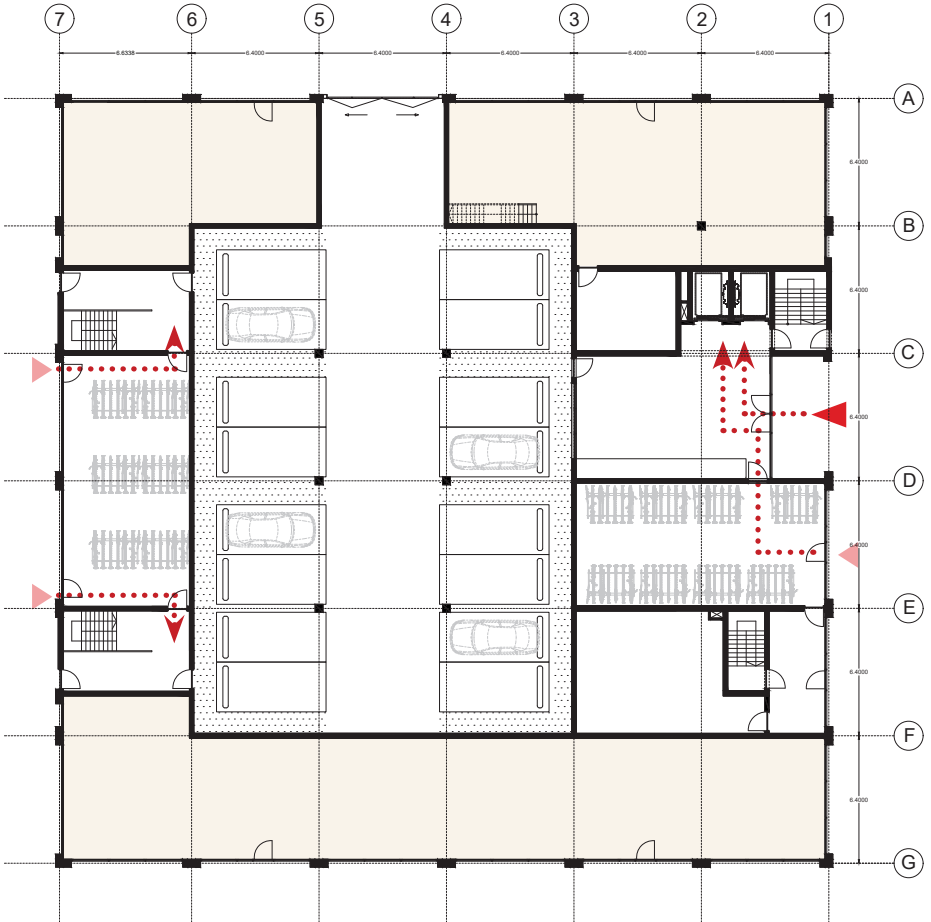
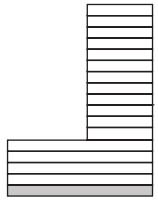
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	Type: T2 Total number: 22		Type: T8 Total number: 5
	Type: T3 Total number: 6		Type: T9 Total number: 5
	Type: T4 Total number: 6		Type: T10 Total number: 2
	Type: T5 Total number: 12		Type: T11 Total number: 11
	Type: T6 Total number: 12		Type: T12 Total number: 2







Ground floor



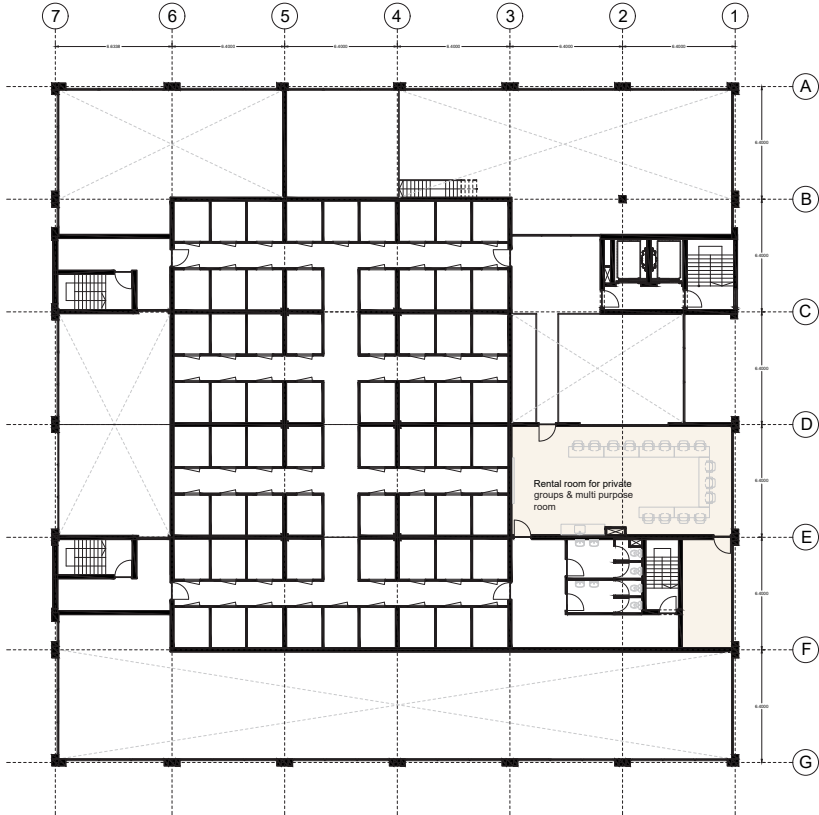
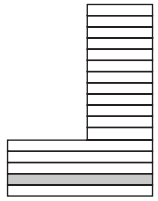
■ Caffe and retails


The ground floor has one main entrance and three escape staircases. The main entrance is considered as an automated concierge due to the existence of (Bringme box technology) for post and parcels. It is also a meeting point for different facilities. The core of the ground floor is dedicated to shared parking, while the commercial functions are placed on the outer side of the block in order to avoid "dead facade".





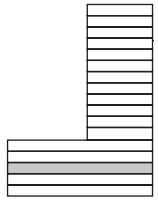




 Rental room for private groups

Generally, the second floor is dedicated to storage while the height of commercial facilities extends up to the second floor to give them a height of 6m. Moreover, there is a rental room for private groups and it requires a reservation to be rented in order to organize the access of the users who do not live in the building.



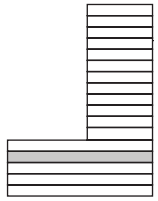


- Communal kitchen
- Laundry room
- Part access to communal kitchen

The 2nd, 3th, and 4th floors combine the concept of both co-living and co-housing and it consists of two clusters, each cluster includes 9 dwellings, communal kitchen, and laundry room. The dwellings in purple color can use the communal kitchen partly because they are either friend's apartments or maisonette but they have the access to use the communal kitchen partly (they can use the communal living room).



Third floor

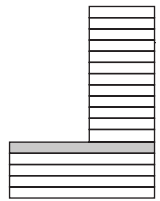


Full access to communal kitchen





Fourth floor

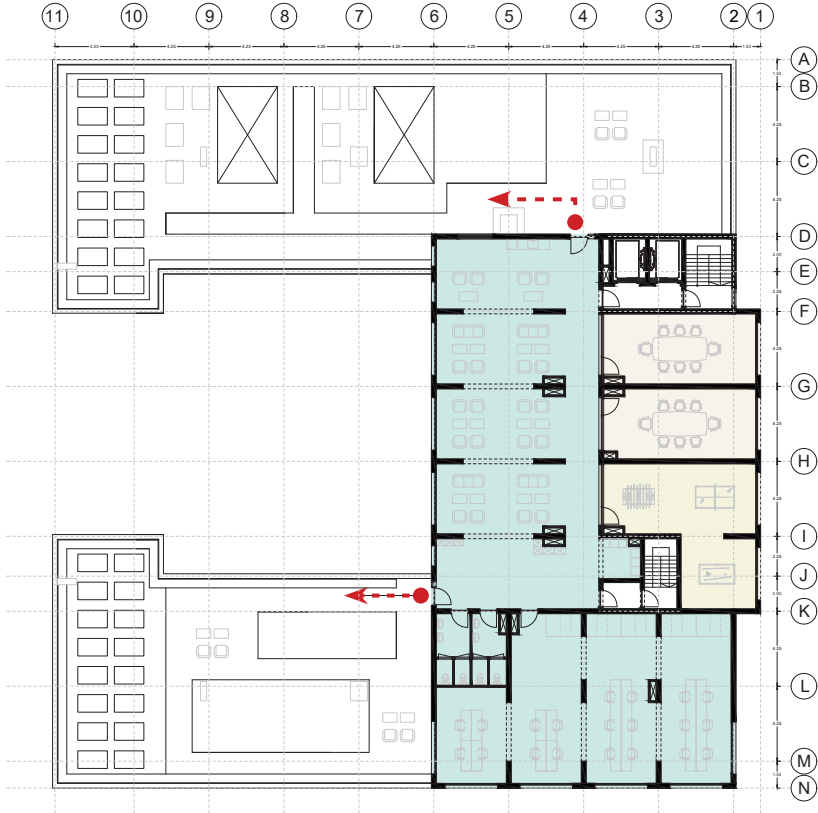
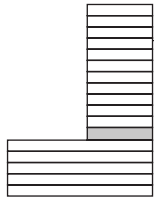


Full access to communal kitchen









- Game room
- Meeting room
- Co-work spaces

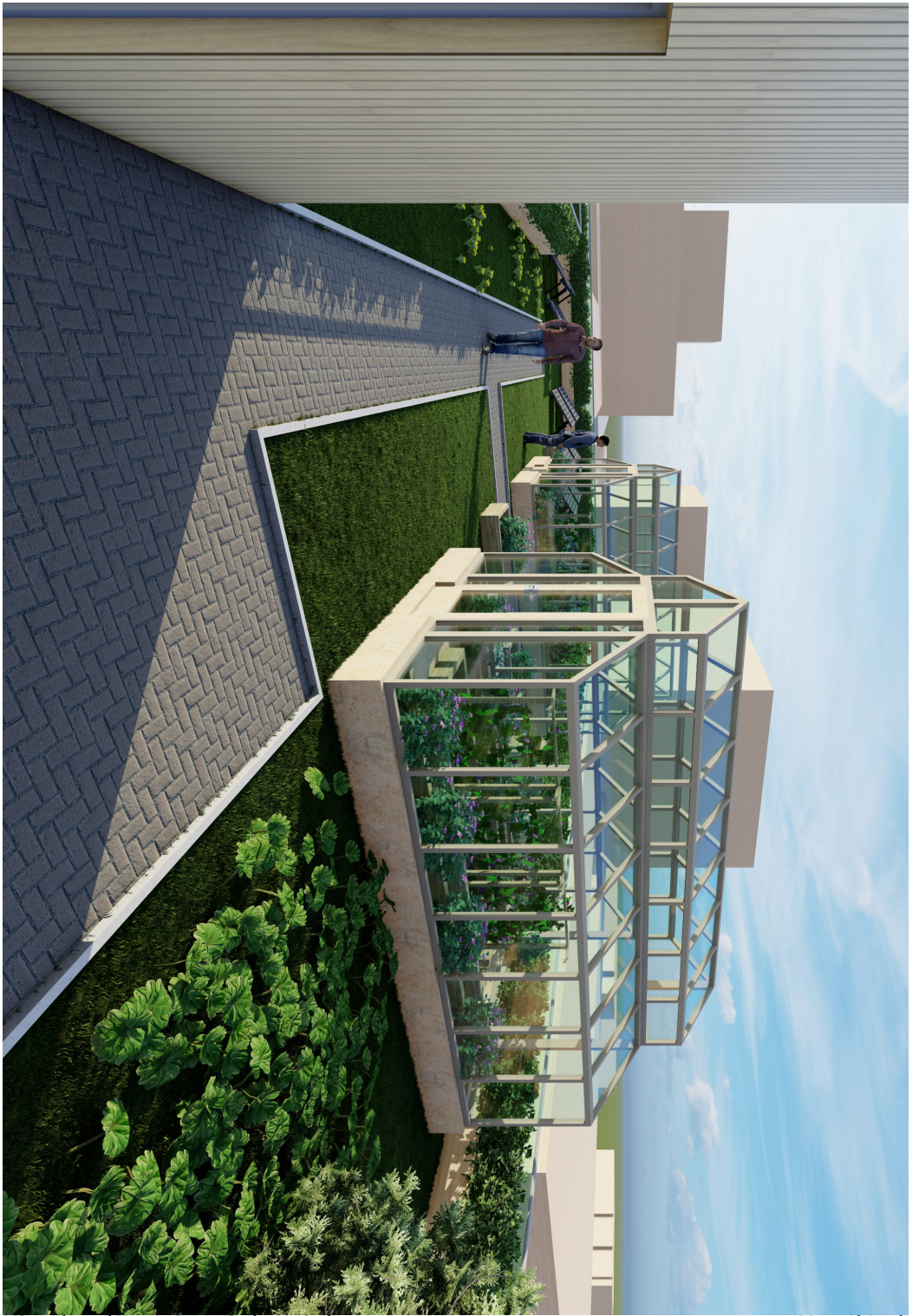
The communal floor is accessible for all residents and consists of three main facilities: game room, meeting rooms for further work collaboration between the residents, and high-end full-service co-work spaces. Two green roofs have been attached with the communal floor, the Northern roof includes two greenhouses to create more activities that can be linked with the communal kitchen, while the Southern roof functions as a terrace with a view on the waterfront.

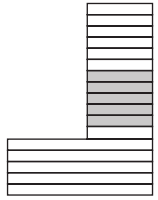




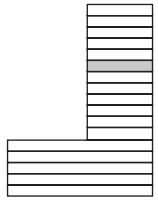






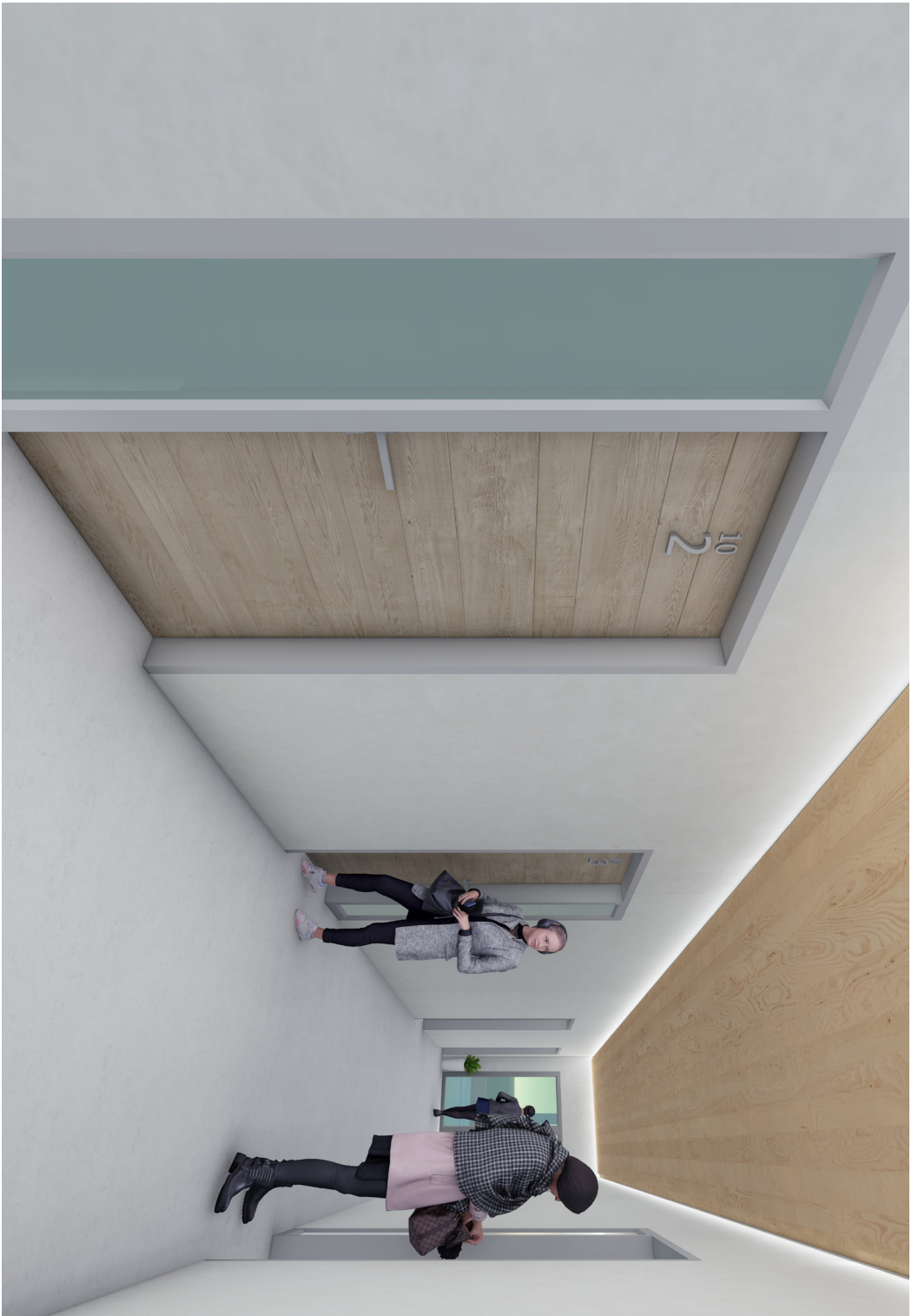


Eleventh floor

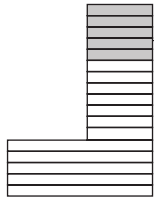


Communal roof terrace

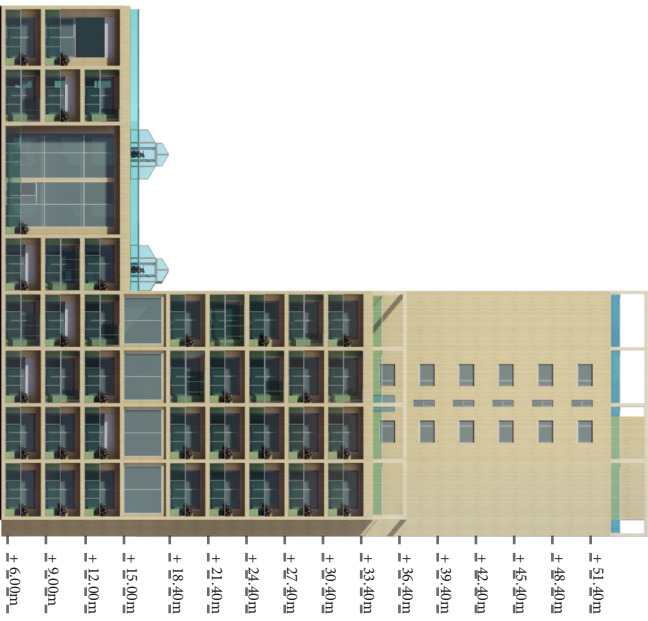




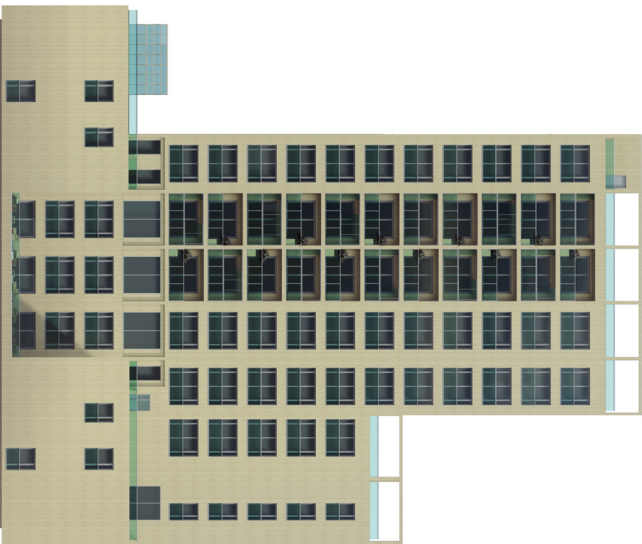
Twelfth to sixteenth floor



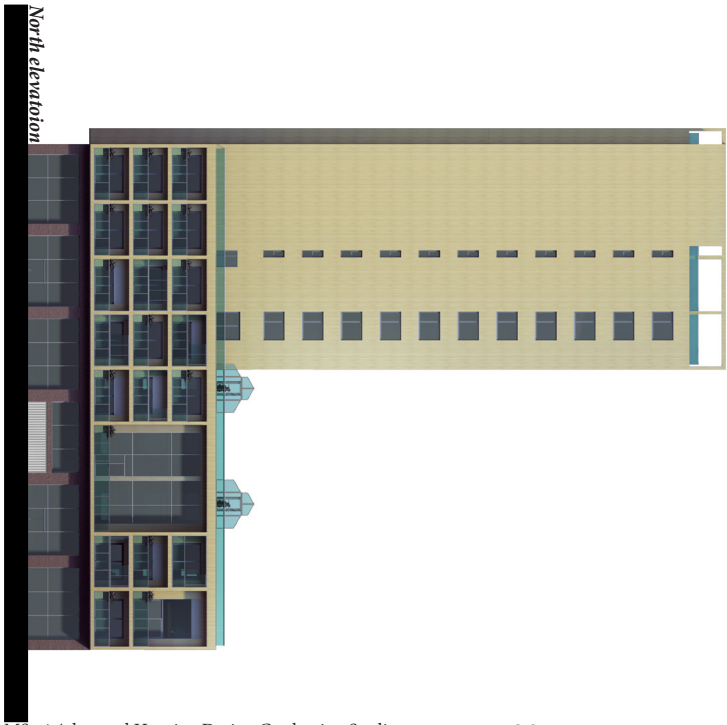
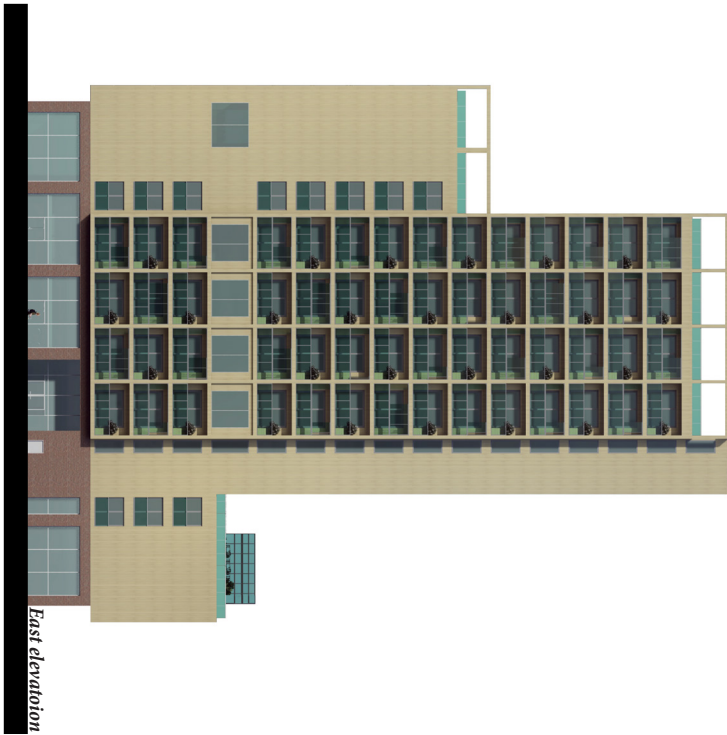
 Rental room for private groups

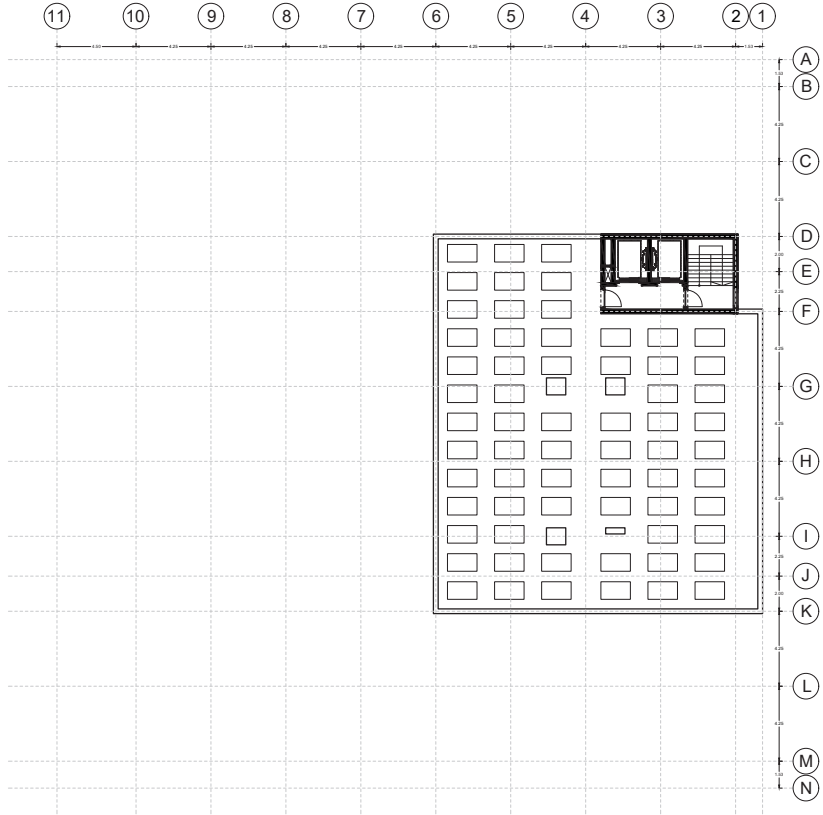
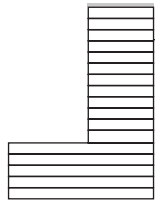


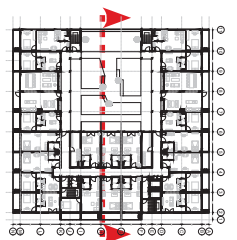
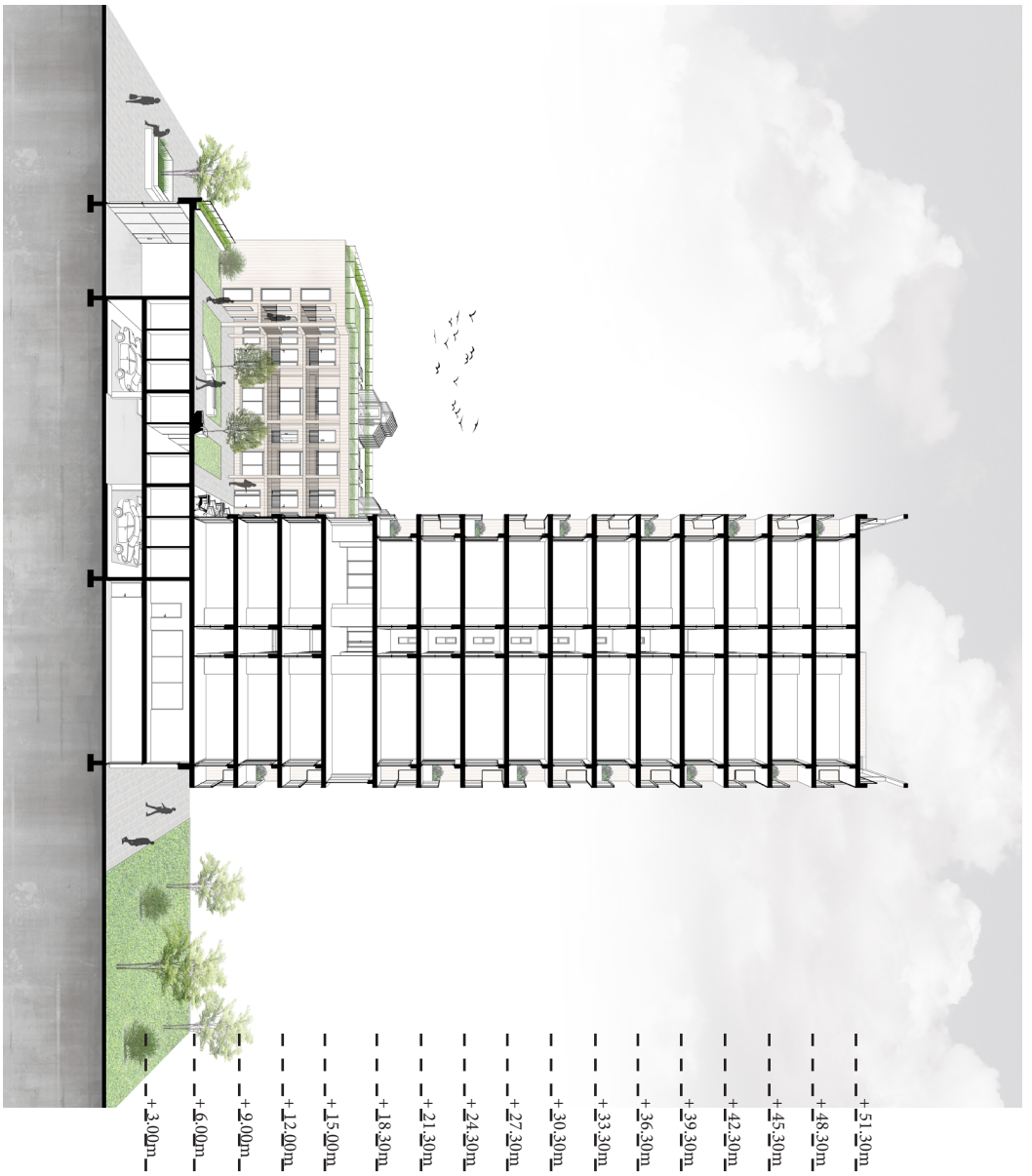
South elevation



West elevation









Zoning



T1



T2



T3



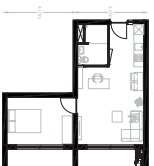
T4



T5



T6



T7



T8



T9

Living Room as Circulation Center



T10

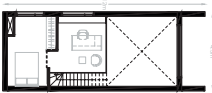


T11

Maisonette



T12

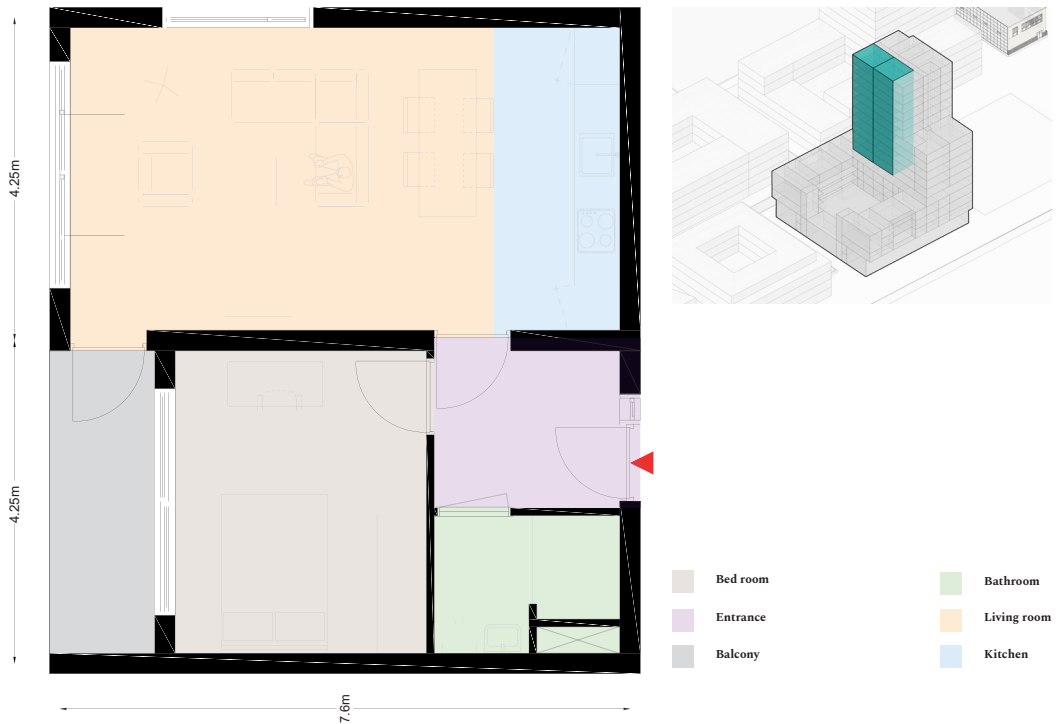


- The dwellings have been categorized according to their characteristics and their inner division. In total, there are three categories:
- **Zoning:** On the one hand, it distinguishes between the general living space, which includes the living room, kitchen, and dining area, and the bedroom section, which includes separate rooms and a bathroom.
 - **Living Room as Circulation Center:** The living room is the focal point of the floor design, which extends outwards and around it.
 - **Maisonette:** The maisonette floor plan typology is distinguished by the fact that the residence extends across multiple full stories. It is typically two stories high.

Dwelling type T2 and point system

Defining the rent

Each dwelling has been divided according to the point system in order to make the process of calculation easier. Not only the square meters influence the rent but also the luxury level of the kitchen and bathroom. Therefore, the balance between the quality of the dwelling and the number of square meters is required in order to get the desired rent. The interior renders of the dwellings have been done according to the decision taken according to the point system.



Puntenstelling voor zelfstandige woningen

Oppervlakte vertrekken (1 punt per m ²)		Keuken			
Woonkamer	18 m ²	18,00	Lengte aanrechtblad	2 meter of meer	7,00
Slaapkamer	16 m ²	16,00	Het maximale puntenaantal voor dit onderdeel is 4, bij een aanrechtblad <1m. Anders is het het dubbele van het puntenaantal van het aanrechtblad		
2e slaapkamer	m ²		Kookplaat	Inbouw inductiekookplaat	1,50
3e slaapkamer	m ²		Oven	- maak een keuze -	
4e slaapkamer	m ²		Atzugkap	Inbouw atzugkap	0,50
5e slaapkamer	m ²		Inbouw magnetron	<input checked="" type="checkbox"/>	
Badruimte	3,5 m ²	3,50	Inbouw koelkast		0,75
Keuken	6 m ²	6,00	Inbouw vries/koelcombinatie	<input type="checkbox"/>	
Zolderkamers	m ²		Inbouw vaatwasmachine	<input type="checkbox"/>	
Ander kamers	m ²		Dubbele spoelbak	<input type="checkbox"/>	
Totaal bevindt zich in douche of badruimte?	<input checked="" type="checkbox"/>	-1,00	Luxe mengkraan		
Totaal vertrekken		43	Thermostatische watermengkraan	<input type="checkbox"/>	0,50
Overige ruimtes [% punt per m ² , minimum 2m ²]			Extra enkele kast		
Kelder	m ²		Extra dubbele kast		
Bijkeuken	m ²		Extra wandbelegging [naar 2m ²]		
Wasruimte	m ²		Vloertegels [naar 2m ²]		
Berging/schuur	m ²		Algehele luxe uitvoering [maximaal 2 punten]		
Vaste en ingebouwde kasten	m ²		Totaal keuken		10,25
Garage	m ²		Sanitair		
Zolderruimte	m ²		Aantal toiletten	<input type="checkbox"/>	3,00
Ander ruimten	4,6 m ²	3,45	Waaraan hangende toiletten	<input type="checkbox"/>	
Zolder aanwezig maar geen vaste trap naar zolder	<input type="checkbox"/>		De extra punten voor hangende toiletten worden meegeld met de luxe voorzieningen onder douche en bad.		
Totaal overige ruimten		3,75	Aantal wastafels, fonteinjes, lavetten en bidets	<input type="checkbox"/>	1,00
Verwarming & installaties			Douche en/of bad?	<input type="checkbox"/>	4,00
Type verwarming	Overige		Het maximale puntenaantal voor het onderdeel is het dubbele van het puntenaantal van de douche en bad, plus de punten voor de toiletten en wastafels.	<input checked="" type="checkbox"/>	
Aantal verwarmde vertrekken (open keuken telt als apart vertrek)	4	8,00	Design radiator	<input checked="" type="checkbox"/>	0,25
Aantal overige ruimten met verwarming [maximaal 4 punten]			Kastje, waarin ingebouwd een wastafel	<input checked="" type="checkbox"/>	0,25
Video hallofoon	<input type="checkbox"/>		Toiletkastje met ingebouwd verlichting	<input checked="" type="checkbox"/>	0,25
Totaal verwarming		8	Extra voor een bubbelbad [whipool]	<input type="checkbox"/>	
Energieprestatie			Schuif- of vouwwand met aluminium frame	<input checked="" type="checkbox"/>	1,00
Soort woning	Eengezinswoning		Luxe mengkraan [b.v. Eenhandbediening]		
Datum energielabel/-index	Na 01-01-2021		Thermostatische watermengkraan	<input type="checkbox"/>	0,50
Zoek op via postcode en huisnummer op www.ep-online.nl			Extra wandbelegging [naar 2m ²]		
Gebruiksoppervlakte	≥ 40m ²	40	Algehele luxe uitvoering [maximaal 2 punten]		
Energietabel	Label A+	40	Totaal sanitair		10,25
Totaal energie		40			

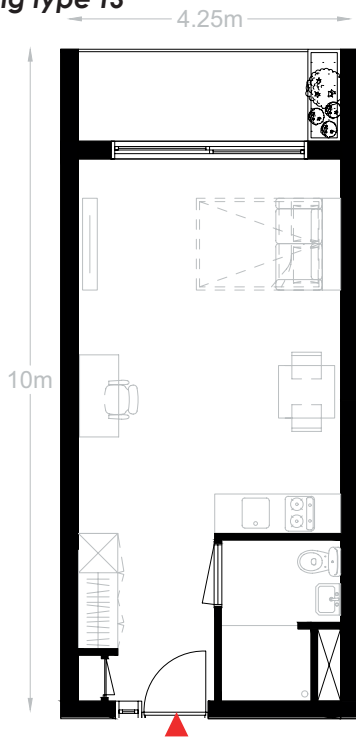
Buitenruimte		
Buitenruimte	[tot 25m ²]	2.00
Buitenruimte is gemeenschappelijk	<input type="checkbox"/>	
Carport	<input type="checkbox"/>	
Totaal buitenruimte		2.00
WOZ-waarde (minimaal € 55888)		
Vul de WOZ-waarde van de woning in (op te vragen bij het WOZ-waardeloket)	€ 190000	<input checked="" type="checkbox"/>
Nieuwbouwwoning 2015 of later (zie ook website Kadaster /		
Of verbouwd in 2015 of later met energieprestatie conform nieuwbouw-eisen (bouwbesluit 2012)		
Oplevering (nieuwbouw/verbouwd) in:	2021	
In welke gemeente ligt de woning?	Rotterdam	
WOZ punten absoluut		17.21
WOZ punten ratio oppervlakt		23.50
Totaal WOZ-waarde		41
Totalen		
Totaal puntenaantal (minimaal 40 punten)		158
Maximale kale huurprijs		€ 838,54
Een bedrag van (47.1€) voor gemeenschappelijke voorzieningen		€ 985,64
Een bedrag van (100€) voor energie- en waterverbruik (couples)		

In order to find up the total rent of the apartment, it was crucial to calculate the service costs. The service costs have been calculated according to the rent commission (huurcommissie) including the energy consumption of two occupants (couples). Therefore, these calculations are valid only to the day of making this thesis but the principles are the same unless the regulations have been updated.

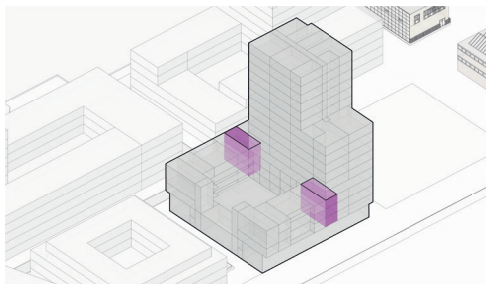
Designations	
Size	64.5 m²
Rent (all inclusive)	985.64 €
Division of the dwelling	Separated bedroom
Points	158
Storage	Yes
Kitchen	Full Kitchen
Private outdoor space	Loggia or Winter-garden
Communal facilities	Yes
Car sharging	Yes
Bicycle storage	Yes



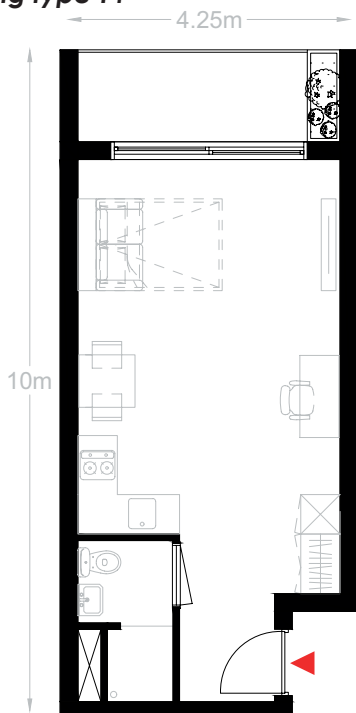
Dwelling type T3



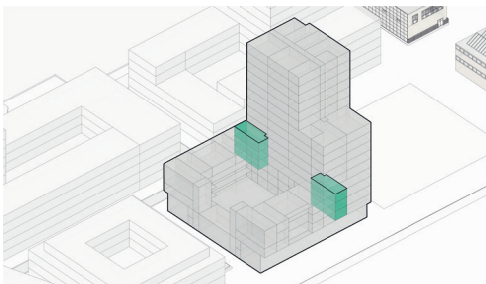
Designations	
Size	42.5 m ²
Rent (all inclusive)	1007.42 €
Division of the dwelling	Combined
Points	144
Storage	No
Kitchen	Kitchenette
Private outdoor space	Loggia or Winter-garten
Communal facilities	Yes + communal kitchen
Car sharging	Yes
Bicycle storage	Yes

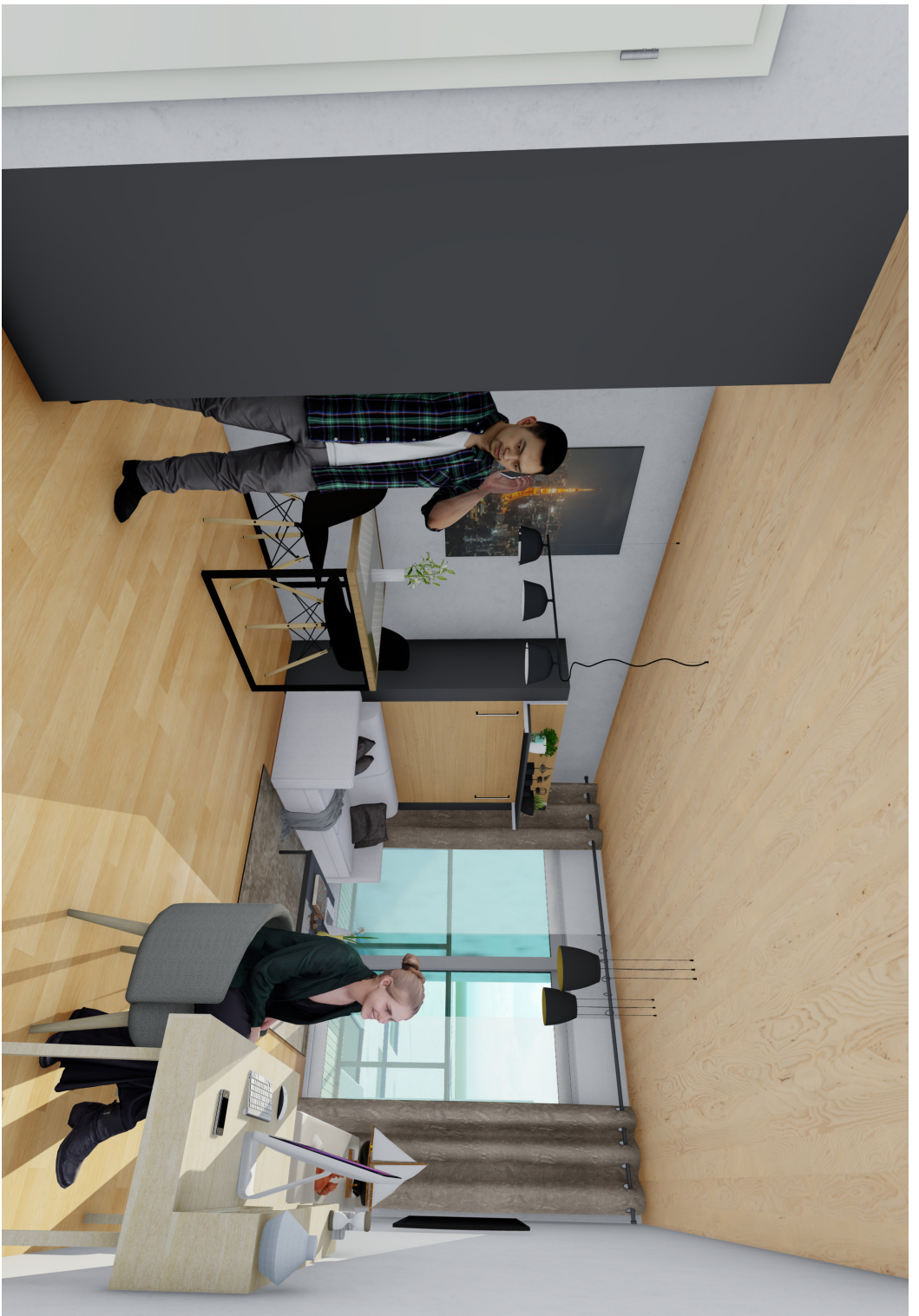


Dwelling type T4

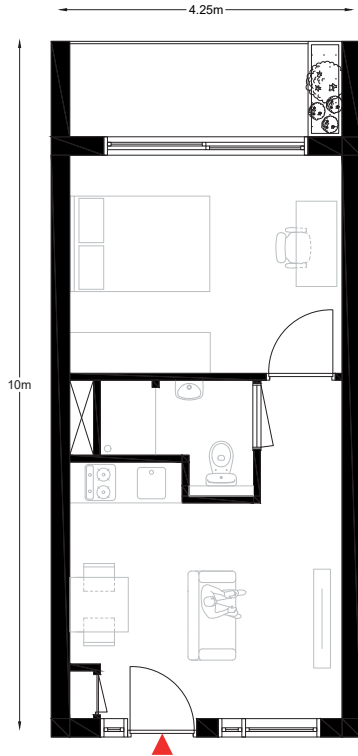


Designations	
Size	41 m ²
Rent (all inclusive)	1001.15 €
Division of the dwelling	Combined
Points	137
Storage	No
Kitchen	Kitchenette
Private outdoor space	Loggia or Winter-garten
Communal facilities	Yes + communal kitchen
Car sharging	Yes
Bicycle storage	Yes

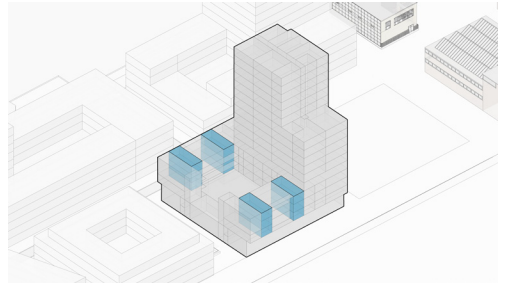




Dwelling type T5

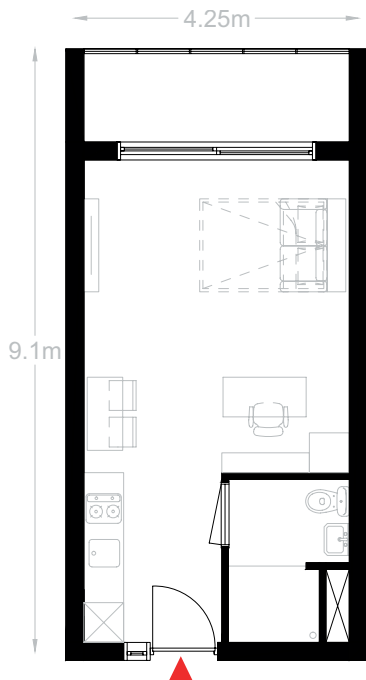


Designations	
Size	42.5 m ²
Rent (all inclusive)	1007.42 €
Division of the dwelling	Separated bedroom
Points	144
Storage	No
Kitchen	Kitchenette
Private outdoor space	Loggia or Winter-garten
Communal facilities	Yes + communal kitchen
Car sharging	Yes
Bicycle storage	Yes

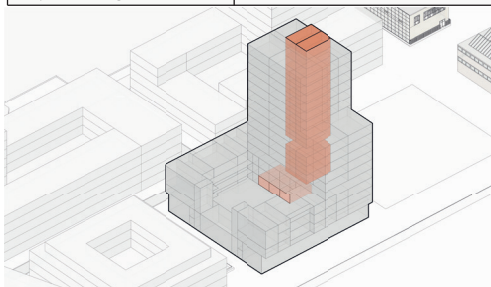




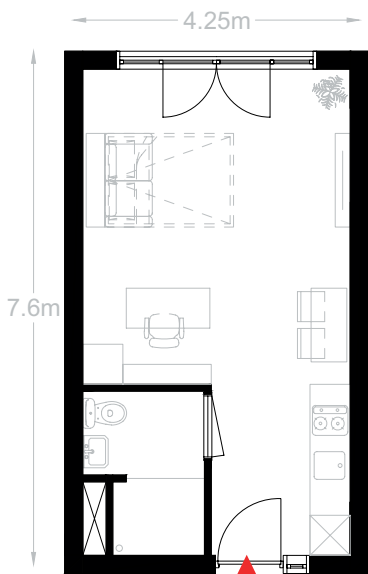
Dwelling type T1



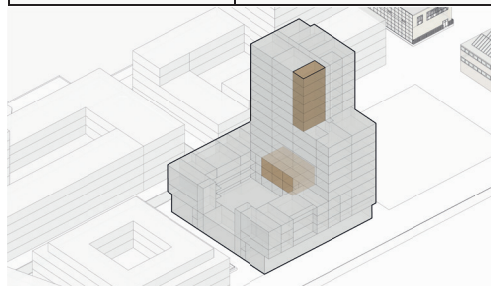
Designations	
Size	38.7 m ²
Rent (all inclusive)	989.62 € or 880.05 €
Division of the dwelling	combined
Points	140
Storage	No
Kitchen	Kitchenette
Private outdoor space	Loggia/Winter-garden/Front yard
Communal facilities	Yes + communal kitchen (2 to 4)
Car sharging	Yes
Bicycle storage	Yes



Dwelling type T6



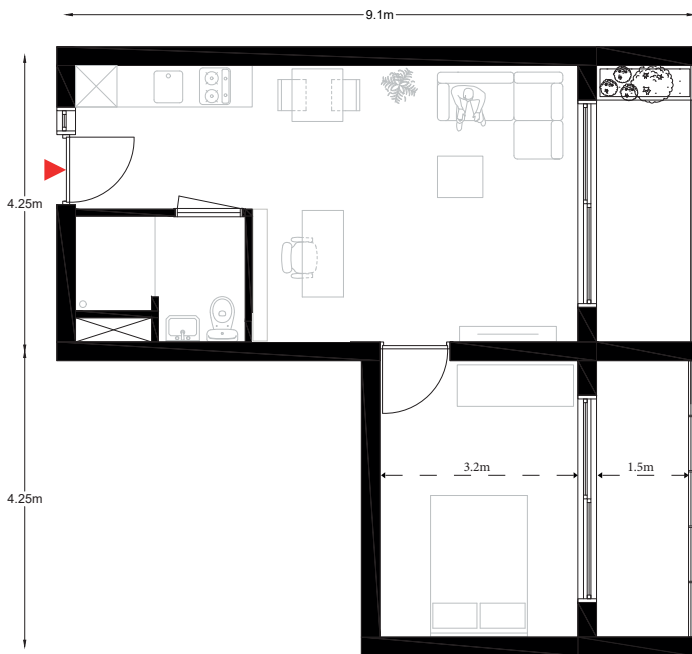
Designations	
Size	32.5 m ²
Rent (all inclusive)	961.83 € or 852.26 €
Division of the dwelling	combined
Points	135
Storage	No
Kitchen	Kitchenette
Private outdoor space	No
Communal facilities	Yes + communal kitchen (2 to 4)
Car sharging	Yes
Bicycle storage	Yes



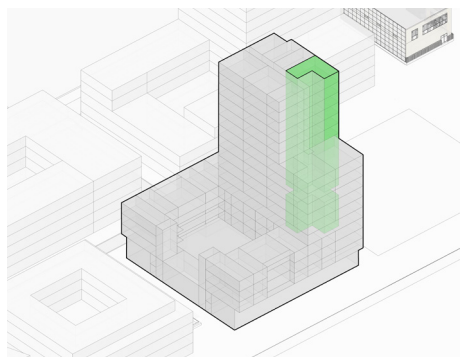
Living room with a view on the inner courtyard (T6)

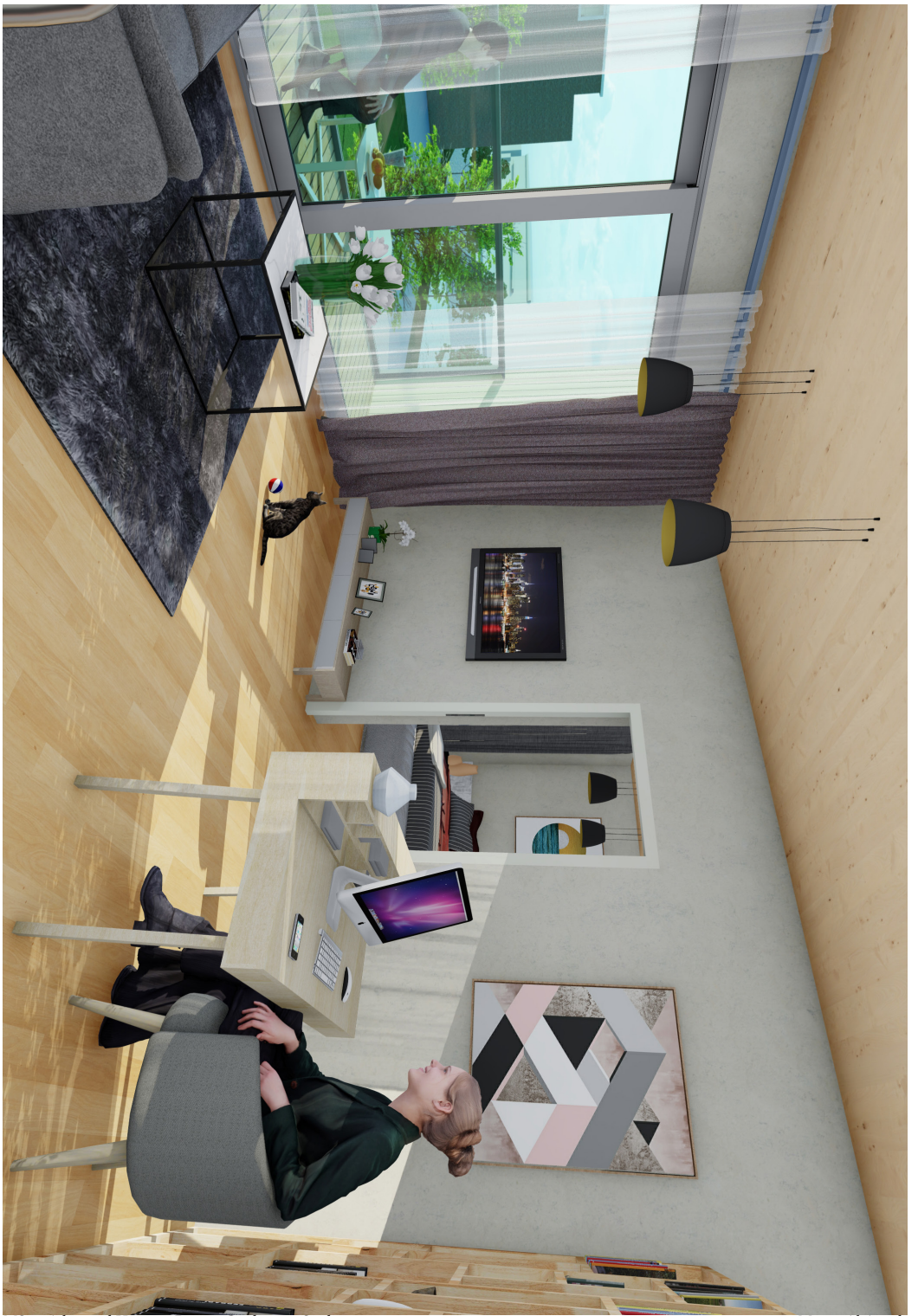


Dwelling type T7



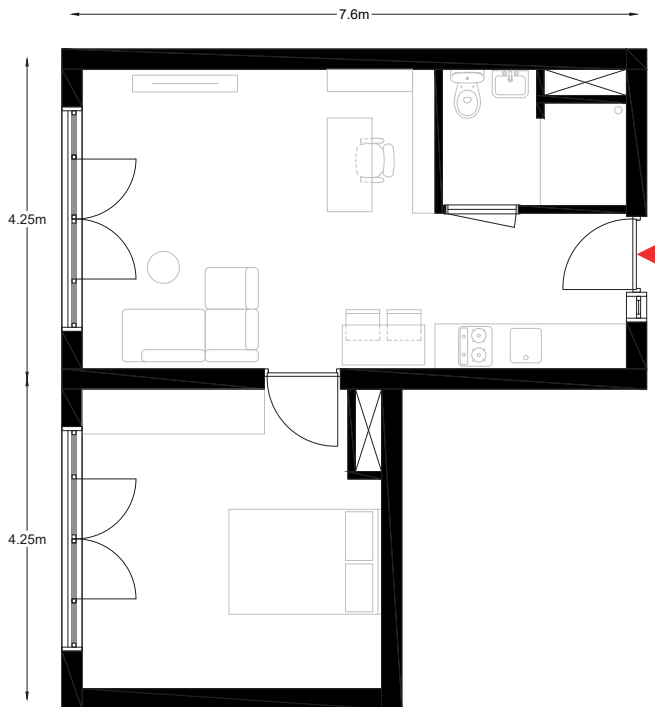
Designations	
Size	54 m ²
Rent (all inclusive)	1,045.21 € or 935.46 €
Division of the dwelling	Separated bedroom
Points	149
Storage	Yes
Kitchen	Standard
Private outdoor space	Loggia or Winter-garden
Communal facilities	Yes + communal kitchen (2 to 4)
Car sharging	Yes
Bicycle storage	Yes



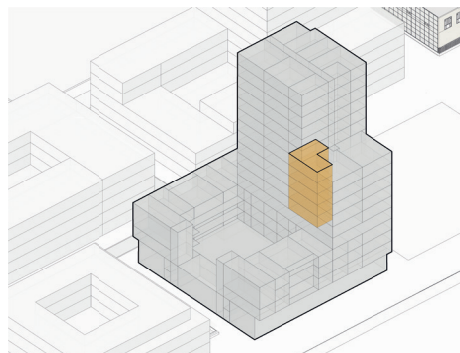




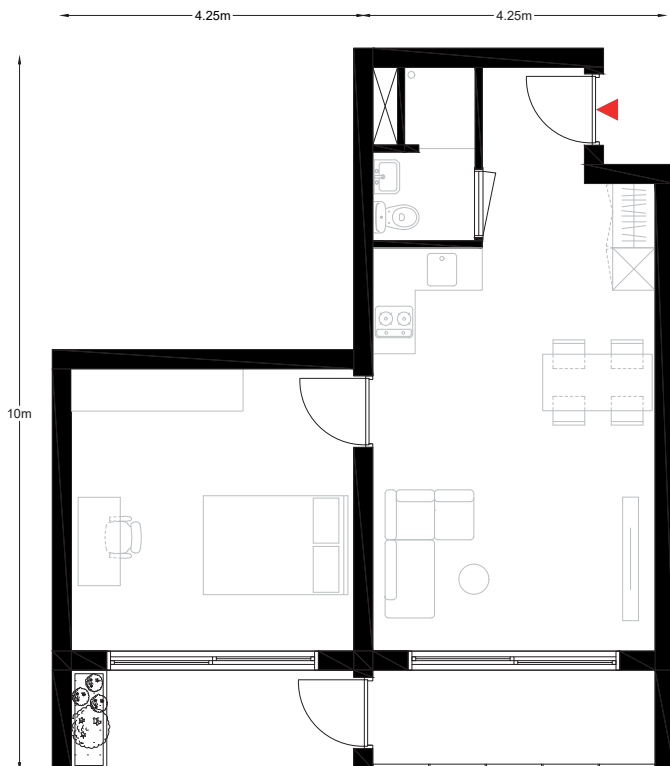
Dwelling type T8



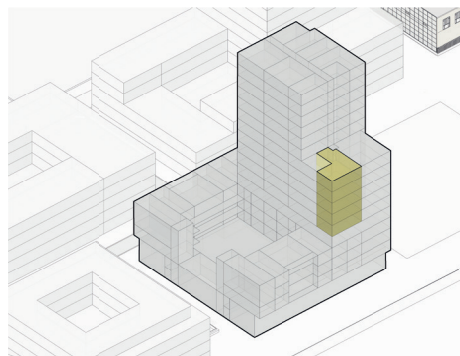
Designations	
Size	46 m ²
Rent (all inclusive)	913.42 €
Division of the dwelling	Separated bedroom
Points	145
Storage	No
Kitchen	Standard
Private outdoor space	No
Communal facilities	Yes
Car charging	Yes
Bicycle storage	Yes



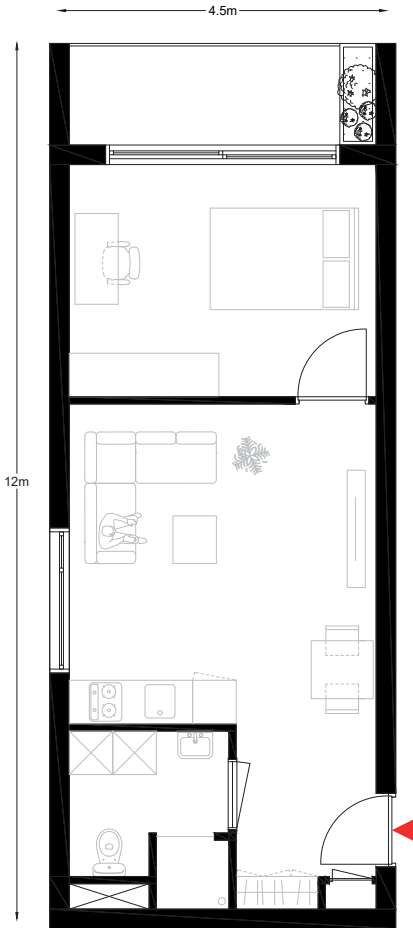
Dwelling type T9



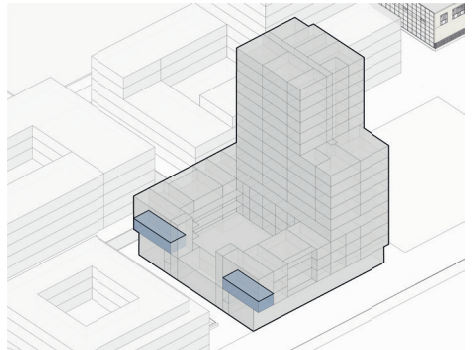
Designations	
Size	60 m ²
Rent (all inclusive)	952,3 €
Division of the dwelling	Separated bedroom
Points	152
Storage	yes
Kitchen	Standard
Private outdoor space	Loggia and Winter-garden
Communal facilities	Yes
Car sharging	Yes
Bicycle storage	Yes



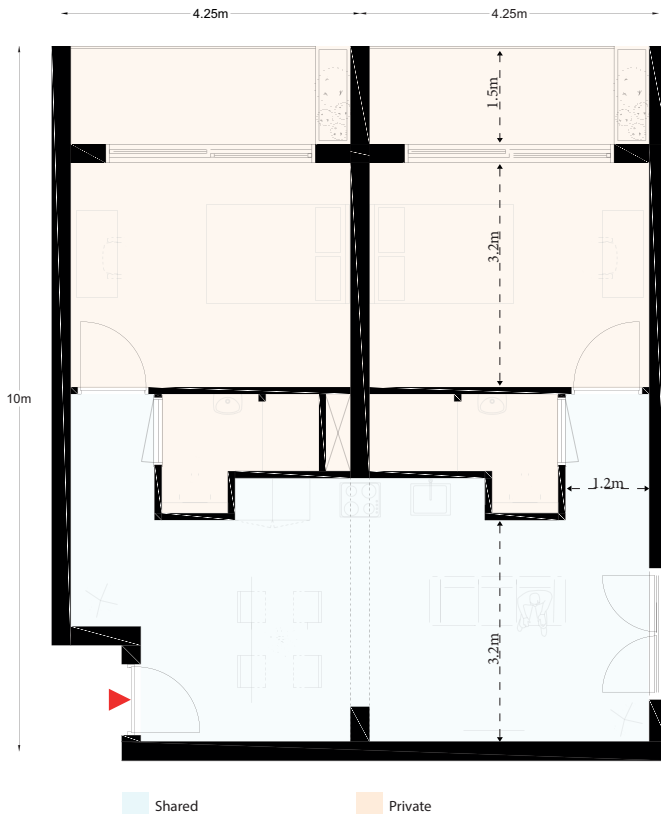
Dwelling type T10



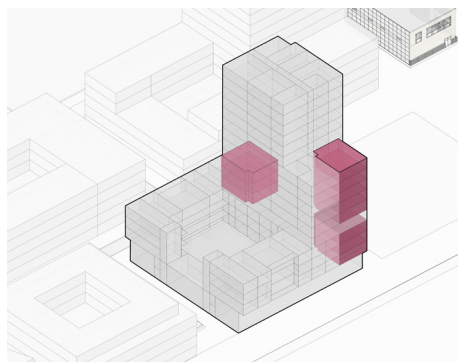
Designations	
Size	54 m ²
Rent (all inclusive)	930.08 €
Division of the dwelling	Separated bedroom
Points	148
Storage	Yes
Kitchen	Standard
Private outdoor space	Loggia
Communal facilities	Yes + communal kitchen
Car sharging	Yes
Bicycle storage	Yes



Dwelling type T11

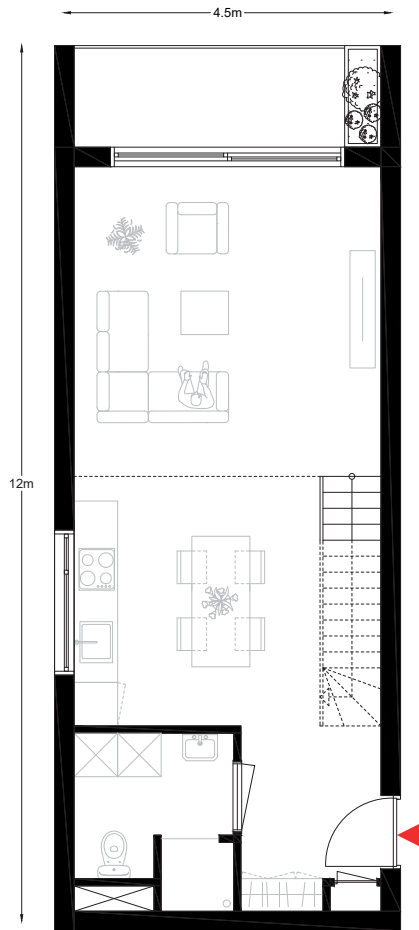
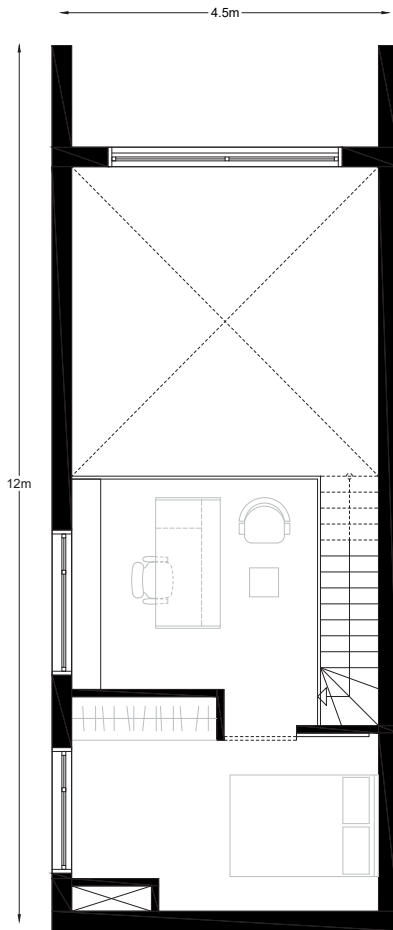


Designations	
Size	83.5 m ²
Rent (all inclusive)	1,082.98 € (two tenants)
Division of the dwelling	Fiends apartment
Points	242
Storage	Yes
Kitchen	Full kitchen
Private outdoor space	Loggia
Communal facilities	Yes
Car sharging	Yes
Bicycle storage	Yes

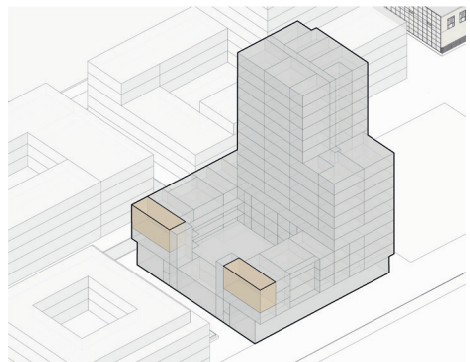




Dwelling type T12

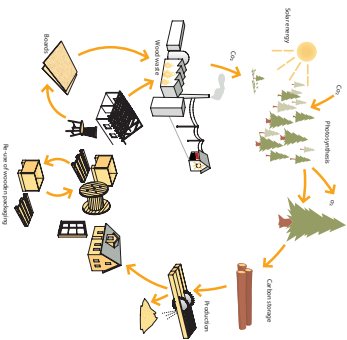
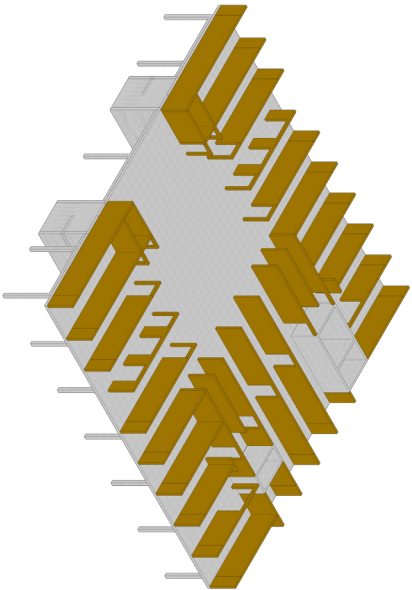


Designations	
Size	71 m ²
Price (all inclusive)	1030.12 €
Division of the dwelling	Duplex / Separated bedroom
Points	166
Storage	Yes
Kitchen	Full Kitchen
Private outdoor space	Loggia
Communal facilities	Yes
Car charging	Yes
Bicycle storage	Yes





Building Technology



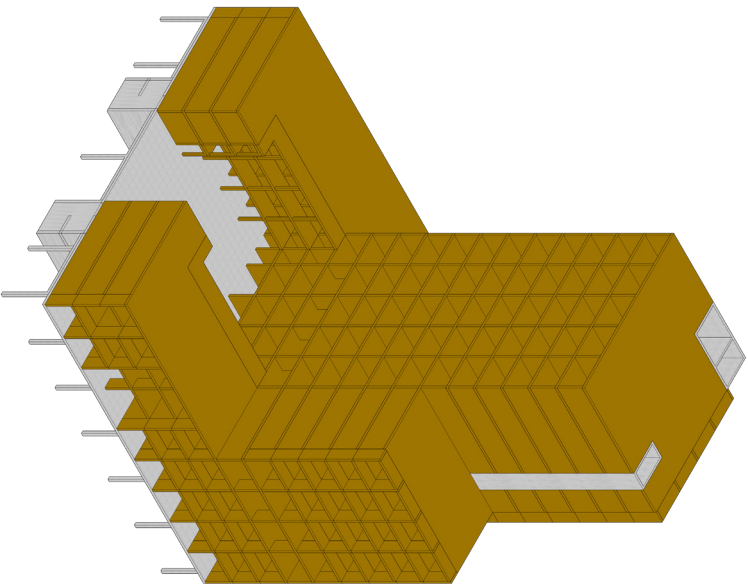
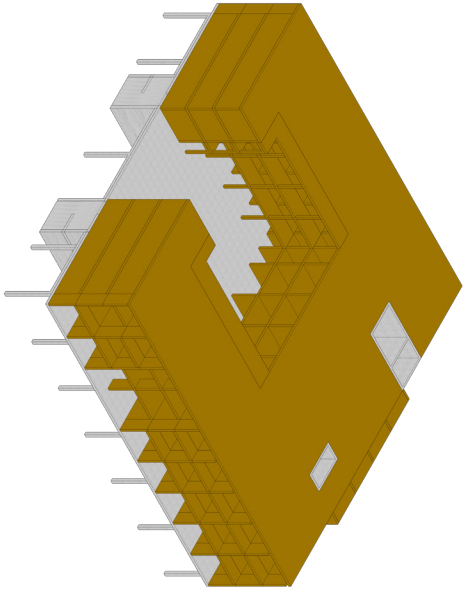
Timber is an extremely long-lasting construction material. Wood construction may thus be employed effectively when sustainability standards are highly required. Timber is considered as a renewable building material because it always can be regenerated. In contrast to beton, which depletes the soil, the reason is that no more wood is taken from the forest each year than it grows.

carbon dioxide emissions

Beton is one of the main reasons for carbon dioxide emissions globally. Unlike timber, which influences positively on the carbon dioxide emissions. Naturally, trees can transform carbon dioxide into O₂ due to the process of photosynthesis. Once a tree burns, for example, the process of photosynthesis will stop as a result, but when a tree is cut down at a certain moment, the carbon dioxide stays inside the wood.

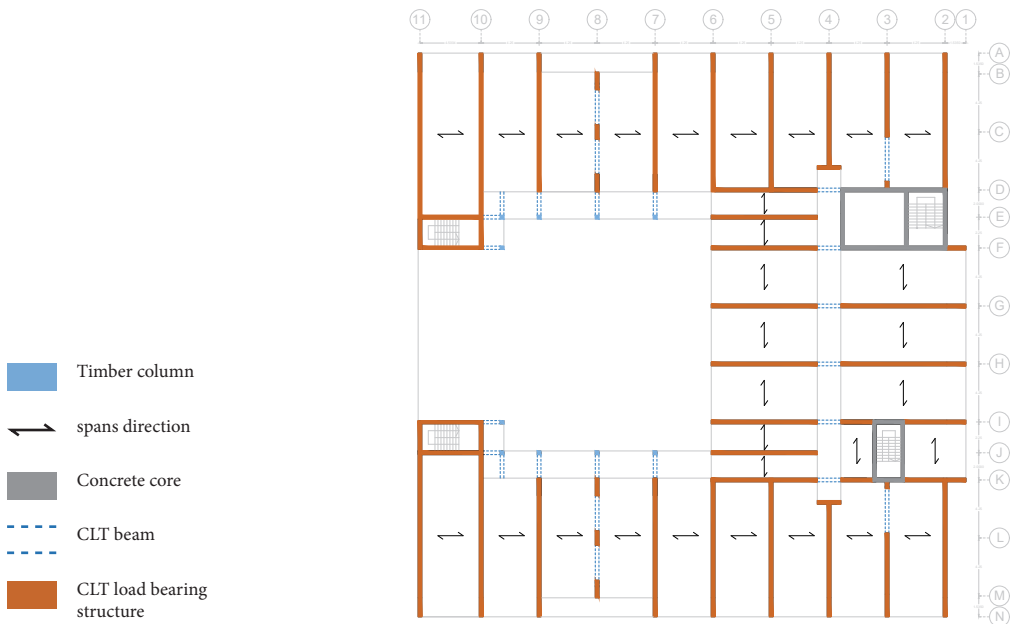
Favorable

Timber as a construction material is ideal regarding reusing because it is convenient to deconstruct and not heavy-weighted which makes the process of production and fabrication easier compared with other construction materials.



The construction material of the block is hybrid because it combines Cross-laminated timber and concrete at the same time. Concrete is chosen as a construction material in the plinth because of the location itself, the block is just beside the waterfront and the possibility of overflow should be taken into account so in this equation, the concrete will be safer than CLT. Also, due to the lightweight of CLT, the construction material of the tower's staircases has been chosen to be concrete in order to give the tower omer stability.

Construction plans





Thermowood

Sustainability level : Klasse 1
Durability: more than 35 years
Rot: good resistance
Finishing: The wood will barely shrink or expand: the dimensional stability is large.

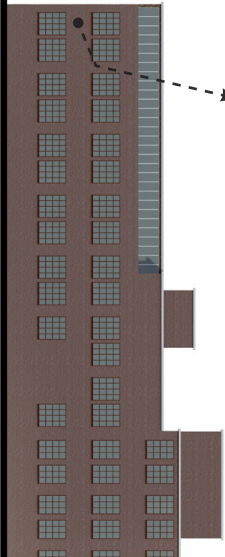


Old



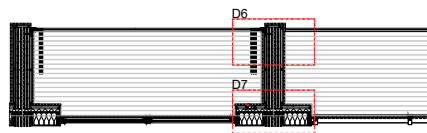
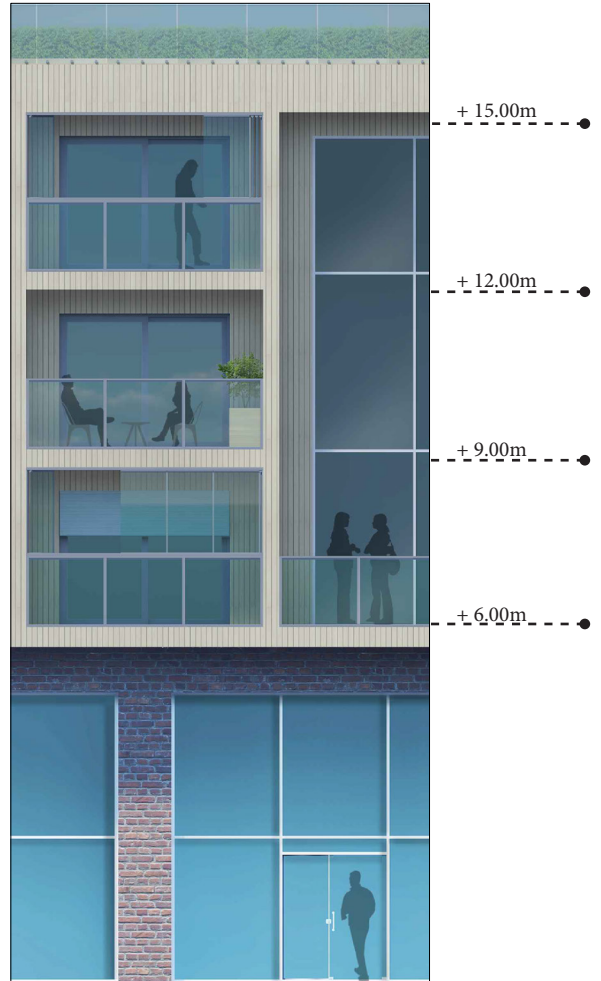
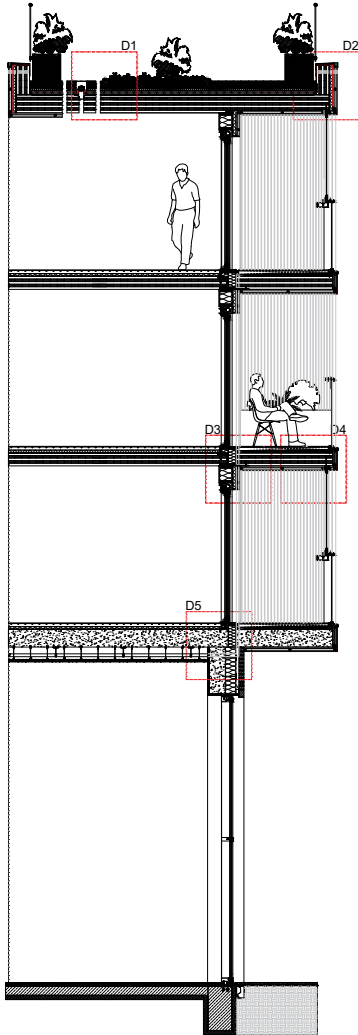
New

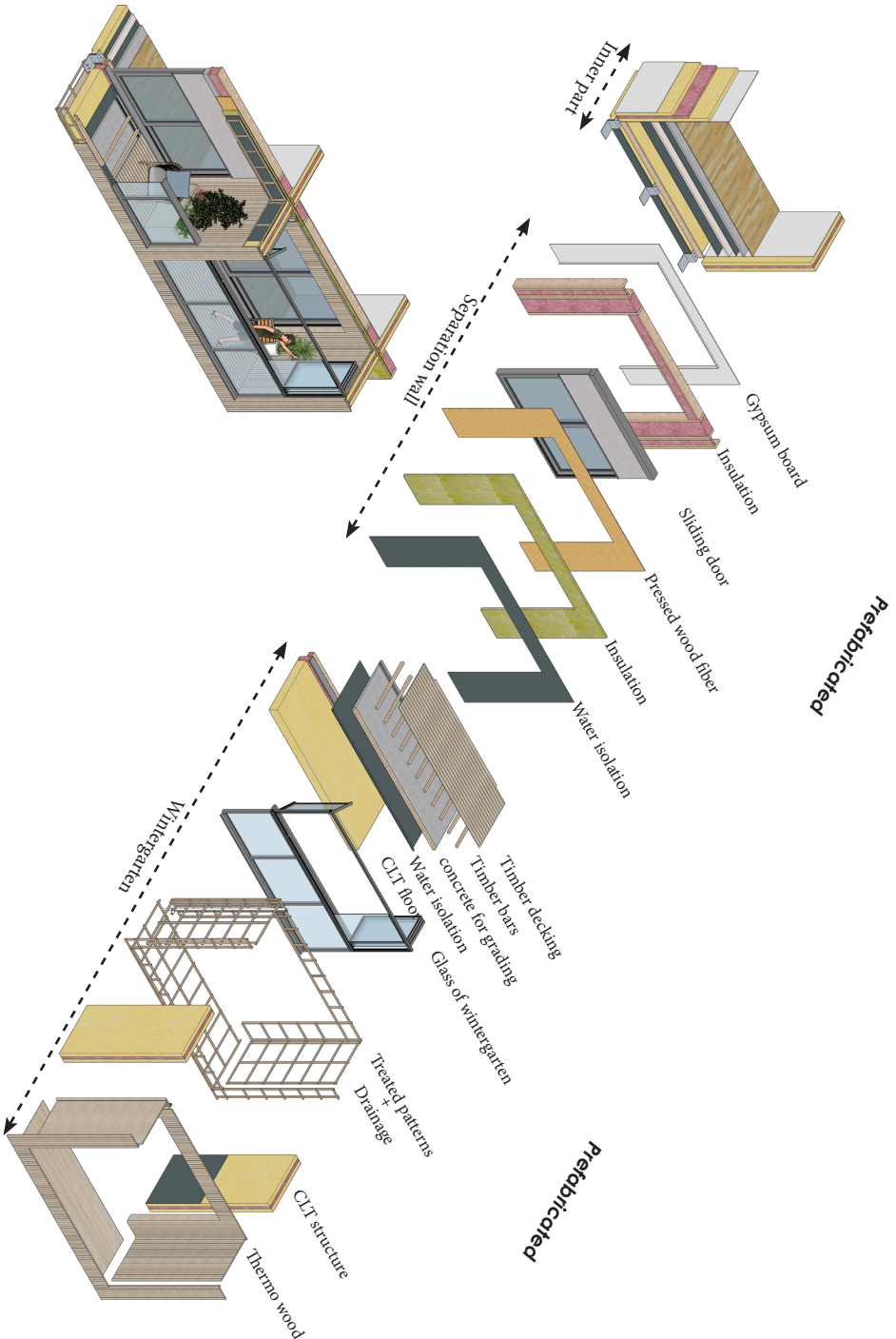
Same color tone



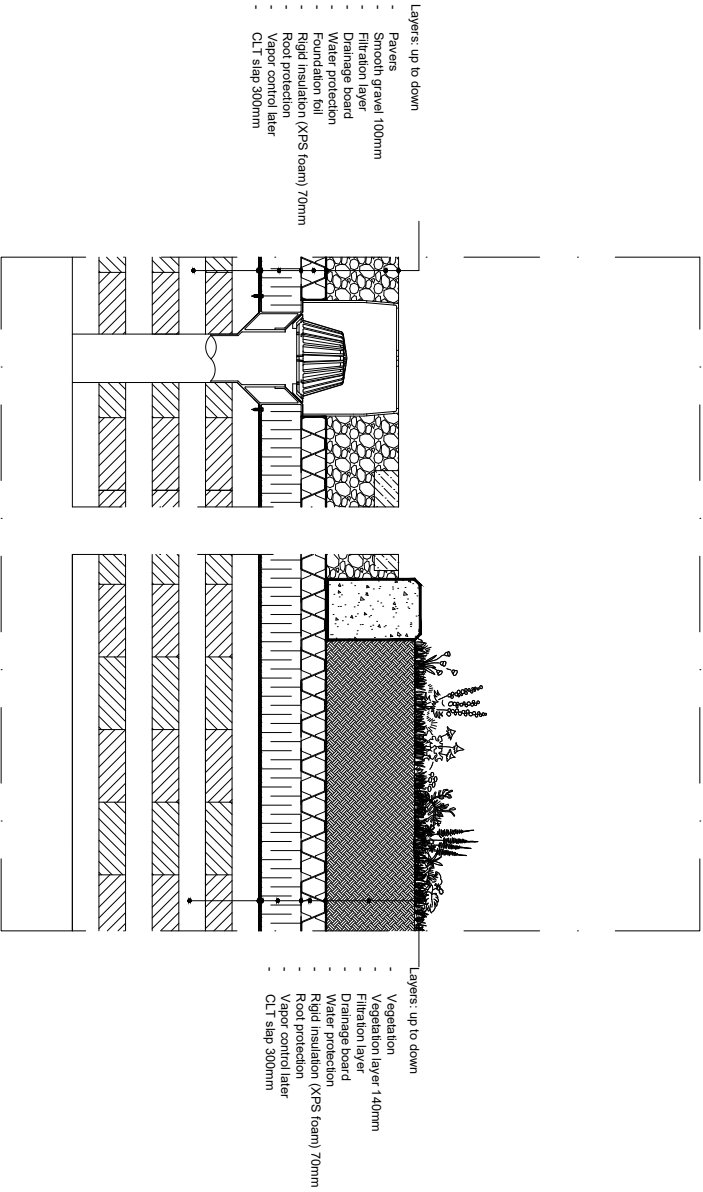


Facade fragment

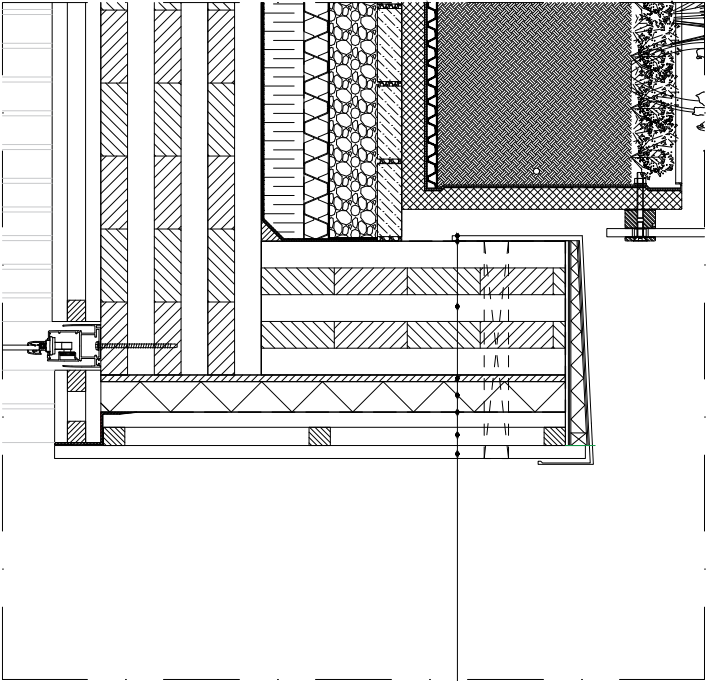




D1



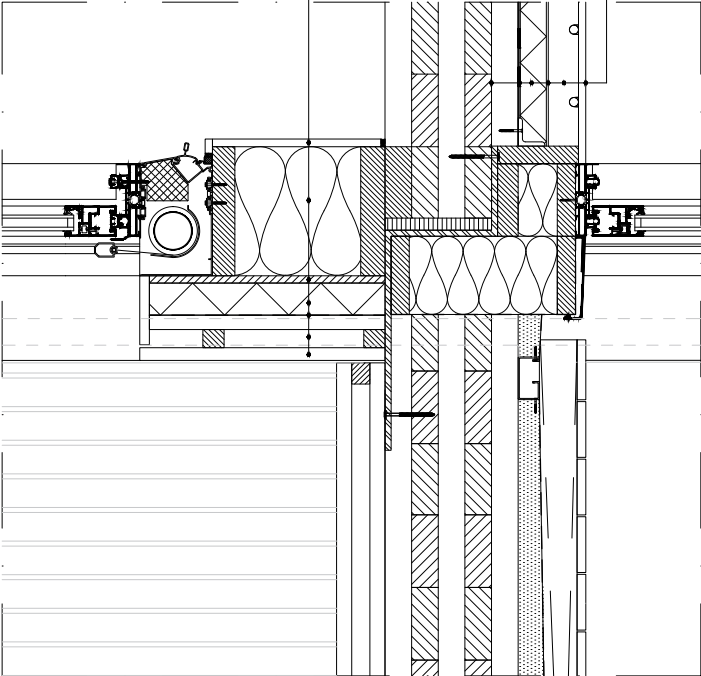
D2



Layers - from left to right

- Sheet-metal parapet cap
sloped to drain roof side
- Waterproofing membrane
- CLT wall 220 mm
- Pressed wood fiber insulation 53mm
- Insulation 53mm
- Waterproofing membrane
- Treated patterns
- Thermo-wood cladding

D3

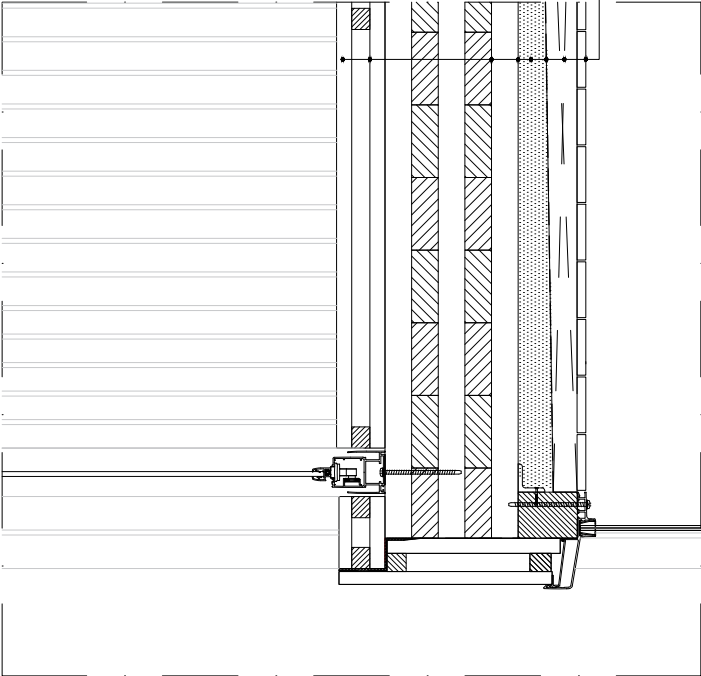


- Layers: up to down
- Laminate floor 10mm
- Carpet creel with integrated under-floor heating 50mm
- Separating layer
- Pressed wood fiber insulation 33mm
- Protective layer
- Load-bearing C.I. structure 220mm

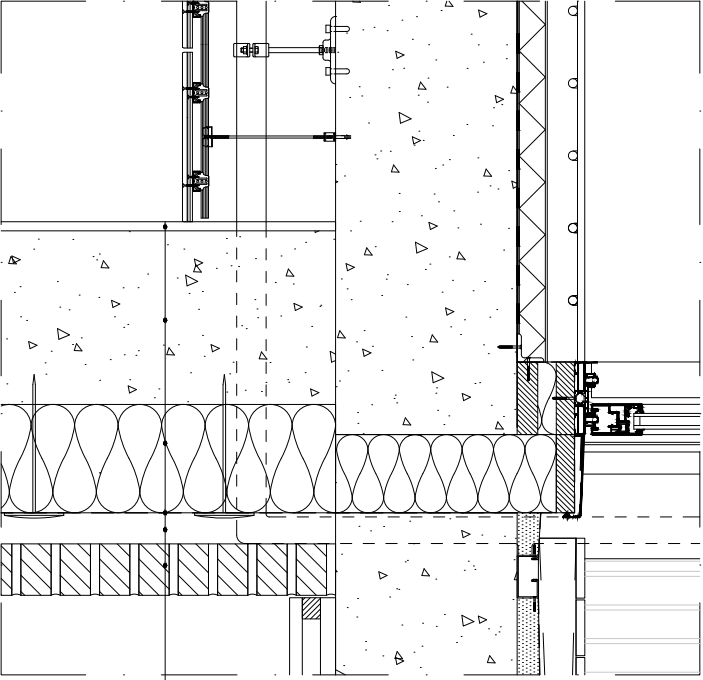
- Layers: left to right
- Fire safety gypsum-board 13mm
- Insulation 200mm
- Pressed wood fiber insulation 13mm
- Insulation 53mm
- Waterproofing membrane
- Treated patens
- Thermo-wood cladding

D4

- Layers: up to down
- Timber decking
- Timber bars for raising the floor
- Waterproofing membrane
- concrete layer for grading (slope of 1%)
- Separation layer
- Load-bearing CLT structure 220mm
- Treated patterns
- Thermo-wood cladding

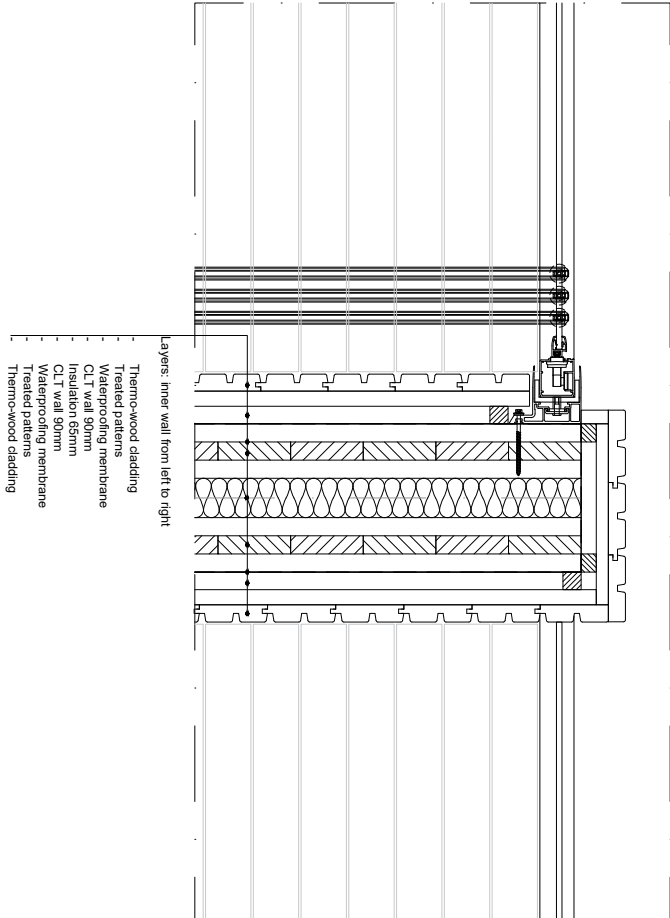


D5

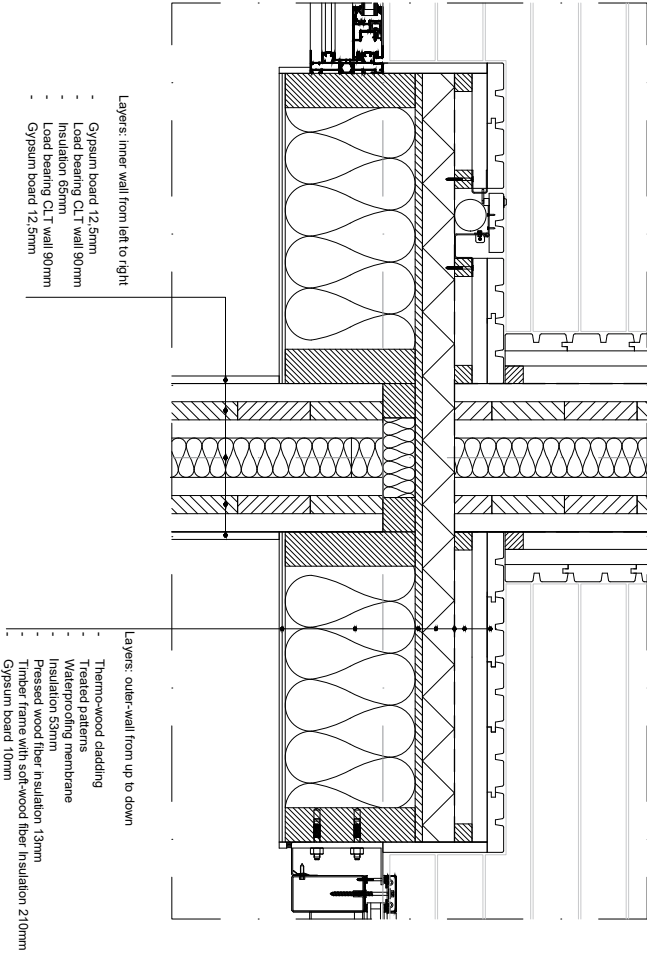


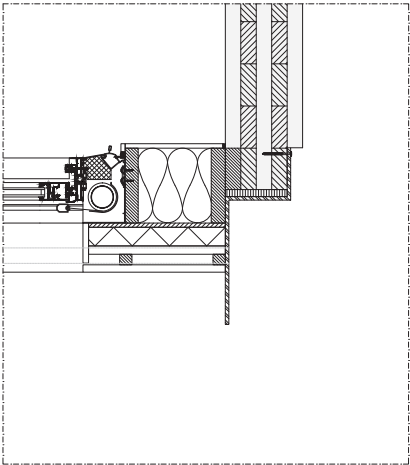
- Layers: left to right
- Gypsum-board 15mm
 - Concrete beam
 - Insulation 180mm
 - Waterproofing membrane
 - Air cavity 60mm
 - Brick 100mm

D6

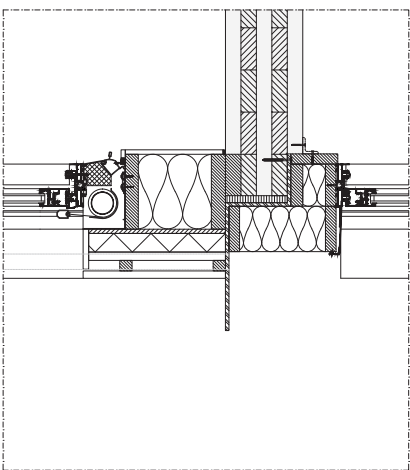


D7

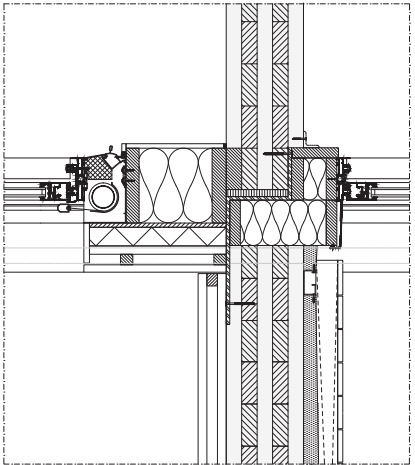




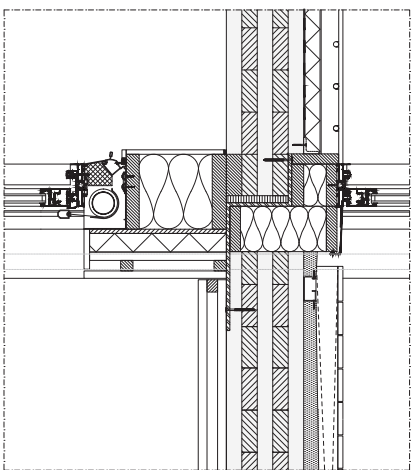
1- The CLT floor is on place.



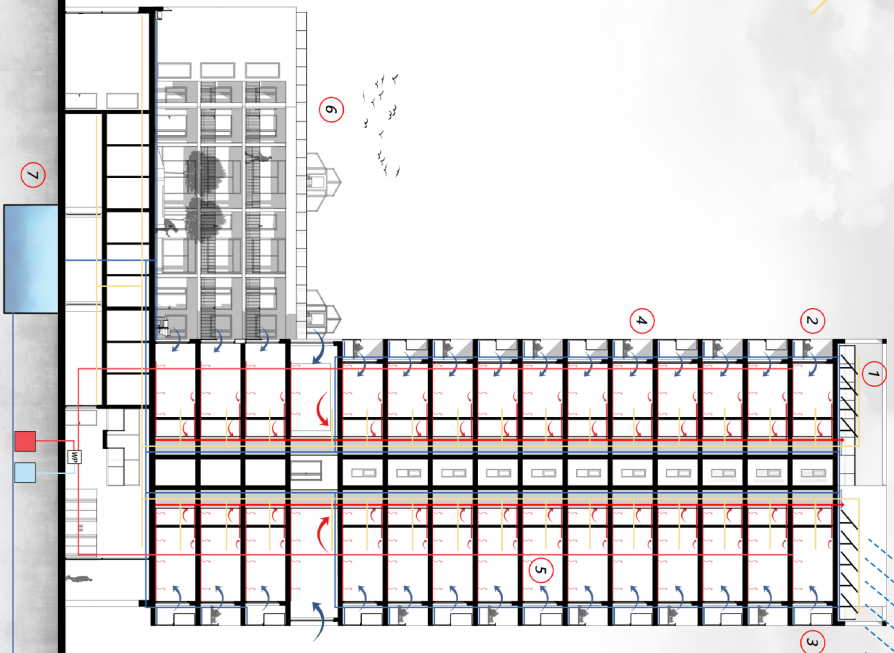
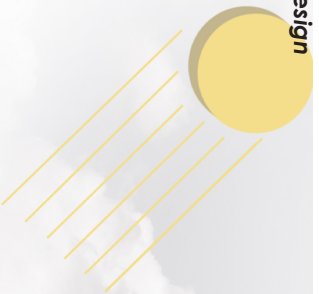
2- Placing the prefabricated inner wall.



3- Connecting the prefabricated loggia/winter-garden with the structure of the floor.



3- Adding the upper layers of the floor.



1- Solar panels to provide the dwellings with electricity. Providing the dwellings with LED lighting devices will improve the amount of power saved.

2- Ventilation system type C (natural input and mechanical output).

3- The collected rainwater from loggias, wintergarens, and roofs goes to the water reservoir.

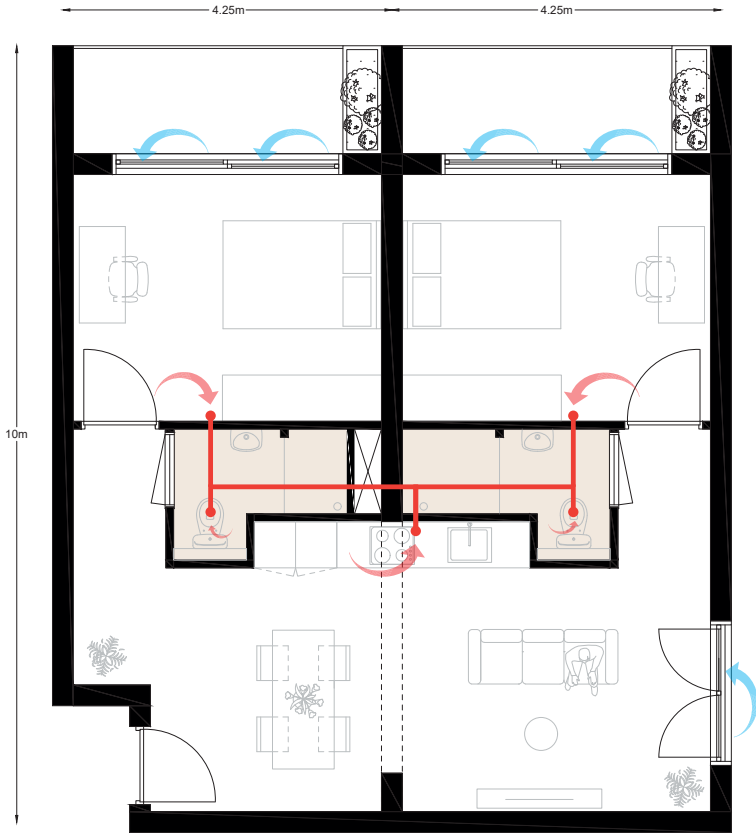
4- Loggias and wintergarens will enhance the shading and reduce the overheating.

5- Heat exchanger as heating system (ground heat pump).

6- Providing the building with roof gardens will attribute to the enhancement of biodiversity in the surrounding.

7- The gathered water will be used to irrigate the plants and the WC flash tanks.

Ventilation



The ventilation system (Type C) is chosen to be applied in the block which is natural input and mechanical output. The shafts (which also contain ventilation pipes) are placed in the dwellings in a manner to be adjacent to all the facilities in order to reduce the number of ventilation pipes used for air out-take. Also, all the output ventilation pipes are hidden by using suspended ceilings.

- Suspended ceiling
- Mechanical output
- Natural input

The weather and its influence on the selected materials

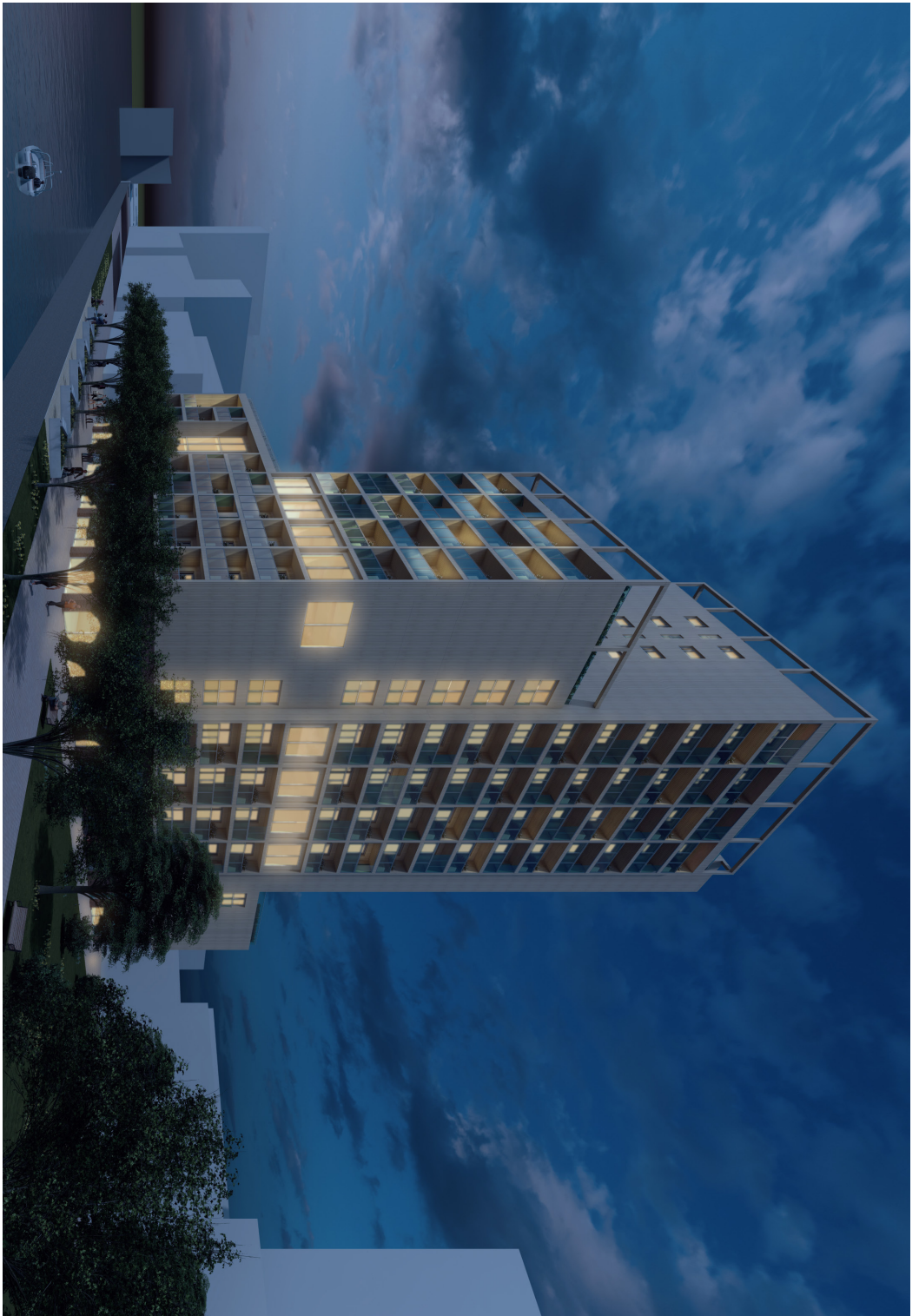


Materials before the weather has an impact on them.



Materials after around 5 years.





Reflection Report

Context:

- Introduction
- Research process:
 - Collectiveness
 - Typology transfer and location
 - Analysis of statistics
 - Target group
 - Literature review
 - Questionnaire
 - Four case studies
 - Quick start
 - Computer Aided Design
 - Points system
 - Materiality
- Conclusion
- Four other reflections

Despite the fact that I had done research several times in my prior academic education, I was not much aware of the relationship between design and research until my graduation project because I had to make many decisions and choices more than ever. Designing depends on architect's comprehension of physics, history, sociology, psychology, and a lot of other aspects. Thus, these considerations are too complex to be grasped by one individual. Here lies the centric role of research which demystifies the complexity of "designing". Research allows finding to be drawn that influences design choices and decisions. However, I started to notice that during the writing of my graduation project.

Therefore, being part of the technological sciences is one of the things you learn when you study at the faculty of architecture of TU Delft (van der Voordt, 1998). The insight that I received through the curriculum, especially, in the graduation year was like (eye-opening) to the importance of scientific research, as well as the contrasts between scientific and non-scientific research.

As mentioned above, making a design with a full sensibility of scientific awareness is strenuous task, but I have acquired the knowledge to utilize several research methodologies which help making thoughtful decisions in order to come up with validated design.

I will highlight, In this reflection report, most of the research techniques in order to formulate an appropriate decision throughout my graduation project. Moreover, I will mention the decisions that have been taken from these techniques. rewefa

What is research?

Wang & Groat (2013) defined research as "systematic inquiry directed toward the creation of knowledge.". Also, the authors mentioned that during the design process, the interplay between research and design is equally relevant for every phase of the design process. Similarly to Wang and Groat (2013), Van der Voordt (1998) defines scientific research as "collecting, processing and analyzing data to find out more. Sometimes this knowledge is an end in itself and the research is purely aimed at increasing knowledge and insight. In other cases, "knowing more" serves as a means of more informed decision-making.".

In the following paragraphs, I will go through most of the requirements that I have done during my graduation project in the Advanced Housing Design Studio as follows:

- Collectiveness
- Typology transfer and location
- Target group and analysis of statistics
- Literature review
- Questionnaire
- Case studies
- Quick start
- Computer-Aided Design
- Points system and affordability
- Materiality



Collectiveness

the first (group) assignment in the studio was an ethnographic research in order to study and investigate collectiveness in a specific building in Rotterdam (Spaansekade). In this ethnographic research I used three methods to analyze collectivity:

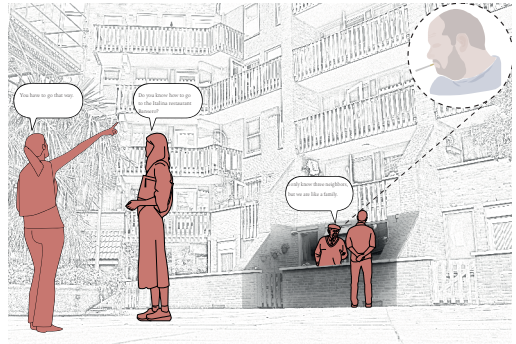
- Sketching;
- Observing;
- Photography;
- Interviews.

After collecting and analyzing the data with the group, we came up with two main results.

- 1- Aspect that promotes collectivity;
- 2- Aspects that diminish collectivity.

Based on the findings of this research, I made the following design decisions:

- A- The inner courtyard boosts accidental meeting and visual connections.
- B- Placing the active functions of the dwellings (such as living room) towards the courtyard
- C- Providing the building with many staircases reduces the chance of accidental meetings



Living room towards courtyard



Accidental meetings

The location of the project is Merwe-Vierhavens (M4H) in Rotterdam. This was also a group research and on a larger scale. First, we were split up into four different groups (also the location of M4H was divided into four quadrants) and each group had to investigate a specific neighborhood in Rotterdam. Thus, my group analyzed and studied most of the important residential buildings in Katendrecht - Rotterdam in terms of:

- Dimensions of the blocks;
- Functions (mixed-use/ only residential);
- Building typologies;
- Heights.

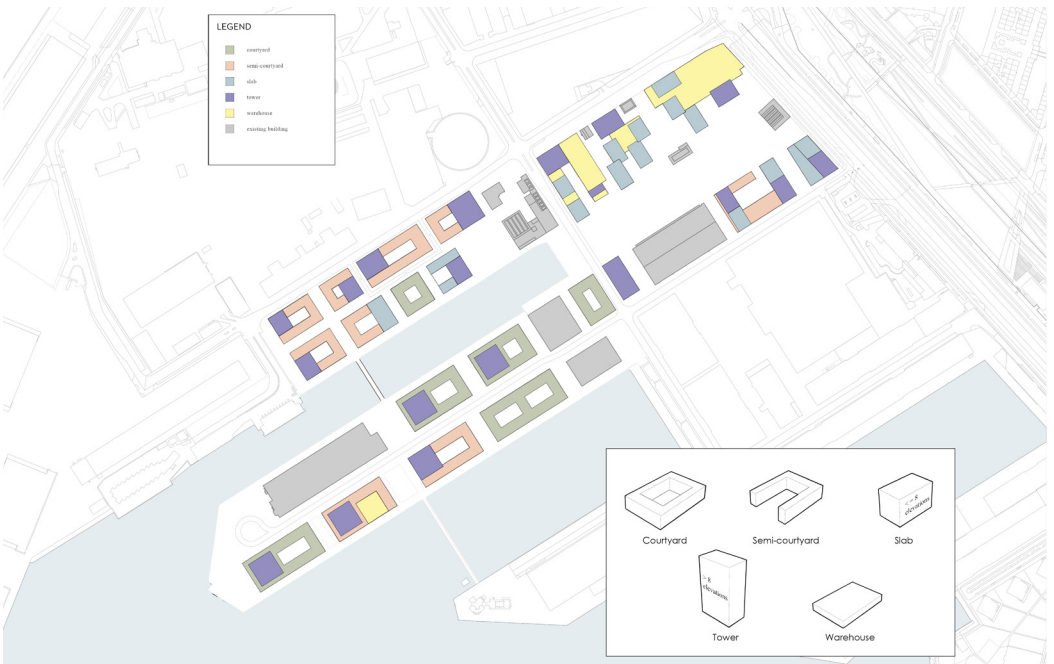
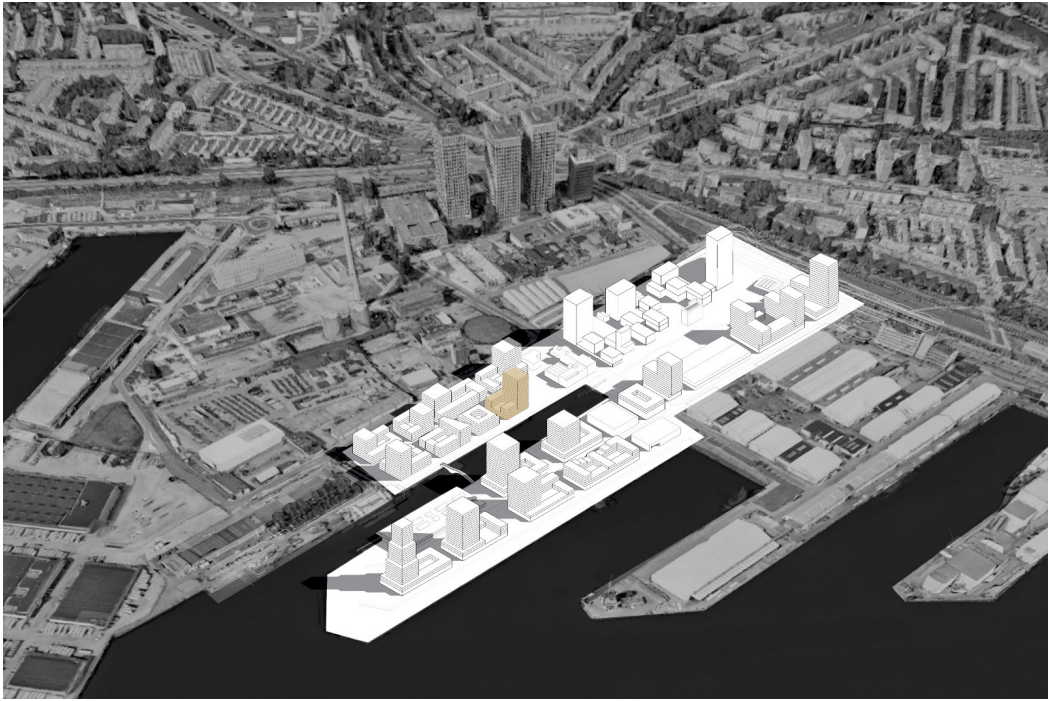
I have to mention here that Katendrecht is a post harbor area and transformed into a vibrant neighborhood.

The concept of Typology Transfer is to transfer the studied blocks of Katendrecht into M4H. Each group kept experimenting with the transferred block types and taking into account the process of the other groups in order to make one master plan for M4H. After that, the adopted master plan was analyzed by the whole four groups in order to present it (P1 presentation).

The analysis of blocks typologies gives me an insight into the consideration and the major dimensions of each block typology and analyzing the city helped me to identify the target group.

Based on the findings of this research, I made the following design decisions:

- Recognizing the needs of the location
- Plot number 20
- Target group (Young Professionals)





Target group

Just after finishing the first group presentation (P1), a pivotal decision had to be made and the whole graduation project passed on: choosing a target group.

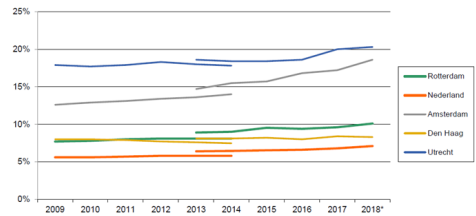
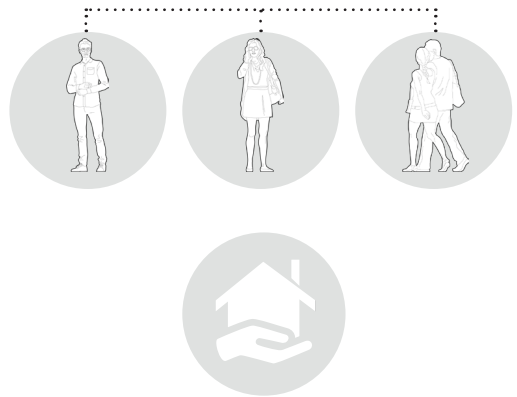
For me, choosing Young Professionals was based not only because of the lack of housing but also searching on other hidden issues that contribute in a way or another to the current main problem. Therefore, I had relied on many trustworthy resources to base the research on, such as:

- Municipality of Rotterdam;
- Rijksoverheid
- Central Office for Statistics;
- Universities reports on graduates;
- Books and academic articles;
- Financial (banks) reports;
- Journals;
- Questionnaire.

During the preliminary skimming of the collected data, I formed a general perception of the target group including their age, which ranges from their early twenties up to early thirties, highly educated, single /couples status, the conspicuous financial-related issues which provoked me to orientate the design theme on affordability.

Based on the findings of this research, I made the following design decisions:

- Designing affordable dwellings.
- Designing dwellings for singles and couples.



Bron: CBS, Sociaal Statistisch Bestand; bewerking OBI. Peildatum: 1 oktober.
The proportion of Young Professionals in Rotterdam compared with the other big cities and the national lot.

I could find plenty of statistical data about the young professionals in Rotterdam between 2009 to 2020 on the financial front.

I also used a research that had conducted by Rabobank about the financial barriers that hinder young professionals from purchasing dwellings. The reason for this is, mostly, due to their middle-income status, which prevents them from obtaining a sufficient mortgage. For example, a young professional with an average income of 43.000 € in Rotterdam will get a mortgage of not more than 135.000 €, while the average property price is 265.494 €. As a result, there is a deficit of 130.000 € (also keeping in mind that the student loan reduces the mortgage).

I had to see the regulation of the Rijksoverheid that concerns renting a social housing and compare it with their average annual income of young professional according the Employee Insurance Agency (UWV/ Het Uitvoeringsinstituut Werknemersverzekeringen).) The average annual salary of young professional ranges between (43.000 € and 46.000 €) and the maximum annual income to rent a social housing is 39.055 € (prijsspeil 2020). As a result, their yearly wage does not entitle them to rent in the social housing sector.

Based on the findings of this research, I made the following design decisions:

- Designing affordable **rental dwellings**.
- Determining the rent range of the dwelling as (750 € to 1000 €).
- Concentrating on cost-effective architectural techniques and strategies.

Following that, I continued the research by reviewing the literature. I had noticed that less is written about the young professionals in the Netherlands. Thus, I had to relate the selected target group to the generation that they belong to which is Millennials or generation Y. This step allowed me to grasp the traits, characteristics, aspirations, and the lifestyle of the generation as a whole (including young professionals), here I depended on the book of A History of Collective Living: Models of Shared Living by Susanne Schmid.

By reading the book, I found that the notion of “sharing” appeals to the target audience. Here, I could distinguish two models:

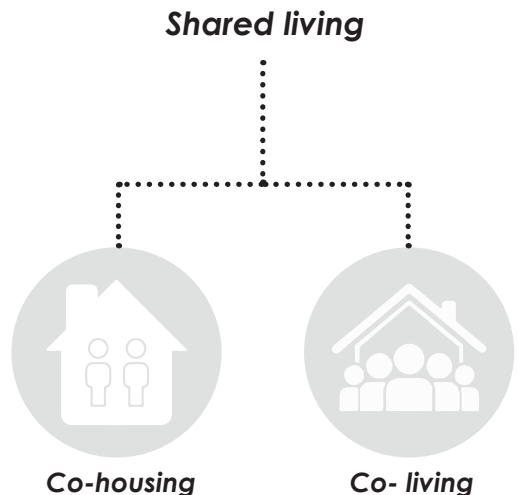
- Co-living: comprises of small individual residences (micro-dwellings) coupled with shared facilities such as a communal kitchen or communal laundry room. Also, co-living is frequently correlated with co-working spaces.

- Co-housing: When multiple tenants share a living room, kitchen, and/or bathroom in the same dwelling. Even though I obtained the necessary information, I was perplexed between the two choices.

I kept questioning myself, “Do I have to use both options or just one?” If I choose one of them, the other tenants will be excluded. As a result, I decided to conduct an online survey in order to find out the preferences of Rotterdam's young professionals regarding co-living and co-housing.

Based on the findings of this research, I made the following design decisions:

- Designing affordable **rental dwellings**.
- Determining the rent range of the dwelling as (750 € to 1000 €).
- Concentrating on cost-effective architectural techniques and strategies.



The questionnaire was created with two goals in mind. The first purpose was comparing a specific trend between the past and the current days which helped me to finish the historical part of the thesis. The second section focused on young professionals' preferences for co-living and co-housing.

Although that the survey placed in the pages and the groups of young professionals on Facebook such as **The FIZZ** and **OurDomain**, the survey's respondents had to meet the following requirements in order to participate:

- Recently or finished his/her higher education (HBO or WO);
- Age between 20 to 30;
- Succeeded to find at least part-time job in the labor market;
- Only singles or couples;
- Live in Rotterdam.

These criteria are characteristics of young professionals according to the literature. Therefore, the first section of this questionnaire is dedicated to gathering information on the abovementioned topics. Eventually, the questionnaire was filled with 15 respondents.

When I asked the young about the concept of co-housing, I introduced

it in terms of **friends' apartment**. Almost half of them accepted it and the rest rejected it. By looking over the data of the respondents, I found that all the couples refused it, while most of the singles accepted it.

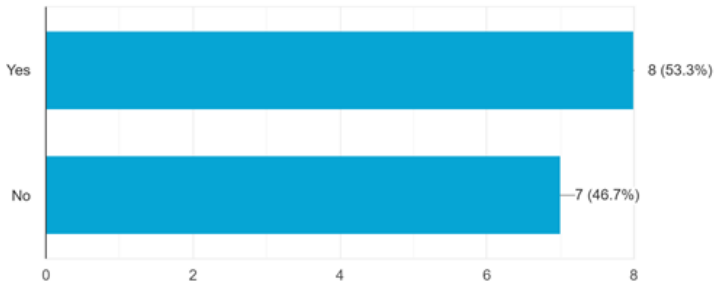
Regarding the notion of co-living, I tried to simplify the form of the question and not to mention the term of co-living explicitly in order to avoid any sort of ambiguity and misunderstanding to the respondents, so I mentioned it as **communal spaces**. Approximately half of the respondents agreed with providing the building with communal facilities such as communal kitchens.

Based on the findings of this research, I made the following design decisions:

- Applying both of co-living and co-housing with the needed requirement.
- Knowing which kind of projects to analyze and look into.

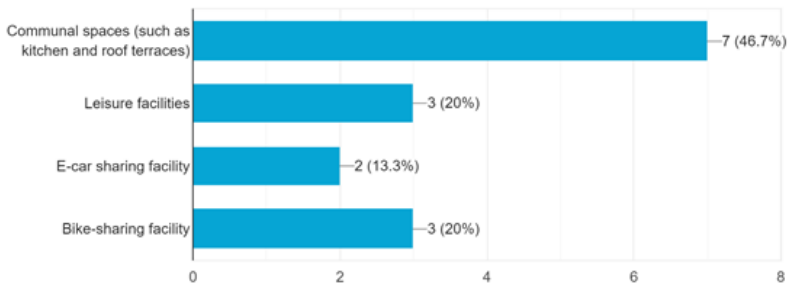
Do you prefer to live alone or to share your dwelling with other tenants (such as a friend)?

15 responses



What are the building-related facilities that influence your decision?

15 responses



Before designing, I selected four reference projects to analyze them thoroughly in terms of the following aspects:

- Public - Private spaces & functions;
- Accessibility and circulation;
- Dwellings : dimension & typologies.

1- Tietgen Dormitory in Denmark by Lundgaard & Tranberg Architects:

I chose this project because it promotes the concept of co-living and it has a gallery dwellings typology with an inner courtyard (which I have in my block). Also, the programme on the upper floors was helpful to investigate in terms of the number of users for every communal facility and the required square meters.

2- Villa mokum in Amsterdam by Kampman Architecten:

This project is relatively aimed at young professionals and it, partly, includes the notion of co-living. The corridor micro-dwellings and communal terraces are oriented towards the inner public courtyard.

3- Westbeat in Amsterdam by Studioninedots:

Westbeat is partially devoted to young professionals. The corridor dwellings, mid-rise tower, elevated inner courtyard, elevations with the greenery system, and the public

plinth were all helpful to analyze.

4- The FIZZ Don Bosco (Block A) in Amsterdam by Studioninedots:

It is fully dedicated for young professionals and promotes the concept of co-housing because it contains many friends apartments and gallery dwellings typologies.

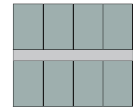
Based on the findings of this research, I made the following design decisions:

- Dwellings typologies: orientation, dimensions, and layout.
- Circulation: accessibility and escape routes
- Public - Private spaces & functions
- Programme

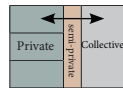
Gallery



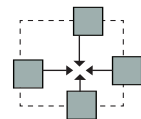
Corridor



Transition zones



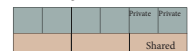
Interaction among clusters



Co-living



Co-housing



Clusters: dwellings and communal facilities and dwelling division

shared facilities in the same dwelling and dwelling division



Tietgen Dormitory

- Public - Private spaces & functions
- Accessibility
- Dwellings : dimension & typologies



Villa Mokum

- Public - Private spaces & functions
- Accessibility
- Dwellings : dimension & typologies



WestBeat

- Public - Private spaces & functions
- Accessibility
- Dwellings : dimension & typologies



The FIZZ Don Bosco (Block A)

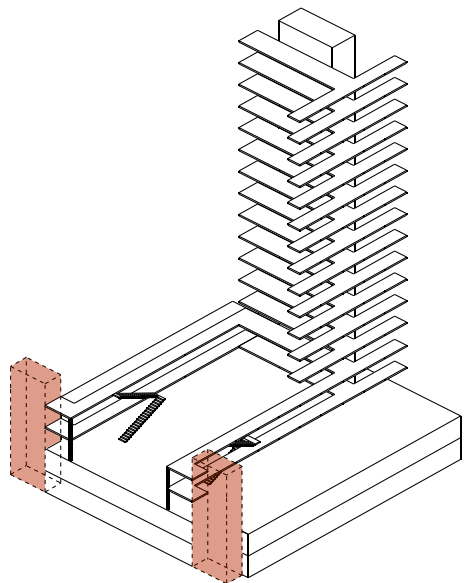
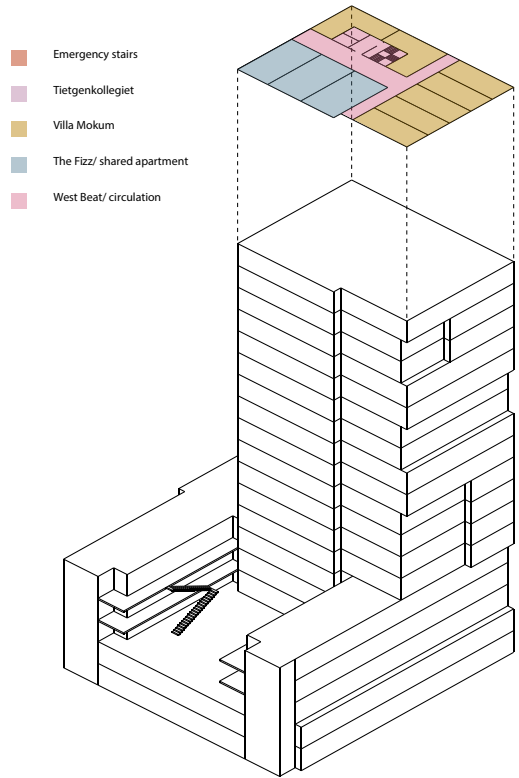
- Public - Private spaces & functions
- Accessibility
- Dwellings : dimension & typologies

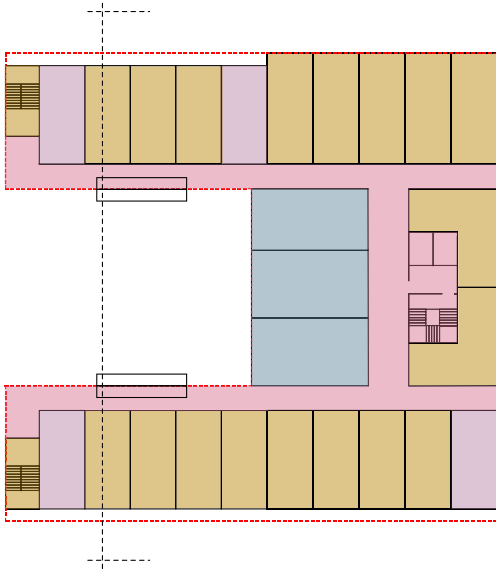
Quick start

The assignment of quick start was the starting point of the design. The task was to put the typologies of the case studies in the selected building block. Here, we had the choice to transfer only one case study or use all of them. For me, it was an interesting exercise because it encouraged me to understand the dimensions of the chosen plot, how to mix between the tower and the gallery typologies, and thinking twice about the escaping routes.

Based on the findings of this research, I made the following design decisions:

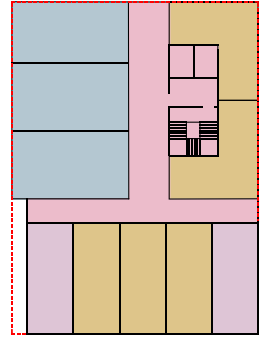
- Dwellings typologies: orientation and dimensions.
- Enhancing escape routes.



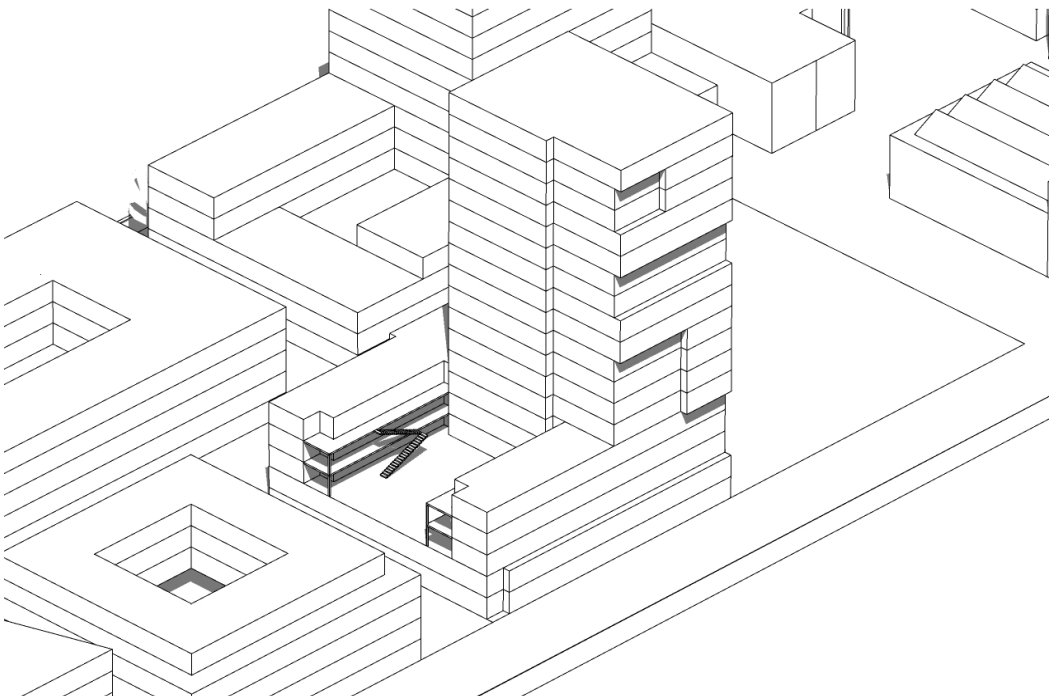


Floor plans 2,3,4

- Tietgenkollegiet
- Villa Mokum
- The Fizz/ shared apartment
- West Beat/ circulation



Floor plans 5 to 16



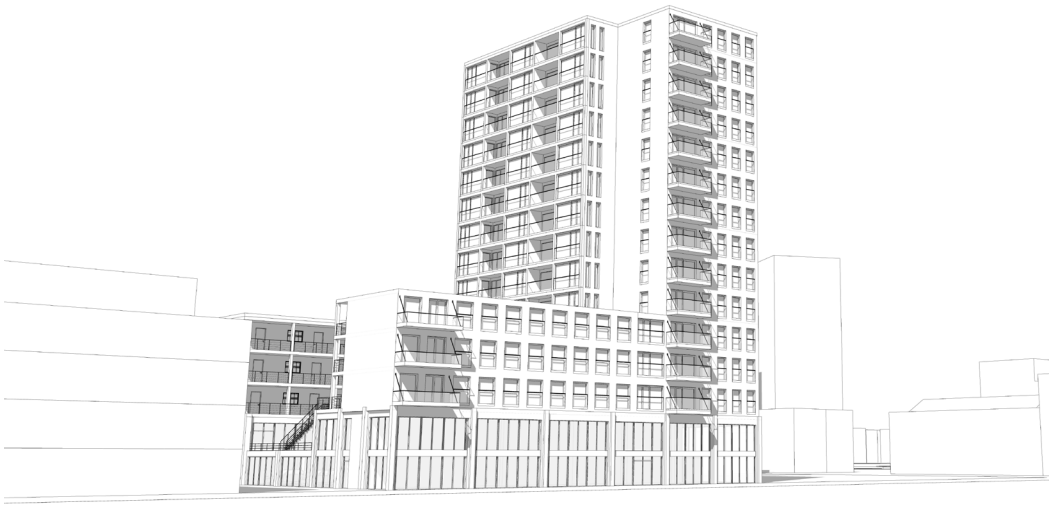
The 3D form of the selected block was continuously changing. It was important for me to see the influence of the changes and the design decisions on the function, human scale, inner atmosphere, and surrounding because the 2D drawings do not give me the proper perception. Basically, the aspects that I continuously changed were:

- the layout & openings of the dwelling: because I wanted to provide every dwelling with private outdoor space and a variety of typologies.
- The position of the communal facilities: For instance, it is preferable to place the co-work spaces in a centric place in the block.

-The position of functions in the plinth in order to avoid "dead facade"

Based on the findings of this research, I made the following design decisions:

- Enhancing wellings typologies: orientation and dimensions.
- Enhancing circulation escape routes
- Thinking about materiality, construction principles, and facade fragment.

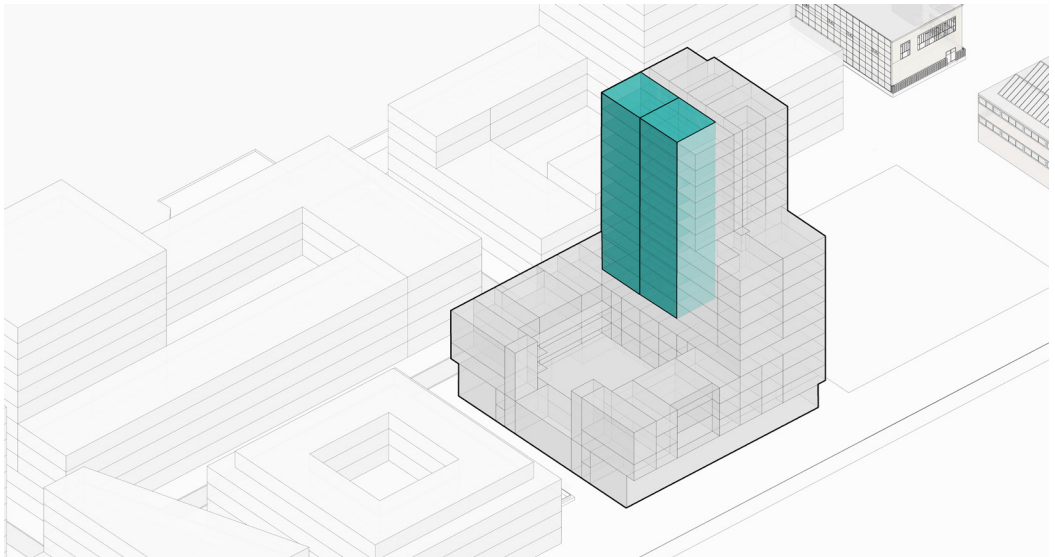


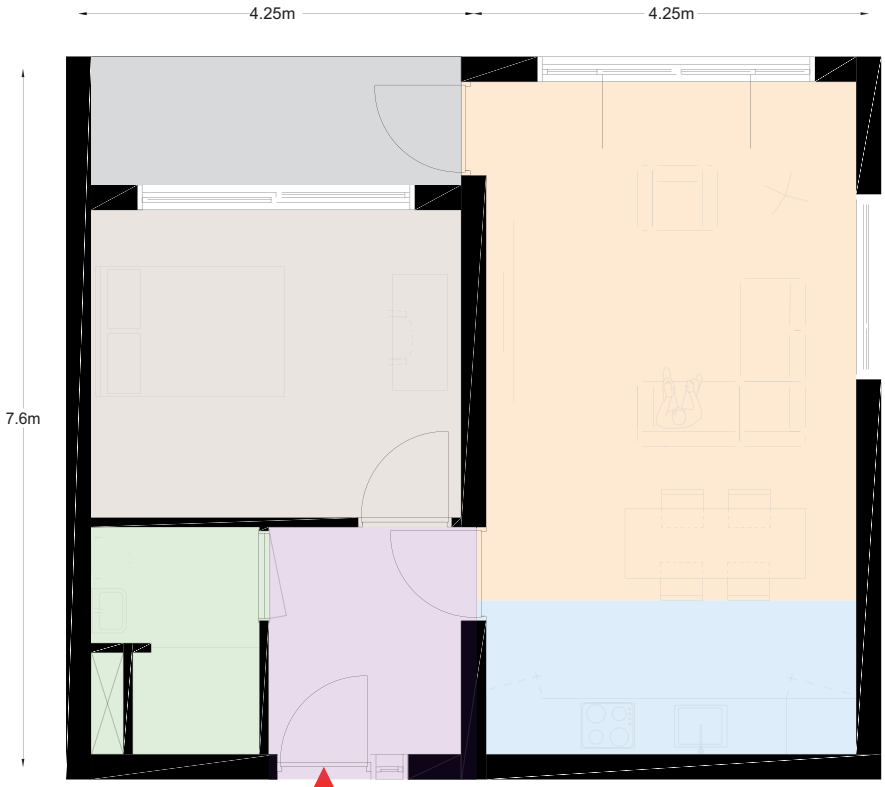
I mentioned in a previous paragraph that the dwellings fall in the mid-rental sector (750 € to 1000 €). Therefore, to make the study more realistic I applied the point system on the dwellings in order to determine the rent. The challenge of the points system was the balancing between the size of the dwelling and its facilities, so I eliminated most of the unnecessary luxury in order to gain more square meters, such as combining and compacting the bathroom and WC. Another important aspect was that I have in the suggested design twelve typologies in total, so studying everyone separately will be time-consuming. Therefore, I used Standardization, Repetition, and Prefabrication in order to reduce the time of the study and the cost of the building at the same time.







After that, I divided the dwelling into several divisions in order to make the calculation process comply with the points system. In the end, I came up with a scheme that includes all the designation info of each dwelling.

Based on the findings of this research, I made the following design decisions:

- The exact square meters of each dwelling.
- Determining the rent of each typology
- Calculating the points of each typology
- All inclusive rent
- Scheme includes all the designations info of each typology.





- | | | | | | |
|---|-----------------|---|--------------------|---|-----------------|
|  | Entrance |  | Living room |  | Bed room |
|  | Balcony |  | Kitchen |  | Bathroom |

Punten telling voor zelfstandige woningen

Oppervlak vertrekken (1 punt per m ²)		Keuken			
Woonkamer	18 m ²	18.00	Lengte aanrechtblad	2 meter of meer	7.00
Slaapkamer	16 m ²	16.00	Het maximale puntenaantal voor dit onderdeel is 4, bij een aanrechtblad <1m. Anders is het het dubbele van het puntenaantal van het aanrechtblad	Inbouw inductiecookplaat	1.50
2e slaapkamer	m ²		Cookplaat	Oven	0.50
3e slaapkamer	m ²		Afzuigkap	Inbouw magnetron	0.50
4e slaapkamer	m ²		Inbouw magnetron	Inbouw koelkast	0.75
5e slaapkamer	m ²		Inbouw koelkast	Inbouw vrieskast	
Badruimte	3.5 m ²	3.50	Inbouw vries/koelcombinatie	Inbouw vaatwasmachine	
Keuken	6 m ²	6.00	Inbouw vaatwasmachine	Dubbele spoelbak	
Zolderkamers	m ²		Dubbele spoelbak	Luxe mengkraan	
Andere kamers	m ²		Luxe mengkraan	Thermostatische watermengkraan	0.50
Toilet bevindt zich in douche of badruimte?	<input checked="" type="checkbox"/>	-1.00	Thermostatische watermengkraan	Extra enkele kast	
Totaal vertrekken		43	Extra enkele kast	Extra dubbele kast	
Overige ruimtes (1% punt per m ² , minimum 2m ²)			Extra dubbele kast	Extra wandbelegging (naar 2m ²)	
Kelder	m ²		Extra wandbelegging (naar 2m ²)	Vloertegels (naar 2m ²)	
Bijkkeuken	m ²		Vloertegels (naar 2m ²)	Algehele luxe uitvoering (maximaal 2 punten)	
Wasruimte	m ²		Algehele luxe uitvoering (maximaal 2 punten)	Totaal keuken	10.25
Berging/schuur	m ²		Totaal keuken	Sanitair	
Vaste en ingebouwde kasten	m ²		Sanitair	Aantal toiletten	3.00
Garage	m ²		Aantal toiletten	Waaraan hangende toiletten	
Zolderruimte	m ²		Waaraan hangende toiletten	De extra punten voor hangende toiletten worden meegerekend met de luxe voorzieningen onder douche en bad.	
Andere ruimten	4.6 m ²	3.45	Aantal wastafels, fonteinjes, lavetten en bidets	Aantal wastafels, fonteinjes, lavetten en bidets	1.00
Zolder aanwezig maar geen vaste trap naar zolder	<input type="checkbox"/>		Douche en/of bad?	Douche en/of bad?	4.00
Totaal overige ruimten		3.75	Douche en/of bad?	Het maximale puntenaantal voor het onderdeel is het dubbele van het puntenaantal van de douche en bad, plus de punten voor de toiletten en wastafels.	
Verwarming & installaties			Douche aanwezig	Design radiator	0.25
Type verwarming	Overige		Design radiator	Kastje, waarin ingebouwd een wastafel	0.25
Aantal verwarmde vertrekken (open keukens telt als apart vertrek)	4	8.00	Kastje, waarin ingebouwd een wastafel	Toiletkastje met ingebouwde verlichting	0.25
Aantal overige ruimten met verwarming (maximaal 4 punten)			Extra voor een bubbelbad (whirlpool)	Extra voor een bubbelbad (whirlpool)	
Video hallofoon	<input type="checkbox"/>		Schuif- of vouwwand met aluminium frame	Schuif- of vouwwand met aluminium frame	1.00
Totaal verwarming		8	Luxe mengkraan (b.v. Eenhandsbediening)	Luxe mengkraan (b.v. Eenhandsbediening)	
Energieprestatie			Thermostatische watermengkraan	Thermostatische watermengkraan	0.50
Soort woning	Eengezinswoning		Extra wandbelegging (naar 2m ²)	Extra wandbelegging (naar 2m ²)	
Datum energielabel/-index	Na 01-01-2021		Algehele luxe uitvoering (maximaal 2 punten)	Algehele luxe uitvoering (maximaal 2 punten)	
Zoek op via postcode en huisnummer op www.ep-online.nl	≥ 40m ²		Totaal sanitair	Totaal sanitair	10.25
Gebruiksoppervlak	Label A+	40			
Energietabel		40			
Totaal energie		40			

Buitenruimte

Buitenruimte 2,00

Buitenruimte is gemeenschappelijk

Carport

Totaal buitenruimte

WOZ-waarde (minimaal € 55888)

Vul de WOZ-waarde van de woning in (op te vragen bij het WOZ-waardeloket)

Nieuwbouwwoning 2015 of later (zie ook [website kadaster](#) / Of verbouwd in 2015 of later met energieprestatie conform nieuwbouweisen (bouwbesluit 2012)

Oplevering (nieuwbouw/verbouwd) in:

In welke gemeente ligt de woning?

WOZ punten absoluut

WOZ punten ratio oppervlak

Totaal WOZ-waarde

Totaal puntenaantal (minimaal 40 punten)

Maximale kale huurprijs

Een bedrag van (47,1€) voor gemeenschappelijke voorzieningen

Een bedrag van (100€) voor energie- en waterverbruik (coupons)

Designations	
Size	64.5 m ²
Rent (all inclusive)	985.64 €
Division of the dwelling	Separated bedroom
Points	158
Storage	Yes
Kitchen	Full Kitchen
Private outdoor space	Loggia or Winter-garden
Communal facilities	Yes
Car charging	Yes
Bicycle storage	Yes

During the final phase of the design process, choosing the materiality of the elevations has been a challenging issue because of the industrial character of the context, the existence of two monumental buildings beside the plot, and the natural materials of the block. Therefore, my decision was to make a clear distinction between the old existing material and the new natural material by applying the spirit of the old materials on the plinth while keeping the natural materials on the upper residential floors. As a result, the materiality differentiates between old and new, as well as public and private/collective functions.

By selecting the possible options of the materials, applying them on the block, and using realistic renders, I had the chance to choose the option that fulfills the desired distinction.

When I was working on the renders, an idea came to my mind. Most of the students try to present their projects in their most ideal condition, that is logic, but it is well known that the weather in the Netherlands is rainy and unpredictable. Therefore, these factors will have an impact on the building's materials at the very least. Thus, I applied the weathering influences on the materials of the building and its surrounding. Afterward, I made a comparison between the

optimum conditions of the materials, and after five years when weathering and time had done an impact on it.

Based on the findings of this research, I made the following design decisions:

- Choosing the material of the plinth and upper floors.
- Harmony between the material of context and the material of the block.
- Experimenting with the appearance of the material after weathering and time had done an impact on it.

Upper floors material



Thermowood

Sustainability level : Klasse I
Durability: more than 35 years
Color: light brown
Rot: good resistance
Finishing: The wood will barely shrink or expand; the dimensional stability is large.



Hard wood FSC

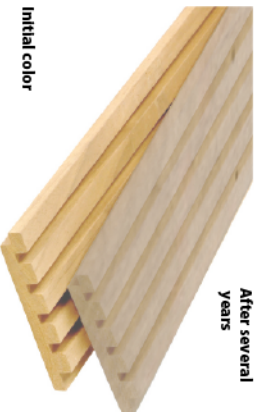
Sustainability level : Klasse I
Durability: More than 25 years
Color: yellowish light brown
Rot: Good resistance
Finishing: The dimensional stability is large. "expensive comparing with Thermowood"



Eiken Deans

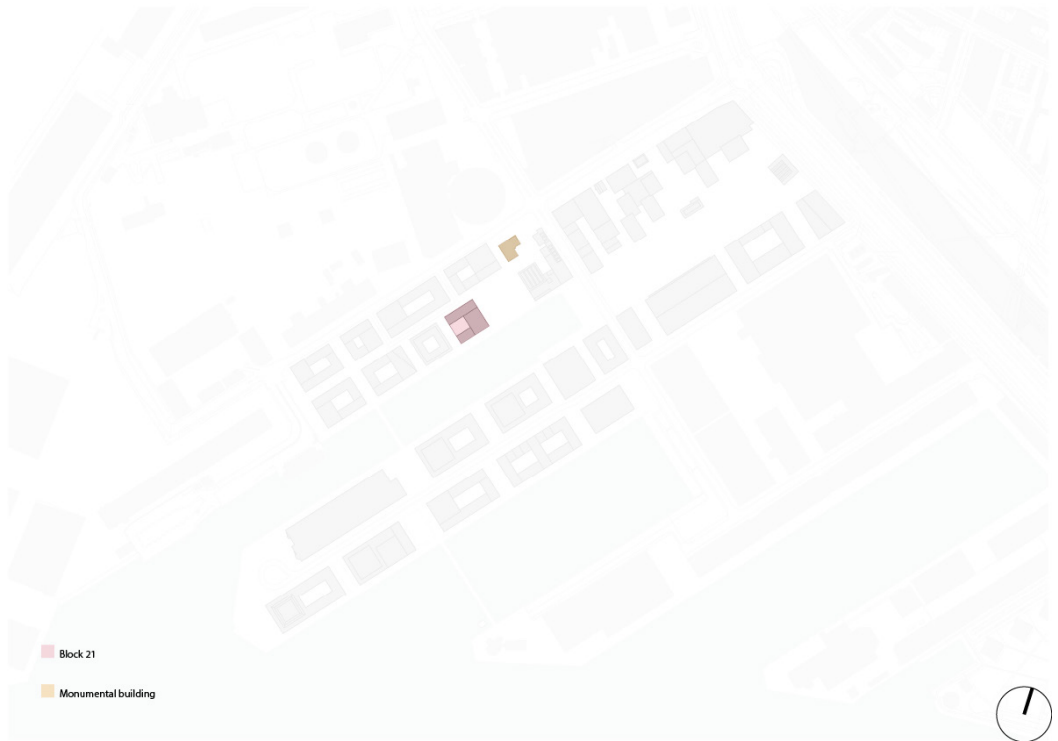
Sustainability level : Klasse II
Durability: 15 to 25 years
Color: light brown with golden brown lines
Rot: moderate
Finishing: The wood will shrink or expand by the time.

The aim is to choose the best option of wooden cladding that has light brown color. Because the color of the wood will change from light brown to grey after several years and this transition will be less remarked by using this color. Therefore, Thermowood has been chosen.



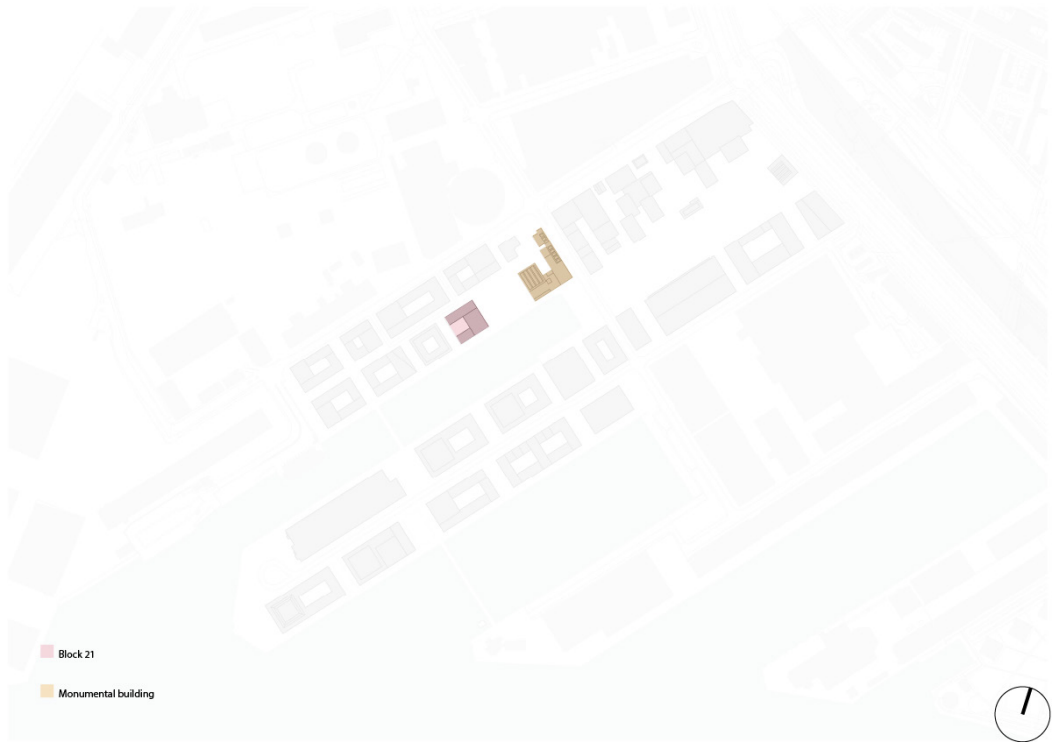
Initial color

After several years



Yellow bricks is the dominant material in this building.



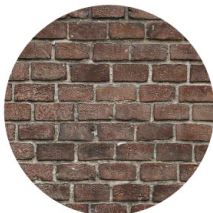
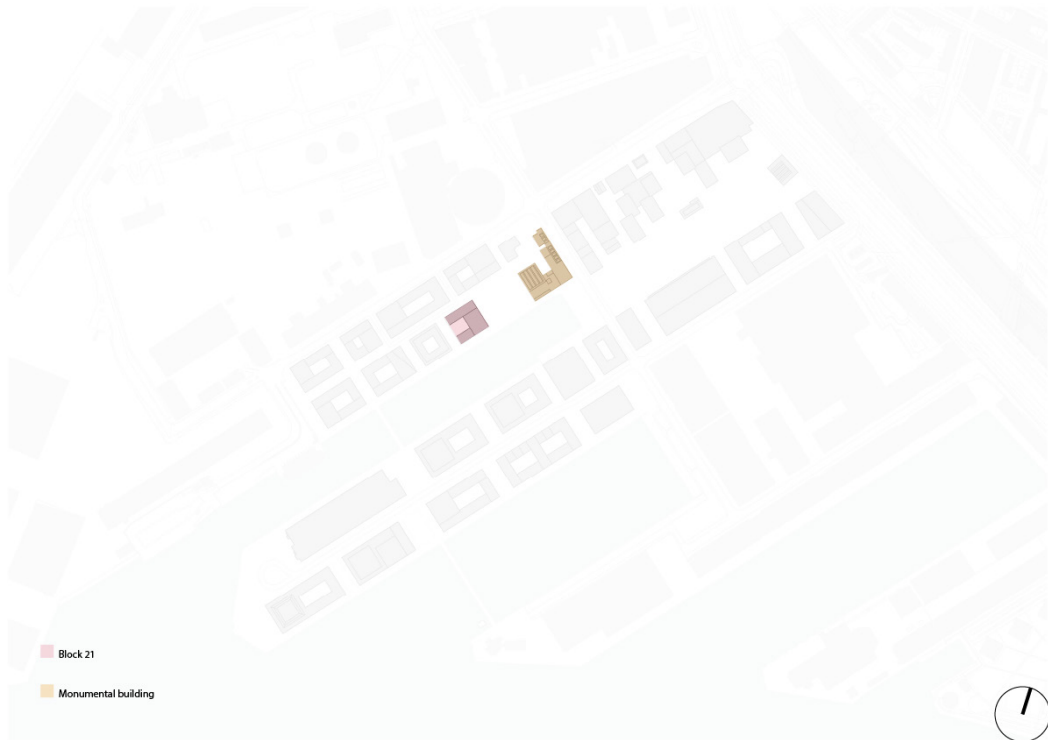


brown bricks is the dominant material in this building.



Using only concrete which is the construction material of the plinth.





**Old brown bricks is the dominant material in this building.
Applying brick material that has the same color tone**





The initial condition of the materials.



The condition of the materials after 5 years.



Conclusion

In the end, the process of design and research does not have a standard forms and techniques and the designer can use a variety of tools in order to make a decision. By reflecting on all the methods that I have used, I believe, that the majority of my decisions have been based on research by design or scientific research. In other words, I combined design by research and research by design to make decisions.

Overall, I can say that I am glad for conducting this research for my graduation project and I consider it thorough with regard to tools and techniques that I applied in order to come up with a reliable and realistic project. Undoubtedly, the experience that I have gained and the way of tackling the dichotomy of design and research will help me in the future when I practice the profession.

Discussion

1- The relationship between the graduation (project) topic, the studio topic, the master track, and the my master program:

The studio of Advanced housing design focuses this year on creating a living-work area in M4H in Rotterdam and the theme was

collectiveness. The studio of Advanced housing design focuses this year on creating a living-work area in M4H in Rotterdam and the theme was collectiveness.

My graduation project is dedicated to young professionals and they face difficulties in terms of finding dwellings that fit their budget. Another hidden aspect is that the young professionals want to create a new living biography away from the existing outdated solutions. Life is changing and the lifestyle as well. Therefore, more attention is required with regard to dwellings design, especially, after the outbreak of COVID19.

Another aspect is the national housing shortage in the Netherland which addresses the importance of housing design because the challenge is not only to build but also to meet the requirements of the dwellers. Thus, there is a crystal clear relation among the studio topic, the master track, and the master program.

2- Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.

I already described my research method in the previous paragraphs. Generally, in my graduation project, I followed the specified research criteria of the studio and they are literature research, analyzing four case studies, and site analysis. The literature research was the essential part of my project (research report) by collecting qualitative and quantitative data in order to comprehend the lifestyle, aspirations, and characteristics of young professionals. Also, the online questionnaire helped me to identify the demands of young professionals who live in Rotterdam. The case studies, reference projects, and other visual techniques (research by design), on the other hand, were more influential on design decisions, especially, in terms of compactness and efficiency.

3- Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.

The municipality of Rotterdam wants to build more than 8000 dwellings by 2030, and these dwellings will be dedicated for the people who earn between 37.000 euros to 55.000 euros (Gemeente Rotterdam, 2020).

Furthermore, in other research that has been conducted by the municipality of Rotterdam called Strong Sholders "Sterke Shouders", it is mentioned that young professionals are one of the target groups that want to increase their numbers (Gemeente Rotterdam, 2019). Therefore, my graduation project can provide the municipality with a good understanding of the requirements of the residential buildings for young professionals.

Moreover, throughout the research process, I have noticed that there are plenty of resources talking about the financial problem of young professionals in the residential sector, while less is written about their aspirations, needs, and residential requirements. Therefore, the research can be useful to any researcher or student who is interested in this target group.

4- Discuss the ethical issues and dilemmas I may have encountered in doing the research, elaborating the design, and potential applications of the results in practice.

The ethical issues that I have encountered were about the rent and the square meters.

- The easiest way to reduce the rent is by decreasing the square meter.

I believe that this strategy should be used wisely in order to design dwellings rather than capsules. My struggle was to find the optimum square meters and dwelling quality that fit the suggested rent. In the end, by using the points system and applying “repetition and standardization” the process has become easier and faster. Therefore, I highly recommend every student who wants to design an affordable dwelling to understand the points system

- The dichotomy of dwellings and communal facilities is always controversial in such projects because if I add more communal spaces then I have to reduce the amount of the dwellings, so more charges have to be added to the rent. Thus, I had to think about every facility, the number of users, and the quality that it will add.

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Figure 1

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Figure 2

Mulder, C. H., & Hooimeijer, P. (2002). Leaving home in the Netherlands: Timing and first housing. *Journal of Housing and the Built Environment*, 17(3), 237-268.

Figure 3, 4, and 5

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Figure 6

The info of Figure 6 is from Municipality of Rotterdam and the table created by the author

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https://issuu.com/editionblondal/docs/tietgen_dormitory

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<https://www.donbosco.amsterdam/>

<https://www.ltarkitekter.dk/tietgen-en-0>

<https://www.villamokum.nl/>

Young professionals	2009	2010	2011	2012	2013 voor revisie	2013 na revisie	2014	2015	2016	2017	2018*
Rotterdam	7,7%	7,8%	8,0%	8,1%	8,1%	8,9%	9,0%	9,5%	9,4%	9,6%	10,1%
Amsterdam	12,6%	12,9%	13,1%	13,4%	13,6%	14,7%	15,5%	15,7%	16,8%	17,2%	18,6%
Den Haag	8,0%	8,0%	7,9%	7,7%	7,6%	8,1%	8,1%	8,2%	8,0%	8,4%	8,3%
Utrecht	17,9%	17,7%	17,9%	18,3%	18,0%	18,6%	18,4%	18,4%	18,6%	20,0%	20,3%
Nederland	5,6%	5,6%	5,7%	5,8%	5,8%	6,4%	6,5%	6,5%	6,6%	6,8%	7,1%

Attachment 1: young professionals in each city of the metropolitan region (Randstad) compared with the national lot.


Figuur 1.3: Sterke schouders in Rotterdam.

Sterke schouders	2009	2010	2011	2012	2013 voor revisie	2013 na revisie	2014	2015	2016	2017	2018*
<i>Aantallen:</i>											
Young professionals	35.723	36.217	37.515	38.262	38.200	41.788	42.775	45.764	45.635	46.817	49.938
Hoog opgel. gezinnen	23.246	24.143	25.298	25.609	26.482	26.506	27.823	28.400	29.514	30.555	30.838
Hoog opgel. zonder k.	18.837	19.313	18.814	19.119	18.985	21.687	22.216	21.628	22.261	22.070	23.378
Empty nesters	13.608	14.039	14.861	15.994	16.994	18.624	19.038	19.983	20.042	20.588	20.998
<i>Subtotaal</i>	<i>91.414</i>	<i>93.712</i>	<i>96.488</i>	<i>98.984</i>	<i>100.661</i>	<i>108.605</i>	<i>111.852</i>	<i>115.775</i>	<i>117.452</i>	<i>120.030</i>	<i>125.152</i>
Studenten	21.589	22.576	23.667	23.619	23.719	23.629	24.290	24.386	24.547	25.312	24.819
Sterke schouders	113.003	116.288	120.155	122.603	124.380	132.234	136.142	140.161	141.999	145.342	149.971
<i>Idem incl. ov. hoog opgel.:</i>											
Overige hoog opgel.	5.517	5.977	6.400	6.897	7.164	7.759	8.129	8.303	8.621	9.026	9.718
<i>Totaal</i>	<i>118.520</i>	<i>122.265</i>	<i>126.555</i>	<i>129.500</i>	<i>131.544</i>	<i>139.993</i>	<i>144.271</i>	<i>148.464</i>	<i>150.620</i>	<i>154.366</i>	<i>159.689</i>
<i>waarvan hoog opgel.</i>	<i>99.744</i>	<i>102.695</i>	<i>106.331</i>	<i>109.492</i>	<i>111.305</i>	<i>119.953</i>	<i>123.498</i>	<i>127.726</i>	<i>130.004</i>	<i>133.224</i>	<i>138.901</i>
<i>Totale bevolking:</i>											
15 tot 75 jaar	462.105	465.319	470.693	470.970	471.614	471.666	476.312	479.604	485.183	489.548	494.965
<i>Percentages:</i>											
Young professionals	7,7%	7,8%	8,0%	8,1%	8,1%	8,9%	9,0%	9,5%	9,4%	9,6%	10,1%
Hoog opgel. gezinnen	5,0%	5,2%	5,4%	5,4%	5,6%	5,6%	5,8%	5,9%	6,1%	6,2%	6,2%
Hoog opgel. zonder k.	4,1%	4,2%	4,0%	4,1%	4,0%	4,6%	4,7%	4,5%	4,6%	4,5%	4,7%
Empty nesters	2,9%	3,0%	3,2%	3,4%	3,6%	3,9%	4,0%	4,2%	4,1%	4,2%	4,2%
<i>Subtotaal</i>	<i>19,8%</i>	<i>20,1%</i>	<i>20,5%</i>	<i>21,0%</i>	<i>21,3%</i>	<i>23,0%</i>	<i>23,5%</i>	<i>24,1%</i>	<i>24,2%</i>	<i>24,5%</i>	<i>25,3%</i>
Studenten	4,7%	4,9%	5,0%	5,0%	5,0%	5,0%	5,1%	5,1%	5,1%	5,2%	5,0%
Sterke schouders	24,5%	25,0%	25,5%	26,0%	26,4%	28,0%	28,6%	29,2%	29,3%	29,7%	30,3%
<i>Idem incl. ov. hoog opgel.:</i>											
Overige hoog opgel.	1,2%	1,3%	1,4%	1,5%	1,5%	1,6%	1,7%	1,7%	1,8%	1,8%	2,0%
<i>Totaal</i>	<i>25,6%</i>	<i>26,3%</i>	<i>26,9%</i>	<i>27,5%</i>	<i>27,9%</i>	<i>29,7%</i>	<i>30,3%</i>	<i>31,0%</i>	<i>31,0%</i>	<i>31,5%</i>	<i>32,3%</i>
<i>waarvan hoog opgel.</i>	<i>21,6%</i>	<i>22,1%</i>	<i>22,6%</i>	<i>23,2%</i>	<i>23,6%</i>	<i>25,4%</i>	<i>25,9%</i>	<i>26,6%</i>	<i>26,8%</i>	<i>27,2%</i>	<i>28,1%</i>

Bron: CBS, Sociaal Statistisch Bestand, bewerking OBI. Peildatum: 1 oktober.

Attachment 2: The proportion of Young Professionals in Rotterdam compared with highly educated people in the other target groups.

Questionnaire



TU Delft Delft University of Technology

Moving patterns and housing preferences of young professionals.

Socio-Demographic information
In this section a general information will be taken

What is your gender?

Male

Female

Other

What is your age?

20 - 23

24 - 27

28 - 30

Prefer not to say

What is your nationality?

Dutch

Other EU countries

UK

Asia

Middle East

Africa

Other

What is your educational degree?

High school degree (HBO)


University degree (WO)

What is your study field?

Your answer _____

Next Page 1 of 2

Attachment 3: Socio – demographic questions (5 questions).



TU Delft Delft University of Technology

Moving patterns and housing preferences of young professionals.

Household composition, moving patterns, and dwelling preferences

Household composition and moving patterns

What is your current household composition?

One-person household

Couples (without children)

Other: _____

How did you find your current dwelling?

Estate agent

Via friends, family or acquaintances

Lessor

Woonnet

Other: _____

What is your current dwelling type? *Friends apartment: it is when you live with several friends/tenants in the same apartment and each resident has their own bedroom, but shares kitchen, living room, and other facilities.

Studio with shared facilities

Private rental apartment/ studio

Social housing

*Friends apartment

Living with parents

Owner-occupied apartment

Other: _____

Attachment 4: household composition and moving patterns (3 questions).

How many times have you changed your accommodation until now?

Your answer _____

What is the main reason for moving to the current dwelling?

Price

Dwelling space

Work

Its proximity to the city centre

Want to live independently

Campus Contract

Living with partner

Other: _____

How long do you think you will live in your current accommodation?

I consider my current accommodation as an 'interim solution'

I plan to live here for a longer period of time

I do not know yet

Other: _____

Dwelling preferences

What are the dwelling-related facilities that influence your decision?

Separate bedroom

Kitchen

Livingroom

Balcony

Other: _____

Do you prefer to live alone or to share your dwelling with other tenants (such as a friend)?

Alone

With friend

Other: _____

What would you prefer to have in your current accommodation?

Your answer _____

What are the building-related facilities that influence your decision?

Communal spaces

Leisure facilities

E-car sharing facility (service is included)

Bike-sharing facility (service is included)

Would you mind having a (ZOOM) interview? If you agree, could you add your E-mail, please?

Your answer _____

End of the survey. Thank you for filling in the survey.

[Back](#) [Submit](#) Page 2 of 2

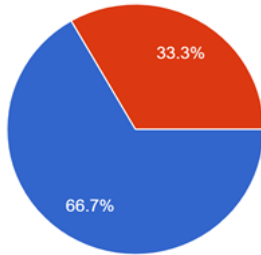
Attachment 5: household composition and moving patterns (3 questions).

Attachment 6: dwelling preferences (5 questions).

Results of the questionnaire

What is your gender?

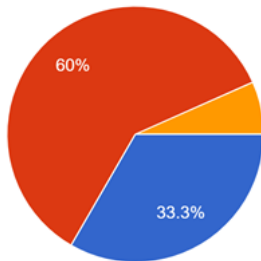
15 responses



- Male
- Female

What is your age?

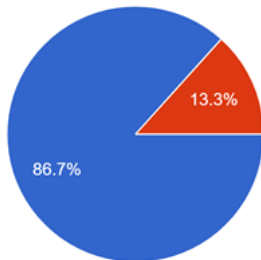
15 responses



- 20 - 23
- 24 - 27
- 28 - 30

What is your nationality?

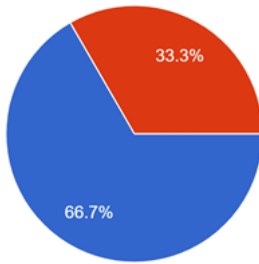
15 responses



- Dutch
- Other EU countries

What is your educational degree?

15 responses



- High school degree (HBO)
- University degree (WO)

What is your study field?

15 responses

insurance advisor

Teacher in primary school

Arts and Culture Studies

Social work

Teacher / Physics

Sales support

Online marketer

Assistant manager

Speech and language therapist

What is your study field?

15 responses

Online marketer

Assistant manager

Speech and language therapist

HR assistant

Personal trainer

European studies

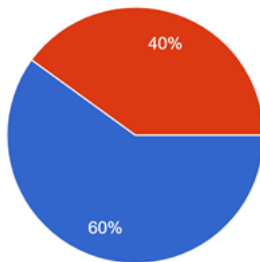
Archivist

Communication advisor

Teacher "math"

What is your current household composition?

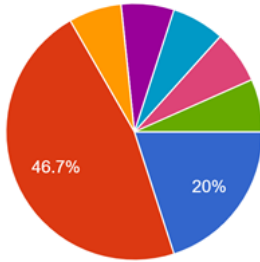
15 responses



- One-person household
- Couples (without children)

How did you find your current dwelling?

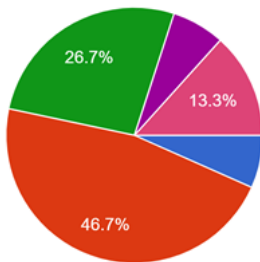
15 responses



- Estate agent
- Via friends, family or acquaintances
- Lessor
- Woonnet
- mainly, I used the internet, I had to make endless research. But also your netwo...
- I live with my boyfriend and actually he already lives here.
- still searching for reasonable option.
- Internet

What is your current dwelling type? *Friends apartment: it is when you live with several friends/tenants in the same apartment and each resi... shares kitchen, living room, and other facilities.

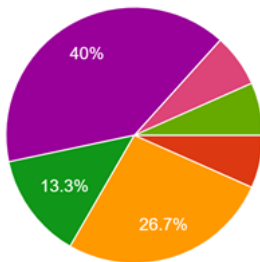
15 responses



- Studio with shared facilities
- Private rental apartment/ studio
- Social housing
- *Friends apartment
- Living with parents
- Owner-occupied apartment
- Friends apartment

What is the size of your current accommodation?

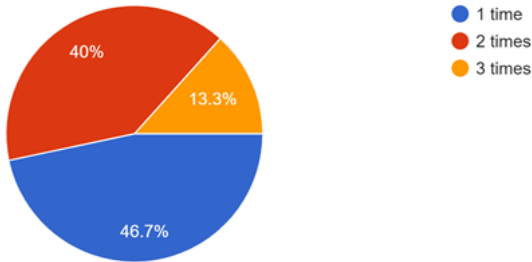
15 responses



- Less than 17 m2
- 18 m2 to 24 m2
- 25 m2 to 34 m2
- 35 m2 to 40 m2
- More than 40 m2
- I do not know
- It is difficult to say the actual size because I have my own bedroom whic...
- I am not sure, but I will say something around 40 m2

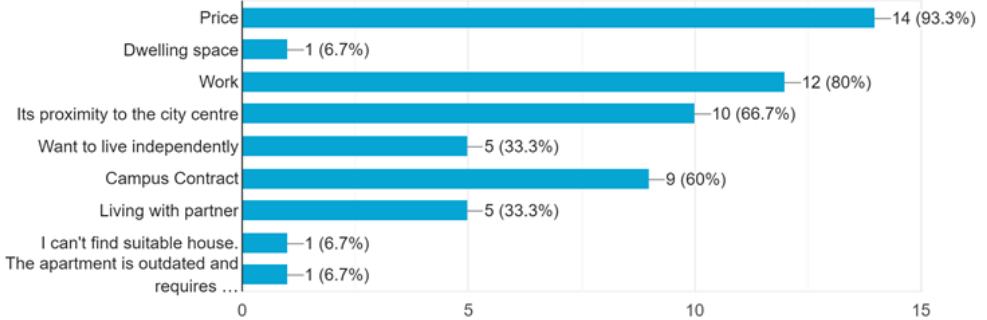
How many times have you changed your accommodation until now?

15 responses



What is the main reason for moving to the current dwelling?

15 responses



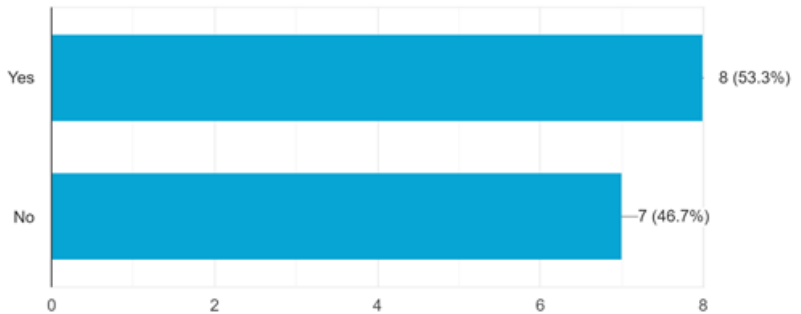
How long do you think you will live in your current accommodation?

15 responses



Do you prefer to live alone or to share your dwelling with other tenants (such as a friend)?

15 responses



What are the dwelling-related facilities that influence your decision?

15 responses



What would you prefer to have in your current accommodation?

8 responses

Extra storage area

Maybe, large windows to the floor. I visited a friend of mine who has these windows. The sunlight was amazing and the apartment seemed to be bigger

For sure, updated water cyc and bathroom. And a bigger living room, especially, during the COVID19 and everything is closed so we use it frequently.

A bigger living room and a bigger balcony.

I still living with my parents. however I prefer to have a big living room with a nice view.

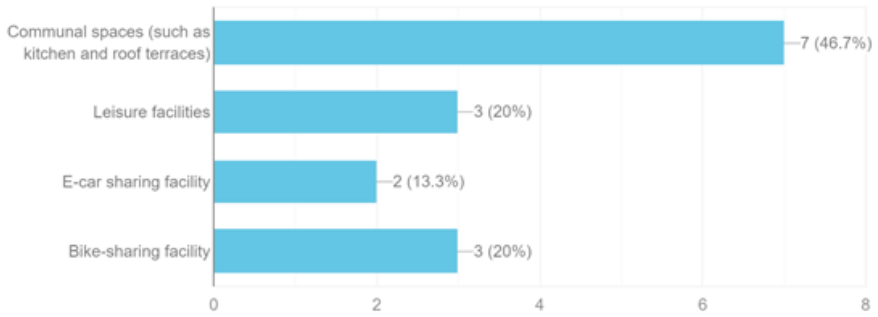
Maybe a bigger bedroom, because the one that we have is really small and it does not fit a big closet

An adequate area to place my desk.

Storage for my bike

What are the building-related facilities that influence your decision?

15 responses



TU Delft
November 2021

