

# Next Life Living

---

*Solving the Dutch housing shortage by transforming post-war neighborhoods to cater to the diverse housing needs*



Volume

Version 1.0  
25-06-2023

Graduation 22/23  
Theo de Laat

## Supervisors

Jan-Willem van Kuilenburg  
Pieter Feenstra

## Mentor

Huub Niesen

## Education

Master of Architecture | Fontys Tilburg

# Index

## Introduction

01. Essay ..... 5

02. Research findings ..... 10

- Desk research
- Interviews
- Investigated example projects
- Diagnosis and design guidelines

03. My personal logbook ..... 46

Stakeholders ..... 72

Literature ..... 74

Version	Date	Changes
Research V0.07	03-12-2022	Initial document - research phase
Research V0.08	20-01-2023	<p>1. Adjustments based on remarks Jan-Willem Kuilenburg, Pieter Feenstra: a. organize the different scales (district, neighborhood, building block and building), b. select a set of design components, c. test new goals on impact, d. add vision on living environment, f. make it clear that it is a pilot and that it can be rolled out in the Netherlands, 6. make conclusions more specific (should have the power to steer the design (more instrumental and operative), 7 change Dutch in English</p> <p>2. Add more reference projects, local pictures, essay (own theory and narrative) and feedback on concept ideas</p>
Volume V0.1	12-03-2023	Advise JWK and PF, integrate documents essay, research and logbook and structure it based on the most important vindings (turning points in your project) + include advise from the concept phase : 1. explanation of how design elements are translated into the 9 design guidelines + 2. more background on the design (what was the basis for this design decision / relation diagram).
Volume V0.8	14-05-2023	Extra information in research
Volume V1.0	25-06-2023	Final version, distributed to the examination committee.

# Introduction

*This year, everything seemed to align perfectly. Not only did I apply the knowledge I acquired during my four years at the academy, but my idea also benefited from the practical and intuitive knowledge gained from my past experiences. Without the guidance of the academy and the support of my mentor, structuring the project would have been a challenge. The summary of my research by design, which explores the connection between my hypothesis, research, and design, is elaborated in **Chapter 1**.*

*I came to realize that having a solid understanding of theory gave me an extra boost of confidence. **Chapter 2**, which delved into my research, provided validation for the design decisions I had made, making me even more certain of their effectiveness.*

*I received incredibly valuable input and help from people with various backgrounds, which led to numerous discussions that sparked new ideas throughout the year. Even when experts in the field had differing opinions, consulting with them reinforced my belief that I was on the right track. Interacting with both my fellow students and those in the second and third years provided fresh perspectives and gave me new insights into my ideas. **Chapter 3** highlights the discoveries I made for myself in the process, as described in Chapter 3.1, as well as the design breakthroughs I achieved in the spaghetti-like journey, outlined in Chapter 3.2.*

*Please take pleasure in reading it.*

*-Theo*

# Next Life Living

*Solving the Dutch housing shortage by transforming post-war neighborhoods to cater to the diverse housing needs*

By Theo de Laat

## Keywords

urban growth, social cohesion, flexible typology, resident aspirations, revitalization, neighborhood transformation, housing shortage, "Stempel" typology, livability, adaptive reuse

## Abstract

In the Netherlands, we are confronted not only with a **housing crisis** stemming from a scarcity of available houses but also with a **dearth of vitality on the streets** and a deficiency in social cohesion among inhabitants. These problems are particularly evident in Dutch post-war neighborhoods that were constructed according to the "Stempel" typology, designed for large-scale housing from the 1960s to the 1970s.

The housing shortage in the Netherlands is primarily caused by people, especially elderly and empty nesters, choosing to stay in their homes for longer than necessary<sup>[1]</sup>. This tendency is characterized by the occupation of larger residences than required, leading to a substantial amount of **unutilized living space**. Such behavior is driven by factors such as the increased costs of relocation, including higher rents, as well as a strong emotional attachment to the existing living environment.

Difficulties in socializing often occur when there is a lack of adequate social interaction within neighborhoods. This is particularly evident in areas lacking facilities that promote community engagement among residents or fail to create spontaneous meetings on the streets<sup>[2]</sup>. Architects and urbanists have a responsibility to create spaces that promote social interaction, enhance livability, and inspire a sense of unity within neighborhoods.

The design, executed as a graduation project at the Academy of Architecture in Tilburg, is a fusion of architectural intervention and urban restructuring aimed at solving the housing crisis in the Netherlands together with revitalizing post-war "Stempel" neighborhoods. Within this framework, three distinct housing typologies have been carefully designed. The technical approach entails dividing existing large family homes into multiple residences of various types, tailored to accommodate the needs of different groups, such as the elderly, families and young individuals starting their lives.

*"By integrating architectural interventions and reconfiguring urban structures, the design aims to breathe new life into the neighborhood while addressing the housing requirements of its residents."*

## Design framework

The **foundational principles** underpinning the design were derived from rigorous research findings and comprise the following components:

1. Ageing in place: people should have the opportunity to reside in a single location, spanning from birth to old age.
2. Diversity: providing housing options that cater to diverse demographic groups, including the young, elderly, families, individuals, renters, and buyers and more.
3. Demolition is an act of crime: rejecting the demolition of existing structures as an unethical practice, emphasizing the importance of preservation and adaptive reuse.
4. Neighborhood densification: increasing the population density with 150%, from 1,600 to 4,000 inhabitants, fostering a more vibrant and closely connected community.

## Thesis and hypotheses

**Thesis:** This architectural study explores revitalizing post-war stamp neighborhoods to address housing shortage, social cohesion, and sustainability, demonstrating potential through restructuring, increased population, and enhanced livability.

**Hypothesis:** By implementing diverse housing typologies, increasing the population capacity, and integrating amenities, this study hypothesizes that revitalizing post-war stamp neighborhoods can effectively tackle the housing shortage in the Netherlands **and** promote social cohesion, and improve sustainability



[1] Boelhouwer, P. J., and H. M. H. van der Heijden. "De woningcrisis in Nederland vanuit een bestuurlijk perspectief achtergronden en oplossingen." 2022.

[2] Muis, M., P. Smets, C. Buitendorp, S. De Groot, R. Zijlma, and S. Jonkman, VU Amsterdam. "Hoe sociale cohesie de buurt bij elkaar houdt." Amsterdam, 2022.

## Learning from the past

The post-war situations, is comparable to the situation now. At that time, there was also a housing shortage of 1 million homes. The difference between then and now is that there is now a huge diversity of people with their own lifestyles, needs and wishes. Many architects believe that by understanding the changing needs of different user groups, they can design buildings and spaces that cater to those needs. However, some argue that this perspective may carry a certain degree of arrogance, implying that users are unable to discern and address their own needs independently.

*"Urbanism is the translation of social structures, nowadays these structures are more diverse"*

The presence of a living concept that enables residents to make adjustments, even while renting a house, is essential. This concept should provide individuals with the opportunity to adapt their living arrangements throughout their lifetime. It ensures that if their current home no longer meets their needs and cannot be further modified, an alternative nearby home can be readily available to accommodate their evolving requirements. Through these considerations, we can revitalize the existing housing stock, enabling it to meet the diverse demands of our ever-changing society.

## The cause of the housing crisis and how to solve it

The housing shortage problem in the Netherlands cannot be effectively addressed solely by creating more homes, as this approach is merely an end-of-the-pipe solution. Instead, it is necessary to tackle the **root cause** of the shortage to effectively resolve the associated issues. In the Netherlands, the housing shortage stems from the fact that individuals tend to remain in their homes longer than necessary. This is particularly evident among elderly individuals and empty nesters, who reside in houses that are excessively large, with significant unutilized space, and are not suited for long-term occupancy. Research conducted in Dutch municipalities confirms that the primary cause of the current housing crisis is the reluctance of elderly and empty-nesters to relocate to more suitable homes<sup>[3]</sup>.

In post-war "Stempel" neighborhoods, the issues of vitality and under occupation of dwellings are particularly pronounced and evident. These neighborhoods were built in the Netherlands 60 years ago with the purpose to house young families to solve the housing crisis in that period. Nowadays you see that people that lived there in the '60s and 70's are still living there because of the arguments already named. A simple calculation shows that optimizing occupancy in post-war "Stempel" neighborhoods can help alleviate the housing crisis.

Netherlands: 15-25% of the housing stock consists of post-war "Stempelwijken". With a total of 7.9 million homes, an average of **20% corresponds to 1.6 million homes**. Increasing the average occupancy from 2.1 persons per dwelling to 3.7 has the potential to address the housing crisis effectively.  
 $(3.7 - 2.1) \times 1.6 \text{ million} = 2.5 \text{ million people}$  (what is the need in Netherlads)

## Introducing greater diversity in homes can be a win-win situation

To address the diverse housing requirements of various user groups, three new housing typologies have been devised, utilizing the existing concrete structure of the housing stock. By incorporating additional volumes and implementing vertical and horizontal divisions, a total of nine distinct housing types ranging from 35 (xs) to 140 (XL) square meters can be created, see the figure below.

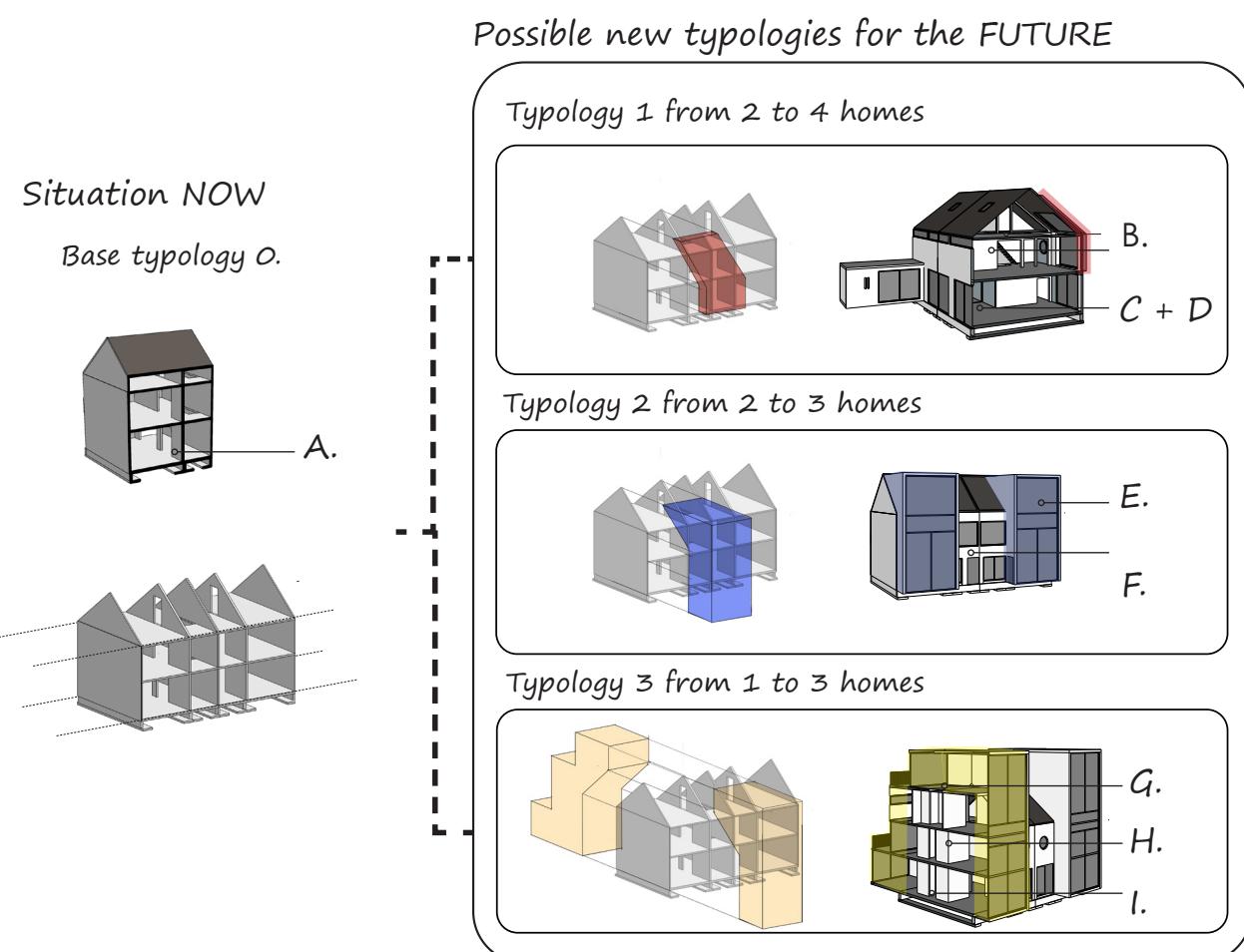


Figure 2. Transform existing homes into 9 diverse types for increased housing options

This transformation simultaneously accomplishes the goals of both densification and diversification, making it widely regarded as a win-win situation.

## Post war "Stempel" neighborhoods

The early 20th century saw the ideal city described as a functional and rational urban space with separate industrial and living areas, promoted by the International Congress of Modern Architecture (CIAM). In the Netherlands, this concept influenced the stamp structure or stamp typology, introduced by urbanist C.M. van der Stad, which consisted of fixed arrangements of building blocks with designated traffic and recreation spaces. These neighborhoods featured rectilinear structures, intimate public spaces, and brick facades, reflecting the principles of CIAM<sup>[4]</sup>.

**Urbanism is the translation of social structures** that are enclosed in different types of buildings from cheap to expensive as well as in rent as in buy. The "Stempel" neighborhoods, were build within a socio-economic landscape characterized by minimal income disparities, exhibit a

*"Post war "Stempel" Neighborhoods with uniform dwellings were designed for massive housing"*

### "Kastelenbuurt" as pilot

I grew up in the 1970s in a "Stempel" neighborhood named the "Kastelenbuurt" located in Oosterhout, Netherlands. It was designed for young families, with a primary school nearby, fostering strong bonds among children and parents. It was a close-knit community with minimal social disparities.

This selected neighborhood serves as a pilot study, examining the implications at a national level in the Netherlands. The focus is on the rental corporation houses within this neighborhood, which have not undergone similar transformations as privately owned houses. They provide a representative basis for applying the conceptual framework to the broader Dutch context. The neighborhood has undergone a significant transformation, shifting from a vibrant community with lively street life to a car-centric environment, characterized by an increased presence of elderly residents who have been living there since my youth and continue to do so due to the scarcity of alternative options. This change has led to decreased social interactions among residents and an abundance of unoccupied space within homes.



[4] <https://nl.wikipedia.org/wiki/Stempelstructuur>

[5] Liebregts, M. "De jaren 60 wijk, de stempel als stedenbouwkundige ordening." Accessed March 21, 2023. [www.bestaaandewijk.nl](http://www.bestaaandewijk.nl).

## Breathing new life into housing and neighborhoods

The diversity in social structures is also translated into current urbanism ideas like those of Jan Gehl and David Sim<sup>[6]</sup>. People want to show their own identity, also with their homes. Research from the 1960s and 1970s<sup>[7]</sup> already highlighted the importance of individual architecture in an urban environment. It showed that people take more care of the whole neighborhood if they can distinguish their home from others.

The idea of architecture as a social science might seem odd but there's not much that more powerfully places, joins, separates and patterns people, and relations between people than the built spaces we live, work and learn in. Architecture is unavoidably social<sup>[8]</sup>.

### Transformative new life Interventions in the pilot of the "Kastelenbuurt"

In the pilot of the "Kastelenbuurt," interventions have been implemented to enhance social relations among residents. These include creating spaces for unexpected encounters, robust collective areas in front of dwellings to foster a sense of togetherness, enhancing the attractiveness of corners in the rows, centralizing underground parking and providing additional pedestrian walkways connecting the parking to the homes to add vibrancy to the streets. By removing cars from the streets, there are more opportunities for increased safety and a greater presence of people. Additionally, efforts have been made to minimize shadows in gardens or courtyards, creating more inviting and well-lit spaces.

To cultivate vibrant spaces, the "Kastelen" neighborhood aims to increase its population from 2,400 to 4,000 residents. The pilot study demonstrated that this growth can be achieved through the following strategies:

1. By implementing the assigned architectural concept, it becomes possible to create 400 new homes by utilizing the existing structure of 400 corporation homes.
2. Adding volumes or homes along the borders of the neighborhood can generate an additional 800 homes.
3. Researchers have recommended incorporating new non-residential functions and allocating floor space for economic activities. These provisions are integrated both in the new spaces along the borders and within the existing building blocks

## Conclusion

We are currently facing a dynamic situation characterized by not only the continuous growth of the population but also an increasing diversity among individuals, and this trend is expected to persist in the future. Nevertheless, the existing housing supply fails to adequately meet the needs and preferences of both the growing number and the diverse range of people, consequently leading to a housing crisis with a shortage of approximately one million homes. Furthermore, this inadequacy in housing provision also contributes to a living crisis, impacting the vitality and liveability of neighborhoods.

Instead of resorting to demolition and new construction, this proposed design solutions will show how the existing housing stock can be transformed, enabling it to meet the diverse demands of our ever-changing society **and** in the same time solves the housing crisis. The Minister of Housing and Spatial Planning, Hugo de Jonge, has recently advocated for the revitalization of post-war Dutch neighborhoods, like those that have the "Stempel" typology and includes 15-25% of the Dutch housing stock. This study demonstrates that these goals can be achieved without constructing outside the city limits and negatively impacting the environment.

### My position

In the dynamic field of architecture, opportunities arise as buildings and neighborhoods approach the end of their functional or technical lifespan. I see it as a mission for architects to revitalize these structures and spaces by exploring the potential they hold. By utilizing adaptable architectural strategies, the evolving needs of communities can be met, infusing them with renewed energy and fostering meaningful social connections. I firmly believe that these efforts have the power to transform and revitalize the built environment.

### My position in this assignment

The current housing stock in post-war "Stempel" neighborhoods fails to adequately meet the diverse needs of its inhabitants. As architects and urbanists, it is our responsibility to explore how we can breathe fresh life into these existing structures, considering the transformed social dynamics of today. Architecture is not merely about the physical structure, but also about the social interaction it can provide. The revitalization of post-war "Stempel" neighborhoods presents an opportunity to create spaces that foster community building and enhance liveliness in streets. Densification strategies can serve as a means to achieve this objective.

*"Architecture is not merely about the physical structure, but also about the social interaction it can provide. The revitalization of post-war "Stempel" neighborhoods presents an opportunity to create spaces that foster community building and enhance liveliness in streets."*

[6] Sim, David. "Zachte Stad. Densiteit, diversiteit en nabijheid van het leven van alledag." 2022.

[7] Habraken, N.J. "Supports an Alternative to Mass Housing." London 1972, Amsterdam 1961.

[8] Wood, A. "Architecture as Social Science." 2015.

## 02. Research findings

### Desk research

- History of the stamp structure
- History of the place of the pilot
- Urban structure
- Demographic figures
- Different literature studies
- Nitrogen crisis and carbon footprint
- Qualities of densification

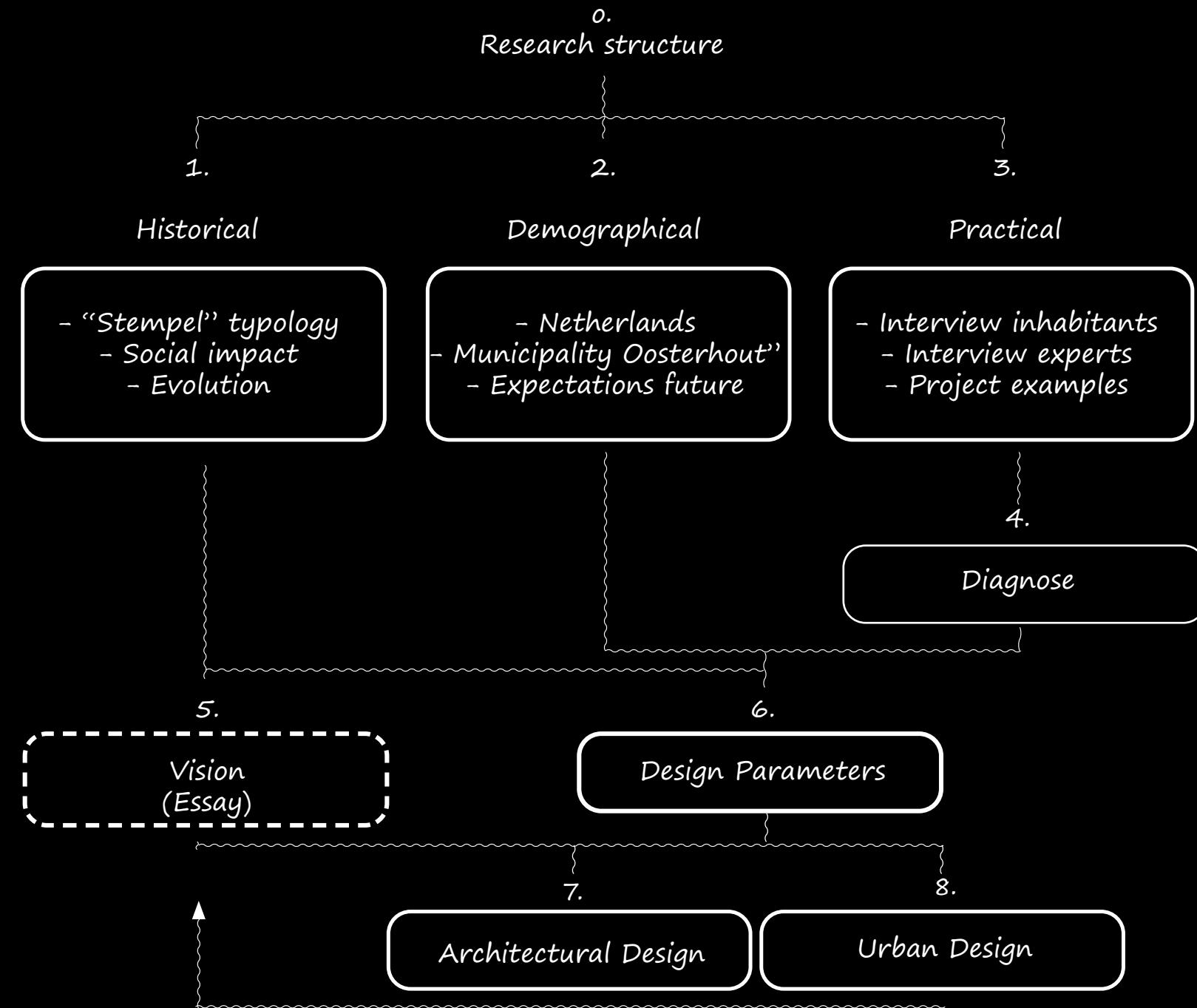
### Interviews

- interview users
- interview municipality
- interview housing corporation
- interview builder van Wijnen
- interview urban and architectural company KAW

### Studied examples projects

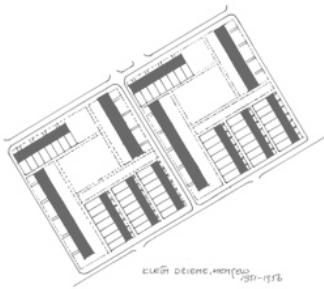
- Bedeaux de Brouwer, maquette "Ministerie van maak"
- MVRDV, maquette "Ministerie van maak"
- Municipality of Tilburg, "Herontwikkeling Tilburg Noord"
- Dingeman Deijs, developmen of the "Rijtjesvilla"
- Peter Barber architects, social housing in the UK
- Different architects, urbanists : "Langer thuis in eigen huis"
- Nohnik, care to share project, Oosterpark Groningen
- Marc Koehler, super lofts
- Sjoerd Soeters, Courtesy of Arkitema, Copenhagen

### Diagnose and program desing phase

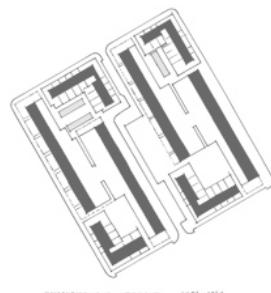


## 01. History

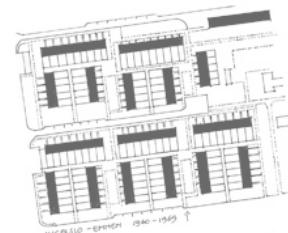
Hengelo - Klein Driene



Utrecht - Kanaleneiland



Emmen - Angelslo

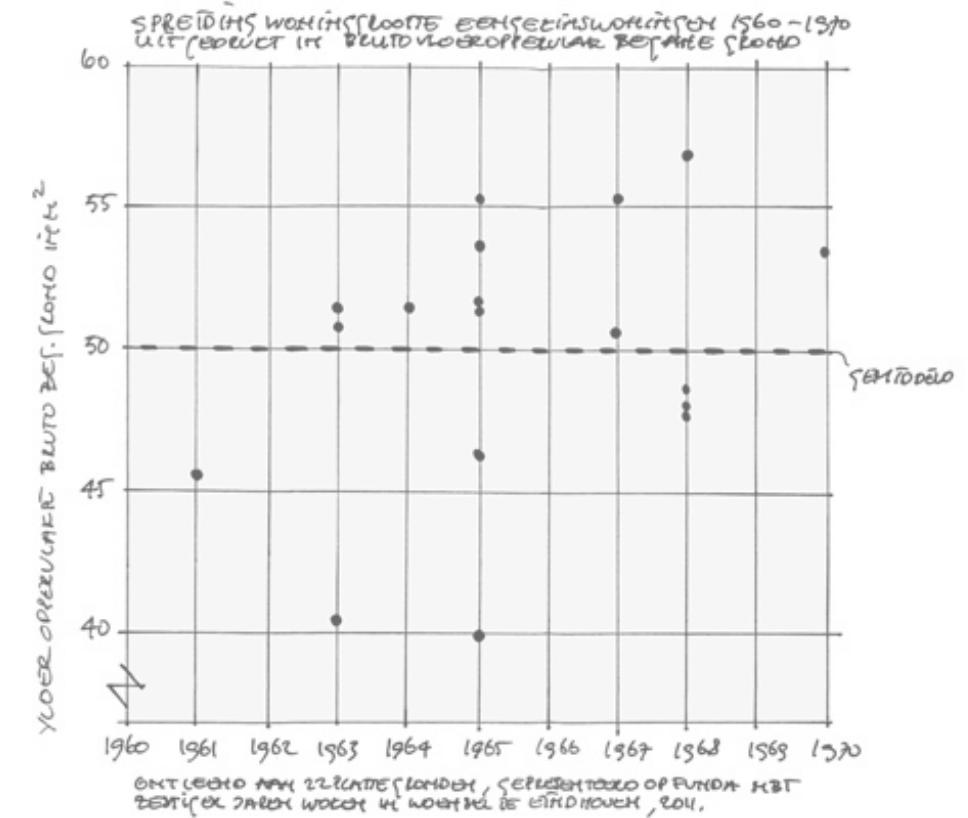


Eindhoven - Mensfort

Eindhoven - De Tempel

An architectural floor plan of a building. The plan includes several rectangular rooms of varying sizes, some with internal partitions. A central feature is a large, multi-level staircase with a landing. The entire plan is enclosed within a rectangular boundary.

Eindhoven - Vaartbroek



## Importance

Research showed<sup>1</sup> that the biggest cause of the current housing crisis is the fact that the elderly and empty nesters, stay too long in their dwellings which have more m<sup>2</sup>'s than needed and/or are not fit for purpose. This is especially the case in after-war stamp neighborhoods, built in the '60s and '70s. What is the reason behind this and what can help these groups to take the next step to move to a more suitable dwelling? This study will explore the needs of these groups and will look if there is a typology or a combination of them that will fit the need. The location of the research is a post-war stamp district located in the municipality of Oosterhout, a location where I grew up.

## Stamp typology

In the '50s, the International Congress of Modern Architecture (CIAM<sup>2</sup>) described the ideal city as a functional city with industrial and shopping areas separated from living areas with a strong social structure with rational buildings. Licht, Air and Space were the key elements in these cities. I grew up in the '70s in a so-called stamp neighborhood that was set up with these principles. This neighborhood is located in the municipality of Oosterhout (Noord Brabant) and is called the Castle neighborhood. When it was built, the area consisted of 70% rental, mainly terraced houses and 30% owned, mainly semi-detached houses. At that time many young families lived there with young children. I had many friends, and we all went to the same primary school that was located at the end of our street. It was a closed community where there was little difference in social status, wealth, or lifestyle.

The stamp structure or stamp typology was the start of urbanism in the Netherlands. The first ones were developed by the urbanist C.M. van der Stad. A neighborhood in a district with this stamp typology is formed by a fixed arrangement of some building blocks with in-between traffic and recreation areas. This led to clear rational urbanism and could lead to massive housing, with improved quality of living in that time. These neighborhoods were built in rectilinear structures in the form language of CIAM. The public space had an enclosed intimate character. Also, bricks were used as façade material instead of concrete. In the figure below you can see how this was set up for the Castle neighborhood in Oosterhout.

## Social structure

In the 60s, but still today, urbanism is the translation of social structures that are enclosed in different types of buildings from cheap to expensive as well as in rent as in buy. The stamp neighborhoods were built in a social context with low-income differences, and this is well translated in the buildings within the Castle neighborhood, see the pictures below. There was a huge similarity in buildings, both in quality as in construction and both in buy as in rent.

There are a lot of similarities compared to the situation nowadays. Also at that time, there were limited houses and housing was scarce. The difference was the social structure what was translated into 70% of rental houses at that time. Nowadays it is around 25%. Another huge difference was the average car density. In 1965, was around 0,3 cars per dwelling and in these stamp neighborhoods, it was even lower. The average occupation per dwelling was around 4 because these houses were meant for young families. Now after 50 years, the average number of cars per dwelling is about 1 and the occupation is dropped to an average of 2,1 of which 72% is meant for one or two-person households.

## Cultural claim

In the Netherlands, **40% of the current building stock is built in the '70s and '80s** <sup>4</sup>. A part of this stock is built in this stamp typology. By having an idea of how to change this building stock into a future-proof neighborhood where local citizens would like to live for a longer time and are willing to change dwellings when it is needed, we can (partly) solve the housing shortage today. Peter Boelhouwer <sup>5</sup>, Professor, researcher and thought leader in the area of housing in the Netherlands, split the current housing problems into:

- Quantitative and qualitative problems: housing shortage, position middle incomes without a bought house, starters, suitable livings for elderly.
- Economic problems: housing costs problems, wealth inequality because of housing
- Social problems: quality of live issues in neighborhoods and districts
- Technical problems: remain quality improvements (especially after war neighborhoods), foundation problems

Boeldhouwer named that the current housing stock is not future-proof. **There is a shortage of specific home forms like clustered living** (eg. Knarrenhofjes 6), residential care communities and two or three-room apartments nearby facilities. He also suggested a mix of rent (social, middle expensive and expensive) as a good way to structure a neighborhood. This was also the advice for the so-called "Vogelaar" neighborhoods in the 90s <sup>4</sup>, where owning houses were used to solve social problems. Research within dutch municipalities<sup>8</sup> showed that the biggest cause of the current housing crisis is the move from elderly to for them suitable dwellings and that the biggest problem is the shortage of housing in different categories, see figure 4.

This research also mentioned that it is difficult to move the elderly from their homes. **Higher costs and the bond with the living environment** are named as the cause for this. A move on broker and offering the right dwelling for this group is named as a solution in this research. The **phenomenon of longer living in one place is called "Aging in Place"** <sup>6</sup>. This also means that the elderly lives at high ages independent on their own even when there is a need for care. One goal (building and building block level) is to create an understanding of what kind of architecture, within a stamp district, can be attractive for the elderly and empty nesters, to move on and to look at how this can help the housing shortage in the Netherlands. The impact will be calculated via a data analysis.

Two other goals (building block, neighborhood and city level) are bringing back the social cohesion and the liveliness of the neighborhood.

NIEUWS CIJFERS BIJ HET NIEUWS

### Nederland woont met 53 vierkante meter aan woonruimte veel kleiner dan gedacht

Nederlanders wonen gemiddeld even groot als in 2017, maar minder ruim dan lange tijd werd aangenomen. Ouderen, alleenstaanden en personen buiten de Randstad wonen gemiddeld het grootst.

Sjors Hofstede 1 december 2022, 00:00



In 2018 publiceerde het CBS nog dat het woonoppervlakte in 2017 gemiddeld 65 vierkante meter per persoon bedroeg. Dat hoge getal werd veel gebruikt om erop te wijzen dat Nederlanders op zeer grote voet wonen in vergelijking met andere Europeanen, en zo ook als argument om kleiner te bouwen.

Vorige maand rectificeerde het statistiekbureau het cijfer: een huishouden met bijvoorbeeld vier personen bleek slechts één keer te zijn meegenomen bij het berekenen van het gemiddelde, in plaats van dat werd gerekend met vier afzonderlijke personen.

## Orzaken van de woningcrisis

Percentage gemeenten dat een probleem noemt



## Grootste problemen op de woningmarkt

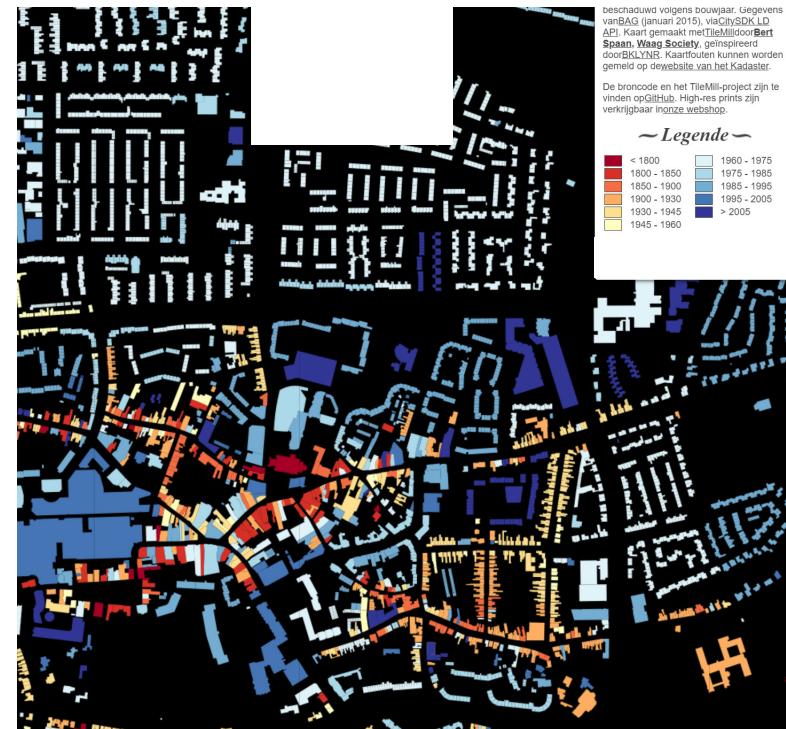
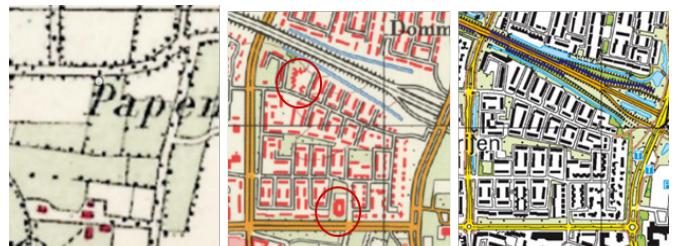
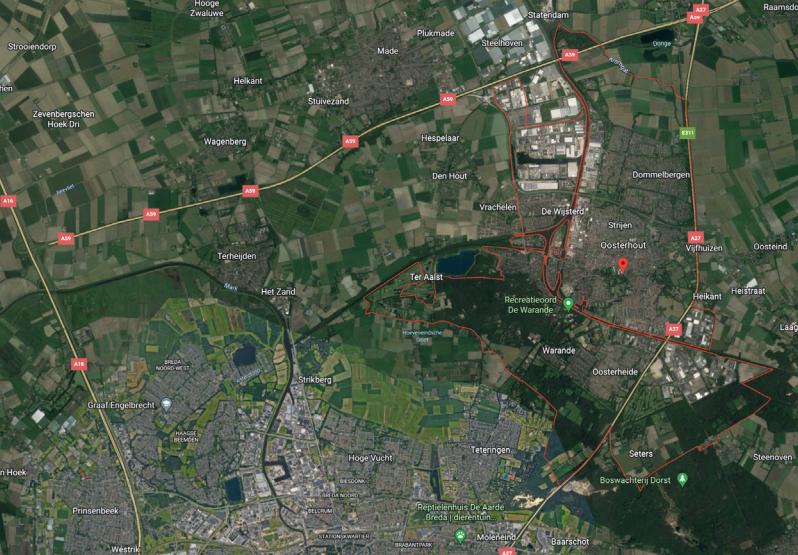
Percentage gemeenten dat een probleem noemt



## Summary:

- Cause housing crisis: elderly and empty nesters do not move. Higher costs and the bond with the living environment are named as the reason for it.
- Stamp structure: fixed arrangement of building blocks: in between traffic and recreation (CIAM principles). Urbanism is a translation of the social structure. This structure is changed but not in these areas. Nowadays still 60-70% (are owned by housing corporations).
- Households are changed (from an average of 4 per house to 2 (72% of two-person households))
  - 40% housing stock in the '70s and '80s
  - Not future-proof (adaptable for change)
  - There is a shortage of specific homes
  - People live longer in one place: "Aging in Place", even when there is a need for care.

## 02. History of the place



beschouwd volgens bouwjaar. Gegevens van BKO (januari 2018), via Cadastral Data Portal. Kaart gemaakt met TileMill door Bert Spaan. Waag Society, geïnspireerd door BKLNR. Kaartfouten kunnen worden gemeld op de website van het Kadaster.

De broncode en het TileMill-project zijn te vinden op GitHub. High-res prints zijn verkrijgbaar in onze webshop.

### — Legende —

< 1600	1600 - 1750
1800 - 1850	1750 - 1850
1850 - 1900	1850 - 1950
1900 - 1930	1900 - 2005
1930 - 1945	1945 - 1960
	> 2008

## City Oosterhout

The Oosterhout core arose on the border of sandy and clay soils, at a junction of country roads. The Oosterhout core initially developed along a number of ribbons, which ran in a fanning pattern towards the surrounding centres. A large village, originally with an open spatial structure, developed at the intersection of the building ribbons. In the 19th century, densification of this structure took place around the Markt and Heuvel squares. A central area was created here where trade and industry settled.

Besides this main village centre, several hamlets and smaller villages developed in the outskirts, which had mainly an agricultural function. Characteristic of Oosterhout were the roads that converged in a star pattern at the Markt and connected the core of Oosterhout with surrounding towns such as Breda, Geertruidenberg and Dongen. The Wilhelmina Canal, which was completed in 1924, enabled further industrialisation. In 1919, a harbour was already in use. This was located west of the city centre and a few concrete factories came here. Due to the improved infrastructure and the emerging industry and trade in the second half of the 19th century, the housing need in Oosterhout grew. The existing centre area was compacted and along the main through roads the core expanded. Oosterhout's growth during this period was unplanned and unguided, with the land between Markt and Heuvel continuing to be built on.

In the 20th century, the first residential areas were built around the centre area. After the Second World War, Oosterhout grew explosively. In the 1950s, the districts Slotjes Oost, Slotjes Midden and Slotjes West were realised south of the core. These new residential areas were the first large-scale planned expansions of Oosterhout, which until then had experienced mainly small-scale, occasional and unstructured growth. Slotjesveld, south of Ridderstraat, remained free of housing developments, creating a green space in the urban area.

In the 1960s, the residential area Oosterheide was built on the south side of the Wilhelminakanal canal. Between 1970 and 2000, Oosterhout's growth took place mainly towards the north, where the Strijen and Dommelbergen districts were developed. The most recent expansion of the core is the Vrachelen district, located on the west side of the Wilhelminakanal, which is nearing completion with the realisation of the De Contreie neighbourhood. Oosterhout has developed into a core characterised in particular by residential areas from different time periods. Oosterhout's current spatial structure is supported by the main access roads, which divide the core into different districts and areas. The centre area, with its original characteristic fanning-out road structure, is enclosed by traffic routes. Outside the centre, the historical routes have in many cases been cut for the purpose of building new residential areas. As a result, they are often no longer recognisably present. The original traffic function of these routes has been taken over by more recent access roads. No monuments, cultural-historical objects or cultural-historical structures are present within this plan area.

### 02-02. Neighbourhood Strijen

The Strijen residential area was largely built between the 1970s and 1990s. A small part of the neighbourhood was built in the 1950s. The district is particularly characterised by a planned urban layout. The Strijen district mainly has a residential function. In addition, the plan area contains social functions (such as schools), sports facilities, retail and business activities. The facilities (shops, schools, etc.) are mainly located centrally in the neighbourhood, near the Hoofseweg. Business activity is located in the west of the neighbourhood, near Statendamweg.

### 02-03. Castle district

The building typology consists mainly of ground-level terraced houses. Differentiation in housing typology is present at the edges of the neighbourhood, in the form of semi-detached and detached houses. There is one apartment building in the northern part. The entire district can be divided into two neighbourhoods, viz:

- Bird neighbourhood (west of Hoofseweg);
- Kastelenbuurt (east of Hoofseweg).

### 02-04. Trafic

The Oosterhout core arose on the border of sandy and clay soils, at a junction of country roads. The Oosterhout core initially developed along a number of ribbons, which ran in a fanning pattern towards the surrounding centres. A large village, originally with an open spatial structure, developed at the intersection of the building ribbons. In the 19th century, densification of this structure took place around the Markt and Heuvel squares. A central area was created here where trade and industry settled.

The profiles of these roads are wide, forming clear boundaries. This clearly separates the neighbourhood from the surrounding districts. Hoofseweg divides the neighbourhood into the Vogelbuurt (west) and Kastelenbuurt (east) neighbourhoods due to its wide profile. The neighbourhood is accessible from the main roads via the various entrances. Two entrances are on Statendamweg, one on Bovensteweg and three on Strijenstraat. From Hoofseweg, the individual neighbourhoods can both be reached with two entrances. There are separate cycle paths along the main roads, such as along Hoofseweg. No separate slow-traffic routes are present in the neighbourhood itself. Cyclists here have to use the residential streets. Where possible, parking is provided on private property. Furthermore, parking is generally found on residential streets and on designated parking spaces.

### 02-05 . Green structure

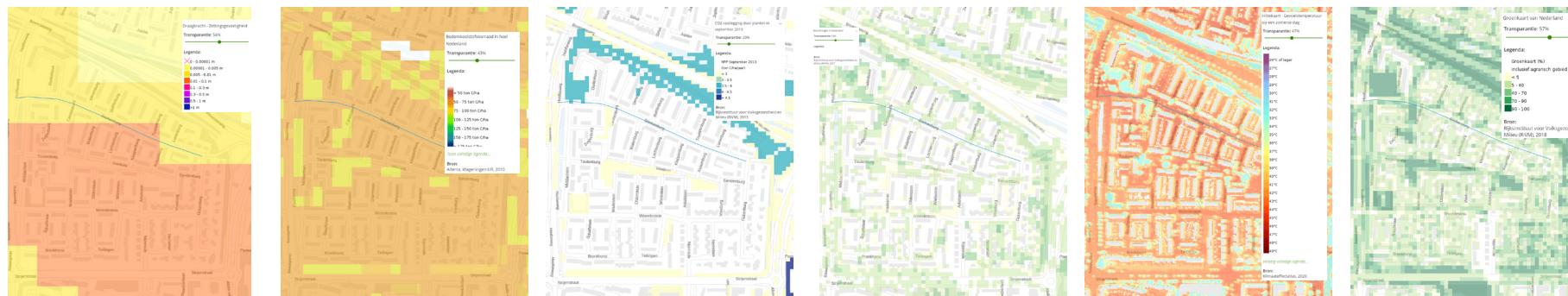
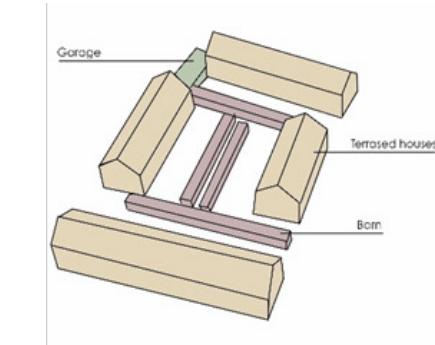
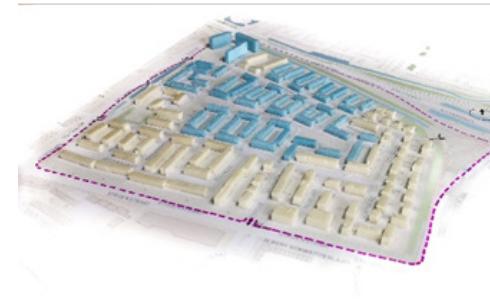
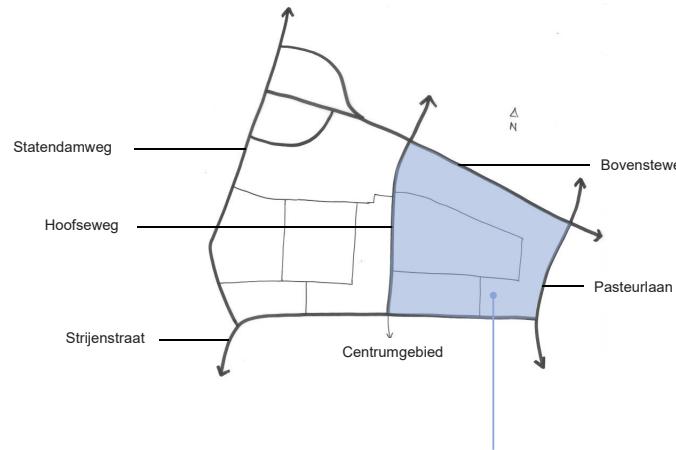
The green structure of the Strijen district is formed by green edges (which are part of the road structure) and several green spaces in the district. In particular, there is a sizeable green zone along Bovensteweg, where some play facilities are located in the northwest side. Along Hoofseweg, Pasteurlaan and a large part of Strijenstraat, wide green strips are present. This emphasises the main route. Tree planting is present in the residential streets. Together with the green spaces and green private gardens, these elements contribute to the internal green structure of the neighbourhoods.

The Kastelenbuurt neighbourhood has an elongated green space, containing play facilities and facilities for slow traffic. Various play facilities are spread throughout the neighbourhood. Especially near the shops and schools, play areas and equipment are present.

## Summary:

- Roads converged in a star pattern, connecting Oosterhout with the surrounding
- The canal (Wilhelmina) enabled further industrialisation
- Oosterhout can be classified as a so-called Newtown, grown fast after the second world war
- Between 1970-2000 growth towards the North of the town (where the Pilot location is located)
- "Strijen" is the district and "Kastelenbuurt" is the neighborhood
- Mostly residential, facilities (shops, schools etc) are centrally in this district, near the "Hoofseweg"

### 03. Urban structure



## Structure district

Strijen is located to the north of the city centre area and is therefore optimally situated in relation to the city centre facilities. Its location between various main roads makes it easily accessible. Via Bovensteweg, the A59 and A27 motorways are fairly directly accessible. As a result, these roads with a wide profile form clearly recognisable boundaries that demarcate the neighborhood. The Strijen district is divided by the Hoofseweg. The layout of the Vogelbuurt and Kastelenbuurt neighborhoods is regular. The street pattern is rectangular, because the building blocks have been realised as a kind of 'stamps'. Especially in the Kastelenbuurt, uniform stamps have been applied. The construction period ranges from the 1950s to the 1990s. A concentration of various facilities is located in the Vogel neighborhood. Present here are: a supermarket with a flower shop and catering facilities, the community centre, two schools, the health centre, a playing field and a small park. The clustering of these facilities and its location on Hoofseweg make this location an important hub in the neighborhood.

Next to it are a physiotherapy centre, two day-care centres and some playing fields scattered around the neighborhood.

## Buildings

Most of the neighborhood was built in the 1970s. As part of infill development and restructuring, new homes were added at a few locations in the early 21st century (Nijerode and Sterkenburg).

The housing typology consists predominantly of terraced houses. These houses consist of two storeys with a roof. The east side of the Kastelenbuurt and the north-west area on Hoofseweg consists of semi-detached houses and some detached houses consisting of two storeys with a roof.

In addition to ground-level houses, one apartment building is located in the Hoofseweg-Bovensteweg armpit. The building consists of up to seven storeys, the lowest of which contains storage areas. Its height and location make it a striking element in the neighborhood.

## Traffic

Strijen is surrounded by the main roads Bovensteweg, Pasteurlaan, Strijenstraat and Statendamweg. The rest of Oosterhout is accessible via these roads. The roads lead to the A59 and A27 national highways and contribute to optimal accessibility.

The Hoofseweg separates the neighborhood into the Vogelbuurt and Kastelenbuurt. The neighborhoods are accessed from the main roads around the neighborhood and via Hoofseweg. The internal access structure mainly follows the east-

## Green and nature

Green zones are present along the main roads Upper Road and Pasteur Avenue. The zones have limited access. A play facility is present in the northwest corner. Hoofseweg is accompanied by wide verges with tree planting. The internal green structure is formed by a large green space in the centre of the Kastelenbuurt area, the green space near the shops and school in the Vogelbuurt area and several smaller green spaces. Playgrounds are scattered in these locations. Tree planting is mostly used in the residential streets. Green squares are present in various places. Together with green private gardens, these elements complete the green structure. West direction. North-south-oriented residential streets connect to the access structure. The network of residential streets is finely meshed, providing good accessibility to homes and facilities.

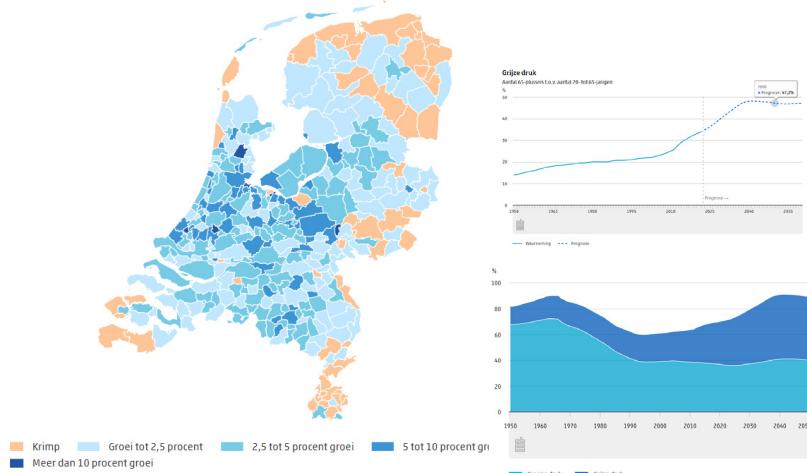
## Building blocks

The building blocks within the scope are owned by the housing corporation Thuisvester. Thuisvester carried out a major renovation a few years ago. As part of this renovation, they replaced all the window frames, installed an additional external wall to meet the new insulation requirements, and included bat homes in the side facade.

## Summary :

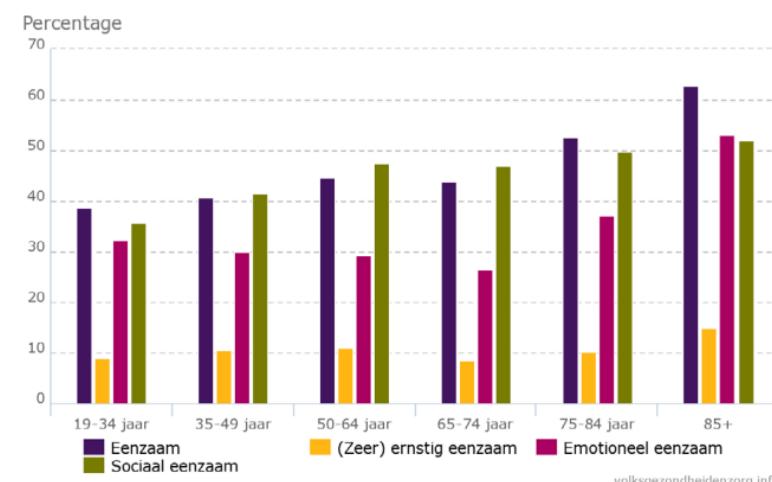
- The Castle district has a central position in the municipality and nearby access roads
- The district is monofunctional, with only housing functions
- Good opportunity of using the green stroke on the North side of the plot
- Sufficient possibilities to store water in the area (opportunity for cooling)
- Wide roads and many parking places in the area (opportunity for extra space)
- The municipality has 6 of these stamp districts (around 10-12 comparable neighborhoods)

## 04. Demographic figures



## Elderly and loneliness

Eenzaamheid naar leeftijd in 2016

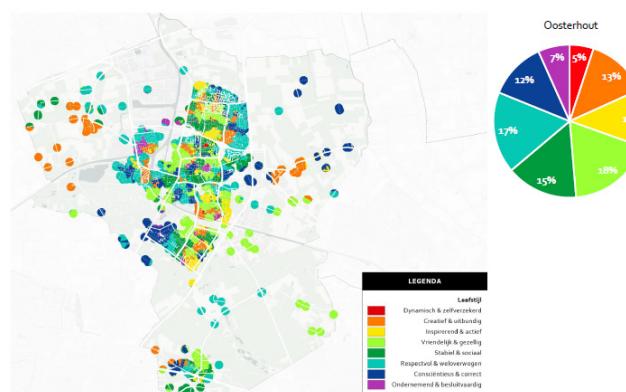


## Oosterhout

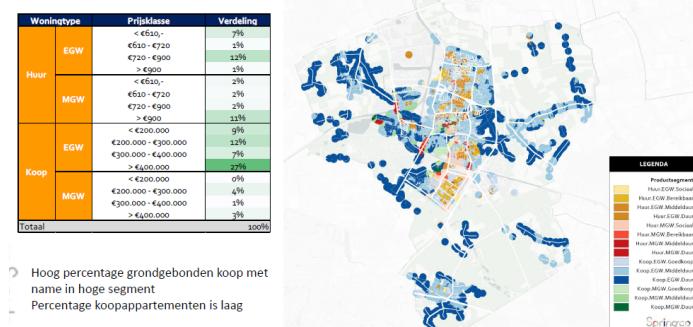
CBS: aantal inwoners gemeente Oosterhout stijgt met 3,78% tot 2035



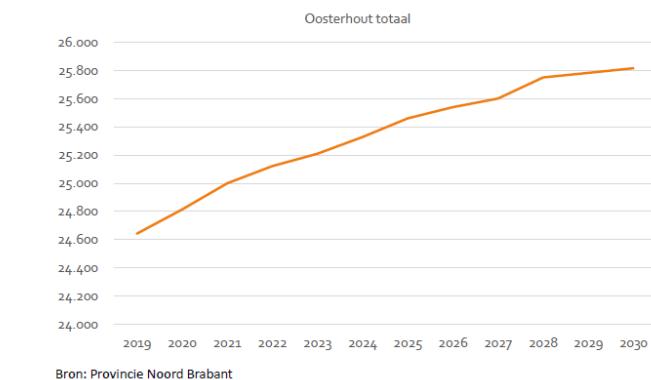
## Inwoners – leefstijl



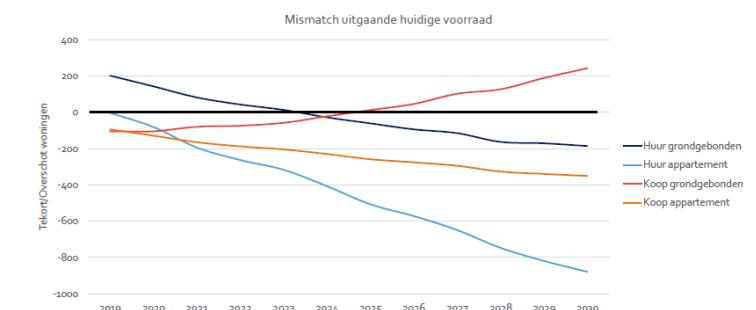
## Woningvoorraad - segmenten



## Inwoners – demografische prognose



## Mismatch vraag en aanbod



## The Netherlands

The Dutch population continues to grow. By 2070, the Netherlands will have 20.6 million inhabitants, according to the CBS forecast. The impact of the Corona crisis on excess mortality and lower migration is included in this forecast. The projected growth is mainly realised due to more people coming to the Netherlands and rising life expectancy. In addition, more children are also expected to be born from 2023 onwards than is currently the case. By 2050, a quarter of the population will be 65-plus (CBS, 2022).

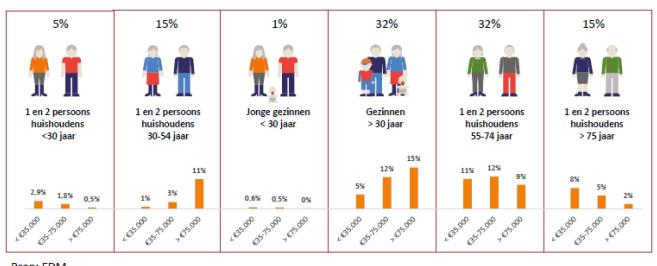
Many young people will move to cities in the coming years. As a result, growth is predicted in urban areas (especially in the Randstad) while population shrinkage will occur in smaller municipalities. Shrinkage is particularly prevalent at the edges of the country, such as in the northern provinces, the Achterhoek, South Limburg and Zeeland, and, for example. Not only the Randstad attracts people, cities like Zwolle, Arnhem, Nijmegen, Amersfoort and Eindhoven are also growing strongly. Increased immigration resulted in fewer shrinking municipalities in the past 5 years than in previous years (CBS, 2020).

In the short term, this leads to declining pupil numbers in primary, secondary, vocational and academic education, especially outside the Randstad. Primary school pupil numbers are expected to decline until 2025, especially in municipalities in the north and east of the Netherlands (Riele, et al., 2019). Secondary education shrinks by about 12% until 2031. Remarkably, the differences are strongly regionally distributed and a few kilometres away growth can be seen instead of shrinkage (Central government, 2021).

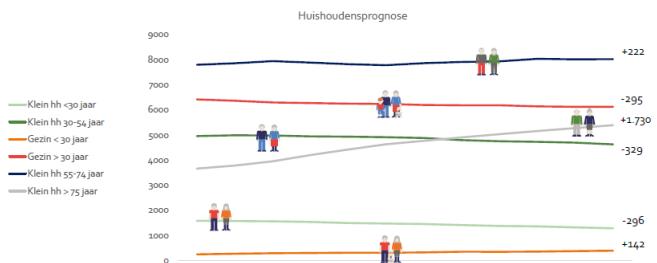
The proportion of over-65s rises from 18% (2015) to 26% (2060). The share of over-80s rises from 4% (2015) to 11% (2060) (UN, 2017). This could start to cause a contraction of the working age population, were it not for the fact that the retirement age is now linked to this demographic trend. In 2026, 65-year-olds are expected to have an average of 20.82 years of life left ahead of them (CBS, 2020).

## "Kastelen" district

### Inwoners – doelgroepen op de woningmarkt

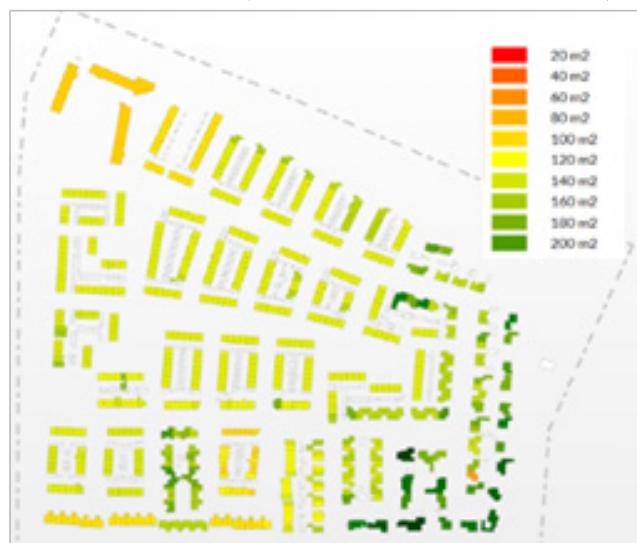
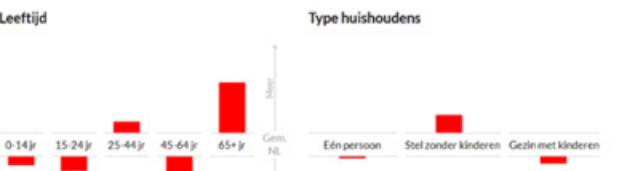


### Inwoners – demografische ontwikkeling



Groei vooral bij empty nesters en ouderen. Ook de jonge gezinnen groeien maar omvang is klein

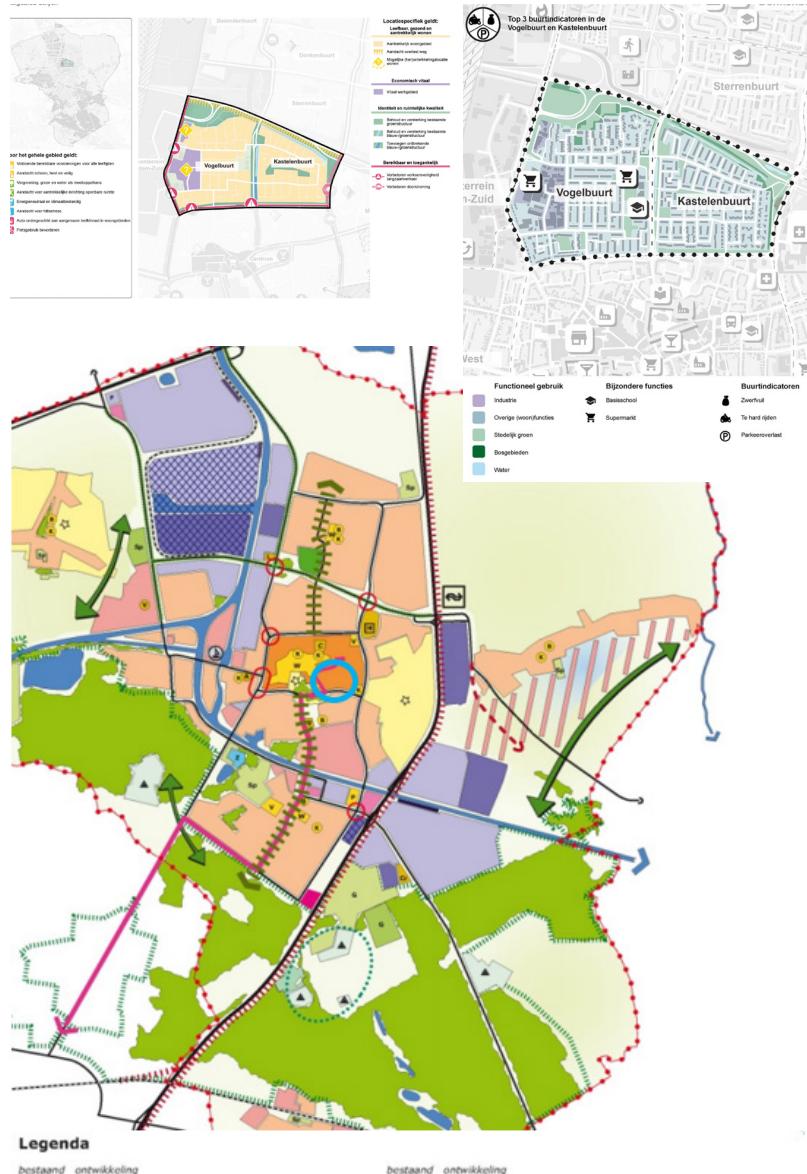
Aantal inwoners	Aantal huishoudens	Personen per huishouden	Bevolkingsdichtheid (OAD)
1.650 Gemiddeld NL	735 Gemiddeld NL	2,2 pers Ondergemiddeld NL	2.459 Hoog NL



## Summary

- Oosterhout is not a high growth area
- Ageing is higher compared to other cities
- Especially the need for rental (apartments 80%) and houses (20%) in the near future
- Sufficient ground-based houses (option demolish part of the bought houses)
- A good mix of lifestyles in the neighborhood

## 05. Policy municipality Oosterhout



### Zoning plan

Structure vision spatial planning 2010 - partial revision 2014 : Since the adoption on 10 July 2015 of the 2014 Spatial Regulation, several decisions for map adaptation have been taken and changes have been made to the rules and naming of the regulation. These changes have been incorporated in con- firmed version dated 15 July 2017. In this consolidated version of the Regulation Space, the plan area is designated as existing urban area. The Space regulation sets rules regarding urban developments.

On the one hand, the strategy structure agenda is an important source of inspiration and information, allowing everyone to take adequate notice of the various projects and their interrelationships. On the other hand, the strategy structure agenda provides clear direction as to how the municipal government deals with initiatives in the various policy areas. The spatial development strategy does not contain any obligations towards third parties. When assessing third-party initiatives, this vision is used as an assessment framework.

### Living

The 2014 - 2018 coalition agreement indicated that the Housing Vision will be updated. The reason for this is that many changes have occurred in the field of housing and adjacent policy fields since 2011 that have an impact on housing. The housing market has changed as a result of the economic crisis as well as numerous developments within the housing corporation sector. The introduction of the amended Housing Act on 1 July 2015 is decisive for the housing corporation sector and with it the housing policy to be pursued. Under the Act, housing associations are required to return to their core task of building, renting and managing social housing. In addition, the transition in the Wmo due to the separation of housing and care has direct consequences for housing. The direction to be taken in the Housing Vision is substantiated on the basis of demographic developments and (local) studies. Regional developments and the role that Oosterhout has and is taking in them also influence Oosterhout's housing policy. The following main themes were considered important by the municipal council and external partners for housing policy in Oosterhout:

- Affordability: The desire is to offer people on low and middle incomes good prospects in the housing market. Important here is that the housing stock matches residents' wishes and possibilities, both now and in the future.
- The social domain: From 2015, long-term care was radically reformed. The aim is to allow people to live independently at home for as long as possible. The separation of housing and care has direct consequences for the existing housing stock but also for new housing to be built. These homes must be qualitatively suitable for (longer) independent living through adaptations.
- Special target groups: In recent years, housing demand from special target groups has increased. Target groups such as status holders, labour migrants and re-starters deserve extra attention in the housing issue given their specific situation and opportunities.
- Livability / Living Environment: The quality of living in Oosterhout depends in part on the living environment. The livability of the living environment is very important for the quality of living now and in the future. Retail, catering, sports and recreational facilities contribute to the livability and thus the attractiveness of the municipality.
- Flexibility in housing construction: partly based on the main themes, it is possible to identify the quantitative and qualitative housing demand in Oosterhout. The basic principle is to build according to demand and respond to the needs from the housing market. Building according to need requires flexibility, which is why it is important to have a clear picture of the quantitative and qualitative demand.

### Mobility plan

The traffic areas play an important role in keeping the living and working areas in Oosterhout and the region accessible and form connections between the living, working and facilities areas. All streets that are not part of the traffic area have a status as a residential area. The aim is to prevent traffic through Oosterhout as much as possible. Additional measures are required on a number of roads. In general, the road network has sufficient capacity to handle the traffic. A cycle network has been established for bicycle traffic in the Mobility Plan, consisting of primary, secondary and recreational routes. The scale of Oosterhout offers many opportunities for bicycle. The bicycle network is separated from the car network as much as possible. Three forms are distinguished for public transport: high-quality public transport, regular public transport and close-meshed public transport.

## Standing still in the future

The municipal parking policy is laid down in the memorandum 'Standing still in the future, parking policy in the medium term (2020)'. This memorandum was adopted by the municipal council in December 2009 and an interim evaluation took place in 2013. The parking policy pursues goals in the areas of quality of life, the economic functioning of the city centre and accessibility. The memorandum includes parking standards that must be met when developing new functions. The starting point here is that parking is solved as much as possible on private property, preferably indoors.

## Green

In Oosterhout, there is an average of 115m<sup>2</sup> of public greenery per home in residential areas. Based on this average, it can be said that Oosterhout is a green municipality. Because Oosterhout wants to remain a green municipality, the municipality of Oosterhout strives for an average standard of 115m<sup>2</sup> of public green space per home in the residential neighborhoods and cores. In the political agreement, the green character of Oosterhout has also been named as a core value of the city. It is a characteristic that distinguishes Oosterhout from other municipalities. The aim of green policy in a general sense is therefore to maintain and improve this green quality. The corresponding execution tracks are protection and development. The green character of the city is formed by the greenery in the public space as well as in the private gardens. The gardens are green spaces in the city, with front gardens, in particular, having a major influence on the atmosphere of the urban outdoor space. Protection of the greenery present in the city precedes compensation. After all, compensation is restoring or making up for something that has been lost.

With regard to private green space, the municipality has limited protection and management options. Zoning plans determine which activities are permitted in gardens (development). The somewhat larger trees (thicker than Ø 0.20 m) are protected on the basis of the felling permit procedure in the (General Local Bye-Law) APV. The monumental trees form a special category; these enjoy heavier protection in both the zoning plans and the APV. The municipality has maximum opportunities for conservation and development in the public area. The development and protection instruments such as zoning plans, the APV and the monumental trees list also apply in the public space. In addition, the municipality makes conscious choices based on policy principles with regard to the maintenance and development of the other facilities. In the public space, given the protection enjoyed by private green spaces, the municipality has sufficient opportunities to maintain and expand the green character of Oosterhout.

## Welfare

From 1 October 2015, an application for an environmental permit for the activity of building in Oosterhout will no longer be subject to a condition test. However, it will be possible to take action retrospectively, via a so-called excesses regulation, against structures which are in conflict with reasonable requirements of prosperity. In addition, the new housing estate De Contreie (outside this zoning plan) will continue to be subject to the external appearance test. Well-being requirements also continue to apply in a protected town and village view (which does not apply to this plan) or in the presence of national or municipal monuments (which also does not apply to this plan).

The Future Vision paints a picture of the Oosterhout of 2030. This Future Vision forms the basis for the Environmental Vision that is currently being drafted. The Future Vision mainly provides an inspiring picture of what the future could look like for Oosterhout. Ambitions and tasks have been identified for various topics. Flexible living in town and country. Within the existing urban area of Oosterhout, 2,700 new homes have been built over the past 12 years. It has not proved necessary to build a whole new residential area on the east side of the A27 motorway, but that possibility is not completely ruled out in the future. In building those new homes, strict requirements have been set for spatial quality, accessibility, liveability and climate adaptation.

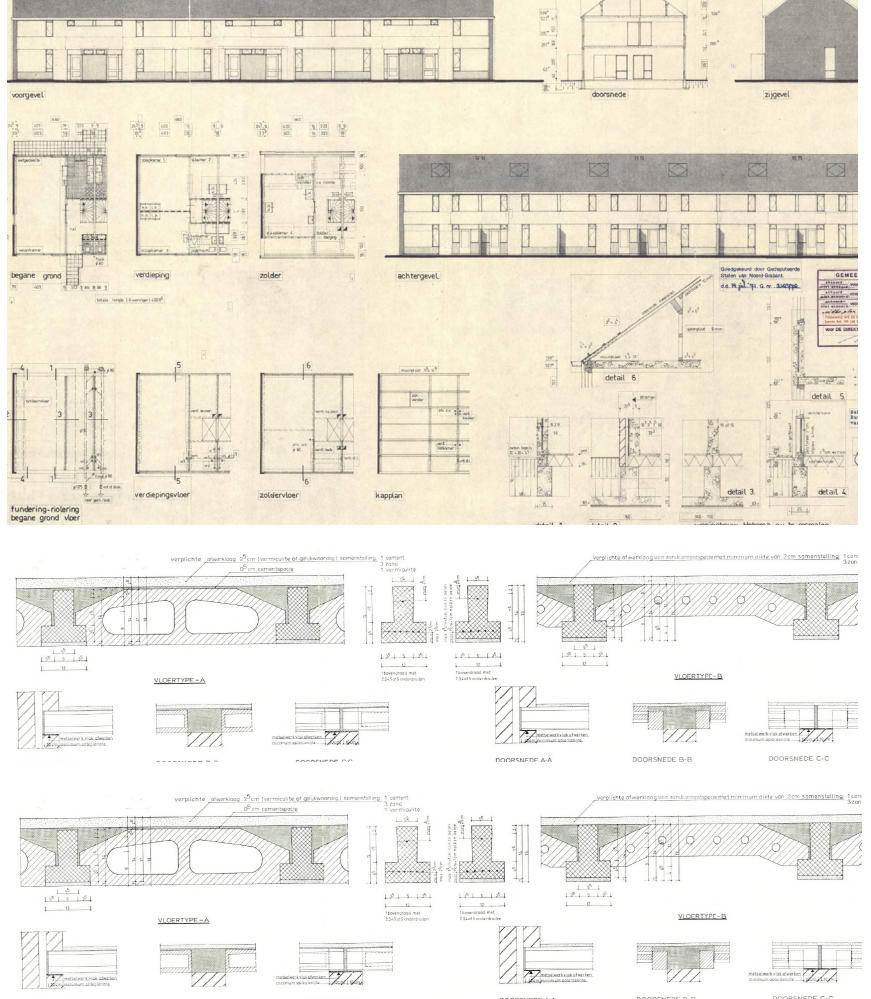
Part of the new housing supply was realised by transforming vacant properties such as churches, shops and offices. On the site around the renovated Amphia hospital, new housing has been realised in addition to a contemporary healthcare facility. Several developments have also taken place on the Slotjesveld. Oosterhout has many different residential environments and offers everyone a suitable home. All developments are based on future-oriented, sustainable and flexible housing. Homes are suitable for the widest possible target groups and for alternative forms of living. Home automation makes it easier for the elderly to grow old in their social environment. They prefer to live in places where 'care is close by'. Space has been made for informal care and generational housing. Homes that become available after the elderly move out are occupied by (young) families.

## Summary

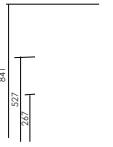
- Most of the functions are located in the "Vogel" neighborhood
- Houses in scope should be payable, in the social domain, for special purpose groups, lively and flexible
- New functions mean parking as much as possible on your own territory
- Average green per living is 115 m<sup>2</sup>, which means extra living will need extra green in the neighborhood -need to calculate the impact
- Trees, bigger than 20cm are being protected

## 06. Construction and status

3169 - 735 - 252



## 06-01Building block level

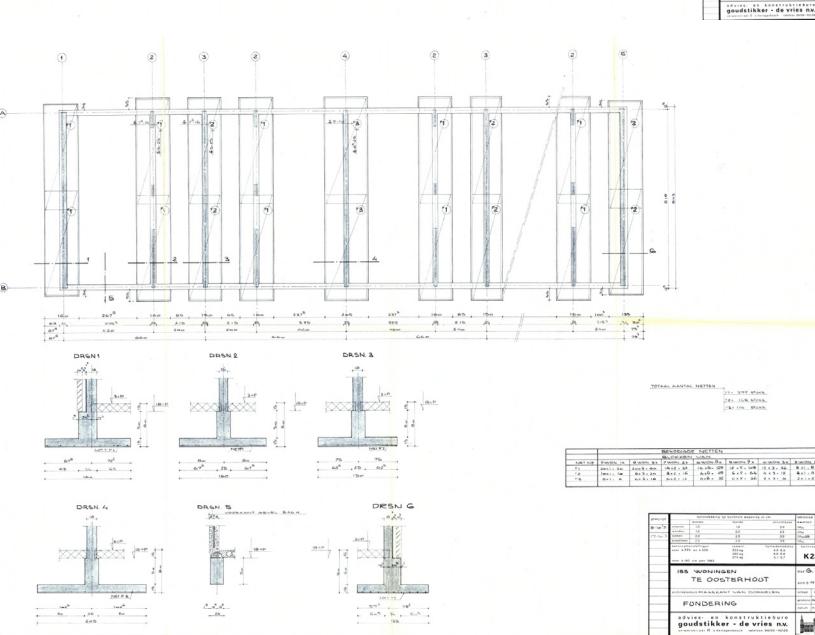


06-02 Building level

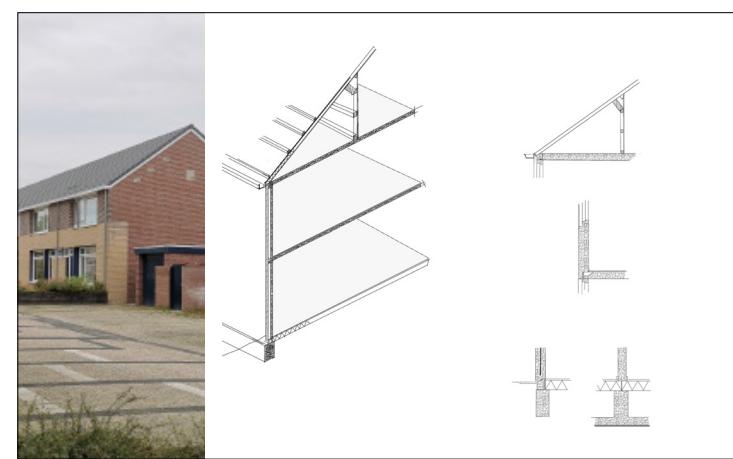
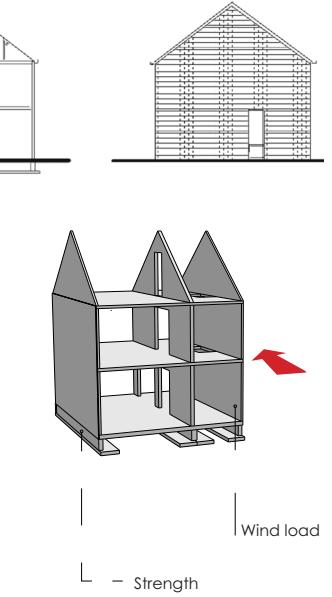
## 0. Ground floor

## 1. First floor

## 2. Attic



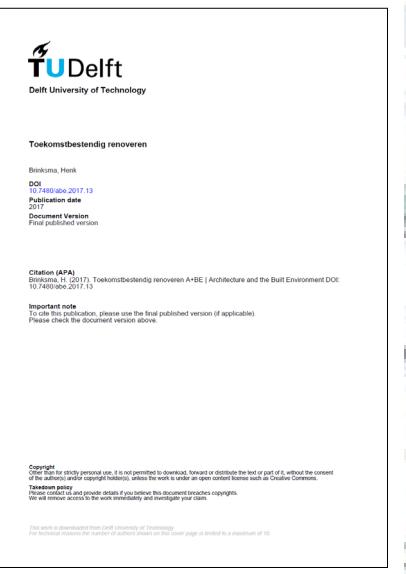
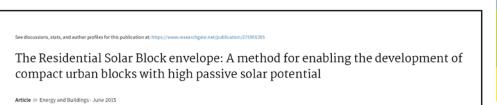
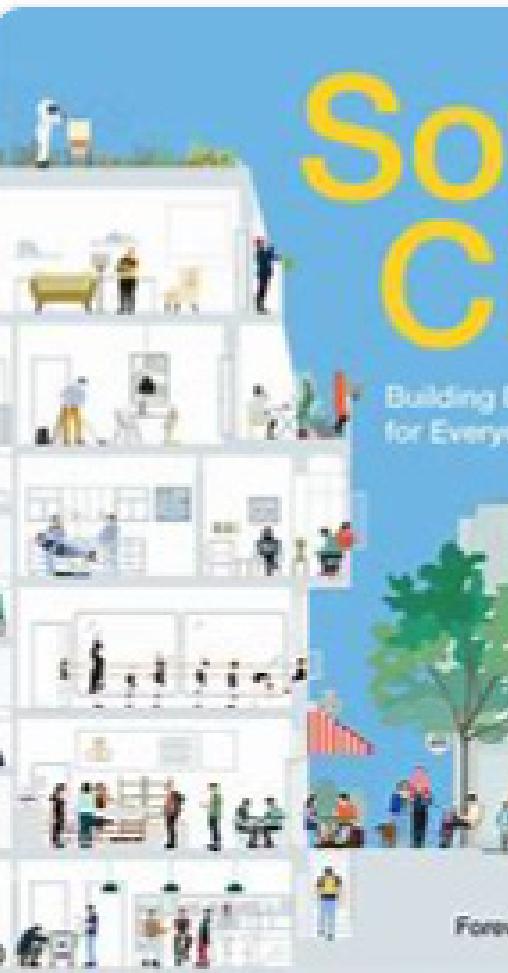
Living	: 37 m <sup>2</sup>
Sleeping rooms	: 50 m <sup>2</sup>
Sleeping room	: 26 m <sup>2</sup>
Kitchen	: 9 m <sup>2</sup>
Bathroom	: 7 m <sup>2</sup>
CV / others	: 10 m <sup>2</sup>
Hall	: 9 m <sup>2</sup>
Hall	: 1 m <sup>2</sup>
Toilet	: 1 m <sup>2</sup>



## Summary :

- Mainly three types of building blocks
- Possibilities construction wise for splitting and topping (easy construction type)
- Sufficient square meters inside the building
- Casting construction for most of the stamp building build in this period (complete concrete skeleton)
- Wind load is calculated from the front side
- Strength of the construction is generated from the floor elements, demolishing them from front to back is not recommended**
- Recent renovation can be a challenge for calculating alternatives (already invested) - or an opportunity
- Easy to demolish sheds (single wall with limited foundation)

## 07. Theory



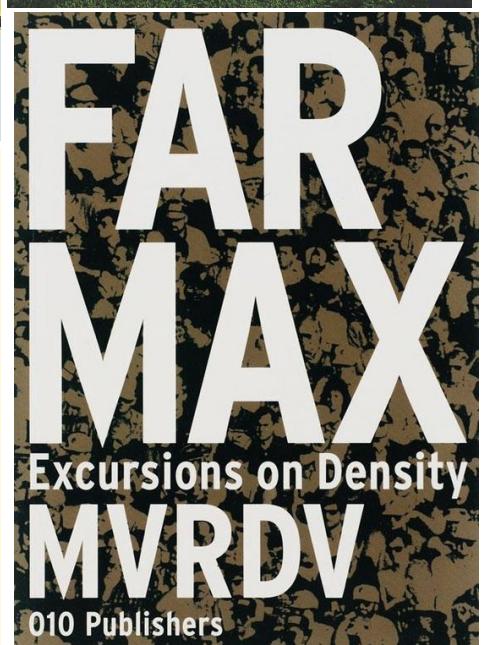
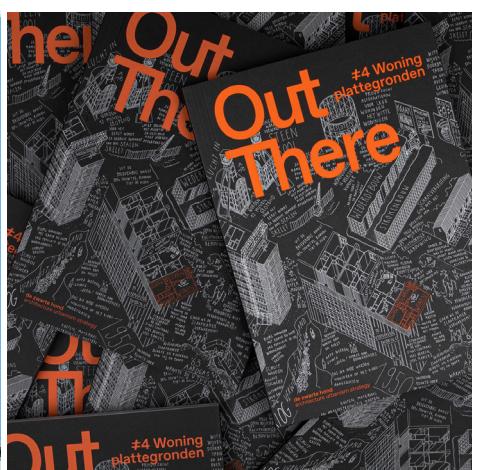
ft  
ity

Density  
day Life



David Sim  
word by Jan Gehl

e  
houdt



## Summary :

- KAW "Ruimte zat in de Stad" described 4 approaches for densification. I worked with two, namely **densification by adjusting existing structure** and **look for opportunities in the borders of a neighborhood**
- David Sim, soft city described on an urban level what you should do to make a soft city. Especially the ideas on **making more diverse architecture** and **eyes on the streets** where the ones that I used.
- From the document "Toekomstbestendig renoveren" I came to the idea of **flexibility** in the renovation process and that this should be done in one day. Also because this can lead to more diverse architecture.
- In Glenn Lyppens study on "De robuuste buitenruimte" I saw the **importance of the in-between space** and how this can lead to the unexpected meeting
- Nextdoor, "Hoe sociale cohesie de buurt bij elkaar houdt". The guidelines **emphasizing quality of contact, safety, and fostering connections among residents** on the same floor were particularly inspiring to me.
- De zwarte hond, "Out there". This small booklet was on the spot for me. The ideas presented on **enhancing the comfort of living through the quality and flexibility of floorplans, along with the inspiring examples** showcased in the book, were truly motivating.

## 08. Nitrogen crisis and carbon footprint

### Nitrogen Crisis:

The nitrogen crisis is a crisis in the Netherlands that started in 2019 and continues to this day. At the heart of the crisis lies the nitrogen issue. In the Netherlands, the soil is burdened by a very high application of reactive nitrogen compounds, particularly ammonia (NH<sub>3</sub>) released from animal manure. In addition, nitrogen oxides (NO<sub>x</sub>) are emitted by combustion engines, such as those in motor vehicles and industry. Human activities that release nitrogen compounds in large quantities lead to undesirable effects on the quality of soil, water, air, and nature.

The nitrogen crisis had a long history, both legally and ecologically, when it began. The first European standards were already established in 1991. European countries are obliged to comply with the Habitat Directive, which states that a "favorable conservation status" should be achieved in Natura 2000 areas. On May 29, 2019, the Administrative Jurisdiction Division of the Council of State declared the government's Program Approach Nitrogen (PAS) invalid. As a result, the PAS could no longer be used for granting nitrogen permits in the vicinity of Natura 2000 areas. This ruling immediately halted various projects (especially in housing), and the government had to urgently seek solutions. Although the nitrogen issue had existed for many years, the Council of State's ruling resulted in an estimated 18,000 construction projects coming to a standstill.

In view of long-term solutions (until 2030), the Remkes Committee published the report "Not everything can be done everywhere" in 2020. In this report, it advised reducing national emissions of NH<sub>3</sub> and NO<sub>x</sub> by 50% compared to 2019. The NH<sub>3</sub> target should be higher in certain areas close to natural areas. Starting from July 2021, construction projects could resume without nitrogen assessment based on the so-called Construction Exemption. However, this exemption was revoked again in November 2022 by a ruling of the Council of State. Meanwhile, the term "protracted nitrogen crisis" was being used.

### Nitrogen and construction projects:

During the construction of houses and other buildings, nitrogen is released. In the construction phase, this can include activities such as material delivery by trucks. Even when the houses are occupied, nitrogen is released. For example, through the use of natural gas for heating or cooking on gas stoves. Due to the excessive nitrogen levels in the air, various construction projects are being halted.

What is allowed? Firstly, projects that do not have significant effects on a nature area can be carried out. This should be determined through a calculation called the Aerius calculation. AERIUS calculates the emissions of NO<sub>x</sub>, NO<sub>2</sub>, and NH<sub>3</sub> from road traffic per road segment. The calculation is based on data about the characteristics of road traffic per road segment (road type, traffic intensities per vehicle category, level of congestion, and maximum speed). Secondly, internal offsetting is permitted. This means offsetting within the same project at one location. Thirdly, you can obtain a permit based on external offsetting, which involves offsetting with a project by terminating another project at a different location. Finally, a nature permit is granted if you meet the ADC criteria: 1) there are no alternatives, 2) it is required for compelling reasons of overriding public interest, and 3) compensation is mandatory. However, the ADC test is rarely applied in practice because the requirements are too stringent.

## Conclusions:

- The nitrogen crisis has two drivers, the reduction of ammonia (NH<sub>3</sub>), released from animal manure and that of Nitrogen Oxides (NO<sub>x</sub>), emitted from combustion engines, such as motor vehicles and industry
- High nitrogen targets are influencing the construction projects, especially nearby "Natura 2000" areas
- Main influence on nitrogen emission in the construction phase are the activities as material delivery by trucks
- Another impact for as well Nitrogen as Carbon footprint, is the use of gas for heating and cooking
- Carbon dioxide (CO<sub>2</sub>) emission and other greenhouse gases in the atmosphere are leading to global warming and climate change.
- The building industry is responsible for 40% of the global energy.

## Carbon footprint

The building industry is a significant contributor to carbon emissions and plays a crucial role in addressing climate change. Carbon footprint refers to the total greenhouse gas emissions produced during the **entire lifecycle of a building, including the extraction of raw materials, construction, operation, and eventual demolition.**

One major factor contributing to the carbon footprint of the building industry is the extensive use of energy, primarily derived from fossil fuels, for heating, cooling, lighting, and operating buildings. This reliance on non-renewable energy sources releases large amounts of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases into the atmosphere, leading to global warming and climate change.

Another significant source of emissions in the building industry is the production and transportation of construction materials, such as cement, steel, and glass. The extraction of raw materials and the manufacturing processes involved in producing these materials often require substantial energy inputs, leading to emissions. Additionally, long-distance transportation of materials to construction sites adds to the carbon footprint.

Furthermore, the design and construction practices in the building industry can contribute to carbon emissions. Inefficient building designs that do not consider energy efficiency principles can lead to higher energy consumption and increased emissions. Additionally, poor construction practices, including the use of low-quality materials and wasteful construction methods, can further exacerbate the carbon footprint.

The building industry is responsible for a substantial percentage of global warming emissions. According to various studies, it accounts **for approximately 40% of global energy** use and 30% of greenhouse gas emissions. These emissions arise from the energy required for heating, cooling, and operating buildings, as well as the production and transportation of construction materials. The building industry's significant contribution highlights the urgent need for sustainable practices, energy-efficient designs, and the adoption of renewable energy sources to mitigate its impact on global warming.

## 09. Qualities of densification

Research TU Delft

Density is a relationship concept. Its meaning changes depending on how we use it. The population density, the dwelling density, the density of uses, and the built density, are among the most commonly used in urban development.

Current global urbanization processes put acute pressure on urban and ecological systems. This has been articulated in UN's sustainable development goals (SDGs) and in UN-Habitat's 5 principles for sustainable urban development. **High density and compact urban form are thereby often propagated as the solution for more sustainable urbanisation**, despite the fact that also a series of negative effects are associated with higher density. UN Habitat (2014) outlines five principles for the development of sustainable neighborhoods focussing on key characteristics of high density, mixed land use, dense street configurations and social mix.

1. Adequate space for streets and an efficient street network. **The street network should occupy at least 30 per cent of the land** and at least 18 km of street length per km<sup>2</sup>.
2. **High density. At least 15,000 people per km<sup>2</sup>**, that is 150 people/ha or 61 people/acre.
3. Mixed land-use. At least **40% of floor space should be allocated for economic use** in any neighborhood.
4. Social mix. The availability of houses in different price ranges and tenures in any given neighborhood to accommodate different incomes; **20 to 50 per cent of the residential floor area should be for low-cost housing**, and each tenure type should be no more than 50 per cent of the total.
5. Limited land-use specialization. This is to limit single-function blocks or neighborhoods; **single function blocks should cover less than 10%** of any neighborhood.

The principles are seeking to promote high-density urban growth, alleviate urban sprawl and maximize land efficiency. The 5 principles are thus expected to achieve the following performances:

1. Promote sustainable, diversified, socially equal and thriving communities in economically viable ways.
2. Encourage walkable neighborhoods and reduce car dependency.
3. Optimise use of land and provide an interconnected network of streets which facilitate safe, efficient and pleasant walking, cycling and driving.
4. Foster local employment, local production and local consumption.
5. Provide a variety of lot sizes and housing types to cater for the diverse housing needs of the community, at densities which can ultimately support the provision of local services.

The Design of the Urban Fabric graduation studio is related to the urban design research group at the Department of Urbanism, Faculty of Architecture & the Built Environment, Delft University of Technology. The graduation studio Urban Fabrics brings together mentors of three sections: Urban Design, Urban Studies and Landscape architecture.

A general consensus has emerged saying that denser and more compact cities also result in more sustainable cities. Higher density development is considered as one of the most important means to counter problems such as climate change and land fragmentation, increase innovation, productivity, job and service accessibility (Ahlfeldt et al 2018), give better accessibility to municipal service opportunities (Jenks et al. 1996) and public transport (Churchman et al 1996). However, there are also negative effects associated with higher density, such as decreased well-being (Chu et al., 2004), more crime (Chhetri et al., 2013), reduced capacity to absorb rainfall and contribute to the urban heat island effect (Carter et al. 2015), decreasing biodiversity (e.g. Hansen et al. 2014), and first indications show reduced mental health related to isolation or crowding (e.g. Barton, Grant 2006, Melis et al 2015, Gruebner et al 2017).

Summary :



Source: Barton, H. and Grant, M., (2006) A health map for the local human habitat, Journal of the Royal Society for the Promotion of Public Health, 126 (6) pp 252-261

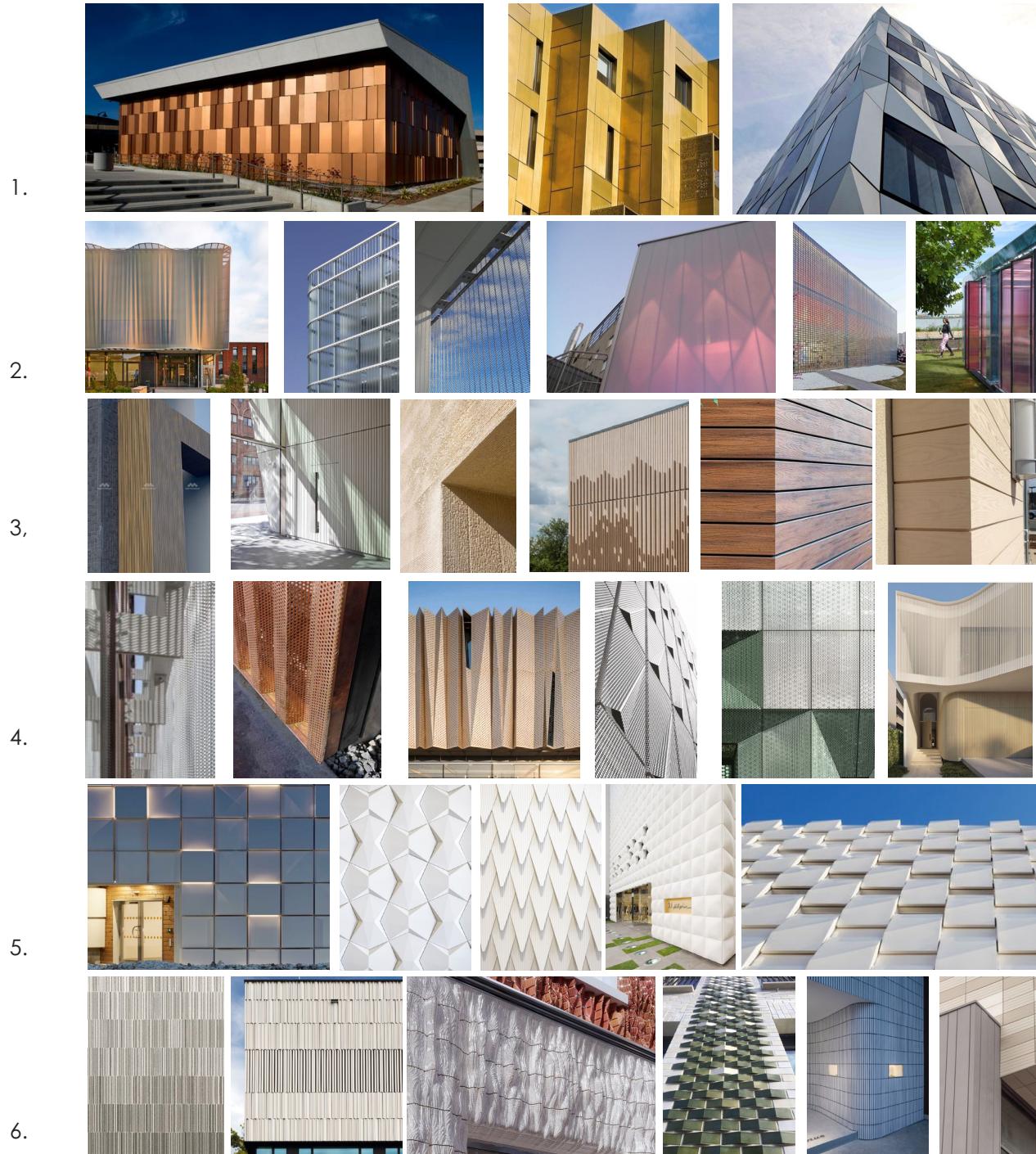
- High density and compact urban form are thereby often propagated as the solution for more sustainable urbanisation
- The street network should occupy at least 30 per cent of the land
- High density. At least 15,000 people per km<sup>2</sup>
- 40% of floor space should be allocated for economic use
- 20 to 50 per cent of the residential floor area should be for low-cost housing,
- single function blocks should cover less than 10%

## 10. Façade materials - lightweight and easy to recycle

In architecture, various lightweight materials are utilized as façade cladding. Some commonly employed lightweight façade cladding materials are:

1. Aluminum Composite Panels (ACP): Aluminum composite panels consist of two thin layers of aluminum with a plastic core. They offer an excellent combination of lightness, strength, and durability. ACPs are frequently employed for their aesthetic appeal and versatility.
2. Glass Fiber Reinforced Plastic (GFRP): GFRP panels are composed of a mixture of fiberglass and plastic resin. They are lightweight, durable, and can be shaped into various designs and colors. GFRP panels are often used in contemporary architecture due to their flexibility and weather resistance.
3. Wood Composite Panels: Wood composite panels are composed of a blend of wood fibers and plastic resins. They provide the warm appearance of wood while being lightweight and low-maintenance. Wood composite panels are widely used for their natural aesthetics and durability.
4. Perforated Metal Panels: Perforated metal panels are commonly utilized as façade cladding due to their lightweight nature and visual appeal. They can be made from materials such as aluminum or steel and can be perforated with different patterns, offering both functional and decorative properties.
5. Plastic Panels: Plastic façade cladding panels, such as PVC or polycarbonate panels, are lightweight, durable, and easy to install. They are available in various colors and finishes, allowing for the realization of modern and contemporary façade designs.
6. Ceramic Panels: Ceramic panels are thin, lightweight panels made of ceramic material. They provide excellent resistance to weather conditions, durability, and a modern appearance. Ceramic panels are increasingly popular as an option for façade cladding.

The selection of lightweight façade cladding materials depends on several factors, including desired aesthetic effects, functionality, durability, and specific project requirements.



## Conclusion :

- Sustainability: Many lightweight materials are made from recycled content and support resource conservation, while their lower energy consumption reduces the carbon footprint.
- Energy Efficiency: Lightweight materials provide better insulation, reducing heat transfer and improving energy efficiency.
- Structural Benefits: They exert less load on the building, allowing for greater design flexibility without compromising structural integrity.
- Design Versatility: Lightweight materials can be easily shaped and molded, enabling innovative and unique façade designs.
- Cost-effectiveness: They can lead to cost savings in construction, maintenance, and operation.

## 10. Interviews

This chapter is divided into two parts. The first part consists of interviews conducted with the individuals directly involved, including:

1. Residents of the dwellings.
2. Owners of the housing stock (corporations).
3. The governing bodies, which encompass the local government (municipality) as well as the Dutch government.

The second part comprises interviews with various experts, categorized as follows:

4. Experts from the construction company van Wijnen, who possess experience in splitting houses in post-war neighborhoods.
5. Architecture and urban experts from KAW architects, with expertise in densification within the city.
6. Urban anthropologists and researchers from Belgian universities.
7. Experts in rental law and legal structures.
8. Construction specialists.

Note: Interviews from the architectural and urbanist company De Zwarde Hond, featuring experts in the field, have been incorporated above to further enrich the narrative whenever feasible.

### Residents who are living in the area or those that left

Elderly that rent a house (Mary and Cas): These individuals have minimal contact with the local community and struggle with the dilemma of excess belongings when contemplating a move. Often, one partner, typically the woman, desires to downsize due to the large size of the house and the associated maintenance. Mary suggests exploring the Polish model of intergenerational living, where children reside above their parents when they become older, and assume ownership of the house when the parents vacate.

Elderly individuals who have left the area (Leo): The departure of one partner and the subsequent challenges of maintaining a large house prompt most elderly individuals to relocate. Moving to the city center is a popular choice among this demographic.

Empty nesters (Bas and Lonneke): Having experienced the departure of their children from home, these individuals maintain limited interaction with their neighbors. They are content in their current neighborhood and foresee a longer stay. Although they lack a direct attachment to the community, many empty nesters express a desire to remain there for numerous years or return to the area.

Young families (Erns-Jan, Giselle, and Thijmen): Originally settling in the neighborhood with the intention of eventually moving and purchasing a house elsewhere, these families have found happiness in their current location. The neighborhood offers ample opportunities for their children to socialize, boasting numerous playgrounds. However, the schools in close proximity, such as Torenshouw, either have limited availability or are not preferred by the parents.

Young families who have relocated (Nino, Marcella, and two children): Residing in the area for a period of two to three years, these families have moved to homes they purchased or to neighborhoods with better schools. While generally content during their stay, they did not establish significant connections with their neighbors.



Hoi Theo! Wat een leuk gesprek was dat man!! Je hebt me aan het denken gezet. Over dat inbreiden en of en hoe je zo'n huis als dit zou kunnen aanpassen zodat er (weer) 4 of 5 mensen in zouden kunnen wonen na een 'empty nest' zoals je het noemde. Dat moet makkelijk kunnen lijkt me als je goed nadenk en plant. Bedankt voor het prikkelen! 😊

Inderdaad een leuk gesprek en ik kreeg een

Young individuals who have left the area (Ares): Primarily driven by academic pursuits, these young individuals relocated for studies and chose to remain in larger cities such as Breda. The cost of housing within the neighborhood prohibits many young people from finding suitable alternatives, whether through renting or purchasing.

Martine, an 80-year-old widow, resides in her privately-owned two-under-one-roof house. She takes great delight in her neighborhood, particularly witnessing the influx of young families purchasing homes in the immediate vicinity. Martine maintains good relationships with her younger neighbors, fostering a sense of community and connection. To accommodate their evolving needs, both Martine and her lone neighbor (also age 75+) have extended the rear of their homes, creating additional living space. These expansions now house study areas and bedrooms, rendering the upstairs sleeping quarters redundant. By repurposing the upper level, Martine and her neighbor have effectively optimized their living arrangements and improved the functionality of their homes.

## Municipality

Previous municipality secretary (Paul de Ridder): Paul de Ridder mentioned that there is a problem on short term, only on a longer therm the expectation is that the municipality will not grow that fast due to all kind of demographic figures. Concerning public transport, the municipality is promoting this and wants to invest in a train station that will not be that far from the Castle district. Perhaps this will give new opportunities for certain purpose groups. There is also a transportation hub planned nearby the "Kastelenbuurt" at the moment.

## Owners housing stock, the corporations

Director property maintenance (Maartje Brans), in the book outlet of "de zwarte hond": Simply downsizing is not the solution. It needs to be smarter, better, and more varied. Our people are enthusiastic about different concepts, innovations, and quality for the entire area development. With a focus on community building. Circular kitchens that allow for easy interchangeability of elements. Furthermore, many tenants are attached to their neighborhood and home, preferring a smaller dwelling over demolition and new construction."

## Construction company van Wijnen

Okt 2022: Van Wijnen Director Breda, Marlijn Lodewijks, described the company as a leading player in building, renovating, and repurposing existing housing stock. With a focus on a home-oriented approach, Van Wijnen addresses problems in a given area through architectural solutions. Marlijn highlighted the existence of three possible solutions.

1. Demolishing and constructing new structures as required.
2. Dividing existing houses into multiple units.
3. Adding additional floors or levels to the existing structures (topping them).

The first solution is frequently employed as the municipality typically has a well-defined vision for future plans. The second solution, however, presents more challenges and is primarily utilized when a building is completely vacant. From a construction standpoint, this is not a problem, but complications often arise due to municipal regulations. The third solution is technically feasible but is less commonly utilized, primarily due to zoning constraints. Marlijn shared an idea based on her experience living in Zurich, where she encountered a building that could be easily transformed from four separate apartments into a single unit. This transformation was achieved by incorporating a central wet zone that could be shared by the four apartments or potentially even fewer.



Jan 2023: Van wijnen Director region south Anton Troeijen and projectmanager support Rob van Boekel): Jl received an invitation from Anton Troeijen, my former construction teacher, to present Van Wijnen's successful ventures in splitting existing post-war row dwellings. Anton shared insights based on his experience with similar projects in established neighborhoods, emphasizing the challenges faced due to the residents' uncertainty about the modifications and the inhabitants of the resulting smaller homes. It became evident that effective communication played a vital role in mitigating these concerns and fostering acceptance among the community.

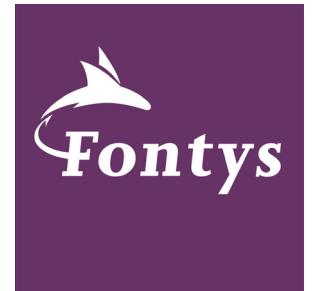
#### KAW architecten

Feb 2023: Stijn Heesbeen, Luuk Thijssen, Wouter Rooijakkers, via Reimar van Meding (Manager, researcher and architect), due to their extensive experience in densifying existing neighborhoods. They emphasized the importance of carefully listening to the neighborhood and understanding its dynamics. They encouraged me to revisit the past and identify the historical locations of various functions within the community. They emphasized the significance of social aspects, such as how residents perceive their neighborhood and where they gather. They referred to these focal points as "sociale Ankerpunten" or social anchor points.



#### Fontys research days

2022-2023 : I made use of the research days, organized by Fontys and engaged in conversations with various researchers. Their advice proved to be valuable for guiding my future work. Gabriella Nava, an urban space anthropologist, provided valuable insights into the lifestyle of individuals with a Muslim background and shed light on the reasons behind their practice of keeping curtains closed during the day. Alessandra Gola, an architect and doctoral researcher, enhanced my understanding of social structures and how these concepts could impact architectural decision-making.



#### Construction Engineering

March 2023: construction engineer Ton Janssen. Ton explained to me the construction details of the existing housing stock, specifically focusing on the concrete construction. He confirmed Van Wijnen's advice regarding the construction flexibility within this housing stock. He also highlighted the significance of the floors in the construction process, emphasizing that it would not be possible to split or divide them. Additionally, Ton explained that the foundation is adequate to support additional volume that may be placed on top of it.



### Summary :

- Empty nesters are suggesting adopting the Polish way of living, wherein space is made for children to eventually take over their parents' homes.
- Elderly homeowners exhibit greater flexibility by constructing ground floor spaces where they can sleep and live comfortably as they age.
- The municipality views the location as an ideal site for a well-connected transport hub. This presents an opportunity for easy densification and potential expansion of the current city center.
- Housing corporations are seeking more options and a diverse building stock. They believe that people will not move due to their strong attachment to the neighborhood.
- The construction company recognizes the opportunities, particularly the potential for extra volume, especially when combined with timber frame construction.
- The constructor further confirms the possibilities, emphasizing the construction's flexibility and how it can facilitate various modifications and additions.

## 11. Example projects



## Reference 1- "Ministerie van maak" - 100 ideas of different designers concerning densification in the Netherlands.

Most relevant for my assignment:

Bedaux de Brouwer (Daniël van Alphen) : 3 options:

1. slitting horizontal
2. splitting vertical
3. adding volume:

MVRDV (Inger Kammeraad, Sanne van Manen) : ask questions and solve within housing storage.  
and look for new typologies that are:

1. flexible,
2. climate adaptive,
3. CO<sub>2</sub> neutral,
4. adaptable,
5. green
6. build with smart building systems with enough individual change possibilities



## Reference 2 - Municipality of Tilburg : Vision Tilburg Noord

1. make use of the backyards
2. add volume
3. split environment up in easy to change and more difficult ones



## Reference 3 - Peter Barber architects, UK - Londen

You tube : [https://www.youtube.com/watch?v=Ff63baruwqg&t=726s&ab\\_channel=TheArchitecturalLeague](https://www.youtube.com/watch?v=Ff63baruwqg&t=726s&ab_channel=TheArchitecturalLeague)

1. densification by building more to each other
2. make sure that the eyes are on the street
3. **demolishing is a crime**



## Reference 4 - Nohnik, care to share, Oosterhpark Groningen

You tube: [https://www.youtube.com/watch?v=gOccDjid7mE&t=4s&ab\\_channel=InfoNohnik](https://www.youtube.com/watch?v=gOccDjid7mE&t=4s&ab_channel=InfoNohnik)

The vision aims to introduce improvements on the scale level of the individual house, the neighborhood and the city district. It includes renovation of existing houses to improve the accessibility of the buildings. Next to that public facilities are incorporated in the neighborhood such as a 'house of craftsmanship' and several hobby workshops. As well the public space got improved by introducing a connective tissue of pedestrian routes and by re-activating green voids by transforming them into sports gardens and public kitchen gardens. The concept is explained further on (Dutch only): [www.abonnementopgoedleven.nl](http://www.abonnementopgoedleven.nl)

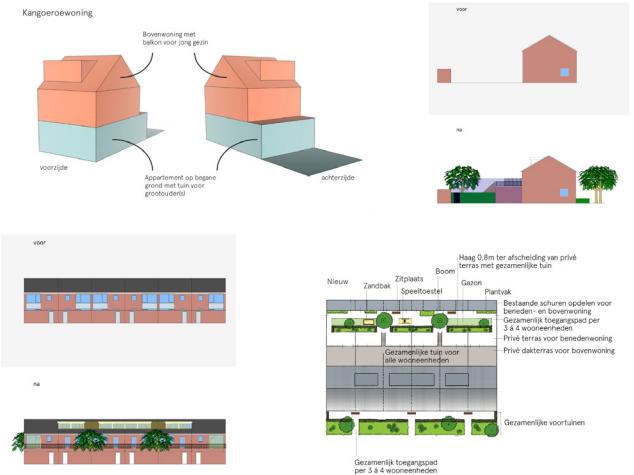


## Reference 5 - Design research "Langer thuis in eigen huis"

Monique Gorisse – architect, Margo Emmen – researcher, Els Leclercq – urbanist

Ernst Joosten – architect, Dion Broeders, care specialist, Bert Voeten, landscape architect

1. create a more safe environment
2. make use of the empty spots in the neighborhood
3. add volume and split the dwelling
4. make use of the backyard of the building block



## Reference 6 - Architect Dingeman Deijs : the "Funda hous"

Design build on searching results of Dutch people searching for a house

Conclusion: people want a villa but have the budget of a row house

How can you create this feeling in a row house



## Reference 7 - Sjoerd Soeters, Courtesy of Arkitema, Copenhagen

You tube: [https://www.youtube.com/watch?v=CcC6d3RINec&ab\\_channel=OpenBuilding-Collective](https://www.youtube.com/watch?v=CcC6d3RINec&ab_channel=OpenBuilding-Collective)

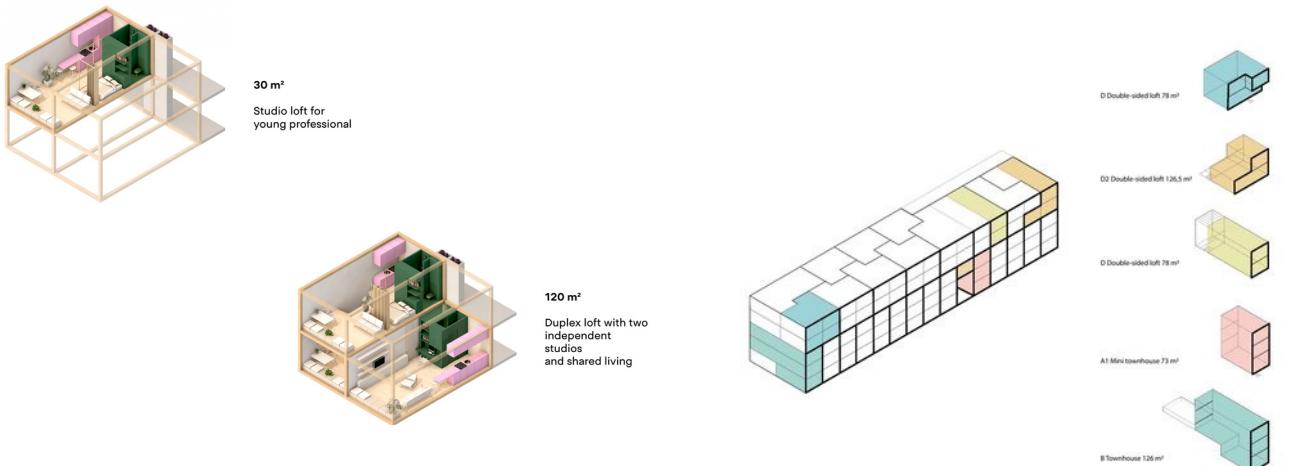
In this project a distinction was made between the construction and the facade. The construction was all the same, namely concrete constructions like those of after war stamp neighborhoods. Architects were asked to design the facade. This gave a diverse look at the outside.



## Reference 8 - Marc Koehler, super lofts

You tube: [https://www.youtube.com/watch?v=dp3\\_aDniya0&ab\\_channel=WorldArchitectureFestival](https://www.youtube.com/watch?v=dp3_aDniya0&ab_channel=WorldArchitectureFestival)

Super lofts is a flexible housing form where you can create your own living environment, based on your wishes. You choose between apartments from 35 m<sup>2</sup> to 120 m<sup>2</sup>. The principles of "Open bouwen" from professor Habraken, where used to create this concept.



### Summary :

- There are different forms to densify the Netherlands, horizontal and vertical splitting of the current housing stock is one but do not look only to this but also incorporate other themes in it is advice.
- On the municipality level, it is good to look to select an environment that is also easy to change. E.g. houses of corporations are easier because they have one owner.
- Combine densification also with the eyes on the street.
  - Demolishing is an act of crime is a good starting point.
  - Create safe environments to also improve social cohesion.
- Data analysis is a good way to start your research to see what people want. Translating this into a nice design is the next step.
- The organization, next to the architectural change is important
  - Making more diverse architecture can be done without changing the inner structure of the building.
  - Making the inside architecture flexible is possible if you place the infrastructure (water and light) in a central place.

## 12. The complete picture

Themes and subthemes	Highlights Research / Theory	Practical ideas and Example projects	Design compo
<p><u>Inner-city densification:</u> (binnenstedelijk verdichten)</p> <ul style="list-style-type: none"> <li>- Transformation (splitting and topping)</li> <li>- Future proof renovation</li> <li>- Adding volume</li> <li>- Life cycle resistant livings (suitable elderly)</li> <li>- Aging in place</li> </ul> <p><u>Social cohesion:</u></p> <ul style="list-style-type: none"> <li>- Functions for purpose / need</li> <li>- Facilitate unexpected encounter (onverwachte ontmoeting)</li> <li>- Pocket parks</li> <li>- Courtyards</li> <li>- Sharing</li> <li>- Individualizing architecture</li> </ul> <p><u>Liveliness:</u></p> <ul style="list-style-type: none"> <li>- Movement (foot/cycle paths, other forms)</li> <li>- More place by reducing cars</li> <li>- Different purpose groups / people</li> <li>- More activities</li> </ul> <p><u>Subtheme :</u></p> <ul style="list-style-type: none"> <li>- sustainability (form follows nature)</li> </ul>	<p>Brinksma, H. (2017). Toekomstbestendig renoveren.</p> <ul style="list-style-type: none"> <li>- Use "open bouwen principles" Split infill and structure</li> <li>- Flexibility for individual changes</li> <li>- Adaptable for climate changes</li> <li>- Changed within one day</li> <li>- 4 different types of renovation, select most flexible</li> </ul> <p>Research KAW - Ruimte zat in de stad:</p> <ul style="list-style-type: none"> <li>- combine physical (buildings) and social (people)</li> <li>- build to stimulate flow of elderly people (50+)</li> <li>- neighbourhood participation in the process</li> <li>- include energy facilities in the project</li> <li>- include green, ecology and climate</li> <li>- use corner dwellings for access to extra dwelling</li> <li>- use public space nearby corner dwelling</li> </ul> <p>Different living forms:</p> <ul style="list-style-type: none"> <li>- Platform 31 : profiles elderly - more different need</li> <li>- Catalogus living forms (6 types bas on need)</li> </ul> <p>Nextdoor report:</p> <ul style="list-style-type: none"> <li>- Promote quality (not frequency) of contact.</li> <li>- Encourage engagement with neighbors.</li> <li>- Prevent a sense of insecurity in the neighborhood.</li> <li>- Find something that binds neighborhood residents.</li> <li>- Create meeting places where people with different ethnic backgrounds can meet each other.</li> <li>- Establish accessible meeting places for the elderly.</li> <li>- Connect people living on the same floor.</li> </ul> <p>David SIM The soft city:</p> <ul style="list-style-type: none"> <li>- diversity in building forms and outdoor spaces</li> <li>- flexibility / ready for change</li> <li>- human scale and passable (move is minimum effort)</li> <li>- a pleasant micro climate</li> <li>- small ecological footprint</li> <li>- huge bio diversity</li> </ul> <p>Genn Luppens, robuuste tussenruimtes:</p> <ul style="list-style-type: none"> <li>- Arrange intermediate spaces in such a way that it stimulates encounters.</li> </ul> <p>Hubs in existing neighborhoods - Exploratory research on spatial integration and impact: Mapping demographics, housing types, green space, car ownership, parking availability, and built/unbuilt areas to determine the need for shared mobility.</p>	<ul style="list-style-type: none"> <li>• Van Wijnen Project Den Bosch: Splitting one house into two or three units. Addressing parking regulations as a potential challenge. Demolition of existing structures often seen as beneficial for the municipality.</li> <li>• Bedeaux de Brouwer at Biennale "Minister of Making": Splitting existing post-war buildings. Adding additional volume. Transforming backyards into communal spaces.</li> <li>• MVRDV: Focus on asking questions and finding solutions for storage within housing. Seeking new typologies that are flexible, climate adaptive, CO2 neutral, adaptable, green, and utilize smart building systems with individual change possibilities.</li> <li>• "Licht verdicht" by various designers: Utilizing unused load-bearing capacity.</li> <li>• Implementing stepped additions to create variation in sightlines. Incorporating green roofs.</li> <li>• New Norfolk in Scheveningen: Combining apartments, social housing, and ground-level buildings. Utilization of "Landschappelijke schotels" to hide cars from view.</li> <li>• De Wijk Molenvliet, Papendrecht: Experimenting with the SAR concept in the 1960s (based on Prof. John Habraken's ideas), emphasizing diversity in buildings.</li> <li>• Knarrenhofjes: Numerous projects, with examples realized in Gouda, Zeewolde, Zutphen, Harderberg, Zwolle, Olst Wijhe, and Emmen.</li> <li>• Projects van Wijnen in Den Bosch: De Slagen, Tamboerijn, and Hambaken.</li> <li>• Various Begijnhofjes: Example of a Begijnhofje located in Breda.</li> <li>• New buildings constructed in a Hof structure: Example of Boeimeerhof in Breda.</li> <li>• Transformed buildings into Hof structures: Example of Lentehof in Breda.</li> <li>• Different Hof structures in Scandinavia.</li> <li>• Adding new streets within urban structures to promote social gathering: Example of Bonnybrook Quarter, designed by Peter Barber Architects in the UK.</li> <li>• Creating more diversity in buildings: Example of Vauban project in Freiburg, Germany.</li> <li>• Topping: Several examples, including Zaha Hadid's Port Building in Antwerp without significant modifications.</li> <li>• Renovation projects such as: BJW Sustainable Living, which involves renovating homes with new facades, roofs, kitchens, bathrooms, and installations using timber frame elements. Reno+ concept by the BVR Group, offering three packages with varying levels of upgrades for post-war rental homes.</li> <li>• Faay Renovation, providing solutions for renovating bathrooms, kitchens, and toilets within a single day.</li> <li>• Renovation of post-war neighborhoods in Amsterdam-Osdorp during the 1990s, one of the early comprehensive transformations in the Western Garden Cities.</li> <li>• The Valley in Amsterdam: parametric calculations considering various factors, including light.</li> </ul>	<p>Brinksma, H. (2017). Toekomstbestendig renoveren.</p> <ul style="list-style-type: none"> <li>1. Concept usable for a s</li> <li>2. Flexibilité for individua</li> <li>3. Adaptable for clima</li> <li>4. Inner hous adaptatio</li> <li>5. New connections us</li> <li>6. Technical lifecycle cili</li> <li>7. Circulare element</li> <li>8. Decision influenced b</li> <li>9. No demolishme</li> <li>10. Adaptable to combin</li> <li>11. Adaptable floor plan</li> <li>12. Installation changes p</li> <li>13. Elements easy to mai</li> </ul> <p>Research KAW - Ruimte zat in de stad</p> <ul style="list-style-type: none"> <li>14. Build to stimulate flow</li> <li>15. Neighbourhood parti</li> <li>16. Include energy faciliti</li> <li>17. Include green, ecolog</li> <li>18. Use corner dwellings f</li> <li>19. Use public space nea</li> </ul> <p>Nextdoor research on social</p> <ul style="list-style-type: none"> <li>20. Platform 31, combin</li> <li>21. Improve quality of co</li> <li>22. Stimulate involveme</li> <li>23. Improve safety</li> <li>24. Add something that b</li> <li>25. Add meeting places t</li> <li>26. Add easy to acces m</li> <li>27. Connect people th</li> </ul> <p>David SIM, Jan Gehl, the soft</p> <ul style="list-style-type: none"> <li>28. Diverse building forme</li> <li>29. Flexibility / ready for c</li> <li>30. Human scale and pas</li> <li>31. A pleasant micro clim</li> <li>32. Small ecological fo</li> <li>33. Huge bio diversit</li> </ul> <p>Genn Luppens, robuuste i</p> <ul style="list-style-type: none"> <li>34. Genn Luppens, robuuste i</li> <li>35. Parking spaces and st</li> <li>36. [research Aristoteles Va</li> <li>37. Water storage possibl</li> <li>38. Integration of homes c</li> </ul> <p>inbetween spaces by eac</p> <p>eachother in these pl</p> <p>Hubs in existing neighborho</p> <p>spatial integration and numbers of households have been mapped number of cars and p</p> <p>well as the relationship (FSI, MXII), were analy</p> <p>shared mobility was c</p> <p>[research Aristoteles Va</p> <p>solar block envelope; ment of compact urb</p> <p>potential, Department of Thessaloniki, Univers</p> <p>Greece]</p> <p>Water storage possibl</p> <p>theory here. Technica</p> <p>not be a problem.</p> <p>Integration of homes c</p> <p>ulated on page .. (c</p>

onents

bestendig renoveren. Use "open  
and structure.

ery of one  
l changes  
te changes  
ns changed within one day  
ble for existing house stock  
nged with each component

current users  
eeded for future changes  
e livings / dwellings

ossible  
ntaining

n de stad:

of elderly people (50+)  
icipation in the process  
es in the project  
y and climate  
or acces to extra dwelling  
rby corner dwelling

different living forms,  
ly with different needs. Catalogus  
up base on need)

l cohesion:

ntact, not quantity  
t of neighbours  
ind the neighbours  
for different ethnic backgrounds  
eeting places  
at live on the same level

t city:

es and outdoor spaces  
ange  
ssible (move is minimum effort)  
ate  
spring

ste tussenuimtes: make robust  
improving the possibility to meet  
aces.

shared mobility demand:  
borhoods - Exploratory research on  
d impact: Age distribution, types and  
s, and green space per hectare  
or each location. Subsequently, the  
arking spaces per household, as  
o between built and unbuilt areas  
zed. Based on this, the demand for  
culated.

rtholomaios ,The residential  
A method for enabling the develop-  
an blocks with high passive solar-  
t of Architecture, Aristotle University  
ity Campus, 54 124, Thessaloniki,

ities, especially rainwater. Check the  
ally, according to the map, this should

based on a percentage table, cal-  
conclusion of demographic figure).

### Urban Scale

District Strijen

Neighborhood Kastelenbuurt

### Architectural Scale

Building block

Building

### Summary & conclusion :

I realized that the large number of design components was too complex to handle. I selected 9 (some of which I combined) that I considered most important and worked on them during the design phase.

1. Make ageing in place possible
2. Combine different housing types
3. Adjust the density of the neighborhood to the need of Municipality
4. Demolishing is an act of crime
5. Create a lively environment
6. Create safe environments + add spaces where people can meet
7. Urban and architectural forms should follow nature
8. Changes in architecture should be possible in one day
9. Living as a service, where you can add parts against a price per month

## 13. Diagnosis and program

1. Average house is too large for the people that live there - Empty volumes
2. First and second-generation stay for a long time - Aging in place without facilities
3. Younger generation stays for a short time due to high rent prices (< 2 years) - No bond
4. No relations with neighborhoods - Liveliness
5. Social functions (like schools) disappeared -Social cohesion
6. Large families (often foreigners) stay for a longer time - Less Inclusivity
7. Economic inequality between rent and buy is separated by the morphology -Skewed growth
8. Too many playgrounds for groups that live there - Unoccupied areas
9. Too many cars in front of the dwellings (sometimes 4 per family) - Image
10. The elderly (mostly women) are thinking of moving only the other part is not (do not want to scale down)
11. Elderly and empty nesters don't have a bond with the neighborhood anymore but live happily
12. People leave the neighborhood due to care (elderly) or due to price (young families)
13. Most of experts believe the housing shortage should be solved within a city
14. The housing shortage in Oosterhout is less than expected (max 4% growth till 2035) - adjust the figures
15. In my opinion was the intention of Minister Vogelaar, good but after 20 years you see that the maintenance of these houses are leaking and impoverishment is the result of it.

Program statement:

*Transform a rigid urban structure into a dynamic one, fostering the coexistence of diverse user groups with varying lifestyles and facilitating mutual support for lifelong living. These groups can personalize their spaces through individualized architecture, adapting them to their current lifestyles.*

Pilot Kastelenbuurt:

- Households now : 1600 in total of which 640 buy and 960 rent
- Growth potential : 400
- Need in Oosterhout : 95% apartments (rent and buy), 5 % "grondgebonden woningen" (+ rent, - buy)

Indication expected population in 2030:

Adjust the housing typology for following need :

1. Empty nesters (55-74)	30%
2. Elderly (>75)	21%
3. Family (>30)	24%
4. 1-2 persons HH (30-54)	17%
5. 1-2 persons HH (<30)	7%
6. Family (<30)	1%

Goals :

First goal: densification from 1.600 to 2.000 people (200 homes) in 5 years by reducing the average # of m<sup>2</sup> and combining houses for different purpose groups in both rent and buy. Bring back social cohesion and Liveliness and do this all in a most Sustainable way.

Second goal: densification from 1.600 to 4.000 people (1200 homes) in 30 years by combining houses for different purpose groups and add houses in the unbuild areas (

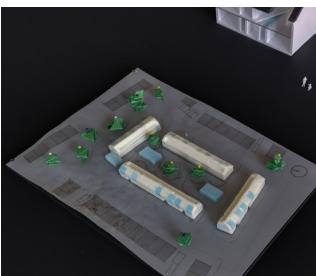
How and where this can be done is described in the next page.

Neighborhood :



- green : minimum 115 m<sup>2</sup> per living (municipality requirement)
- bicycle roads : (20%)
- pedestrian roads : (10%)
- new shared spaces : for generic purpose
- 4 bigger parking lots : 400 places (1,6 per current living)
- rainwater storage
- recreation area (10%)
- sewage
- city accessible for all groups
- playground (5%)

Building blocks :



- Shared community space :
- Infrastructure : electra / water / CAI / per block
- Space for accidental meeting
- shared outside storage : flexible 0 - 4 m<sup>3</sup> per living
- flexible car parking
  - disabled : 4 per block,
  - shared, 0,1 shared transport
  - 1,5 per living
- shared bicycle parking : 0,6 per person
- Shared functions (what is a communal, like make things / cook / ..)

Buildings :



Livecycle resistance buildings (elderly, start from 55+ (40-50%):

- flexible
- facilities for base and or extensive care
- private outdoor space : 6 - 10 m<sup>2</sup>
- kitchen : 2-4 m<sup>2</sup>
- bathroom for elderly
- bathroom : min 1

Small apartment (starters / expats / small families) (30-40%)

- adjustable for size, religion and lifestyle
- base is loft (open)
- private outdoor space : 4-6 m<sup>2</sup>

Family house (20-30%):

- adjustable for size, religion and lifestyle
- base is 3 rooms
- private outdoor space : 6 - 10 m<sup>2</sup>

Adjustments / existing functions:

- (mini) park
- transport (feed, bicycle, car, others)
- infrastructure (sewer, water, light, ..)
- parking (car, bike)
- connection (accidental meeting)
- sustainability (water storage)
- Shared community
- flexible space
- storage
- care
- religion

New functions:

- shared workplaces
- (after school) Childcare
- shared workplace
- shared kitchen
- "beweegtuin"
- shared makershops (ambachtshuis)
- shared music rooms
- shared mobility hub

New organization:

- life is a service (for facilities within the neighborhood & support)
- "leefabonnement" (for functions and support in neighborhood)
- mobility plan
- owners association per block (VVE)

# 03. My personal logbook

## 01. The process (page 48-54)

The research by design project consisted of several distinct phases. In this paragraph, I will reflect on my experiences throughout these processes and share the valuable lessons I learned. I will discuss “what went well” and identify areas for improvement, providing an “even better if” analysis. Each paragraph will conclude with a summary of the feedback I received from both my Fontys mentors and external mentor, along with the specific actions I took to enhance my design process.

Process phases : 1. Start (project specs and research), 2. Research phase and shaping ideas, 3. Conceptual design - sketching and drawing, model making and collabarating, 4. (Pre) Design

## 02. Most important discoveries during this research by design (page 55-71)

I learned that the design process is not linear, especially in a project like this. Research by design is an ongoing journey that never truly ends. Throughout the process, I discovered that new inputs constantly emerge, whether it be theories, insights from mentors, or personal discoveries made during sketching, model making, or even moments of inspiration in everyday life. To structure this dynamic process, I attempted to create a flow diagram and divided my discoveries into distinct paragraphs.

The following paragraphs outline these discoveries:

01. The Process  
(linear)

Project Specs

Research

Conceptual design

Pre design

Def design

Exam

02. Discoveries  
(spaghetti)

Findings Theory

Present findings

Create 3D designs (and or renders) and analyze them

Visit locations

Check fellow students

Write reflections

Check mentors

Make and analyse models

Write summaries

Check experts

Draw ideas

Finding

Finding

Finding

Finding

Finding

Finding

Finding

Finding

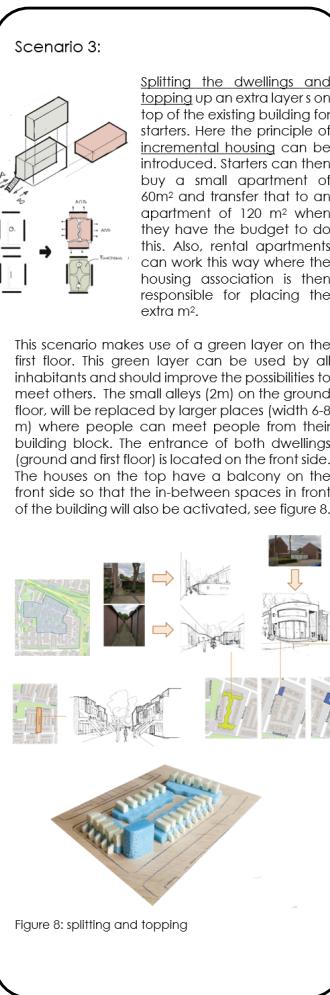
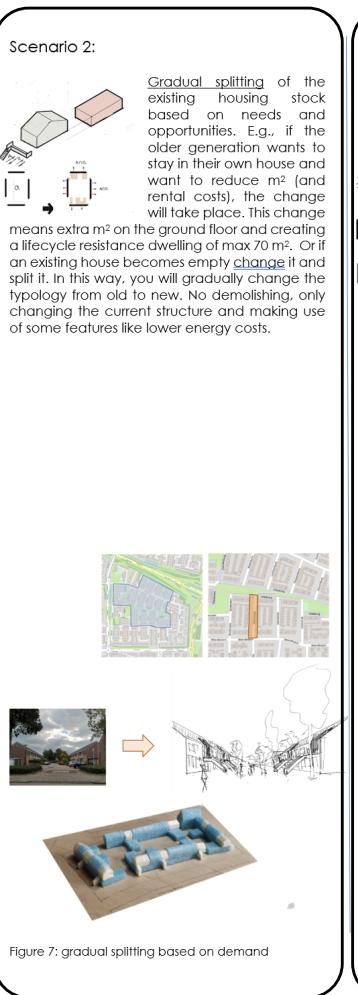
# 01. The process

## 01. Start (project specs and research)

Fontys advised me to start the design process in this early phase, and I followed their recommendation. I began by testing ideas through models and sketches (refer to the images below). These initial models were based on intuition rather than theory or external opinions. However, I felt uncertain about this approach, so I decided to delve deeper into the theory and study various architectural projects (as described in Chapter 01). This research helped me organize my thoughts and provided structure for the later stages of the project.

**What went well:** Formulating ideas and exploring possibilities (such as adding volume while staying within the existing structure), Creating sketches to visualize the potential outcomes, Considering alternative approaches

**Even better if:** Developing a better understanding and learning from other examples



Advise mentors Fontys :

More homes is the message, which will take the pressure from the overheated housing market.

'How to mix' is one of the outcomes. The analysis of the hypothesis is not an analysis yet, but the description of a process instead.

The drawings and model are not sufficiently specific and professional to carry all relevant professional information. Further prioritizing and layering of architectural and urban themes will help form an adequate path to design and structuring of research

Within the scenarios, splitting (living back to back), topping up and stacking (multilevel / making apartments) might isolate people from each other, while there is a strong need for togetherness and community.

The rather quick hands-on scenarios are made in the current district; why not more theoretical approaches, separated from the typical situation and tested on the spot, for example 'load capacity of the district', like a max high density approach of homes at grade (not stacked)?

Does the subject deserve a strategy with more possible outcomes? In that case would there be not one, but more designs?

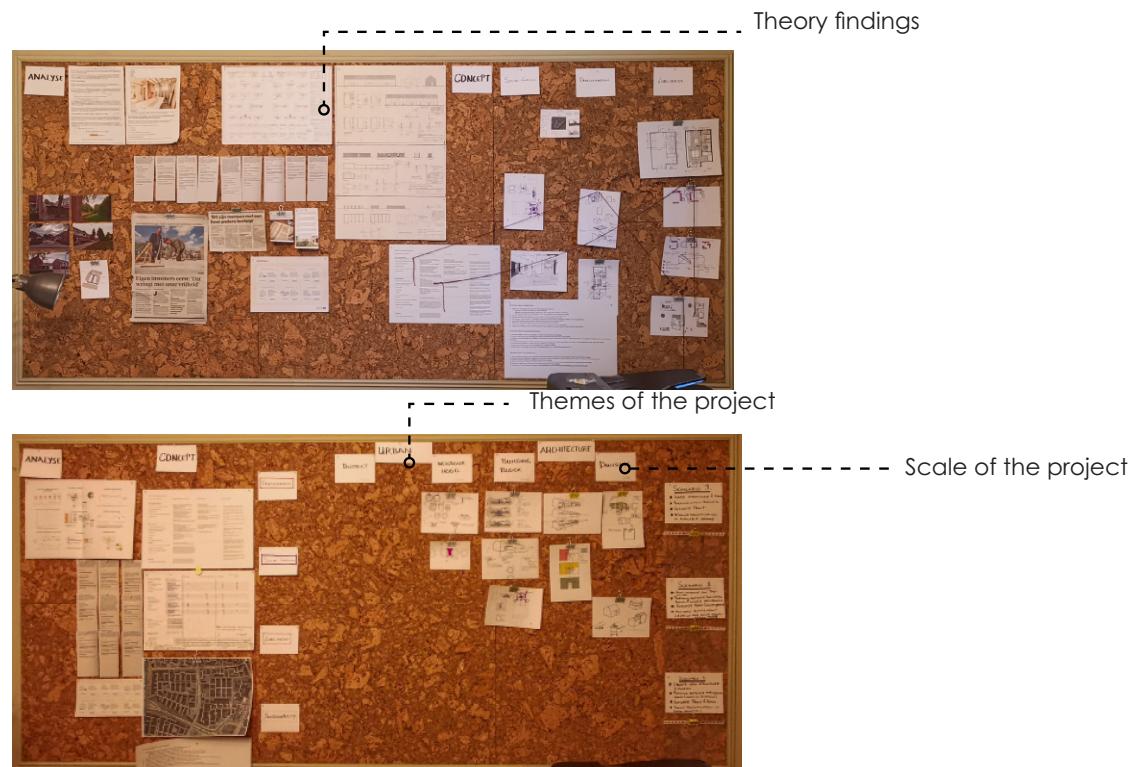
[Without the theoretical background I was not self-confidence to start designing already. The scale models helped me to communicate my ideas]

## 02. Research phase and shaping ideas

**Action I took, based on the advises :** In the initial phase of my research, I conducted an in-depth exploration of the demographic data pertaining to the municipality of Oosterhout. This analysis led to a reevaluation of my hypothesis, prompting me to prioritize a comprehensive examination of theoretical foundations and exemplary projects (detailed in the analysis section). By refining architectural and urban themes, as elucidated in the corresponding section, I sought to establish a more concrete framework for my investigation. Specifically, I directed my attention towards the crucial theme of social cohesion, focusing on aspects of togetherness and community building. Furthermore, I expanded my strategic considerations to encompass a broader spectrum of potential outcomes, as outlined in the essay.

Throughout the research process, one of my mentors recommended utilizing a large board as a means of stimulating idea generation. I incorporated this advice into my methodology, which enabled me to systematically organize my thoughts according to the themes that I identified as pivotal to the narrative: Densification, Social Cohesion, Liveliness, and Sustainability. Moreover, I took into account the respective architectural and urban scales that were germane to my investigation.

What went well : finding material, interviewing and learning from other architectural projects  
Even better if : better understanding of tools (like 3D design tools) for testing alternatives



- Advises mentors Fontys :
  - The different scales and layers involved in dealing with a neighborhood and housing are not yet organized in appropriate material, and the logic is still in mid-air, **not arising from a selected set of design components**.
  - The **new goals** set for the neighborhood and housing are **not yet tested** for their impact, nor for their match with challenges in finding new -or old- typologies in architecture and urban design, or with participation by residents and newcomers.
  - Will the interventions be integrated** in one integrated plan, or will **DIY by residents** do the job? A larger vision of the living environment at present and in the future is necessary and can come from testing scenarios at different scale levels, separate and combined.
  - These research topics cry to be put on paper. How resilient are 60-s housing blocks?
  - The why of Oosterhout still is not explained. If it is supposed to be a case, and as an example for the rest of the country, then explain it as such.

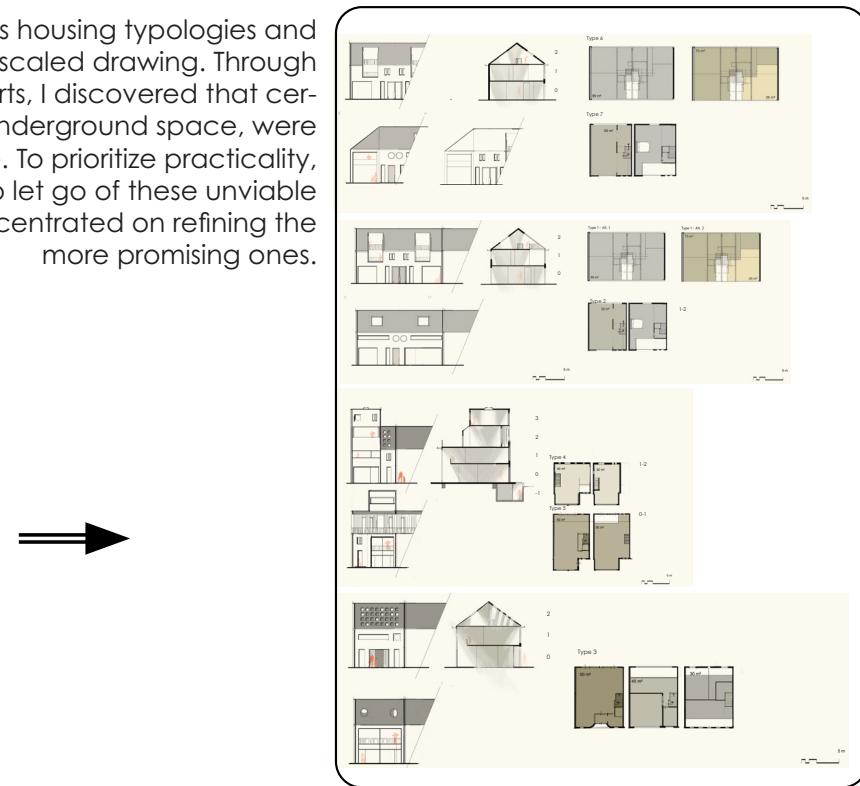
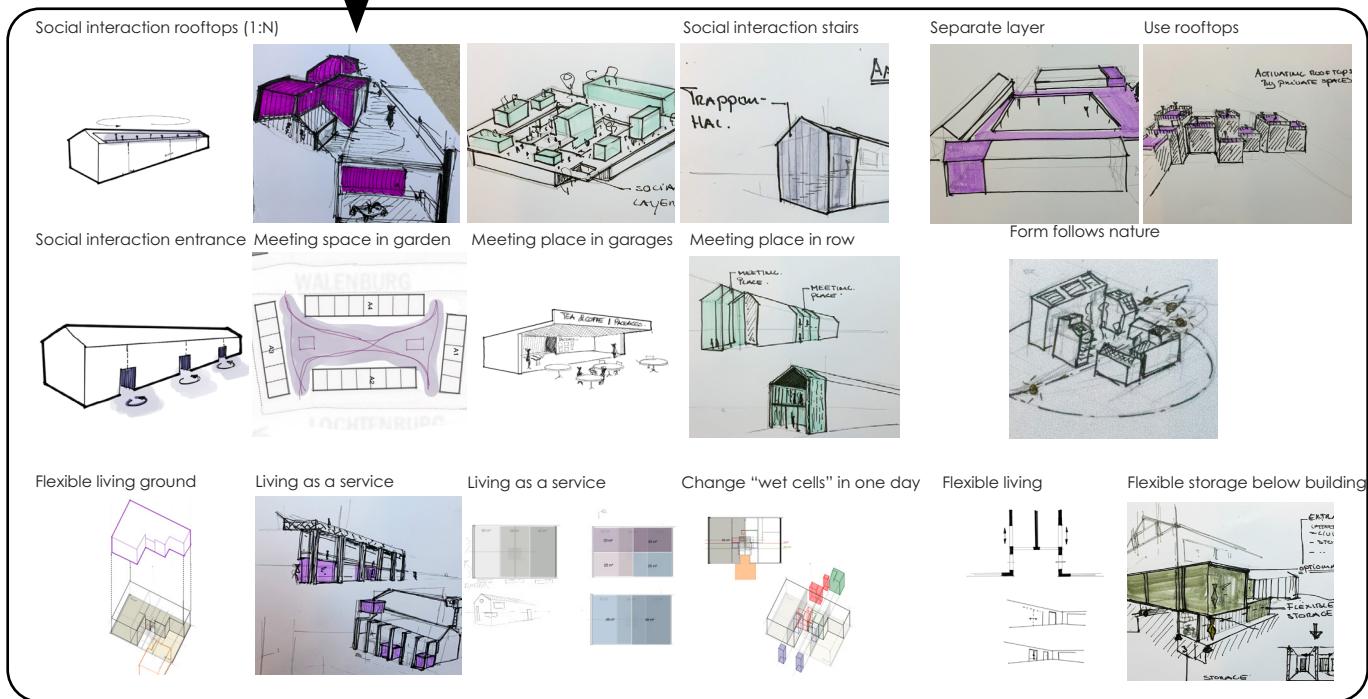
*[The board helped me to structure my thoughts in different phases of the project. It felt a bit like being an inspector that was solving a crime]*

### 03. Conceptual design - sketching and drawing

**Action I took, based on the advises :** During the course of my research, I sought to establish a logical framework for my design approach. As a result, I identified a total of 38 design components, which initially seemed extensive and overwhelming in scope. Recognizing the need for manageability and coherence, I made the decision to streamline and consolidate these components, ultimately narrowing them down to a more focused set of 9 (refer to pages 44 and 45 for further details). In developing my concepts, I carefully considered the implementation of interventions across various scales, namely the architectural and urban levels. This involved evaluating the potential impact of my proposals at multiple dimensions, including the individual home, building block, and neighborhood. By examining the interplay between these different scales, I aimed to create cohesive and integrated solutions that would effectively address the identified design challenges.



I explored various housing typologies and sketched them on a scaled drawing. Through discussions with experts, I discovered that certain ideas, like an underground space, were not technically feasible. To prioritize practicality, I made the decision to let go of these unviable concepts and concentrated on refining the more promising ones.



*[Sketching stimulates my imagination. As soon as I begin to sketch my thoughts, I start to envision things that I may not have known or noticed before. Making sections helped me to get an idea on the atmosphere.]*

### 03. Conceptual design - model making

Various building block configurations were considered, accommodating different types of housing within each block.

1. keeping the structure, only split the building



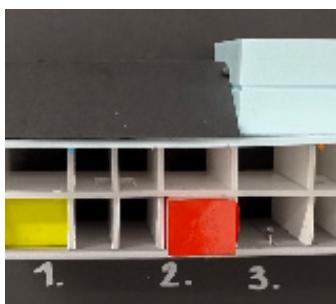
2. add volume to a building / building block



3. breaking building blocks up & adding layers

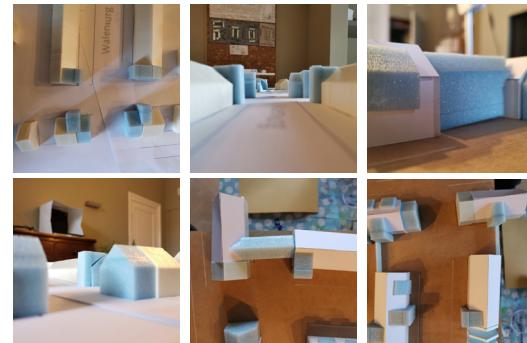


3 different concept options on building level



Conducting density testing and mass studies to explore alternative options for densification.

Densification LOW



Densification MEDIUM



Densification HIGH

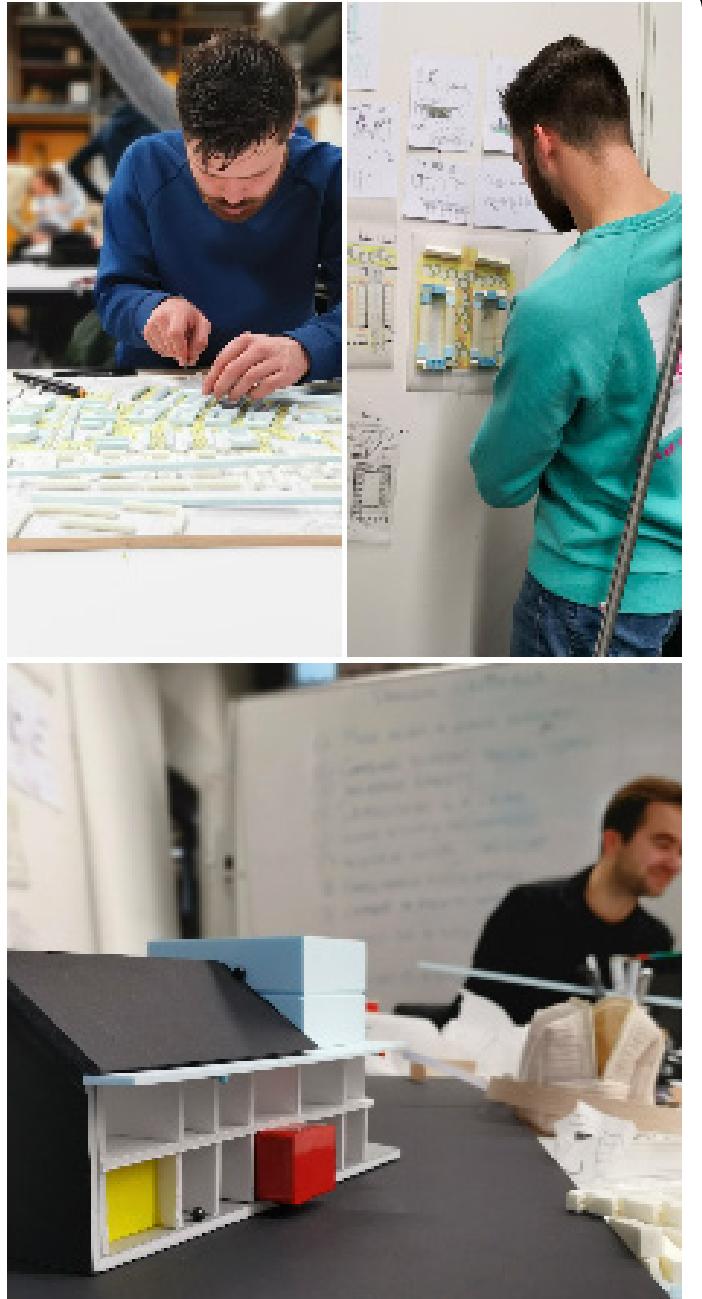


Creating building block street views and activating corner spaces.



*[Model making is a way for me to build. I can see what works and what doesn't. I know when a design is good when the idea or sketch fits well within the model.]*

### 03. Conceptual design - collaborating



"Winterschool" is an annual event designed for graduate students to evaluate their ideas alongside their peers. It comprises a collective segment involving the entire group, as well as an individual component wherein 4-5 individuals engage in brainstorming sessions centered around each participant's concepts.

For the shared portion, I enlisted Arjan Karsen, an industrial designer and author of the book "Maquettes," to provide an introductory session on model making. During his presentation, he emphasized the significance of sketching, model making, and writing, which resonated with my own experiences during the first half of the year.

During the group session, I collaborated with a highly capable second-year students. Prior to the session, they provided me with a wealth of information, and their support continued even after the session concluded. Our group consisted of four members, comprising two urbanists and two architects. Notably, one of the architects was affiliated with the Bedeaux de Brouwer office and had contributed to the model for the "Ministerie van Maak" described on page 41. Recognizing the abilities and expertise of the individuals involved, I made sure to thoroughly prepare for the session.

Learnings from the winter school:

**What went well:** Recognizing the strength of combining three different concepts in one street during the concept phase, I further experimented with this approach in the pre-design phase.

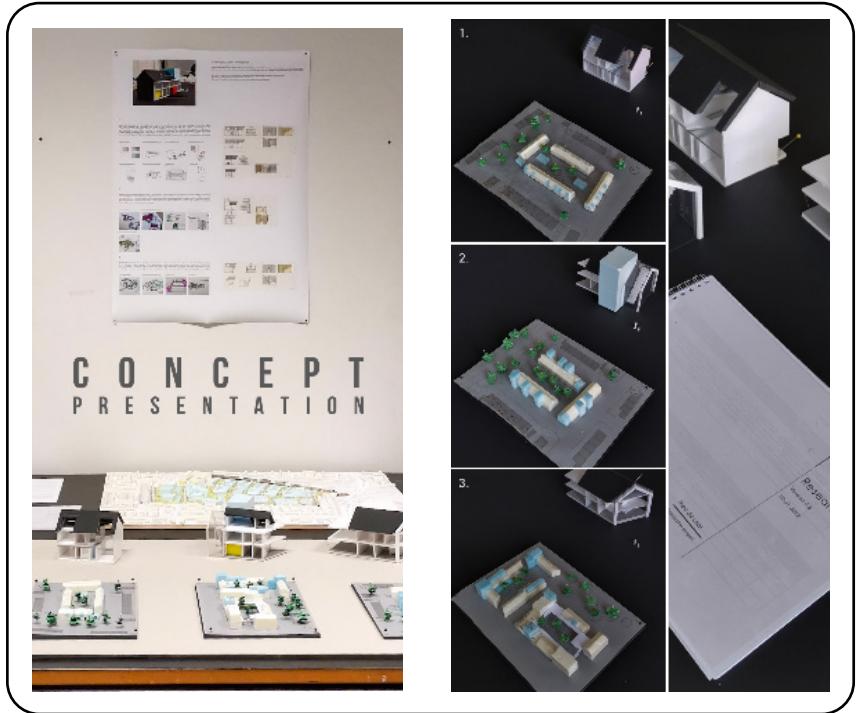
**Even better if:** Exploring concepts in more extreme scenarios would have provided valuable insights into the limits of densification.

*[The collaboration went beyond winterschool, with valuable help provided before and after the session.]*

*[Hearing from a professional about the importance of combining model making, sketching, and writing was truly insightful]*

### 03. Conceptual design - presentation

Final 3 different concepts on building and building block level



#### Concept 1 :

The building retains its existing structure while addressing the issues within it. In the first typology, two buildings are merged to create three or four separate buildings. The ground floor of the first building is specifically designed for empty nesters and the elderly. By combining two ground floors into one, a spacious 99m<sup>2</sup> ground-floor apartment is created, providing direct access to the shared courtyard.

#### Concept 2:

This typology is intended for young families, with the concept centered around the desire to live in a villa-like setting. The inspiration for this idea came from architect Dingeman Dijs, who designed a concept known as the "rijtjesvilla" (row villa) based on the search data of individuals on Funda, a popular real estate platform.

#### Concept 3:

In this typology, the structure is intentionally disrupted to provide more variation within the row. The floor plan layout is similar to alternative 1, but the key difference lies in altering the structure of the row itself. In this particular example, the decision is made to diagonally cut the living room (first part), but there are other alternative approaches as well. For instance, in the masterplan example, a building block is swapped, resulting in intriguing sightlines and perspectives within the plan.

**What went well:** The combination of sketching and model making provided me with confidence that my ideas could be realized effectively.

**Even better if:** I had a clearer understanding of the story and program, identifying what is essential and which design criteria would be most relevant in shaping the project.

#### Summary / advice fontys :

- | The concepts in a row show an increasing level of interference with the present neighborhood.
- | It may be nice to break structures, but what will come instead?
- | How to keep control over this process, if no goals are set in relation to the present housing stock?
- | The essay is about a neighborhood problem, why not tie the project tighter to this framework.
- | The matter of **design criteria and design elements** has to find a clearer structure, more architectural and urban, to become convincing and workable.
- | Demolition is a crime; that's a good start! And the approach has a high level of pragmatism which is great, however it **misses out on research, theory and proof**. The three concepts of densifications, additions, and separations, require a clear **set of criteria to be evaluated**.
- | The district is rather close to downtown and this could be taken in consideration as well.
- | The own theory must be explained, applied, compared, tested, further developed, and deployed.
- | Questions revolve around the new ways of life, quantifications, effects of densification, possible isolation of dwellers that seem to occur with the galleries and in the taller buildings, and more radical testing; for example cutting up to a degree of making detached homes in very high

*[Presenting with panels and models was a new experience for me, and determining where to focus while narrating the story was a challenge]*

## 04 and 05. Pre design and design phase

**Action I took, based on the advises:** In the concept phase, one crucial piece of advice was to establish clear design guidelines and criteria. This allowed for feasible testing and visualization. The following is an explanation of how this process is accomplished.

### THE FRAMEWORK

As stated in the essay, this design caters to three distinct clients. The first client is the future resident of the dwelling, whose needs and preferences must be considered. The second client comprises the housing corporations primarily acting as owners. Lastly, the third client is the governing body, which could be the municipality, province, or even the country itself. Each client has unique requirements. To initiate the design process, I begin by comprehending these individual needs, which subsequently serve as the basis for deriving design guidelines. The needs of the three clients are as follows:

1. Residents: desire a sense of belonging and community within their neighborhood. Additionally, there is a growing demand for greater diversity in housing types and floor plans to accommodate the increasing diversity of people, including varying lifestyles and religious backgrounds, emphasizing the necessity for more inclusive and diverse architectural designs.
2. Housing corporations: have a need to improve their housing stock to meet tenant expectations. They prioritize promoting liveliness and social cohesion within neighborhoods to enhance resident well-being and encourage long-term tenancy.
3. Dutch government; the Dutch (local) government is actively seeking comprehensive solutions to tackle the housing shortage and environmental crises. Their objectives include not only addressing the housing issue but also ensuring the development of efficient infrastructure, transportation systems, and public services that cater to the needs of the community.

These distinct needs serve as guiding principles to develop a design that addresses the requirements of each client effectively.

Definition design guidlines : design guidelines refer to a set of principles, recommendations, or standards that help inform and guide the design process of various products, systems, or experiences. These guidelines are based on research, architectural best practices, and the specific objectives and constraints of the project. The design guidelines in this design are:

- Diversity in homes entails the provision of a home for each group of users. This includes a variety of volumes, facades, floor plans, and other architectural elements that cater to the unique preferences of individuals within each group.
- Enable aging in place by creating an adaptable architectural design that can be customized to accommodate the varying needs and budgets of different elderly individuals.
- Demolishing is an act of crime. The demolition of homes in post-war neighborhoods should be minimized to the greatest extent possible in order to align with the nitrogen and carbon footprint objectives set by the Dutch government.
- Densify the neighborhood from 1.600 to 4.000 inhabitants to introduce liveliness and vibrancy. It is beneficial to densify these neighborhoods, particularly because they are situated near city centers,

During this stage, I realized that my process followed an iterative approach, involving sketching, model making, writing, and collaboration. When I commenced the pre-design phase, I initially focused on writing the essay. This allowed me to gain a clearer understanding of the project's scope, its significance, the design elements involved, and their respective criteria. The academy advised me to incorporate a 3D drawing program into my workflow, which I embraced despite the initial learning curve. Although time-consuming, this decision proved beneficial as it aided in enhancing the professionalism of my output and facilitated testing various alternatives without the need for physical scale models. This approach particularly provided a time advantage for this specific assignment.



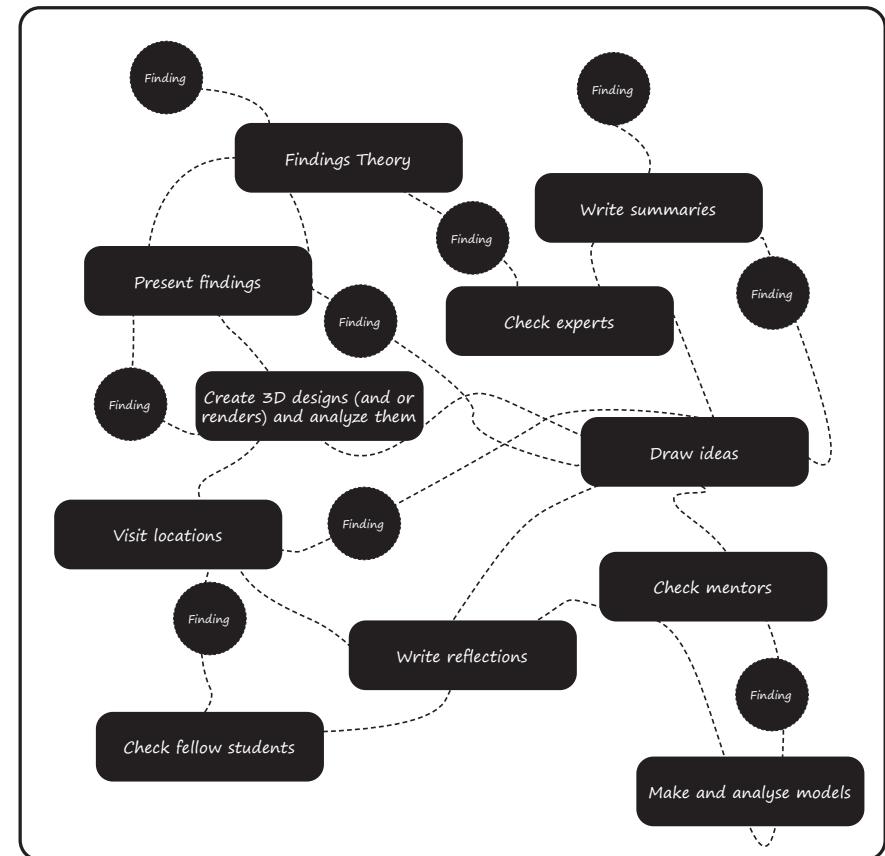
*[The academy's recommendation to utilize 3D drawing as a tool for idea testing and communication proved invaluable. It significantly aided me in advancing my concepts and progressing through this phase. Without this tool, completing this stage would have posed considerable challenges.]*

## 02. Most important discoveries

This chapter is organized in accordance with the **structure derived from the most significant design guidelines**, as well as the discoveries I made while working with them. Another aspect of the design encompasses three distinct scale levels: the dwelling level, the building block level, and the neighborhood level. These levels are incorporated within the structure, leading to the following:

1. Design Guidelines : enabling aging in place
2. Design Guidelines : diversity in homes
3. Design guideline : Densification and improving social cohesion and liveliness
4. Design guideline : demolition is a crime

Sometimes an idea ends and this is marked with a red **X** in the checkbox. Every process concludes with a reference to the design panels, where the final result is presented.



*[I observed that my design process did not follow a linear path but rather resembled a spaghetti-like structure, involving sketching, model making, writing, and collaboration.]*

## 1. Design Guideline: enabling aging in place

- Look for possibilities for lifecycle resistant homes within existing housing stock
- User group: elderly and empty nesters

[The concept of the Polish way of intergenerational living, where children reside separately within the same household as their parents, sparked my interest.]

### Research finding :

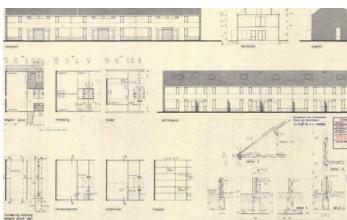
Boelhouder, cause housing shortage: elderly stay in their homes because they want to stay in own environment and the shortage on suitable homes for them.

### Example projects / experts:

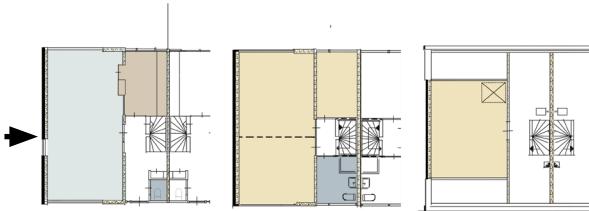
- Design research "Langer thuis in eigen huis" add volume and split the dwelling
  - Bedeaux (horizontal splitting)
- KAW, build to stimulate flow of elderly
- Platform 31 different living forms (6 types), life cycle resistant

### Existing floor plan possibilities

#### Analyse historic drawings



#### Analyse spaces and functions



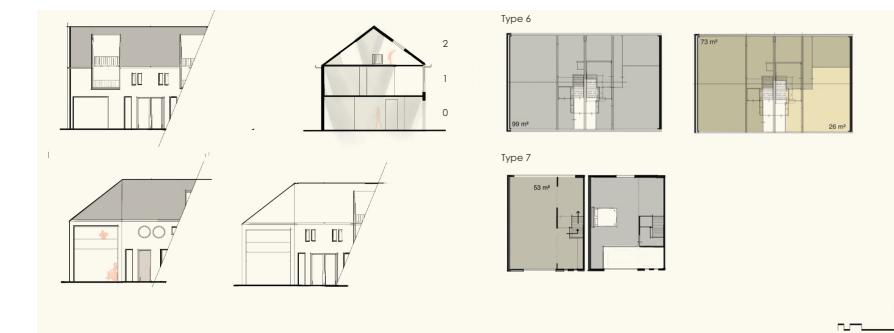
### Interview Cas & Mary Lux (elderly):

Cas Lux, who is Polish, mentioned the way Polish buildings are constructed, specifically with the intention of allowing children to live with their parents if they require assistance. In such cases, the children will inherit the house after their parents pass away.

### Interview Piotr (Polish construction worker):

Confirmed this and advised to be smart with the wet cells in a building

### Alternative options, volumes and impact on daylight



The splitting deal with ding

*[I found both the theoretical ideas of Glenn Lypens and the practical research conducted by "Next Door" to be complementary and captivating, capturing my attention. This insight inspired my idea to design the entrance in such a way that people have the opportunity to meet unexpectedly.]*

## Test Ideas on flexible installations

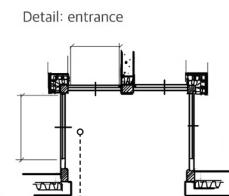
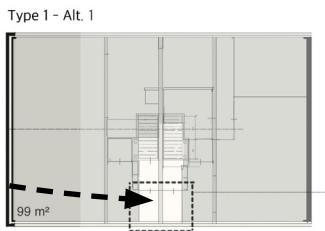


question with  
homes is how to  
splitting and ad-  
installations

## Glenn Lyppens robust inbetween space

Nextdoor: connect people  
that live on the same floor

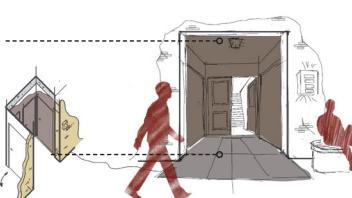
Make joint entrance (3 or 4 doors)



Large entrance

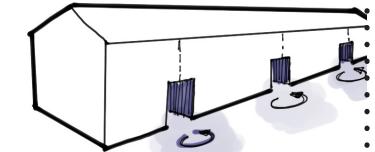
## Unexpected meeting

Robust inbetween space

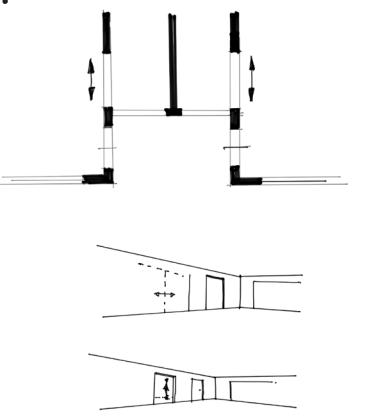


Hooimeijer “Aging in place”  
Lifecycle resistant houses prioritize flexibility, accessibility, durability, accommodating evolving lifestyles.

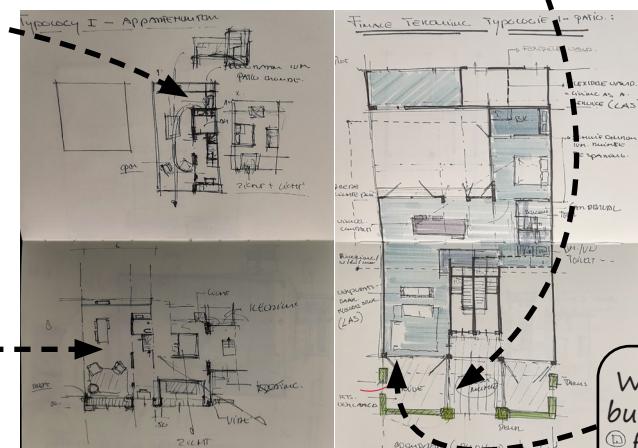
## Options from the outside (place to meet)



## Options from the inside (sliding doors)



Extra spiration from book  
of "De zwarte hond" where al-  
ternative floor plans in Nether-  
lands and outside of Nether-  
lands where drawn, with their  
architectural qualities.



Winy Maas, opening  
building creates space  
(13) for social cohesion  
(Urban Porosity)

## Architectural qualities tested

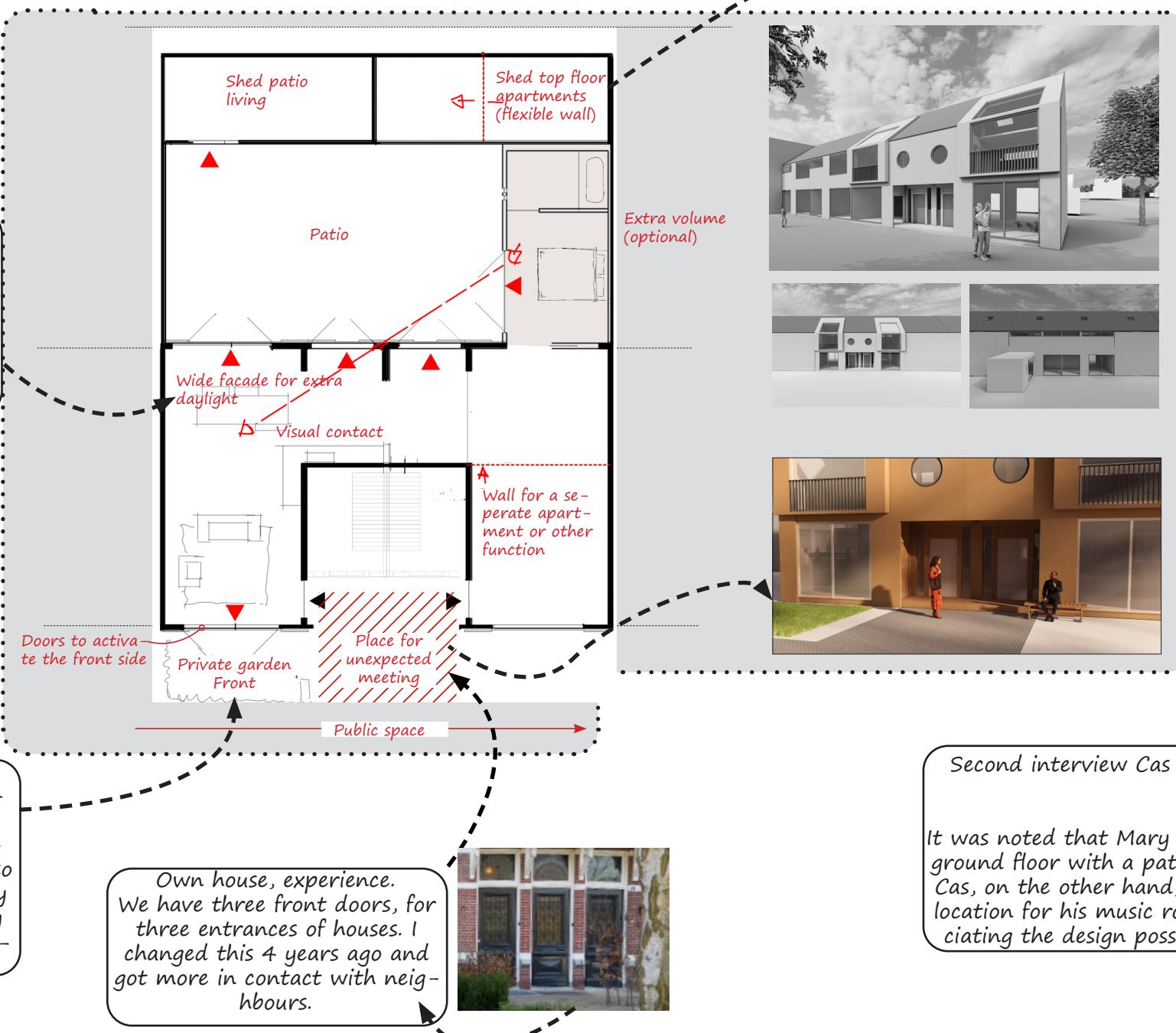


I went to one of my neighbours in the street. He bought the house of his Neighbour and he merged the ground floor (same with as Kastelenbuurt). I experienced especially the extra daylight and space due to the with.



Also, the garden of our own house is made to activate the front. We have much more contact with neighborhoods when we sit outside. Also friends, activated the front by opening it via doors and they have the same experience (improve social contact / cohe-

## Test suggested floor plans by experience



## Test estetics by 3D program



[The floor plan ideas of "De Zwarde Hond," combined with the concepts of urban porosity from Winny Maas, influenced my decision to open the front facade.]

## Second interview Cas & Mary Lux (elderly):

It was noted that Mary particularly enjoyed the ground floor with a patio, finding it wonderful. Cas, on the other hand, needed to identify the location for his music room before fully appreciating the design possibilities. Once he found

Own house, experience. We have three front doors, for three entrances of houses. I changed this 4 years ago and got more in contact with neighbours.



### Reflection on rowhouse patio design for elderly & empty nesters (ground floor)

*Prof. Boelhouder investigated the housing problem and identified the relocation of the elderly to suitable homes as one of the main causes. Taking inspiration from other designers and considering input from the group, a ground floor patio was designed by merging two ground floor areas into a larger apartment. The floor plan is designed with life cycle resistance in mind, featuring larger doors, no height differences between the interior and exterior, and a spacious bathroom.*

*The love for patio living expressed by older individuals, particularly those who were familiar with it, greatly influenced me. Personally, I also find this way of living attractive, which is where the idea of incorporating a patio originated. By adding an additional volume at the back, a larger ground floor can be achieved. This allows for the possibility of dividing the ground floor into separate apartments, such as one for a grandchild, a caregiver, or even an office space with independent access.*



Design  
(Panel 2)

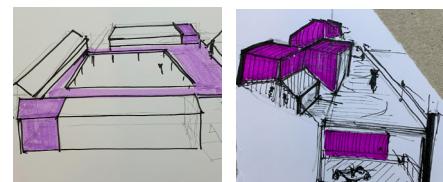
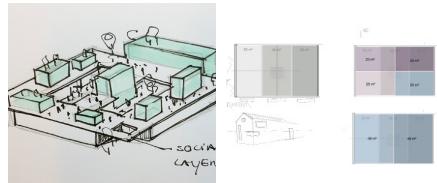
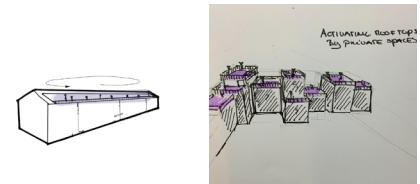
## 2. Design Guideline: diversity in homes

- looking for differentiation in family homes for families with a different budget
- look for different apartment types for starters/1 and 2-person household in different ages and different budget

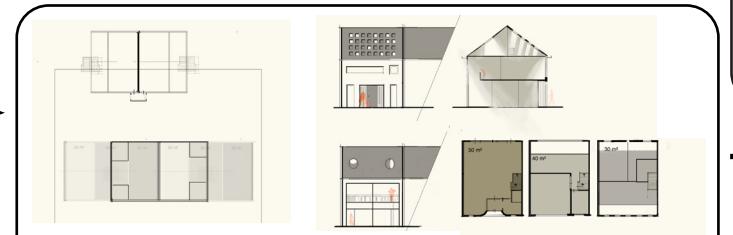
Research finding :

Individual architecture, Alvar Aldo, John Habraken, Alejandro Alvera  
Barba papa architecture, Winnie Maas  
Superlofts Marc Koehler  
Denmark Courtesy of Arkitema, Sjoerd Soeters  
Mario Carpo, the Second diginat turn  
Brinksma, H. "Toekomstbestendig renoveren"

Idea generation on different options  
to create more diversity



Work first ideas out in different views



**X**  
Decide not to add an additional layer on top of the building in order to prevent the formation of two separate social layers.

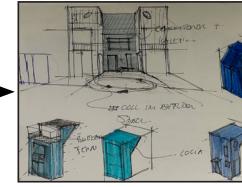
Marc Koehler, Superlofts, concept of spatial adaptability with ingenious floorplans. This empower homeowners to modify their living spaces according to their own preferences and needs.

Sjoerd Soeters, Courtesy of Arkitema, Copenhagen. At an urban level, he designed the city and allowed architects to fill in the facade structures. All structures were pre-defined, including those in the "Stempel" areas. This approach resulted in a wide variety of street-level views.

Test different variants in scale models (1:100)



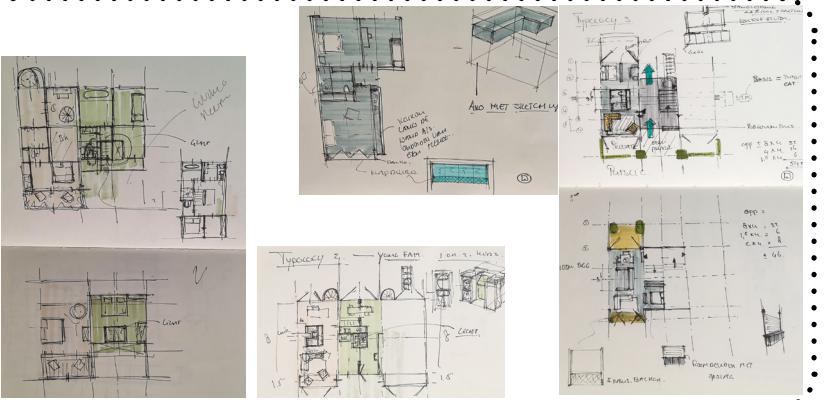
[Sjoerd Soeters' concept of separating the fixed structure from the facade greatly influenced my thinking about personal design and extra volumes.]



During a conversation with a fellow student, mentors of the academy suggested considering the possibility of reducing the size by smaller floor plans. This sparked an idea in me to explore vertical splitting from 2 to 3 family homes

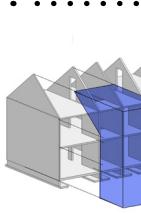
**X**  
After presenting the idea of a "two under a roof" variant, I made the decision to pursue only those variants that would increase the density of the neighborhood and focus on that aspect.

Explore further ideas for fam house and starter



One of the most known veld Schroder house. I found cells for this part of the house that served multiple purposes (e.g. a bathroom became a sign. The toilet will most likely be larger (1100x1100).

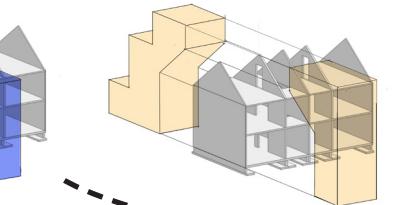
Options for existing struc-



of ter  
la  
la

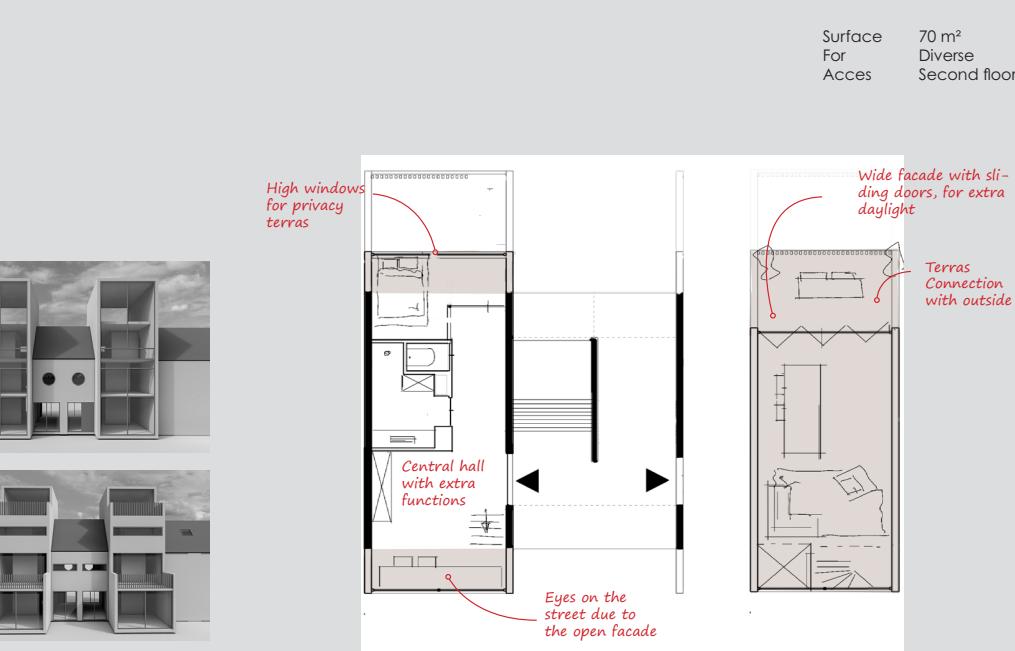
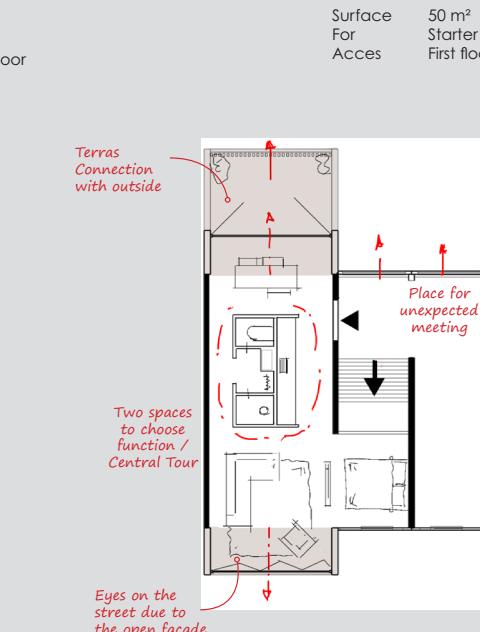
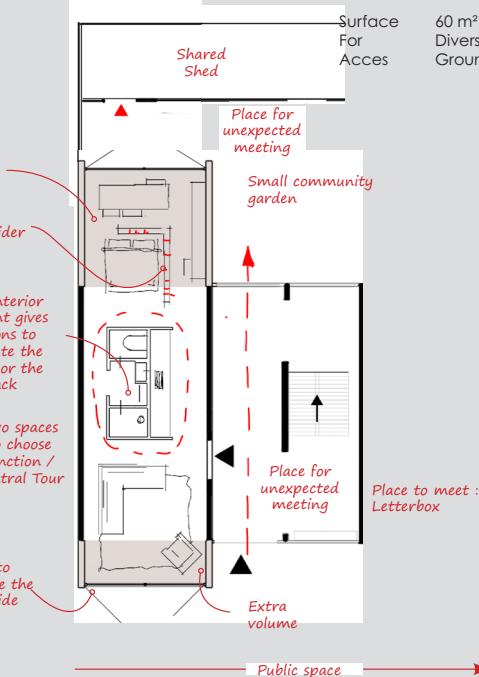
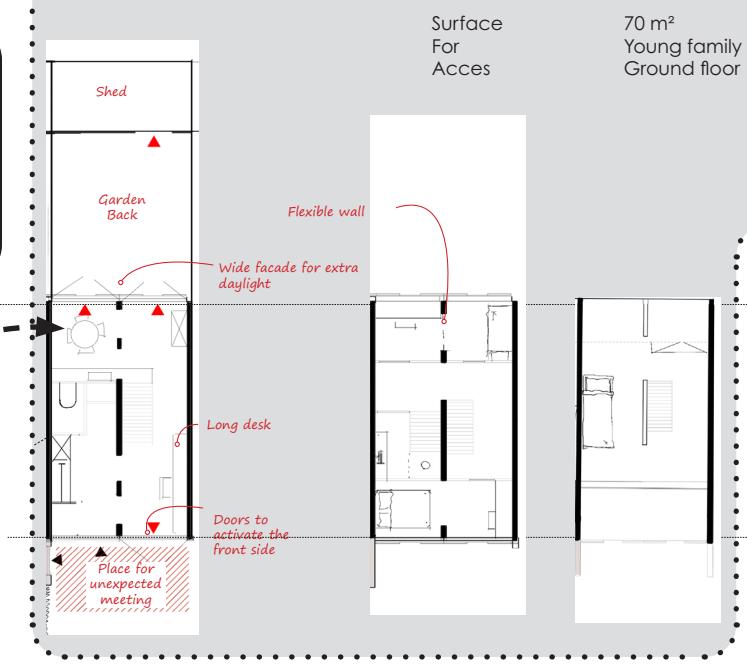
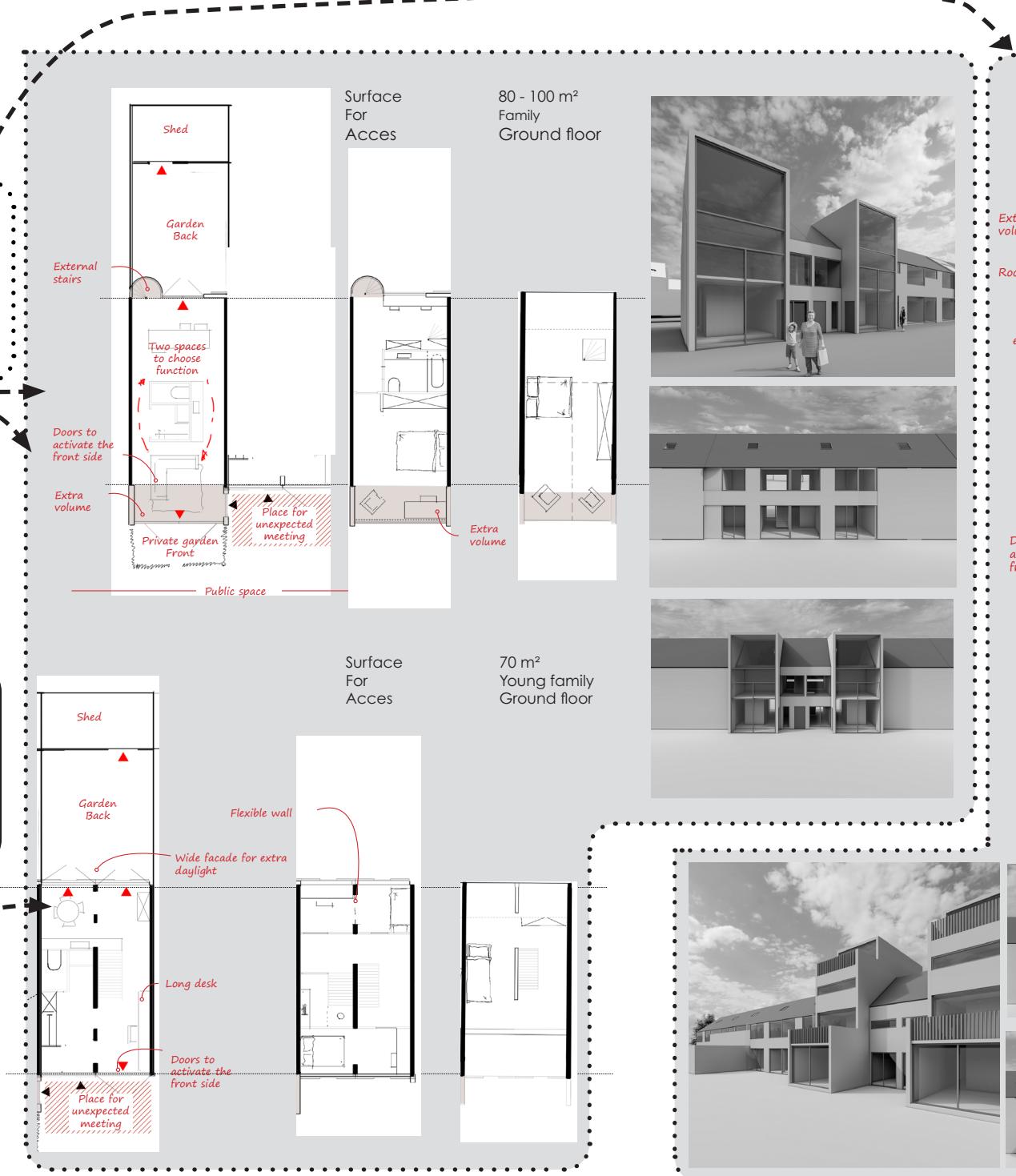
Look for extra qualities in the floor plans

extra volume with using structure



In flexible house is the Rietveld idea about flexible wet design. He sought to maximize wet cells by incorporating elements for various purposes. Changing the wet cells (e.g., a kitchen) is part of the design; they usually have the same place (piping) than others.

Extra inspiration from book "De zwarte hand" where alternative floor plans in Netherlands and outside of Netherlands were drawn, with their architectural qualities.



## Summary on diversity in homes

**Alvaro Aldo, Individualizing Architecture**

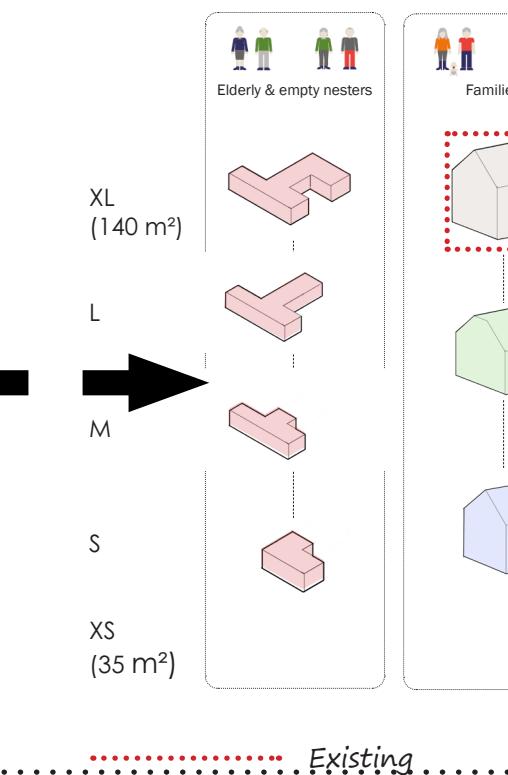
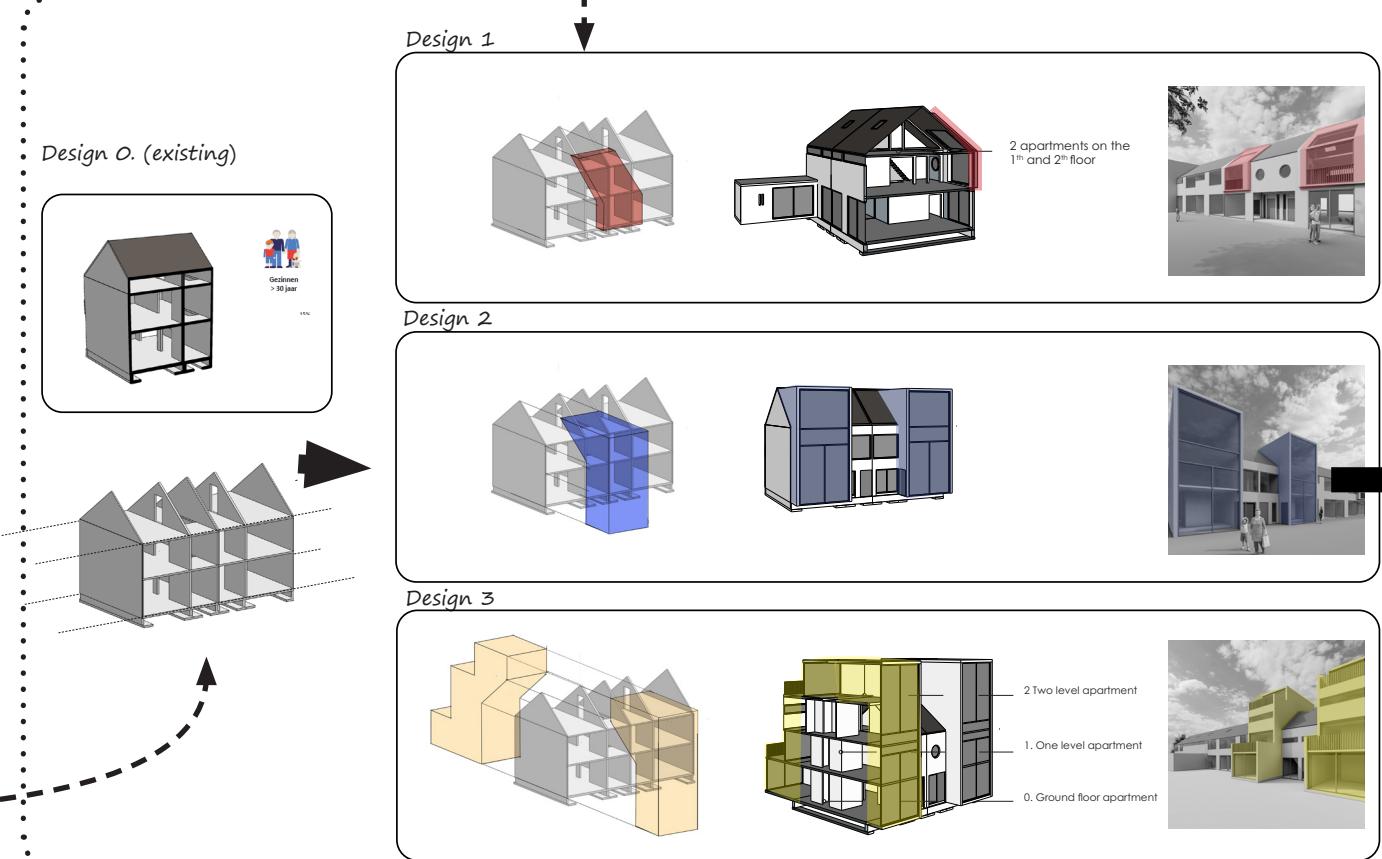
When we have reached the stage where we can achieve different ends with one and the same standard unit, which elastically adapts itself to its task, then we shall have forced the passage between Charybdis and Scylla, between individualism and collectivism.

Mario Carpo (prof and thought leader on history and future architecture): we are at the moment that we can build different types for the same costs. Like printing, 100 sheets of one and the same letter costs as much as 100 different ones

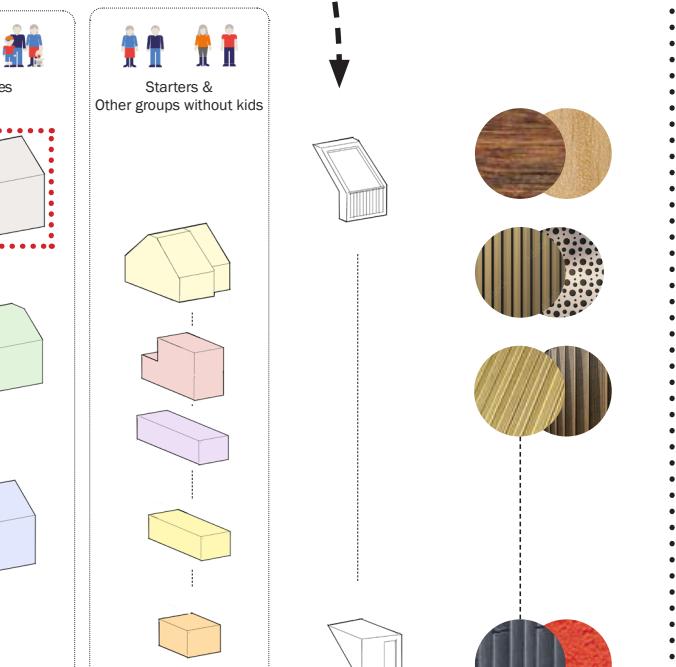
Anton Troeijen, Van Wijnen, the building factory of Van Wijnen in Friesland facilitates this flexibility already. What you need is a good wood kilt construction company that can

Winy Maas, barbapapa architecture, refers to a flexible and adaptable approach to design that embraces constant transformation and evolution. He encourages architects to better serve the evolving needs of individuals and communities.

Brinksma, H. in his research on "Toekomstbestendig renoveren." - Make there renovations future proof and adaptable in one day.



## Design (Panel 2)



### Reflection on design idea of a **family homes**

One of the design objectives was to introduce **diversity in housing options**. By incorporating these two new types of family homes alongside the existing ones, a total of three types of family homes will be available. These include a spacious one measuring 140 m<sup>2</sup>, a medium-sized one ranging from 80 to 100 m<sup>2</sup>, and a smaller one of 70 m<sup>2</sup>. Additionally, the floor plan was structured to provide inhabitants with choices, such as the option to reside either in the front or in the back.



### Reflection design idea of apartments for starters

This typology focuses on adding volume to accommodate more apartments by utilizing the framework of two existing homes. The design emphasizes internal flexibility, primarily through adjustable floor plans. A central feature of the design is a room divider that houses wet areas such as the bathroom, toilet, and kitchen. This allows residents to choose their preferred living arrangements. The ground-floor apartment also offers the potential for alternative uses, such as commercial purposes or community facilities.



### 3. Design guideline Densification and improving social cohesion and liveliness

- on building block level
- on neighborhood level

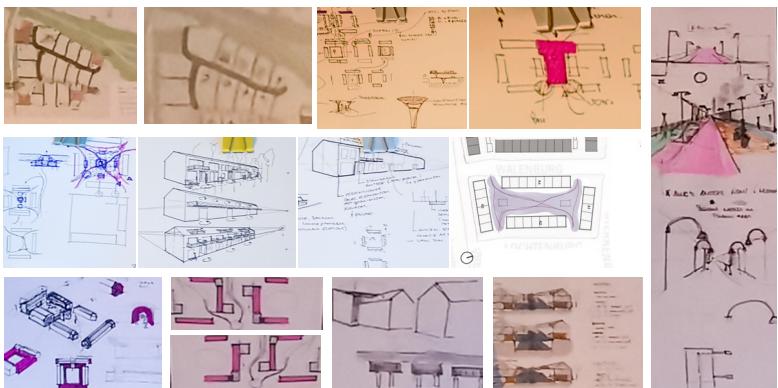
Research finding :

Boelhouder, cause housing shortage: elderly stay in their homes because they want to stay in own environment and the shortage on suitable homes for them.

Example projects / experts:

- Design research "Langer thuis in eigen huis"  
add volume and split the dwelling
  - Bedeaux (horizontal splitting)
- KAW, build to stimulate flow of elderly
- Platform 31 different living forms (6 types), life cycle resistant

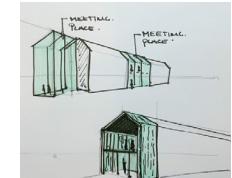
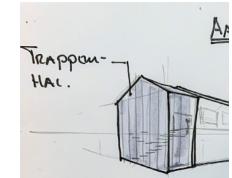
Design options...



**X**  
After researching the ideas of the so called "knaarrenhofjes" I skipped the idea. These are mainly built by people that have the money to create their own living space in a community way, often outside the city center. Ideas on community building is good.

Marjolein van Eig, book  
End Walls gave background why (mainly costs) and some ideas on how it could be improved

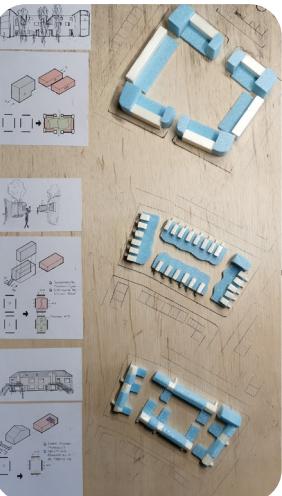
Make corners attractive



Corner dwellings in the 70s often lack intricate detailing due to cost concerns [3]. Parking cars in front poses a challenge. To enhance their appeal, new forms are introduced, serving as residential units or versatile spaces like neighborhood greenery houses.

Glenn Lypens, research on robust collective in between spaces

Test first ideas in model

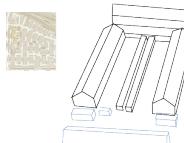
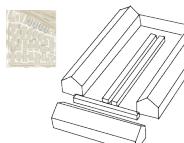
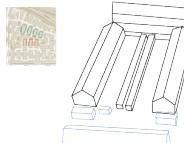


Building blocks (schematic)

FROM: Closed monotonous



TO: Open diverse



Efficient storage place to make space to meet (5.)

Central place to meet / to organize / to play (5. 6.)

High buildings on the North side and in borders (7.)

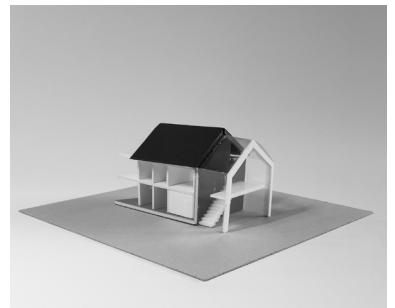
Densification LOW

Densification ME-

Densification HIGH

## Model testing (scale 1:100 - 1:200)

ook Soft city.  
buildings (flexi-  
functions)



an Deijs with  
la House / Row  
new typology

Sketch atmosphere gave confidence



Glenn Lypens (architect & researcher)

Robust collective housing forms lie in a well-positioned intermediary space: a courtyard, a green area that provides a breath of fresh air in the city and is accessible from the public realm. They should bring clarity to the distinctions between private, public, and collective spaces [1].

An example of this is the well-known street parties, where the street is temporarily closed off with fences for a day or weekend, and neighbors open their front doors, creating a pop-up collective. This idea, which is optional but possible to implement at any time, is achieved by adding additional doors at the front of the ground floor houses. On street level, the streets are slightly densified at the front and back, and in this way creating a sense of a courtyard.

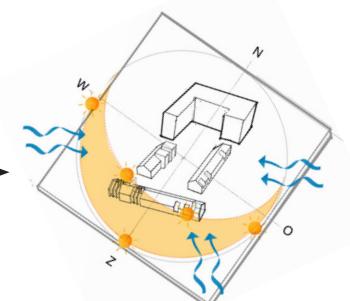
## different compositions on building block level (scale 1:500 and scale 1:200)

eeded to position the va-  
on an urban scale, within  
ntext of a city block, ca-  
nalyzing their placement  
nsidering their impact on  
buildings. My assessment  
passed factors such as the  
n scale, assessing how the  
s would interact with the  
unding environment, and  
ing their potential effects  
play of light and shadow  
within the urban fabric.



Conclusion: you will get a huge variety of building blocks by combining different typologies. Organizing them around courtyards in front of the building is easier to organize.

Robust collective in-between spaces sitmu-



Strategic placement of High buildings (Noord-West) to minimize influence on sunlight in gardens and courtyards.

**X**  
I spend lot of time on finding a solution for social cohesion in the backyard. A mentor asked how this will go if the transition took 20 years. That is why I skipped this idea and went on with activating the front of the building blocks.

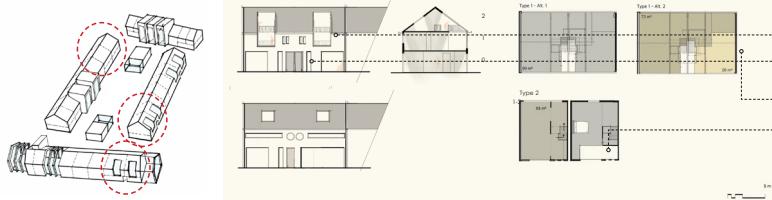
[The ideas of David Sim and Glenn Lypens converged in the activated front side between building blocks, merging architecture and social studies.]

# Designing on building block level

Advise mentor Fontys to create more diverse typologies

Pre design worked out more variations

1 and 2 : Horizontal splitting : 120 apartments and lifecycle and 60 lifecycle resistant groundfloor apartments



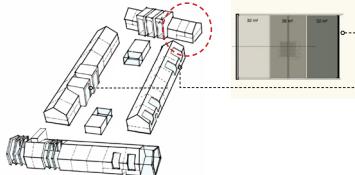
The module makes eyes on the street possible (6.,8.)

Portal makes unexpected meetings possible (6.)

Horizontal splitting gives 50-100% more houses (2.,3.)

Vide gives light and connects with the floor below (6.)

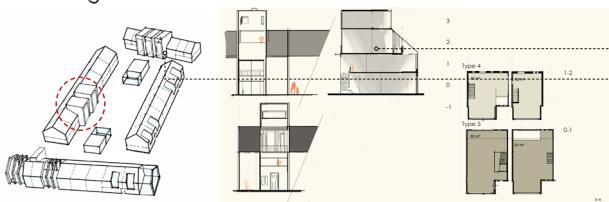
3. Vertical splitting : 90 small terraced houses



Vertical slitting gives 50% more houses (2.,3.)

Can be combined with 1 and 3 (2.)

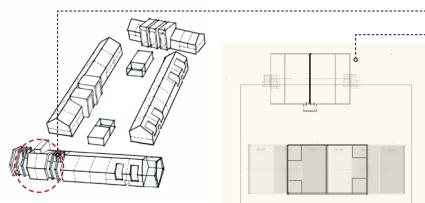
4. Adding volume: 60 row villas



Volume can create new typology (2.)

Connection to the courtyard (6.)

5. Adding volume and removing structure: 20 row two under one hood



Glass breaks the structure and eyes on the street (6.)

Splitting this way gives a new typology (2.)

Design Principles (NL generic)

1. Make ageing in place possible
2. Combine different housing types
3. Adjust the density of the neighborhood to the need of Municipality
4. Demolishing is an act of crime
5. Create a lively environment
6. Create safe environments + add spaces where people can meet
7. Urban and architectural forms should follow nature
8. Changes in architecture should be possible in one day
9. Living as a service, where you can add parts against a price per month

6. Left: 50 existing terrace houses

Ring of the Neighborhood : 100 mainly small to large apartments

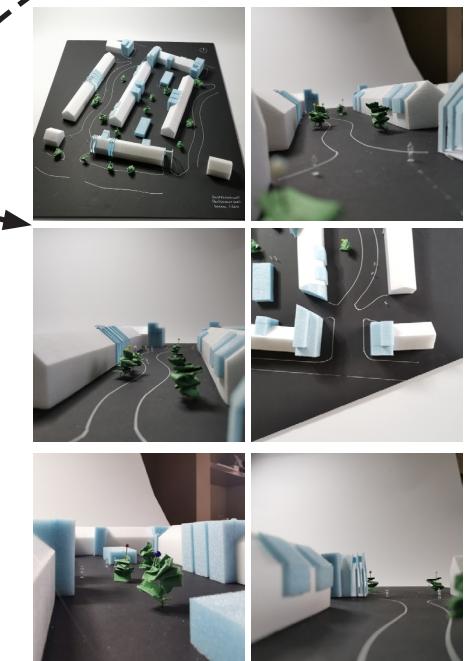
From 400 to 500 Different types RENT and BUY TO: Six building typologies + > 1.000 variants

6 new typologies

Test new variations in models (1:200 - 1:500)



Variants that worked WELL were further explored in a larger scale (1:200)



[Working with the models at this scale made me realize that densification holds the key to addressing the lack of vitality on our streets. It is a mutually beneficial solution that can be implemented immediately, bringing positive change to our urban environment]

models and  
re insights  
evel as on

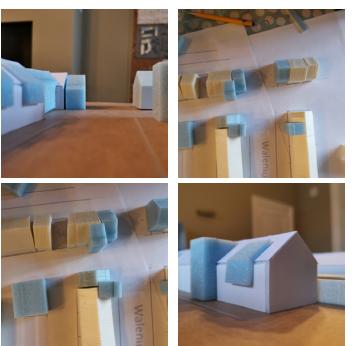
A second test was on densification. Interesting was the possibilities there where on corners. They could add functions, and in the same time, house more people.



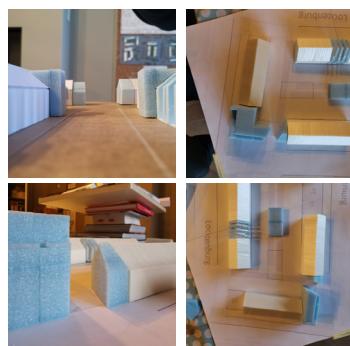
Densification LOW



Densification MEDIUM



Densification HIGH



Mentor mentioned the guidelines of municipalities to promote higher building near to main road (change in zoning plan needed)

Conclusion : main goal is densification. Work on alternatives that create more homes (numbers) and leave the others out  
+  
Advise to make corners attractive

Findings were presented during the pre-design

**X**  
Constructor skip- ped ideas on breaking up the structure of a row (strength issues)

Calculation different strategies on densification



1. Density high (+200%) - The main road municipality
2. Densification medium (+100%) - the Strip and neighborhood street
3. Density low (+50%) - Street courtyard [Densification 50%]

Test options in renderings on birds eye level



Test options in renderings on eye level



Presenting



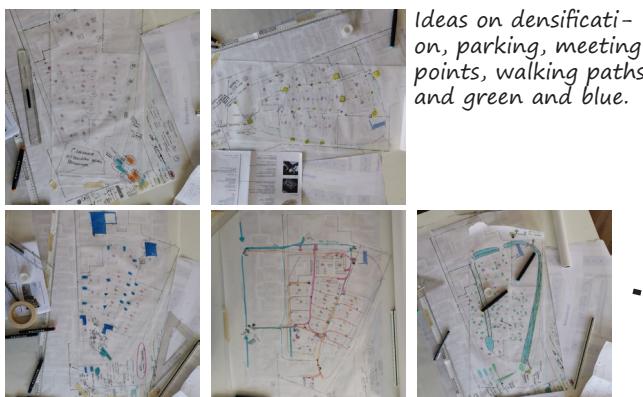
## Designing on neighborhood level

### Research finding :

- Zoning plan municipality (green&parking)
- KAW, build to stimulate flow of elderly and Utilize spaces that are empty
- Nextdoor research on social cohesion: Improve quality of contact, not quantity  
Stimulate involvement of neighbours  
Improve safety , add something that bind the neighbours, add meeting places for different ethnic backgrounds, add easy to access meeting places

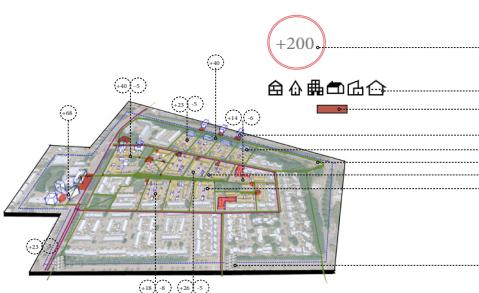
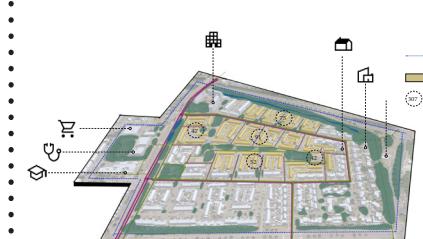


Input mentor aca-demy : check small places where people meet and/or extra walking paths (eg Northside)



Ideas on densification, parking, meeting points, walking paths and green and blue.

FROM : Monofunctional HARD urban structure TO: Multifunctional SOFT urban structure



### Design principle

- 200 New homes (3.), 50% Within the existing structure
- Differentiation in (new) housing typologies (2.)
- New meeting area (5.) and (6.)
- Makers place (6.)
- New apartments for the elderly (1., 2. and 3.)
- Extension of walking path (5. and 6.)
- Boulevard with one walking lane (5, 6.)
- Add different housing typologies for different groups (2. and 5.)

Traffic sign (6.)

Parking on the corners + 80% underground (3., 5., 6.)  
Less traffic (5.)

Small, medium and large meeting places (5., 6.)

- small: bench in strategic places
- medium: shared store, garage, package collect,
- large: backyard and 2 strategic places on the east and west

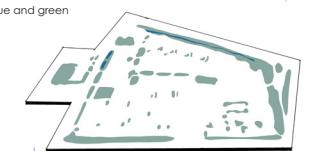
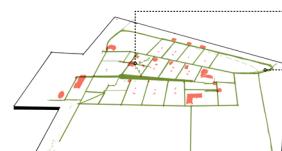
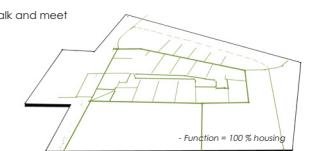
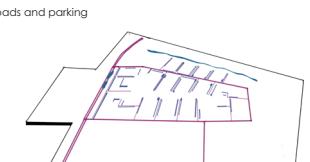
No dead ends in the walking area (4., 6.)

More green and blue (5., 6.)

- possibilities of aqua thermic energy

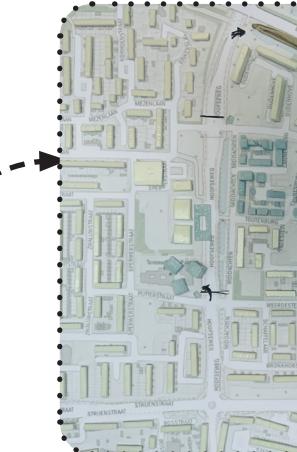
68.

Add findings Winterschool :  
green land and make this wide to improve the connection.



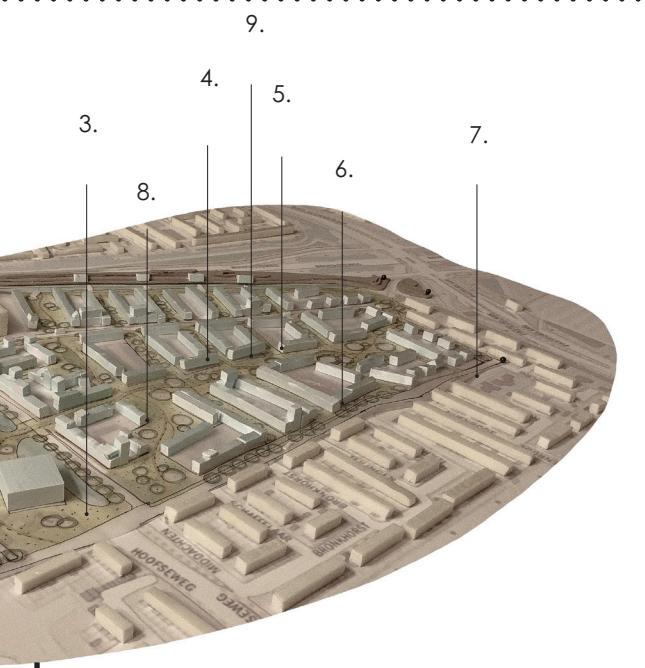
Input interview  
KAW, search for borders, have a good look where functions where located in the past

Advise Mentor to densify more, create a real city area, look for extra volume

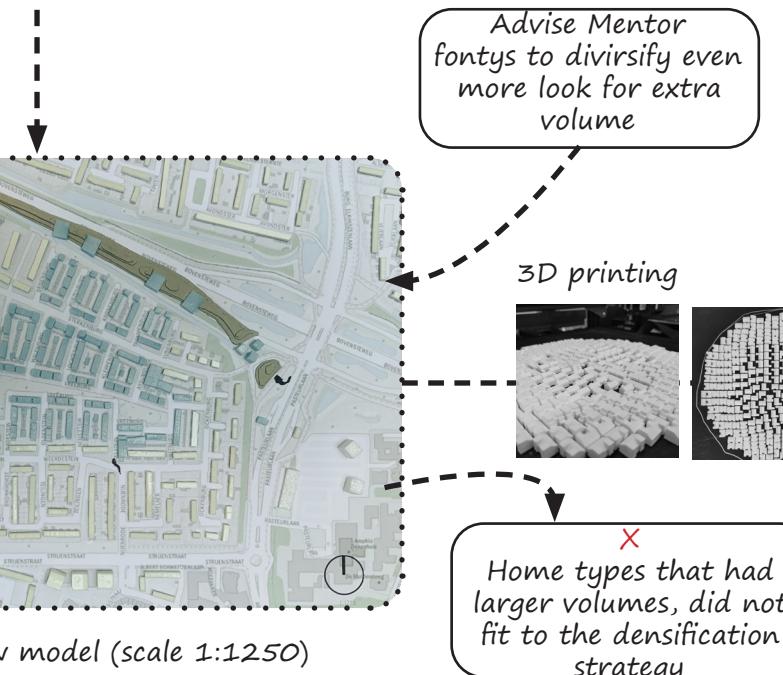


Test ideas in new  
68.

(scale 1:1250) e.g. alternative heights and results on densification etc



1. New apartment block within the plint functions like school, sports, social, food
2. Building block scenario 3 what is in this area suitable because of the height of the surrounding
3. Park that is connected with the corridor in the middle of the plot
4. Building block scenario 2 and in two cases swapped, (scenario 3) for better see throughs
5. Green space combined with new functions like makers world, work, social, play
6. Building block 1 for rest and regularity
7. The pump station transformed into an electric shared car station
8. Huge lane with central footpath
9. Care area for people with dementia



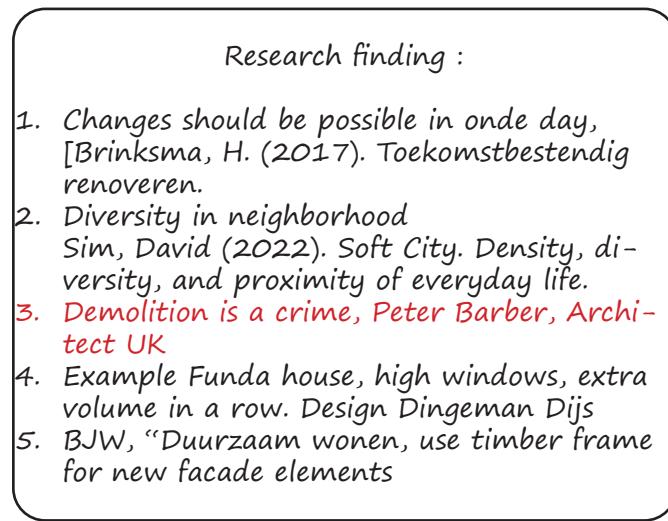
*[This neighborhood's direct proximity to the city center provides an opportunity for increased densification to enhance vitality. In contrast, different approaches may be necessary for locations situated on the outskirts or borders.]*

Presentation model (scale 1:1.000)

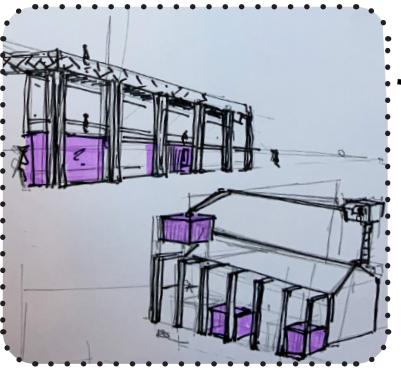


Design  
(Panel 3)

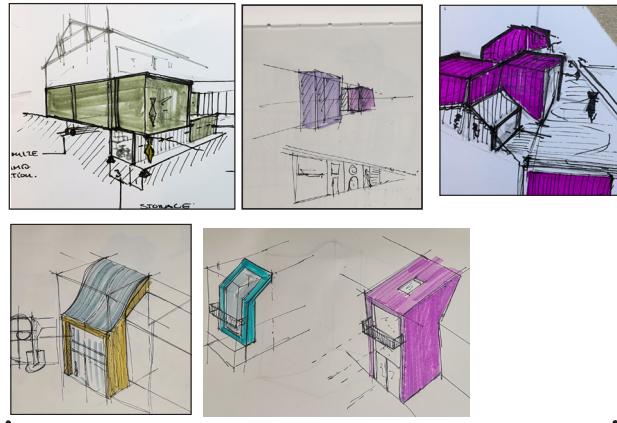
#### 4. Design guideline : demolition is a crime



#### Installation options



#### Design options

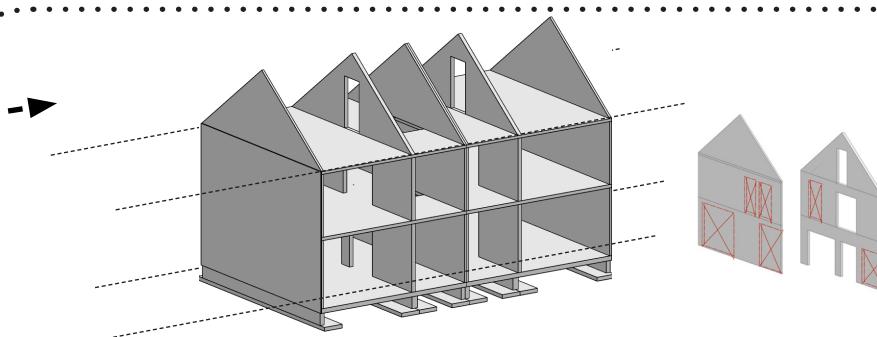


**X**  
Decide not to add an additional layer on top of the building in order to prevent the formation of two separate social layers. Additionally, this would have increased the complexity of the construction, resulting in additional costs.

Testmodel (scale 1:100) different options, separate and in building block (front and back side)



Ideas on additive and subtractive transformation - can create hu...



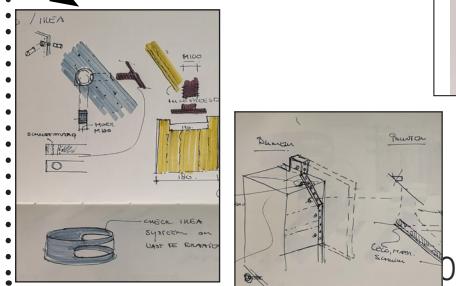
Discuss three options with Anton Troeijen, Director van Wijnen (and previous construction teacher for me):  
With a timber frame construction this could be possible, even in one day. It can hang in the existing construction

Ton Janssen, construct  
not influence the cons  
option

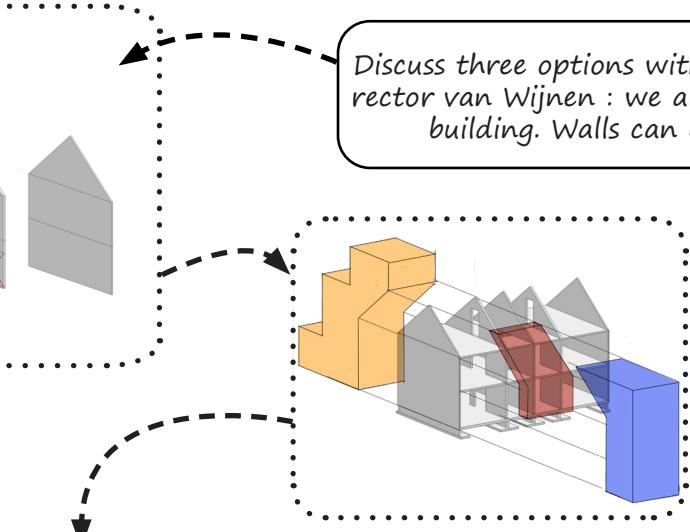
Search for easy con-  
nection methods, like  
Ikea, Lego, ..

**X**  
Decide not to place the volume at the back in order to prevent potential complaints from neighbors regarding shadows. Additionally, the costs and complexity associated with placing it in the back are higher.

Ideation on construction option



ge mix of housing forms



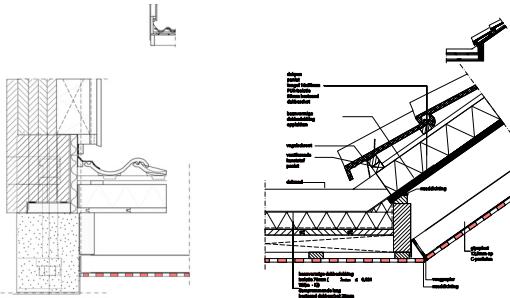
Discuss three options with Anton Troeijen, Director van Wijnen : we are splitting within the building. Walls can be broken easily.

[Anton Troeijen's practical insights were invaluable in generating new ideas. When practicality and theory converge, innovation can truly take off.]

Mentor : the new forces, will  
construction strength, so this  
is possible

Ideas Practical teacher  
school - previous In-  
dustrial designer : this  
can be possible

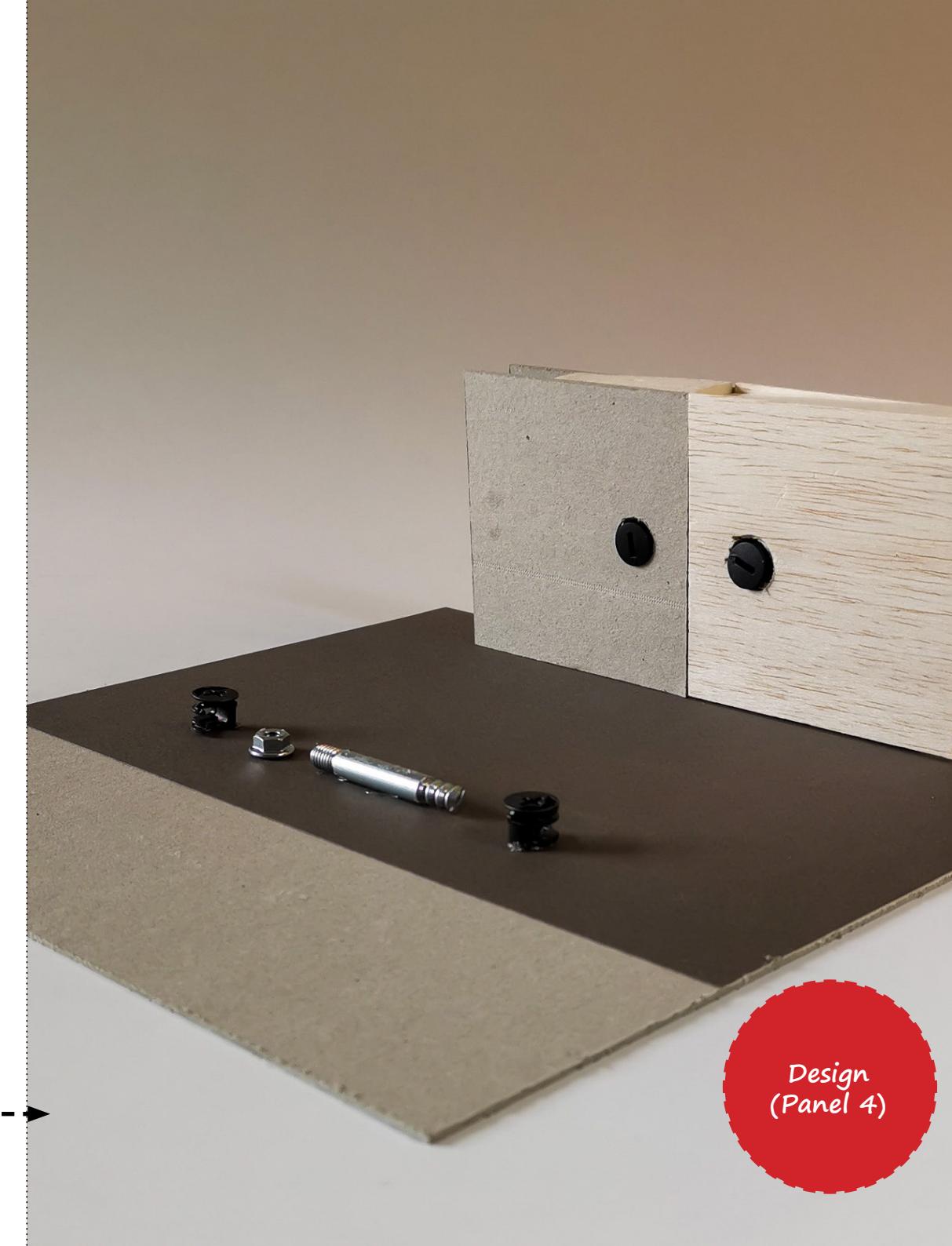
First idea's in technical drawing



Model detail

Mentor : this can be possible and  
shortly discussed details

Ideas, fellow stu-  
dent, HTS constructi-  
on & good knowledge  
in timber frame con-  
structions





## Interviews:

*(see for more details on discussed content on page 34 - 37)*

### Municipality

- Previous municipality secretary (Paul de Ridder)
- Party chairman municipality counsil "Voor heel Oosterhout (Peter de Laat)

### Residents

- Elderly and empty nesters : Mary and Cas Lux (see video), Bas Oomen, Martine Rietvink
- Yong family: Erns-Jan, Giselle and two kids
- Starters: Bas and Noortje,
- People that left the "Kastelen" Neighborhood: Ares, Nino and Marcella Kop
- Many more on the streets during street visit, names unknown

### Experts:

- Van Wijnen construction company: Marlijn Lodewijks, Director Breda; Anton Troeijen, Director region south; Rob van Boekel, project manager support.
- KAW Architects: Stijn Heesbeen, Luuk Thijssen, Wouter Rooijakkers, through Reimar van Meding (Manager, researcher, and architect).
- Fontys research day: Gabriella Nava, urban space anthropologist; Alessandra Gola, architect and doctoral researcher.
- Ton Janssen, constructor, discussing the possibilities.

### Fellow students and Fontys members

- The Winterschool team consisted of Iyad Hamzzah, Daniel van Alphen, Daan de Wit, and Kasper Melis. Their input can be found on page 52.
- Martijn Corvelijn decided to leave the academy at the beginning of the year. He initially assisted me with rendering activities, but later I learned to use the Enscape software and render on my own.
- Fido Melskens provided valuable insights on timberframe construction, in conjunction with my idea of a smart connection to attach the extra volume to the concrete structure.
- Jelle Heuver from Fontys Printshop assisted me with 3D printing and laser cutting. I gained more intensive experience with these new techniques this year.
- Peter van Nugteren and Ben Neesen from the metal and wood workplace were instrumental in my project. I discussed the idea of a fast connection with Peter, while Ben assisted me with the creation of my scale model.

## Experts spoken on other locations

- Cas Pijnenburg, Microsoft, a construction and IT expert well-versed in smart building solutions, discussed the opportunities related to these concepts.
- Floris Wubbena, a Partner and Dutch rental law jurist, provided insights into possibilities and trends in the rental sector. Floris recommended a specialist in "living as a service" for future living arrangements, although I have not yet contacted this expert due to the project's current status.
- Marcel Dekker, a data specialist at a housing corporation from [www.zetjedataopdekaart.nl](http://www.zetjedataopdekaart.nl), assisted in analyzing whether buildings on corners have longer occupancy than others.
- Daniel van Alphen from Bedeaux de Brouwer, who shares similar ideas on splitting and creating extra volume in existing housing stock, discussed these concepts with me. We have regular contact on the topic and Daniel has also been a fellow student who provided assistance during the winterschool.
- Eddy van den Hazelkamp, owner of Crataegus, a community for individuals with a need for light care, explored opportunities and best practices for intergenerational living. Eddy mentioned that the dynamic is very positive, especially when everyone is present at home.
- Huib Brenschot, a lawyer specializing in patent and intellectual property law, discussed the possibilities of obtaining a patent for the connection idea to attach additional volume to existing structures.

## Extra Linked-in contacts, due to knowledge interest in knowledge field

- Glenn Lypens, Tought leader in the area of Robuust Inbetween spaces
- Marjolein van Eig, architect owner "Bureau van Eig" and author of the book "Koppen", used in the research
- Harvey Otten, Architect and developer, known with splitting an topping of buildings
- Dingeman Deijs, Architect and idea owner of the "Rijtjesvilla" Typology
- Pierre Hobbelen, director of the housing corporation Thuisvester
- Reimar von Meding, Luuk Thijssen, Stijn Heesbeen, KAW architects
- Kasper Melis, Daan de Wit and Daniel van Alphen, fellow students and help during winterschool

*[LinkedIn proved to be a helpful platform for gaining inspiration and to get in contact with experts. In particular, the posts shared by Glenn Lypens, Reimar von Meding, Anton Troeijen, Dingeman Deijs, and Hugo de Jonge provided valuable insights and helped me stay updated on the latest ideas in the field of research.]*



# Literature

- Aedes. "Rijksbegroting 2022: De belangrijkste plannen voor woningcorporaties." Accessed March 21, 2023. <https://aedes.nl/politiek/rijksbegroting-2022-de-belangrijkste-plannen-voor-woningcorporaties>.
- Bijlsma, L., G. Bergenhenegouwen, S. Schluchter, and L. Zaaijer. "Transformatie van woonwijken met behoud van stedenbouwkundige identiteit." Den Haag, 2008.
- Blokland-Potters, T. V. "Wat stadsbewoners bindt: sociale relaties in een achterstandswijk." Kampen: Kok Agora, 1998.
- Boelhouwer, P. J., R. van der Drift, and H. Boumeester. "Voor een gezonde woningmarkt zijn structurele hervormingen en beleidsinterventies op de korte termijn een sine qua non." 2022.
- Boelhouwer, P. J., and H. M. H. van der Heijden. "De woningcrisis in Nederland vanuit een bestuurlijk perspectief achtergronden en oplossingen." 2022.
- Brinksma, H. "Toekomstbestendig renoveren." A+BE | Architectuur en de gebouwde omgeving (2017). doi:10.7480/abe.2017.13.
- Carpo, M. "The Second Digital Turn." 2017.
- Callahan Jr., J. "Aging in place." New York, 2019.
- Doevendans, C. H., and R. Stolzenburg. "De wijkgedachte in Nederland: gemeenschapsstreven in een stedebouwkundige context." Eindhoven: Technische Universiteit Eindhoven, 1988.
- Eig, M. van, and L. Spoormans. "Koppen." Amsterdam, 2015.
- Gemeente Oosterhout. "Bestemmingsplan Strijen." 2017.
- Gorissey, M., M. Emmen, E. Leclercq, E. Joosten, D. Broeders, and B. Voeten. "Langer thuis in eigen huis."
- Habraken, N.J. "Supports an Alternative to Mass Housing." London 1972, Amsterdam 1961.
- Hooimeijer, P. "Aging in place." 2007.
- Wood, A. "Architecture as Social Science." 2015.
- Karbaat, A., T. Knibbeler, P. Meurs, M. Provoost, and B. van Tol (Red.). "Van Pendrecht tot Ommoord. Geschiedenis en toekomst van de naoorlogse wijken in Rotterdam." Bussum: Uitgeverij THOTH, 2005.

- KAW (Kooperatie, Architecten, Werkplaats). "Ruimte zat in de stad." Rotterdam, 2020.
- Kempen, R. van, and H. Priemus. "Stadswijken en herstructurering." Assen: Van Gorcum, 1999.
- Leupen, B., C. Gafe, N. Koning, M. Lampe, and P. de Zeeuw. "Ontwerp en Analyse." 2013.
- Liebregts, M. "De jaren 60 wijk, de stempel als stedenbouwkundige ordening." Accessed March 21, 2023. [www.bestandewijk.nl](http://www.bestandewijk.nl).
- Lypens, G. "Robuuste Collectieve Tussenruimte." Antwerpen, 2022.
- Maas, Winy. "Barbapapa Architecture in 'De wereld draait door', Television Program." October 19, 2017.
- Muis, M., P. Smets, C. Buitendorp, S. De Groot, R. Zijlma, and S. Jonkman, VU Amsterdam. "Hoe sociale cohesie de buurt bij elkaar houdt." Amsterdam, 2022.
- Nelson, M. "Incremental Housing: A Short History of an Idea." New York, 2021.
- NOS. "Gemeenten: gebrekke doorstroming oorzaak van problemen woningmarkt." 2021b.
- NOS. "Zo lang is de wachttijd in jouw gemeente." 2021a.
- Planbureau voor de Leefomgeving. "Vergrijzing en woningmarkt." Den Haag, 2013.
- Bleumink, B., S. van Klaveren, Platform 31. "Een nieuw (t)huis, stimuleren van doorstroming van ouderen op de woningmarkt." Den Haag, 2022.
- Sharif S. Kahatt. "The Collective, the Individual and Self-Determination: A Metabolist Project in the Architecture of PREVI Lima." 2020.
- Slot, S. van der, H. Stadens, B. van Kamen, E. van Keulen, B. van Leeuwen, J. van der Meer, E. Roerdink, M. Rottmann, E. Schindler, J. de Willigen, D. Zandbelt. Out There #4 "woningplattegronden." 2023.
- Sim, David. "Zachte Stad. Densiteit, diversiteit en nabijheid van het leven van alledag." 2022.
- Stichting Knarrenhof. "Wat is Knarrenhof." Accessed March 21, 2023. <https://kn>