

ENDURING A CROWDED HOME

A STUDY ON DESIGN PRINCIPLES AND APARTMENT
TYPOLOGIES THAT ALLOW PARALLEL ACTIVITIES IN HOMES
POST-PANDEMIC

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- A B S T R A C T -

The pandemic has changed many people's habits. Some started working remotely and others started using their home as a gym. This shift has contributed to new demands on housing architecture, namely creating homes that allow more activities to take place during the same time in accordance to people's daily actions overlapping now more than ever before.

This thesis aims to examine which design principles and apartment typologies are best to support parallel activities. The aim is to create design strategies that all work towards supporting parallel activities. The research consists of literature reviews, reference analyses and implementation sketches of the defined strategies.

The questions that the thesis aims to answer are:

Q1: Which design strategies do housing architecture need to incorporate to allow parallel activities to take place?

Q2: How would the apartments that implement design strategies which focus on parallel activities in a multi-family residential building look like?

Six design principles are derived from the research: utilizing a zoned plan and/or neutral hall apartment typology, making sure the home has a high-quality kitchen which can fit a dining table, adding outdoor spaces of at least 6 m², creating circulation, giving the homeowners the option to choose between an open floor plan and being able to divide social rooms and lastly adding the possibility to create a temporary room. Other, more general ideas are that homes should be at least 50-60 m² to support parallel activities. There also needs to be at least one bedroom so privacy can be achieved.

The found strategies serve as the basis for a design proposal on a site by Gråberget in Majorna, Gothenburg. The project shows that it is feasible to design apartments which implement the design strategies and therefore are suitable for parallel activities.

A societal transformation that began with the pandemic will cause people to change their expectations of their homes. If future housing stock is to be adapted to these changes, architecture must evolve now.

KEYWORDS

Covid-19, post-pandemic housing, parallel activities, floor plans

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-CHAPTER 1-
INTRODUCTION

CONTENTS:

Background

Purpose

Aim

Research questions

Method

Delimitations

- BACKGROUND -

The aftermath of the pandemic that affected all our lives the last couple of years has had big impact on many parts of society; the economy, environment and healthcare are just some areas. It has also drastically changed how people think about and use their homes. So much more time has been spent at home instead of at the office, in school, at the library, at restaurants etc. The home is no longer just a place for eating, relaxation and hygiene. It has become the hub for almost all our daily activities. In addition to the earlier mentioned ones, it also serves as an office, a study place and a gymnasium just to name a few. Even though these activities are nothing new in people's lives, the homes we live in have not been designed to support all these functions at once. People suddenly expect more from their homes which does put a lot of pressure on the architecture that defines the homes of the future.

Since the population in Sweden is ever increasing, a lot of new housing units are underway and are currently being planned. In the last 10 years the Swedish population has increased by 966 000 inhabitants, and calculations tell us that it will continue to increase (SCB, n.d.). To support the increasing population and to have a large enough housing stock available, Boverket (the Swedish National Board of Housing, Building and Planning) has estimated that 60 000 new residential units need to be constructed each year from now until 2030. The majority of these new units are concentrated to the three largest metropolitan areas of Sweden. In Gothenburg, Boverket expects there to be a need to construct 88 000 new apartments up until 2030 (Boverket, 2021). This points to a shortage of dwellings in the current housing market and necessitates the need to establish a rapid construction rate.

A lot of things are pointing towards the fact that people will use their homes in new ways not previously planned for, or at least to an extent previously unheard of. If the housing stock of the future is to be adapted to the societal changes we're seeing, the architecture needs to evolve with it.

- P U R P O S E -

Residential architecture is constantly changing and evolving. Factors such as new family constellations and new activities are contributing to the change in addition to external factors such as increased immigration and the pandemic that struck last year. A lot of discussions are taking place about how the pandemic has and will affect the built environment of the future.

When people shifted to a work-from-home mode they had to convert their bedrooms, living rooms and kitchens into temporary workplaces (Nanda, Thanos, Valtonen, Xu, & Zandieh, 2020). This applies to most people since living space is often quite limited in an apartment and this might not be a desirable solution in long term. There is however some data that tells us that people are quite comfortable with working from home instead of from the office (Kamouri & Lister, 2020).

This indicates a shift in society that will make people stay at home during many more hours of the day which means that a lot of daily activities done by family members will overlap much more than ever before. This will create problems where there previously were none and in turn set demands on new types of design approaches taken by architects to cope with the changes.

- A I M -

The aim of this thesis is to examine which design principles and which apartment typologies¹ allow parallel activities to take place at home, a topic that will become more relevant post-pandemic. Examples of activities that will overlap often are studying while someone is preparing food, working out while someone is watching TV etc. The subject of parallel activities is not something completely new, there have always been people who have worked from home for example. However, the pandemic has made this topic more relevant than ever and is something that nearly everyone has needed to deal with, which is the reason why this thesis aims to examine it.

Since the topic is not completely new, the thesis also examines already built apartment to see what can be learned from history regarding design principles and apartment typologies.

The thesis establishes a collection of guidelines or design strategies for how homes should be planned to allow for parallel activities. This data serves as the basis for a design project of an apartment building which is situated by Gråberget in Majorna, Gothenburg.

¹ From here on, when the thesis is referring to floor plan typologies it will be referencing the floor plan ideas that Heckmann, Schneider, & Zapel (2017) writes about in their book.

- RESEARCH QUESTIONS -

The thesis aims to answer the following two questions:

Q1: Which design strategies do housing architecture need to incorporate to allow parallel activities to take place?

Q2: How does apartments in a multi-family residential building look like that implement design strategies that focuses on parallel activities?

- METHOD -

During the thesis, four main methods have been used: research for/on/by design as well as literature studies. These methods have been used interchangeably in the three different phases of the thesis. The three phases are *Background*, *Framework* and *Design*.

BACKGROUND

To examine the topic and to build a base on the subject, research for design through mainly literature studies are conducted. The literature comes mostly from academic and scientific articles, books and journals but also from some online sources.

FRAMEWORK

Research for and research on design have been used to create a framework for the upcoming design phase. A historical analysis with research on design has been done within this phase where one project per decade has been analyzed from the 1940s up until today.

Under the design strategies chapter, a short part also incorporates research by design where a couple of sketches which implement the design strategies have been produced and analyzed.

DESIGN

This phase uses research by design throughout the whole process, with the aim to explore different solutions through iterative design. Volumes, floor plans and other aspects of design have been studied with the focus on what was previously researched during the other phases.

- DELIMITATIONS -

The design part of the thesis focuses on a Gothenburg context, following Swedish standards and regulations. The historical examples that have been analyzed are both from Gothenburg but also from a broader Swedish perspective.

The main part of the literature gathered is from an even broader perspective since not enough has been written about Swedish post-pandemic housing. Most references have a European perspective but there are some exceptions.

Also, the focus of the thesis is on multi-family residential buildings since other types of homes, like villas, are generally already large enough to support parallel activities.

The potential economic issue of the design principles, and the project, will not be discussed. Neither will the construction aspect of the design proposal.

- READING INSTRUCTIONS -

The thesis is divided into seven main chapters which are *Introduction*, *Research*, *Design strategies*, *Site analysis*, *Design process*, *Design proposal* and finally *Discussion*. These chapters are combined into three main phases. Phase 1 (background) includes this current chapter which frames the work. It also includes some introductory information on the research of the thesis during chapter two. Phase 2 (framework) consists of the remaining of chapter two as well as chapters three and four, which is where the design strategies are defined and where the context of the chosen project site is presented. The third and final phase (design) includes the two chapters: *Design process* and *Design proposal*. The thesis wraps up with a chapter with conclusions and reflections. Research question **Q1** is studied during the first and second phase whilst **Q2** is examined during the final phase.

-CHAPTER 2-
RESEARCH

CONTENTS:

Parallel activities & the floor plan
Theoretical framework
Starting points: Apartments and households
Architectural references

PARALLEL ACTIVITIES & THE FLOOR PLAN

-ACTIVITIES IN PARALLEL-

Before the Covid-19 pandemic, most people's daily schedules at home overlapped with those of the other household members. Breakfast, dinner, social gatherings and resting were all done more or less at the same time for the whole family. However, with the pandemic forcing people to stay at home more often, a lot of household members' activities suddenly started to overlap. One needed to cook while another had a video conference meeting whilst a third tried to do some exercise.

A table has been created which takes inspiration and reference from Alfirevic & Simonovic Alfirevic (2016) to visualize which common activities at home can take place simultaneously in the same room or space (see Figure 1). Common, already individual activities such as hygiene and laundry have been taken out to simplify the table and to make it relevant to the thesis.

Six daily activities have been picked and their relation to each other is marked with a letter. (A) symbolizes activities that can take place in the same space and at the same time by multiple household members. (B) states that in some cases these activities can be done simultaneously while the ones marked with (C) show what cannot be done at the same time in the same room.

As the table shows, there are several daily activities that need to be done independently. Visual and physical separation of the functions is necessary to achieve a good housing quality. Important to note is that this does not mean that all these activities need to be executed in different rooms. The separation does not only need to be done in physical attributes but can be done by time-of-day as well. For example, sleeping and working/studying can be achieved in the same physical room, just not by two household members at the same time.

A - Can be done in same space B - Potential to be done in same space C - Not possible to do in same space	Sleeping	Cooking	Eating	Gymnastics	Work/study	Socializing	Relaxation
Sleeping	A	C	C	C	C	C	B
Cooking	C	A	A	C	C	A	C
Eating	C	A	A	C	C	A	B
Gymnastics	C	C	C	B	C	C	B
Work/study	C	C	C	C	B	C	B
Socializing	C	A	A	C	C	A	B
Relaxation	B	C	B	B	B	B	B

Figure 1. Table of activities that can take place simultaneously

- OPEN PLAN -

When talking about parallel activities it is impossible not to mention the concept of the open-plan housing. Open floor plans are immensely common in today's housing market and have been the norm for new apartment construction for three decades now. Importantly, open-plan does not mean a complete obliteration of walls between rooms since many functions still require separation, like bathrooms and bedrooms. Some combinations of rooms include the kitchen and the dining room, the dining room and the living room as well as a combination of all three (Ollár, Femenías, Rahe, & Granath, 2020; Wallender, 2021).

Before the 1940s most floor plans were structured around a neutral hallway which had doors into the different functions of the home. The kitchen was often placed in the back of the dwelling, sometimes with its own entrance for staff and deliveries. At the time, architects like Frank Lloyd Wright began designing homes of the future where the dining- and living areas were combined into one large space, but often still divided by a central fireplace. The idea of open floor plans we see today manifested in post-war times where the floor plans started to include an open kitchen. A big change that pushed the adoption of open-plans is the densification of urban spaces where floor area is limited (Wallender, 2021).

Alfirevic & Simonovic Alfirevic (2016) have defined three types of "openness". Plans can be categorized into: (A) closed plan – rooms are differentiated as separate spaces, (B) Half-open – some rooms are either partially combined or combined through flexible solutions, (C) open-plan – many rooms are combined to achieve an all-in-one space. (C) is usually found in smaller apartments to create better spaces for living. Ollár, Femenías, Rahe, & Granath (2020) corroborates this claim by stating that the open floorplan is a compromise on compact living space.

There are many benefits of living in an open-plan apartment. Firstly, it provides more rooms with much better light conditions since there are fewer walls blocking it. It also allows greater social activities and better oversight of your children. The openness also helps with the experience of spaciousness (Giacobbe, 2021; Ollár, Femenías, Rahe, & Granath, 2020; Wallender, 2021). The open-plan is also a desirable and preferable option for people when choosing a residence (Giacobbe, 2021). During research conducted in Finland, the majority of responders in a survey on the ideal kitchen said that they preferred open-plan kitchens compared to other kitchen typologies (Tervo & Hirvonen, 2019).

Even though there are many positive aspects of open-plan layouts there are still many drawbacks, especially regarding allowing parallel activities to occur. There is a strong lack of privacy and space for activities such as relaxation. Noise levels from activities that can disturb other members of the household (Wallender, 2021). Wallender also states that even though the open-plan is desirable by many, there seems to be a shift of preference towards more closed-off rooms. The best solution to allow parallel activities to occur might therefore be a plan that offers reorganization of spaces and/or rooms.

THEORETICAL FRAMEWORK

- ADAPTABILITY: POLYVALENCE -

Adaptability of the home, often referred to as polyvalence, is a concept in which the home can adapt to changes of behavior and needs of its residents. It means that the dwelling can be used in different ways without the need for structural intervention. The important factor here is how each room is accessed and how they relate to each other in conjunction with how the rooms can be used for different activities (Leupen, 2006).

To achieve a high level of polyvalence there needs to be several rooms that are large enough to accommodate several different activities. A room size of 16 m² is general enough to accommodate any basic daily activity. The more rooms of this size, the more polyvalent and adaptable the dwelling becomes (Leupen, 2006).

Leupen (2006) continues by stating that the polyvalence also relies on the spatial configuration between rooms. He defines five different models for spatial configuration, labeled A-E. The level of polyvalence increases with each step. The chain model (A) is by far the least polyvalent type since you always must pass one room to reach another. On the other end of the spectrum, you find the grid model (E) which is the most polyvalent since each room can accommodate almost any function because of the independent relation between them.

All this means that an apartment that implements a hall which acts as a central and neutral space from which every room is reached can be seen as the best solution to an adaptable floor plan layout (Braide, 2019; Leupen, 2006). Additionally, large sliding doors and folding walls can be ways to achieve a greater level of polyvalence since they can alter room sizes and their inter-relation without any structural intervention (Leupen, 2006).

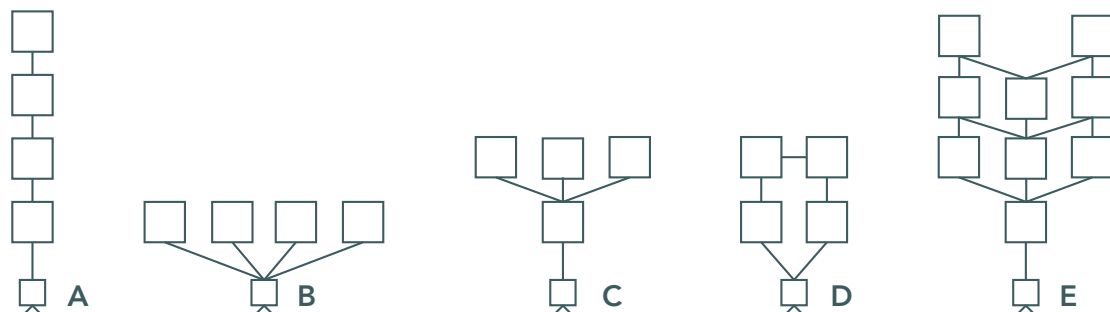


Figure 2. Graph of the five different polyvalence models (Adapted from Leupen, 2006)

- ADAPTABILITY: FLEXIBILITY -

Another way to improve housing quality can be to design homes which have some adaptability already built in. This can be appreciated because our need for home arrangement can change daily. The number of occupants will change throughout the day and people use their homes very differently during working hours and weekends. Larger changes such as family growth and shrinkage affect the need of the home's arrangement (Tarpio, 2016).

In her doctoral thesis, Braide (2019) describes three concepts of adaptability. These are generality, flexibility, and elasticity.

Generality can be described as rooms being physically fixed, but the way people use them is interchangeable (Braide, 2019; Manum, 2005). This concept also draws several parallels to polyvalent layouts described under the previous heading. Again, here it is described that rooms that are 16 m² can support many different functions and it of often a square shape (Braide, 2019).

A flexible layout on the other hand refers to apartments that are planned to allow physical changes to reconfigure room sizes or their number (Braide, 2019). These changes require more effort from the dwellers since walls need to be torn down or constructed in order to change the apartment. However, this could be avoided if the architect planned for this in the first place and offered movable partitions or large sliding doors to allow easier reconfiguration.

Elasticity refers to spaces that can belong to either one of two or several apartments. The space can be either just a single room or a collection of rooms, sometimes including all the functions for it to support being its own apartment (Braide, 2019).

- APARTMENT TYPOLOGY -

There are a lot of different apartment typologies that architects use, and none of them could be singled out as the best. According to Heckmann, Schneider & Zapel (2017), the best solution is a combination of different typologies. However, there are some that are better suited for supporting parallel activities than others. Below are the most relevant ones collected from the book by Heckmann, Schneider & Zapel.

CORRIDOR/HALL

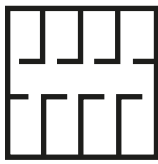


Figure 3.
Corridor/hall

The apartment is structured along an axis with the rooms of the apartment arranged on one or either side of the corridor. The advantage of using a corridor to access the rooms is that all rooms are enclosed and independently accessed, and the corridor acts as a neutral space. To not make the corridor an unpleasant space, the hallway can widen and shrink to create rooms within the room. Also, sightlines and daylight are important factors in order to create an enjoyable space.

ZONING

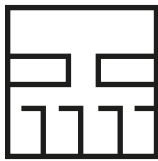


Figure 4. Zoning

In this typology the plan is clearly divided into different zones. The living, dining and kitchen areas are often grouped together while the bedrooms and bathrooms are gathered. Also, guest rooms or home offices can form a third zone. To separate the zones, a kitchen or a dark core of bathrooms, shafts and storages are often used. The idea is to create spaces which can be used by family members without disturbing one another.

DIVIDING ELEMENTS

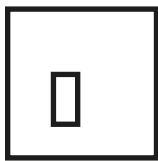


Figure 5.
Dividing element

An apartment that incorporates dividing elements are read as large, open spaces with prefabricated components dividing up the space. The core often occupied by the kitchen, bathroom and storage offers circulation around it. Sliding walls can be used to separate the otherwise open space into smaller rooms if necessary.

FLOOR PLAN WITH CIRCULAR PATH

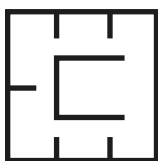


Figure 6.
Circular path

When using this typology, most rooms in the apartment can be reached by two or more paths. The paths often circulate around a centerpiece of the home, often an atrium or a core of support functions like bathrooms. The disadvantage of having multiple entrance points to each room is the limited ways of furnishing the rooms since you want to keep the paths free of blockage.

- ROOMS AND FUNCTIONS -

In the following text, some typical rooms found in apartments are picked out and further discussed. These rooms are singled out because of their relevance to support parallel activities.

KITCHEN

It is commonly known that some time ago, the kitchen was seen solely as a service function where staff could cook the food without disturbing the main residents of the dwelling. The kitchen was off-limits to visiting guests and entertainment and socializing was done in more formal rooms (Wallender, 2021). Nowadays the kitchen is more commonly seen as a centerpiece of the home where families can gather and socialize.

When talking about what people see as their ideal floor plan, the kitchen comes up a lot during the discussions. The kitchen type, size and configuration heavily impact the notion of the ideal floor plan. The impact of the kitchen's solution increases when the size of the apartment gets smaller (Tervo & Hirvonen, 2019).

The most preferred kitchen typology in Sweden is the straight or the L-shaped kitchen. Among these two, the straight kitchen is the best alternative if there is space for it. It is said that corners are difficult to solve in a good way in kitchens, which makes the U-shaped layout the worst. A preferable solution for the kitchen is to have an open floor plan with a kitchen island which encourages social interactions and activities (Ollár, Femenías, Rahe, & Granath, 2020).

There are however problems with this solution, as discussed under the prior heading, Open plan. The open kitchen is seen as a compromise because of smaller living space. One way to improve things somewhat can be to place the kitchen island as a divider between different living functions found within the same room, or to use movable or sliding walls to divide the spaces temporarily (Ollár, Femenías, Rahe, & Granath, 2020).

A conclusion drawn by Tervo & Hirvonen (2019) is that the open-plan could be renowned by architects and developers but not actually appreciated by residents. In their study they acknowledged that 56% of the responders appreciated an open kitchen and found it preferable, while 38% valued a closed kitchen that could fit a dining table. They conclude that while most responders preferred the open kitchen, its popularity is relatively low compared to the norm of kitchen designs in new development, where most apartments incorporate an open-plan solution.

BALCONY & OUTDOOR SPACE

The most common way for people living in apartments to experience the outdoor must be through a balcony or a terrace. That is if the dwelling has access to one. During the recent Covid-19 lockdowns, the balcony was widely sought after by residents as a way to increase the available area of the dwelling and to have a good space for working out

when the gyms closed down. For it to be usable for different functions and activities the balcony should be at least 6 m². Also, the direction it is facing is of great importance. North-facing views should be avoided since the usability and quality of the outdoor space is diminished (Rosa-Jiménez & Jaime-Segura, 2022).

An international survey was done during the Covid outbreak in April 2020 with several hundred applicants. Over half of the responders said that they had started using their balcony more during the pandemic, as it was their only completely safe outdoor space available. It was also concluded that many new activities not previously done on a balcony were suddenly common practice, like working out or studying (Litsardaki, 2021).

A way to further increase the apartment's usability without increasing the actual size of the home can be to incorporate a winter garden in the transition zone between the indoor and outdoor areas. This glazed room can be used as an office or serve as a private gym (Rosa-Jiménez & Jaime-Segura, 2022).

WORKSPACE

The shift to working from home forced people to reevaluate which functions of their home serves what function. A lot of people have needed to convert space into a temporary office to accommodate their changed daily schedules (Nanda, Thanos, Valtonen, Xu, & Zandieh, 2020).

Interestingly, there is some research that shows that people already had a wish for more space for a home office, even before the Covid outbreak. In a survey conducted by Tervo & Hirvonen (2019), additional space for a home office ranked as the second highest desire of where to use additional square meters for multi people households and the fourth highest for solo dwellers. The most common answer for both reference groups were to use potential extra space for more storage. It is quite interesting that even solo dwellers valued additional space for a home office that high. One can assume that solo dwellers already have complete control over their home where they are not disturbed by other household members and therefore could theoretically conduct work from anywhere in the home. There seems to be a need for people to draw a line between overlapping domestic spheres. It seems necessary for people to be able to reside in different spaces to be able to shift from a work environment to a leisure environment at home.

ADDITIONAL AREA

According to some, people wish to have at least one extra room in their apartment to use as a home office, spare bedroom etc. (Giacobbe, 2021; Tervo & Hirvonen, 2019). In a lot of cases, the price of the apartment could probably be a limitation which makes people opt out of this additional room.

Possible solutions to solve the shortage of space is to utilize both furniture and doors

to expand and shrink room sizes to create new possibilities for rooms. For example, pocket doors can be used to separate a large social room into smaller areas to limit disturbance between the different zones while closed. When open, they move out of the way and the space can be seen as a larger whole. Also, furniture can be placed so that a room is seen as divided in two, with the different zones serving different functions (Giacobbe, 2021). For example, a home office can be placed in the far end of the living room divided by a large sofa, credenza or sliding partitions. This way, work-from home employees can have their own office space while still allowing a living room to feel large during evenings and social gatherings.

STARTING POINTS: APARTMENTS AND HOUSEHOLDS

- APARTMENT SIZE -

When discussing how apartments are best designed to support parallel activities, we also have to discuss their sizes since that is what ultimately dictates the architect's design possibilities regarding supporting parallel activities. It might seem obvious, but to have sufficient area in your home is a very essential aspect that effects your life profoundly. According to an Italian study done by Amerio, et al. (2020), apartments should not be smaller than 60 m² to support a good lifestyle and to supply enough space for its residents. Another study done in Finland states that architects should strive to design apartments no less than 50 m² to overcome a shortage of space. However, since this size is not always possible to achieve in all projects, the absolute minimum floor area should be 30 m² (Tervo & Hirvonen, 2019).

In Gothenburg, most apartments are found in the size range of 51-60 m² with the second most common range being 71-80 m². When compared to Sweden as a whole, the distribution of Gothenburg's apartment sizes is quite similar but in general the sizes of apartments are smaller (Göteborgs Stad - Statistikdatabasen, n.d.).

When an apartment exceeds 55 m² in size, Boverket (which regulates laws regarding apartment design) has stated that some of the looser rules change into stricter ones. For example, in apartment between 35-55 m² either the bedroom or the kitchen needs to be able to be separated from the living area. While in apartments greater than 55 m² both functions need to be separated from it (Boverket, 2020). This information together with the statistical data seen in the pie chart below (Figure 7) tells us that there is probably a wish from developers to push architects into designing small apartments below 55 m² to avoid needing to follow stricter regulations.

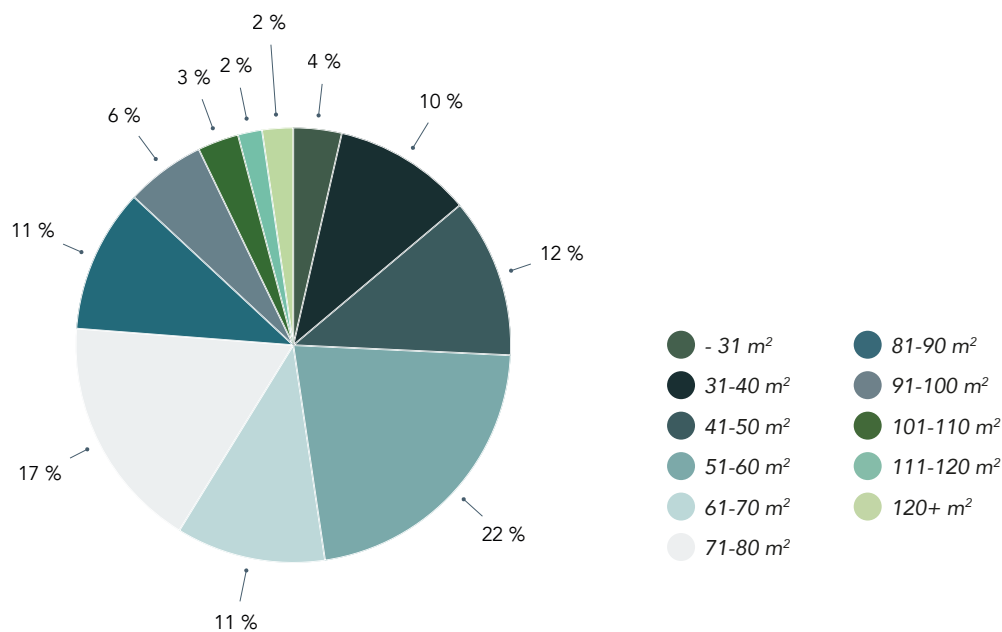


Figure 7. Apartment size distribution in Gotheburg 2020

- APARTMENT TYPE -

The type of apartment refers to the number of rooms one can find in the dwelling. A room is defined as being at least 7 m² large and having direct daylight from a window. A kitchen, kitchenette and bathroom never count as rooms. Also, a dining area is not defined as a room if a kitchenette together with the dining area is labeled as a kitchen (Lantmäteriet, n.d.-a). An interesting note is that Boverket, which usually regulates what sizes functions of the home necessitates, does not have any regulation regarding minimum room size (Boverket, n.d.).

The most preferred apartment type is a three-room apartment according to 44% of the solo-dweller participating in a study done in Finland. 38% said that their preferred type is a two-room apartment. This data points to the fact that people in general wish to have additional rooms in their homes to feel satisfied with their dwelling. There is also some research that states that there might be a need for a spare bedroom for people to be able to maintain meaningful relationships (Tervo & Hirvonen, 2019).

The concept of open-plan layouts should be brought up again in this discussion. The most common use of this is the combination of the living area and the kitchen. The openness can help to improve the satisfaction experienced by dwellers since the apartment appears larger than it actually is (Alfirevic & Simonovic Alfirevic, 2016).

In Gothenburg a two-room apartment is by far the most common type found, adding up to 38% of the housing stock, with three-room apartments making up 30% (Göteborgs Stad - Statistikdatabasen, n.d.). In general, smaller types of apartments (defined as two-room apartments or smaller) have grown greater in number compared to larger ones (SCB, 2020).

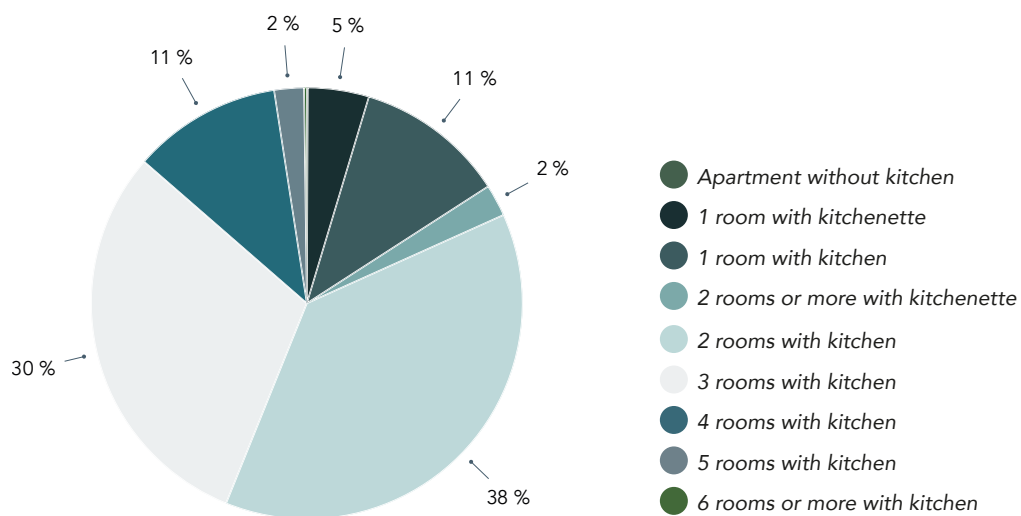


Figure 8. Apartment type distribution in Gotheburg 2020

- HOUSEHOLDS -

Solo dwellers account for the biggest number of households found in Gothenburg, totaling 47%. The next two most common households are couples without and with children, taking up 23% and 16% respectively (Göteborgs Stad - Statistikdatabasen, n.d.). Also, statistics show that for couples with children, two-children families are the most common type followed by one-child homes (SCB, n.d.).

Three typical households have been picked out for this thesis because of their relevance to parallel activities at home. Even though solo dwellers account for most households they do not experience the same need for design solutions that support parallel activities since they do not need to share their space. The three households chosen therefore are: couple without children, couple with two children and single parent with one child. The latter household type may not represent the biggest market share (single parent with children only account for 5% of all households (Göteborgs Stad - Statistikdatabasen, n.d.)) but the challenges associated with parallel activities can be greatly represented. This type of household and solutions for it can also draw parallels to other types of households, such as people living as roommates where the bedroom is preferably not shared.

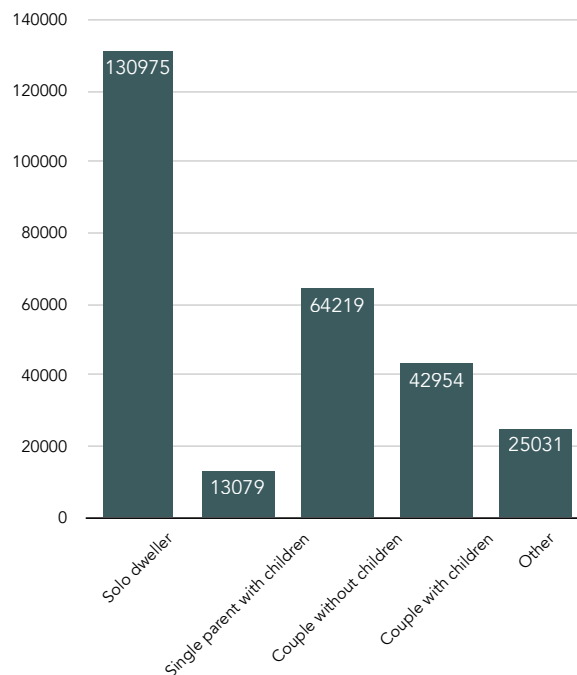


Figure 9. Household type distribution in Gotheburg 2020

COUPLE WITHOUT CHILDREN

For a household where more than one person is at home at once there is a need for independence in some circumstances, for example when someone needs to work while the other one is relaxing. There are however many activities that can be done together like sleeping.

SINGLE PARENT WITH ONE CHILD

This type sets some higher demands on privacy and independence compared to a couple-without-children household since fewer activities can be done together. There is still a strong need to allow members of the household to do their individual activities such as work, school or relaxation independently from one another.

COUPLE WITH TWO CHILDREN

In a big household the importance of separation of rooms is of great essence. Many different activities can take place at the same time from several different family members. The concept of adaptability and flexibility is best applied here to be able to divide and open up rooms for the different stages of the day.

ARCHITECTURAL REFERENCES

- REFERENCE ANALYSIS -

To get a general overview of how apartment design has evolved in Sweden, 8 projects have been picked out and studied. One apartment project per decade since 1940 has been selected because of the typical plan for the decade it was built in or its great spatial qualities that are seen as relevant to the thesis. These projects serve as reference projects and the knowledge gathered from the analysis will be used during the design phase of the thesis (see the appendix for the full analysis).

Firstly, some basic information is noted for every apartment, such as size, which type it is and if there are any balconies to be found (if present, their sizes are also stated). In addition to the floor plans, three other diagrams are created for each project. A polyvalence diagram is created which draws reference from Leupen (2006). They are later analyzed, and some conclusions are drawn from what the diagrams tell. Also, a simplified zoned plan is included in the analysis where private and common rooms are marked in contrasting colors. The final diagram for each project is a floor plan where general architectural qualities are highlighted and improvements that could be made regarding parallel activities are manifested.

Lastly, a short, written analysis is included which focuses on how well the apartment is suitable for parallel activities. The focus points for the analysis are:

The points that are analyzed are as following:

- How rooms are accessed (is tied to the polyvalence diagrams).
- Which apartment typology is used, can it be interpreted as only one or are there several combined?
- Kitchen. Can the kitchen fit a dining table or is dining a separate function? If so, how are the rooms relating to each other?
- Flexible room. Is there a possibility to create additional rooms, either through structural intervention or flexible solutions?
- Circulation. Can rooms be reached from more than one point? Is the circulation a quality or does it negatively impact the apartment?

CONCLUSIONS FROM REFERENCE ANALYSIS

Conclusions from the analysis include that the older apartments are better suited to support parallel activities than some of the newer dwellings. This is because of the use of a neutral hall/corridor in several of the early projects. This central hall offers the homeowners the choice of which room should serve which function, and the rooms can be used independently without disturbing an activity in another room. The user can enter and exit most rooms without crossing and interfering other functions or activities.

Even though the newer apartments are worse in supporting parallel activities (because of their more open-plan typologies) there is a possibility to improve their qualities. For example, a hall could be created by taking some space from what is supposed to be the living room.

Another conclusion that is drawn is regarding the zoned apartment typology. Some of the references have implemented a package of two bedrooms and a bathroom (in some cases also storage). This makes the apartment very usable in regard to parallel activities since this zone is undisturbed from the social rooms. However, in many of the references this zone is reached only from a large room, which most people would use as their living room, limiting that room's usability. A better solution would be to access this zone from a neutral hall.

Also, having multiple or large outdoor spaces is great and can increase the possibility for parallel activities. The best examples come from where there are balconies that are accessed from different types of rooms, both social and private.

Below are some of the sketches from the analysis. Again, see the appendix for a full analysis of all reference projects.

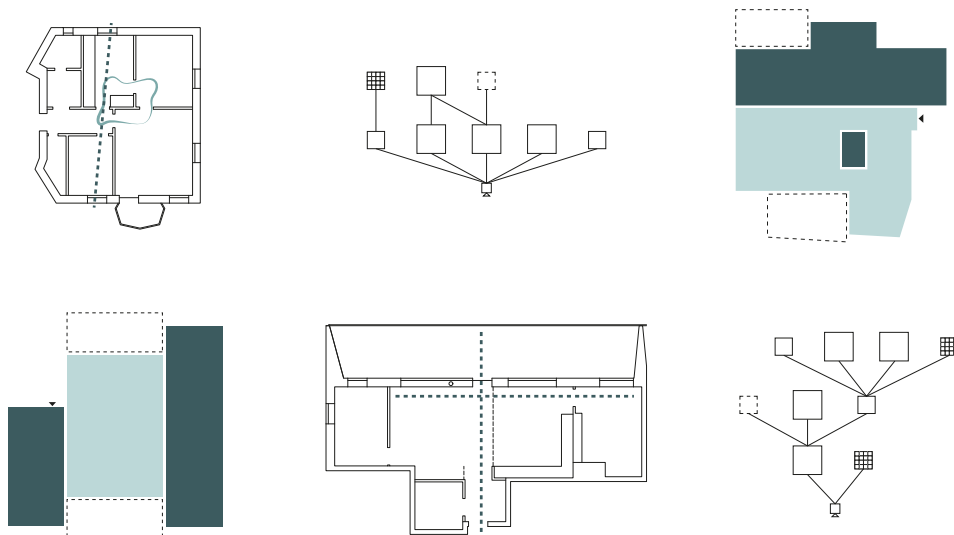


Figure 10. A selection of drawings and diagrams from the analysis

-CHAPTER 3-
DESIGN STRATEGIES

CONTENTS:

Six principles
Implementation

SIX PRINCIPLES

- GENERAL STRATEGIES -

The following chapter contains a description of several design strategies that are concluded from the previous research. The design work of the project (the process and results can be found in the following chapters) will rely on these strategies during decision making process regarding floor plan layouts. The focus of these strategies is of course supporting parallel activities for as many household members as possible.

General ideas for any apartment to support parallel activities include giving a home at least 50 m² of floor area, preferably closer to 60 m² to overcome a shortage of space for the dwellers. The home cannot be a studio apartment but must have at least one bedroom so that if there are two people living there, one can shut the door behind them to get some privacy.

The most important design aspect to think about when designing apartments supporting parallel activities is how rooms are accessed. To ask the question "Will the placement of this room or door create noise disturbance or create passageways through other functions?" can be of help during the design phase. To further help guide the architect, six design strategies have been created.

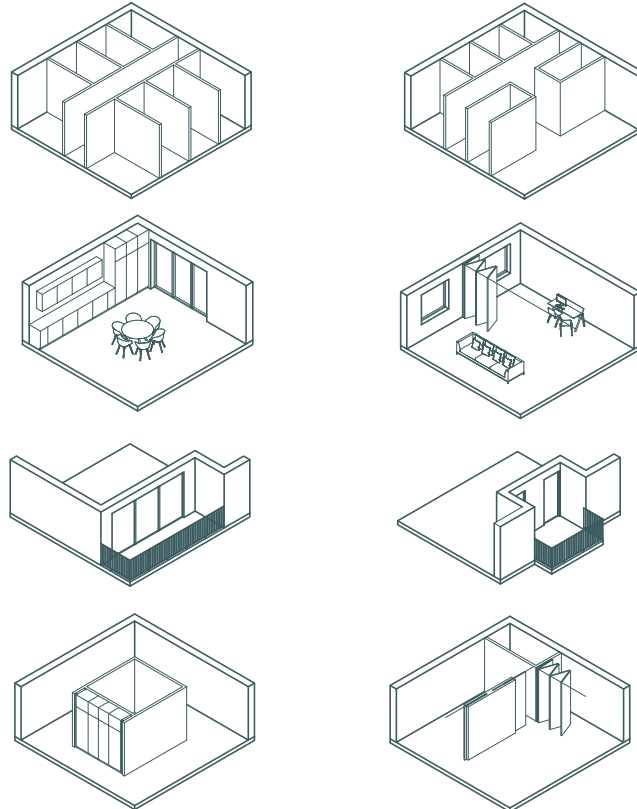


Figure 11. Icons for the different design strategies

- APARTMENT TYPOLOGY -

Conclusions drawn from the reference analysis include that the zoned typology is a very good way of supporting parallel activities and offers many great qualities. Specifically, the projects from 1965, 1985 and 2005 have these qualities. How the apartment is read and experienced is dependent on the placement of the zone of private functions. The best solution is to place it in the back of the apartment to achieve a great level of privacy, with the common functions placed closest to the entrance. Also, the neutral hall typology offers many great qualities on its own since you do not have to pass another room, or another potential zone, to reach other functions. A combination of both, which combines the greatest strengths is a great solution that will allow any floor plan to support several parallel activities. Additionally, dividing elements could be incorporated in conjunction with sliding or folding partitions to expand or contract rooms (for further details, see the description of the strategy openness/closeness).

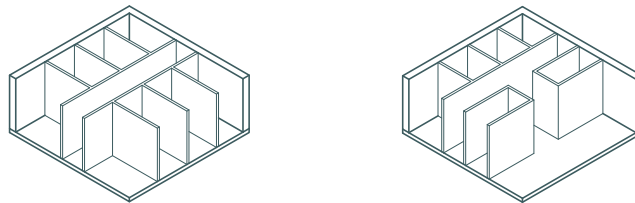


Figure 12. Icons representing the two apartment typologies

- HIGH QUALITY KITCHEN -

large enough kitchen is necessary with enough space for a dining table in the actual kitchen or in an adjacent dining room with flexible interplay in between (so the rooms can be closed off when needed or opened for large social gathering for example). Several entrance points to the kitchen are vital to make the apartments polyvalent and to allow the residents to use the homes as they wish and access the kitchen from the rooms they want. One of the entrances should be from a neutral space, like a hall, while the other(s) can be from rooms with other functions.

The aim should be for the kitchen to be separated from the living room and other functions so that cooking can take place in parallel with other activities at home.

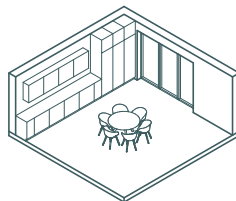


Figure 13. Icon representing a high quality kitchen

- OUTDOOR SPACE -

An outdoor space, such as a terrace, balcony or loggia, should be available for all apartments. The size should strive to be at or larger than 6 m² and not too narrow to create good opportunities for many use cases. It can be used for working out, recreation or work/study if the weather allows it. To extend the usability of the space, making parts or all of it glazed is required. One solution could be to include a winter garden as a buffer zone between the interior and exterior space, but this is not necessary.

The orientation of the outdoor area is of great importance as well. Strictly north-facing balconies cannot be used to the same extent as balconies facing more sun-exposed directions. One aspect that increases the quality of the space is to have multiple access points to the outdoor space, preferably with one access from a relatively neutral space.

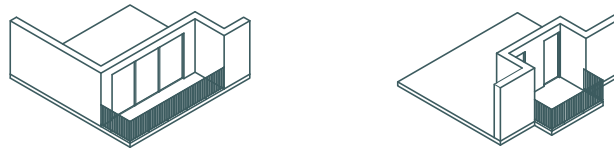


Figure 14. Icons representing two great outdoor spaces

- CIRCULATION -

Circulation can be added to the apartment to be able to reach several rooms of the home without needing to cross another room which may be occupied by another household member. It is important not to apply this strategy just because, but to apply it where it makes sense and elevates the apartment's qualities. It is also important to make sure the multiple access points do not disturb the natural path through a room, which could make the furnishability limited.

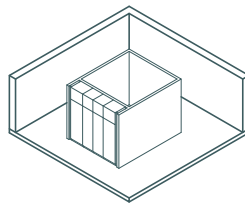


Figure 15. Icon representing circulation

- OPENNESS / CLOSENESS -

An open floor plan is favorable by many residents as discussed and concluded from the research part, but it imposes many limitations to support parallel activities. The most common type of open-plan is between the kitchen and living room or kitchen and dining area. The best solution to support parallel activities is to have the option to choose between openness and closeness through adaptable solutions like large sliding or folding partitions. Otherwise, most rooms should be able to be closed with a door.

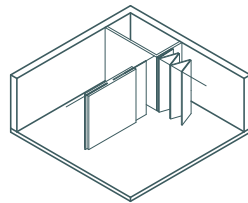


Figure 16. Icon representing dividing partitions

- TEMPORARY ROOM -

If the apartment is large enough to support it, there should be a part of a room that could be temporarily transformed into its own area. This should be done by including folding or sliding partitions into the final design during the construction, so no additional assembly must be conducted by future residents.

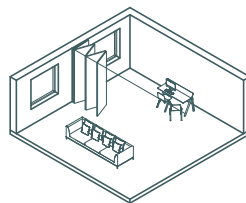


Figure 17. Icon representing a temporary room

IMPLEMENTATION

-ANALYTICAL SKETCHES-

Several floor plan sketches have been created to get a better understanding of how the previously defined design strategies affect the result of apartment design. Only larger apartments are studied, with at least 2-3 bedrooms plus the potential additional temporary room. A general building width of 12 meters has been selected and applied to all sketches because of its common use in apartment construction. To examine several different potential buildings, two general apartment kinds are studied. Firstly, a gable apartment in a lamella is studied with potential to have windows in three directions. Secondly, a middle apartment in a lamella is studied with light from only two directions.



Figure 18. The two apartment kinds studied

For each apartment kind, different apartment typologies are implemented. As the design strategies defined, the zoned plan and plan with a neutral hall or corridor works best to support parallel activities. Therefore, three sketches for each apartment kind are done: one implementing a zoned plan, one implementing a neutral hall and the third being a combination of the two or an iteration of the sketch that ended up the best.

Each sketch is followed by an analysis where the layout is discussed.

GABLE APARTMENT 1: 3-4 ROOMS WITH KITCHEN IN 93 M²

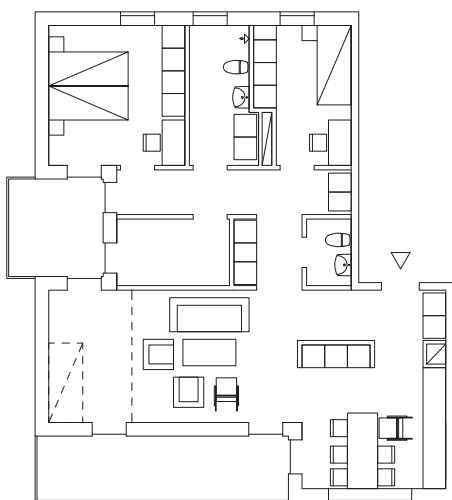


Figure 19. 1:200 Implementation sketch 1

The first sketch contains all the defined design strategies. It utilized the zoned apartment typology with a separate bedroom package towards one facade separated from the common functions by a bathroom and storage. This allows resting, working and leisure to be performed without disturbing other activities. The storage room is large enough to fit a small guest bed or a desk. The dining area is placed in the kitchen and the kitchen can be separated from the living room. The living room is rather small in this quick sketch but there is a possibility to temporarily make an additional room from it. Circulation is achieved in multiple places.

GABLE APARTMENT 2: 4-5 ROOMS WITH KITCHEN IN 107 M²

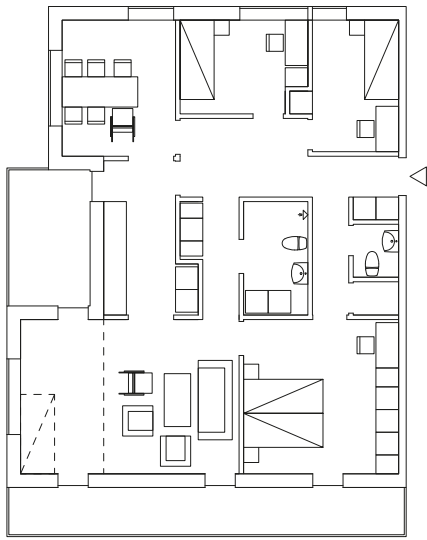


Figure 20. 1:200 Implementation sketch 2

This sketch also incorporates all design strategies. This one is utilizing a neutral hall typology instead of a zoned plan. The central hall serves as the access point to all permanent rooms. In turn, this means that every single function of the home can be accessed without disturbing another fellow dweller. The hall gets indirect daylight from several rooms and the entrance has a direct sightline out through a window.

A temporary room can be created with space from the living room. This room is then reached from the large room or through circulation from the balcony.

GABLE APARTMENT 3: 3 ROOM WITH KITCHEN IN 98 M²

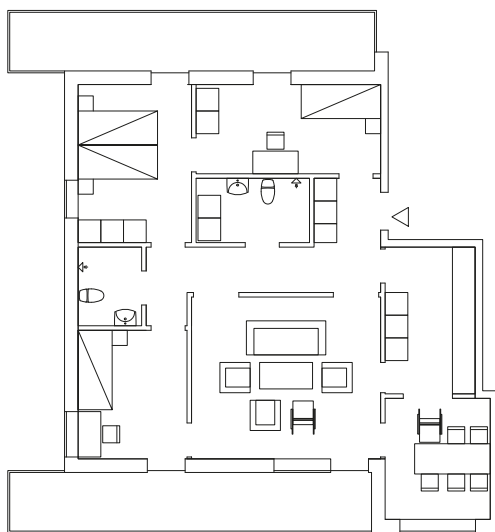


Figure 21. 1:200 Implementation sketch 3

A combination of a zoned plan and a neutral hall is studied in this sketch. The zoned part is found in the far back towards the gable with two bedrooms and a bathroom. From the hall one can reach all rooms except the dining area. One major flaw with the design is that if a future homeowner decided to close off the dining area from the kitchen; the kitchen would no longer have access to daylight.

The layout of the apartment allows for circulation through many parts of the home, through social/common areas as well as what is imagined to be more private quarters. This means that the function for these rooms can actually change and become whatever.

MIDDLE APARTMENT 1: 3-4 ROOMS WITH KITCHEN IN 99 M²

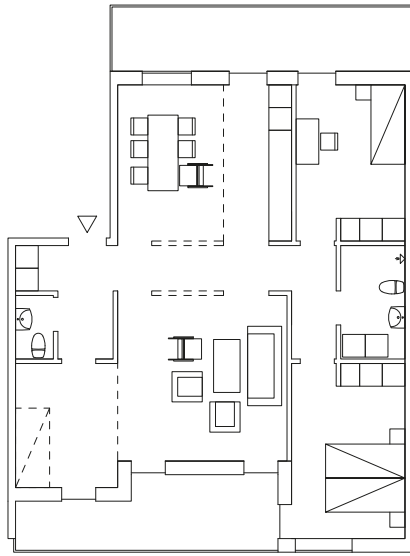


Figure 22. 1:200 Implementation sketch 4

For the sixth sketch some inspiration was gathered from the previous historical analysis, specifically the project called Godhemsberget 2005 (see appendix for details). Adaptations were made to incorporate the design strategies. This is a zoned plan where the bedrooms and the bathroom are gathered and divided from the common areas. The temporary room connected to the living room can be used as an office during daytime or can open up during evening for social gatherings for example.

To divide the otherwise very large common rooms, walls can be put up which would create a hallway through the space and circulation around them. Additionally, the dining area can be separated from the kitchen.

MIDDLE APARTMENT 2: 3 ROOMS WITH KITCHEN IN 87 M²

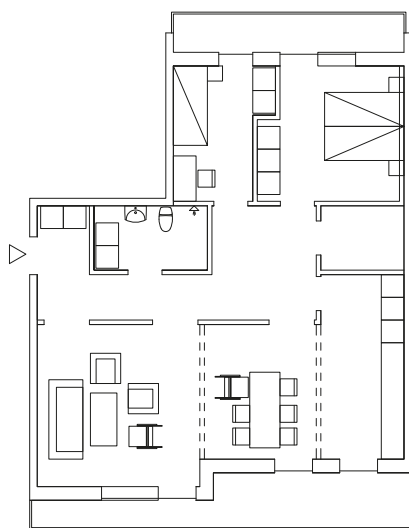


Figure 23. 1:200 Implementation sketch 5

A neutral hall was chosen to implement for the second middle apartment sketch. Every room of the home is accessed from this hall. The dwelling also offers the opportunity to divide the very large common space of combined kitchen, living- and dining room. Circulation is achieved both through the hall and common areas as well as through either of the two balconies. What is missing from this sketch is a temporary room. Instead, work, studying and working out need to be done within the existing rooms, limiting parallel use a bit.

MIDDLE APARTMENT 3: 4-5 ROOMS WITH KITCHEN IN 106 M²

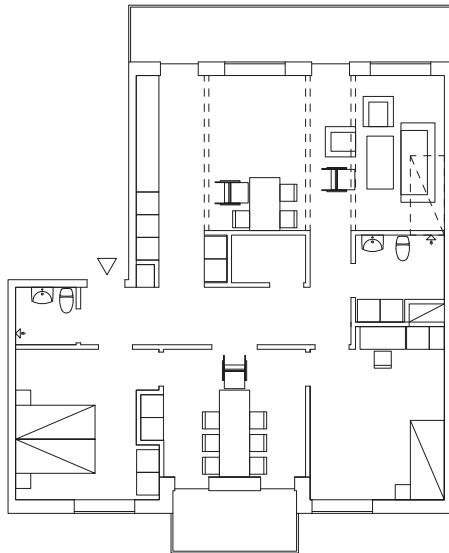


Figure 24. 1:200 Implementation sketch 6

For the final sketch the neutral hall is implemented once again. A study on quite large general rooms is done here (see bottom three rooms in the floor plan) and all these rooms support a range of functions from sleeping to dining. The social areas are very adaptable with small additions in the structure by putting up walls. The dining can be completely closed off from either the living room, the kitchen or both. Also, the living room can become a room on its own or a temporary room can be created in its place.

CONCLUSIONS FROM IMPLEMENTATION SKETCHES

After trying to implement the design strategies into actual floor plans it became clear that it does not really matter if the apartment is towards a gable or not. All strategies can still be implemented just as well. It could also have a lot to do with that all the studied apartments are rather large. It is of course easier to make a large apartment good compared to one with limited space. However, these sketches still show that the defined design strategies would not compromise any living qualities and they also do not make an apartment unnecessarily large.

Other findings from the sketches are that, once implemented, a temporary room was often placed at the far back of the dwelling. Maybe it was a coincidence that all temporary rooms were placed unreachable from the main hallway, but it is something to think about. The sketches also show that a kitchen that does not fit a dining table, while being interconnected to a dining room, turns out to be very small and sometimes dark when closed off from the dining area. Of course, more area could be given to the kitchen, but that would also mean wasting a lot of square meters to empty floor area that could be used for other useful functions instead.

-CHAPTER 4-
SITE ANALYSIS

CONTENTS:

Majorna
Local context
Expansion plans
Summary of the site

MAJORNA

- LOCATION IN THE CITY -

The chosen project site is located where Slottskogsgatan transitions to Ekedalsgatan which lies approximately 3,3 km from the city center of Gothenburg.

Gothenburg is divided into four urban areas and the site is found within what the city labeled as "Centrum" (Swedish for city center). Furthermore, the city is divided into smaller primary areas and the project site is in Majorna, primary district 103 (Göteborgs Stad, n.d.).

Gothenburg's official visitor guide described the neighborhood of Majorna as "a cultural hot spot with restaurants, bars and shops aplenty. The neighbourhood derives much of its character from the typical Gothenburg houses called "landshövdingehus" that line the streets" (Storm, 2021, para. 1). Landshövdingehus can be translated to governor's house in English.

To reach the site you have several options of transportation. A bike ride from the central station takes around 20 minutes. There is a possibility to walk to the site from downtown as well but expect it to take double the amount of time or more compared to biking. A direct tram ride takes just under 20 minutes to get there. During rush-hour the trams leave every five minutes from the public transport hubs of the Central station and Brunnsparcken close by. Since the site is located out towards the ocean there is a possibility to easily reach it by biking or through public transport. Expect an additional 20-30 minutes of transport depending on the transport mode (Google maps, n.d.).

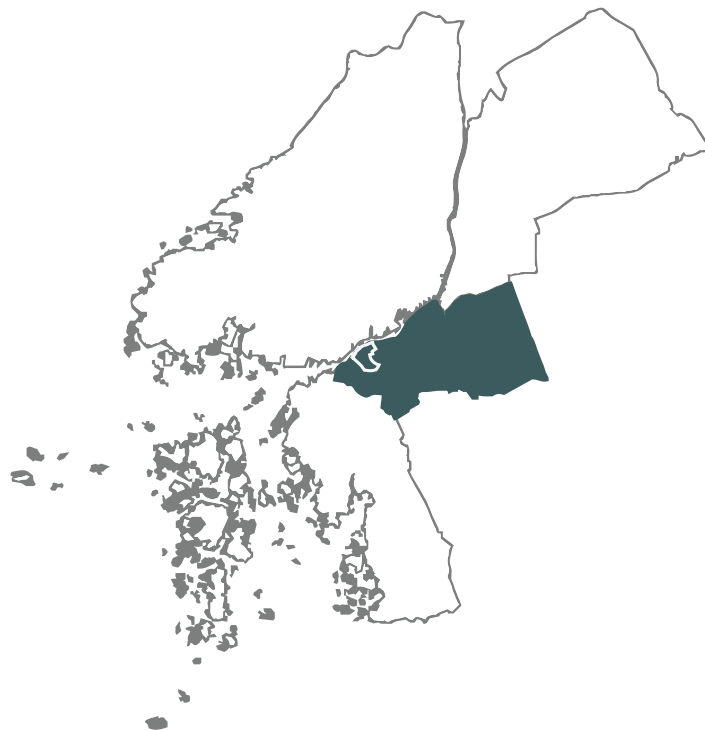


Figure 25. Map of Gothenburg with "Centrum" marked in blue and Majorna with a white outline



Figure 26. Orthophotograph of Gothenburg 2012

- MAJORNA: HISTORY -

Majorna is one of the oldest parts of Gothenburg. During the 17th century the area started growing as a suburb to the larger city. Most people in the area had some connection to the dockyards, sailing or boatbuilding. In 1868 when the district was incorporated into Gothenburg there was 11 000 people living in area. At that time most buildings were smaller in scale and built out of wood with tight margins between the structures.

In 1878 a new city plan was developed which meant that new construction in Majorna was built as square blocks of governor's houses with small courtyards. Later, in 1920, a revised city plan was drafted and further development kept the governor's house typology but allowed for far larger courtyards within the closed blocks.

Since then, the area has been developed and expanded periodically. During the 1930s and 1940s residential buildings in functionalism style (Swedish: *funkis*) was erected and parts of the hilly terrain was exploited during the 1950s (Stadshem Fastighetsmäkleri, n.d.).



Figure 27. Historical orthophotograph of Gråberget 1960



Figure 28. Collage of photos taken in Majorna

- MAJORNA: TODAY -

The district of Majorna is often described as a “city within a city” because of its strong and unique identity with lots of small shops, thriving urban life and green courtyards. It is often lifted as a good example of a mixed zoning district with good residential space in addition to several commercial locations and services.

On average, the level of income is lower of residents in Majorna than in Gothenburg, but the education level is greater. In general people bike, walk and use public transport to a greater extent than the average Gothenburg inhabitant (Göteborgs Stad - Stadsbyggnadskontoret, 2008). Approximately 10 800 people live in Majorna. The majority of the population is fairly young compared to other districts in Gothenburg. 44% of the population is aged 18-45 years old and 46-65 year old's account for 23% (Göteborgs Stad - Statistikdatabasen, n.d.).

Apartment housing is by far the most common type of accommodation. One reason to the generally young population can be because of the large amount of smaller and in many times cheaper apartments found in the area. There are few apartments that have four rooms or more (Göteborgs Stad - Stadsbyggnadskontoret, 2008).

62% of the available housing stock in Majorna are two room apartments with kitchen or smaller which is a larger percentage compared to when looking at all of Gothenburg. The absolute largest type of apartment is two room with kitchen which makes up 44%. However, when looking at apartment sizes in square meters in Majorna compared to Gothenburg things look more similar. 48% of apartments in Majorna are 60 m² or smaller while the same sizes account for 47% of Gothenburg's housing stock (Göteborgs Stad - Statistikdatabasen, n.d.).

Subsequently because of the smaller types of apartments the general household size is smaller in Majorna than in Gothenburg. Small households with one- or two-persons account for a whopping 81% with solo dwellers accounting for 54% of that (Göteborgs Stad - Statistikdatabasen, n.d.).

Other typical characteristics for Majorna is the diverse background of the population with varying socio-economic differences. People with different resource strengths live side by side. Interesting to note is the high level of education of its inhabitants while at the same time the unemployment rate is high (Göteborgs Stad - Stadsbyggnadskontoret, 2008).

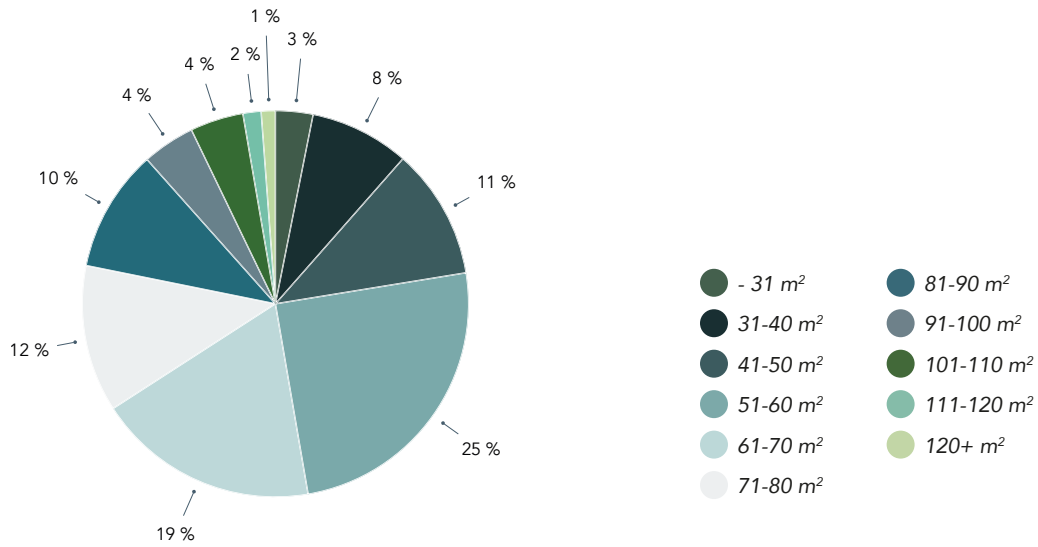


Figure 29. Apartment size distribution in Majorna 2020

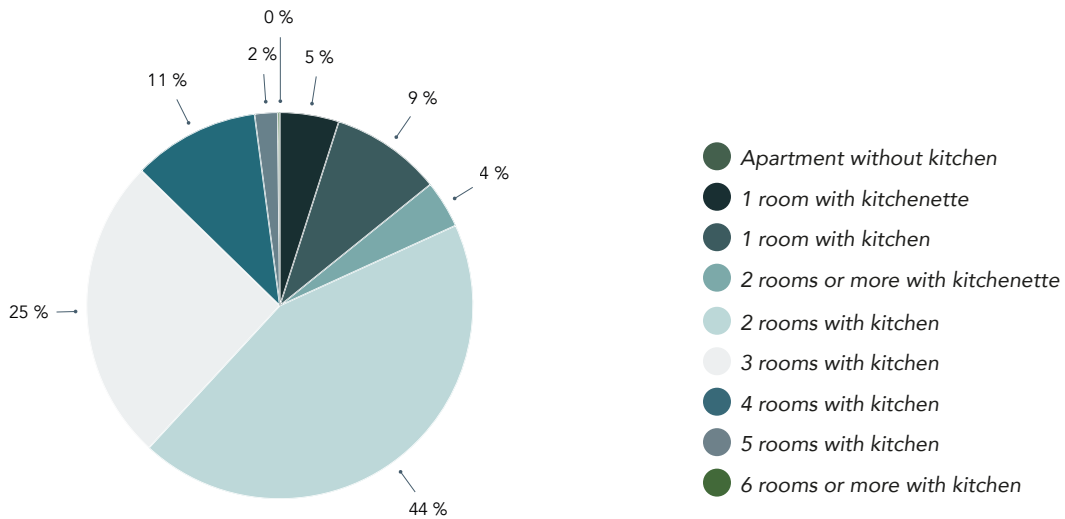


Figure 30. Apartment type distribution in Majorna 2020

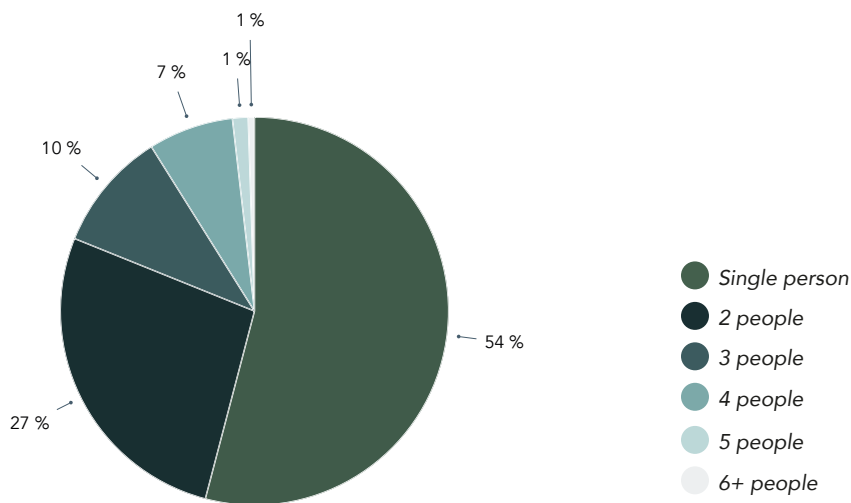


Figure 31. Household size distribution in Majorna 2020

LOCAL CONTEXT

- SURROUNDING FUNCTIONS -

The chosen site is today occupied by an electrical substation that needs to be either moved or incorporated into new development (Göteborgs Stad - Stadsbyggnadskontoret, 2011). Right next to the substation, in between it and the existing residential units to the west, lies a small recycling station which needs to be taken into consideration. In the north direction there is just a big hill of greenery and steeper rocky terrain.

In the direct vicinity you can find a pizzeria, a sushi restaurant, café and a couple of minor shops. 200 meters to the west you find Mariaplan with several shops and restaurants. There are two grocery stores within walking distance as well.

The large structure to the south-west, seen on the map in Figure 33, is the large Kungsladugårdsskolan. There are also several preschools surrounding the site which in turn means that there are a lot of children in movement in the area.

One entrance to the large green area of Slottsskogen be found south-east, a very short walk away. You can also find the allotment plots of Slottsskogen close by which contributes to nice green areas.

Several public transport stations are within a 250 meter radius around the site. At the stops of Mariaplan and Godhemsgatan you can catch the number 3 and 11 trams which both take you downtown and to the eastern parts of Gothenburg. From here you can also travel towards the sea with line 11 and Marklandsgatan, a bustling transport hub, with line 3. Line 11 also stops at Ekedal which is just 170 meters to the east from the site.

The street that runs by the plot is primarily used for car traffic, with parking situated on either side of each traffic lane. There are no dedicated bike lanes so cars and bikes share the relatively wide street. There are sidewalks for pedestrian traffic on both sides of the street.



Figure 32. Photos of chosen project site

- SURROUNDING ARCHITECTURE -

Most of the buildings around chosen site are built as Landhövdungehus and erected in early 20th century, in pre-war times. The façades of these structures mostly follow the typical Landshövdungehus-look with stone materials for the first floor, like exposed brick or covered in plaster, and with wooden facades for the remaining two.

Right next to the site and up the hill on Gråberget are some newer constructions erected during the 1950s and later. These buildings have mostly plaster facades and are slightly taller than the other building types, consisting mostly of 4-5 story buildings.

The color palette is in general very muted, with many shades of white and beige making up a large portion of the spectrum. There are also some light shades of green, yellow and red found in certain blocks. The contrasting base in bricks are often colored brown or brick-red. All roofs are pitched with an angle in between 30-40 degrees and are clad in orange-red clay tiles.



Figure 34. Collage of photos of surrounding buildings and facades. Top: Typical landshövdingehus. Middle: Facades around Mariaplan. Bottom: Newer development

EXPANSION PLANS

- EXISTING PLANS -

According to the development strategy of Gothenburg, Majorna is defined as an extension of the intermediate city. Since Gothenburg is expected to grow with 150 000 new inhabitants until 2035 there is a strong need for densification and a lot of potential in the intermediate city. For the west part of Gothenburg (where Majorna lies) it is forecasted that 700 new residential units are to be built since 2014. With a further 2500-3000 homes possible to construct after 2022 (Göteborgs Stad, 2014).

There are some undergoing development programs in Gothenburg that strives to create additional dwellings in addition to the ordinary construction. BoStad 2021 is one which aims to construct 7000 extra dwellings until 2021. By the end of 2021, over a half of the planned apartments has been built, with the remaining planned to be finished in 2023. Two of the projects in the program are located close to the project site, Fixfabriken west of the site and Godhemsberget to the north-east (BoStad 2021, n.d.).

Even though Gråberget in Majorna is not included in BoStad 2021 there are still plans to densify the area. In 2011 the city planning office of Gothenburg did a report on which areas on Gråberget is seen as potential sites of densification. In total there is a possibility to create 300 additional dwellings. The chosen project site is marked as number 4 (see figure 35) in the report and it is stated that around 20 apartments can be constructed on it (Göteborgs Stad - Stadsbyggnadskontoret, 2011).

Since several of the plots on Gråberget are limited in the amount of flat areas there is a need to use souterrain solutions and rock blasting. Since the chosen site is located towards a slightly larger street than on the top of the hill it is also indicated in the report that there should be public functions on ground level. It is not desirable to place the potential garage facing the street (Göteborgs Stad - Stadsbyggnadskontoret, 2011).

Because of the hilly terrain on the plots it may be difficult to arrange for courtyards and parking on the site. There is however just a short walk to several tram stops and Gråberget has many green areas scattered around it. Since we are in an old part of the city, the report states that new development need to be subordinate to the existing surrounding structures (Göteborgs Stad - Stadsbyggnadskontoret, 2011).

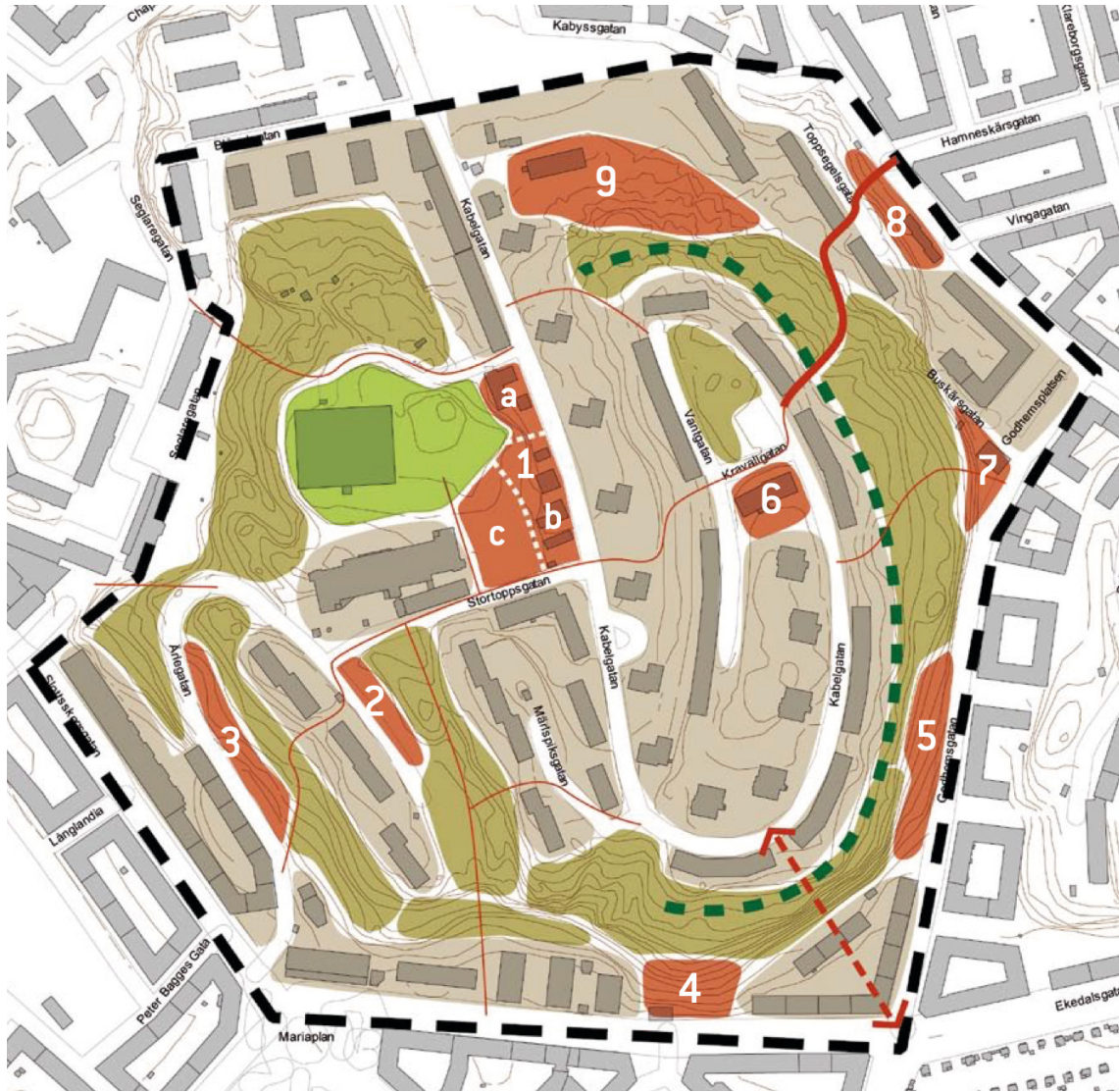


Figure 35. Development areas on Gråberget (Reprinted with permission from Göteborgs Stad - Stadsbyggnadskontoret)

SUMMARY OF THE SITE

- SWOT ANALYSIS -

The chosen site is in Majorna and in a culture rich area with people from varying background, income level and education. Even though the inhabitants are diverse, the surrounding architecture is rather homogeneous. The typical Landshövdingehus populated the majority of plots while some functionalistic buildings are found as well, concentrated on Gråberget. The color palette is mostly muted, but some foundations and first floors are in darker brick colors.

Majorna has smaller households and apartment types with fewer rooms compared to the whole of Gothenburg. This means that even though people come from different backgrounds, the type of households are very homogeneous. Larger apartments in new developments can help to diversify the types of families living in the area.

Surrounding the site are also several schools and preschools as well as a boatload of restaurants and cafes, offering a bustling neighborhood. Although, since the site is located on a side street, noise disturbance levels should be kept to a minimum.

STRENGTHS	WEAKNESSES
<p>There are very nice green areas on and surrounding the site. It's proximity to many functions is a great quality, especially the closeness to public transport. The hilly terrain is seen as a strength as it allows for innovative solutions to be made. Amazing qualities are found here since the site is oriented towards south with great solar exposure during many hours of the day.</p>	<p>A relatively small site with a steep hill which makes setting up a flat, usable courtyard very difficult. Only a limited number of building widths are possible because of the size restraints. A new building would block the view towards greenery for some residents across the street as well as passersby.</p>
OPPORTUNITIES	THREATS
<p>The site has the potential to offer very nice views towards greenery for future residents. The future building has a potential to densify the area and add values without much intervention. New services can be added to make the now quite unused street feel more alive.</p>	<p>Since parking needs to be set up on the plot a driveway needs to be built which could collide with the existing street's infrastructure. The placement right by the intersection could cause problems with noise and safety. The side towards the hill could become a very shady and unsafe place if the future volume is not plan for correctly.</p>

Figure 36. SWOT diagram

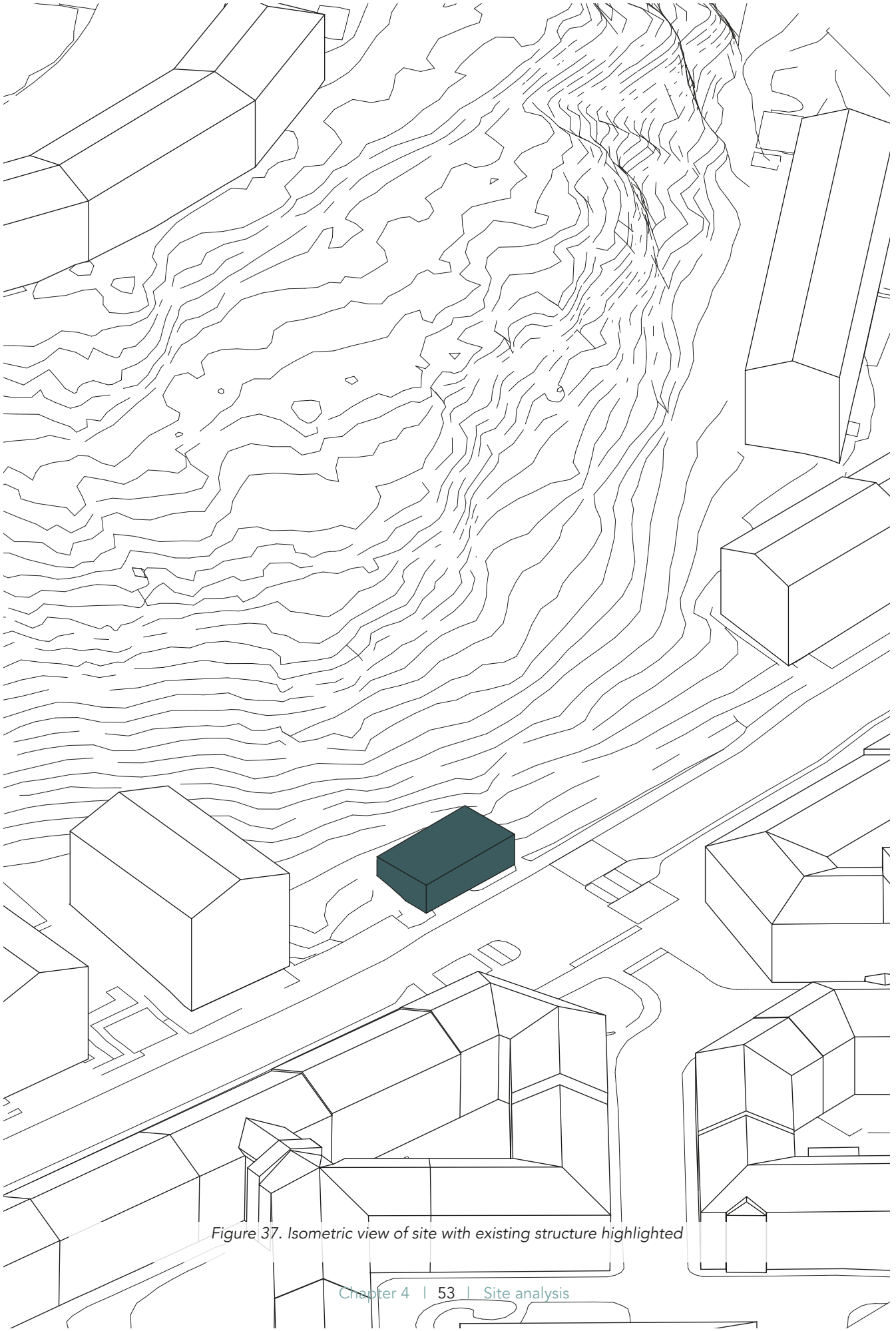


Figure 37. Isometric view of site with existing structure highlighted

-CHAPTER 5-
DESIGN PROCESS

CONTENTS:

Site studies

Concept

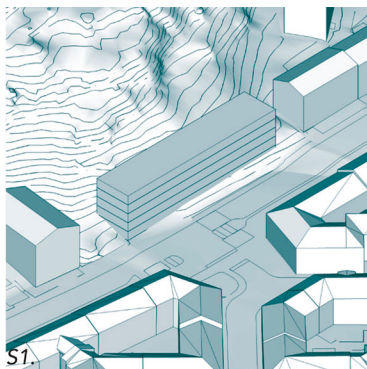
SITE STUDIES

-VOLUME STUDY-

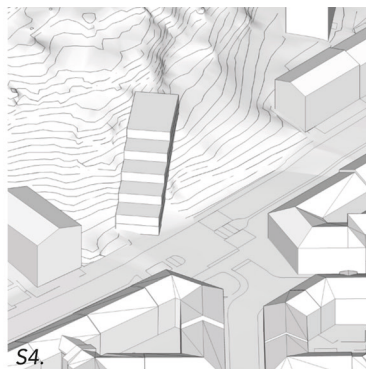
A couple of volume studies were conducted to try to visualize the possibilities the site. Firstly, a single volume was experimented on and the floors were rearranged to create different solutions. Secondly, multi and double volumes were analyzed. See below and on the opposing page for the result of the analysis.

SINGLE VOLUME

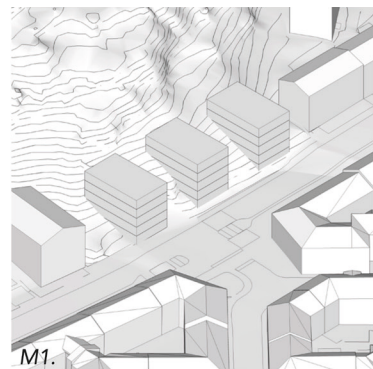
MULTI-VOLUMES



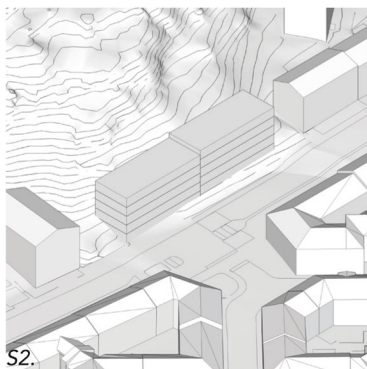
S1. Creates a barrier to Gråberget but allow many apartments.



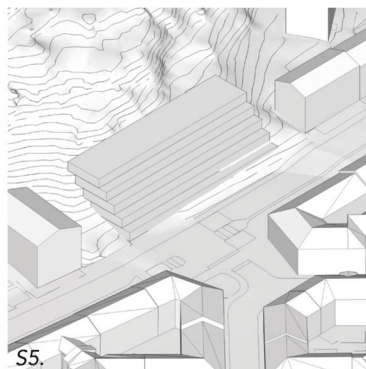
S4. Creates dark areas since the northern side is obstructed by the terrain.



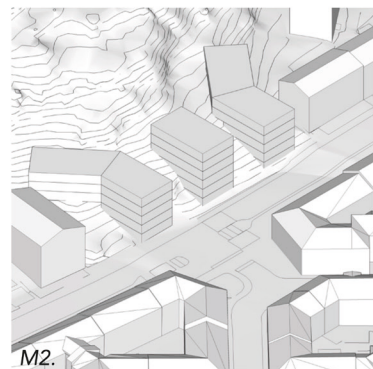
M1. Small volumes with maximum two apartments per level. Two small yards.



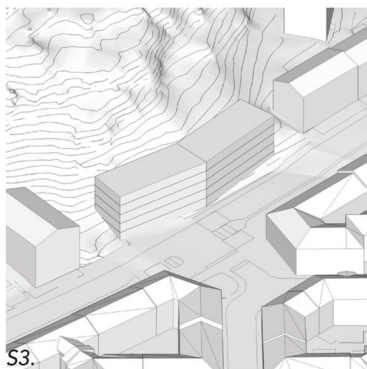
S2. Inspired by nearby buildings with different heights in a single volume.



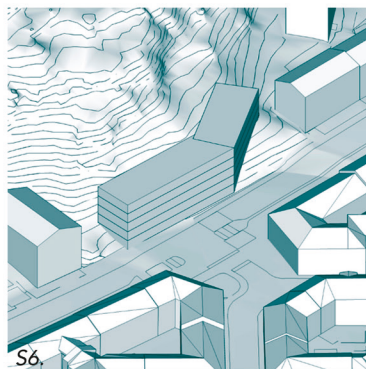
S5. A lot of dark areas are created with many single sided dwellings.



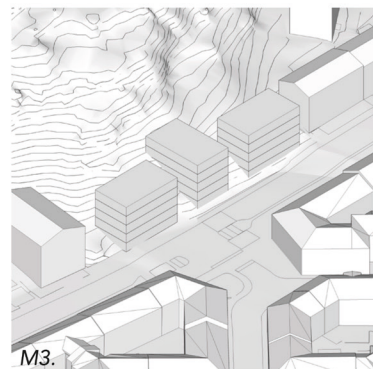
M2. Difficult to reach the back-end apartments from street level.



S3. Not related to surrounding area which makes it stand out.



S6. The angle follows an adjacent building and creates a front- and backyard.

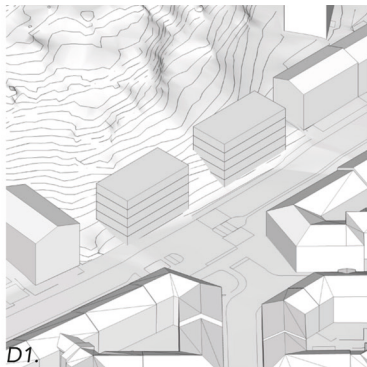


M3. Again, small volumes and small yards. Closeness between buildings.

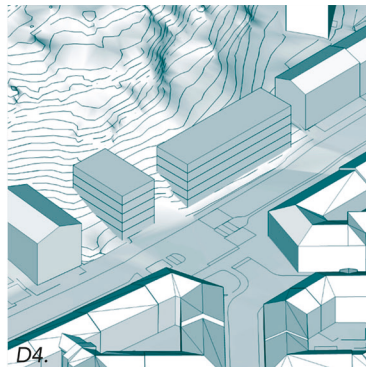
Figure 38. Volume study

The single volumes here are great because of them maximizing the available floor area for apartments. Nevertheless, they also create a barrier for the neighborhood to see and experience the greenery of the hill. Multi- and double volumes solve that problem but come with their own additional drawbacks.

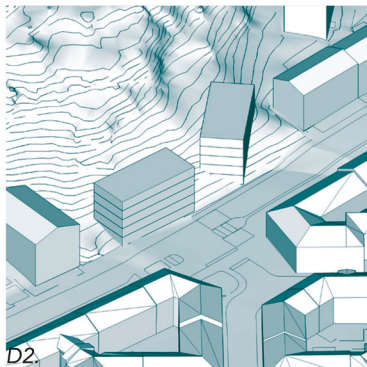
DOUBLE VOLUMES



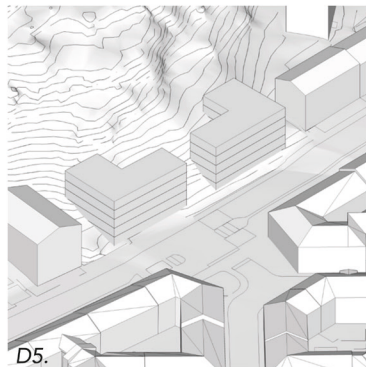
D1. *Good courtyard between volumes and does not block views of greenery.*



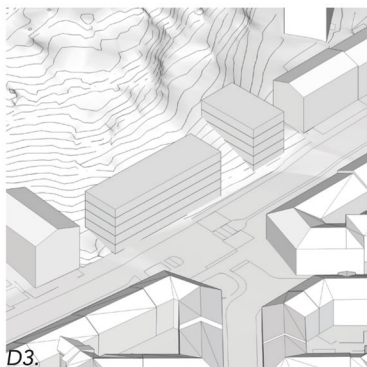
D4. *Inspired by adjacent buildings in their orientation and size.*



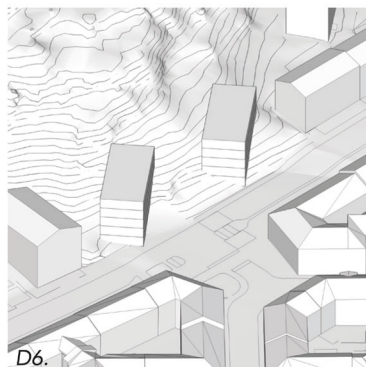
D2. *An iterative design from a previous single volume sketch but split in two.*



D5. *Aims to create an enclosed yard but ends up unsuccessfully because of hill.*



D3. *Two volumes of different character create a playful expression.*



D6. *Two parallel volumes on an angle from the street breaks the city pattern.*

Each volume uses a base width of 12 meters. Since the municipality has stated that new development should be subordinated to existing structures, the height was set at five stories. This is taller than the surrounding landshövdingehus but aligns well with the newer development on Gråberget.

The highlighted volumes (S1, S6, D2 and D4) are chosen for further study which can be found on the following pages. These were chosen because they fitted in best with the surrounding and would provide homes with many qualities. S1 is a very long volume (60 m) which acts as a blockage towards Gråberget's greenery but can fit three stairwells and many homes. S6 and D2 are similar, offering the potential to construct a frontyard but the terrain blocks a backyard for S6. D4 on the other hand comprises of two smaller units which is seen as a modern interpretation of the buildings to the west and east of the site.

- SECTION STUDY -

The four previously chosen volumes from the volume study are further analyzed in section below to examine which one relates best to the hill and the street. Each floor is given a height of 3 meters. The analysis tells us that a slim volume that follows the height lines will have their north facade covered in two stories while a perpendicular volume (see last section study) will have three stories covered.

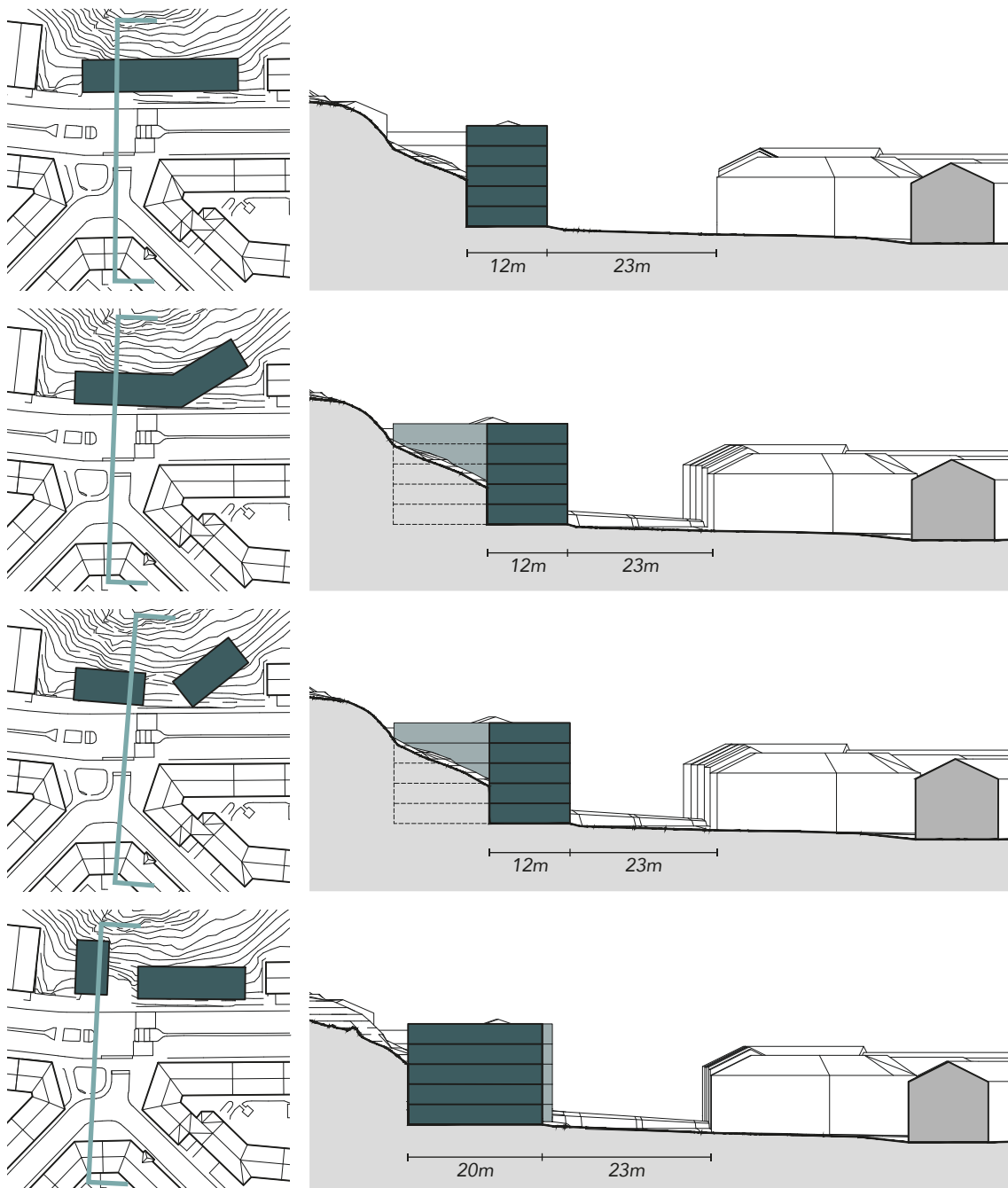


Figure 39. Section study; Site plans 1:2500, Sections 1:1000

- SUN ANALYSIS -

The sun analysis is done during three set timestamps during the 20th of March, the vernal equinox. Some conclusions from the analysis include that the split volumes of D2 and D4 offers more apartments extra exposure to sunlight because of their increased facade area. They also allow a potential courtyard to be reached by sunlight from south.

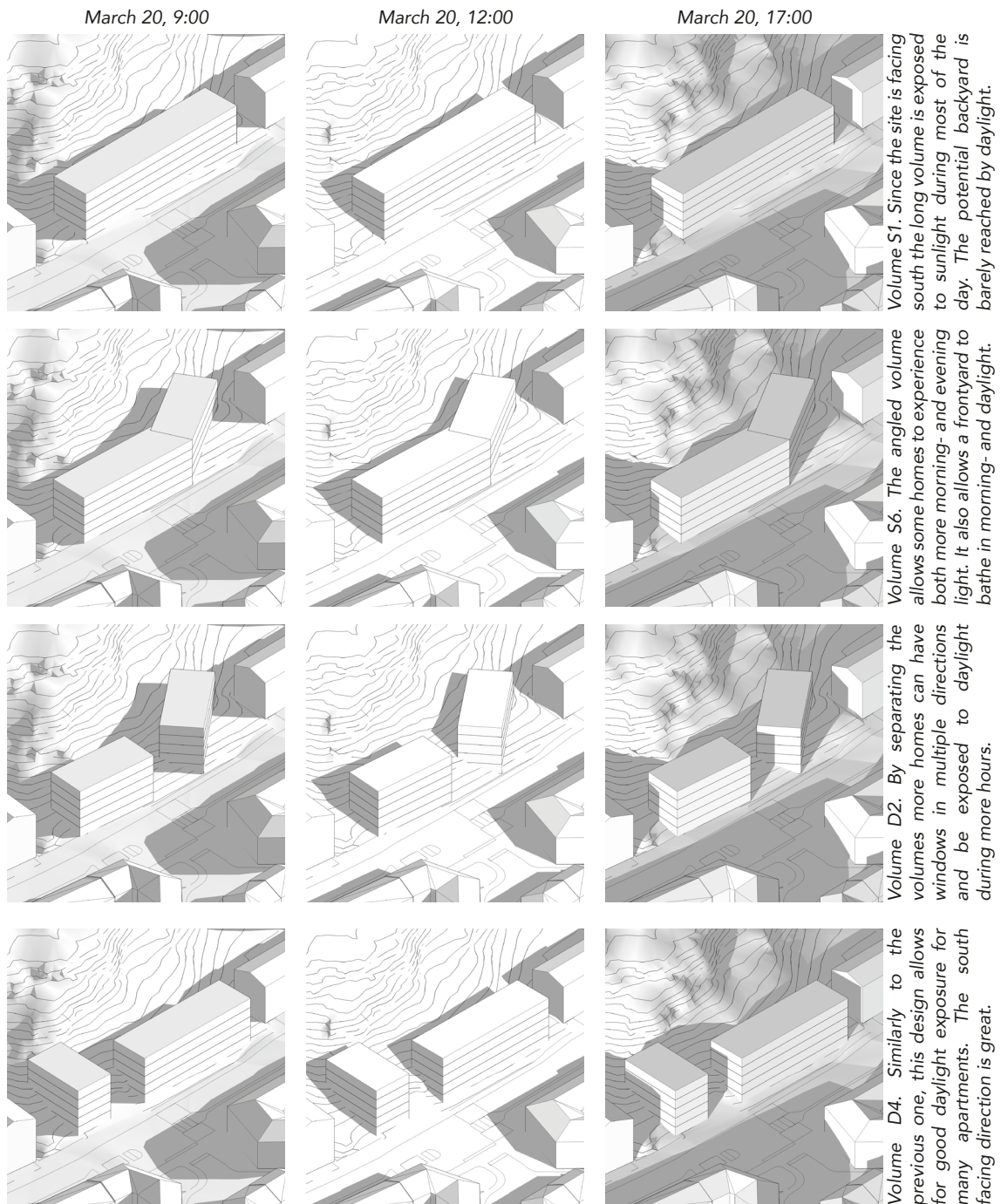


Figure 40. Sun analys

CONCEPT

- VOLUME -

Out of the previously four studied blocks, the one that best fits in with the surrounding, gave the best daylight exposure and did not block too much greenery was chosen for the design proposal. The chosen volume is D4. The floor plans will consist of many large apartments, a reaction to the small number of larger dwellings in Majorna. Over 50% of the available apartments will have two bedrooms or more, with the aim to include 3-4 bedrooms for the largest ones. All design strategies are meant to be incorporated into every home. However, the strategy regarding temporary rooms may only be possible to implement in the largest of the apartments (see chapter 3 for an in-depth description of the design strategies). The idea is that even though the apartments will be generally larger than the rest of the district, they will not be unrealistically large. For example, a one-bedroom apartment is strived to be around 55 m² in size.

Four concepts that describe the new apartment block are created and described below:

TWO IN ONE

The two volumes are connected to each other through a raised podium. On top of this base, the two four story volumes are placed and in between them there is space for a raised courtyard. The podium can house features such as car parking, technical spaces as well as public functions towards the street.

CONTINUE THE EXISTING PATTERN

The two new volumes are seen as an extension of the already established rhythm of the street. They share both some measurements as well as orientation and height with the adjacent buildings.

DIVISION

Since the typical landshövdingehus incorporate several different facades along the same block, the new development should strive for the same look. The podium is in a darker color and of a different material than the upper floors. Meanwhile, the two volumes on top should be of different colors, but match in the type of material to still tie them together.

FIT IN WITH THE SURROUNDING

To blend in with the neighborhood the new building should share some characteristics with the surrounding buildings. The facades should be closely connected to what can be seen around the site. The podium is to be clad in a tactile material of a somewhat darker color to mimic the other buildings around. The upper floors can be of wood, plaster or brick in muted and earthy colors.

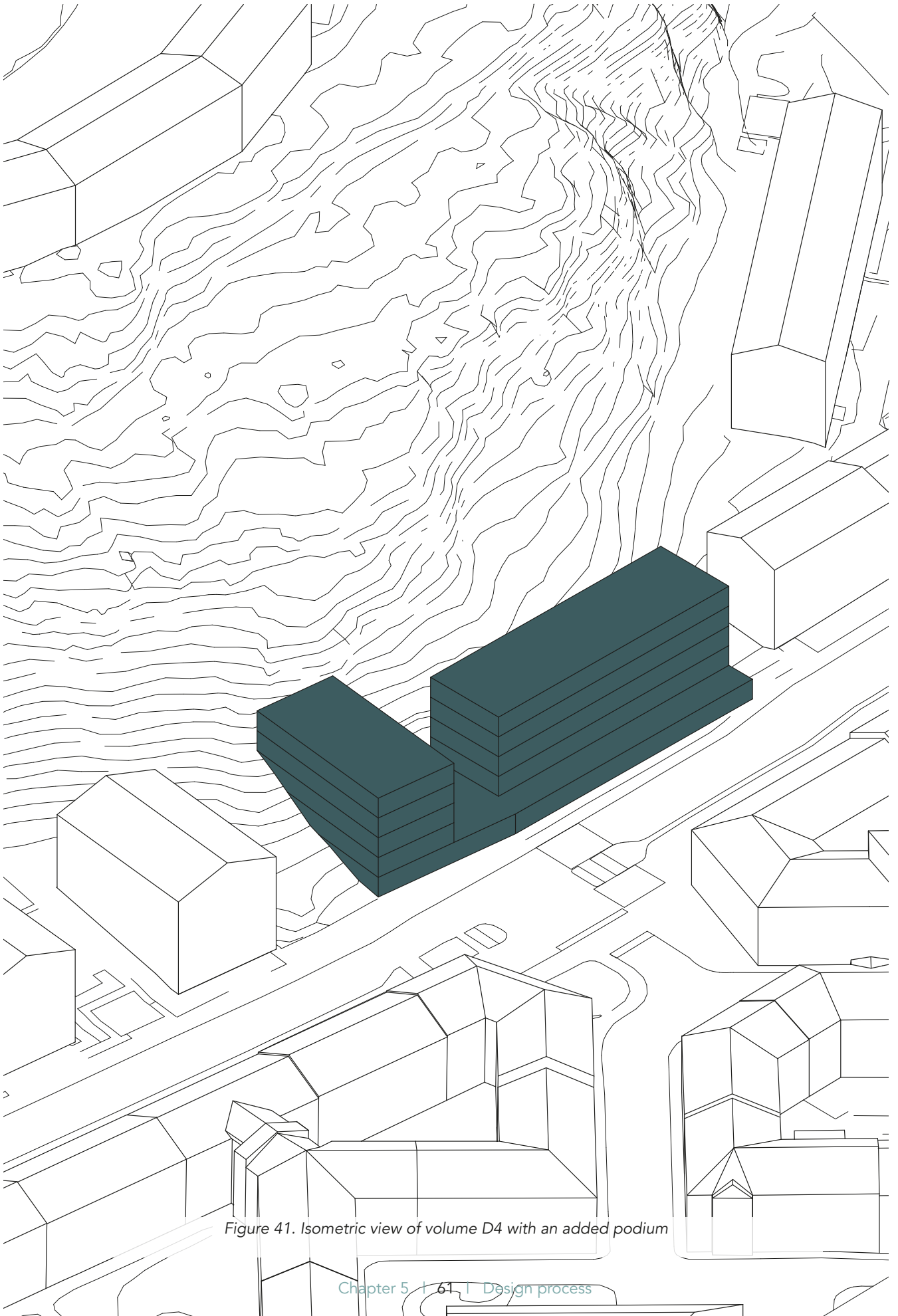


Figure 41. Isometric view of volume D4 with an added podium

-CHAPTER 6-
DESIGN PROPOSAL

CONTENTS:

Site plan & volume

Floor plans

Apartments

Facades & section

Perspectives

SITE PLAN & VOLUME

- FITTING IN WITH THE SURROUNDING -

The proposed building can be seen below in an isometric view (Figure 42) and on the opposing page in the form of a site plan (Figure 43). As visible, the new addition acts as a transition piece that heals the previous gap found in the rhythm of the street. The left side of the volume continues the pattern of the street facing gables found west of the site. It is placed so that it is repeating the distance found between the old buildings (ca. 16 m). Meanwhile, the right side of the proposed volume aligns with the long volume found east of the site. A raised courtyard acts as a podium that supports the two upper volumes. The podium aligns with both the buildings to the west and the fenced off frontyards of the buildings to the east, further strengthening the already established rhythm of the street.

A sitting stair is added in between the two volumes which is facing directly south. The idea is that this, together with two public functions on the ground level, are adding something back to the neighborhood since some green areas are taken away by the new construction.

As seen below (Figure 42) and on the next spread (Figure 44), the main entrances to the building are placed within niches that embrace the resident or visitor when arriving and keep them out of the rain during typical Gothenburg weather.

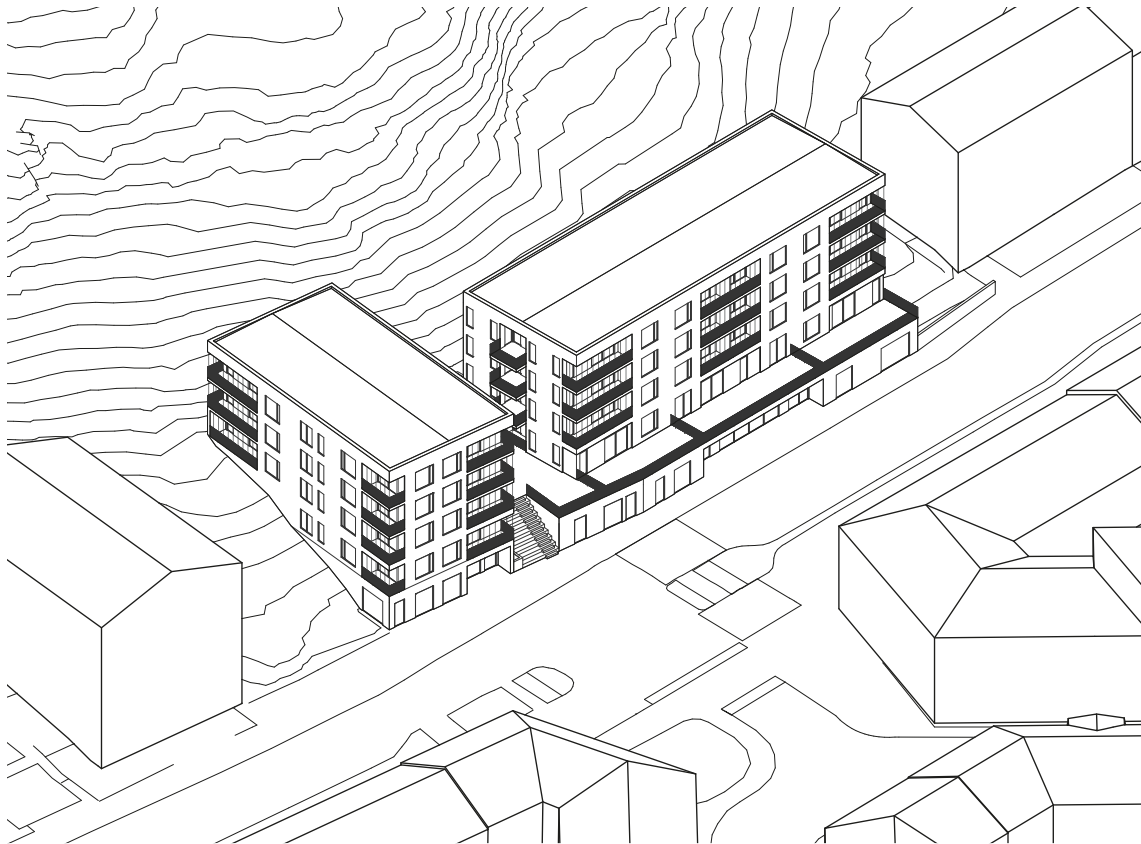
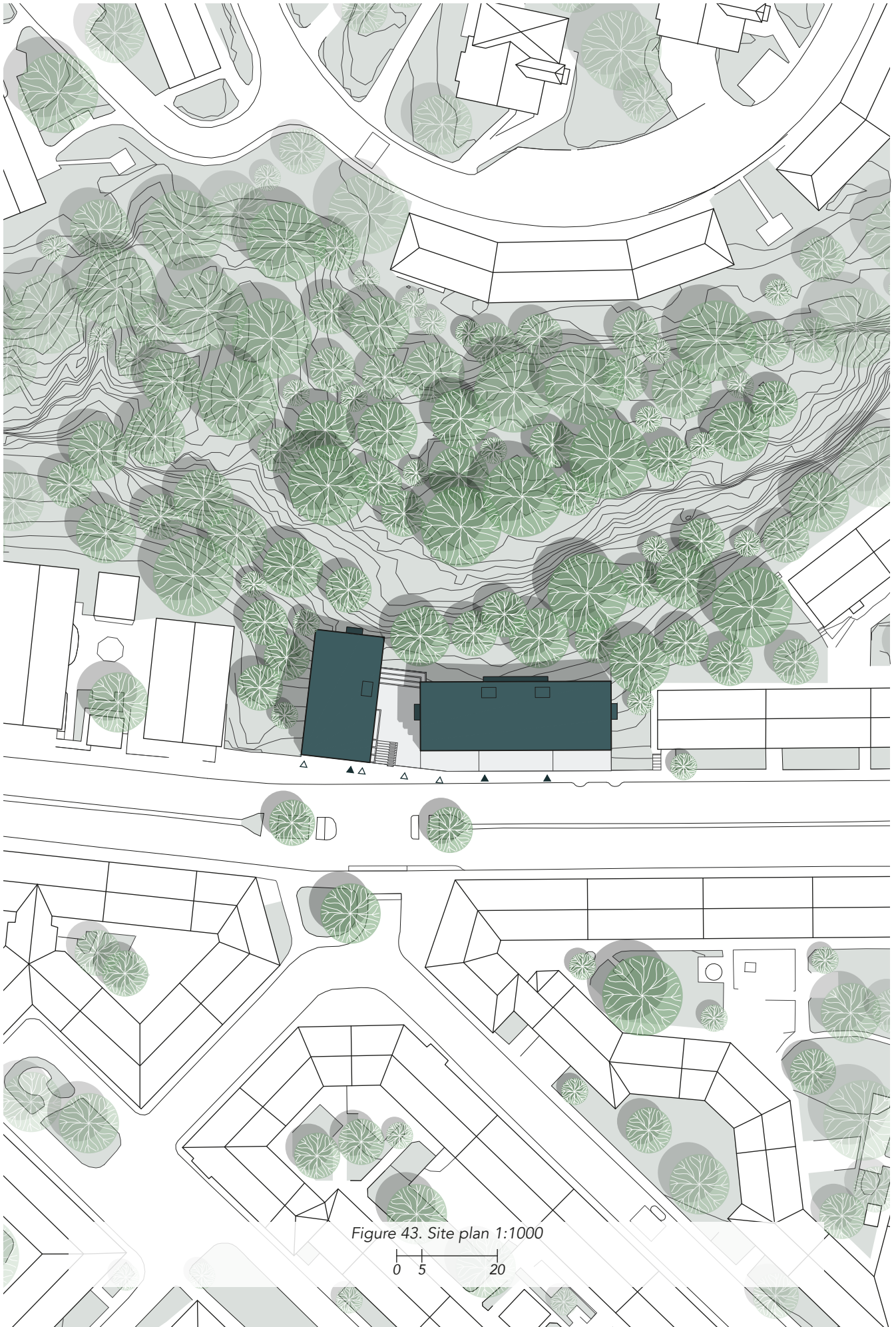


Figure 42. Isometric view of design proposal



54 bicycle parking spots in double-decker storage racks make a ratio of 2.07 spots per apartment.

Two public, lettable premises are incorporated into the design.

Niches by the entrances embraces you as you approach the building.

The recycling room is placed in between the two volumes to allow for easy access.

The public functions are placed strategically in the optimal spots.

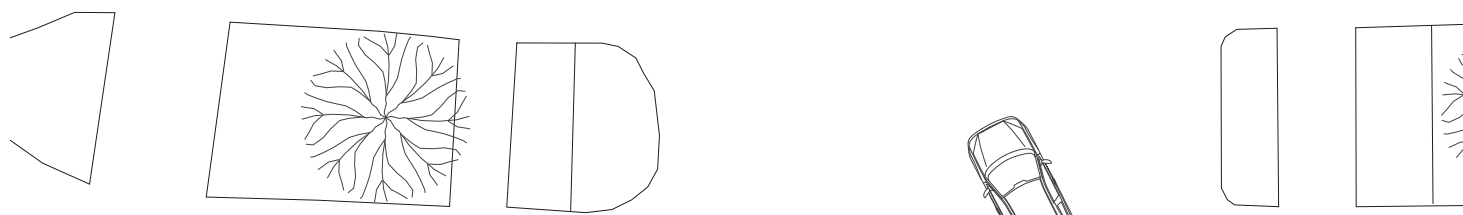
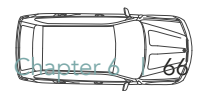
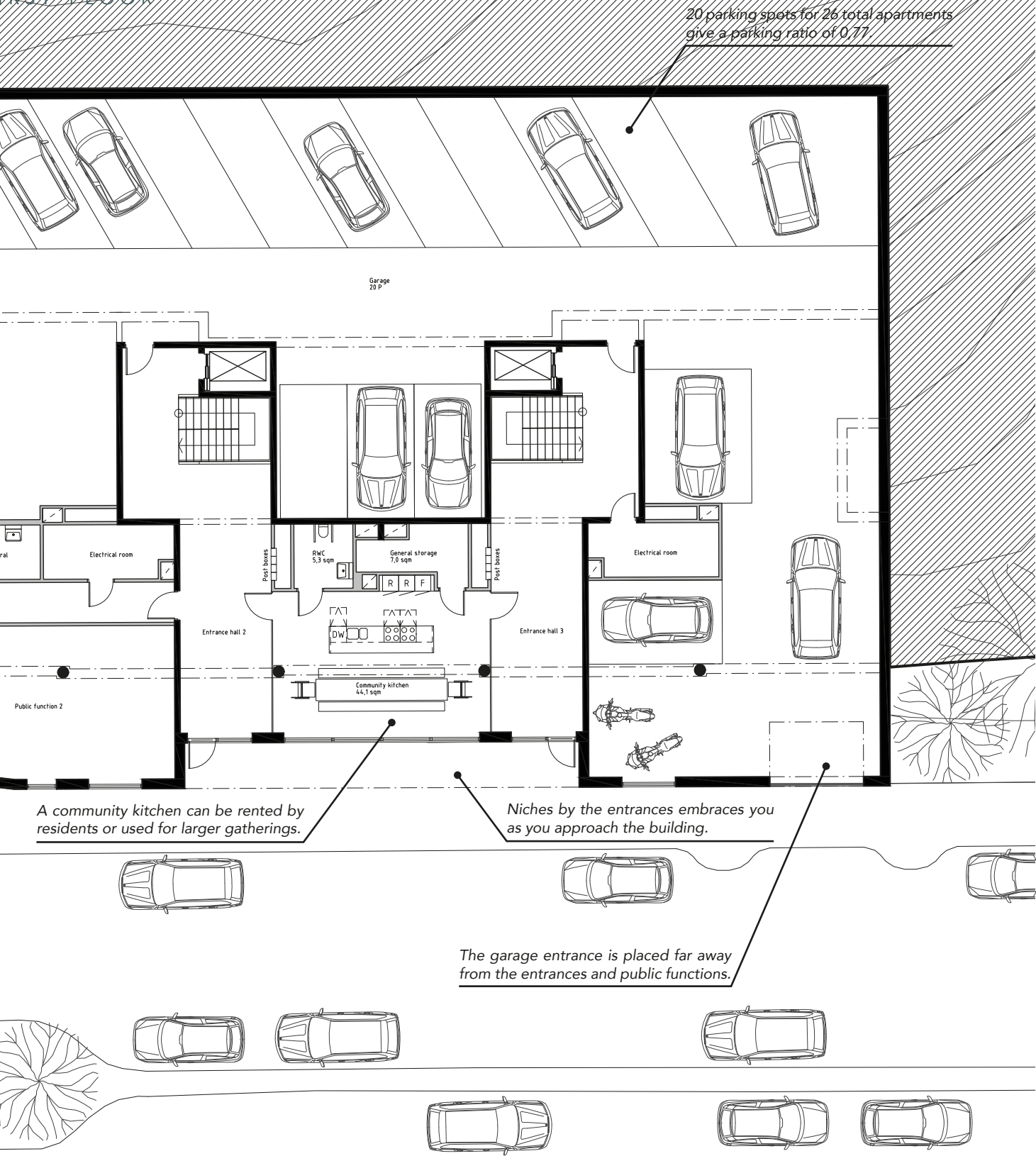


Figure 44. Ground floor 1:200



PLANS

FIRST FLOOR



20 parking spots for 26 total apartments give a parking ratio of 0.77

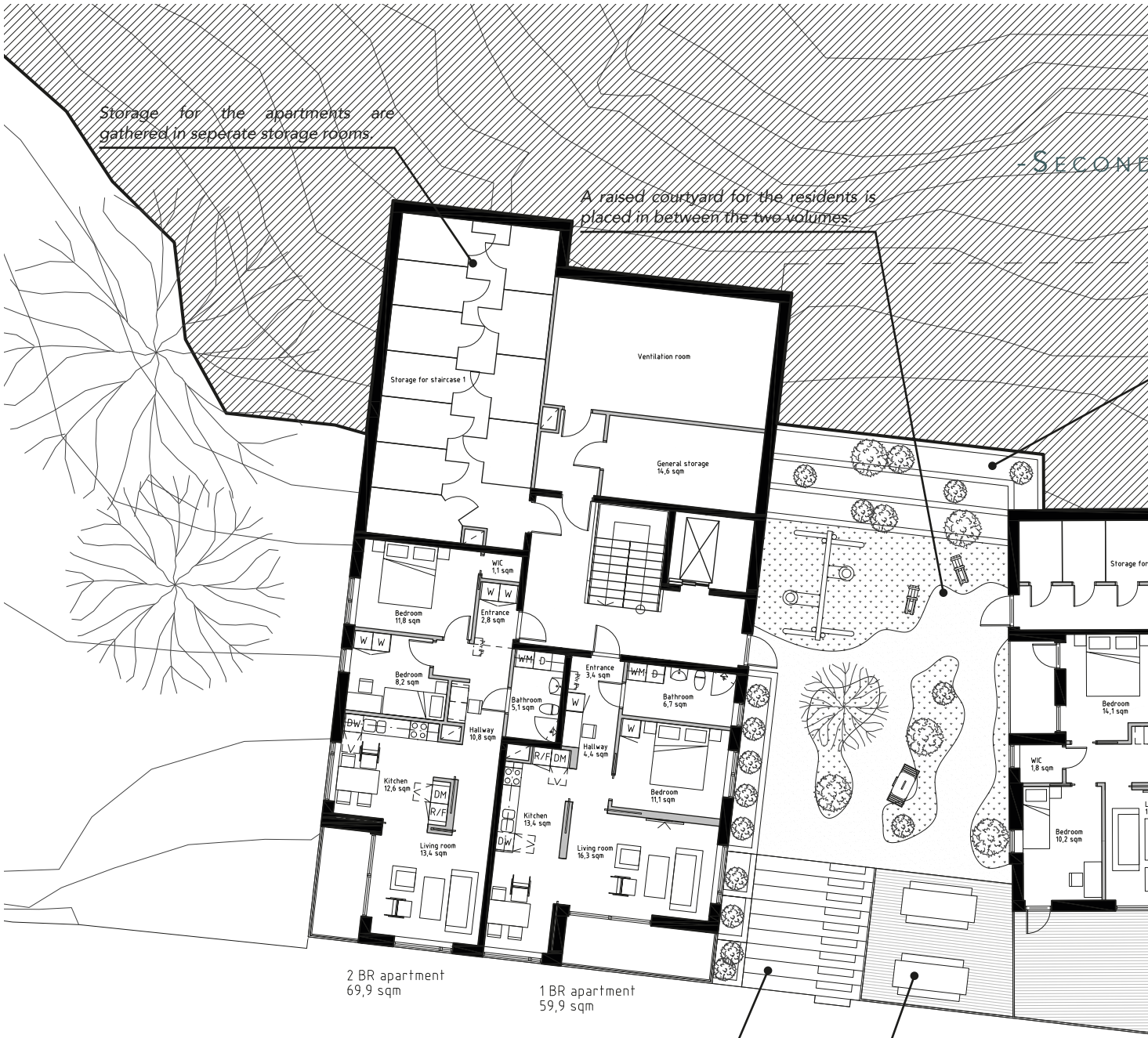
A community kitchen can be rented by residents or used for larger gatherings.

Niches by the entrances embraces you as you approach the building.

The garage entrance is placed far away from the entrances and public functions.

Storage for the apartments are gathered in separate storage rooms.

A raised courtyard for the residents is placed in between the two volumes.



2 BR apartment
69,9 sqm

1 BR apartment
59,9 sqm

A public sitting-staircase is incorporated into the design facing directly south.

The courtyard includes a playground, greennery, a BBQ and some seating.

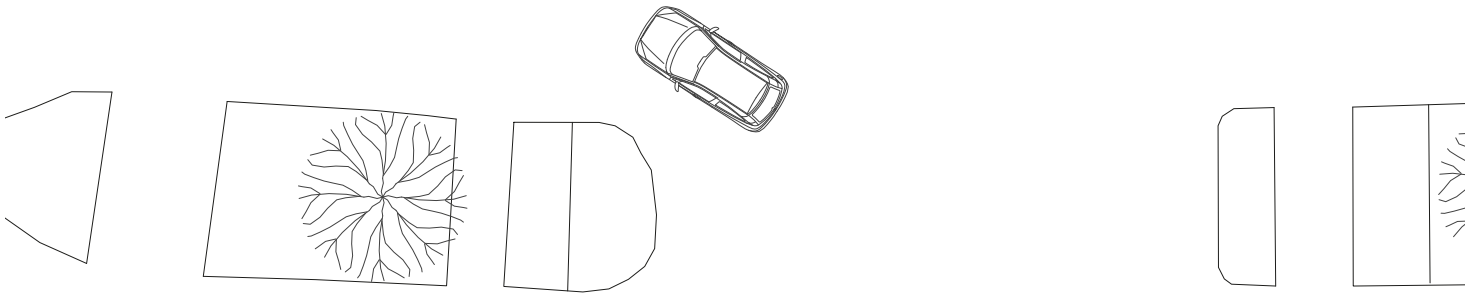
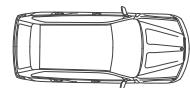


Figure 45. Second floor 1:200

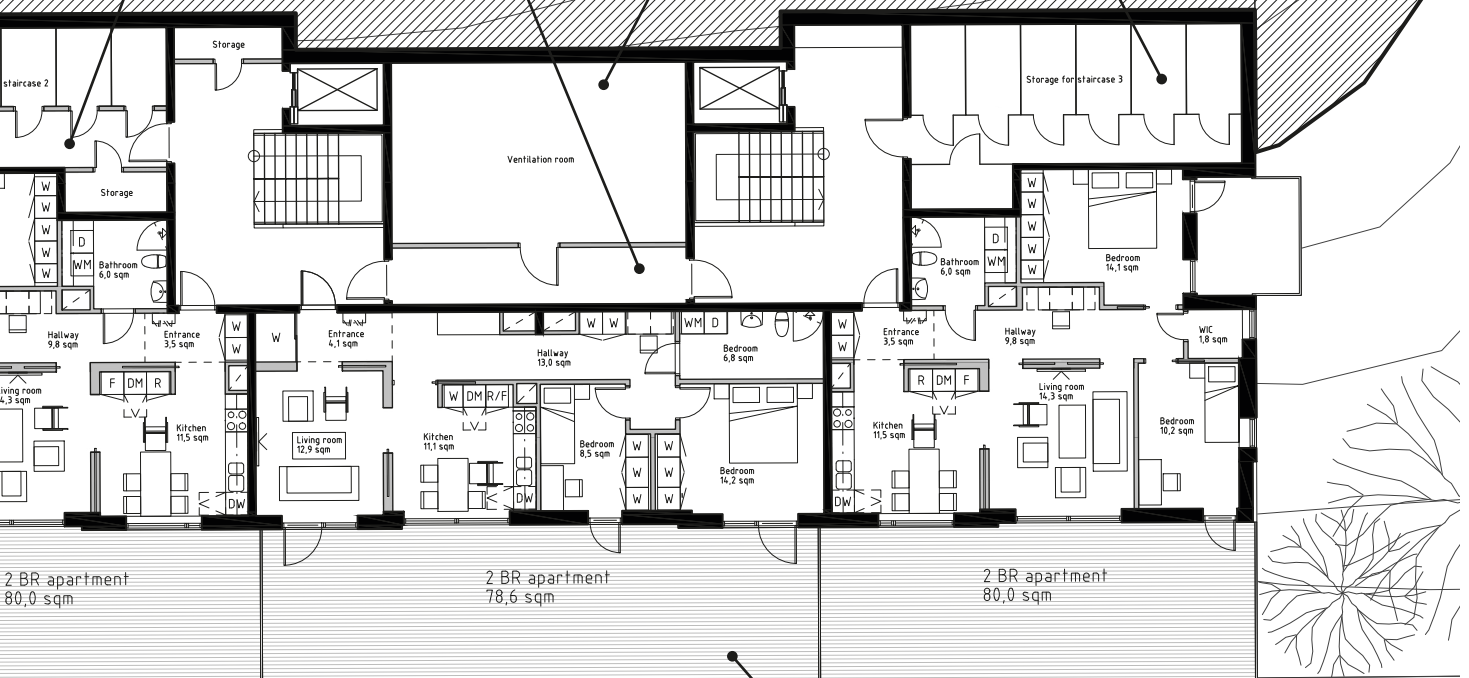


FLOOR

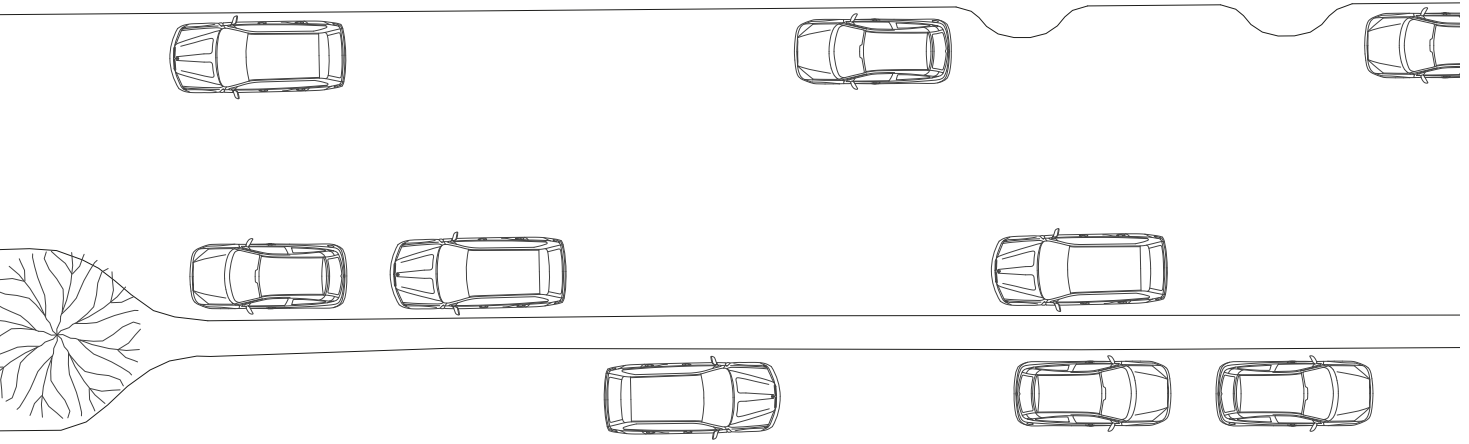
Some terraced planters make the hilly terrain not seem so steep.

Passageways are added to allow access to the courtyard from all staircases.

Storage and tech is placed on the dark, ground-facing side of the first floor.



Floor 2-5 is setback from the ground floor, creating large terraces for some homes.



- SECOND FLOOR -

The second floor (seen on the previous spread) consists of both apartments and additional support functions that could not fit on the ground level. These include storage rooms for the apartments, tech functions and general storage facilities. These functions are placed towards the backside of the building, which on the second level is also covered by ground and therefore not suitable for apartments. Some of the apartments on this level are adaptations of the homes located on the typical floor. These homes are given large terraces since the volume of floor 2-5 is setback from the podium level to align with the building next door.

There are secondary entrances to the two volumes from the raised courtyard and a passageway allows all staircases to have access to the yard. The courtyard serves several functions in a small space. The residents have access to a playground, a BBQ, some seating area and they can also enjoy the greenery.



Figure 46. Typical floor 1:200

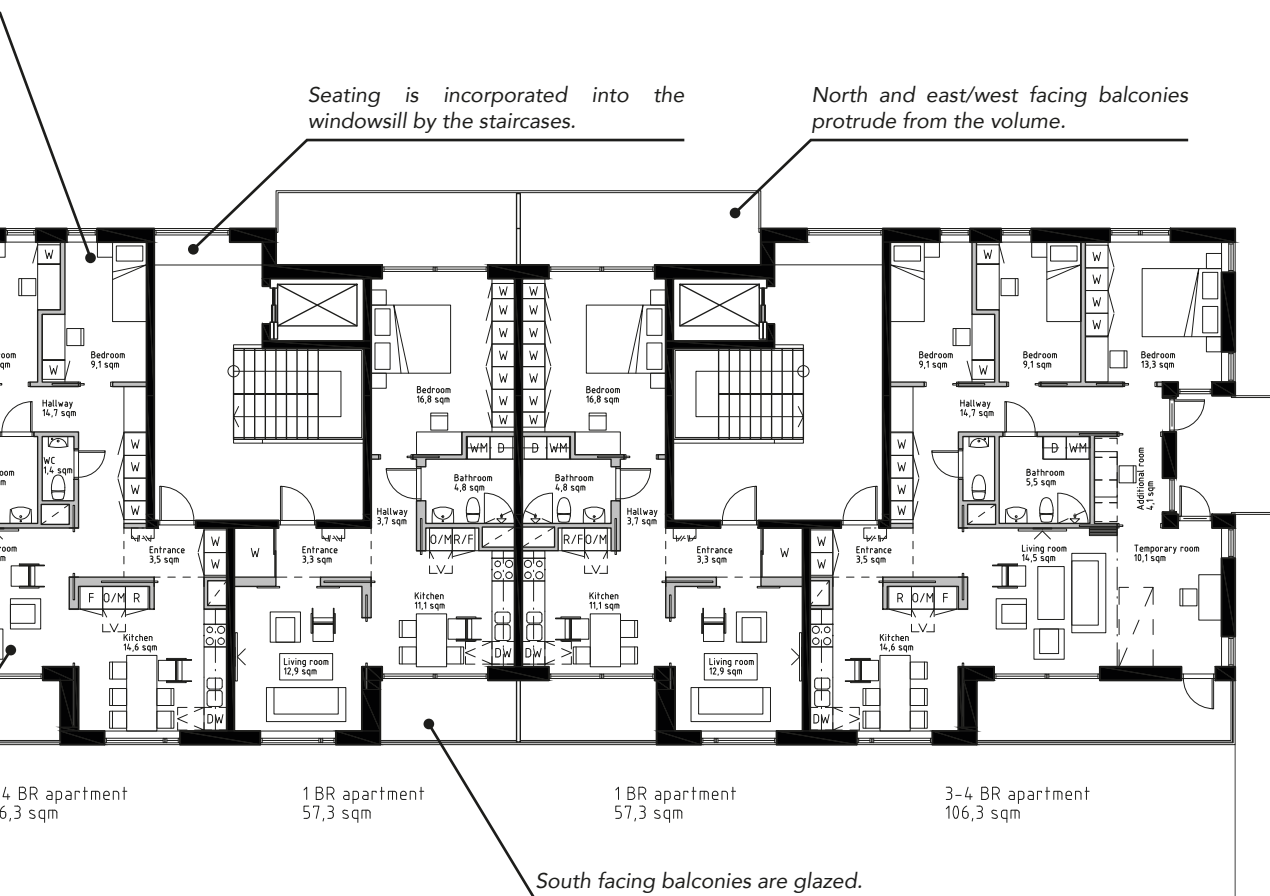


- TYPICAL FLOOR -

The typical floor (floors 3-5) consists exclusively of apartments. Out by the staircases there is a seating area incorporated into the windowsill. In the left volume, there are three apartments per floor. In the second volume, there are four apartments per floor reached by two staircases. A mix of sizes and apartment types was strived for so that the building will be inhabited by different kinds of families. A large apartment of roughly 106 m² with 3-4 bedrooms (depending on how the temporary room is used) is found by each staircase. Also, a smaller 1-bedroom apartment is placed by each staircase. Finally, and only for the left volume, a small 2-bedroom apartment has been added.

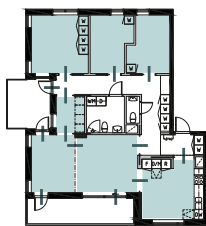
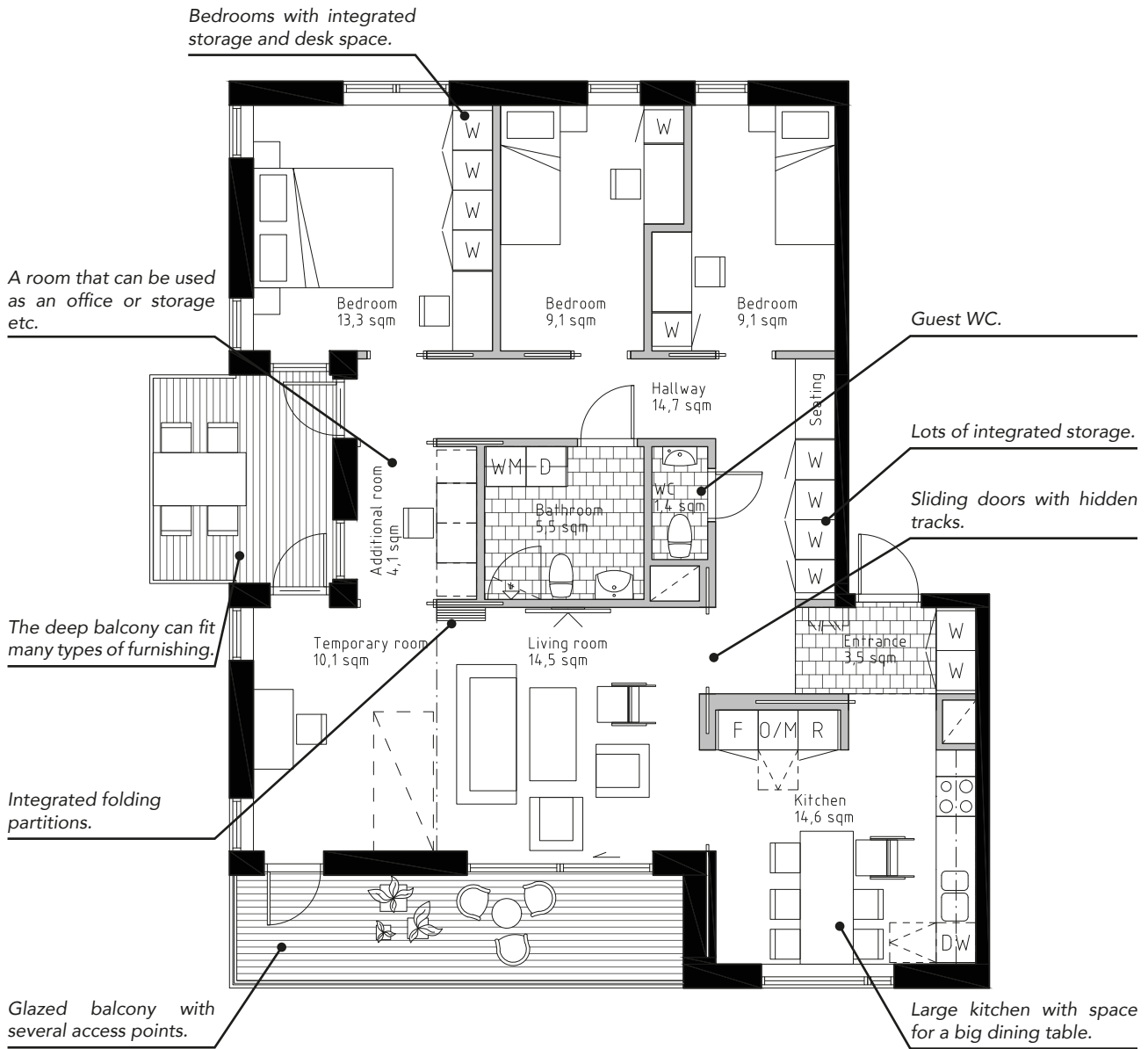
All apartments have at least one balcony facing south or west to receive the best sunlight conditions. Since most of these are facing the street, they have been glazed which helps preventing the disturbing noise levels as well as extending the usability for several months. Additionally, some apartments have a secondary balcony, which extends past the volume's borders to allow greater sunlight conditions since they are otherwise facing undesirable directions.

A selection of the apartments is visible in a larger scale on the following pages.

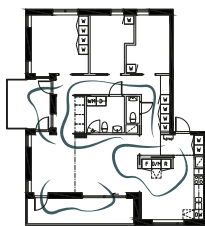


APARTMENTS

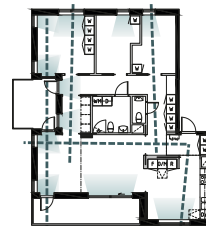
- APARTMENT 1: 3-4 BR IN 106 M² -



Connections and openness



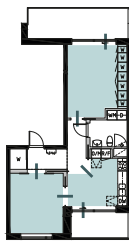
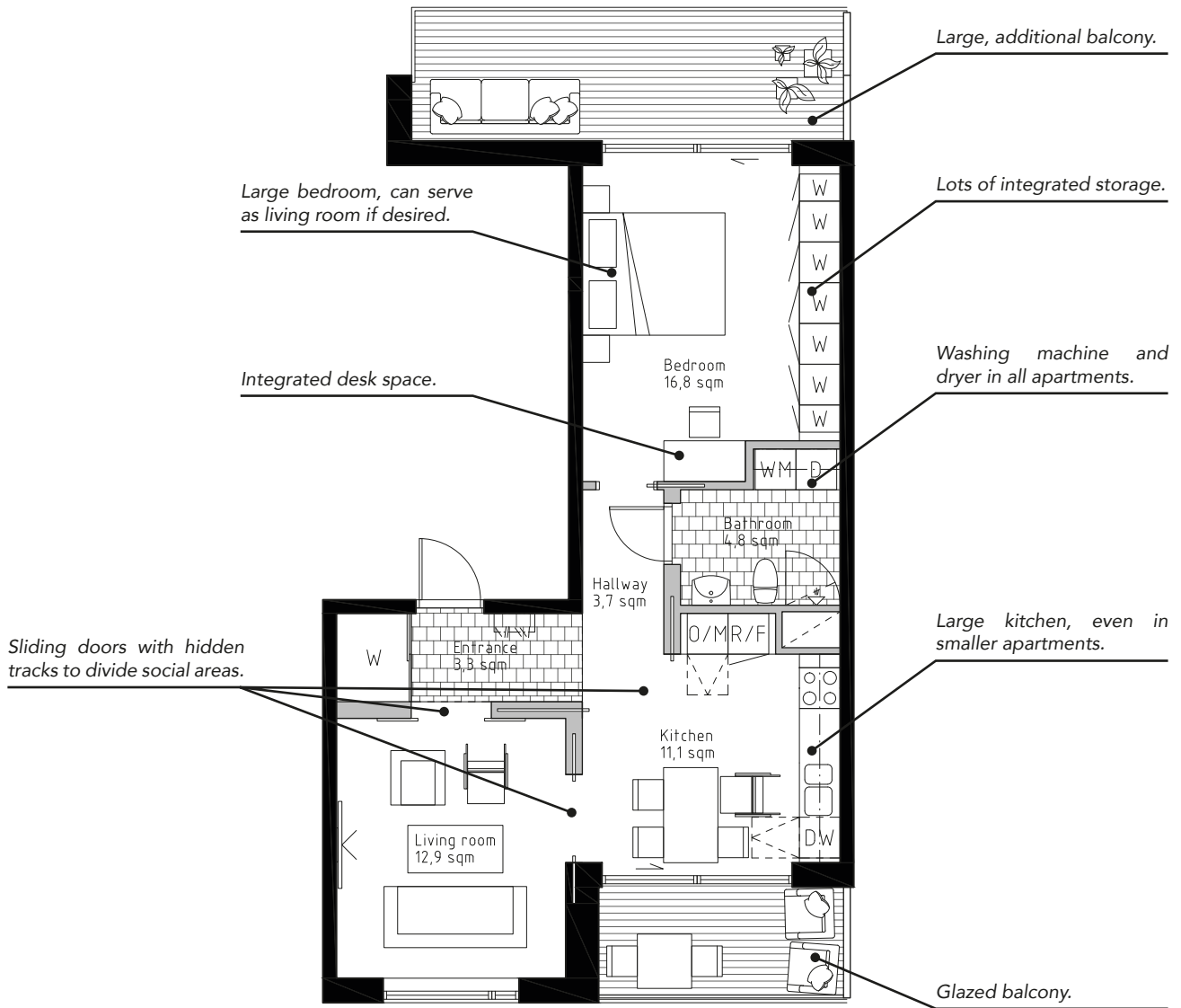
Circulation & movement



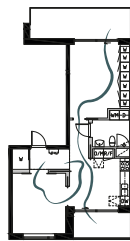
Light & sightlines

Figure 47. Apartment 1 with three design principles

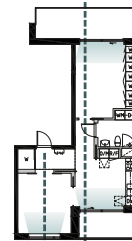
- APARTMENT 2: 1 BR IN 57 M² -



Connections and openness



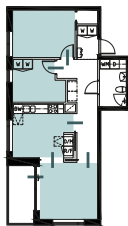
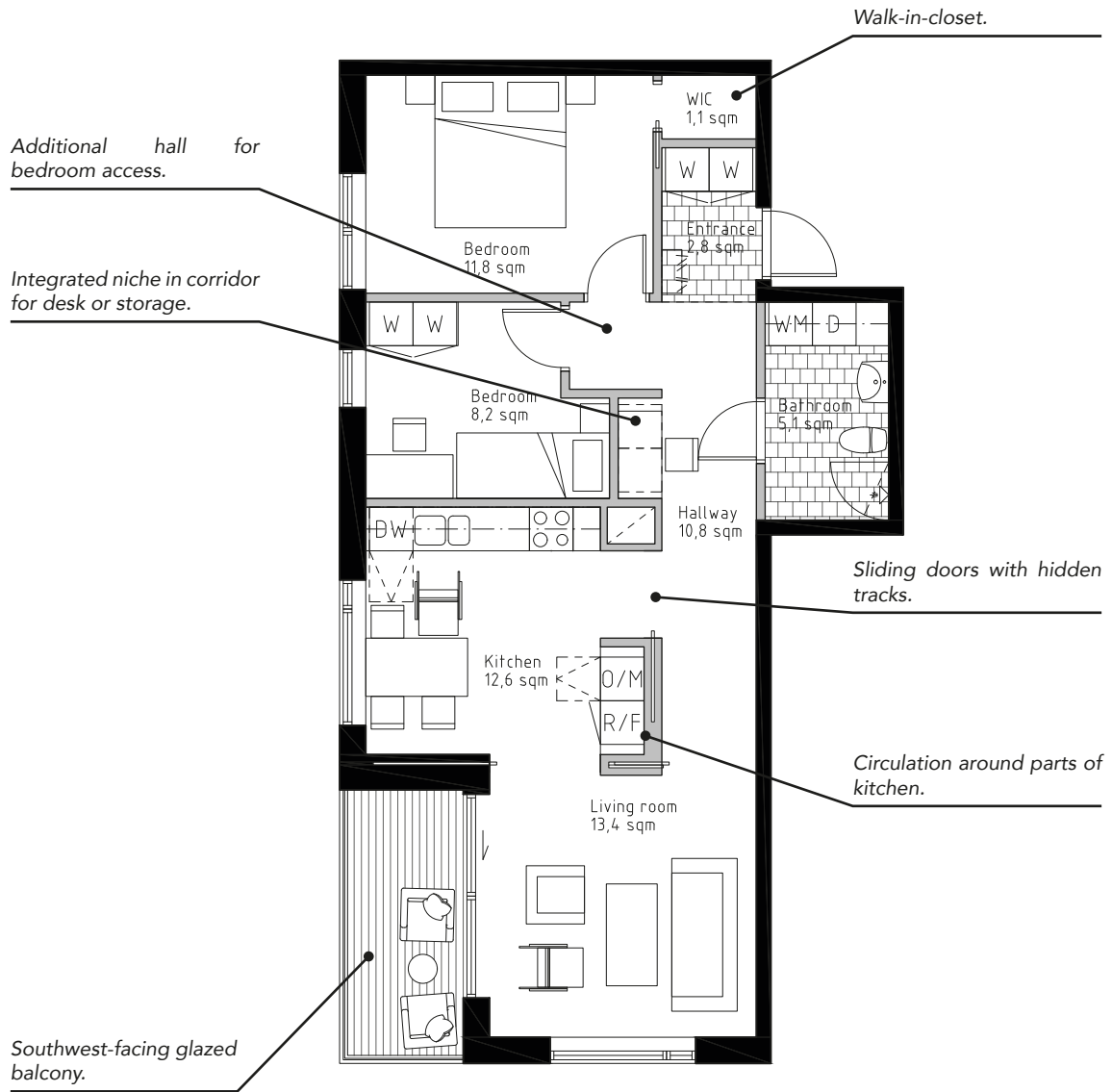
Circulation & movement



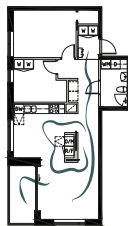
Light & sightlines

Figure 48. Apartment 2 with three design principles

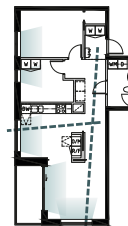
- APARTMENT 3: 2 BR IN 70 M² -



Connections and openness



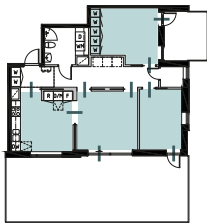
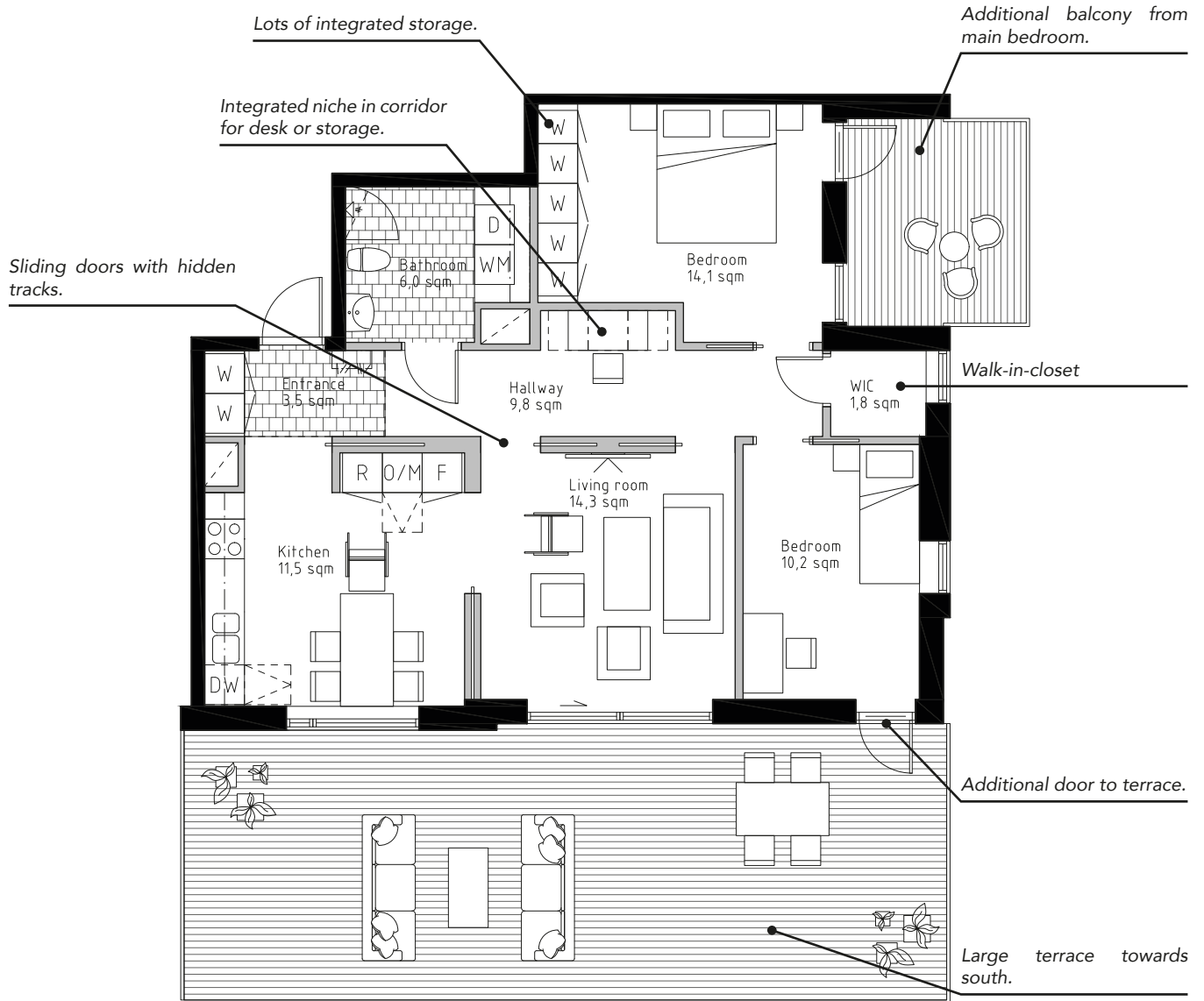
Circulation & movement



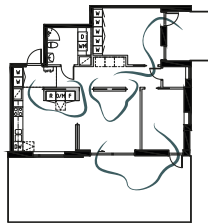
Light & sightlines

Figure 49. Apartment 3 with three design principles

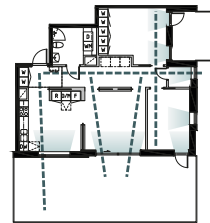
- APARTMENT 4: 2 BR IN 80 M² -



Connections and openness



Circulation & movement



Light & sightlines

Figure 50. Apartment 4 with three design principles

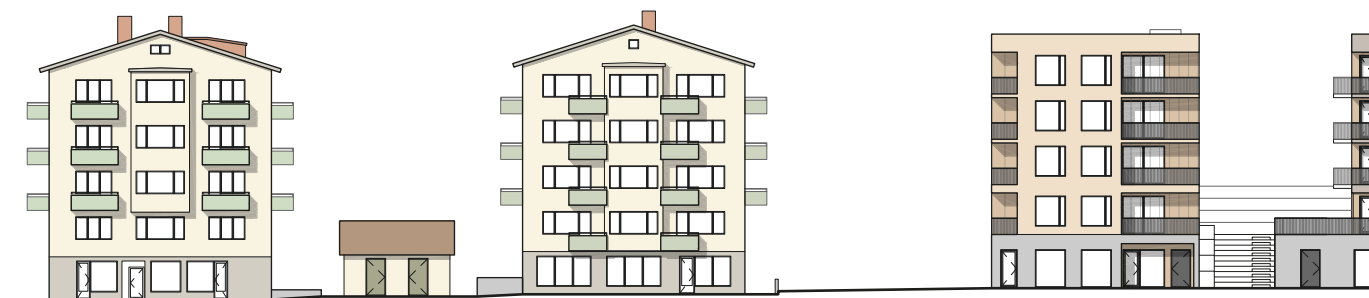


Figure 51. Street facade 1:500



Figure 52. South facade 1:200



& SECTION

FACADE-



- FACADES -

To blend in with the surrounding facades, a podium was created in a contrasting color and material to the above floors. The podium is in in-situ-cast concrete in a natural concrete grey color to fit in well with the stone facades of the ground floor of the two adjacent buildings (see Figure X on previous spread). The upper floors of the two volumes are both in brick but in different colors. The bricks are from Petersen Tegl and from their Kolumba line of bricks. Specifically, Kolumba 71, a nice beige/yellow brick is used for the western volume and Kolumba 91, a grey type is applied to the eastern volume. They both contrast the in-situ concrete well and fit in well with the existing, surrounding color scheme.

To contrast the rigid brick, the walls around the balconies are clad with SIOO:X treated pine wood paneling, softening the expression of the building somewhat. Railings, window frames and doors are clad in anthracite colored aluminum.



Figure 53. East facade 1:200



- SECTION -

The ground floor is given an interior room height of 2,9 m to give it a more public appearance than the other floors. A slab of 600 mm separates the ground floor from the second floor giving the raised courtyard and terraces a desirable distance from the street. The thick slab also allows enough insulation to be incorporated for the parts which are protruding. For the apartments, a general room height of 2,7 m is used, giving great qualities and an airy feeling. Windows to the balconies go from the floor up to a height of 2,5 m, letting in lots of light. All the other windows have a sill height of 0,5 m and stretch to the same height of 2,5 m as the balcony ones, keeping them cohesive.

Interior doors are given a slightly taller than average height of 2,3 m, giving a more luxurious feeling. Also, all of the room dividing sliding and folding partitions go all the way up to the ceiling with hidden tracks to make them seem invisible when open.



Figure 54. Section 1:200



PERSPECTIVES

- EXTERIOR -



Figure 55. Entrance & public sitting stairs



Figure 56. Corner of building

- INTERIOR -



Figure 57. Balcony



Figure 58. View from entrance in 106 m² apartment



Figure 59. Living room in 106 m² apartment



Figure 60. Looking east onto proposed building



-CHAPTER 7-
DISCUSSION

CONTENTS:

Conclusions

Reflections

- CONCLUSIONS -

This thesis took its point of departure from the Covid-19 pandemic that struck the world about two years ago. At the time of writing, most restrictions have been eased in Sweden and people are slowly getting back to their normal daily schedules. However, a lot of people are not going back to how things used to be. Many people saw that it was possible to conduct their work and studies from home, enjoyed it and plan on keeping staying home during more hours of the day. In this thesis I have tried to solve some of the problems that arise when more people stay at home at the same time. Typical apartment layouts of today often incorporate an open-plan layout which simply does not support parallel activities. Open-plan apartments causes problems to residents since they cannot conduct their work from home in private whilst another household member tries to watch TV, work out or cook etc.

General requirements to have an apartment that supports parallel activities by its dwellers is to have at least 50-60 m² of floor area available and that rooms and functions are separated by walls and doors. Spaces that share several functions do not support parallel activities well, or at all. The thesis defined six design strategies that all work towards supporting parallel activities. These are: utilizing a hallway or corridor typology, implementing a high quality kitchen, adding good outdoor space, implementing circulation, working with openness/closeness and lastly, adding a temporary room (see chapter 3 for detailed descriptions of the strategies).

The strategy that solves the most problems regarding parallel activities is the implementation of a neutral hallway that serves as the main access point to all the home's functions. This neutral area can be trafficked by several dwellers at once without having any consequence of disturbing any activities happening inside other rooms. However, as it is brought up previously in the thesis, an open-plan layout is very favorable by residents and the typology has many qualities, just none that can be associated with parallel activities. Therefore, it was important to try to keep some of the feelings associated with an open-plan in the design project and through the definition of the design strategies. Fluid space between social areas can create a good balance between openness and closeness. It turned out that large sliding and folding partitions that went from floor to ceiling offered the opportunity to feel invisible and create large open spaces when tucked away.

The design project proves that it is possible to design apartments that are way better at supporting parallel activities than typical apartments of today. It also proves that the plans by the municipality to densify Gråberget is possible. Although it could be a bit difficult because of the major landscaping alterations that needs to be made to fit a large building with many apartments. The design also tries to give something back to the neighborhood by including public functions and providing facilities like a sitting stair to the public, all while giving maximum attention to the quality of the apartments.

- REFLECTIONS -

For this thesis I chose to focus my research and investigation on apartment layouts and floor plans in relation to parallel activities. Another approach for a thesis could have been to look at the issue from a community level, maybe trying to design spaces for people to use during daytime to conduct work from when the home becomes too crowded. What I am saying is that this thesis highlights one possible solution to the problems we see in today's housing stock regarding parallel use, but there are also many additional solutions.

The thesis' design strategies all work towards solving the problems associated with a crowded home. Even though they give great qualities to apartments if implemented, they do have some drawbacks as well. The most notable is the clash between trying to implement a neutral hallway while trying to keep the total square meters of the home to a reasonable number. As visible in the design proposal of the thesis, the hallways and the corridors do take up a lot of area of every apartment. Area, that in other projects which do not implement the strategies, could have gone to increasing storage or making the now small living rooms more spacious. Of course, another solution that was explored was just to increase the overall size of every apartment. However, this did not feel feasible in a realistic perspective since not many developers or potential buyers would appreciate spending so much more on oversized homes. Instead, for this thesis, I chose to keep some areas to their minimum size and instead focused on implementing the design strategies in the best way possible.

What is also worth pointing out is that none of the design ideas brought up in the thesis are completely new. As both the literature review and historical analyses showed, the ideas that make a home suitable for parallel use have been written about and even implemented to some extent before. Although, the intention behind it was not to solve problems that arose with the pandemic, but instead was linked to general improvements to dwellings or cultural or historical tradition of floor plan designs.

Overall, the findings are very satisfactory. The design proposal shows that it is possible to design apartments that do not follow typical design philosophies of today but still manage to feel contemporary and have great qualities for the potential dwellers.

We are standing in front of a large societal change that started with the pandemic that will see people change what they expect from their homes. If the housing stock of the future is to be adapted to these changes, architecture needs to start evolving now.

-CHAPTER 8-
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Figures

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CHALMERS
UNIVERSITY OF TECHNOLOGY

Enduring a crowded home






A study on design principles and apartment typologies that allow parallel activities in homes post-pandemic

A master thesis written by
Edvin Edström

Chalmers University of Technology
Department of Architecture and Civil Engineering
Master's programme of Architecture and Urban design (MPARC)
2022

APPENDIX

The analysis of reference projects mentioned in the Research part under Historical analysis is included in this appendix. 8 projects have been selected for their relevance to the thesis. For each project a floor plan, a space syntax/polyvalence diagram, a zoning plan, a plan showing axiality & circulation as well as a written reflection is included. For the space syntax diagrams, the symbols mean the following:

-  *Large room, often used as living-, dining- or bedroom or a kitchen.*
-  *Small room, often a hallway, corridor or storage room.*
-  *Bathroom or toilet.*
-  *Entrance with small hall.*
-  *Balcony/terrace.*

- 1940s -

GRÖNDAL 1946 Stockholm

Architect: S. Backström & L. Reinius

Size: 62 m²

Type: 3 room with kitchen

Balcony: 1 2,6 m²

B-bathroom K-kitchen R-room

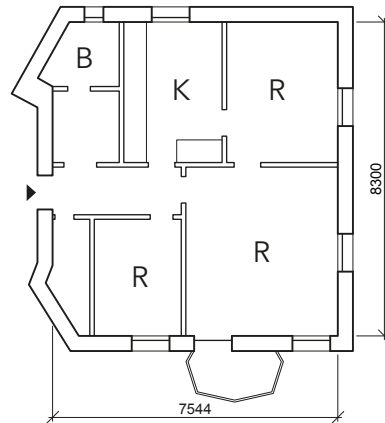
■ Private ■ Common

Floor plan 1:200

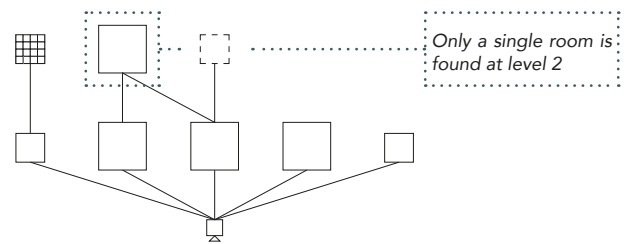
Space syntax/Polyvalence diagram

Zoning

Axiality, circulation & improvements

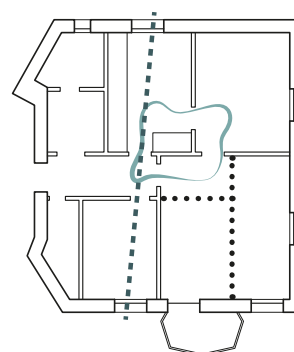


The layout of the apartment is an adaptation of the hall/corridor typology where all rooms except one is accessed from an indirectly lit hall in the center of the apartment. The final room is reached through either the kitchen or the large room at the end of the hall. Regarding parallel activities, this apartment could support quite a few. Since rooms are connected to this neutral hall, all activities from rest and social activities to studying or working out can take place in all rooms. Also, the only room on level 2 in the polyvalence diagram can be reached from the kitchen, which is a function that does not necessarily need to be separated from others. The two door openings to the final room make sure circulation is achieved.



Even if the large room is meant to be used as the living room, either of the three rooms can support that function because of their relation to other functions, albeit in a smaller scale in the smaller rooms. The kitchen is large enough to fit a small dining area, but a larger one can potentially be in the room next to the kitchen.

The large room almost has the potential to be divided in two to create an additional room. However, the resulting rooms would be very narrow and probably not appreciated by the homeowners.



- 1950s -

ÖSTBERGA 1955 *Stockholm*

Architect: S. Wallander & L-M. Giertz

Size: 67 m²

Type: 3 room with kitchen

Balcony: 1 5,2 m²

B-bathroom K-kitchen R-room

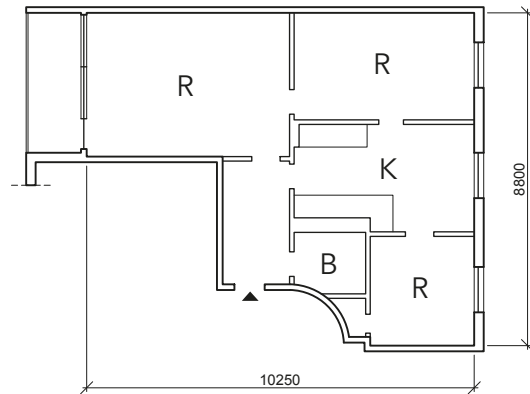
■ Private ■ Common

Floor plan 1:200

Space syntax/Polyvalence diagram

Zoning

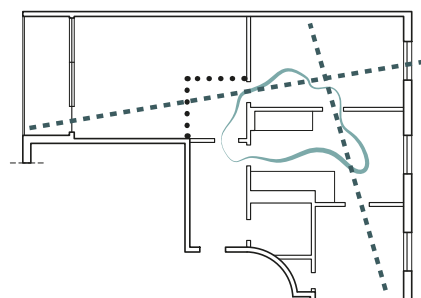
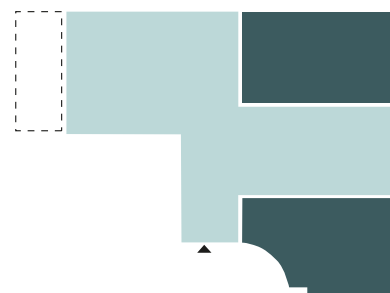
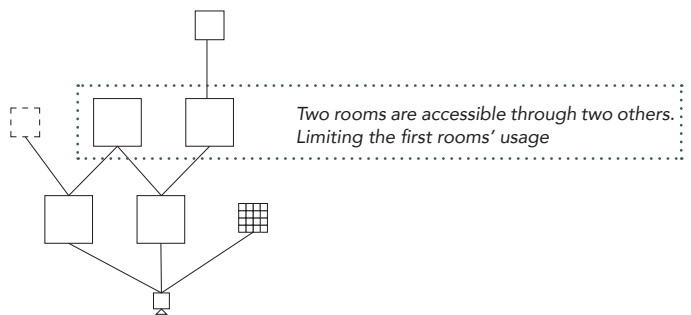
Axiality, circulation & improvements



It is quite difficult to establish a single apartment typology that fits to describe the layout of this home. There is a large hall present but only two out of four rooms are reached from it. The other two and both accessed from the kitchen with one of them from the large room as well. Since you have to pass other rooms to reach some of the rooms, the large one at the end of the hall is definitely only usable as the living room. A great quality however is the two door setup for one of the rooms, allowing circulation through it, the large room, the hall, kitchen and back again.

The room in the far back of the home has some limiting use cases. You need to pass by the kitchen and its dining area to reach it. It could potentially serve as a dining room but then the kitchen is unusually large and wastes space. A more suiting option is of course to use it as a bedroom, or maybe an office.

To increase the usability of the apartment, the hallway could be extended into the living room which would allow for a neutral passageway to one of the other rooms. This would mean that these two rooms could have interchangeable functions. Maybe future residents want the living room connected to the kitchen and therefore let the large room be a bedroom.



- 1960s -

KUNGSMARKEN 1965 *Karlskrona*

Architect: C. Strehlenert & S. Bofeldt

Size: 91 m²

Type: 3 room with kitchen

Balcony: 1 12,1 m²

B-bathroom K-kitchen R-room

■ Private ■ Common

Floor plan 1:200

Space syntax/Polyvalence diagram

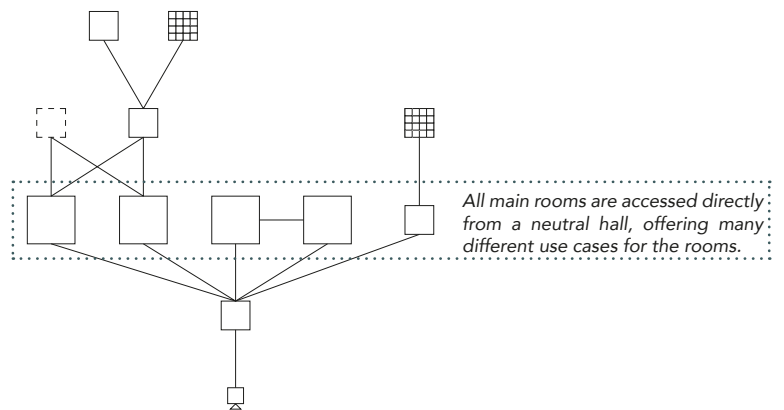
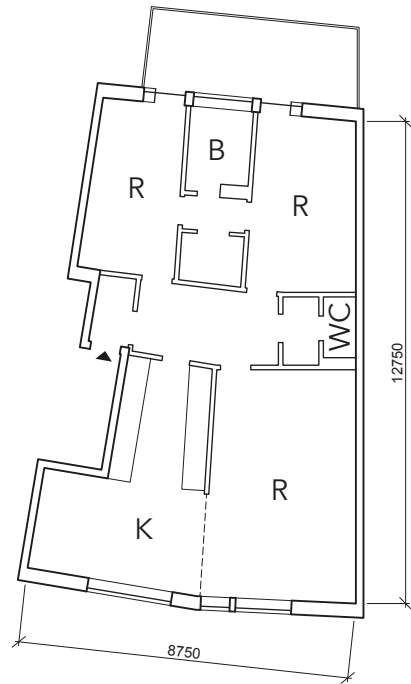
Zoning

Axiality, circulation & improvements

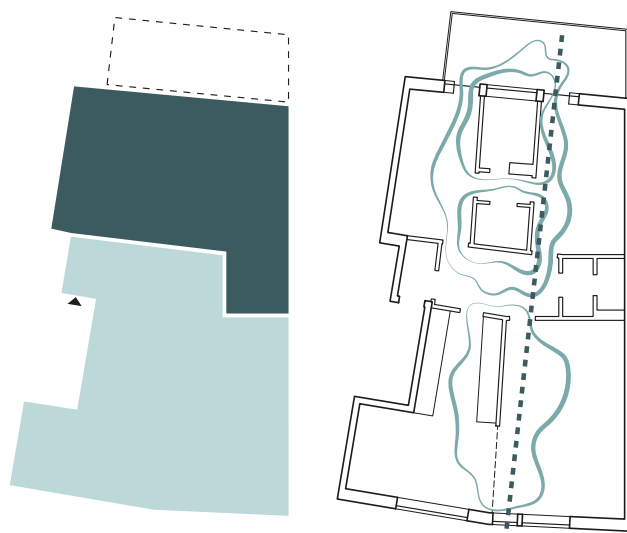
Spatially, this apartment is the most complex and the most polyvalent out of all the references. The typology is a mix of hall/corridor, zoned plan and circular path. From the main hall one can access all essential rooms like the kitchen, large room (living room), guest WC and the two other rooms, obviously meant to be used as bedrooms. The kitchen and living room are open in-between but there is the ability to easily close them off since they both have doorways to the main hall. The kitchen would still be large enough to support the dining function.

A zone of two rooms with storage and bathroom squeezed in-between is found on one side of the home; with a connection to the apartment's balcony. The sizes of these rooms would potentially allow them to be used for other functions than sleeping. But their rather narrow width limits this possibility somewhat. When used as bedrooms, they create a great private zone of the dwelling with a clear division between private and common space.

There is not a ton to do in terms of improving the apartment without doing too much structural intervention. As previously mentioned, the kitchen can be cut off from the large room but that is about it.



All main rooms are accessed directly from a neutral hall, offering many different use cases for the rooms.



- 1970s -

VAGNMAKAREN 1973 Falun

Architect: Engstrand & Speek

Size: 99 m²

Type: 3 room with kitchen

Balcony: 1 8,7 m² by the entrance

B-bathroom K-kitchen R-room

■ Private ■ Common

Floor plan 1:200

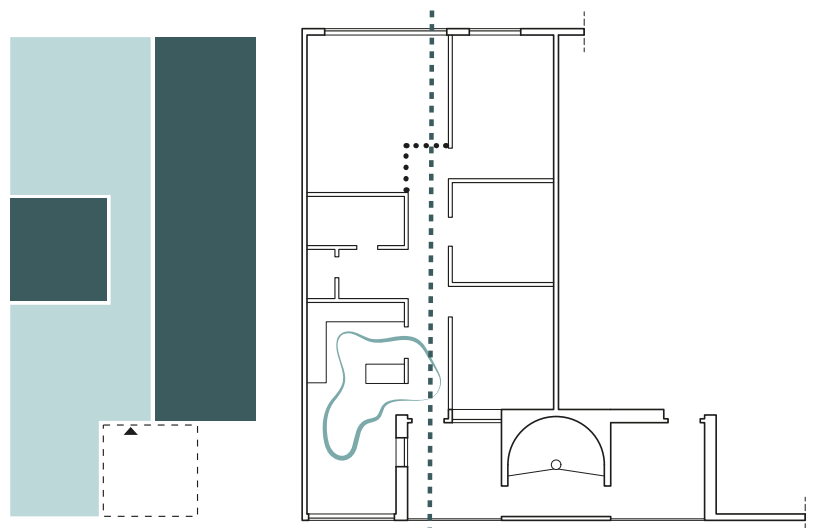
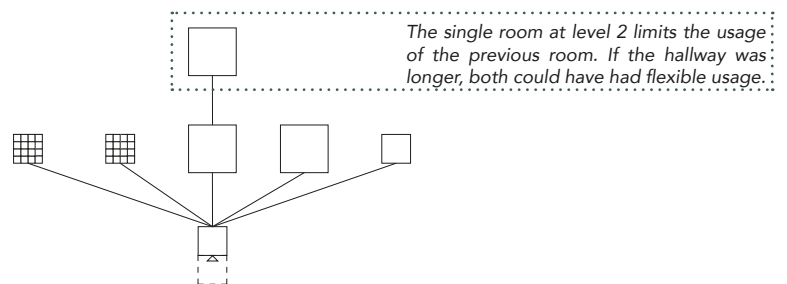
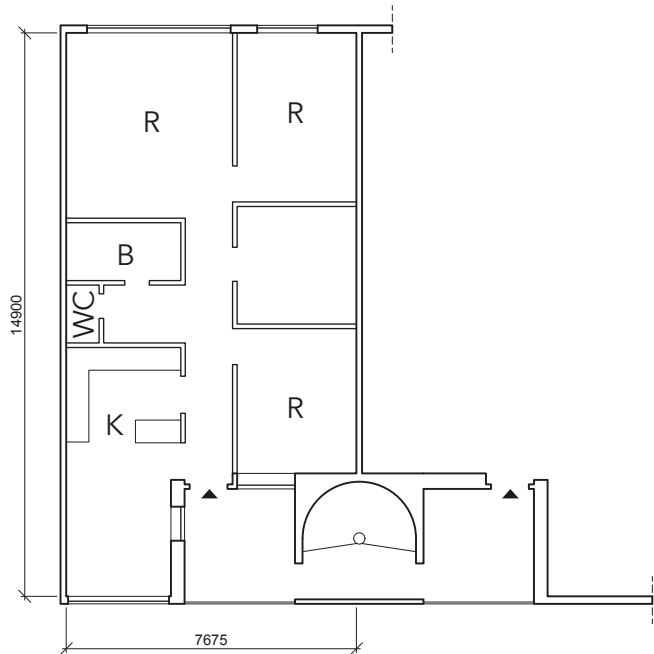
Space syntax/Polyvalence diagram

Zoning

Axiality, circulation & improvements

Interestingly, with this apartment the only balcony is found as a wide access balcony directly from the stairwell. This greatly limits the usage of it since both dwellers and visitors must pass by it to even gain access to the apartment. When entering the apartment, the possibility to do parallel activities does improve. The kitchen and two of the three rooms are accessed directly from the central corridor. The final room is unfortunately connected only to the large room at the end of the corridor, limiting both rooms' use case. The hall could be extended to solve this problem, reducing the size of the large room somewhat but achieving other qualities regarding parallel use.

The dining area of the home is connected directly to the kitchen and the two functions share the same space. If it was not for the lack of daylight into the kitchen these two functions could have been separated and allowed for much more parallel use. Again, because of limitation of light facades it is not possible to construct an additional room through flexible solutions. Possibly, if the dweller chosen to do so, the very large storage unit in the middle can be used for basic, shorter, functions and activities such as working out, studying or taking a digital meeting.



- 1980s -

GRÖNDAL 1985 *Stockholm*

Architect: L. Bryde

Size: 77 m²

Type: 3 room with kitchen

Balcony: 1 4,8 m²

B-bathroom K-kitchen R-room

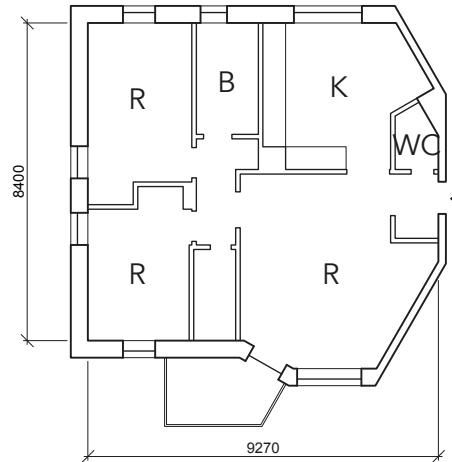
■ Private ■ Common

Floor plan 1:200

Space syntax/Polyvalence diagram

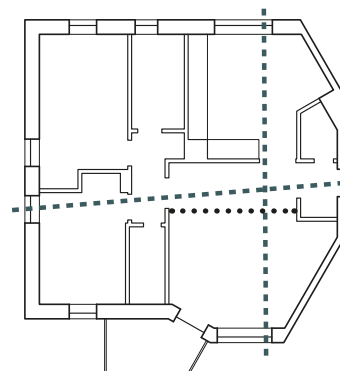
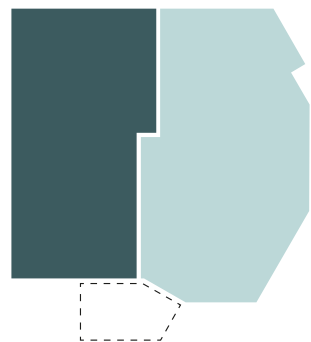
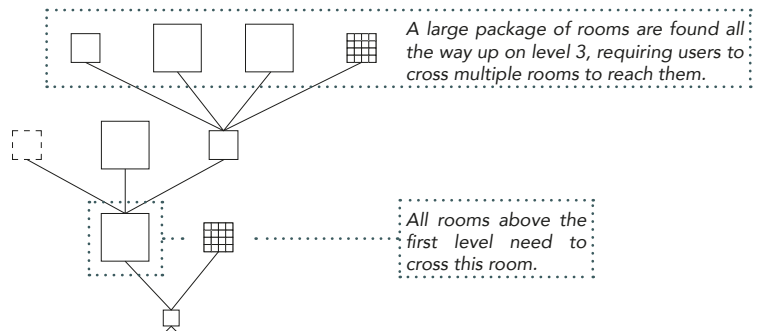
Zoning

Axiality, circulation & improvements



During 1983-1985, Gröndal in Stockholm was densified, and a couple of new tower blocks were constructed. These took heavy inspiration from the existing buildings in the area and the form of the houses kept the star shape their predecessor used (see previous analysis of Gröndal 1946). However, since housing design have evolved during the 40 years that passed the floor plans are very different. They now utilize a typical zoned typology where the two smaller rooms of the home together with bathroom and storage comprises their own separate unit in the far back of the dwelling. This creates a very clear separation between the different functions. What makes it not so great in terms of parallel usage is that users need to pass the large room to even reach this zone. Which in turn means that the large room close to the entrance needs to be used as the living room.

A potential improvement is to create a hallway in the center, using some space of the large room to do so. This would allow the living room to be undisturbed by household members going to and from the private zone and the kitchen. The kitchen is large enough to support both cooking and dining.



- 1990s -

KVARTERET HOLGER DANSKE 1999 Helsingborg

Architect: White

Size: 84 m²

Type: 3 room with kitchen

Balcony: 2 9,7 m² & 6,6 m²

B-bathroom K-kitchen R-room

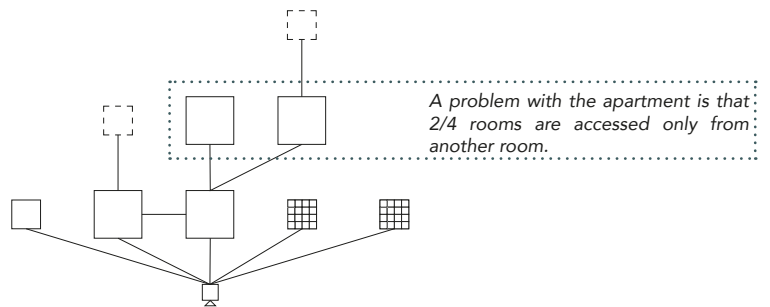
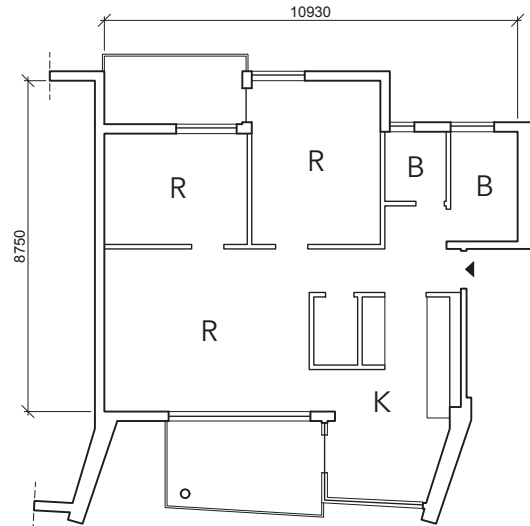
■ Private ■ Common

Floor plan 1:200

Space syntax/Polyvalence diagram

Zoning

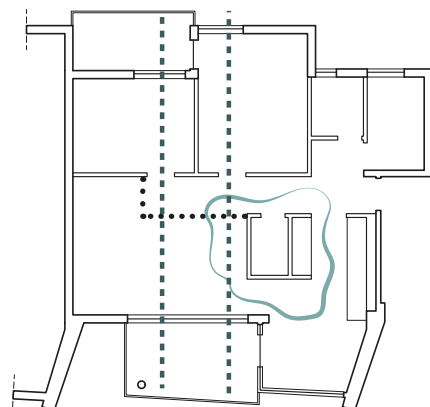
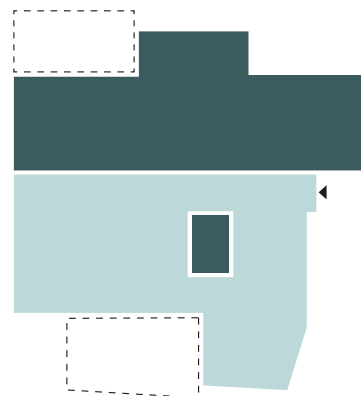
Axiality, circulation & improvements



This apartment does not follow any of the previously mentioned typologies. It is more closely comparable to another defined typology by Heckmann, Schneider, & Zapel (2017), The living room as circulation center. In this home, the large room is serving as the base of communication to other rooms. There is a hall present from which the bathrooms and the kitchen is accessible, but it is not the main concept this apartment's design follows. This drastically limits the usability of all the three rooms available because of their access points.

Yet again, a potential improvement is to take some space from the large room to extend the hall to allow the other rooms to be reached from it. This would create a nice niche for a desk or anything else in the living room and allow the apartment to support parallel activities in all rooms of the home.

Circulation as well as a high-quality kitchen are both present in the layout. The kitchen has space for a dining group with access onto one of two balconies (the other balcony is accessed through one of the rooms). A storage room and parts of the kitchen makes up the centerpiece that circulation takes place around.



-2000s-

GODHEMSBERGET 2005 Gothenburg

Architect: KUB architects

Size: 120 m²

Type: 4 room with kitchen

Balcony: 2 12,7 m² & 12,7 m²

B-bathroom K-kitchen R-room

■ Private ■ Common

Floor plan 1:200

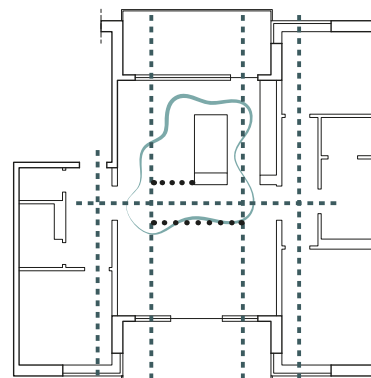
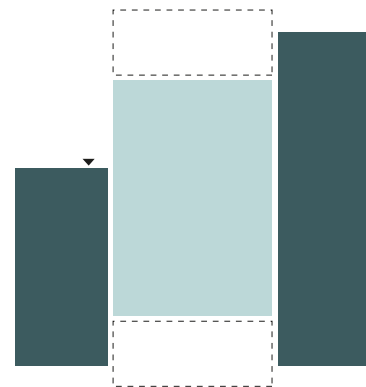
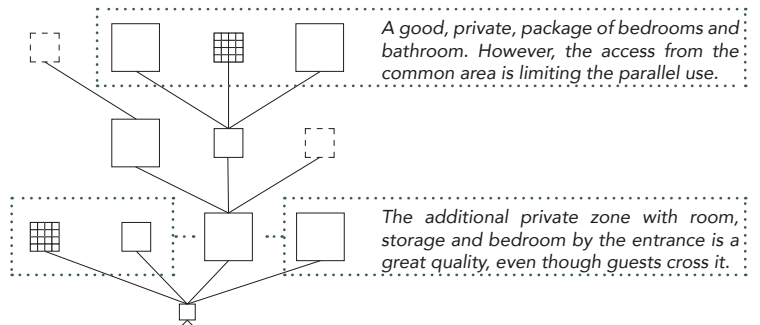
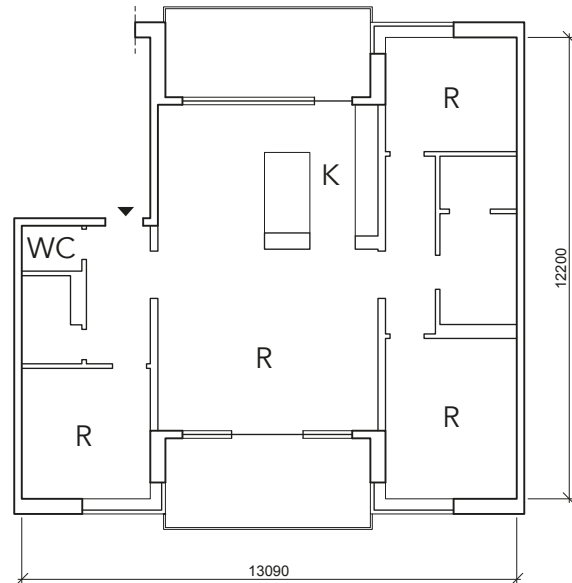
Space syntax/Polyvalence diagram

Zoning

Axiality, circulation & improvements

The floor plan is clearly divided into three distinct zones. With a completely private segment with bedrooms and bath, a very open common middle part and the semi common entrance zone with guest toilet, storage room and a room that can be used as a guest bedroom, a study or similarly. The distinct zones means that visitors to the potential home office do not need to see or go through the rest of the apartment. Even though the floor plan is separated, one must still pass through the common zone of the large room, with interconnected kitchen, to reach the private area. To solve this problem, the part in-between the kitchen and the living room can be converted into a neutral hallway with indirect daylight from two sides. This would allow residents to use these rooms in many new ways, with of course parallel use being a great additional quality.

The kitchen itself already has many spatial qualities. There is circulation around a central island and a large space for dining. If the window setting would allow it, another improvement could be to have a flexible separation between the kitchen and dining area. Then, together with the new hallway, both the dining and cooking zone would support parallel use and still be connected to each other.



-2010s-

BERGSKROKEN 2018 Gothenburg

Architect: Wingårdhs

Size: 83 m²

Type: 3 room with kitchen

Balcony: 1 42,3 m²

B-bathroom K-kitchen R-room

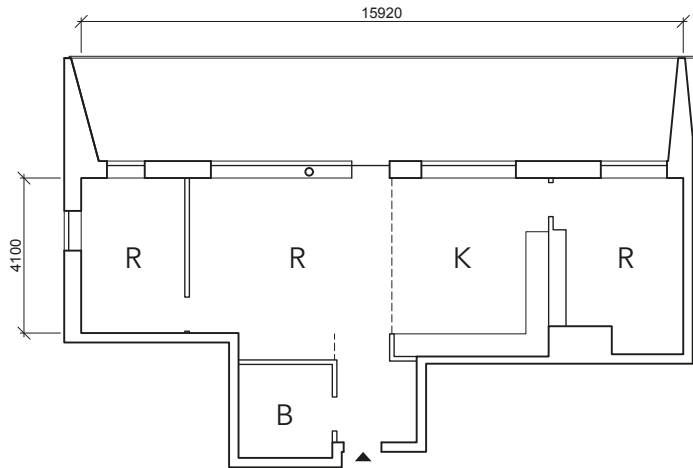
■ Private ■ Common

Floor plan 1:200

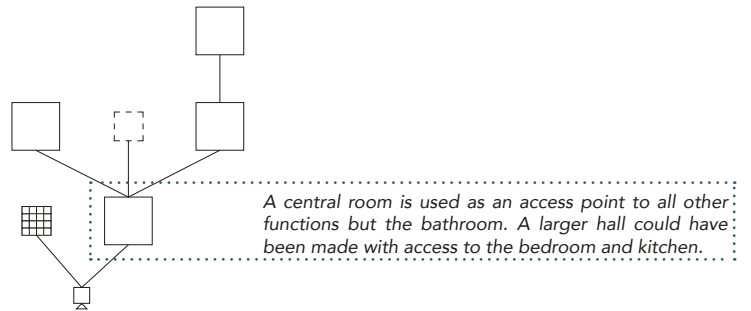
Space syntax/Polyvalence diagram

Zoning

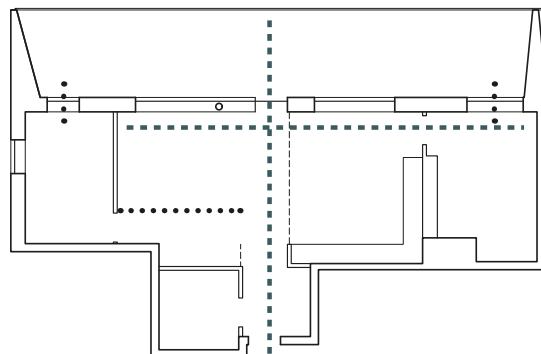
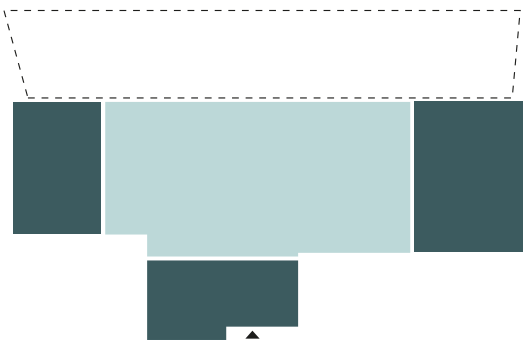
Axiality, circulation & improvements



In 2018 these residential units by Wingårdhs were erected in Mölndal, close to the boarder to Gothenburg. The apartments outstanding feature are their enormous terraces. The analyzed apartment's terrace is almost to 50% of the available indoor floor area! An improvement that could have been made during the design phase would have been to incorporate more doors out to this large loggia.



Regarding parallel use this apartment is not very good. The large social space of the kitchen and adjoining room serves as the centerpiece of circulation and access. This drastically limits the useability of all rooms. The kitchen can be closed from the large room, and still fit a dining area. Nevertheless, its access would be from the large room. Even though it would drastically reduce the size of the large room, it is possible to construct a small hall that would act as a shortcut to one of the rooms, from which the kitchen could also be accessed. It is not possible to do anything about the room found after the kitchen at level 3 in the polyvalence diagram.





CHALMERS
UNIVERSITY OF TECHNOLOGY

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A master thesis written by
Edvin Edström

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Department of Architecture and Civil Engineering
Master's programme of Architecture and Urban design (MPARC)
2022