



REIMAGINING A MILLION

An investigation into the potential of the dwellings of the million program

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Headline: Reimagining a Million

This thesis is an investigation into the potential of the dwellings of the million program. It came to fruition through an interest in Sweden's record years', an era from 1965 to 1974 known as the million program.

According to Boverket (2020), one in five of Sweden's current homes was built during these years; this was a time when prosperity and hope for the future, powered by new modernistic ideas, created an expansion of the housing stock at a scale that is today hard to comprehend.

The background of the topic selection was the negative image of the dwellings today; it sparked an interest in if it is as imperfect as it is perceived today. Are there qualities? If so, which?

Today, six hundred thousand dwellings from the era are in a desperate state; there is an urgent need for rearmament. However today there is an ongoing debate if they should exist at all. Destroy or refurbish?

The starting point of the thesis is the perspective that the best buildings are the ones already built. Especially when the building is as well built as most of the million program buildings are. The focus is on getting familiar with the debate around the buildings while concluding an opinion. Therefore, the history has been researched, its motivations, the era's trends, what is possible and what needs we have in today's society.

The thesis will be developed through research by design by creating models and digital visual representation. The aim is to provide a different perspective by proposing an intervention of a building from the era, which can further contribute by inspiring developers and municipalities in what can be done. In essence, to provide an option by visualizing the potential from an aesthetical- and sustainable point of view. The intervention will have the outset that architectural interventions are dependent on context. Every site and era of the building has more or less its own history, social factors, and culture, which all are essential to take into account when designing. The history of a building should not be hidden or neglected but somewhat enhanced through improvements and change.

Keywords: The Million Program, Residential, Refurbishment, Sustainability

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INTRODUCTION

PROBLEM STATEMENT

The dwellings built from 1965 to 1974 are part of the record years of residential building in Sweden. According to Boverket (2020), one in five of Sweden's current homes was built during these years, the years commonly known today as the million program.

The buildings of the million program are today in need of refurbishment. According to Viden (2012) in the book Miljonprogrammet; utveckla eller avveckla, about 600 000 dwellings from the period are in desperate need today. She continues, "we have never had this many homes to refurbish in this country" (Viden 2012). If so, this provides an entirely new situation for the building industry. There is enormous pressure on the housing construction market, not least in Stockholm, says Chris Österlund, CFO of Sabo's public utility umbrella organization.

The more critical areas of improvement in buildings of this era usually are relining, bathroom renovations, replacements of electrical installations, ventilation, windows, balconies, and facades (Viden, 2012). However, much more would be needed to be done to reach the government's sustainability goals of halving the energy use by 2050. The number of improvement areas and the rate of refurbishments need to be heavily increased in Sweden to attain this goal. (Regeringskansliet 2022)

Today's debate is polarized and negatively infected since much of the public wants to demolish the buildings. They are generally seen as failures, which is best done by forgetting and building new. For example, Integration Minister Sabuni said, "Demolish in the million programs for integration" (DN 2009).

In the book Estates on the edge, Anne Power expresses that demolishing is not a solution to these areas, as has been done in some countries. The costs would be too high, and the buildings are needed in today's society (Power, 1997), which proves that this opinion lacks arguments against the fact that these record years are an essential part of our history.

The refurbishment required could be an opportunity since additional improvements are easier and cheaper to add with an extensive refurbishment. They led to several different interesting discussion points. What qualities should be kept? What should

be changed? Could the million program finally get the chance to be adapted to be incorporated into Swedish society with open arms? What could be done to improve these buildings from an architectural standpoint with sustainability and architectural qualities in mind?

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PURPOSE

This thesis aims to find, through exploration, a new proposal to adapt one specific building of the housing stock built within the record years in Sweden. The refurbishment will be of a residential project where the focus will be on improved life quality for the tenants in social sustainability and better-refurbished floor plans. With this in mind, positive aspects of the record years will be kept and enhanced while sustainability and the economy will be evaluated.

DELIMITATIONS

What to do with the million program suburbs has been a debated subject ever since it was built. Both the million program and sustainable refurbishment are large areas of the study. Therefore, certain delimitations have been required.

The thesis is focused on Sweden, although dwellings of this type exist in large parts of Europe. Tenancies instead of condominiums have been the main focus since these are the most common in the chosen site.

Architecture intervention in an adapted building has been the priority, although technical and economic aspects are discussed throughout the thesis. The issue of gentrification will only be brought up briefly, although it is a vital subject. History has worked as a starting point for the thesis; it is brief and could be more in-depth. The intervention will have a perspective on a building level, and a broader perspective will not be looked at. The thesis does not want to achieve a code or a map on how to deal with the buildings going forward, nor will it utter a perfect solution, but proposes an open suggestion for a specific building.

OUTCOME

The expected outcome will be a booklet exploring possibilities leading to an eventual project in the form of a refurbished residential building. This proposal will be visualized through models, renders, sections, plans, and elevations.

OBJECTIVES

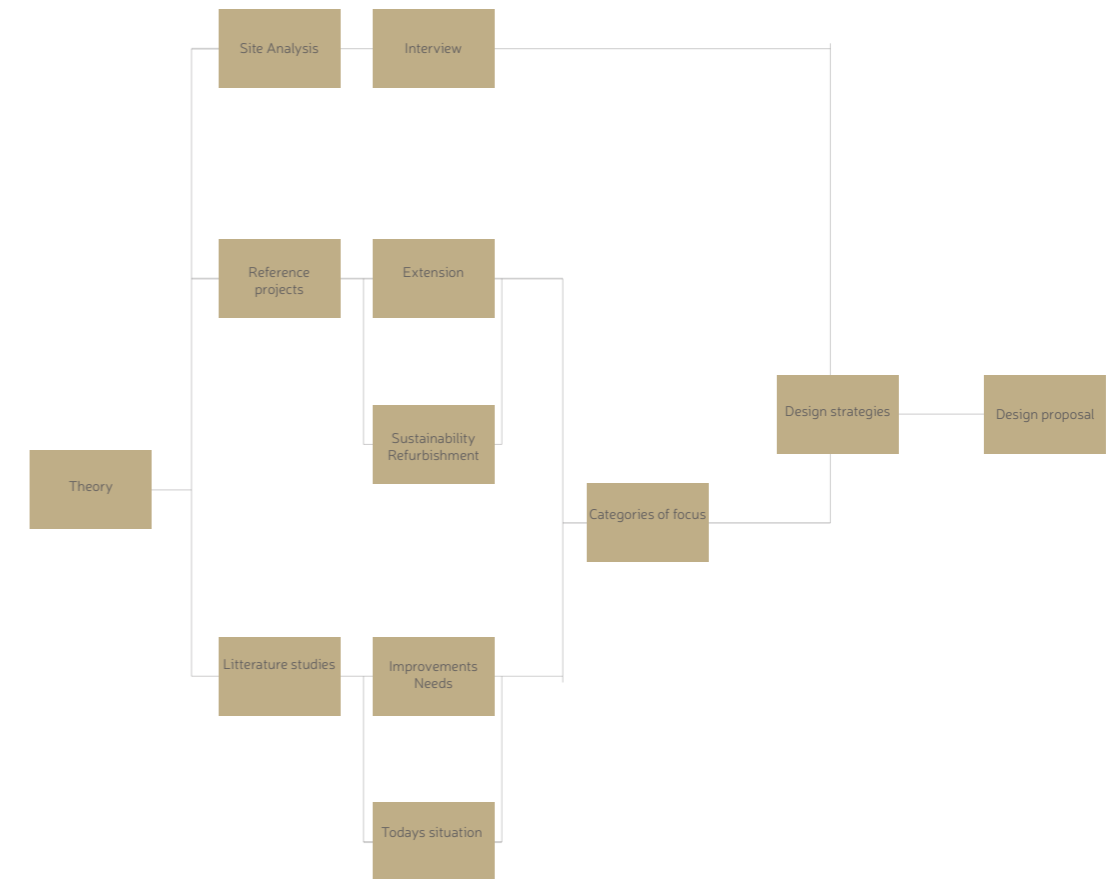
-Learn the reasoning and driving forces behind the million program

-Find qualities and issues with the design and the execution

-Gather information from residents and reference projects

-Implement the found material in a refurbishment of a residential building

METHOD



This project will consist of four main stages. First is the research stage, where the million program will be looked into in-depth. Here, the focus will be on learning the background, how it came to be, the politics, and its reasoning. Books and articles will be read and analyzed to be used in the project stage. Some focus will also be put on different apartment typologies to find qualities that could be enhanced and adapted in a later stage, while a focus point for the improvements will also be found.

The second stage will look at the site, creating an extensive analysis of its layers and actors. Here, research will also be done on case studies in architectural extensions and sustainable refurbishment made in a Swedish context and a European one. This thesis is based on the idea that architectural interventions are dependent on context.

The project will be based on the residents' lives and their suggestions for possible improvements. Fur-

thermore, there will be a need to conduct interviews with the residents to get some insight into their view of the building. This interview would be conducted through some questions about what they like, what they do not like, and any suggestions for improvements or adjustments to improve their everyday lives, used and analyzed for the future design stage.

Since this project aims at being developed through research by design, the third stage will be about spatial transformation and architectural intervention. Here the case studies analyzed in the first step will be used as inspiration, and the information from the interview will be used as a base for the volumetric studies. It will be explored through the creation of models and drawings.

The fourth stage is about finalizing the outcome of this thesis work, creating detailed drawings, models, and visual representations.

TERMINOLOGY

Functionalism: An era where the idea that the layout of a building should be determined by practical deliberation such as use, material, and structure.

Semi-private space: A semi-private allocated space is an area in between the utterly private space (of the home generally) and the non-private space of the society. It is a space the general public will only enter if they have a reason to; it can be a front garden or a yard.

Framtiden: The Framtiden Group is a real estate company owned by the city of Gothenburg and includes housing, property management, production of new homes, and disturbance services.

Allmännyttan: A name for non-profit housing companies all over Sweden where the municipality generally decides on half the board members. These housing companies are required to take active social responsibility and, at the same time, conduct business in accordance with business principles.

THEORY

A BACKGROUND OF THE MILLION PROGRAMME

In Sweden during the 1900th century, the trend of urbanization started. There was an increasing stream of people moving from the countryside to the city for the job opportunities connected to the expanding production corporations.

In the 1930s, the standard of a general Swedish dwelling was low; it was considered one of the lowest housing standards in Europe and one of Sweden's biggest social problem areas (allmännyttan n.d). In 1930, about half of the apartments in Stockholm consisted of one room and kitchen, 70 percent did not have running water while 60 percent did not have central heating (Johansson, 1930).

After the Second World War, urbanization increased drastically. The move from the countryside was significant enough to almost instate a crisis in the country. At the same time, according to Arnstberg in the book Miljonprogrammet, a baby boom further accelerated the influx to the big cities. The consequences of this became overcrowding and social misery (Arnstberg, 2000).

Therefore, in 1965, a country with 7.5 million inhabitants, incited by an economic growth period unlike any other, decided in parliament to build one million new dwellings during a timeline of ten years. A policy that later became known as the million program. The main political objectives behind the project were to "wipe out" the slums, increase the standard, abolish overcrowding, take political responsibility for housing supply, ensure that housing production took place in speculative forms, and abolish distress, shortages, and insecurity (Arnstberg 2000).

Consequently, the state and municipality took a more active role in the housing market through acquisitions of land and subsidized loans for housing construction, providing more beneficial terms for the more significant projects in terms of units (Arnstberg 1998).

All of this coincided with the height of the Swedish Social Democrats' power in Sweden. Per Albin Hansson's vision of the "Swedish Folkhem" was central in the society. Social housing with subsidized rents and other forms of categorization was not something Sweden wanted to strive for, different from many other countries in Europe. Instead, the intention was that everyone would have the right to live anywhere



Figure (2) Stenberg Ohlson and Skarnes Skarne 66 during construction



Figure (3) Skärholmen opening

they wanted to. The conditions and opportunities had to be equal, and the integrated housing would lead to an understanding of solidarity and democracy. Segregated housing was seen as a failure that could lead to social disintegration and anarchy (Törnquist, 2001).

The planned buildings were aimed at the new man, neither a citizen nor a proletarian, a villager or a city dweller. The suburb should be a symbol of Swedish faith in the future - a weapon against the old class society (Arnstberg, 1998). It was a we-feeling that was sought after and a counterweight to the totalitarian political ideals that had broken the world and that were still threatening in the distance (Törnquist, 2001).

Functionalism

The record years happened at a time of the introduction of functionalism in Sweden, a trend fueled by the Stockholm exhibit of 1930. Functionalism can be seen as the last stage of the modernism era, the core of which was the creation process. Its main ideas coincided with the million program. Therefore, they were implemented, aspects such as the conviction of the functionalist rational view of the home being a combination of several met functions.

The consensus was that of a revolution to create a new way of living through the vision of a more equal society. Architects such as Le Corbusier incited the change by saying it would obsolete the old way of building homes. The result became the architect's distorted role as part of a production chain focusing on fast assembly through standardization. At the same time, the buildings became thicker and taller to accommodate more people (Törnquist, 2001). The approach was to build from the inside out to create a finished product. Standardized furniture and room sizes were designed and regulated through the state and municipality-owned organs God Bostad and SBN (Swedish building regulation). While the architect became the all-knowing planner, the inhabitant's role turned into adaptation to the standardized plans the architect drew.

The focus became the aims of the different actors in the building process, such as the building companies' target of building in the fastest and cheapest way to fulfill their contracts. The developers aim to make the inhabitants content enough with the dwellings to accept further rent increases in the future. Furthermore, lastly, the politicians

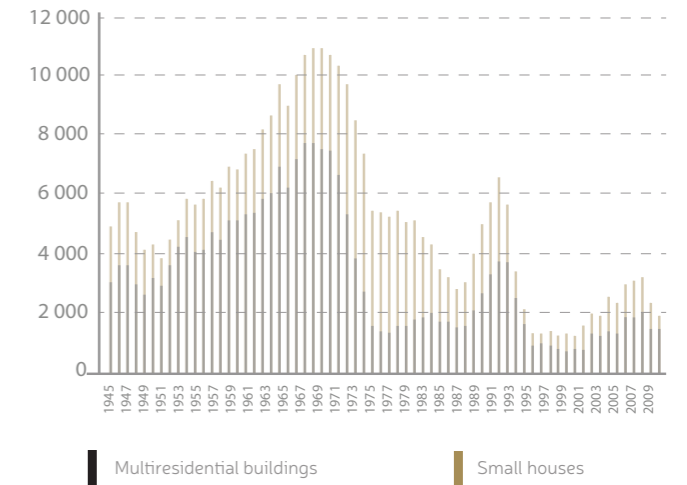


Figure (4): Amount built. Miljonprogrammet: avveckla eller utveckla (2012)

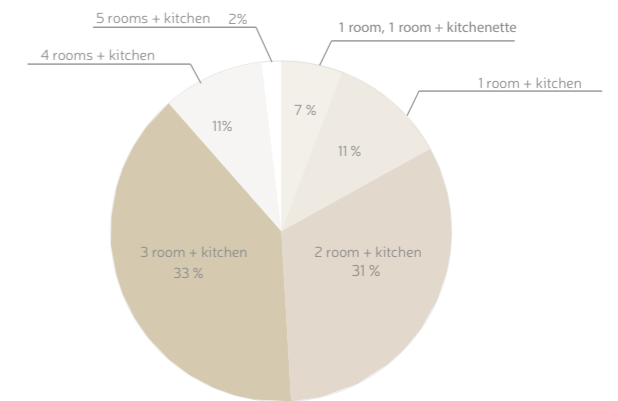


Figure (5): Sizes of apartments built in multiresidential dwelling complexes 1961-1975. Göteborgsstad (2021)

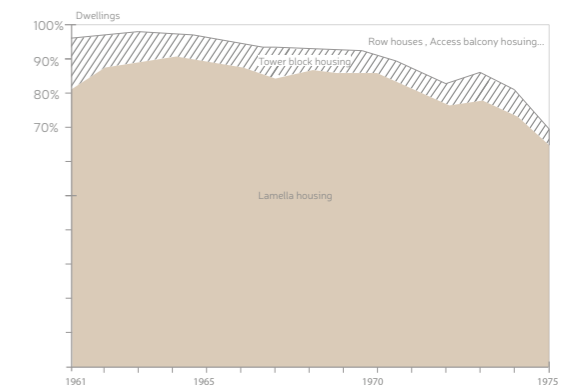


Figure (6): Division of types of buildings. Göteborgsstad 2021



Figure (7) Amount of living units built. Miljonprogrammet utveckla eller avveckla 2014

aim to live up to their promises while improving the cities for the residents (Arnstberg 2000).

The best way for improvement during this time, according to the decision-makers, was to embrace the strategy advocated by Ebenezer Howard in the late 18th century in the book "Garden cities of tomorrow," which supported a city, or rather what would replace it, enclaves of smaller societies with a limited population surrounded by greenery. To provide access to the urban center, the public transport stations had to be no less than one thousand meters from the buildings, which led to the enclaves being positioned like a string of pearls from the city centers. (Upptäck Angered, 2005).

The new suburbs were seen as a way to provide space, safety, and prosperity for all. At the same time, they were becoming a way to apply new fundamental ideas such as traffic separation and local shopping areas. Even if the population grew, the enclaves would retain their size. Instead, new enclaves would be added to the string of pearls of existing ones. The result became an archipelago city with separate housing, work, trade, and traffic facilities. Tailored for functions and values applied in the middle of the twentieth century. (Andersson, 2012)

Outcome

From the beginning, the million program areas were positive alternatives to the cramped and worn inner city environments. The suburbs which often now are perceived as "unattractive problem areas" were viewed differently when they were compared to the cramped outdated apartments of the inner cities. (Herlitx, Johansson, and Olsson 1998, p10).

Caldenby, in *Svenskt Byggande under 1900-talet*, describes the million program as an ideal-typical monument over their time and a program that ideologically failed as early as 1968 but continued by "sheer speed" (Caldenby, 1998).

The result of the program became fast solutions and largely prefabricated buildings grouped in enclaves surrounding the cities of Sweden. Larger suburbs such as Tensta, Skärholmen, and Norsborg came to be a reality around the larger cities in Sweden. The new modern building units attracted many from the city centers, which still lasts, three out of four today live outside of the city center in Stockholm. About 180 000 dwellings were built outside Stockholm and 90 000 outside Gothenburg in similar locations (Vi-

den, 2012). The buildings were usually long, straight building blocks since straight crane tracks were generally used for the fast assembly. A product chain for the production of dwellings was created unlike what Sweden had ever seen before or since (Andersson, 2012).

The intention did not become a reality. The dreams of the Swedish politicians never really came to fruition. The aim of create suburbs where everyone could live.

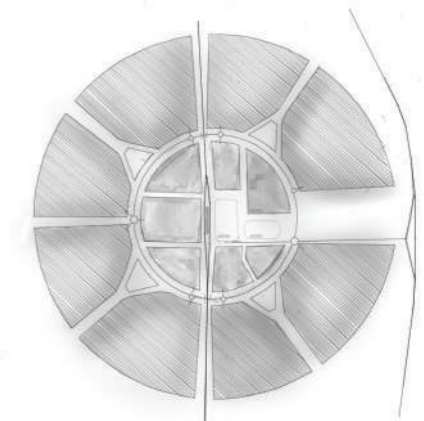


Figure (8) The planing of the suburbs. Utopia 2012.



Figure (9) Hammarkullen Center Jens s Jensen

Even though some may end up in the more attractive areas and others would end up in the less attractive, they would still live in the same suburb and have the possibility of making a living journey within the suburbs (Törnquist, 2001). The planners could not foresee the lack of contact between these areas or how people in the more unattractive areas would make it to the attractive places.

A misconception about the million program is that it only encompassed sizable multi-residential buildings, see diagram XXX. (Viden 2012). An increased single-family house construction of 550,000 from 1970 to 1990 (Rudberg 1991), led to clear consequences in the early 1970s. This turned out to be a problem since the single-family housing construction would increase the segregation in the suburb due to the current restrictions on low-income households—the lack of funds.

The population increased from 7.5 to 8.2 million residents during the record years, boosted by increased work immigration from neighboring countries like Finland, Estonia, and Poland.

The increased prosperity in overall Swedish society led to more households getting opportunities to live more prominent. Contributing to impacting the record years' dwellings, they got more extensive and spacious. According to Ola Nylander in the book *Svensk Bostadsarkitektur* (2013), the era provided the generally most spacious floor plans to date in Swedish history. (Nylander, 2013)

The End of an Era

The era came to an end in 1975, resulting in the completion of 1.4 million dwellings, after the contemporaries abandoned the modern urban planning project. This was fueled by an oil crisis (1973) which contributed to the Swedish industry starting to struggle, which in turn led to a shift in the economy, from a production economy to a consumption economy. (Andersson, 2012)

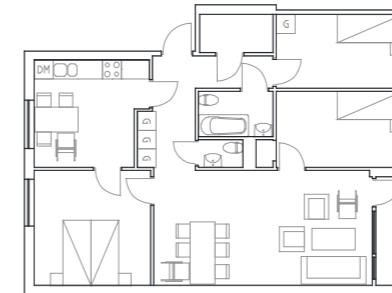
The dilapidated inner cities proved increasingly suitable for these societal changes since they were easily adapted. Only years after the buildings were complete many stood vacant. During the 80s, attracting people to the apartments became even more challenging due to a housing surplus in Sweden. The deficit in rental income made it difficult for housing companies to maintain the buildings, which contributed to increasing neglect. Later on, during

the crisis years of the nineties, many properties had to be demolished as the lack of tenants and money led to primarily neglected maintenance. (Boverket 2003). A lock-in arose in the million program areas making it increasingly complex for residents to find opportunities to enter Swedish society, whether in work, education, or the opportunity for other housing, leading to further stigma (Törnquist, 2001).

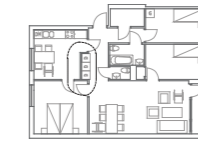
Of the 830 000 dwellings still left from the million program today, about 600 000 require extensive renovation in the coming years (Viden 2012).

ANALYSIS OF CASE STUDIES IN PLAN

Area: Oxelsösund
 Building year: 1963
 Architect: HSB architecture office



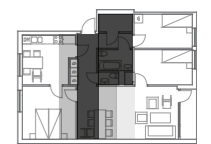
Circulation



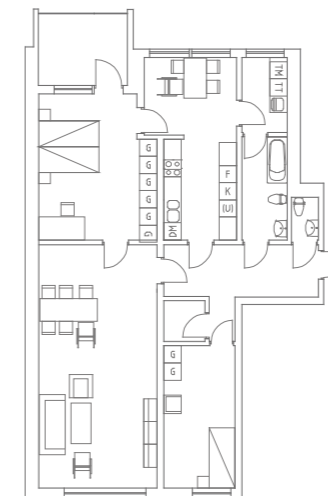
View points



Dark areas



Area: Södra Bergsjön
 Building year: 1966



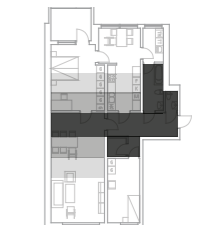
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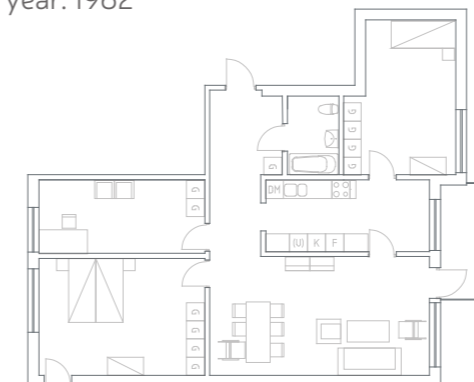
View points



Dark areas



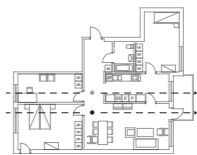
Area: Chapmanstorg, Göteborg
 Building year: 1962



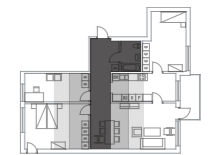
Circulation



View points



Dark areas



CONSTRUCTION

The most used construction method was the bookshelf frame system. Staircases, cast in concrete, stabilized the construction in the longitudinal direction of the house, while the facades normally worked as non-load-bearing folding walls. A cast-in-place frame was often used, which led to improved molding equipment. Part of the molding was typically a basement. From 1961 to 1975, 56% of the buildings had one, generally built through cast-in-place concrete (Carlén, Cars, 1990).

The walls were insulated on the outside to make casting possible even when it was cold. While the floor molds consisted of so-called mold tables, which could be adapted to different room widths, these could be hoisted up after casting up to the next floor.

However, creative methods were also applied, such as the Skarne 66 method developed by Ohlson and Skarne, where some walls were non-loadbearing and could therefore be adapted to what the inhabitants required (Stenberg, 2015).

Material

The dwelling complexes during the million program were often fitted with flat roofs of metal sheets or roofing. These roofs often had a water management system on the inside through a slight tilt. With new techniques, the builders and architects had more possibilities to vary the facade's appearance and material. The most common was using concrete elements, which were given more durable surfaces through exposed ballast - the cement was scrubbed away on the surface, and the stone, often brown sea stone from Denmark, was brushed out. (Caldenby, Hansson, Sanja, 2005)

Foundation

During the million program, the developers aimed to create as similar a starting point as possible for the design of the buildings to decrease the costs of designing any unique solutions. Therefore the ground was generally adapted before building by leveling it to a flat surface. The layers underneath mattered less and less since new blasting technology and shaft techniques made building on the hilly ground easier, while new forms of piling and liquid foundations improved structure on the muddy ground. (Carlsson, 1993)

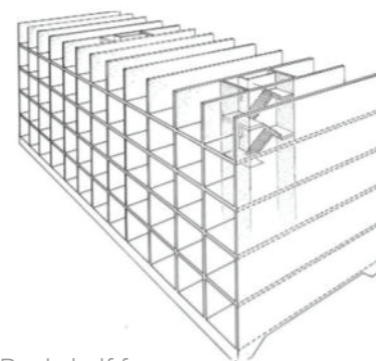


Figure (10) Bookshelf frame system

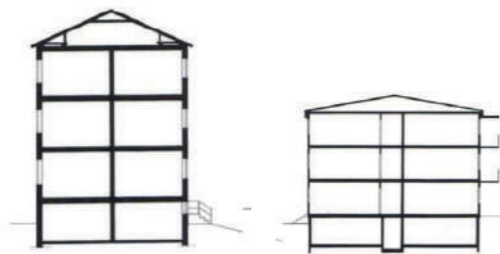


Figure (11) Examples of different buildings from the era

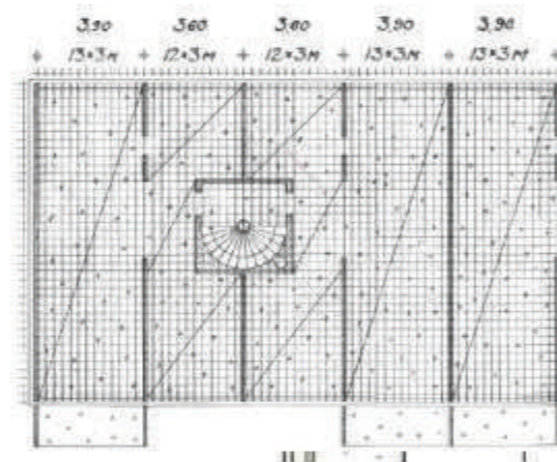


Figure (12) Common rebar placement of the era

Common Facade Materials:



NEGATIVE MEDIA PICTURE



Figure (13) Collage of news articles relating or mentioning the million programs suburbs over time

The areas started to become unpopular because they expressed yesterday's ideals. The program changed from a sense of a future utopia to a sense of a stigmatized failure. The overall design of these areas was no longer the image of healthy and rational housing. The demand had changed in society. Increasingly, newspapers and television started to paint the picture of the buildings from the era as hubs of alienation and social problems. Residents were rarely seen as anything other than symbols of the welfare state's failures (Andersson, 2012).

For example, during the completion of Stockholm suburb Skärholmen on the 8th of September 1968, a criticism storm was channeled through the media. The author Lars Gyllensten wrote on the day of the inauguration of Skärholmen, "it exemplifies an urban planning and community development governed by manipulative technocracy class" (Egelius, 2018). Two days after this, the newspaper Dagens Nyheter wrote an article titled "Demolish Skärholmen." In Gothenburg, it was a similar story, the newspaper Göteborgs Posten wrote the following about Angered, "What have the people in Hjällbo

done to deserve this" (GP 4.7.1969) "Poor bastards in the high-rises exclaims Arne Gadd" (GP 23.2.1970)

The media storm affected the residents; the accommodation started to be viewed as a temporary solution while waiting for something better. (Egelius, 2018) While it further escalated to a feeling of anger that started to build in the suburbs over the slander that indiscriminately affected the residents. It had far-reaching consequences for the new fragile forms of society that already fought for survival through cultural clashes and high migration (Törnquist, 2001).

Today's view of the area in the media has not changed; the suburbs are still associated with violence, social misery, and segregation. According to Arnstberg, the segregated suburb is today-usually a world on its own, a small society. If the conditions are right, the inhabitants create their own lives within it, independent of the surrounding community. If not, they tend to shape their life against the state and the general society (Arnstberg 2000).

PROBLEMS AND CRITIC FROM THE SOCIETY

The modern world is constantly changing; it can be described as an unwritten law. Modernism and functionalism attempt to make individuals feel at home in this change. Modernist literature, music, and art, together with photography and film, have made it possible to feel at home in this fluid state. However, it is precisely its fluid, ever-changing character that makes any form of modernity never final. Modernist architects' attempt to create a new, once and for all definite form of modernity itself was according to Andersson in the book "Vykort från Utopia" doomed in advance to failure. (Andersson, 2012).

In a larger context, the problem with modernist urban planning is the creation of such rigid structures. Because of the influence of functionalism and modernism, almost every aspect of the Million program was designed for one type of function, making it difficult to redevelop for other uses. The era's way of tailoring buildings to a specific role became a strait-jacket for the businesses and people that housed them. The new forms of modern life were obsolete when they were inaugurated. The planning was unable to deliver anything other than yesterday's future Modernism's dream of the once and for all completed city was incompatible with modernity itself. The volatile state cannot be captured in the solid forms of modernist urban construction. (Andersson, 2012).

On a building scale, the large concrete buildings created feelings of being disproportionate for the residents, which provided a sense of unsafety. At the same time, they have less conditions for social life. therefore larger houses are less attractive on the housing market (Gillwik 1974). Another problem was the era's destruction of the notion of semi-public space. The buildings were planned so that the residents left the complete privacy of the home directly to the public areas. There was no transitional space to meet the people living closest, like a larger entrance or common spaces of any kind. It contributed to an increasing feeling of unsafety which robbed the residents of a sense of unity with the neighbors. (Arnstberg 2000)

The inhabitants' own ability to change their neighborhoods and apartments was non-existent. There were no properties that could be rebuilt independently of neighboring plots, no neighborhoods

that could be densified. Instead, the authorities had to laboriously find ways to sneak into buildings among the original ones during the residents' protests without losing the original idea that made the area function. While the size of the buildings that did exist left people feeling disproportionate to the pure size, creating unattractive shadows (Andersson, 2012).

From an aesthetic point of view, gray was an over-used color on facades, contributing to the feeling of monotony and isolation in the areas. (Tunström 2012). New construction methods applied in the buildings, such as flat roofs and internal drains, should not have been used to such a large extent as they were; there was a lack of knowledge of the effects in many cases. They contributed to many incidents of leaking roofs, damaged facades, and moisture and mold problems in wet areas. (Rörby 1996).

According to Arnstberg (2000), an essential aspect of the home is the opportunity to make it personalized, people want to be encouraged to creativity through adapting the home. Therefore providing opportunities for individualization is extremely important. Plans like the one in Oxelsösund (see analysis of projects) prohibit this due to its very divided narrow rooms. This general lack of openness and program divisions also became an issue since it created a large portion of dark areas combined with the generally deep buildings of the era; this contributed to the difficulty of using rooms and apartments as isolated cells around a dark neutral hall. An example of this was the typical for the era cramped central corridor (Nylander, 1998). This can be observed in Södra Bergsjön and Chapmanstorg dwellings (page 15).

HERITAGE ASPECTS

However, the negative aspects of the era can not be mentioned without expressing the fact that the million programs suburbs did succeed at times. Architect Lennart Holm believes that the million program contained large amounts of extraordinarily well-planned residential areas (Holm, 1987). Even though every time modern life changed shape, the dynamics disappeared.

The fundamental basis of solidarity, a sense of home about "we," and an often informal but still tangible social cohesion and organization led to the Swedish model revered throughout Europe described as a "successful symbiosis in the middle of socialism and capitalism" (Rudberg, 1991, p26)

The building's proportions had, like previously mentioned, adverse effects, but they also had symbolic value. They become essential parts of identification in the suburbs. The adverse effects on social cohesion in these buildings were compensated through differentiation in buildings. Row houses and detached houses in the suburbs have significantly less relocation, contributing to stability. The differentiation in housing contributed to attracting different population groups by both coercion and choice, which created diversity that reduced segregation.

According to Stenberg (2015), the program's concrete use provided well-built enduring buildings with much potential. Since the builders could not afford too much variety contributed to a relatively high standard implemented. The improvements in building techniques and material science made it possible and economically viable to use materials that had never been used before, such as metal sheeting and raw treated concrete. Many promising innovations, such as piling and liquid foundations, were introduced (Veritas, 2009).

Usually, the apartments' size was significant compared to today's standards. The living units are typically divided so that the bedrooms are detached from social spaces, such as the living room and kitchen, and can therefore be reached independently of moving through them (see Chapmanstorg unit). Another quality usual to the record year's apartments is that there is often a circularity in the apartments through at least some of the rooms providing a movement from the darker areas to light spaces (examples in all

of the analyzed plans).

The suburbs are mostly not hostile to live in, nor are the vulnerable suburbs impossible living environments. It has potential; it is just that the influence over the area and the housing have been lacking for the residents to make it their own (Törnquist, 2001).

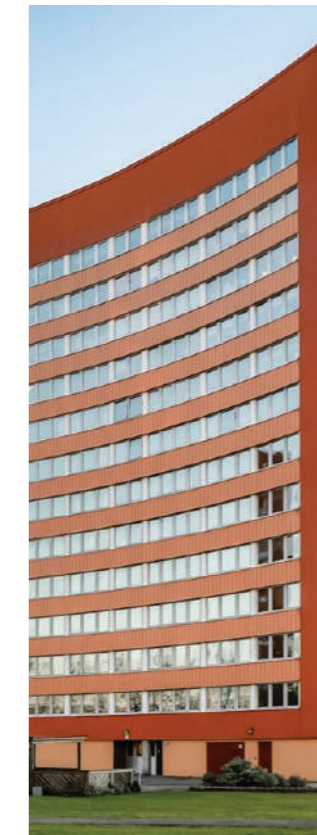


Figure (14) Västra Frölunda



Figure (15) Social housing in Europe



Figure (16) A living room in Hammarkullen, Jens S Jensen

ECONOMY

The economic aspects of any project like this can not be disregarded entirely, even though it is not this thesis's primary focus. The profitability of a refurbishment is a big part of anchoring it to reality. The decision to refurbish a building is a large and capital extensive one that is unlikely to be taken if it is not desperately needed. Nevertheless, many buildings from this era are owned by "allmännyttan" (look at terminology); the reasoning behind an intervention is always a matter of profitability.

Today there is no government-paid relief that a developer could ask for about a refurbishment project. It does not help that the housing companies today must comply with extensive regulations and various societal goals that place demands on a high rate of construction of new homes, energy efficiency, and increased accessibility. So to fund it, a developer must choose between increased rents or hope to get their investment back 20 years in the future, often contributing to the decision of substantial rent increases, which could lead to people having to move. A study carried out by the National board of housing, building, and planning shows that a standard refurbishment leads to an increase in capital costs of SEK 150-200 per square meter. This cost increase corresponds to a rent increase of approximately 30%. The total conversion cost is estimated to be between SEK 5,100 and 7,000 per square meter (Carlsson 2003), which could only be described as significant.

If measures are not taken, society's long-term costs can be high. However, in a new proposal from NCC and Sveriges Allmännyttan, they have concluded ten measures that could increase the pace of refurbishment in a financially sustainable way. The list is generally aimed at a societal level with essential regulations and loan capabilities that has to be designed in parliament, which could allow for decreased gentrification (see appendix).

What can be achieved short-term concerning the economy in a refurbishment? According to a survey, priority should be given to the measures that the residents want; this is because it is the willingness of the residents to pay that determines which measures will be carried out. The same survey has shown that residents primarily value improvements in social conditions, often lacking in redevelopment projects (Carlén & Cars 1990).

A financial refurbishment is a big undertaking for the developer, which provides little return in the short term through lower heating and maintenance costs. According to Johansson (1991), the best way to achieve as even and lasting profitability as possible should strive to mix short-term and long-term measures and implement as many of them as possible at the same time. According to Nordstrand and Landelius (2021), there are significant gains in the long-term energy savings within the million program, as these properties are currently energy culprits in Sweden. An energy efficiency improvement would significantly reduce up to 50% of the energy use in these properties. Even relatively simple measures can make a big difference. For example, the entire nordic import need for electricity could be saved if all double-glazed windows in Sweden, which are mainly found in the million program, were replaced with energy-labeled windows (Veritas AB 2009).

WHAT IS AN IDEAL RESIDENTIAL AREA IN THE FUTURE?

Globalization has further increased during the 2000s. According to Egelius in the book BoStad (2018), revolutionary political changes have led to increased privatization and reduced housing market regulations in Sweden. The building market is far from the regulated market that existed during the million program years. Torsten Hansson, an architect in Gothenburg, adds to that by saying that today's residential architects are aimed at the "strong people," unlike the million program, which was focused on everyone. (Hansson, 1991). By "strong people," Hansson means the middle classes, not the lower classes. A reason behind this could be the free-market thinking that has become dominant. Unlike the record years, today, the builders' profit interest has become the driving force behind most of the construction today (2018).

There are more aspects which have changed since the record years, the view of the ideal residential area has as well. An important part here is the balconies or terraces. Modern-day dwellings have increasingly become a symbol of status; therefore, individuality and uniqueness have become attractive aspects of the housing market.

The era of labeling and separation of spaces and services during the record years is the opposite of today's view of the ideal city. The belief is that separation leads to areas lacking city living conditions, such as offices, stores, and natural meeting places (Sax 2000). Today, instead, the call is for increased densification and mixing of services. Sustainability is central in the ideal residential area. Sustainable dwellings should be an investment, not a sacrifice, which will make it even more of a norm in the building industry. Consumption and production could be a common addition in the future dwelling. The introduction of greenhouses and cultivation could become a future trend. Sharing items such as tools or bikes is more economically viable and more sustainable; therefore, this is an aspect that will be a part of everyone's lives in the future. (BoStad, 2018).

According to SCB, 40 percent of Sweden's constructed dwellings are built toward the core family. However, Sweden has the most significant number of single households globally. The need for smaller apartments is therefore more significant than ever; this has to be prioritized and incorporated into the ideal residential area (SCB, 2022).

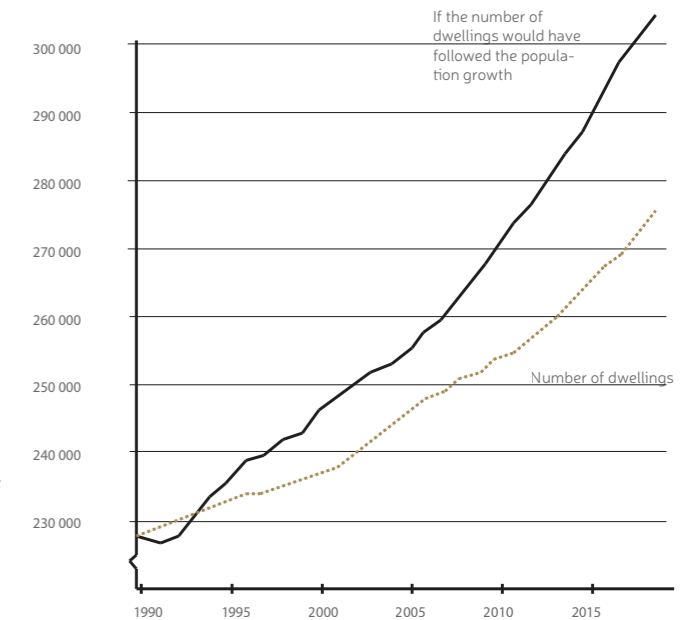


Figure (18) Number of dwellings in Gothenburg cities 1990-2019. SCB

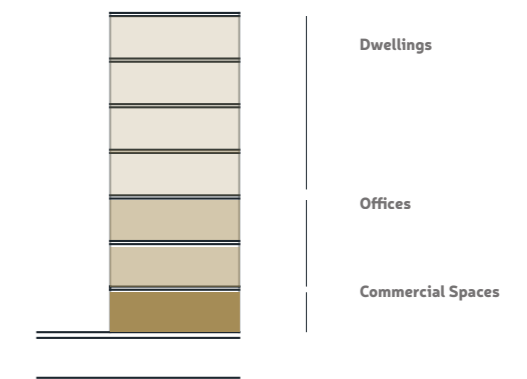


Figure (19) Illustration of the ideal city today

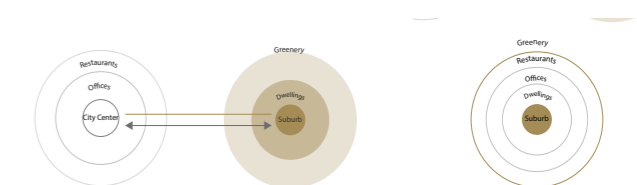


Figure (20) Comparison of services, the record years in comparison to today

ECONOMY

Generally, the building's outer walls often have good thermal insulation in the million program, but the tightness often needs improvement. Exterior walls with light unfolding sections are often perceived as draughty and cold since they leak more air than cast or masonry walls. The vast majority of the windows in the million program houses are double-glazed, while just under 5% of the windows from 1961-1975 are triple-glazed. Some have done well and have only needed routine maintenance, while others have fared much worse. For example, the windows may have poor sound insulation or thermal insulation. In those houses where the windows need to be replaced at the same time as additional insulation is made, the new windows should be moved closer to the new façade life to avoid cold bridges and negative effects on the facade (Dalenbäck 2012).

ment-based construction: wood-framed solutions are lightweight. For energy technology and building economy reasons, renovated or new balconies should be made as a self-supporting structure outside the new facade surface.

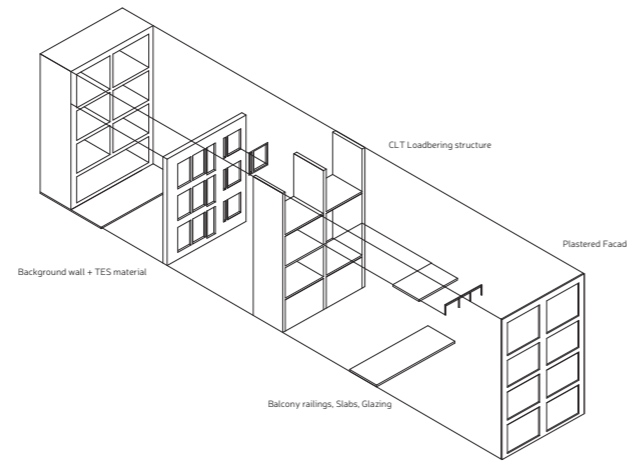


Figure (21) A possible assembly were the method is implemented.

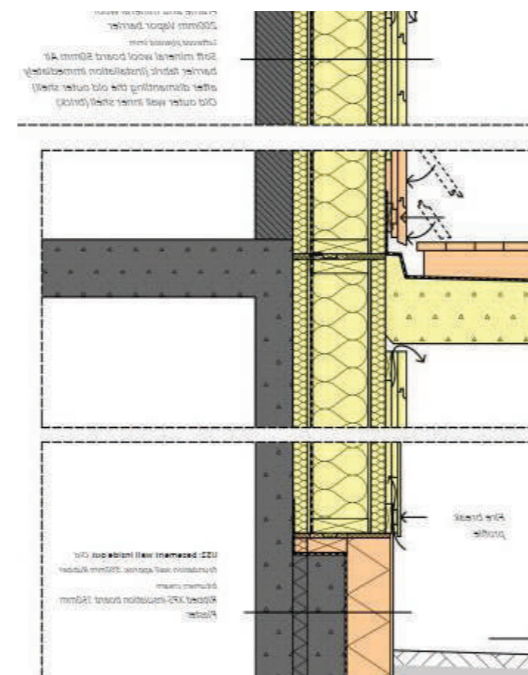


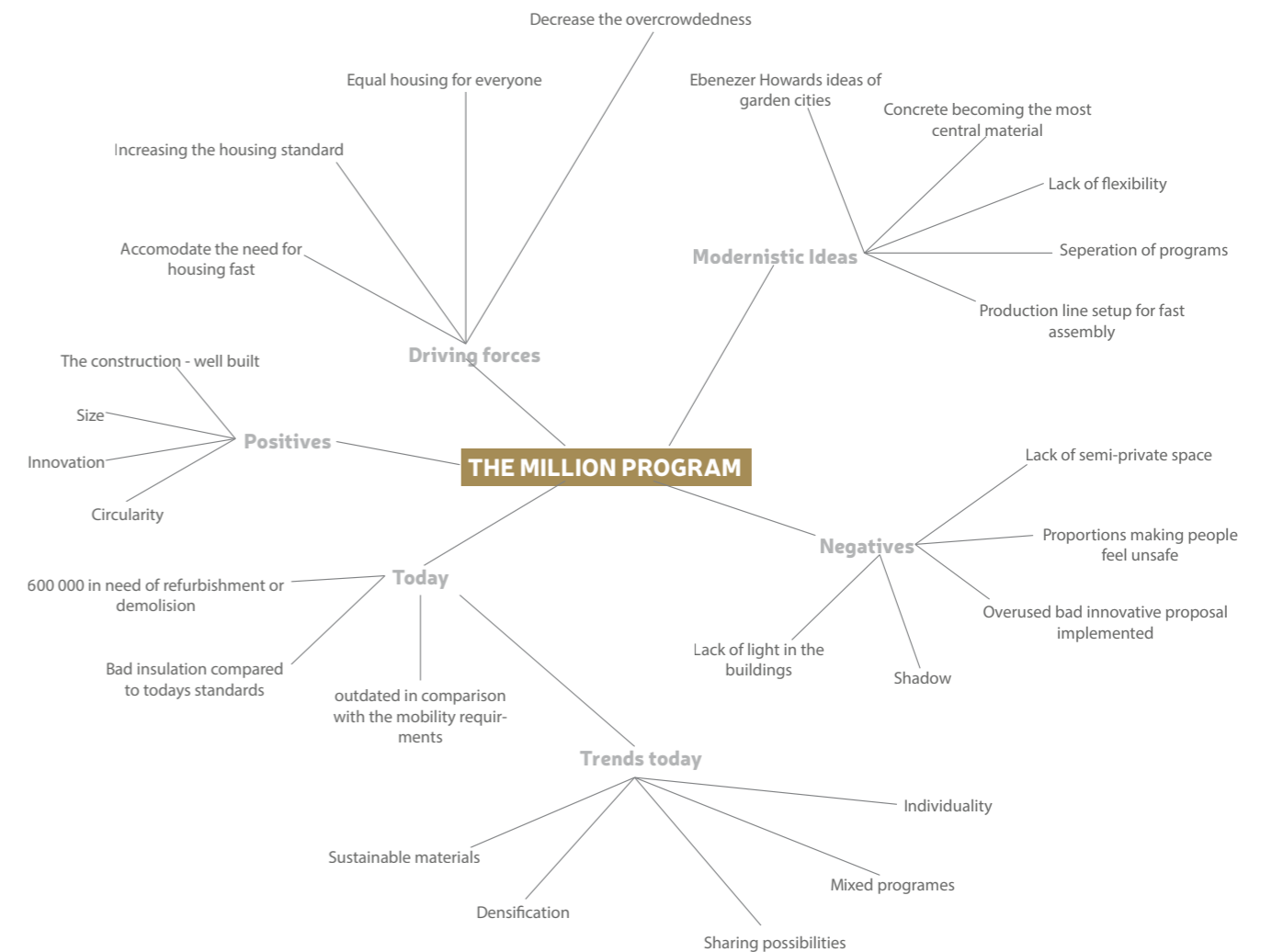
Figure (22) The TES facade Method in layers.

An excellent option to achieve energy improvement is the TES Energy Facade method. The innovative renovation method is based on an international research project in engineering and architecture faculties at the Technical University of Munich (TUM). TES is a facade repair method that enables continuous housing during the repair work. It is based on industrial wood construction and a data model-based design and implementation process. By utilizing industrial prefabrication and element technology, the working time on the site itself is considerably reduced compared to the on-site repair work. The process is more controlled since the work is mostly done indoors, reducing the waste material. The elements can also be installed directly on top of the old facade of the building, eliminating the demolition phase.

Residents and developers will also benefit from an increase in housing quality: as energy efficiency improves, heating costs decrease, and as thermal insulation increases, the home will be more drafted, quieter, and warmer after the renovation. The TES method uses wooden-framed, prefabricated facade elements. They consist of the following structural layers: compressible leveling wool (so that the element fits tightly against an uneven surface), a building board (stiffener), an air barrier (if necessary, combined with a vapor barrier), thermal insulation, and a self-supporting wooden frame, wind protection board (stiffener) and any external cladding.

The use of wood material is beneficial in ele-

SUMMARISING



Making it into five criteria

The aspect brought up in the text (present in the mind map above) is all-important for understanding the million program's buildings. For the net part of the thesis, these have been summarised into five main areas:

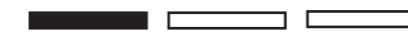
- Semi-private space
- Sustainability
- Gentrification
- Liveability in the plan
- Attention to heritage.

REFERENCE PROJECTS

THE METHOD OF ANALYZING

The focus has been on analyzing one project in each of the following categories: semi-private space, gentrification, economy, community involvement, and heritage. When choosing relevant projects to analyze, many different aspects have been taken into account. However, a lot of them encompass multiple aspects of this. Therefore the following tool was implemented to grade each area.

The grading system is as follows:



Average

The project doesn't achieve the objective



Good

The project achieves part of the objective to a certain level



Great

The project achieves the objective to a high level

Community and Semi-private space

The ability to create unity within the neighborhood by providing spaces where people can meet. Since it was found in the research part, residents primarily value improvements in social conditions (see page 21).

Avoiding Gentrification

Designing with relation to the economy. Building for the people living in the renovated projects since money can be more effectively spent when the residents are considered (see page 20).

Sustainability

Thinking of environmental footprint in decisions. Using solar panels, energy production, insulation sufficiently, etcetera (see page 22).

Liveability in Plan

Qualities implemented, which enhances liveability through implementations in the plan. The possibilities to furnish and how many possibilities there are for individualization (see page 15).

Attention to heritage

Thinking about the trends of the past in the design. Keeping good aspects of the original design qualities such as circulation, an elementary form, or material (see page 19).

Reference Project: Ørsted Gardens Apartment

Name: Ørsted Gardens Apartment
 Architect: Tegnestuen LOKAL
 Where: Frederiksberg, Copenhagen, Denmark
 Built: 2020
 Original building year: 60s
 Type: Residential extension
 Size: Facade

About the project:

The intervention is located in an area of Copenhagen characterized by more significant multi-story residential properties and detached residential buildings. The main idea of the Ørsted Gardens Apartments is built as a holistic environmental, social, and architectural counterpoint to the pragmatic renovations that are carried out all over the world today.

The architects say, "If we want to achieve a sustainable future, it is not enough that we build sustainably in the future. We need to have innovative methods to transform and adapt our existing building stock to the needs of the future in order to extend their service life and service life."

Ørsted Gardens is an example of a project that has taken a generic facade renovation to a whole new level and thereby future-proofed a highly criticized building for the benefit of the environment, the residents, and the surrounding urban space. The architect drastically changed the house's common, semi-private, and private living areas and their relationship to the road. Instead of choosing an ordinary facade renovation, which usually prevents water ingress on the open swallow passages and reduces noise from the road, a solution with a swallowing passage was chosen. Private living areas have been arranged on glass-covered terraces. The main idea behind this grip is to create a new kind of social space where the occupants of the house can meet each other in a way that is random, immediate, and with high frequency.

The incentive for this project is a change over time in what is considered "qualitative living." The original project answers an urgent need for affordable housing at the end of the 1960s. The presupposed quality of this housing was rooted in modernist ideas, like the existent minimum and provision of essential utilities, which is different from what we think to be suitable quality housing today. On the other hand, over time, the facade got worn off,



Figure (23) Comparison to the surrounding



Figure (24) The semi-private space created



Figure (25) The modularity created

Semi-private space	████████	████████	████████
Sustainability	████████	████████	████████
Gentrification	████████	████████	████████
Liveability in Plan	████████	████████	████████
Attention to Heritage	████████	████████	████████



Figure (26) Comparison with the old facade

Figure (27) The process and plan layout

it suffered from water erosion to the point it could no longer perform its water repellent and thermal function. However, the project is more than a restoration. It also meets increased expectations of what qualitative living is today as we want better thermal performance and more space in the form of outdoor space and access to greenery.

Qualities:

- Rethinking the usage of the facade
- Making an otherwise unfriendly space attractive
- Providing visibility and a view, connecting to a street in a sheltered way
- Prioritizing semi-private space, increase unity

Material:

- Glass
- Concrete extension
- Wood panels

Sustainability:

A new way of looking at the sustainability factor. In the intervention, they use environmentally unfriendly materials. However, they provide excitement in an otherwise uneventful and plain facade from the 60s. They renew what otherwise would have been demolished, which would have a substantially more significant environmental impact. The best building is the one already built.

Improvement

- Overheating in the summers? Can the windows be opened?
- Concrete parts in the intervention, Could a different material have been used?

Reference Project: Block G, H, I

Name: **Block G, H, I**
 Architect: **Lacaton & Vassal, Druot**
 Where: **GHI Grand Parc, Bordeaux, France**
 Built: **2016**
 Type: **Facade and Reurbishment**
 Size: **530 dwellings**

About the project

The project is the refurbishment of 3 social housing blocks, 10 to 15 floors high, within a comprehensive plan for renewal. The transformation of the units is a response to the gradual depopulation of the neighborhood on account of conditions of lack of comfort. The Lacaton Vassal approach was based on the Plus strategy, a manifesto written by Druot, Lacaton & Vassal in 2004. Initially, it brought much skepticism, but it found ground after a while and is still being exposed in various locations worldwide. In 2003 a new law passed into legislation in France, the Borloo Law. It created the tendency to demolish these 'undesired' housing blocks with the idea of urban renewal. This was in contrast with the growing scarcity of flats.

The plus manifesto was a statement against this national policy of demolition and reconstruction of the social housing stock. They suggested that improving quality and adding spatial value could be done by adding surfaces to existing structures. Changing the apartment layout to a more contemporary way of living, increasing the general well-being of the tenants, and all this at a reduced cost compared to the demolition, concluding, creating much room for little money.

Why transformation instead of demolition?

- Cost saving (about half of the demolition cost)
- Energy-saving (60% less heating consumption)
- Positive social impact: the tenants were not displaced, the rent did not rise, and the number of the apartments did not decrease

The concrete structures of large housing estates from the 1950s to 1970s were well constructed and generally did not need reinforcement. For Lacaton Vassal, it is not a question of heavy restructuring of the structures but targeted interventions such as replacing decades-old electrical installations, elevators, facades, or even the reinforcement of sound insulation, which does not justify breaking everything.



Figure (28) Comparison, old with new

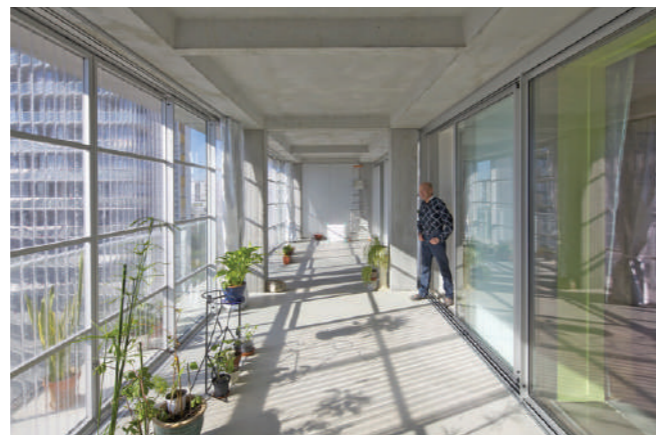


Figure (29) The space created



Figure (30) Intervention in compared to the surrounding

Semi-private space	██████████	██████████	██████████
Sustainability	██████████	██████████	██████████
Gentrification	██████████	██████████	██████████
Liveability in Plan	██████████	██████████	██████████
Attention to Heritage	██████████	██████████	██████████



Figure (31) Modularity

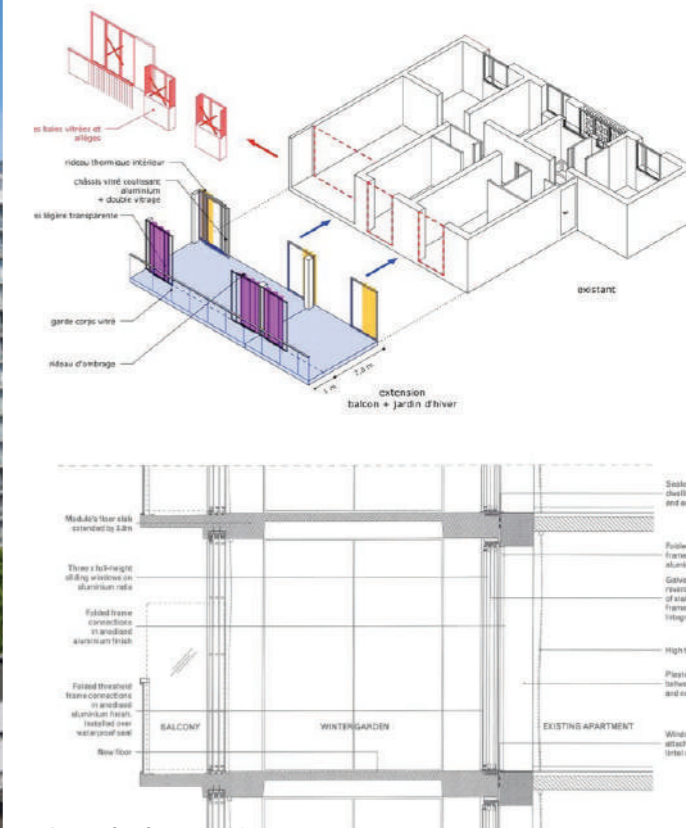


Figure (32) Detail of the extension

Qualities:

- By the adding more space, light and fluidity gets provided in all the apartments
- The addition of winter gardens and balconies large enough provides accommodation for different uses; they extend the apartments by complementing them with a 3.8m-deep buffer zone serving multiple purposes. In total, they increase the floor area of each apartment by approximately a third, giving the residents the opportunity to enjoy more daylight and views."
- On the other elevation of the building, the original concrete walls were taken down and replaced by new floor-to-ceiling, double-glazed sliding doors. Behind these doors, thermal curtains provide extra insulation

Material:

- Glass
- Concrete extension

Sustainability:

- There is no need to move the inhabitants since one apartment is always accessible in the building.
- The existing windows are improved with double

glazed variants

- The rent does not increase because, even if the share of gross rent increases, maintenance, and heating costs drop considerably, causing rents to stagnate. With the contribution of the winter gardens and the best envelope quality, the transformation reduces heating consumption by 60%.
- While winter gardens serve to improve the building's thermal performance, as well as fully transform the appearance of the building. Winter gardens had a specific impact on improving the thermal quality of the facade by acting as a heat buffer – they significantly contributed to a decrease in primary energy consumption–Prefabricated components, allowing for an efficient and rapid construction process
- The plumbing and ventilation systems were upgraded. Interior improvement interventions and restructuring of the bathrooms were also planned.
- Additionally, new penthouses and workshop areas were added to the project.

Improvement

Could the inside qualities be improved? Walls changed and so on?

Reference Project: Solhusen Gårdsten

Architect: **Christer Nordström Arkitektkontor**
 Where: **Gårdsten, Gothenburg, Sweden**
 Built: **2000**
 Original building year: **1969-1972**
 Type: **Residential building**
 Size: **10 buildings 256 apartments**

About the project:

In the 90s, the area of Gårdsten was suffering from severe social problems due to a more than 60% unemployment rate leading to poverty. This led to increased crime rates—contributing to the municipality-owned dwelling company introducing renovations to improve social and ecological sustainability and make much-needed refurbishments in three blocks of Gårdsten. Here 30% of the flats were empty, and the buildings were grey and hostile.

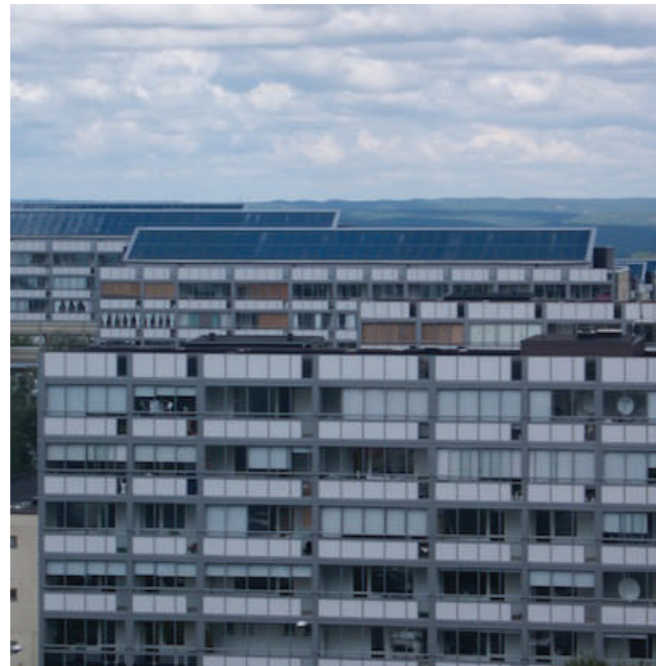


Figure (33) Present solar panels

The architects found “a total lack of natural semiprivate places to meet and get to know other tenants outside the apartments – as soon as you step outside the apartment, you found yourself in “no man’s land.” Therefore a lot of the focus was on opening up and brightening these areas. The common areas such as laundry rooms and social areas on the ground floor were prioritized with the addition of a general greenhouse to bring people together and increase the sense of unity in the buildings.

Today the area has turned into a popular housing area, with all apartments now rented (Gårdstensbostäder, n.d).

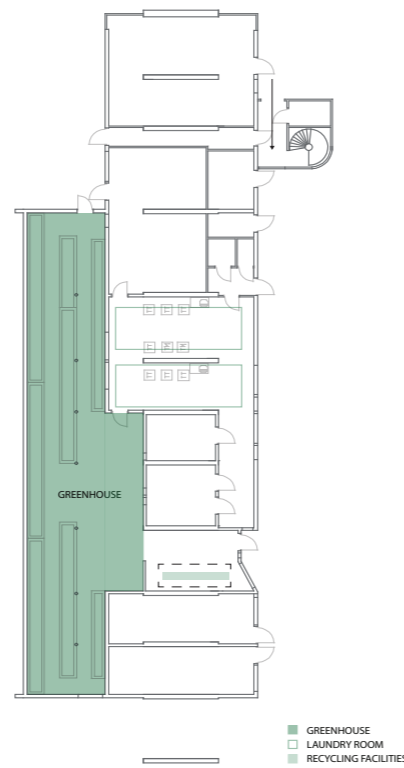


Figure (34) The ground floor

Semi-private space	████████	████████	████████
Sustainability	████████	████████	████████
Gentrification	████████	████████	████████
Liveability in Plan	████████	████████	████████
Attention to Heritage	████████	████████	████████

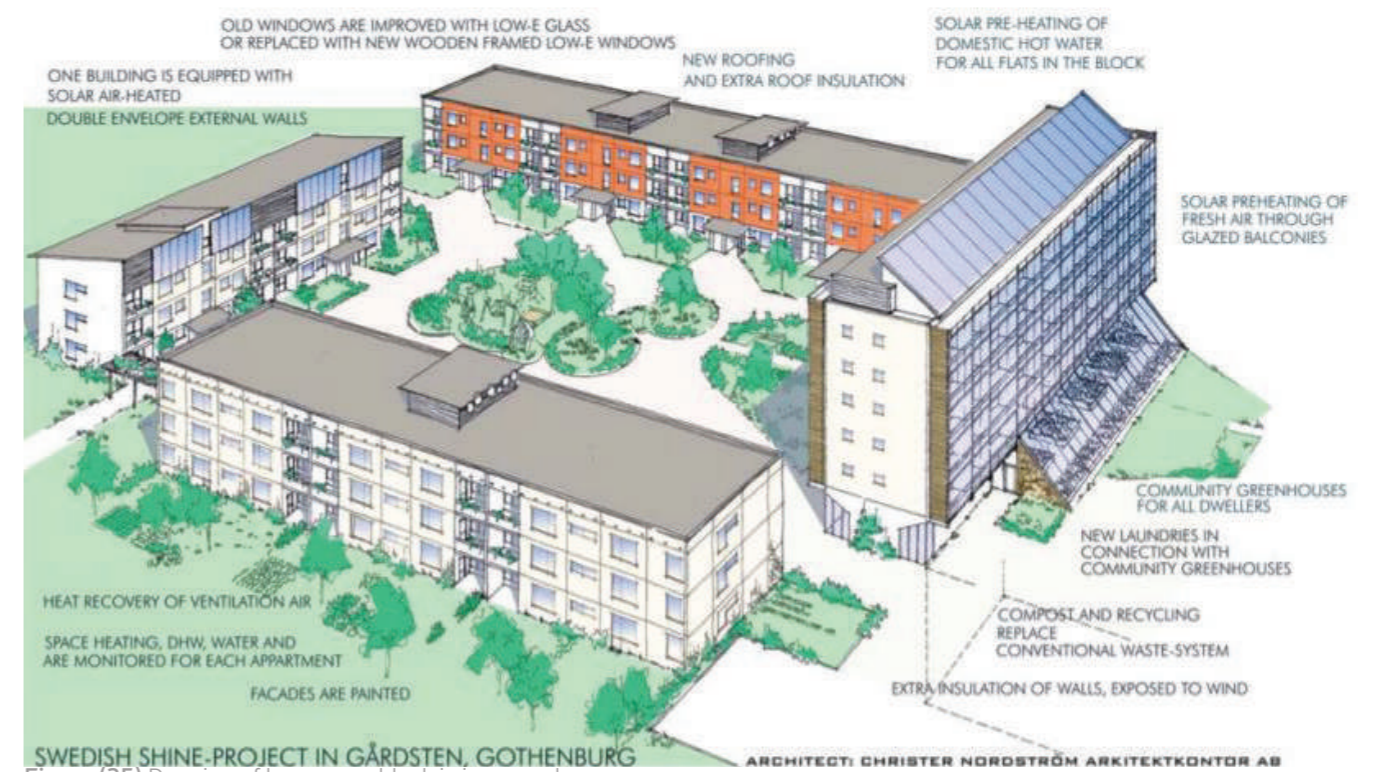


Figure (35) Drawing of how every block is improved

Qualities:

Semi-private space, to provide more unity
 It provides a feeling of making an impact through the visible sun panels
 Private gardens
 Cost-efficient
 Preserving and reinforcing the architectural qualities. The scale, shapes, and details of the buildings have been preserved and renovated concerning the original architecture.
 The sustainable renovation will lead to long life and low energy consumption (40% reduction)

Material:

New facades have been made of durable wood in order to create a more friendly outdoor environment.
 Apartments have been renovated and upgraded with new paints, finishes, and appliances.
 Glassed balconies.

Sustainability:

In all buildings, the roofs have been insulated
 The end facades of the 6-story buildings have been insulated.
 New low energy windows have replaced the original windows
 An advanced building energy management system has been installed
 On the south-facing façades of the six-story buildings, the balconies have been covered with a glass system

Improvements:

More private gardens
 No change in the apartments

Reference Project: Säteriet

Name: **SÄTERIET**
 Architect: **QPG**
 Where: **Platåvägen, Mölnlycke, Gothenburg**
 Built: **2007-2019**
 Original building year: **1969-1972**
 Type: **Facade and Refurbishment**
 Size: **780 dwellings**

About the project:

This is a limited budget renovation project where the architects have been in close cooperation with the tenants. The project has taken advantage of the area's and buildings' unique properties and character. To highlight the good qualities, fill in the lines and make it simple while adding extra finesse to the place. Old concrete elements with exposed ballast have been cleaned and highlighted through a contrasting play with new materials given new life by adding dark or light facade panels of teak and copper. There has also been a focus on a new division of the land. The focus has been to give the area courtyards and green areas. Those who live on the entrance level have been given a front garden in front of the entrance, which gives a cozy townhouse feeling. The project creates a sense of a new identity with the core values retained.

Awards:

The project won first prize in SABO Renovation of the Year 2019, which is the industry organization for Sweden's Allmännyttan. The residential area Säteriet was also nominated for the Helgopriset 2013 for a renovation that, with small funds, shows and develops qualities in a million program area.

Dialogue

One reason for the project's success is the close dialogue with the tenants. The seven blocks have each had a representative in a reference group. There they discussed what they value in their living and block environment. The school, pre-school, home care service and contractors were also involved in the process and presented their thoughts in workshops. Pretty soon, a plan crystallized where it became essential to maintain the character that existed in the area.



Figure (36) New material selection implemented



Figure (37) Semi private space created

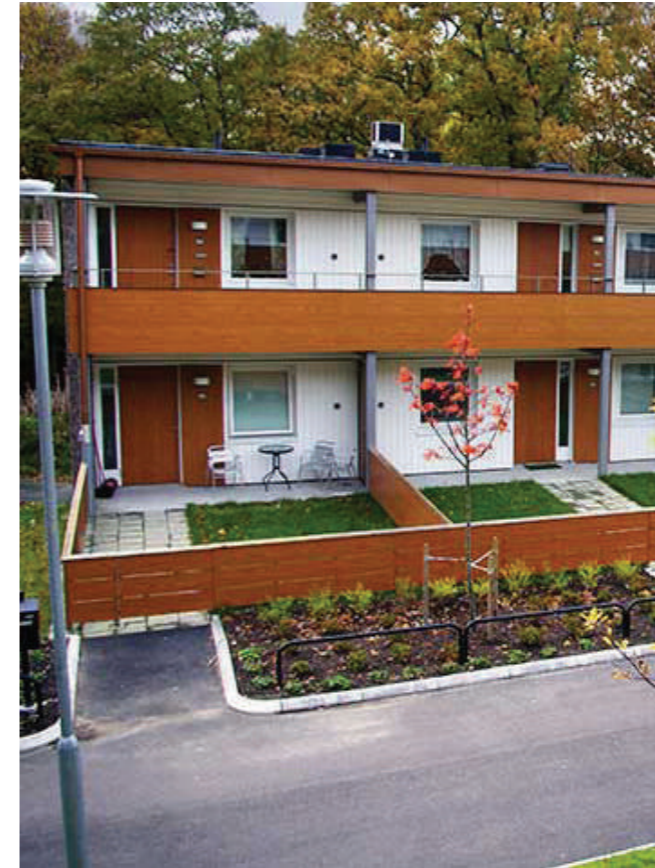
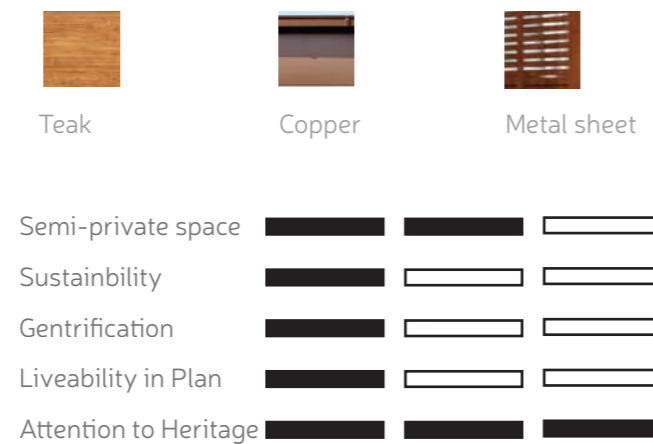


Figure (38) Semi-private space



Figure (39) Entrance situation

Qualities:

Qualities of the original design are preserved and enhanced
 Semi-private space created
 Complementing material selection

Sustainability:

Reuse with limited resources
 Making it an attractive living space that would be used for a longer time. The best building is the one already built.
 Introduction of solar panels
 Introduction of more vegetation

Material:

Concrete elements with exposed ballast
 Adding dark and light facade wood panels
 Teak
 Copper

Impact of the intervention:

Addition of glassed balconies
 Better insulation
 Less carbon-intensive material as the cladding

AESTHETIC INSPIRATION REFERENCE PROJECTS



Figure (40) A visualization of the proposal

The 'Bark' proposal Schauman Arkkitechdit ja Schauman & Nordgren Architects

The following proposal is from a competition in the town of Malmi. In the project, the City of Helsinki's housing production tasked a few architectural firms to refurbish eight concrete prefabricated buildings, all 3 to 4 floors high. It was up to the competitors to plan the renovation, facade repair, and upgrade of the site using as much wood material as possible.

The proposal raises all buildings evenly with two wooden floors. It consists of graying wood cladding and an eaves roof. The facades are extended through a partly covered balcony area, and the old outer facade is opened up through the large openings in the wall surfaces. The large apartments have two floors, so there is no need to take the staircase and elevator to the top level. The load-bearing wall lines have been preserved, and the additional layers of wood require only the reinforcement of the foundations.



Figure (41) The facade of the project

Bogerse Velden Social Housing / META architectuurbureau

Name: Bogerse Velden Social Housing
Architect: META architectuurbureau
Where: Lier, Belgium
Built: 2019
Size: 3 semi-detached houses

A residential project in Lier in Belgium consists of multiple different building types. However, the most intriguing part of the project is the 14 terraced houses in which the ground floor and first floor are always identical. A shallower volume is provided on the second floor, placed either on the street or the garden side. In the more compact houses, the second floor has been omitted. The alternation of the different dwellings creates an attractive volumetric situation within the row of houses.

SITE

HAMMARKULLEN

One mile, or roughly 17 minutes by tram, to the northeast from the city center of Gothenburg, there is a suburb called Angered. It consists of 10 different areas, all built during the record years in Sweden. Today one-tenth of the population of Gothenburg call this area home.

Angered has a young population; half of the inhabitants are younger than 30, and only 10 percent are older than 65 (Göteborgsstad, 2021). The suburb is today seen as an area of social-economical status in Gothenburg, with many people being in the lower income bracket in the country. Three of the sites are on the police lists of particularly affected areas. These are Hammarkullen, Hjällbo, and Lövgärdet.

The police define a “particularly affected area” as a place with a disinclination to participate in the legal process. People in these areas are usually discouraged by threats and abuse if they were to testify or report a crime. This makes it incredibly hard for the police to maintain a law-abiding society (Törnquist, 2001).

The site of this project is called Hammarkullen. It is one of 4 to 5 areas in Sweden that has been allowed to stand as a symbol for the million program’s residential areas. It is known for its underground tram stop, the only one in Gothenburg, its closeness to nature as Vettefjäll (GAKO, 1971), and its annual Carnival. The housing stock consists predominantly of tenancies of lamella housing, built between the 60s and 70s, large owned by the municipality-owned company Bostadsbolaget.

The housing is based around Hammarkulletorget, where one can find a pizzeria, a hairdresser, a swimming facility, an elderly care facility, a library, a university, and a community building (Folketshus). Close to this, the only park is located called Hammarparken. Hammarkullen is an area with a primarily mixed heritage, about 85 nationalities are represented, and 86.5% of the population have a foreign background. The proportion of foreign nationals is still rising sharply. In total, approximately 8000 people live here today.

As a district, Hammarkullen is well delimited to its surroundings. The area is nestled with tall trees, which to some extent reduces the large-scale of the

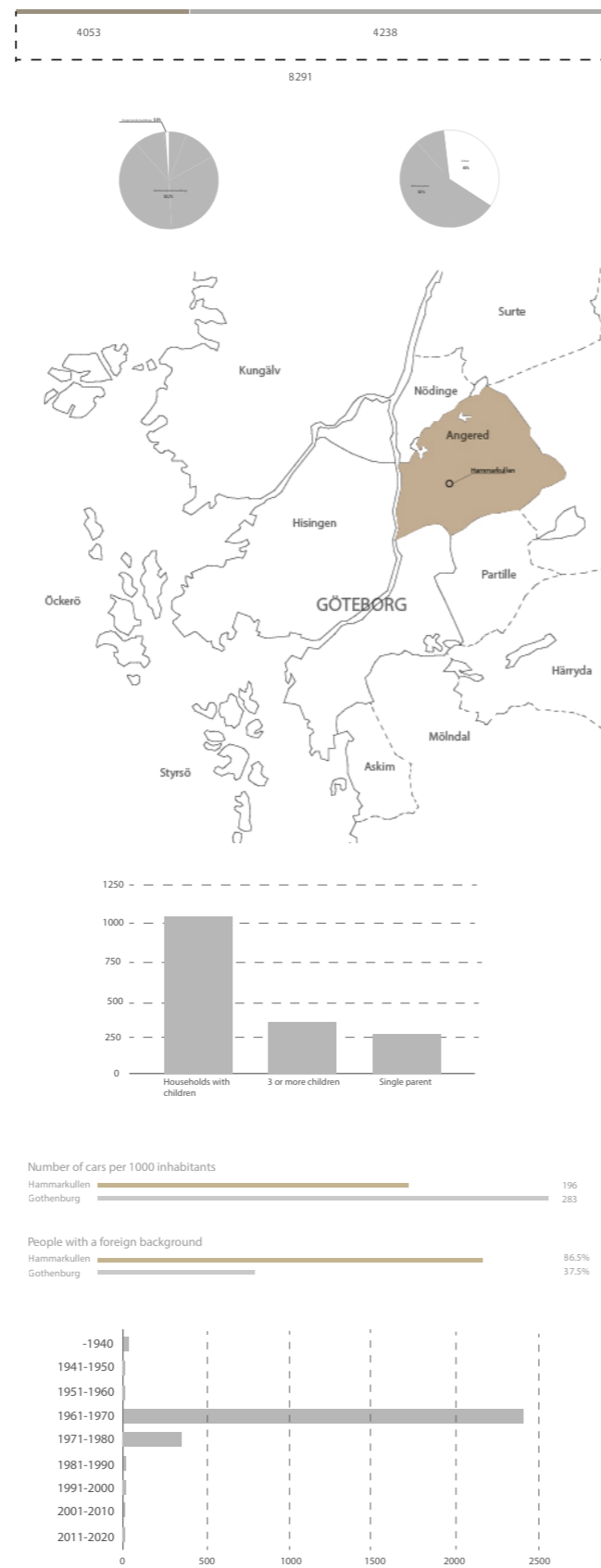


Figure (42) Göteborgsbladet 2021

SITUATION PLAN





Figure (43) Photograph Jens S Jensen

buildings. Steep elevation differences and forests surround the whole area. It is easy to perceive enclaves like Hammarkullen as a collection of small islands, isolated in their own way. However, footpaths and cycle paths connect them, but they are sparsely utilized (Törnquist, 2001).

The reason for Hammarkullen's location is that the building method utilized in the era required a large area to allocate the large track-bound cranes used.

During the 70s and 80s, the area embodied what the politicians had envisioned when deciding on the Million program. The occupation was mixed between the middle class, the workers, and the elderly. It was a multicultural hub where people came together for the newly started Carnival (1974). At the same time, the closeness to nature was cherished and widely used.

However, relocation was high from the beginning. For many, Hammarkullen became just a stop on the road (Törnquist, 2001). Old neighborhoods would be removed to get people to move to Hammarkullen. The industry needed people; this is where they ended up. It is tempting to see Hammarkullen, if not as a battlefield, then at least as an arena for the battle between the popular ambitions that were the core of the million program and the lousy development after the area's completion.

What speaks for Hammarkullen has always been its robust identity. It is something to be a resident of Hammarkullen; there is a modern equivalent to a sense of frontier. Since the 1970s, a very active and responsible local community building has been going on in Hammarkullen, driven by a high degree of organization and zeal among the residents and the officials in the area. A work aimed at stability, self-esteem, and activity in the area. Lennart Zintchenko says that Hammarkullen is a settler district in a changing Sweden. In a report, he says he finds a sense of a "settler spirit," a spirit where nothing "sits in the walls" and where the work and not least the cooperation between municipal administrations and the resident (Zintchenko, 1992).

According to Törnquist, untiring local communities have been working here for decades, with great success and severe setbacks. One of the setbacks is the limitation regarding the residents, especially the people that are still relocating here. Those who stay for a few years to later move on elsewhere which



Figure (44) Photograph Jens S Jensen

DIAGRAMS OF HAMMARKULLEN



Movement axes



Green areas



Purposes



Car movement



New Development

never intended to stay from the beginning. In this sphere, the unoccupied apartments and the uncontrollable occupancy in different rounds affect the district negatively (Törnquist, 2001).

At the same time, there has been an active counter-image in the media coverage of Hammarkullen since the beginning of the seventies. This has made it difficult to be objective about the suburb, especially the first black and white images from Jens S Jensen and others, which show the buildings large scale in an equally appalling grayscale (Törnquist, 2001). The area was painted as a “future nightmare” in the newspaper Göteborgsposten already in 1969. While the newspaper Aftonbladet described the area, “When the first residents in Hammarkullen were moving in, the people of Gothenburg agreed- A new miss by the architects.” It went to such an extent that a nine-story building to the north was demolished, as it contributed to bad press. A few semi-detached houses replaced it. (Upptäck angered, 2005)

Later in the 90s, another blow came in the form of the economic crisis, which contributed to lower life expectancy, more people moving from the suburb, fewer people passing school, and poverty rising. However, the strong and active civil society from the 70s and 80s has stayed with various associations working in the area.

Future of Hammarkullen

Recently the city of Gothenburg created a policy to remove the areas from the police list by 2025. The municipality-owned company Framtiden (owner of Bostadsbolaget) has developed strategies to achieve this in Hammarkullen. They are now planning to upgrade Hammarkullen with the addition of new dwellings, renovation of one of the building blocks, and demolishing the leading commercial building. The square of Hammarkulletorget is the first part of this process.

According to Framtiden, the area is planned according to the goals within an equal Gothenburg, which means creating sustainable and equal living environments. In particular, they believe that urban planning must contribute to a more cohesive area where mental and physical barriers must be reduced. Furthermore, they will also focus on clarifying lanes for walking and cycling while supporting attractive and safe public transport. The plan is to work from the inside out by strengthening the local square since it is an integral part of

the suburb’s overall urban development strategies.

Along the north-south axis, Hjällbovägen in the north via the square to the area Sandeslätt in the south should be planned to have increased activity. To strengthen the attractiveness and increase orientability and security along these routes, they should be developed with variety, inviting ground floors and new buildings.

The east-west section is being developed into a green connection connecting the homes’ existing park and nature areas. The north-south section is planned to be more urban, while the existing pedestrian and bicycle paths will be strengthened to and from the square. At the same time, they will change the pedestrian road Lilla Blomstigen to a new entrance for the public transport to the square. New buildings will be placed to support these continuous lanes and contribute to creating clear urban spaces.

As the research from Göteborgsstad (2021) states, Hammarkullen is home to a large proportion of young people who want cheap housing at the same time as many large families are overcrowded. Both small and large homes are therefore in demand. At the same time, the need for renovation is demanding. Framtiden proposes that one way to address these challenges may be to build smaller apartments in new construction and, at the same time, renovate and rebuild or merge apartments in existing stock into larger ones.



Figure (45) View of the new square. Link Arkitektur

GROPENS GÅRD

Gropens gård is one of five areas within Hammarkullen. Gropens gård is located in the north of Hammarkullen, and the inhabitants primarily consist of families with children. The name Gropens gård is originally from the fact that it used to be a pit from a previous quarry. It was designed in 1968 but completed in the mid-70s after the construction of Hammarkullen. The architect was Stig Henrik Lundgren who also designed Bredfjällsgatan (Upptäck angered, 2005).

It has a unique profile contributed by its more human proportions, compared to bredfjällsgatan and Hammarkulletorget and its six separated building volumes, which provide good conditions to function well and a good residential area (see page 11). There are 211 apartments; 42 percent are two-bedroom apartments, 33 percent are one-bedroom apartments, and 20 percent are three-bedroom.

The buildings are made through the bookshelf method, where the loadbearing elements are inside the building. Concrete is the primary construction material, while metal sheets and wood are the primary cladding materials. The residential areas placement creates a strong connection with the square, Hammarkulletorget, and the nearby school. Gropens gård has hosted other programs than living units since one of the buildings at Gropens gård used to be a resource school. (Törnquist, 2001)

During the years, Gropens gård has changed owners multiple times with a history of mismanagement and bankruptcy. It was designed for private owners and has stayed that way until recently, when municipality-owned Bostadsbolaget acquired it. Over the years, few and low impacted refurbishments have been made. Today the buildings are in bad shape with apparent thermal breaches and complaints about the lack of warmth inside the buildings.

Recent interventions in the area have been installing underground garbage disposal facilities, garages in the parking lot, and two new designs of the inner courtyards. Influence from the residents over the physical environment has always been lacking, according to the residents.



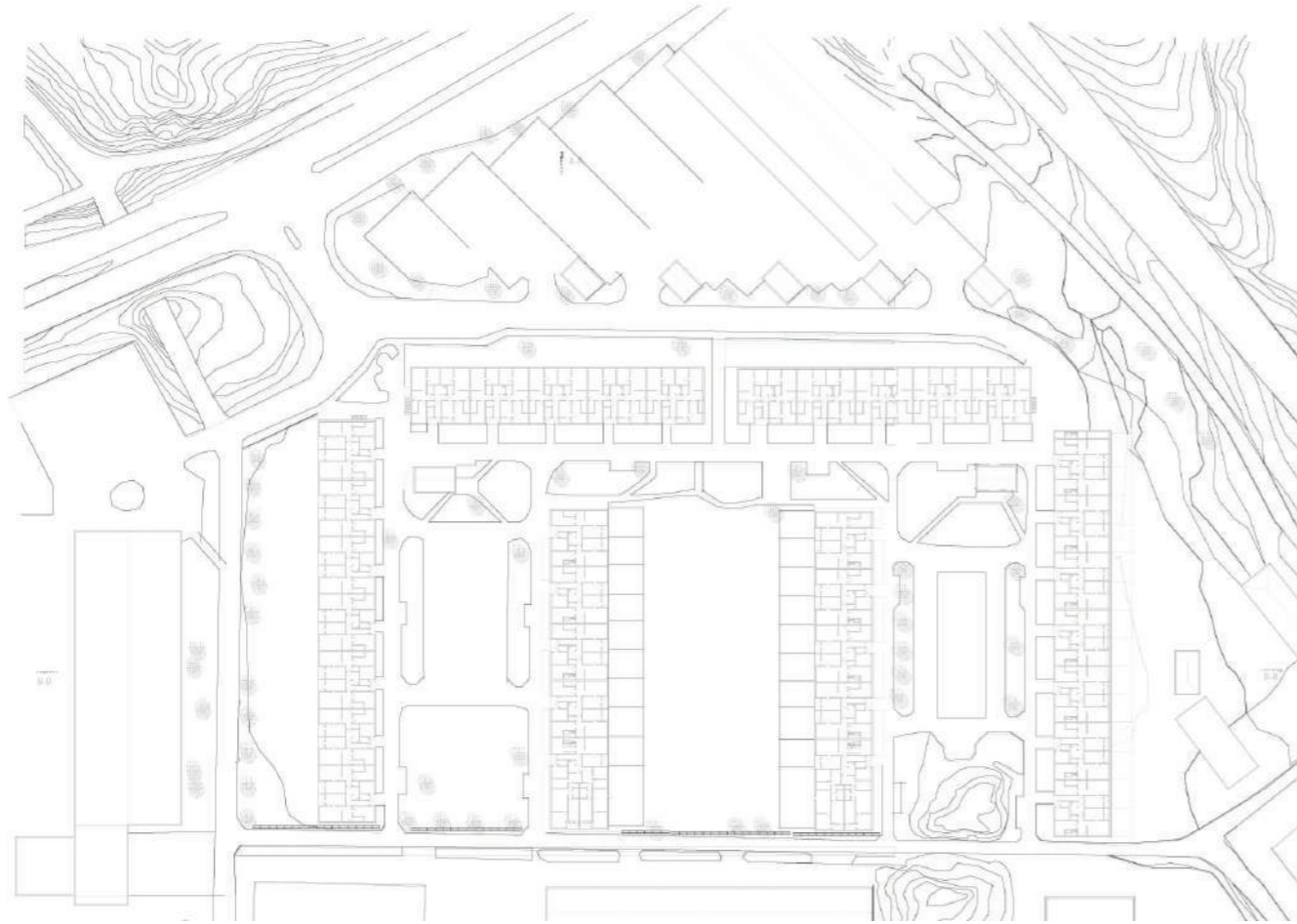
Figure (46) View of the main street



Figure (47) Facade condition

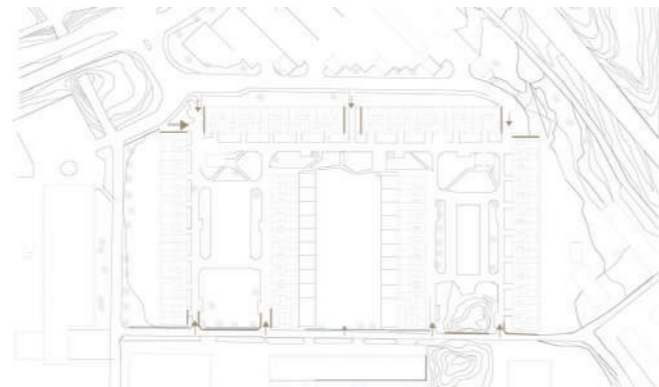


Figure (48) Basement where current laundry rooms is located



Flow and areas of activity

At Gropens gård, there are some central areas of activity. Most central of which is the meadow which is used for events and general outdoor activities.



Entrances

The pedestrian road to the south is widely used. There is a movement within the area of cars, such as mail cars and people moving. The rest mainly consist of people walking through the area to get to the parking lot as well as general residential movement. The municipality is planning a public transport road to the west, providing a new relationship with the buildings in the west of Gropens gård.

STATE OF THE AREA

Taking it into their own hands

From walking around the area, the need for refurbishment becomes clear. The facades are in a bad state; rust is apparent in places. The wood cladding in entrances and balconies has disappeared in different locations.

However, there is also visible evidence of people taking their dwelling situations into their own hands through creative ways of making them their own by adapting them to their own needs.

See figure 49, where an example can be seen where a resident converted their balcony supposedly to provide more living space for the family. There are multiple examples of other forms of adaption, mainly relating to these balconies, ranging from extensive interventions like the one in the photo to smaller ones.

According to a public survey, a visual mapping of Hammarkullen was conducted by Liane Thuvander, Jenny Stenberg, and Alfredo Torrez in collaboration with Chalmers and Hyresrättsföreningen. According to the public, Gropens gård is the area in most need of refurbishment.



Figure (49) The residents taking the issues into their own hands

Satisfaction with the condition of the apartment distributed at the various addresses

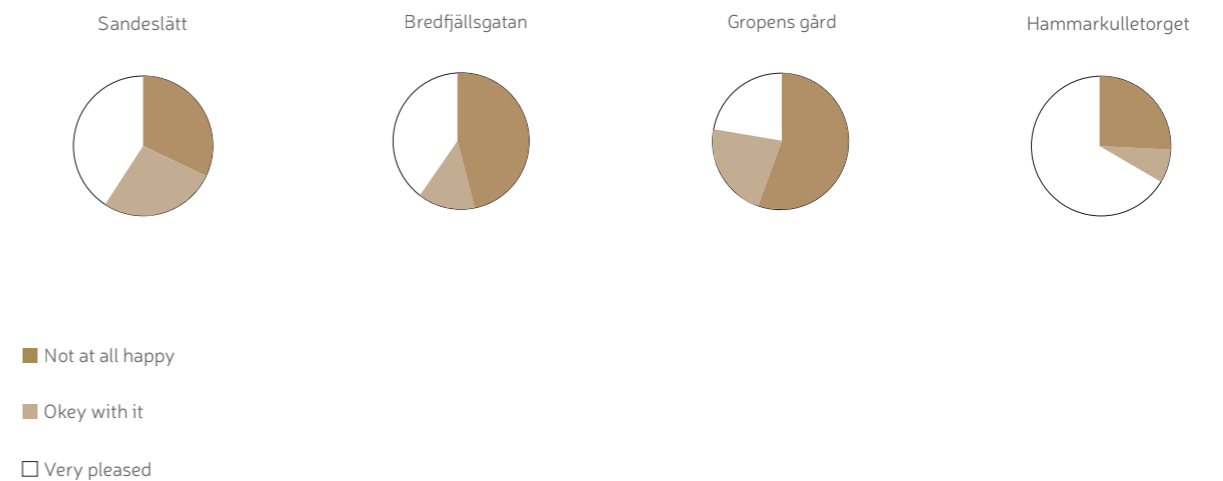


Figure (50) Survey by Liane Thuvander, Jenny Stenberg and Alfredo Torrez



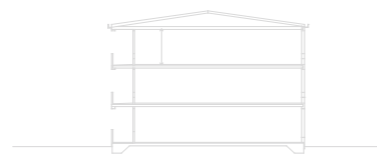
East Facade



South Facade



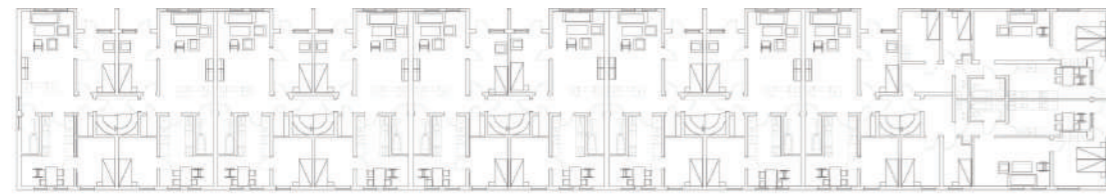
North Facade



Section



West Facade



Ground



1st and 2nd

PROCESS

THEORY APPLICATION

There are conclusions to be made from the reference projects. None of the projects has fulfilled every aspect, even remotely, of the material gathered. Although every project seems to have its strong suit, the focus on social aspects and semi-private space in Solhusen has been a large part of its success. To start the design process at Gropens gård, these same five areas of intervention will work as a starting point for this architectural intervention.

Community and Semi-private space

To create unity within the neighborhood, spaces should be provided where people can meet. There should be an implementation of a community space where the many associations of Hammarkullen could meet. The entrance areas should be widened and furnished.

Gentrification

An interview has to be made to design concerning the economy, which could work as a foundation for prioritizing the changes needed in the building and surroundings.

Sustainability

The environmental footprint should be considered in the renovation through material choices and energy production on the new roof and by providing a well-insulated, energy-efficient shell, TES method

Liveability in Plan

An analysis should be made; qualities need to be found and enhanced to improve the liveability.

Attention to heritage

This same analysis needs to provide the heritage aspects in the form of qualities. Since the character should be kept, a similar-appearing facade should be.

INTERVIEW

According to the survey (see theory) Carlen and Cars conducted, priority should be given to the measures that the residents want; this is because it is the willingness of the residents to pay that determines which measures will be carried out. The same survey has shown that residents primarily value improvements in social conditions, often lacking in redevelopment projects (Carlén & Cars 1990).

This inspired the belief that an interview was essential to achieve a good project. The decision was made to use a semi-structured interview style to enable room for spontaneity while still keeping a structure to follow. The interview was conducted with five of the residents in the buildings of Gropen gård,

two males and three females with different periods of living in the area. The participants were gathered through convenience sampling in contact with the tenancy association of the area. It was made according to their suggestions on what they wanted to be changed and improved. A priority list of interventions resulted from the interview (see next page). Underneath, one can find some of the quotes from the interview.



5 years as a resident

"We like it here. The plan has a soul, unlike many new buildings being constructed today. We have never thought about moving away, but hopefully, in a few years, we will be able to get one of the larger apartments at Gropens gård."



25 years as a resident

"I have lived here for 25 years. I like it here. I have a great garden and good friends. I like the openness of the courtyards, but I believe that there is too much insight into the apartments and the balconies."



6 years as a resident

"There is a great community here, although my children and I freeze during the winter. Some windows have not been changed since when the building was built. This is not good for anyone."



9 years as a resident

"Compared to the rest of Hammarkullen, Gropens gård has better proportions. I think it is more suited for families."

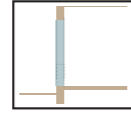
STRATEGIES

The Site



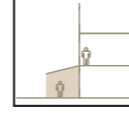
Encourage gathering

Provide sheltered spaces where people can meet



Create transparency

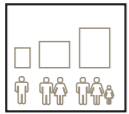
Opening up the facade to provide safety



Providing privacy

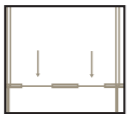
Create privacy for residents

The Building



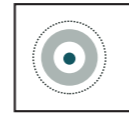
Apartment journey

The ability to make an apartment journey within the building



Extending Balcony

The balcony as an extension and as an aspect for improved living quality



Hierarchy of spaces

Reintroduce the semi-private space



Circularity

Keep and improve the circularity inside the apartments

QUALITIES IN PLAN

2 Bedroom apartment



This apartment is the most common in the area:

Positive:

- Circularity
- Large living room
- One centered shaft

Negative:

- Equal size bedrooms
- Small kitchen and WC
- Draggy Balcony
- Comparison measurements not fulfilled

First floor module



This is the general groundfloor unit in the dwellings:

Positive:

- Some circularity
- Large living room
- Two centered shafts

Negative:

- Equal size bedrooms
- Small kitchen and WC
- Draggy Balcony
- Comparison measurements not fulfilled

3 Bedroom apartment



The largest dwelling unit.

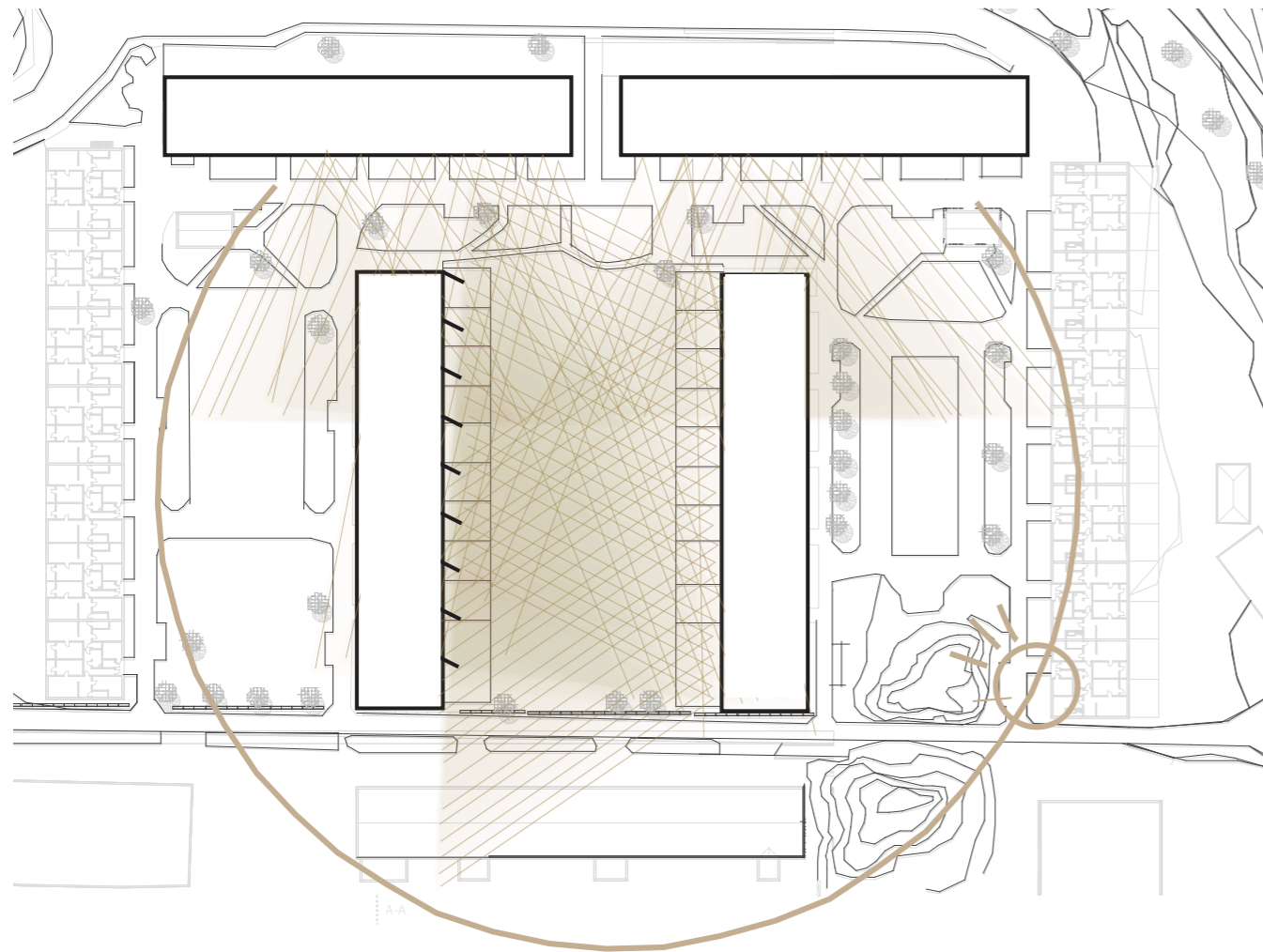
Positive:

- Two bathrooms
- Large living room
- Generous entrance situation
- One centered shaft

Negative:

- Equal size bedrooms
- Small kitchen and WC
- Draggy Balcony
- Comparison measurements not fulfilled

LOCATION



The chosen building is one of the two connected to the central meadow where the residents like to have events. The reason is its unique location in this larger public space. Today when walking there, one feels observed; this, in connection to its central connection, makes it ideal for implementing a shared community space in the area. The different apartment sizes in the building were also intriguing. By adding one more floor, it could also work as a visual beacon of change for the entrance of Hammarkullen as well as the suburb center.

Since the thesis is based on using what is at hand, the effort is made to improve in a way that is not foreign to the site itself. Efforts have been made to keep material qualities and proportions. One of the reasons behind choosing this part of Hammarkullen was the size of the buildings. Unlike the large lamella multi-residential housing of the extensive million program, it introduced more minor proportion qual-

ities which erase many of the issues of the feelings of unsafety generally perceived with the scale of these buildings. At the same time, it provides different possibilities for unity.



DECISIONS TAKEN

Identified problems	Proposal	Why?
- Bad placement of laundry rooms	-Relocated and improved laundry room	- Provide safety
-No space for the residents to gather	-A common room	-Increase unity and provide a better social climate
-Unmodern plan layout	-Change of the unit plans	-Provide a more significant quality of spaces and to modernize after today's needs and demands
-Visibility issues	-Make active areas more transparent	-Provide safety and community
-Unchildfriendly area	-Obstacles added for cars	-To make it more child-friendly
-Potential for densification	-Addition of a new floor	- Improve the economy and diversify
-No gathering possibilities outside to meet sheltered from the elements	-Outside seating	-Improve unity
-A lot of heat waste	-Build away the interior balconies and change the facade	-Decreased waste of energy, making it more sustainability

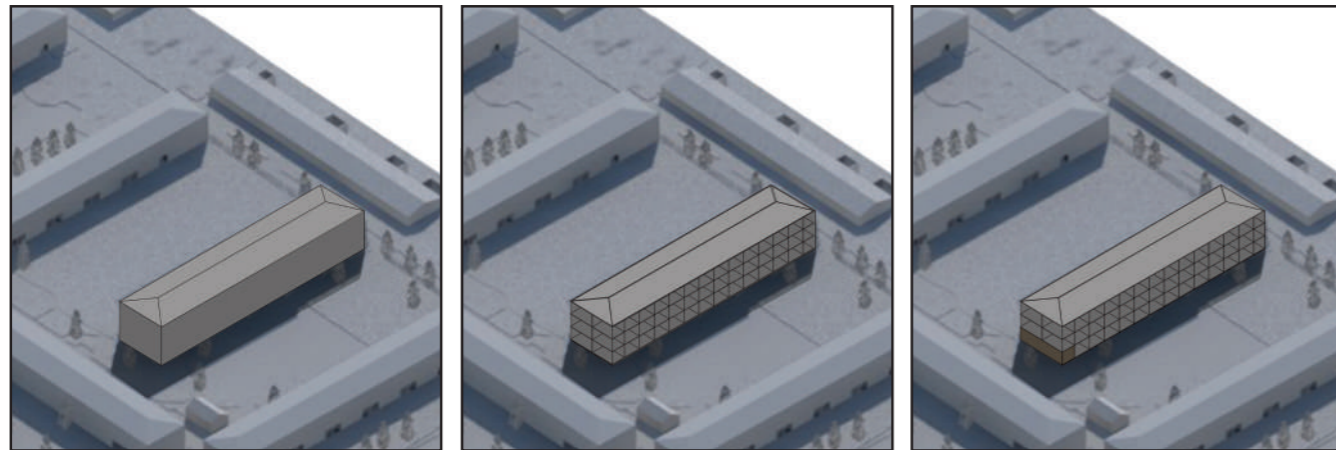
The New Floor

- Provides increased rent for the developer
- Enables a more extensive range of different apartment sizes, which would allow for an apartment journey within the area
- Providing a shared terrace

Why the Scale?

To provide a proof of concept in one building. At the same time, giving a proposal to fix the issues on the site pointed out by the residents interviewed to provide a more liveable area.

VOLUMETRIC TRANSFORMATION



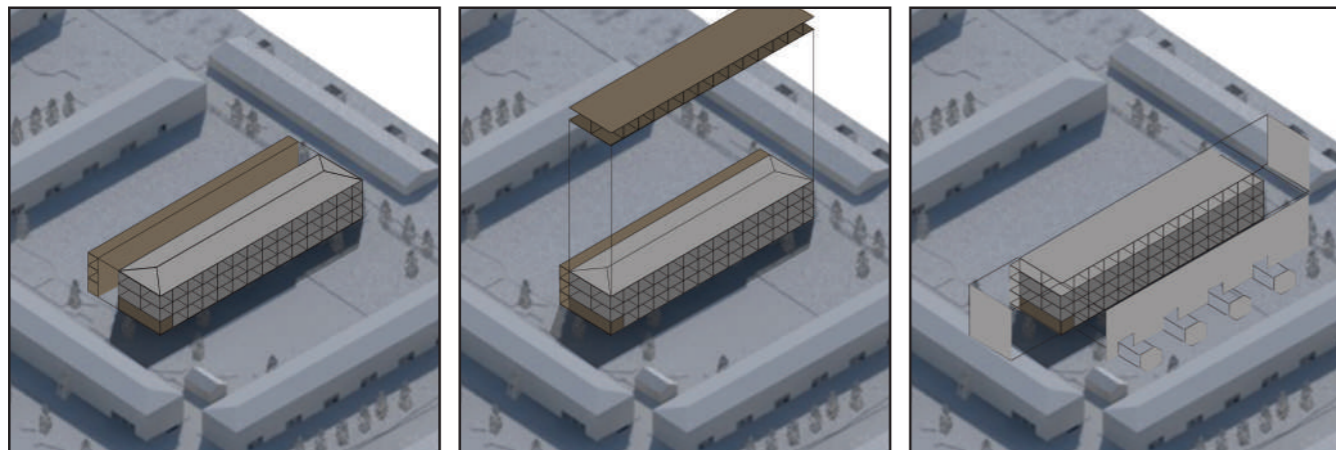
The building its context

Stripping the building of the old facade

Since the facade is in a bad state, it needs to be changed.

Opening up the northern facade

The residents identified the laundry rooms as being in a suboptimal location. Because of people's flow, the north is an ideal location for a transparent laundry room and gathering room.



Eastern facade extension

To provide more oversized balconies for all the residents on the very sun profitable east.

Addition of a new floor

The building will get extended through a lite CLT floor to increase the profitability and achieve the apartment journey strategy.

New entry extensions and new timber cladding

To increase the level of safety, semi-private space is provided in each entrance situation through an extension. To address energy effectivity, a new facade is added.

MATERIAL RESOURCE EFFICIENCY

Material choice

The aim is to keep the design expression of Gro-pens gård. Therefore the color will be kept. However, a more sustainable wood facade will be implemented instead of the steel facade. This would be colored and adapted for low maintenance to improve the profitability and longevity of the building.

The windows implemented would be triple glazed to provide the best heat effectivity.

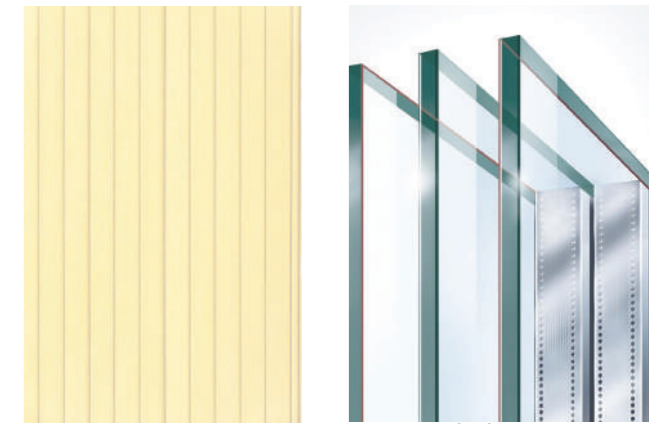
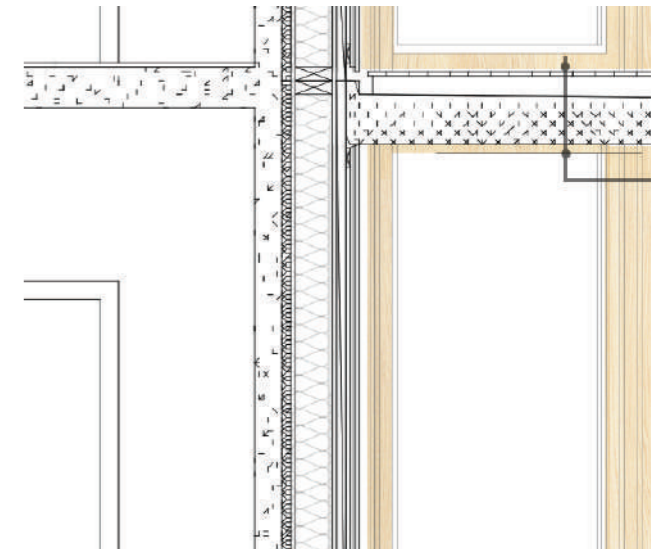


Figure (51) Triple glazed

Mineral wool

Mineral wool is the insulating material chosen. This is because mineral wool has a better (lower) thermal conductivity than cutter chips, about 0.04 W / mK . Although glass wool is manufactured to a certain extent from recycled glass, mineral wool must still be regarded as mainly produced from stored natural resources, even though it requires more energy to produce. However, it is possible to recycle to manufacture new insulation, although there is no recycling from demolished houses yet. This could change in the future with the world becoming more aware of the environmental challenges present.



Energy Production

The psychometric chart for the era has been consulted in the design, and aspects such as passive solar heating and south-facing windows have been implemented to provide better heat effectivity and lower heating costs.

Ways of producing energy have also been made a priority, with the introduction of solar panels on the roof and geothermal heating. Production is an essential aspect of the sustainability of the building and could today be a very profitable investment for the property owner.

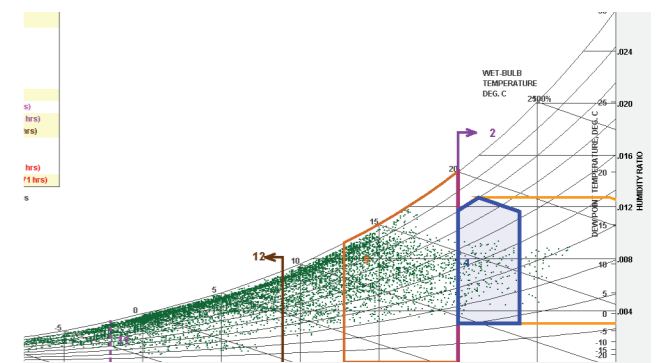
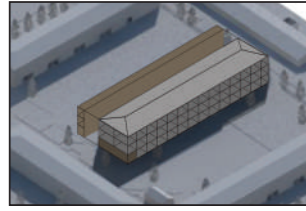


Figure (52) Solar panels

FACADE PROCESS



This part of the extension is essential since it is related to many improvement areas for the residents. It should improve light conditions within the building, provide a balcony space for all the residents, and work as a privacy barrier. To help in this process, the reference project has been used to inspire an intervention.

Inspired by Ørsted Gardens Apartment

Inspired by Lacaton Vassal

Inspired by Bogerse Velden Social Housing

Inspired by Schauman & Nordgren Architects



Inspired by Ørsted Gardens Apartment with a transparent facade that is angled in a southern direction to let light through and provide privacy



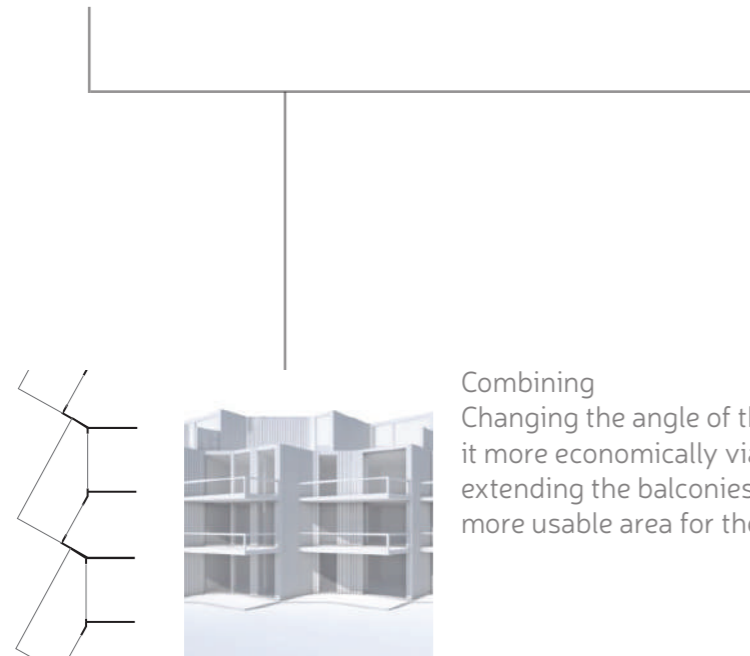
Inspired by Lacaton Vassal and more cubistic extension with adjacent balcony to each apartment. Here the extension would be a Wintergarden.



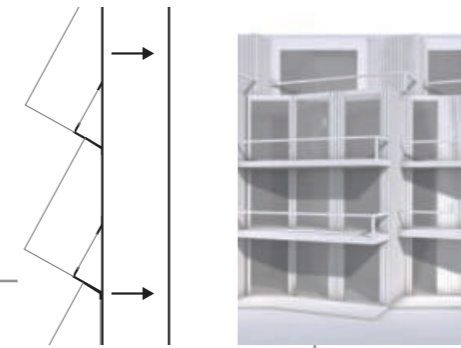
Inspired by Ørsted Gardens Apartment and Lacaton Vassal. A combination of the two



Inspired by Shauman and Nordgren architects in combination with the proposals, while trying to implement more of the original elementary form



Combining
Changing the angle of the facade to make it more economically viable. Instead of extending the balconies to provide a more usable area for the inhabitants.



Adapting to existing

Moving back the added floor to keep the original proportions of the building and extending the balconies to provide better furnish ability. Changing the depth of the balcony on the higher levels to improve the amount of light on the first floor. Adding a less complex extension on the roof covering seventy percent of the building.



Giving back

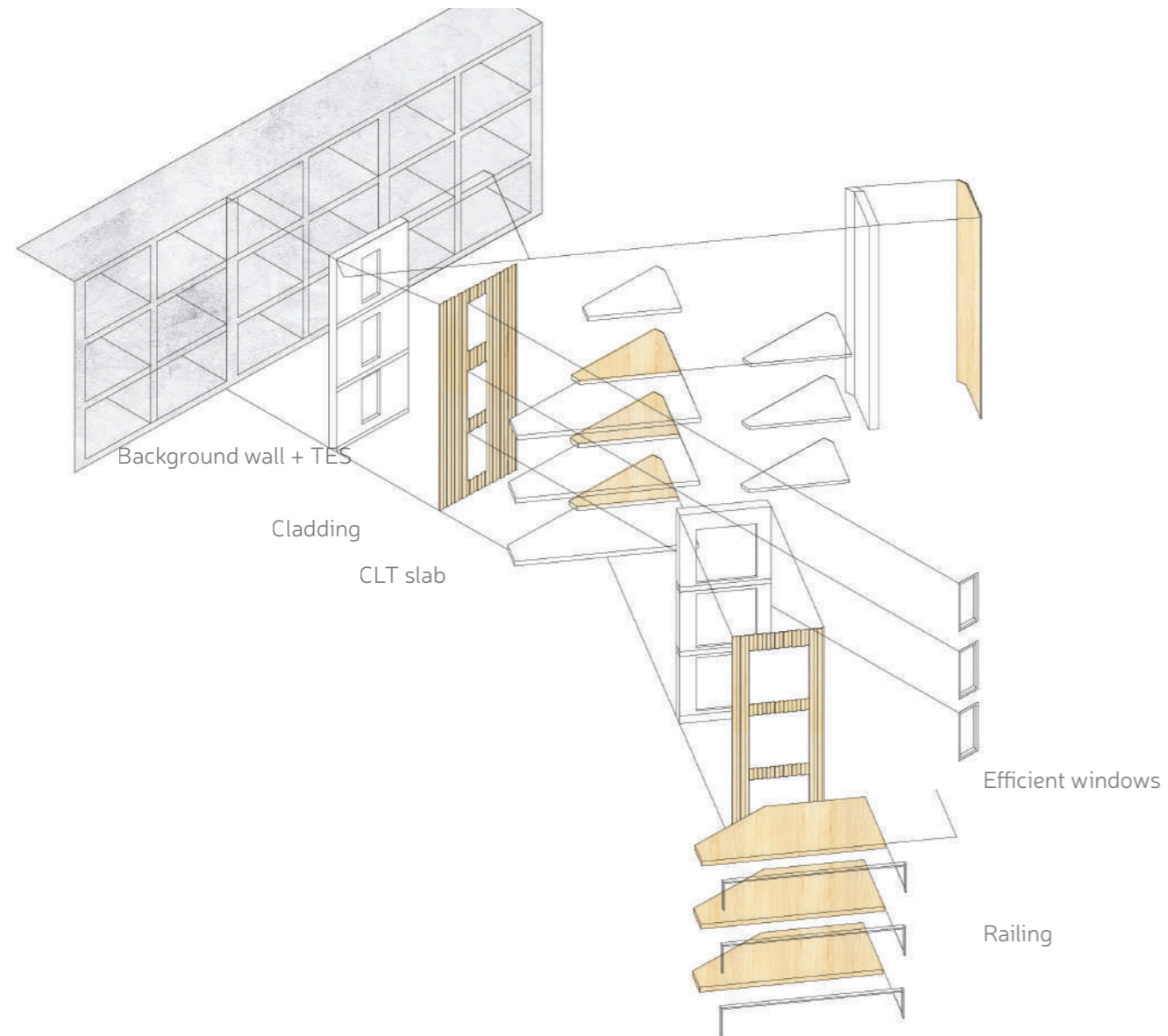
Making the addition more minor and more transparent extension provides a better relationship with the main building body underneath. Here parts of the rest of the roof would be used as an extension of the public space like a terrace.



Cohesion

Implementing a storage extension on the top floor to provide an increased sense of unity with the main body of the building. Here also, separation walls between the apartments have been implemented to increase privacy for the residents.

EASTERN ADDITION STRUCTURE



A view of how the eastern facade could be implemented through CLT construction. At the same time, adding better insulation, new windows, and new wood cladding for the buildings.

PROPOSAL



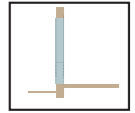
View from the Community extension



View from the Meadow

SITE PLAN

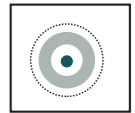
Implemented strategies



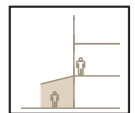
Increased transparency



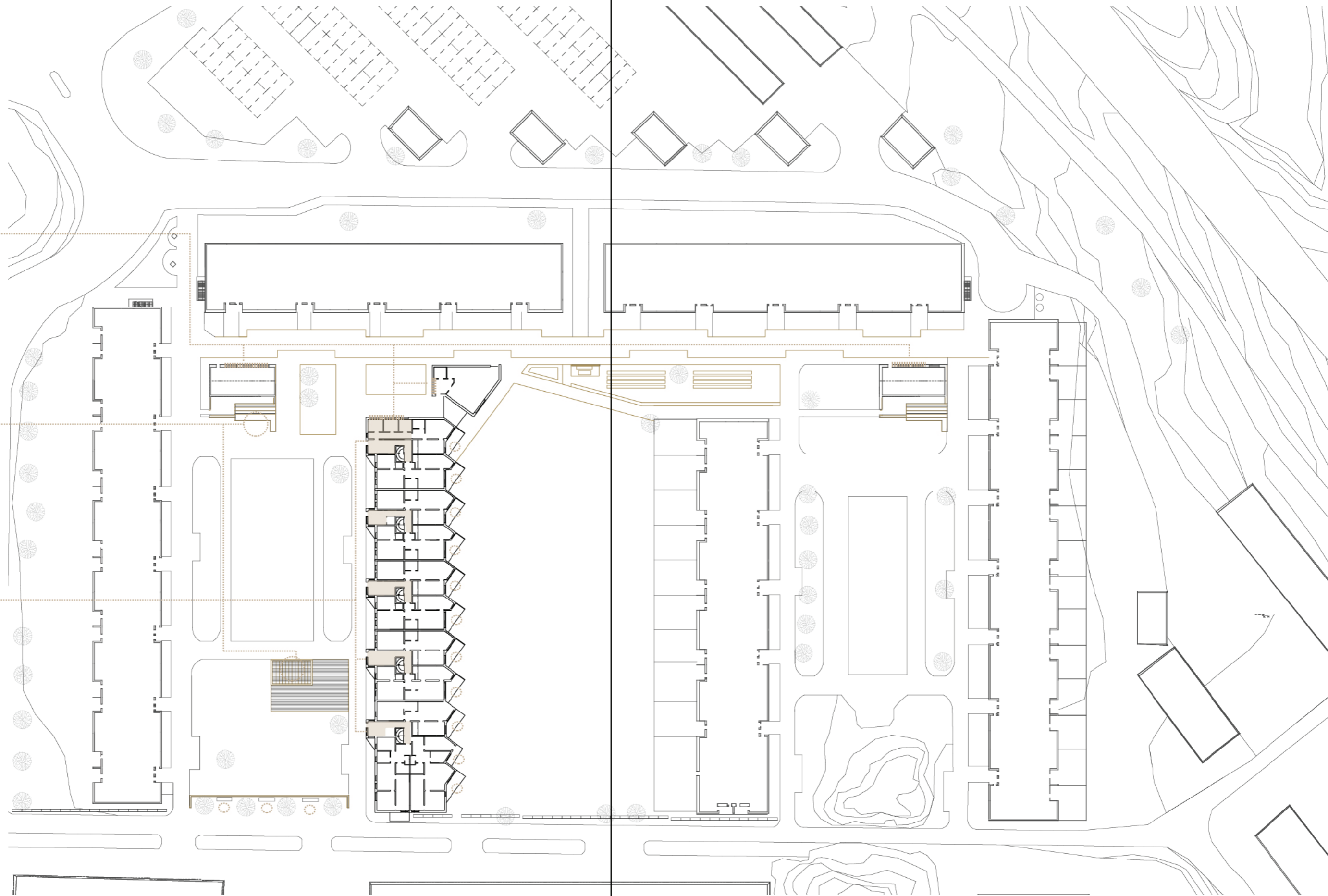
Gathering spaces



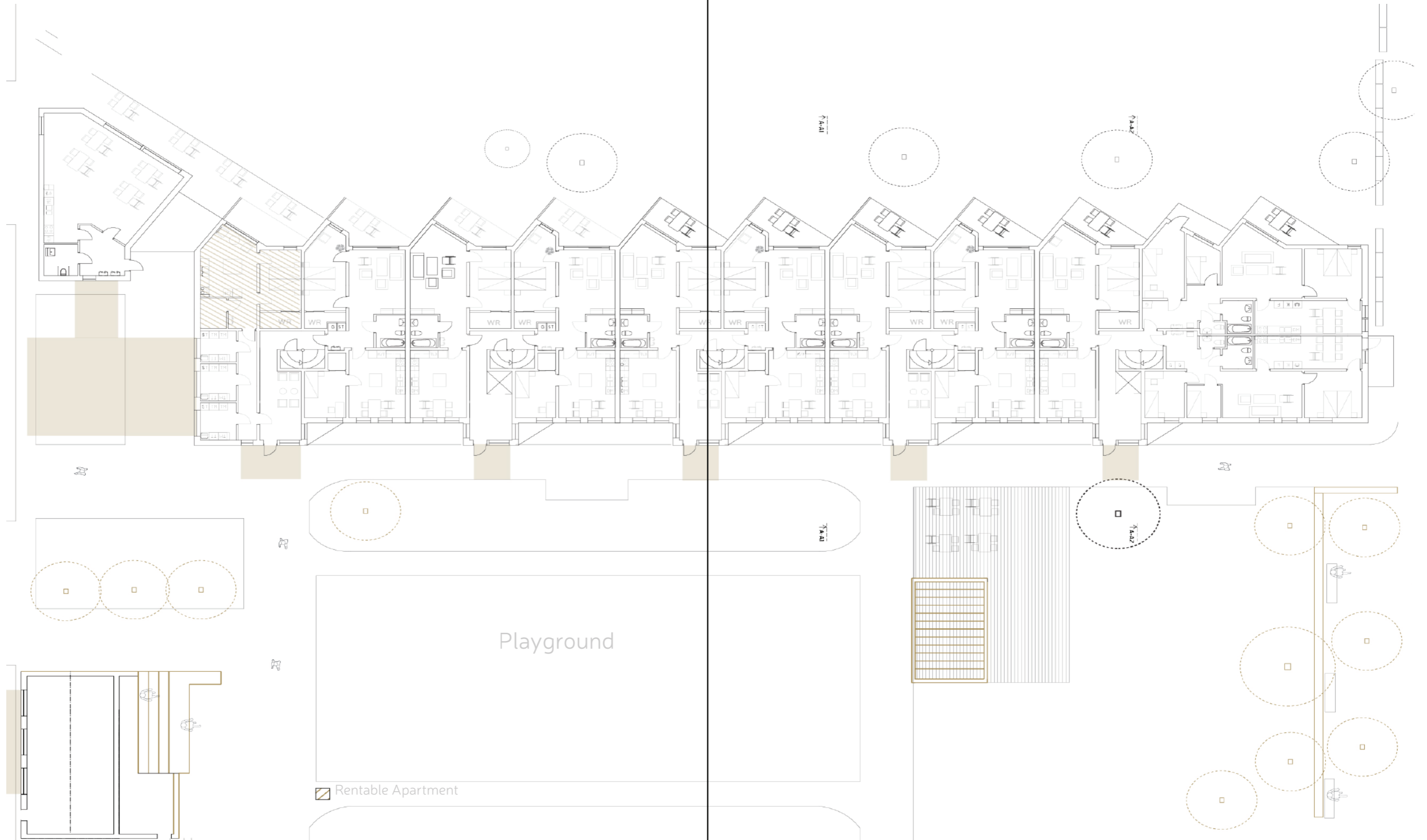
Semi private space



Sheltered areas



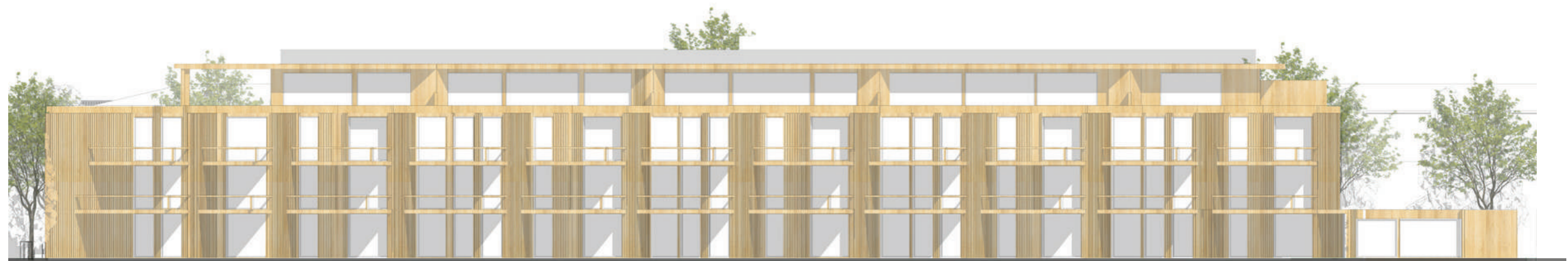
PLAN GROUND FLOOR



▨ Rentable Apartment



Section A1-A1



Elevation East

Floor 2 and 3



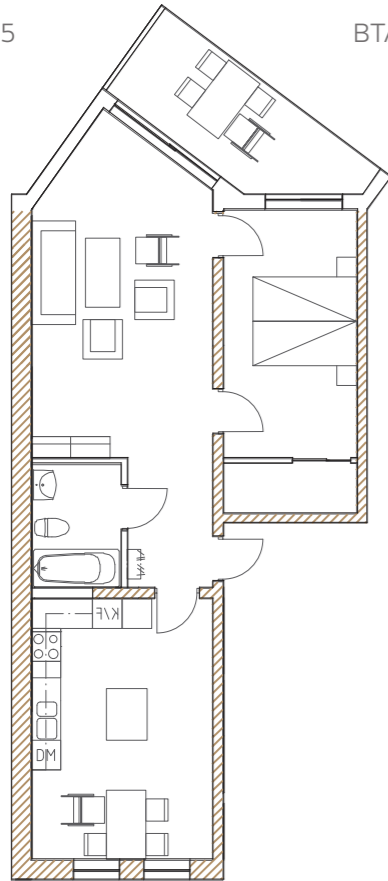
Extension Floor



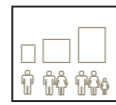
CHANGES IN PLANS

1 Bedroom apartment

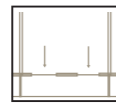
Size: 61 m²
Amount of: 5



BTA: 945 m²



Apartment journey



Extension



Circulation

Deviation from today's mobility measures

Since the building is not up to date with today's regulations for mobility measurements, the layout of the plans has been adapted to change this. However, in some places, compromises have had to be made. One of these areas is the master bedroom in both two and one-bedroom apartments. The load-bearing wall dividing it from the kitchen does not provide the necessary width requirements for the mobility measurements. About 30 centimeters are lacking. However, a solution is to open up another door entrance in the load-bearing wall, which could work as a compromise.

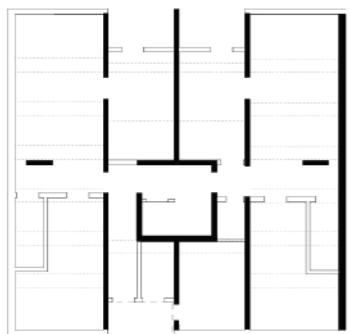
Construction:

According to a consulted engineer, the extra opening in the loadbearing wall next to the master bedroom is possible. The kitchen and WC need to be placed in the same area in all refurbished apartments to limit the need for digging under the building and therefore saving costs; there are only a few centered vertical shafts in the building.

Changes and whats kept?

The circulation was not existent in this apartment type, unlike the other apartment types in the building; therefore, it has been added to the master bedroom area.

Construction Diagram



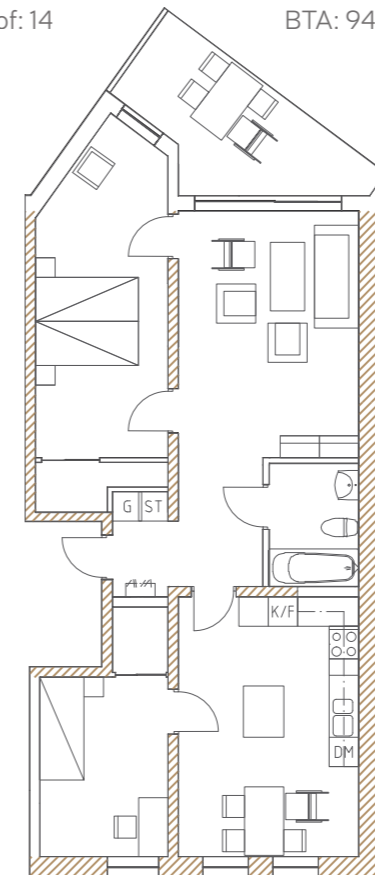
Why?

All of these changes have been made to improve the residents' living quality. The small and unmodern dimensioned kitchen and bathrooms have been a priority, while the extension in the east will provide light into the otherwise deep and dark building. The balcony has been moved to lessen the drag it has provided in the apartments. The qualities found previously have been kept while the new strategies have been implemented.

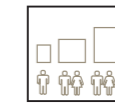
CHANGES IN PLANS

2 Bedroom apartment

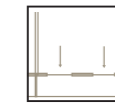
Size: 76 m²
Amount of: 14



BTA: 945 m²



Apartment journey



Extension



Circulation

Deviation from today's mobility measures

Since the building is not up to date with today's regulations for mobility measurements, the layout of the plans has been adapted to change this. However, in some places, compromises have had to be made. For example, the stairway and entrance situation is not made for people with disabilities; there is no space to turn around for people in wheelchairs. Here the design possibilities are limited because of the amount of load-bearing walls around it since it is the stairway core of the building. Therefore compromises in the form of a push-button next to the door.

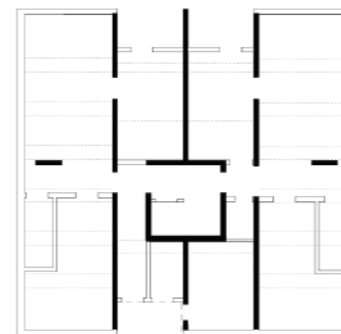
Construction:

The facade is not loadbearing and, therefore, not necessary in a placement sense. A loadbearing wall next to the kitchen has been hard to understand and deemed not essential. Therefore this wall has been removed for every apartment unit.

What aspects are kept?

The circulation, which was initially in the apartment, has been kept. However, it has been relocated to the master bedroom to fulfill the mobility requirements. The kitchen and bathrooms are still in a similar position. At the same time, the facade towards the west has remained the same regarding window placement and size.

Construction Diagram

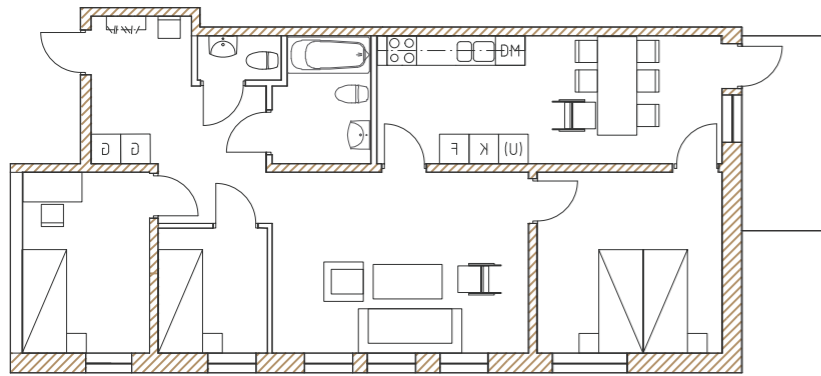


Why?

All of these changes have been made to improve the residents' living quality. The small and unmodern dimensioned kitchen and bathrooms have been a priority, while the extension in the east provides light into the otherwise dark core of the building. The qualities found previously have been kept while the new strategies have been implemented.

CHANGES IN PLANS

3 Bedroom apartment



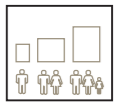
Deviation from today's mobility measures

Since the building is not up to date with today's regulations for mobility measurements, the layout of the plans has been adapted to change this. However, in some places, compromises have had to be made. One of the bedrooms has been decreased in size. However, the mobility measures for the bedroom are still fulfilled, but it has left the room less furnishable

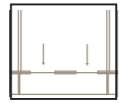
Size: 86 m²

Amount of: 6

BTA: 945 m²



Apartment journey



Extension



Circulation

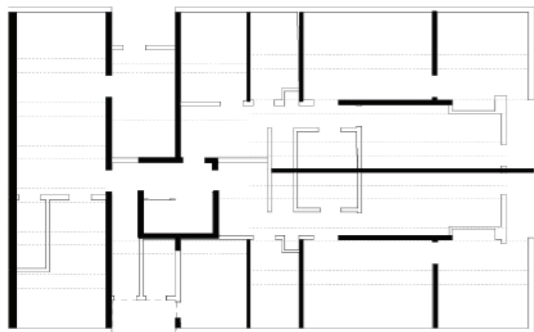
Construction:

Since the facade is not loadbearing, the small indented balconies could be abolished by moving the wall to the facade. Allowing for more light and leaving room for creating a more practical balcony on the outside of the facade.

What aspects are kept?

The positioning of the bedrooms, the kitchen, and the two bathrooms are still in a similar position. However, some changes have been made after prioritizing expanding the kitchen and the bathrooms. These shifts of spaces have been taken from one of the smaller bedrooms and the living room.

Construction Diagram



Why?

All of these changes have been made to improve the residents' living quality. The small and unmodern dimensioned kitchen and bathrooms have been a priority, while the extension in the east will provide light into the otherwise dark core of the building. The balcony has been relocated to lessen the drag it has provided in the apartments and provide more space. The qualities found previously have been kept while the new strategies have been implemented.

LIVEABILITY



View of the master bedroom

Master bedroom

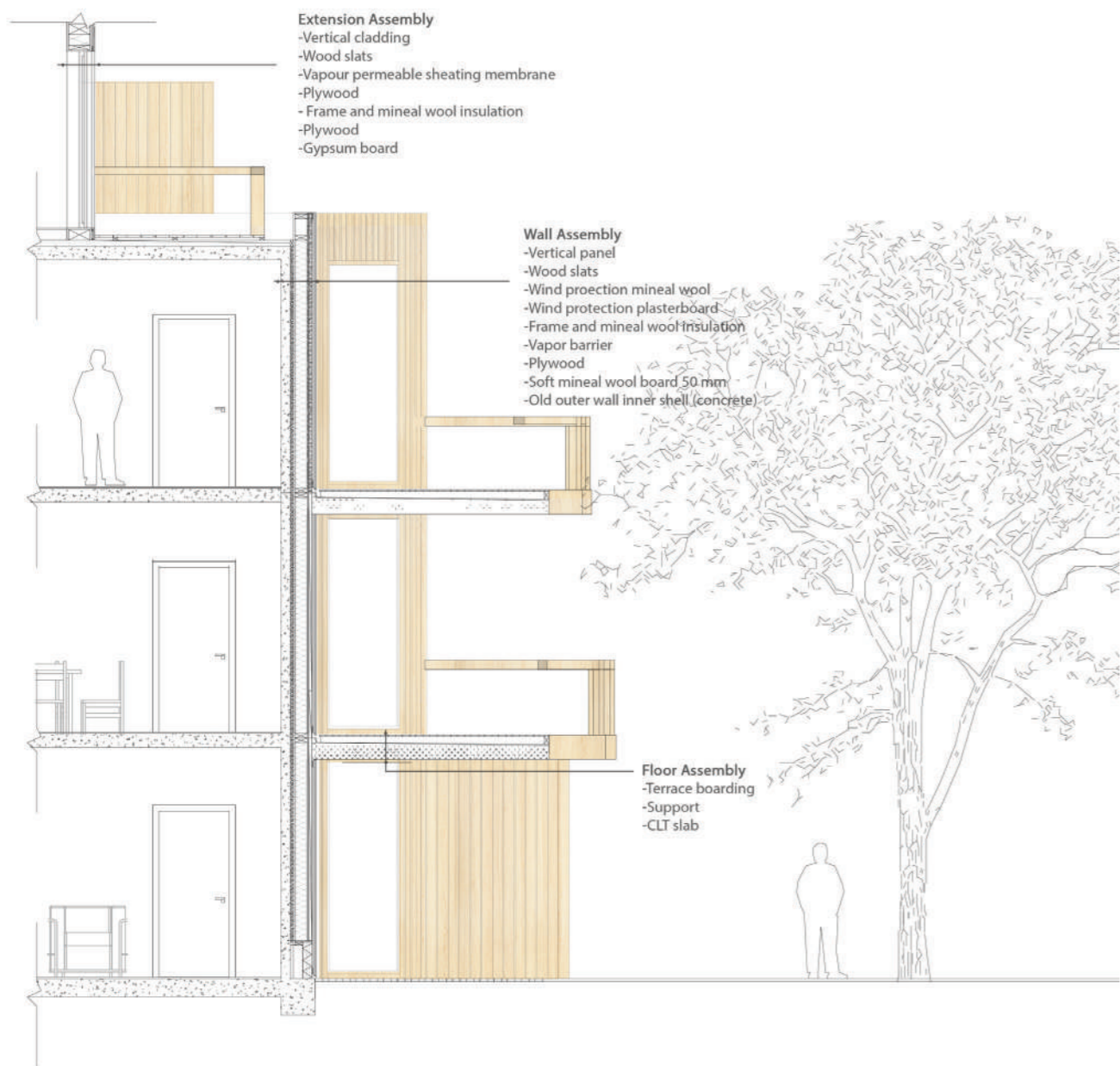
To follow the rational pattern implemented in the east's facade extension, some of the units have gotten an extended master bedroom. This space is made use of a reading corner with attractive views over the surrounding.



View of the living room

Living room

The light becomes a more central aspect of the large living room through the enlarged windows. It invites and makes people curious to experience the sheltered balcony beyond the windows.



Detail section



Detail elevation

RESULT

The result of the project became an adapted and modified residential building. Central of which became the five aspects found in the theory part of this thesis and the interview conducted with the residents.

The intervention includes the addition of a floor with five larger apartments; this is a way to provide a more considerable diversity within the apartment sizes while also increasing the profitability of the refurbishment. The new floor contributed to installing two elevators per the building requirements.

The intervention takes social responsibility through a shared terrace for gatherings, a one-room visiting apartment, more extensive entrance situations, and a transparent laundry room to improve safety and unity. For the bigger scale of the neighborhood, Gropens gård, an extension of the main building body working as a community-building, has been added. This space is designed to be rented out and accessed by the rich association diversity in Hammarkullen and the tenancy association.

Living quality has been improved by modifying the original division of rooms by applying today's standards of mobility measurements, especially in the kitchen and bathrooms, while enlarging the windows to provide better light conditions.

The privacy aspect from and to the meadow became an essential aspect of remedying through the architectural intervention; this was combined with taking advantage of the sun to use more of the valuable southern location. Here it has also become essential to provide the first and second-floor apartments to retake access to the meadow through more oversized balconies.



Inside the living room **before**



Inside the living room **after**

DISCUSSION

This thesis started in the ongoing societal debate about the million program and its future. The urgency and necessity were intriguing to pursue, especially when there is so much stigma around this building era. From reading, discussing, and writing, my previous feeling of the potential of the buildings developed into a belief. Much work is necessary, especially if we do not want to remake past mistakes such as mass production and believe that the architects knew better than the people living in the buildings.

How could the million program evolve in the future through architectural intervention?

The intervention brought forward in the result part of this thesis is by no means the perfect solution to the million programs' future use. Neither was it meant to be. It is a proposal to awaken and provoke discussion within the field. This thesis contributes a new way of using proven materials and methods implemented in a structurally well-constructed building within the million program. It is adapting instead of demolishing, rejuvenating instead of building new. The design show possibilities for what a similar building could look like in the future. It is also evidence that nothing can be done without dialogue and collaboration with the residents living in the buildings.

How could economic, social, and sustainability aspects be incorporated to complement the existing building to create an attractive living space?

The theory in the thesis is conceived of five areas of study related to history, trends, innovation, sustainability, and gentrification. These areas worked as a base for further analysis and the design process. The aspects of analysis were condensed and chosen from the time available since there is a true abundance of material, literature, and innovations within the area.

From the beginning, the focus was to create an equilibrium of sorts. However, along the way, it became clear that there are multiple points where different design choices could have been made and motivated by the perimeters. For example, the economy could motivate another decision than what sustainability necessarily would.

Like with all design proposals, it became more of a balancing act than anything else, compromising one thing for another. Here the interview was an effective tool for choosing and reminding why there was a need for an intervention in the first place. No matter the esthetic och prioritized programs, the people living in the buildings should be the priority.

Reflection the process

This is meant to be the beginning of something, a potential check. A manifest of an architecture student's learnings, contributing to an eventual architecture implementation proposal. It is a start, an inauguration but by no means an end. The field study has left me realizing that there is so much more to uncover and test. If there is something to conclude, it would be that, however, the reputation of the suburbs of the record years. If there is something to conclude, it would be that, however, the reputation of the suburbs of the record years. No matter design, planning, or function, there is potential. After all, the best building is the



Section A2-A2



Elevation South



Elevation North

APPENDIX

SOURCES

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ALLMÄNNYTTAN AND NCCS LIST

1. Create incentives to provide funds for future renovation. Changing the tax rules should be reviewed so that housing companies can set aside untaxed profits for future maintenance.

2. Increase the opportunities for industrialized rearmament. Larger refurbishments at the same time. Provide incentives for companies to merge in joint procurements to increase the number of properties that are being renovated.

3. Simplify the regulations for rebuilding. It needs to be easier and more flexible to make refurbishments.

4. Develop the procurement procedure to reward quality before the lowest price. In order for all stages of the renovation of the million program to become more sustainable, sustainable procurement should be used to a greater extent.

5. Before credit guarantee for conversion. Today, the state issues credit guarantees for the construction of new homes. In order for more extensive renovation projects to be possible, government credit guarantees for redevelopment need to be investigated.

6. Reform and expand the new state support for energy efficiency. The support in its current form leads to more but less extensive renovations. It is economically profitable to only implement measures that provide an energy saving of 20 percent or just over. The limit for support needs to be changed to 30 percent.

7. Increase joint planning and collaboration. By collaborating earlier in the process, public housing companies, technical administrations, and construction contractors can benefit from each other's skills to build faster, more efficiently, and more cheaply.

8. Involve tenants and save costs. All parties involved need predictability and security in connection with a rebuild. Landlords want to avoid cost-driving delays while tenants want transparency, feel involved and have predictability in rental levels.

9. Assign the AP funds to expand their long-term holdings in rental properties. Several pension companies already own properties, usually indirectly through, for example, real estate companies. In order to increase access to long-term capital, the state pension funds should be commissioned to expand their holdings and the role of the pension funds as long-term owners and managers of sustainable community building should be clarified.

10. Introduce targeted rot-avdrag (tax deduction) for refurbishment of rental properties. An extension of the rot-avdrag, which includes socially and environmentally sustainable investments in rental apartments, would help to even out the tax difference that exists between the forms of tenancy.

INTERVIEW

The decision was made to use a semi-structured interview guide.

The participants started by introducing themselves in a few words. Who they are, How long they have lived at Gropens gård, and their general impression of the place. It was clearly indicated that the interview was based on their own experiences. Nothing was wrong, and the more differing views that emerged, the better.

The session was recorded. This was clearly conveyed, and all the participants gave their blessing for it.

The interview was based on five areas. For each part, the question was put forward about (what was good, bad, and what could be improved):

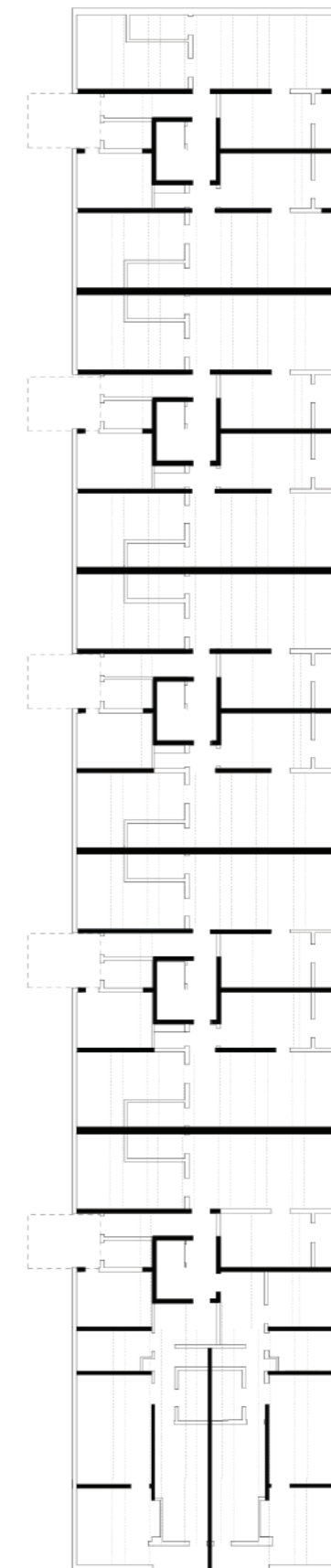
- Environment
- Kitchen
- Storage options
- Bedroom and living room
- Bathroom

Since the time allowed, some more specific questions was also asked the participants:

- Renovations / renovations carried out?
- Privacy?
- Are there qualities that are valued extra highly?
- What is the best thing about living on the pit farm?

When all areas have been reviewed, and the issues that the participants have been interested in have been discussed. Everyone was thanked for their valuable efforts, and they were told where they could access the documentation and in what form.

CONSTRUCTION DIAGRAM



APPENDICES

Figure (1): Potential possibilities for suburban areas. Edited by author, <https://www.pinterest.se/pin/734860864210330789/>

Figure (2): Ohlson och skarnes skarne 66 under uppförande. Stenberg, E. (2015, 9 december). Miljoner att tjäna på miljonprogrammet.

Figure (3): Skärholmens öppning. https://sv.wikipedia.org/wiki/Sk%C3%A4rholmens_Centrum

Figure (4): Amount built. Miljonprogrammet: avveckla eller utveckla (2012)

Figure (5): Figure (4): Apartment sizes. Göteborgsstad (2021)

Figure (6): Division of types of buildings. Göteborgsstad (2021)

Figure (7): Miljonprogrammet utveckla eller avveckla

Figure (8): Utopia s

Figure (9): Jens S Jensen. <https://www.gp.se/kultur/hammarkullens-fotograf-har-avlidit-1.111061>

Figure (10): Bookshelf frame system. <https://vpp.sbuf.se/Public/Documents/ProjectDocuments/6ac56b52-4e98-4bf0-9021-da4deb5d79/FinalReport/SBUF%2012455%20Slutrapport%20Praktiska%20till%C3%A4mpningar%20av%20h%C3%B6gpresterande%20v%C3%A4rmeisolerings%20i%20ombyggnadsprojekt.pdf>

Figure (11): Examples of building layouts (same as link above)

Figure (12): Rebar placement of the era. <http://kth.diva-portal.org/smash/get/diva2:431590/FULLTEXT01.pdf>

Figure (13): Collage of news articles over time. Made by author

Figure (14): Västra Frölunda Mandolingatan, Brf Ruddalen. <https://www.bjurfors.se/sv/tillsalu/vastra-gotaland/goteborg/ruddalen/mandolingatan-7/>

Figure (15): A building of the era. <https://architectureofdoom.tumblr.com/post/65052235849/dinosaurworld-teams-flats-gates-head-1960s>

Figure (16): Jens S Jensen <https://www.gp.se/kultur/hammarkullens-fotograf-har-avlidit-1.111061>

Figure (17): If the number of dwellings would have followed the population growth. SCBs website

Figure (18): The ideal city today. Made by author

Figure (19): Comparison of services. Made by author

Figure (20): TES Facade method under construction. <http://mediatum.ub.tum.de/doc/1355420/287313.pdf>

Figure (21): A possible assembly. Made by author

Figure (22): The TES facade Method in layers. <http://mediatum.ub.tum.de/doc/1355420/287313.pdf>

Figure (23): Orsted Gardens. Dezeen. <https://www.dezeen.com/2021/11/02/orsted-gardens-teggestuen-lokal-new-facade/>

Figure (24): Orsted Gardens. Dezeen. <https://www.dezeen.com/2021/11/02/orsted-gardens-teggestuen-lokal-new-facade/>

Figure (25): Orsted Gardens. Dezeen. <https://www.dezeen.com/2021/11/02/orsted-gardens-teggestuen-lokal-new-facade/>

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Figure (27): Orsted Gardens. Dezeen. <https://www.dezeen.com/2021/11/02/orsted-gardens-teggestuen-lokal-new-facade/>

Figure (28): Transformation of 530 dwellings. Archdaily. <https://www.archdaily.com/915431/transformation-of-530-dwellings-lacaton-and-vassal-plus-frederic-druot-plus-christophe-hutin-architecture>

Figure (29): Transformation of 530 dwellings. Archdaily. <https://www.archdaily.com/915431/transformation-of-530-dwellings-lacaton-and-vassal-plus-frederic-druot-plus-christophe-hutin-architecture>

Figure (30): Transformation of 530 dwellings. Archdaily. <https://www.archdaily.com/915431/transformation-of-530-dwellings-lacaton-and-vassal-plus-frederic-druot-plus-christophe-hutin-architecture>

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Figure (33): Solhusen i gårdsten <https://docplayer.se/4259035-Solhusen-i-gardsten-solhusen-i-gardsten.html>

Figure (34): Solhusen i gårdsten <https://docplayer.se/4259035-Solhusen-i-gardsten-solhusen-i-gardsten.html>

Figure (35): Solhusen i gårdsten <https://docplayer.se/4259035-Solhusen-i-gardsten-solhusen-i-gardsten.html>

Figure (36): Säteriet. QPG. <https://www.qpg.se/sateriet>

Figure (37): Säteriet. Article. <https://www.mynewsdesk.com/se/foerbo/pressreleases/sateriet-i-moelnlycke-nominerat-till-aarets-baesta-renoveringsprojekt-2872563>

Figure (38): Säteriet. Article. <https://www.mynewsdesk.com/se/foerbo/pressreleases/sateriet-i-moelnlycke-nominerat-till-aarets-baesta-renoveringsprojekt-2872563>

Figure (39): Säteriet. Article. <https://www.mynewsdesk.com/se/foerbo/pressreleases/sateriet-i-moelnlycke-nominerat-till-aarets-baesta-renoveringsprojekt-2872563>

Figure (40): Schauman & Nordgren Architects Malmi competition- Website

Figure (41): Bogerse Velden Social Housing / META architectuurbureau.

Figure (42): Data Hammarkullen. Göteborgsstad (2021)

Figure (43): Jens S Jensen. Jens S. Jensen <https://www.gp.se/kultur/hammarkullens-fotograf-har-avlidit-1.111061>

Figure (44): Jens S Jensen <https://www.gp.se/kultur/hammarkullens-fotograf-har-avlidit-1.111061>

Figure (45): Link Arkitektur. <https://linkarkitektur.com/se/projekt/hammarkulletorget>

Figure (46): Hammarkullen. Pictures taken by the author

Figure (47): Hammarkullen. Pictures taken by the author

Figure (48): Hammarkullen. Pictures taken by the author

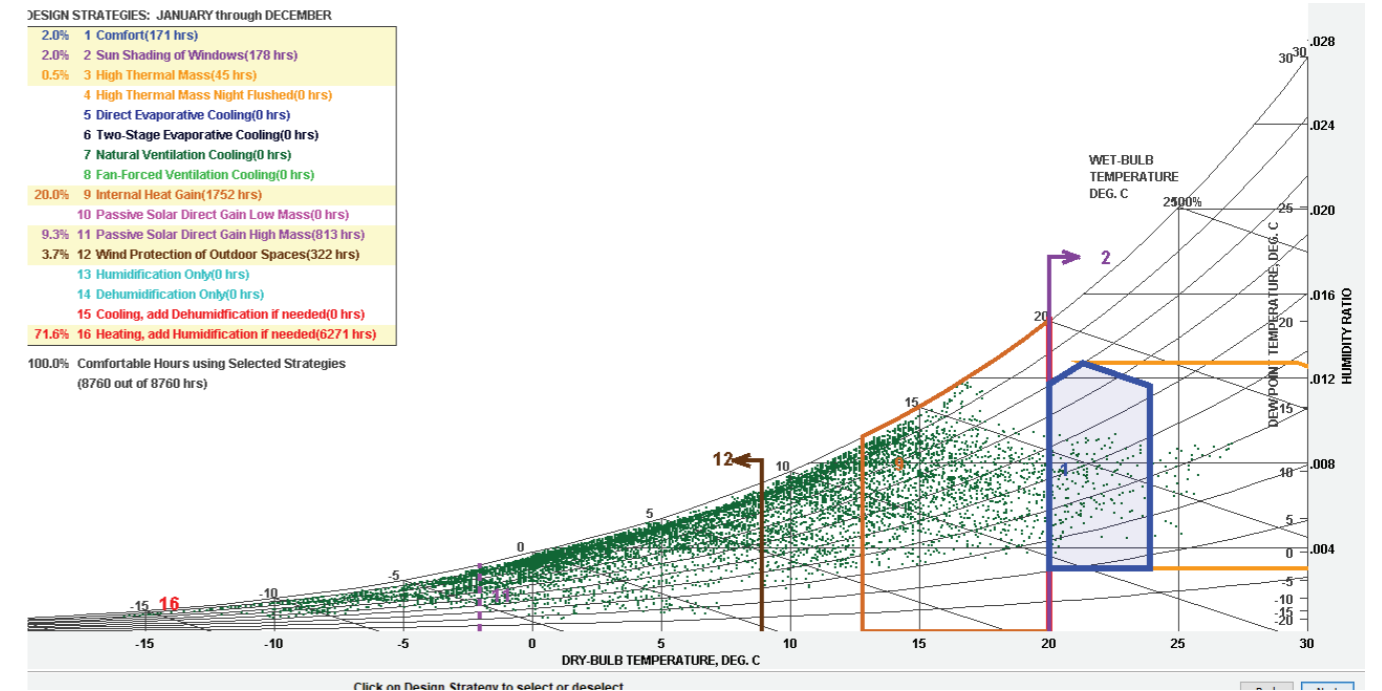
Figure (49): Survey by Liane Thuvander, Jenny Stenberg and Alfredo Torrez

Figure (50): The residents taking the issues into their own hands. Pictures taken by the author

Figure (51): Triple glazed. <https://www.neuffer.de/en/triple-glazed-windows.php>

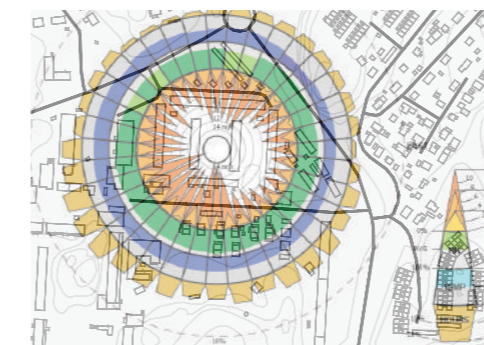
Figure (52): Solar panels. <https://www.rmit.edu.au/news/all-news/2021/apr/airports-solar>

ENVIRONMENTAL DATA



Climate Chart

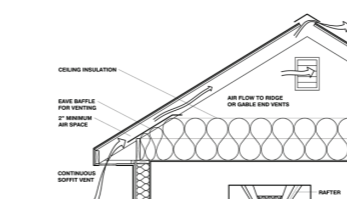
Wind



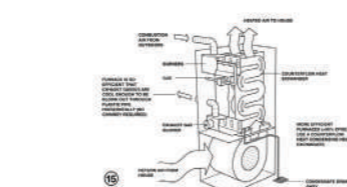
Sun



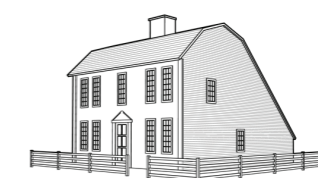
Passive energy implementations



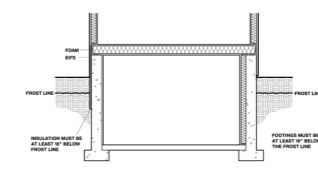
Increased the insulation



Effective heat pump



South facing windows



Increased insulation inside the foundation



Thank you to everyone involved

Reimagining a Million

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