

Research-by-Design **Journal**

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Graduation studio '*Public Condenser in Copenhagen*'

Architecture and Public Building | TU Delft

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week

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The Public Condenser

Theory and Delineation Assignment 1

Defining Public Spaces: Balancing Civic Freedom, Governance, and the Risk of Gentrification

Marit Smit, Mike Newell, Ludo Swaans, Sjoerd Tekelenburg

Definition of Public

For our definition of public, we interpret views expressed in both Sennett's essay on the 'Public Realm' and Feinberg, Ghorbani & Herdes's literature review of the 'Urban Commons'. We identify public as spaces where people or groups of people with no prior knowledge of each other, can gather. This provides these spaces with a shared sense of ownership: they are a resource that can be used by everyone. Within these spaces, certain activities can take place that would not be possible in a private setting. To illustrate the concept of public space as a shared resource, we use the following analogy. When a group of new students enters a lecture hall, at first their positions will be spread out. When there are many empty seats, a student deciding to sit directly next to another student would be perceived as a social gesture and lead to an interaction between the students. However, as the lecture hall begins to fill and seats become scarce, anonymity among the students could be maintained. This is because there would be an unspoken understanding that the ownership of space must be shared between more individuals. It is the freedom of choice that made the simple act of sitting together into a social deed rather than a compulsory one.

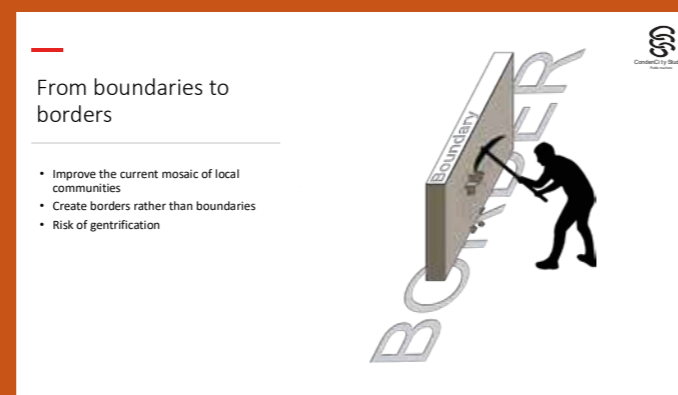
However, if given this free choice, most students would choose to sit individually. This begs the question of whether this forced manner of socializing is better than nothing at all. Would people really get to know each other in an unconstrained environment? This matter is a concern of freedom vs governance.

Freedom vs Governance | paradox between civic rights and needed authority

Feinberg, Ghorbani and Herder proposed a rather interesting paradox in chapter 4.1. that commoning would be part of civic rights and an expression of a collective identity. In contrast, authority could be necessary for formalization or support and thus exert influence. This makes for a necessary balance. Different approaches to achieving this balance can be argued. We propose that close neighbourhood involvement could increase the likelihood of successful commoning in which collective identity is expressed and governance could be minimized. One possibility could be implementing the "Cityplot" concept, as explained by Studioninedots. An ideal plot envelope of 100 x 100 meters is used, and different plots are created within. These plots can be used for distinct functions and building typologies. Therefore, a diverse urban ensemble is created (Studioninedots, 2023). Because of this, a collective feeling is created, and urban participation works quite well, as well on paper as in practice. During an interview in Buiksloterham, an example of the Cityplot concept, neighbours spoke fondly about how they felt more connected to the neighborhood than previous residence. There were already some public functions such as cafés where residents would often meet and thus support the establishment's ownership. Therefore, the community can support the commons, without too much institutional involvement.

Risk of gentrification when designing 'borders'

Instead of only focusing on social coherence in neighbourhoods, the same issue occurs on a city scale. Here Sennet emphasizes the importance of creating borders rather than boundaries in urban design, to enable the city to become "something more than a mosaic of local communities". Borders, as described, serve as spaces where people from different communities can interact, potentially fostering communication and mutual understanding. However, Sennet cautions that simply mixing people in these spaces does not necessarily lead to improved relationships or understanding. Additionally, there is a risk in designing these borders, as modern urban planning can shift boundaries between neighbourhoods, possibly leading to gentrification. While enhancing borders and creating public spaces may promote interaction, it is not a guaranteed solution for connecting different neighbourhoods. This highlights the complexity of urban integration and the unintended consequences that may arise in efforts to bridge social and spatial divides.

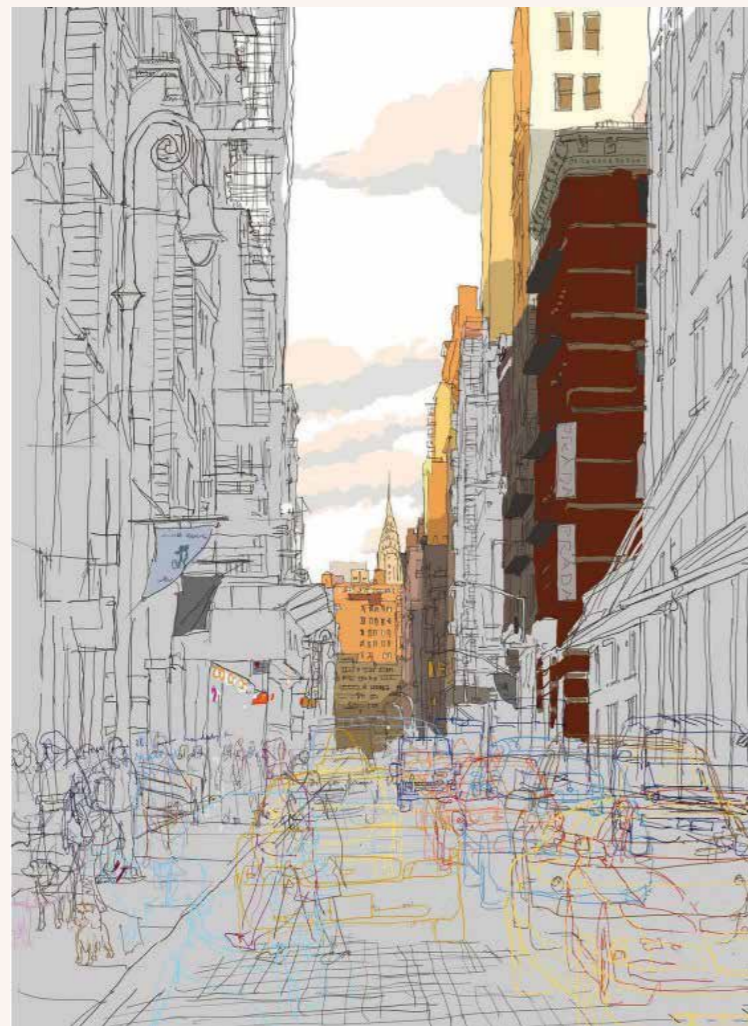


Excursion preperation

CITY

Marit Smit, Mike Newell, Ludo Swaans, Sjoerd Tekelenburg

The term “city” is broad and multifaceted, encompassing various layers and scales. A city is not just a place where people live; it is a dynamic organism where elements such as economy, culture, and social interactions create a unique urban environment. Cities are complex and constantly evolving, shaped by their history and inhabitants. The city’s morphology, from its streets to its buildings, reflects not only its past but also how it functions in the present. Every neighborhood, park, and corner has stories that contribute to the city’s unique character. The public sphere within a city also holds a paradox of anonymity and community. It’s a space where strangers cross paths daily yet often remain strangers. Analyzing the City involves exploring its various layers, from its broader morphology to its finer details. This includes studying its overall structure and function, examining urban typologies, and understanding the role of public spaces in daily life. On a more granular level, it requires looking at how architectural and urban materials shape the atmosphere and experience of the city. By focusing on both large and small scales, we can gain a deeper understanding of how cities function and how people live within them.



Case studies

ARCHITECT: BIG
YEAR: 2018
DISTRICT: Glaspberg

CASE 03
DORTEAVEJ RESIDENCE

The project was commissioned by Danish non-profit affordable housing association Legerbo as a part of their mission, drafted by Danish urban designer Jan Gehl, to create affordable housing and public space. Conceived as a porous wall, the residential building is characterized as a shell-and-puffin which is produced as a result of a singular prefabricated structure and accentuates the internal organization of space. Prefab elements are stacked in a way that allows every second module to have extra height for the living spaces. The modules have been gently adjusted by curving a linear block away from the street, expanding the sidewalk into a public square. The living spaces have been oriented towards the square with recessed balconies giving depth to a facade dominated by timber and glass. On the street level, passageways allow the general public to flow seamlessly from the street to an enclosed green courtyard, allowing residents of the neighbourhood to use this space for recreational activities. (Hendriks, 2018)

ARCHITECT: EFJEKT
YEAR: 2018
DISTRICT: Østertro

CASE 10
KILDEVÆLD COMMUNITY CENTER

The community center Kildevejd is built in order to give the neighbourhood a new gathering point. It combines different functions to serve as a dynamic place where culture and learning can happen. Functions such as a workshop, cafe and kitchen are combined with conference facilities, a library, concert hall and activity rooms to do so. Located between the public school, park and the community garden the building design has a well visible character. The atrium between the public school and the community center gives this building a distinct appearance in combination with the facade that reflects the programmes behind it as a sort of bookshelf. Inside the building this concept is also visible with many open and surprising spaces where typical hallways and closed doors are unnecessary. Therefore, a diverse floor plan was created which gives many possibilities to use the space in different ways. As EFJEKT describes it this led to the creation of “synergies between the neighborhood and the school with a strong focus on culture, movement, nature and climate” (EFJEKT 2013).

CITY

Marit Smit, Mike Newell, Ludo Swaans, Sjoerd Tekelenburg



Morphology

After the second world war, Copenhagen experienced a huge urban growth which asked for an ambitious urban expansion plan. Along railway lines, five 'fingers' emerged from the city, connecting the new urban spaces with the centre. The space in-between those fingers could be used for agriculture and recreation

Typology

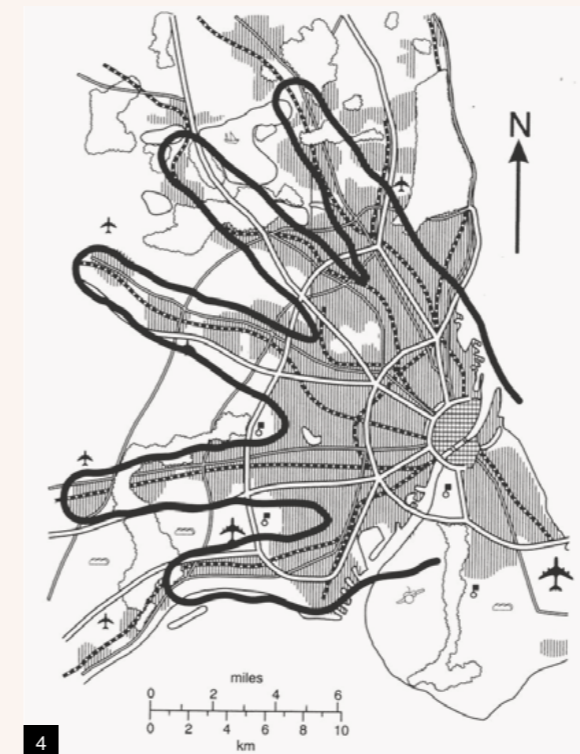
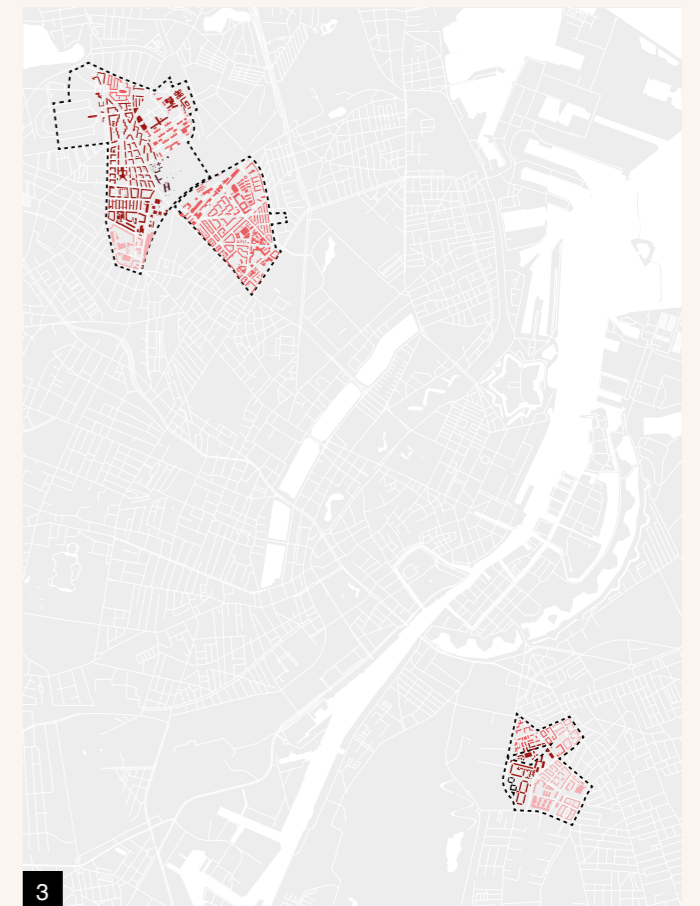
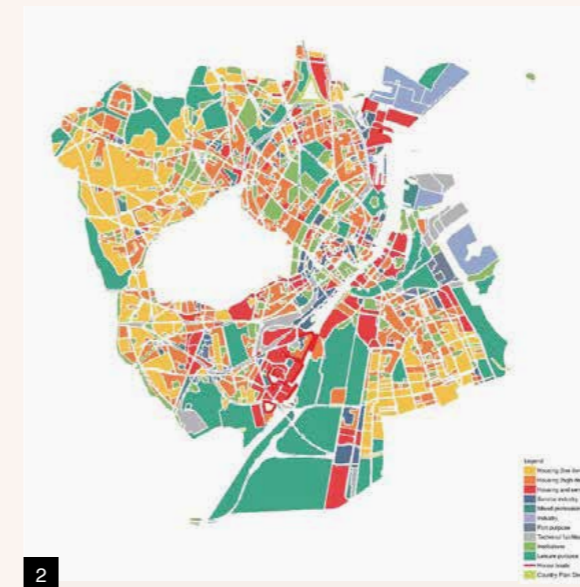
Public functions are of great importance in Copenhagen. The city has a diverse character where many functions take place. The historic centre gives space for many of the commercial functions, whereas the suburbs allows for residential area. Furthermore, the harbor is an unique quality of the city where older structures are revitalized and offices, restaurants and industry are combined. Architectural offices such as 3XN/3GN, but also former restaurant Noma, which was the best in the world, are located in this area. An inspiring environment to say the least...

Public space

Copenhagen consists of a rich variety of public spaces, from parks and outdoor swimming locations to recreational squares and marketplaces. By removing the dominance of roads and highways, these spaces have been interconnected with a network of paths and bicycle lanes focusing the city on the human scale. Through public engagement with communities and urban designers such as Jan Gehl, the city has been developed with the welfare of its residents as a core principle. This has led to Copenhagen being considered as a prime example of a modern metropolis.

Details

Copenhagen's public spaces showcase a blend of materials, colors, and patterns that shape the city's atmosphere. Warm brick, sleek concrete, and wood are commonly used, with earthy tones and minimalist designs. Repeated symbols and geometric patterns in urban furnishings and architecture create a sense of unity and calm throughout the city.



- 1 Materials of the city, via google maps
- 2 Map of function
- 3 Morphology map of site areas
- 4 The Finger Plan Copenhagen, HALL, Peter & WARD, Colin (1998)

Proposal Research plan

Proposal 1



Kamikatsu Zero Waste Center / Hiroshi Nakamura & NAP

Circular economy within a public condenser

Industrial symbiosis (Frosch and Gallopoulos, 1992) is a systems-oriented concept that stems from the view that systems must not be designed in isolation from their surroundings but in relation to all the systems in the surrounding as well as the environment. Industrial Symbiosis promotes the exchange of resources, materials, and energy through a network of industries resulting in closed-loop. (Gopalakrishnan, 2017) This research proposal aims to explore how a public condenser can contribute to a circular economy by providing a space for organizations and companies to collaborate and innovate in transforming waste into resources. This collaboration can create a closed-loop system where one entity's waste becomes another's resource. For instance, a data center generating excess heat could share this energy with other tenants, such as an urban farming greenhouse within the same building. Additionally, a mushroom grower could utilize coffee grounds from an on-site café as a growing medium, enhancing sustainability and resource efficiency. An inspiring example of this system in action is BlueCity in Rotterdam. This research would address critical challenges related to resource scarcity and waste management in today's urban environments. As global populations grow and urbanization intensifies, finding innovative ways to create closed-loop systems becomes essential for reducing environmental impact. It promotes sustainable business practices, fosters innovation, and can lead to more resilient, self-sufficient communities.

BlueCity. (z.d.). <https://www.bluecity.nl/>
 Encyclopedia of Sustainable Technologies. (2017). ScienceDirect.
<https://www.sciencedirect.com/referencework/9780128047927/encyclopedia-of-sustainable-technologies>

Proposal 2



Maggie's Leeds Healthcare Center / Heatherwick Studio

Creating social connections through Biophilic design.

The term “biophilia” was introduced by social psychologist Erich Fromm in 1964 to describe the “love of life.” In the early 21st century, this concept was adapted in the field of architecture to highlight the emotional importance of human interactions with the natural environment in built spaces (Zhong et al., 2021). Biophilic design aims to create environments that are climate-positive, sustainable, and healthy. In response to the COVID-19 pandemic, discussions around biophilic design have expanded to include the human need for connections—both with nature and with each other (Tabb, 2020). This research proposal explores the potential of biophilic design to enhance social connections, focusing on how nature-inspired design and activities can promote social cohesion. Parks, for example, provide communal spaces where people of diverse ages and backgrounds can interact. The question is whether this concept can be effectively applied to architectural design. The proposal addresses the increasing demand for healthier, more sustainable, and socially cohesive environments, particularly in the post-pandemic era. As urbanization accelerates, people are becoming more disconnected from nature, affecting both mental well-being and social interaction. The research will investigate how biophilic design can strengthen social connections and contribute to the development of inclusive, resilient communities.

Tabb, P. J. (2020). *Biophilic urbanism*. In Routledge eBooks. <https://doi.org/10.4324/9781003034896>
 Zhong, W., Schröder, T., & Bekkering, J. (2021). *Biophilic design in architecture and its contributions to health, well-being, and sustainability: A critical review*. *Frontiers Of Architectural Research*, 11(1), 114–141. <https://doi.org/10.1016/j.foar.2021.07.006>

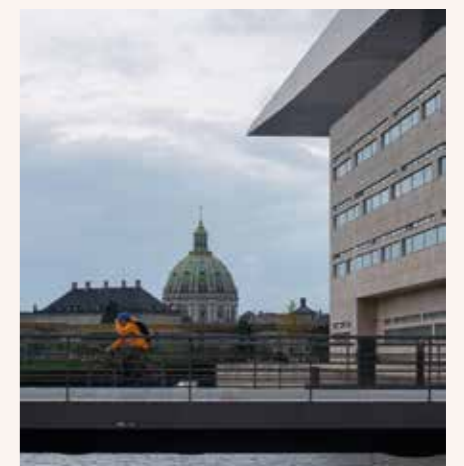
Excursion Copenhagen

Day 1

Walking tour Copenhagen inner city & Lecture on Copenhagen by Deane Simpson

On the first day of our excursion, our group organized a walking tour through the heart of Copenhagen. We explored the city's unique architecture, including its iconic, colorful houses, starting from BLOX, the Danish Architecture Center. The tour offered a fascinating look at Copenhagen's diverse buildings, spanning from historic structures to modern designs.

Following the tour, we attended a lecture by Deane Simpson at KADK, The Royal Danish Academy of Fine Arts. He gave an insightful talk on Copenhagen's urban development history, from around 1852 to the present, discussing the city's layout influenced by the Finger Plan, the impacts of industrialization, and various urban renewal projects over the years. He concluded with a discussion of current urban renewal initiatives in the city.



Excursion Copenhagen

Day 2

Visit and Lecture Jan Gehl Architects, Visit case study projects by Cobe & First site explorations per site area

On the morning of the second day of our excursion, we visited Jan Gehl Architects, where we attended an engaging lecture on designing for a healthy city. The talk explored health from various perspectives, including those of designers, residents, and healthcare professionals. Their approach emphasized health interventions that reach the entire population, with a strong focus on prevention, and included examples of their design projects.

Afterward, we toured two case study projects—two libraries designed by COBE architects. It was fascinating to see how each library serves different functions within its surrounding neighborhood.

We wrapped up the day with our first exploration of the site area. Walking through the area gave us an initial sense of the design space. The streets were relatively quiet and not very lively, which might have been due to the rainy weather.



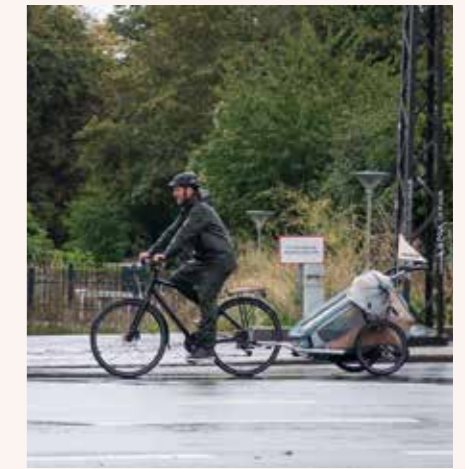
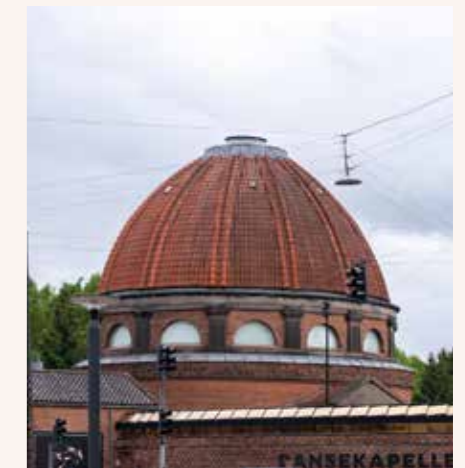
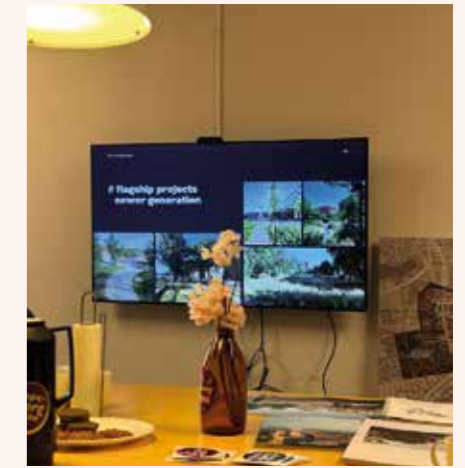
Excursion Copenhagen

Day 3

Visit Cobe Architects, Exploring Nordhavn & Site Explorations per Site Area

On the third day of our excursion, we visited COBE Architects, where we attended a lecture on the firm and its projects around Copenhagen. It was fascinating to hear how COBE quickly grew into a major architecture firm. Following the lecture, we explored the Nordhavn area, admiring its modern architecture, and passed by the offices of BIG Architects. It was impressive to see how this former industrial district has been transformed into a vibrant, contemporary neighborhood.

In the afternoon, we attended a lecture by Rikke Lequick Larsen, an architect with the municipality, who shared insights about the Bispebjerg neighborhood and the design site. She focused on the existing challenges in the area and discussed the ongoing urban projects aimed at improving the neighborhood.



Mapping

Theory and Delineation Assignment 2

Expectations vs. Experiences of Bispebjerg, Copenhagen

Marit Smit, Mike Newell, Ludo Svaans, Sjoerd Tekelenburg

This assignment focuses on mapping our expectations and experiences from the Copenhagen excursion.

Before the trip, we created a preliminary drawing centered on our expectations for the neighborhood. Using a clock format, we represented activities over a 24-hour period, with figures in the center depicting these activities. We also aimed to highlight the architectural diversity of the area, so the outer ring of the map shows where these activities take place, featuring a variety of both modern and historic buildings.

After the excursion, we modified the map to reflect our actual experiences. The neighborhood was much quieter than expected, with notable issues like crime. The center of the poster illustrates these challenges through a photo collage of the area. When viewed under black light, the hidden realities of the neighborhood are revealed, with added graffiti, groups of young people, drug dealers, and homeless individuals.



Recap Excursion

Presentation

After the excursion, we gathered the group's findings into a presentation, focusing on key themes such as History, Landmarks, Housing, Public Buildings, Green Spaces, Connectivity, and Culture. We also included interviews with local residents, highlighted on the final slide. The presentation concludes with an overview of the area's main challenges.

History of the Site

Urbanicity first started in the south throughout the rest of the 19th century. During that time there was a huge growth in the use of perimeter blocks, resulting in residential density without the necessity of high-rise. This was the modernity and equality which was very well.

After the second world war, the growth in the north was also a high peak in the growth can be found. The Finger Plan was introduced to facilitate this growth, which spread along its axis to allow for a good mix with the city centre and to create greenery for all. A train track is located in the light of the neighbourhood. This is the optimistic period where the blocks seemed to open up, taking an L-shape figure.

Healthcare in the environment is the people who could afford it, the rest of the suburbs, the rest.

History of the Site

Public buildings - Institutions

Public buildings - Leisure

Green - Parks

The Bispebjerg area has a lot of diverse green spaces. Key parks include Bispebjerg Cemetery, famous for its orderly rows of graves in spring. Grundtvig's Church Gardens offer a peaceful retreat with well-kept lawns and historical buildings. Nørre Lyngby serves as a park with playgrounds and sports facilities.

The renovation of the two separate green areas of Grønningen NV and Bispeparken is just complete. The residents have been heavily involved in how the park should be designed, and at the same time the park can prevent flooding when it rains heavily.

Bispebjerg Hospital has established a garden dedicated to the mentally vulnerable. It is both a place where users can cultivate the land and a destination for patients, staff and the doctor's other residents who can enjoy the flowers.

Green - Streets

Landmarks (Nordvest)

As visible on the poster of a local committee in Bispebjerg (image 1), landmarks are an important aspect of the neighbourhood identity. In this chapter, we have discovered a collection of four important landmarks in our design area and can be found in the larger neighbourhood of Bispebjerg.

Landmarks (Bispebjerg)

Social Connections

The site provides three exterior spaces for general social connections:

1. A triangular space with a cafe area.
2. The campus of the NEXT.
3. The green space for the local community.

The "subject" / "facilities" within the define the way of communication and social connections.

Social Connections

The buildings' infrastructures around the site show different characteristics:

4. A view of "parallel lives". Metro above the bridge and homeless below it.
5. The mental arts centre, within a nice looking building, but limited access to public.
6. Nørrebro shopping mall for the district.
7. Lyngby Station, a grocery store for local communities.
8. Lyngby Station, an old train station transformed into a theatre and club.
9. Sjøskat, a community centre with a basketball court.

Cultural offer

Everyone

- flea markets
- activities
- movie screenings
- game nights
- community dinners
- stand up

Youth

- art workshops
- dance workshops
- education guidance
- sports

Cultural offer

Migrants

- cycling lessons
- Danish lessons
- help with homework, assignments, exams
- making job applications
- health and prevention advice

Seniors

- help with IT, mobile phones, iPads and social media
- cognitive training
- physical gymnastics and training, yoga
- board games, e.g. bowling, board games, quizzes
- art club
- singing group

Housing

Bispebjerg breathes diversity in all its aspects, including its housing. It holds historical, industrial and green sites of significance, as well as a wide variety of housing forms. An overview:

1. Rental Apartments (left, right): ranging from older buildings (dating from the 1920s to the 1970s) to more modern constructions. Rental apartments are rented out by private owners and dominate due to the high demand for housing in Copenhagen and the influx of young professionals and students. In Bispebjerg these are very common.
2. Cooperative Housing (Andelsboliger): quite prevalent in Bispebjerg, these housing cooperatives are particularly appealing due to the relative affordability compared to rental apartments (lejlighedslejer).
3. Public Housing (Almen Bolig): these units are often subsidized and intended to provide affordable housing options, particularly for low-income residents, the elderly, and young families. These are very common in Bispebjerg, mostly developed in the 1930s until the 1950s.
4. Detached Houses: these single-family homes make up a relatively small portion of the housing in Bispebjerg in the north, and are more common in suburban parts of the city.

In no coincidence Bispebjerg holds a variety of housing, this is because it is located on the urban-suburban border, with the south holding apartment blocks from the 19th century, the middle blocks from the 1930s until the 1950s, and the north detached homes as part of a garden city developed in the beginning of the 20th century.

The plan is to further develop the south of Bispebjerg, an historically industrial area where craftsmanship is at the heart of its industry. Along the redevelopment of NEXT college, new student housing will be built in this area, community and diversity is created in the south as well, therefore upgrading the identity and tradition of Bispebjerg!

Note: we would like to gain more insight into the exact figures, but these were not publicly available. WW

Housing

People - Interviews

Do you like this neighbourhood, and if so, what do you like about it?

Subject 01
young, native, male, starter
"Yes I love it for me, this neighbourhood brings a lot of really friendly and cosy."

Subject 02
young, native, female, student
"Yes, I've been living here since one and a half years (I'm a student and for me, there are a lot of things I like, such as vibrant and calm."

Subject 03
45+, non-native, male, worker
"Yes, I love it so nice here."

Subject 04
young, non-native, male, worker
"I don't see here, I just work here. For me, there is not a lot of things to do here. Also, there are interesting buildings."

What is your favorite place to go to in this neighbourhood?

Subject 01
young, native, male, starter
"I would not recommend anything in the neighbourhood, but there are a few very cool cafes in Nørrebro."

Subject 02
young, native, female, student
"I love going to the markets around the hospital because the cherry blossom trees are very pretty."

Subject 03
45+, non-native, male, worker
"The food here is really good! My food truck is the best in town."

Subject 04
young, non-native, male, worker
"Go to Nørrebro, there is it much more nice!"

How would you describe the challenges this neighbourhood is facing?

Subject 01
young, native, male, starter
"I don't think there are any problems. But it is getting more and more expensive, and more students are coming."

Subject 02
young, native, female, student
"I am the problem, I am the problem. I am the problem of gentrification, brown buildings and cultural things are disappearing and being replaced into windows."

Subject 03
45+, non-native, male, worker
"There is too much rain here! It is not good for my customers."

Subject 04
young, non-native, male, worker
"The site is cool, I think the buildings are going on!"

Problems and challenges in Bispebjerg

- Too expensive
- Winebars & new cafés
- Gang activities
- Friendly & cosy
- Run-down
- No hotspots
- Local Culture
- Students
- Gentrification

Research Plan Draft

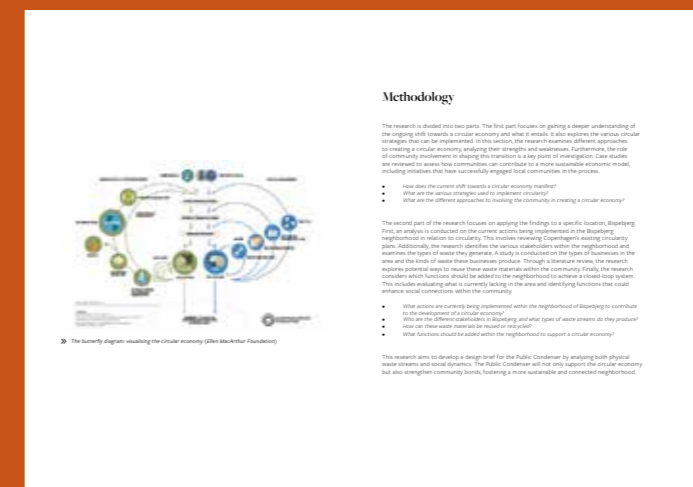
Over the past century, global consumption has increased tenfold and is projected to triple by 2050 (Haas et al., 2020). This rapid increase poses significant socio-environmental challenges, prompting the emergence of the Circular Economy (CE) concept as a potential solution. Circular Economy aims to minimize resource use and waste generation through strategies such as refusing, reducing, reusing, remanufacturing, refurbishing, and recycling. Currently, cities are at the forefront of this issue, consuming 80% of global resources, generating 50% of the world's waste, and contributing 75% of greenhouse gas emissions (Williams, 2019).

In Denmark, the government launched its “Strategy for Circular Economy” in 2018, inspired by recommendations from Danish business leaders. Copenhagen, in particular, aims to position itself as a leader in the circular economy by focusing on improved waste management, reuse initiatives, and active public engagement (Circular Copenhagen, 2019). Despite its ambitions, Denmark’s economy is only 4% circular. This is considerably lower than the Circularity Metric for the global economy, measured at 7.2% in 2023. This means that out of all the materials consumed only 4% make it back into the economy in the form of recycled materials. (Circularity Gap Report, 2024).

This research explores how a public condenser can advance the circular economy on a smaller community scale, by facilitating partnerships between organizations, companies and residents to transform waste into valuable resources. By facilitating space and encouraging people, the public condenser aims to help create a closed-loop systems where one entity’s waste becomes another’s resource. For example, excess heat generated by a data center could be repurposed to support an urban farming greenhouse within the same building, while coffee grounds from an on-site café could serve as a growing medium for a mushroom farm. The research explores opportunities for community initiatives to transform Bispebjerg into a circular community. To uncover this, the following research question has been formulated:

‘How can a public condenser facilitate a waste-to -resource processes to create a circular community in Bispebjerg, Copenhagen?’

Focus more on architecture and your role as a designer. Involve the design of the building. What tools are you using to address circularity? Materials? Structures? Facade?



Copenhagen City

Presentation

Marit Smit, Mike Newell, Ludo Swaans, Sjoerd Tekelenburg

In our group analysis, we focused on the theme of the City, examining aspects such as urban morphology, typology, functions, public spaces, and the finer details of the cityscape. My primary focus was on the details of the city and the specific design site.

The facades of Copenhagen's city center are vibrant and diverse, featuring colorful townhouses in pastel shades like ochre, blue, and terracotta. Architectural styles range from classical to Baroque, adorned with ornate details like carved cornices, decorative molding, and elegant, multi-paned windows. Each facade tells a unique story of Danish heritage.

The map on slide 8 shows a route through the Bispebjerg neighborhood. The façades in Bispebjerg are mainly brown and red brick. These buildings were constructed starting from 1900 and are mostly social housing, interspersed with new developments. The overview of the façades clearly illustrates the shades and patterns of the architecture in Bispebjerg.

In slide 9 the various elements of the streets in Bispebjerg are displayed. These are typical features that can be found throughout the entire neighborhood and are visible in almost every street.

These elements are not present everywhere. Within the neighborhood, there are many closed façades at street level, numerous empty streets without any street furniture, and many parked cars along the roads. While there is a lot of greenery in the area, much of it is fenced off as private property.

October 2024

Morphology.

Copenhagen expanded from the coast towards the mainland over time. The old city centre first developed within the city's fortifications, but was forced to spread outside of its walls after a huge population increase. Innovations in transportation made it possible to still be connected to the old town. After the Second World War, the Five Finger Plan was implemented, expanding the city aligned to railways.

1:50,000 2024

October 2024

Typology.

After the old town had been in flames twice, more space was reserved between buildings. The spread of cholera led to an increase in housing quality, focusing more on people's health and access to sunlight. A considerable population growth was tackled by high-density perimeter blocks. These blocks opened up throughout the years, eventually creating suburbs with detached houses.

1:50,000 2024

October 2024

Functions.

Bispebjerg shows an array of different functions. When filtering the different functions individually it becomes more evident how the site area is positioned within an area of mixed-use apartments with public plazas, business & industrial and educational functions. Therefore, it can be intriguing how a new public building would relate in its surroundings.

1:50,000 2024

October 2024

Public Spaces

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1:50,000 2024

October 2024

Green Parks

- The scale of the green parks increases in magnitude at greater distances from the city centre.
- The green structure of the Finger Plan is still present especially towards the North and South of the city.
- Narrow elongated parks interconnect larger green spaces. However, these are becoming dispersed in more urbanised areas of the city.

1:50,000 2024

October 2024

Boundaries

- The presence of boulevards and railroads fractures public space across Copenhagen especially at the pedestrian level.
- This ranges from the discouragement of residents to cross wide roads to train tracks physical separation of neighbourhoods.
- In contrast, these boundaries are critical to the city's transport network, they facilitate movement across the city.

1:50,000 2024

October 2024

04 Details.

The facades of Copenhagen's city center are vibrant and diverse, featuring colorful townhouses in pastel shades like ochre, blue, and terracotta. Architectural styles range from classical to Baroque, adorned with ornate details like carved cornices, decorative moldings and elegant, multi-paned windows. Each facade tells a unique story of Danish heritage.

1:50,000 2024

October 2024

Facades.

This map shows a route through the Bispebjerg neighborhood. The façades in Bispebjerg are mainly brown and red brick. These buildings were constructed starting from 1900 and are mostly social housing, interspersed with new developments. The overview of the façades clearly illustrates the shades and patterns of the architecture in Bispebjerg.

1:50,000 2024

October 2024

Elements.

In this slide the various elements of the streets in Bispebjerg are displayed. These are typical features that can be found throughout the entire neighborhood and are visible in almost every street.

1:50,000 2024

October 2024

Empty spaces.

These elements are not present everywhere. Within the neighborhood, there are many closed facades at street level, numerous empty streets without any street furniture, and many parked cars along the roads. While there is a lot of greenery in the area, much of it is fenced off as private property.

1:50,000 2024

Copenhagen City

Poster

Marit Smit, Mike Newell, Ludo Swaans, Sjoerd Tekelenburg

This collage combines the various elements, colors, patterns, and materials of the Nordvest Bispebjerg neighborhood. It provides a visual representation of the area's atmosphere, capturing the distinctive features and character of the district. The image highlights the unique textures and architectural details found throughout the neighborhood.

The various texts highlight key conclusions from our research, providing deeper insights into the connections between Copenhagen and our specific design site.

CITY.

Analysis of Copenhagen and Bispebjerg

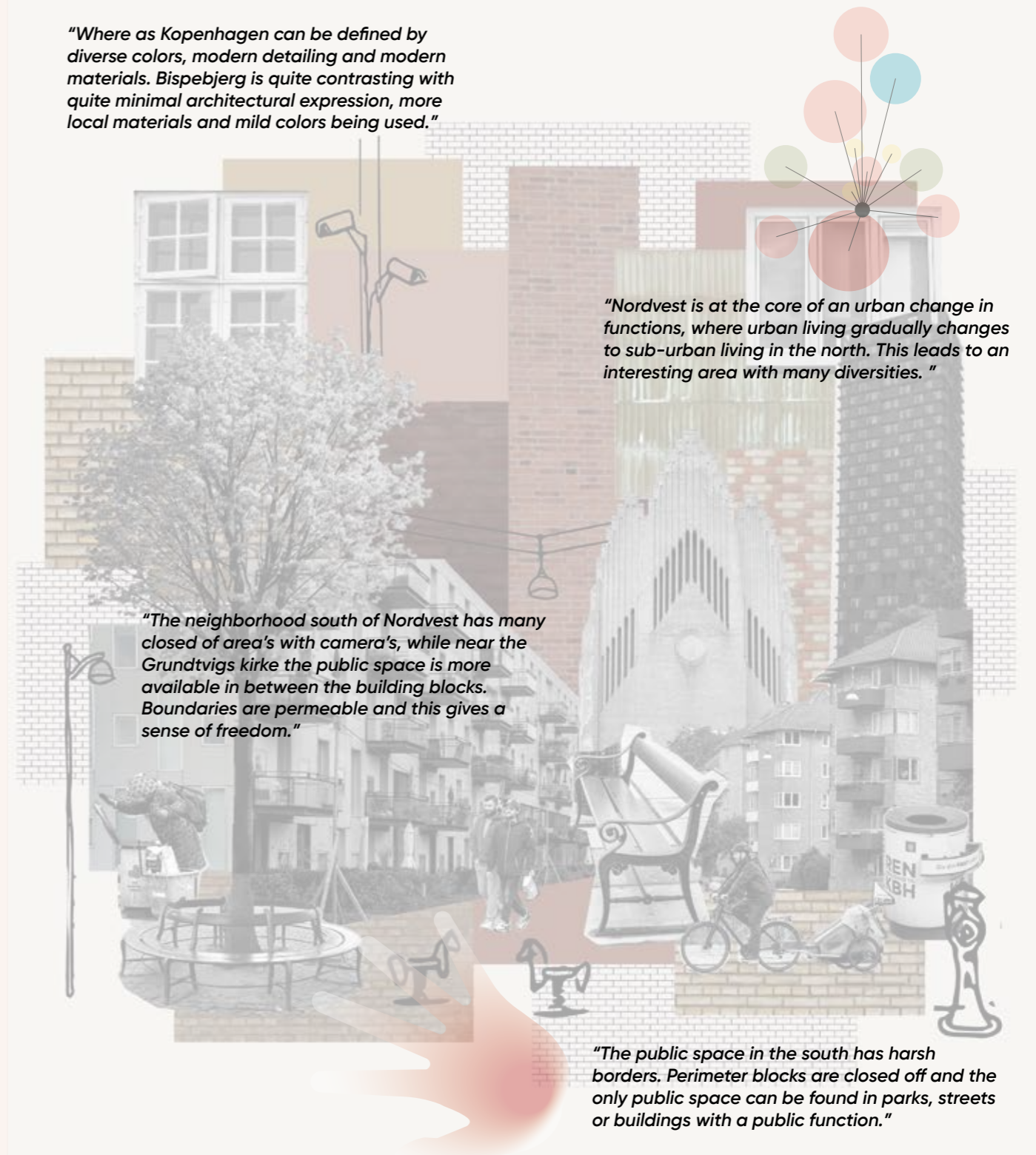
"Where as Kopenhagen can be defined by diverse colors, modern detailing and modern materials. Bispebjerg is quite contrasting with quite minimal architectural expression, more local materials and mild colors being used."

"Nordvest is at the core of an urban change in functions, where urban living gradually changes to sub-urban living in the north. This leads to an interesting area with many diversities."

"The neighborhood south of Nordvest has many closed of area's with camera's, while near the Grundtvigs kirke the public space is more available in between the building blocks. Boundaries are permeable and this gives a sense of freedom."

"The public space in the south has harsh borders. Perimeter blocks are closed off and the only public space can be found in parks, streets or buildings with a public function."

"Bispebjerg has an array of building typologys, ranging from row housing, perimeter blocks to opened blocks. Reflecting modern urbanism, which happened throughout the years to focus more on health, sunlight and permeability."



Diagramming

Theory and Delineation Assignment 3

Analysis of Public Buildings, Green spaces, and Residential Buildings in Bispebjerg.

Marit Smit, Mike Newell, Ludo Svaans, Sjoerd Tekelenburg

This assignment involves creating a 3D diagram as a “visual essay” to illustrate the relationships between different spaces in Bispebjerg. Our group developed three variations, each focusing on a specific aspect of the neighborhood.

The first diagram highlights the green spaces in the area. On the horizontal plane, a map of the neighborhood displays the scale of these green spaces. The front of the box represents the greenery, the left side showcases the activities taking place within these spaces, and the right side illustrates the people interacting with them.

The second diagram focuses on the residential buildings. The base layer shows the location and scale of the buildings within the neighborhood. The front side emphasizes the shapes of the buildings, the left side presents the street views, and the right side highlights the facades and architectural details.

The final diagram centers on public buildings. The front side shows the scale of these buildings, the left side depicts the facades and architectural details, and the right side illustrates the activities and people within these spaces.

Green spaces



Residential Buildings



Public Buildings



Qualitative brief & Quantitative brief

I began by considering both the qualitative and quantitative aspects of the design brief, and then held a brainstorming session to explore initial ideas, focusing on the following questions:

For whom do you design the Public Condenser?

What is the role of this public building in the Copenhagen societal context?

Which core elements define your Public Condenser as a HYBRID?

What are the key sustainability and futureproofing measures you include in your project?

How does the neighbourhood and site research inform your PUBLIC CONDENSER brief?

How will your design merge elements of green, blue, sensory, sociable, and inclusive spaces to enhance overall HEALTHINESS?

The design of the public condenser will focus on three primary objectives: creating, connecting, and discovering. In terms of creation, the space will turn neighborhood waste into resources, embodying the principles of circularity. For example, there could be a makerspace where small businesses repurpose waste into new products, an urban farm where compost is generated from organic waste, and a repair studio where students repair broken items from the community.

In addition, the building will serve as a social hub, offering spaces to connect and interact. This could include a café or kitchen that uses produce from the urban farm, as well as a playground crafted from repurposed materials. Lastly, the space will promote discovery and learning, with workshops, exhibitions, and a reuse shop where old materials can be given new life.

The public condenser aims to embody circularity in both its construction and programs, creating a self-sustaining ecosystem where different functions reuse each other's waste.

This hybrid design will support a community where students, residents, and visitors can learn, create, and connect, reinforcing a culture of circularity and sustainability in everyday life.



Hybridity

Theory and Delineation Assignment 4

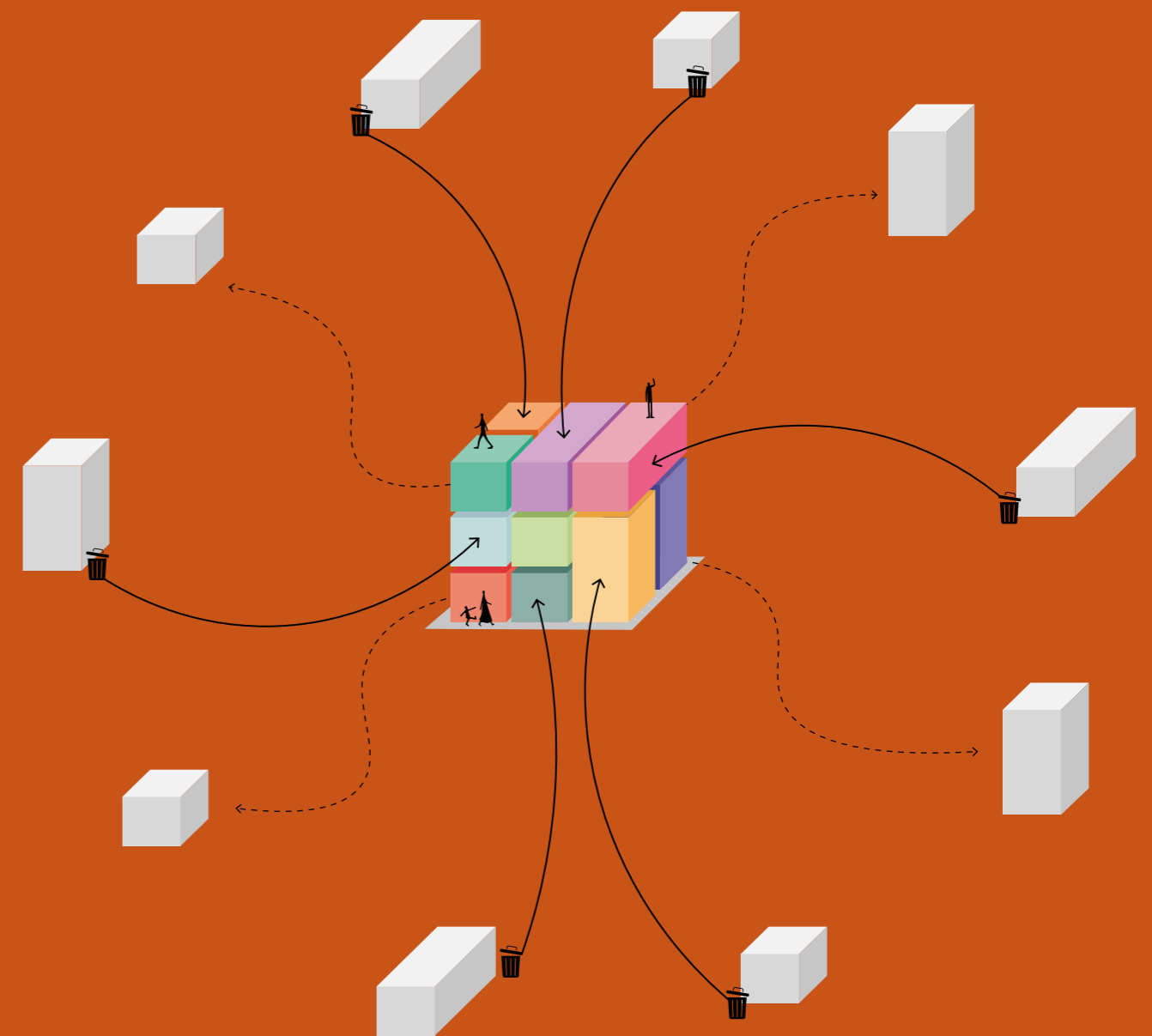
A Circular-Hybrid Public Condenser

The research aims to explore the potential of a circular public condenser, a building concept where neighborhood waste is repurposed as valuable resources for both the structure and the program. The goal is to design a building that operates largely on repurposed materials, creating a sustainable, self-sufficient environment. This space would not only function as a hub for recycling and upcycling but also as a gathering place where community members collaborate to transform waste into useful resources. One person's discarded materials could become valuable inputs for another's projects, fostering a circular economy at the local level.

In Joseph Fenton's 1985 catalogue, a hybrid building is defined as one that connects individual programs, allowing them to share intensities and interact. It's a building that integrates various functions, creating interdependence among them, which encourages social interaction and fosters new connections. The Public Condenser will feature a hybrid program, incorporating various public functions within the building that will contribute to the Bispebjerg neighbourhood. These functions will utilize waste generated by the local community. The aim is to establish a system where different functions also reuse each other's waste to produce new goods for the building or the community. This approach strives to create a closed-loop system in which the functions are interconnected and rely on each other to thrive. By linking the various functions, the building operates as a unified system.

Additionally, research will explore the concept of making the building socially circular. This would involve designing hybrid spaces that can serve multiple purposes throughout the day, adapting to different needs at different times. By merging different elements within a shared space, the building not only serves multiple purposes but also generates a dynamic environment that promotes the exchange of ideas and relationships. This fusion of functions creates a versatile structure that supports both practical needs and social engagement, enhancing community interactions in the process.

This hybrid program can take multiple forms. For example, organic waste from the neighbourhood could be transformed into compost, which would then be used for urban or aquaponic farming, helping to grow food for a communal kitchen. A key aspect of the building is advancing circularity. A repair centre could enable local residents to bring in broken electronics, which students from the Next education centre could repair. Additionally, discarded plastics could be melted down and repurposed into new products for sale in a reuse shop. This approach not only reduces waste but also fosters skill-building, resource-sharing, and community connections. By integrating waste-to-resource processes with educational opportunities, the program promotes environmental awareness while supporting local economies.



Design thinking workshop

1-minute pitch

Problem statement

“How might we designing a circular public condenser for the local residents and the Next school in order to improve social connections and circularity in a fragmented Bispebjerg?”

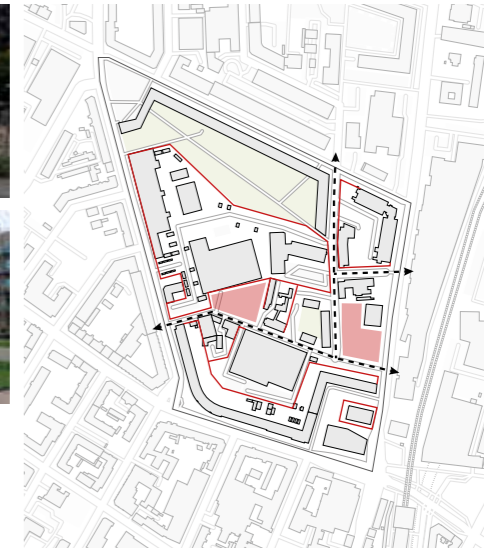
The design site offers an interesting mix of various functions. However, there is limited social connection in the area. One reason for this is that a significant part of the space is fenced off, creating large, inaccessible areas.

One of the key stakeholders in the area is the Next School. The school is enclosed by a fence, and after classes, the space becomes empty. Through my research, I want to explore ways to foster more social connection between the students and local residents.

One of Copenhagen’s goals is to become more circular. In recent years, there has been investment in waste separation in Bispebjerg, but beyond that, little has been done to advance circularity.

To address these issues, my goal is to design a circular public condenser that repurposes neighborhood waste within the design or the community itself. A space where residents and students can come together to turn one person’s waste into valuable resources for others.

Context | Bispebjerg Nordvest

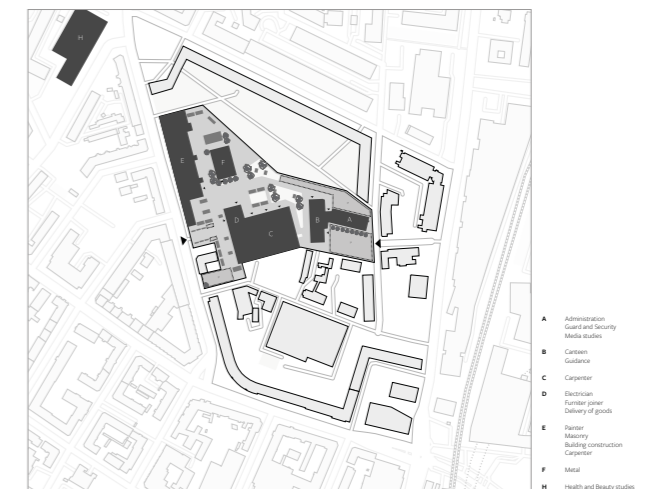


The design site offers an interesting mix of various functions. However, there is limited social connection in the area. One reason for this is that a significant part of the space is fenced off, creating large, inaccessible areas.

Stakeholders and target group | NEXT Vocational School

One of the key stakeholders in the area is the Next School.

The school is enclosed by a fence, and after classes, the space becomes empty. Through my research, I want to explore ways to foster more social connection between the students and local residents.

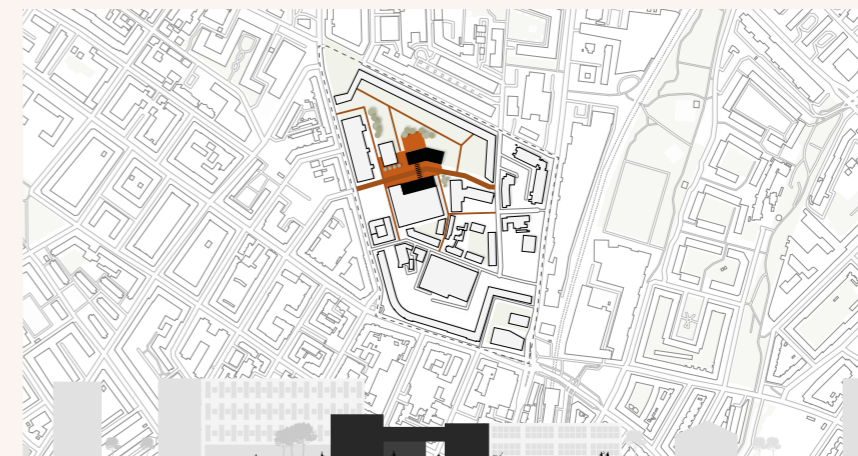
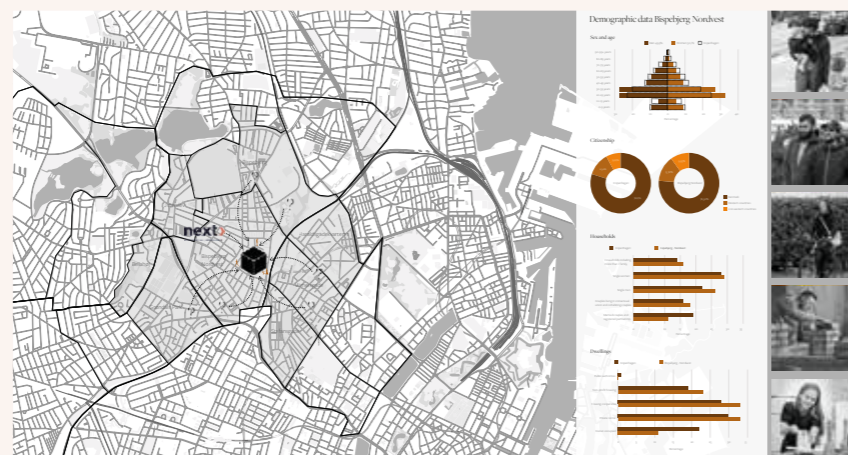
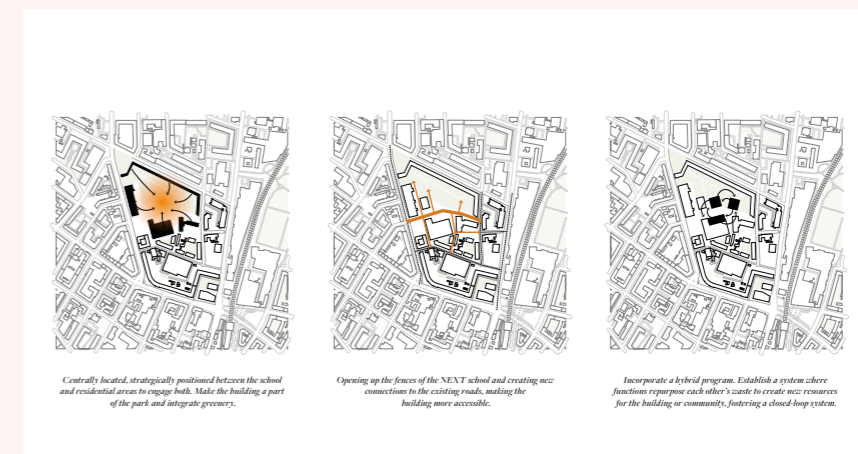
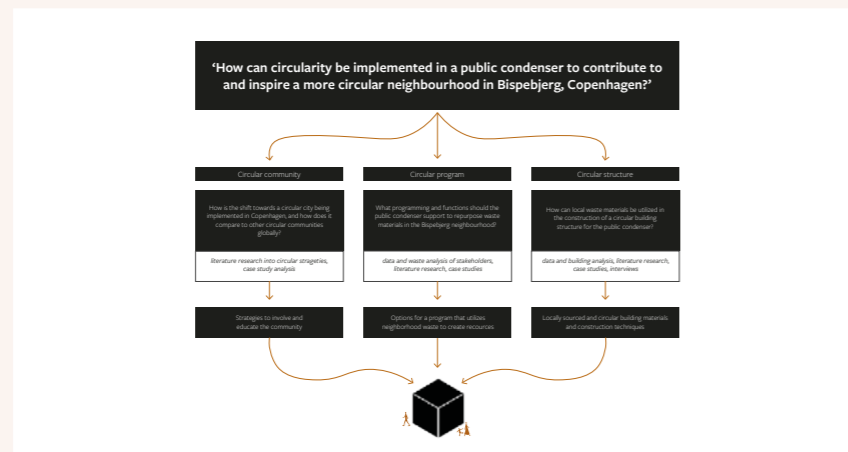
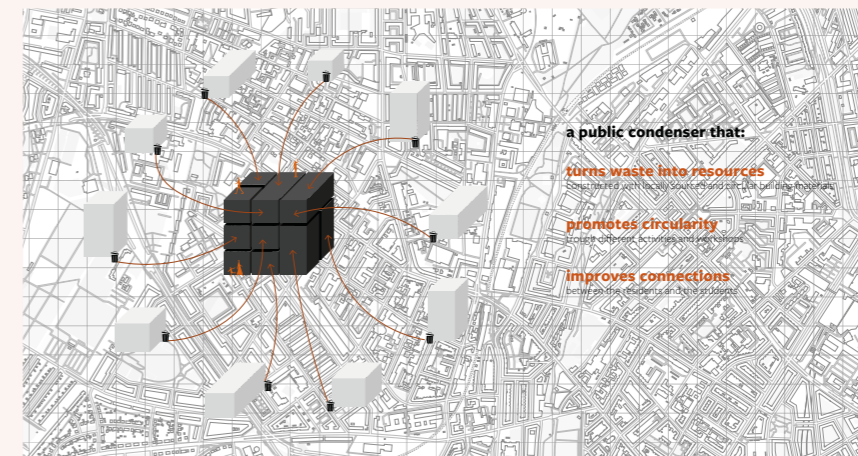
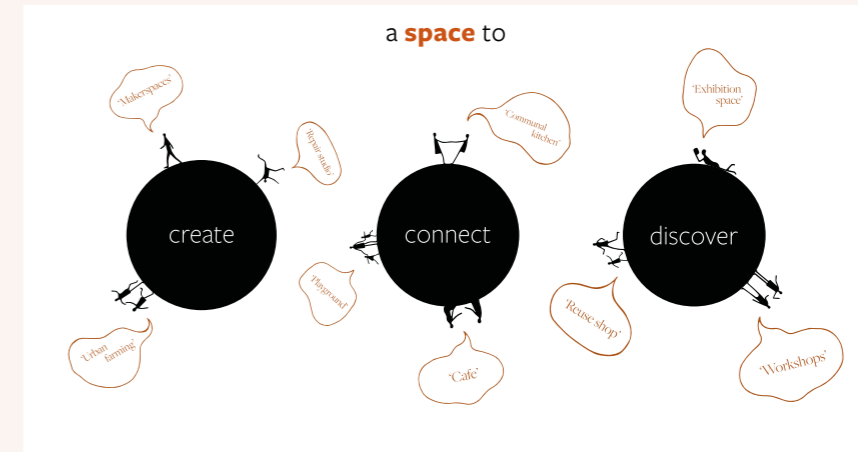


City Goal | Circular Copenhagen

One of Copenhagen's goals is to become more circular. In recent years, there has been investment in waste separation in Bispebjerg, but beyond that, little has been done to advance circularity.



P1



Research plan

'How can circularity be implemented in a public condenser to contribute to and inspire a more circular neighbourhood in Bispebjerg, Copenhagen?'



Research Introduction

This research aims to explore the concept of a circular public condenser—a building designed to repurpose neighbourhood waste as a resource for the structure itself and the program. Positioned in Bispebjerg, the project envisions a public building that integrates multiple functions, providing space for community gathering, learning, and recreation. Through engaging design and practical applications, the building aims to foster environmental awareness and educate visitors on sustainable practices.

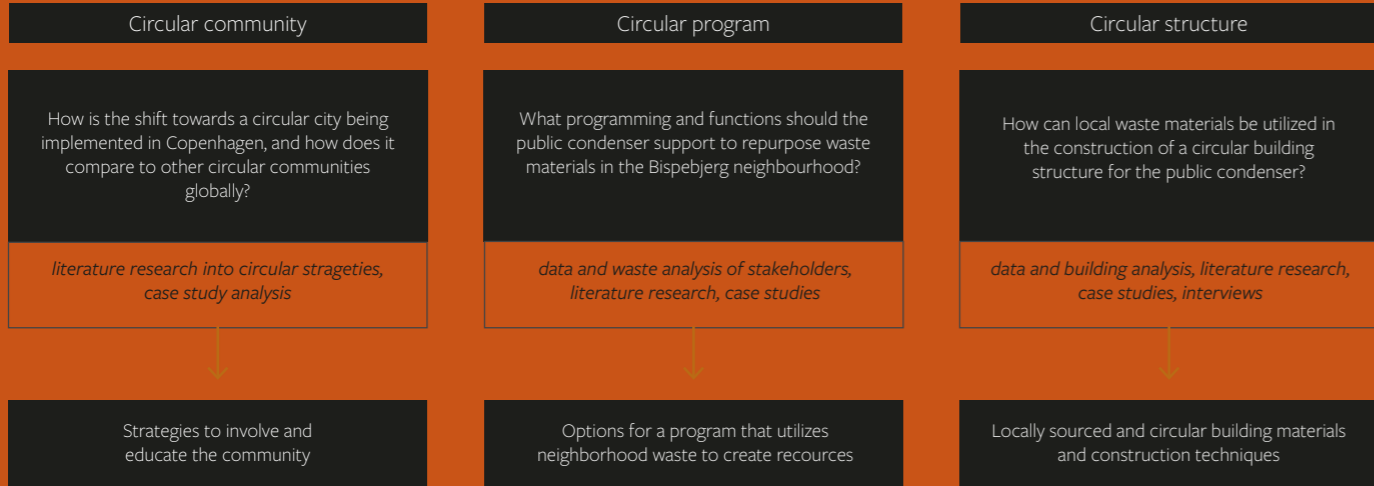
In a circular economy, waste is not discarded but continuously repurposed or regenerated, promoting sustainable use of resources. Materials are reused, refurbished, or recycled rather than extracted, used, and discarded, as in the traditional linear economy (Ellen MacArthur Foundation). This project examines circularity principles, zero-waste strategies, and case studies from around the world to inform and inspire the design. By analyzing local waste management patterns and community involvement, the study identifies opportunities for embedding circular practices within the public condenser.

Problem statement

The extraction of natural resources has surged over the past few decades, tripling globally and driven largely by extensive infrastructure development and high levels of material consumption. This resource-intensive model contributes to the global crises of climate change, biodiversity loss, and pollution, posing significant challenges to both the environment and human health (UNEP, 2024). Cities play a central role in this issue, consuming both of global resources and generating half of the world's waste (World Bank, 2021). In response, the concept of a circular economy has emerged, promoting strategies such as refusing, reducing, reusing, refurbishing, and recycling to minimize resource use and waste generation (Hass et al., 2020).

Denmark launched a national "Strategy for Circular Economy" in 2018 to address these challenges. Copenhagen, in particular, aims to position itself as a leader in the circular economy, focusing on waste reduction, reuse initiatives, and public engagement (Circular Copenhagen, 2020). However, Denmark's economy remains only 4% circular, significantly below the global average of 12%, indicating that only a small fraction of materials re-enter the economy through recycling (Circularity Gap Report, 2024).

As part of its efforts, Copenhagen has launched a waste management plan targeting increased household recycling in Bispebjerg by installing 44 new sorting points with a total of 87 waste containers. Construction is planned to begin in early 2025 (Circular Copenhagen, 2024). Yet, despite these measures, there remains an opportunity to foster a broader culture of circularity through public education on practices such as repair and reuse. A potential partnership with local schools, such as the NECT school, a vocational institution offering diverse programs, could create a collaborative space for circular education. Currently, NECT workshops are isolated due to security concerns. By opening these spaces, Bispebjerg could create a community-centered hub for students and residents to learn about sustainable practices, further advancing the city's circular economy goals. It highlights a clear need to not only improve waste sorting and recycling infrastructure but also foster a deeper cultural shift toward sustainable resource use in Copenhagen.

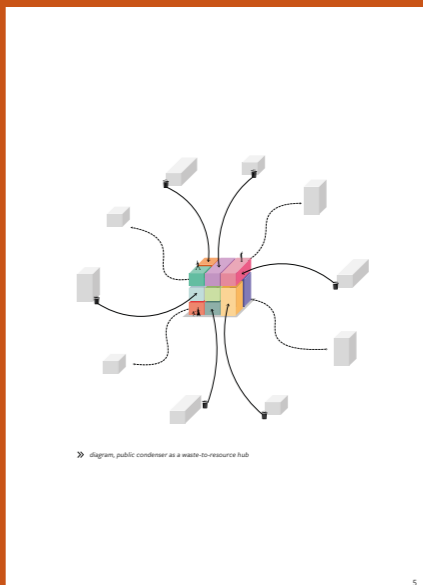


Research Aim

The aim of the research is to explore the potential for a circular public condenser, in which waste from the neighbourhood is repurposed as resources for the building and the community. The objective is to design a building that functions as much as possible on repurposed materials, serving as a space where people can come together to transform one person's waste into value for another.

The research investigates the fundamental concepts of circularity, examining various zero-waste strategies and approaches for implementation. It emphasizes the role of community involvement in this transition by analyzing case studies around the world that engage local populations in sustainability initiatives.

Within the neighbourhood Bispebjerg the research assesses existing actions on waste management, stakeholder involvement, and waste generation patterns to identify opportunities for reusing materials within the condenser. By evaluating the current landscape and proposing what functions are lacking in the neighbourhood, the study aims to propose a program for the public condenser.



Research Question

The main research question is:

'How can circularity be implemented in a public condenser to contribute to and inspire a more circular neighbourhood in Bispebjerg, Copenhagen?'

Circular Community
The first part of the research focuses on gaining a deeper understanding of the ongoing shift towards a circular economy in Denmark. It explores the various zero-waste strategies that can be implemented. Additionally, the research examines the role of community involvement in driving this transition, analyzing case studies to evaluate how communities can actively contribute to creating a zero-waste public condenser.

Circular Program
To identify the appropriate programming for the public condenser and the functions it should support, research is conducted on the existing activities in the Bispebjerg neighbourhood and the types of waste they generate. A stakeholder analysis is performed to evaluate any gaps in these functions and explore how the public condenser can take on new roles to repurpose waste materials as resources. Furthermore, the research investigates the potential for creating a socially circular program, where daytime walk-in cafes transform into community activity spaces in the evening, and educational facilities serve as private event venues.

Circular Structure
To develop a circular building structure, this research explores how local waste can be utilized in the construction of the public condenser. Circular building design emphasizes the use of local waste materials to create sustainable structures, transforming waste streams—such as discarded wood, metal, and organic materials—into valuable resources for construction.

Methodology

Quantitative research
To deepen understanding of the circular economy, the quantitative research will focus on a literature review of key strategies, including waste transformation into various materials and innovative construction techniques using reused materials. This research aims to identify practical methods and successful approaches within circular economies.

A data analysis will examine local businesses in the neighbourhood, focusing on waste patterns and types of materials they produce. Additionally, an analysis of vacant buildings in Copenhagen will be conducted to assess the potential for repurposing materials within these structures. This will help identify feasible materials for circular building applications and support targeted reuse efforts.

To complement this, case studies of established circular structures and communities worldwide will be examined. These case studies will offer insights into effective circular practices and identify challenges encountered in various contexts. The findings will be analyzed to determine which elements could be adapted to Copenhagen's urban landscape.

Qualitative research
Exploring the possibility of conducting interviews and site visits for circular projects in the Netherlands could provide valuable insights. Potential locations include BlueCity in Rotterdam, developed by Superuse, which exemplifies innovative circular practices. Through these visits and conversations, firsthand knowledge of effective circular economy strategies could be gained, offering practical perspectives on challenges and successes.

Research By Design
This research will use a research-by-design approach, combining analysis and imagination to generate architectural ideas. Rather than relying solely on theory, it incorporates projection and speculation, allowing creative exploration. The process will involve comparative studies, topic-specific explorations, and mapping as a source of inspiration. All findings and insights will be documented in a Research-by-Design Journal, capturing the evolution of ideas and the development of the research.

Design brief

The goal of this research is to develop a design for a public condenser in Bispebjerg, Copenhagen. This public condenser will combine educational and recreational functions, supporting diverse activities for the community.

Located in Bispebjerg Nordvest, the design area is a neighbourhood with a varied housing mix. The demographic profile shows a slightly younger population with a higher proportion of residents aged 18-34, more single individuals, and a significant number of residents from non-Western backgrounds compared to the rest of Copenhagen. The public condenser will also integrate with the nearby NECT school, a vocational institution offering programs ranging from carpentry and hairdressing to graphic design and business courses. NECT's vision is to open up its campus, which is currently fenced off due to security concerns, to the local community.

The design of the public condenser will focus on three primary objectives: creating, connecting, and discovering. In terms of creation, the space will turn neighbourhood waste into resources, embodying the principles of circularity. For example, there could be a makerspace where small businesses repurpose waste into new products, an urban farm where compost is generated from organic waste and a repair studio where students repair broken items from the community.

In addition, the building will serve as a social hub, offering spaces to connect and interact. This could include a call or kitchen that uses produce from the urban farm, as well as a playground crafted from repurposed materials. Lastly, the space will promote discovery and learning, with workshops, exhibitions, and a reuse shop where old materials can be given new life.

The public condenser aims to embody circularity in both its construction and program, creating a self-sustaining ecosystem where different functions reuse each other's waste. This hybrid design will support a community where students, residents, and visitors can learn, create, and connect, reinforcing a culture of circularity and sustainability in everyday life.

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Explore the circular strategies currently being implemented at Copenhagen and suggest potential areas for improvement.

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- 2.8 **Building Design**
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Circular Economy & R-Strategies

Research

The concept of Circular Economy

The concept of the Circular Economy (CE) can be difficult to comprehend due to its origins in diverse scientific disciplines and the coexistence of varying interpretations and definitions across industry and academia (Blomsma and Brennan, 2017). In a circular economy, waste is not discarded but continuously repurposed or regenerated, promoting sustainable use of resources. Materials are reused, refurbished, or recycled rather than extracted, used, and discarded, as in the traditional linear economy (Ellen MacArthur Foundation).

The R-strategies

The 2017 PBL Netherlands Environmental Agency Report identifies a series of ten strategies, called the R-strategies, which can lead to the reduction of raw material resources consumption and the production of waste.

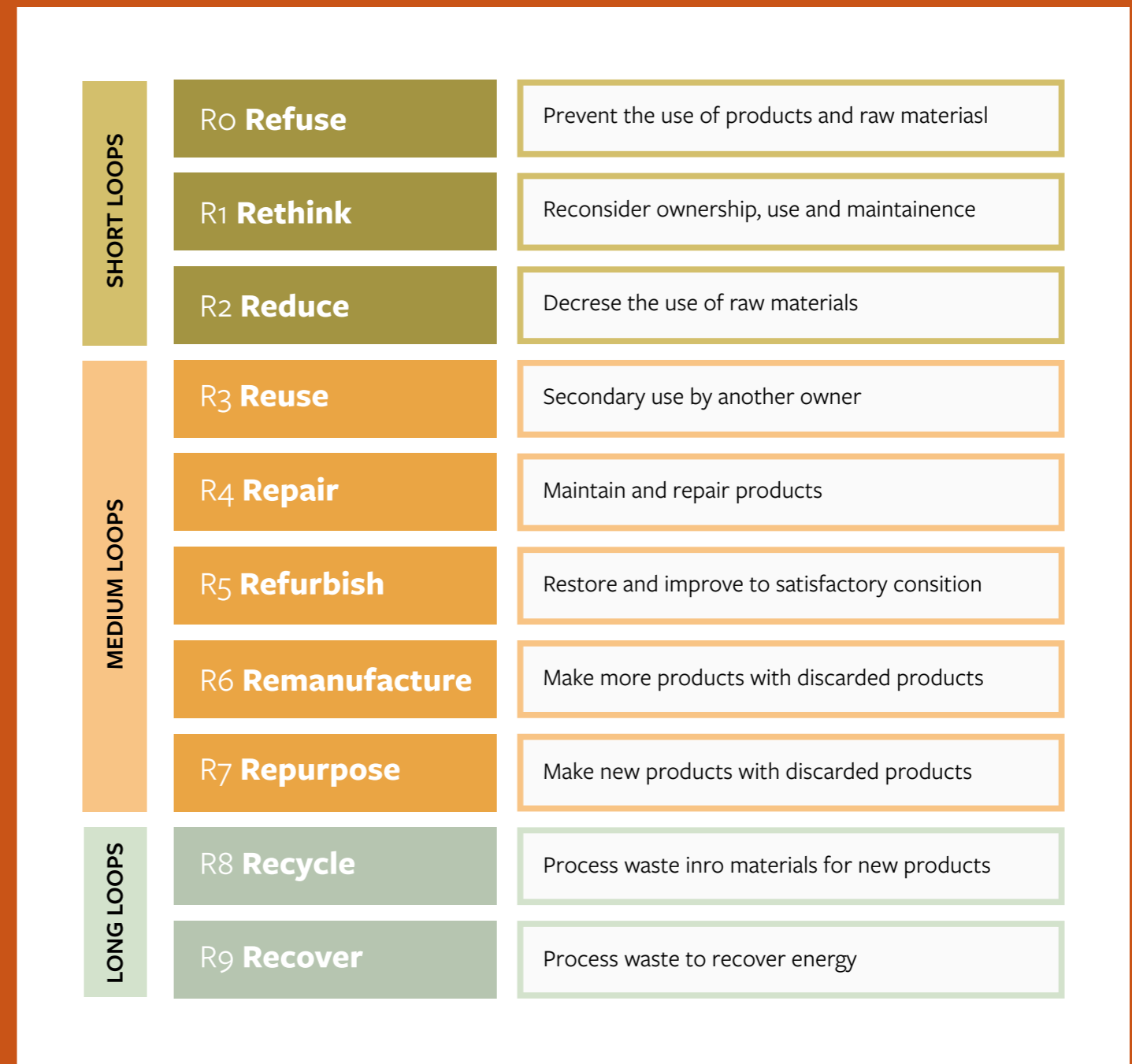
Refuse, Rethink and Reduce refer to smarter product manufacturing. Three strategies form part of this higher level of circularity and apply to the first stages of a product's conceptualization.

Refuse, turning a product redundant by either cancelling its function or by substituting it with a radically different product. **Rethink** alludes to intensifying product use and finally **Reduce** refers to using and/or manufacturing products with fewer resources.

Reuse, Repair, Refurbish, Remanufacture and Repurpose

the second group of R strategies contains those related to prolonging the life-span of materials. These strategies aim to retain the value embedded in products for as long as possible by keeping them in use through maintenance, upgrades, and alternative applications.

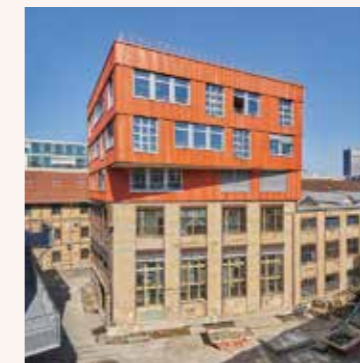
Recycle and recover are the two strategies that refer to the end-of-life scenarios are recover and recycle. Recycling prioritizes recovering materials from discarded products for reprocessing into new materials or products, while recovery focuses on extracting energy from non-recyclable materials through incineration.



Case-studies

First List of Case studies

Case study name	Architect	Year	Program	Location
Tscherning House	GXN	2024	Office	Denmark, Hedehusene
Waste Retreat	Lendager Group	2018	Retreat	Denmark, Odsherred
Karstadt Re-Parked	Lendager Group	2025	Office and Retail	Germany, Berlin
Resource Rows	Lendager Group	2019	Housing	Denmark, Copenhagen
TRÆ	Lendager Group	2023	Commercial	Denmark, Aarhus
Upcycle Studios	Lendager Group	2018	Housing	Denmark, Copenhagen
Denmark Pavilion	Lendager Group	2021	Pavilion	Denmark
People's Pavilion	Overtreders W	2017	Pavilion	Netherlands, Eindhoven
Schoonschip	Space&matter	2021	Housing	Netherlands, Amsterdam
Collectief Ecosysteem Boschgaard	Superuse	2024	Housing	Netherlands, Den Bosch
Nestle	Superuse	2024	Housing	Netherlands, Eindhoven
Villa Wepeloo	Superuse	2009	Housing	Netherlands, Enschede
Kantoor Q-dance	Superuse	2017	Office	Netherlands, Amsterdam
Housing cooperative W1555	Superuse	2022	Housing	Netherlands, Rotterdam
Buitenplaats Brienoord	Superuse	2020	Community center	Netherlands, Rotterdam
Circular Living Room and Temporary Housing	VLOT architecten	2023	Housing	Netherlands, Haarlem
horecapaviljoen	KHV architecten	2024	Restaurant	Netherlands, Noordoostpolder
Circulair Paviljoen ABN AMRO	Architecten Cie	2019	Pavilion	Netherlands, Amsterdam
Kamikatsu Zero Waste Center	Hiroshi Nakamura	2020	Waste station - Hotel - community hall - reuse shop	Japan, Kamikatsu
Brasserie 2050	Overtreders W	2018	Restaurant	Netherlands, Lowlands
Grondstoffenstation	Superuse	2023	Waste station	Netherlands, Rotterdam
BlueCity Offices	Superuse	2017	Offices/Restaurant	Netherlands, Rotterdam
Afrikaanderwijk Coöperatie	Afrikaanderwijk Coöperatie	2013	Community	Netherlands, Rotterdam
I'M Binck	I'M Binck	2017	Community	Netherlands, The Hague



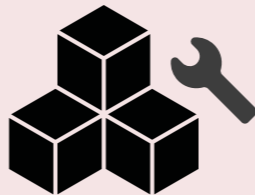
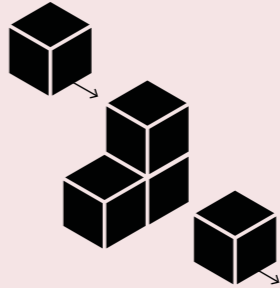
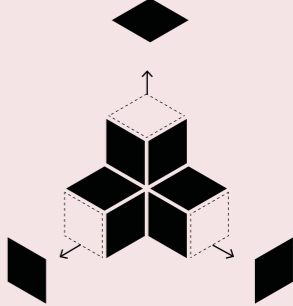


Circular Construction

Circular Design Strategies

The design of the public condenser is centered on circularity, recognizing the construction sector’s critical role in advancing the transition to a circular economy (CE). Achieving this transition requires a comprehensive design approach. For the public condenser, I propose five design strategies aimed at ensuring circularity and minimizing raw material use. These strategies draw from the **Circular Design Guide (2023) by Platform CB’23** and the German **CirCon4Climate (2023)** project, both of which provide frameworks for integrating

circular principles into architectural design. The proposed strategies are organized around three timeframes: The **Past**: Prioritize using existing materials and resources, avoiding the need for new raw materials. The **Present**: Design for reliability and efficient functionality, ensuring the building meets current needs effectively. The **Future**: Enable adaptability and reuse, ensuring the building can evolve or be repurposed as future demands change. By applying these strategies, the public condenser can become a sustainable, circular model for architectural design.

Past	Present		Future	
<p style="text-align: center;">Reuse</p> 	<p style="text-align: center;">Durability</p> 	<p style="text-align: center;">Maintenance</p> 	<p style="text-align: center;">Adaptability</p> 	<p style="text-align: center;">Disassembly</p> 
<p>Designing with Reused materials</p> <p>Designing with recycled materials and waste plays a significant role in reducing the consumption of primary resources. This approach focuses on reusing components from existing constructions, to replace parts that would otherwise be made from primary raw materials.</p> <p>A key aspect of this strategy involves mapping the availability of reusable construction components. Processes can be employed to adapt components to fit their new application more effectively and to repair any wear and tear.</p> <p>Reuse: Use existing materials and products and intergrate them into the design</p> <p>Repair & Refurbish: Materials with the same function again through additional maintenance or refurbishment.</p> <p>Remanufacture: New materials made from old recycled materials</p> <p>Repurpose: Use materials for another function through modification</p>	<p>Designing for Durability</p> <p>Designing durable buildings and components ensures longevity and reduces the need for frequent repairs or replacements, minimizing waste. This approach extends the lifespan of materials, protects existing value, and enhances safety and comfort for occupants.</p> <p>By prioritizing durability, buildings can withstand extreme weather, natural disasters, and other hazards, improving overall quality and resilience. These principles apply throughout the building lifecycle, from initial design to long-term use.</p> <p>Reliability: giving preference to materials with a long lifespan, and use reliable construction methods and materials.</p> <p>Resilience and resistance: building envelope should be designed to withstand wind, rain, and temperature fluctuations, excluding possible corrosion and damage.</p> <p>Autonomous: designed for operational independence from external power grids and water systems.</p>	<p>Designing for Maintenance</p> <p>Design for Repairability ensures that building elements can be easily repaired, replaced, or adapted to changing needs, extending the building’s lifespan. Damaged sections can be upgraded without replacing entire structures.</p> <p>The concept of “cherish” emphasizes creating constructions that users value, encouraging longer use. This approach considers different scales, from entire structures to individual materials, promoting sustainability and adaptability while preserving both functional and emotional value in the built environment.</p> <p>Maintain: The more users appreciate the aesthetics and spatial quality of a construction, the more likely they are to treat it well and to maintain it.</p> <p>Extending lifespan: of the constructions, elements and materials and to reduce the need to disassemble.</p>	<p>Designing for Adaptability</p> <p>Flexible design enables buildings to adapt to changing user needs over time, ensuring long-term functionality and relevance. By accommodating different scenarios across scales, time periods, and functions flexibility prevents obsolescence.</p> <p>Spatio-functional adaptability allows constructions to adjust to shifts in use, while technical adaptability ensures components can be disassembled and reconfigured. This approach supports sustainable, future-proof buildings that remain versatile and efficient.</p> <p>Short-term: adapting to the day-night and seasons changes. Long-term: Adapting to the years and decades .</p> <p>Spatio-functionally adaptive: changes in functions and space requirements.</p> <p>Technical adaptive: connections can be disassembled, and parts are physically independent of each other.</p> <p>Modular design: components that can be easily rearranged.</p>	<p>Designing for Disassembly</p> <p>The principles focus on the end-of-life phase of buildings, emphasizing designs that enable easy dismantling and reuse of components. Assemblies and systems should allow materials to be extracted undamaged for high-quality reuse, viewing the building as a material bank.</p> <p>This approach aligns with Stewart Brand’s Shearing Layers model, which highlights varying lifespans of construction parts, supporting sustainable disassembly, renovation, and the repurposing of materials for other applications.</p> <p>Disassemblable connections: Prefer dry connections and connections with added elements such as screws</p> <p>Separation: of parts by lifespans. elements with shorter lifespans that require interim replacement are not enclosed by elements with longer lifespans</p> <p>Standardization: of dimensions for the elements of the building. standardised connections of construction parts</p>

People's Pavilion | bureau SLA & Overtreders W

Hedehusene Denmark, 2024

The People's Pavilion is a 100% circular building designed to showcase the new circular economy. It was constructed using only borrowed materials, including concrete, wooden beams, lighting, facade elements, and even a glass roof. The materials came from traditional suppliers as well as Eindhoven residents. After the event, all materials, except for the distinctive colored tiles made from recycled plastic waste, were returned to their owners unharmed. The pavilion, without the need for screws, glue, or saws, represents a new sustainable construction approach, emphasizing collaborations and innovative building techniques. It served as the main venue for the World Design Event, hosting various events such as talks, music, and theater. With a capacity of 200 seated or 600 standing, the Pavilion was open to all, free of charge. Its structure, including concrete piles and wooden frames, was designed in partnership with Arup and featured a glass roof used in greenhouse construction.



Tscherning House | 3XN/GXN

Hedehusene Denmark, 2024

Tscherning's new headquarters reimagines office interiors by harmonizing people and materials. Designed by GXN, the project transforms an existing warehouse into a head office that reflects Tscherning's identity as a family-owned deconstruction company. Tscherninghuset demonstrates the potential of limiting materials to those salvaged from demolitions across Denmark, such as bricks from a school in Vridsløse and stairs from another public school. GXN developed a flexible interior design strategy to accommodate the challenges of working with reused materials, emphasizing the value of repurposing demolition waste. Beyond reducing carbon emissions and conserving resources, the project fosters an emotional connection between people and spaces, encouraging users to appreciate the origins of materials around them. The design embraces a circular approach, with aesthetics emerging naturally from reused elements. This mindset prioritizes user experience and well-being, challenging conventional design norms in favor of authentic, meaningful, and enduring spaces.

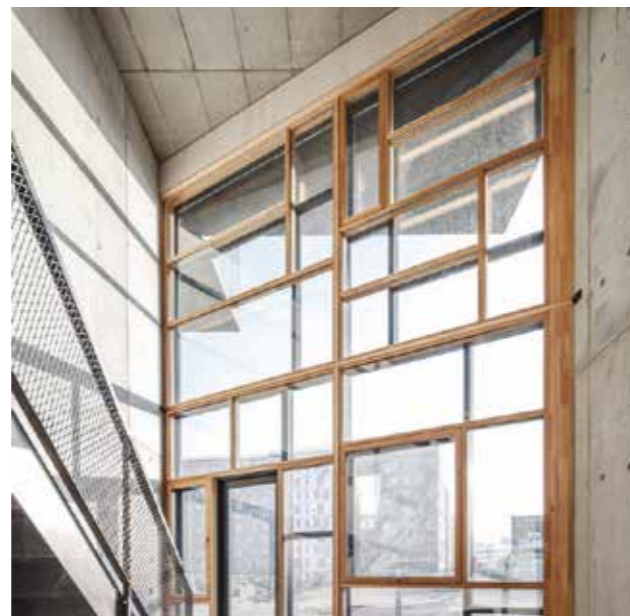


Upcycle Studios | Lendager

Copenhagen, 2018

Upcycle Studios is an award-winning project in Copenhagen's Ørestad district that transforms 3,000 m² of rowhouses into a model of sustainable construction. Built from recycled concrete, repurposed double-glazed windows, and discarded flooring boards, the project reduces CO₂ emissions by 45% and repurposes 1,000 tonnes of waste. Comprising 20 sustainable townhouses, it demonstrates that quality, aesthetics, and affordability need not be sacrificed for sustainability.

The Danish Design Award jury praised the project as a prime example of the circular economy, addressing the construction industry's role in generating up to 35% of global waste. By showcasing innovative design, material reuse, and thorough process documentation, Upcycle Studios sets a benchmark for sustainable architecture. The houses promote sustainable living through flexible layouts, enabling spaces to serve as offices, rental units, or workshops. Roof gardens and solar panels enhance self-sufficiency, encouraging residents to embrace a circular way of life.



Resource Rows | Lendager

Copenhagen, 2019

The 92 flats and rowhouses in Resource Rows prove that reusing bricks and waste wood can be both cost-effective and aesthetically pleasing. This innovative project reduces CO₂ emissions and material waste while fostering strong community bonds among residents. Arranged around a shared courtyard and roofscape, the design incorporates recycled materials without increasing construction costs.

A key innovation is the reuse of brick facades from abandoned buildings, demonstrating that recycling can enhance modern architecture. The shared rooftop features 29 greenhouse huts, made from recycled glass and window frames, where residents can grow food or relax, creating a vibrant community atmosphere. Even the TT beam-bridge connecting the terraces is recycled from a nearby VAX factory. Residents take pride in the project's history, as highlighted by Birgitte and Kim: "We tell everybody about it." Resource Rows is a cost-neutral, sustainable development that quickly became one of Ørestad's most sought-after rentals.



K118 Kopfbau Halle 118 | baubüro in situ

Winterthur, 2021

At the former Sulzer factory site in Winterthur, the Swiss Pension Fund “Stiftung Abendrot” has created K.118, a striking example of climate-friendly, sustainable construction. Shimmering red with reused sectional metal sheeting, the building extends Hall 118 to house 12 studios, think tanks, and a tinkerer’s laboratory, constructed primarily from reclaimed materials: wood, straw, clay, and salvaged components. With construction now accounting for 75% of a building’s lifetime emissions, K.118 focuses on reducing embodied energy. By reusing materials, the project saved 60% of greenhouse gas emissions and 500 tons of primary resources. Its steel skeleton, repurposed from a Basel distribution center, supports the structure, while concrete is used sparingly for static, sound, and fire protection needs. Reclaimed elements, such as staircases, windows, and granite facades from Zurich’s demolished Orion office building, define the building’s character. Prefabricated wooden façade elements, straw bale insulation, and clay plaster ensure adaptability, minimal waste, and a healthy indoor climate. Circular construction at K.118 redefines design, emphasizing flexibility, resourcefulness, and ecological harmony.



ELYS Kultur- & Gewerbehaus | baubüro in situ

Basel, 2021

For the Elys cultural and commercial building in Basel’s Lysbüchel district, Baubüro in situ constructed a 1,000 m² wood-framed façade primarily from reused building components. Transforming the former Coop distribution center, the architects minimized structural interventions, avoiding 91 tons of CO2 emissions through material reuse. An additional 7,000 tons of CO2 were saved by preserving the existing structural system. To bring natural light into the 88 x 86 m footprint, a light well was added at the building’s core. About 40% of the wood-framed façade was built using salvaged purlins, rafters, and glued laminated timber beams, repurposed from local deconstruction projects. Rock wool insulation cut-offs and 200 energy-compliant reclaimed windows, sourced within a 100 km radius, were incorporated.

The structure now houses a mix of uses, including a café, stores, production spaces, a bouldering hall, and sports facilities for a nearby school, showcasing circular design and flexible interiors.

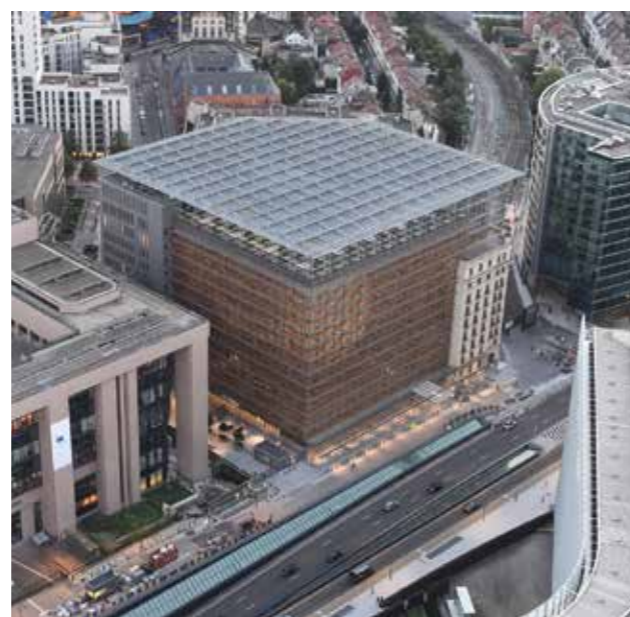
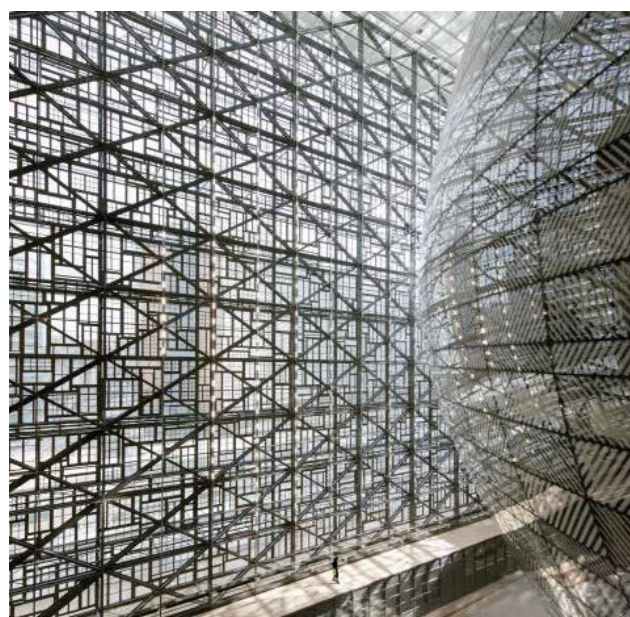
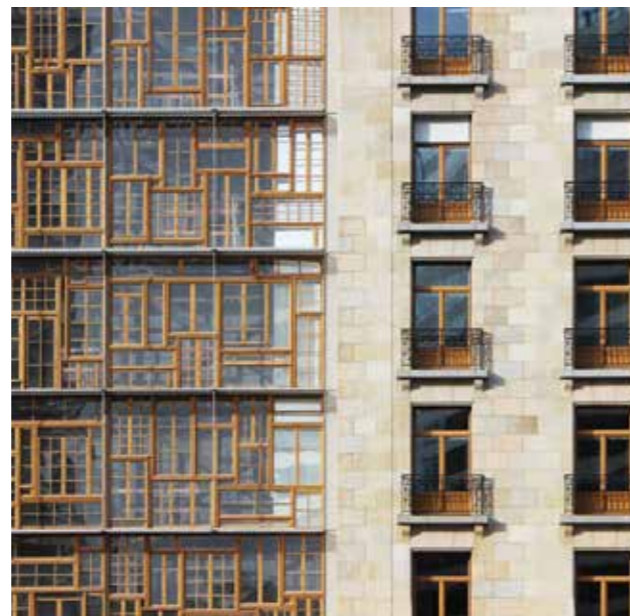


EUROPA | Samyn and Partners

Brussels, 2016

Following the 2004 European Union enlargement, the Justus Lipsius building became too small for the growing needs of the Council. As mandated by the Treaty of Nice, all sessions must be held in Brussels, which required additional real estate. In response, the Belgian government proposed Block A of the Residence Palace complex as the future home for both the European and the Council of the EU. The building required significant reorganization to accommodate the Council's bi-weekly and quarterly sessions, along with spaces for the presidency, delegates, and the international press.

In 2004, a European architecture competition was held, with Philippe SAMYN and PARTNERS, along with Studio Valle Progettazioni and Buro Happold, winning the project. The design features a glass atrium and a lantern-like volume housing key meeting rooms, with sustainability in mind. The building's façade includes recycled oak window frames, contributing to its energy efficiency

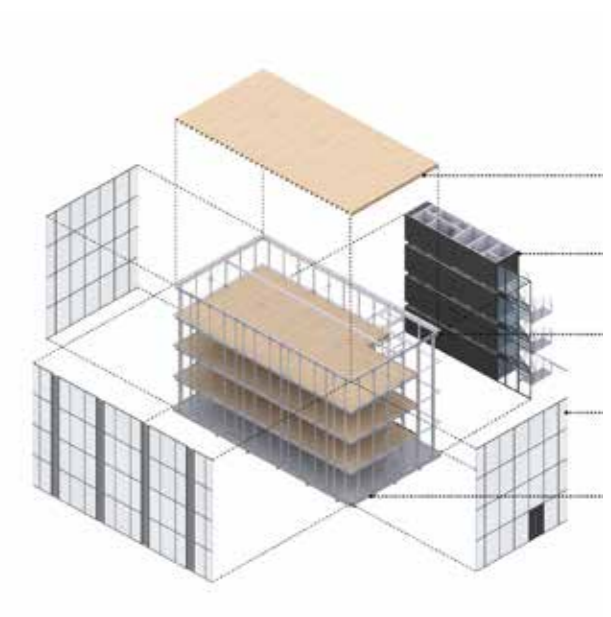
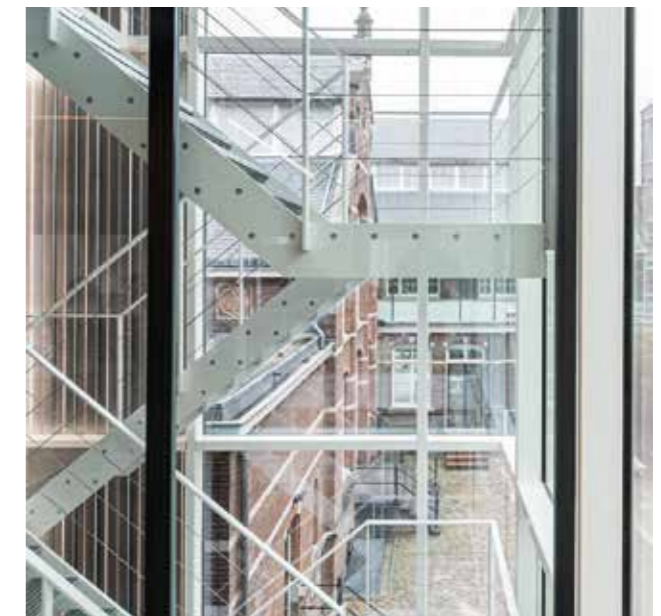


D(emountable) | cepezed

Delft, 2019

Building D(emountable) was designed with efficiency and rationality in mind, utilizing a prefabricated steel supporting structure. Its lightweight floors and roof are made of Laminated Veneer Lumber (LVL), with the visible LVL ribs contributing to the building's aesthetic. The organic screed is a dry, easily removable system made from gravel-like granules in a honeycomb structure, topped with gypsum fiberboards and finished with partially recycled PVC flooring.

The building features a frameless facade with double-layer insulating glass mounted directly onto the steel structure, providing clear views both inside and out. Fresh air enters through vertical slats, and the building remains largely fire-resistant, with minimal fireproofing materials needed. A heat exchanger in the ceiling helps manage both heating and air conditioning, while roller blinds offer sun protection. The entire structure was completed in just over six months, thanks to efficient communication and in-house expertise, ensuring high-quality results throughout the process.



The Natural Pavilion | DP6

Almere, 2022

The Natural Pavilion is a near 100% biobased, circular, and fully demountable structure that can be reconfigured and relocated. Designed for the Dutch National Government's Pavilion at Floriade Expo 2022, it addresses key challenges faced by the Netherlands, including energy transition, housing shortages, sustainable agriculture, biodiversity restoration, and climate adaptation. The pavilion showcases innovative bio-based construction to promote the widespread use of such materials. Its design features two main elements: a framework of indigenous wooden beams connected by universal steel connectors, and a flexible infill of bio-based and reused materials like wooden floors, bio-based walls, and reused glass windows. This modular setup allows for easy dismantling and rebuilding in different configurations. After the expo, it will serve as an exhibition space and film theatre in Dutch nature reserves, eventually becoming part of the FlevoCampus sustainable food project. The pavilion also features minimal technical installations, with optimized natural ventilation and cooling through wooden louvers and roof windows.

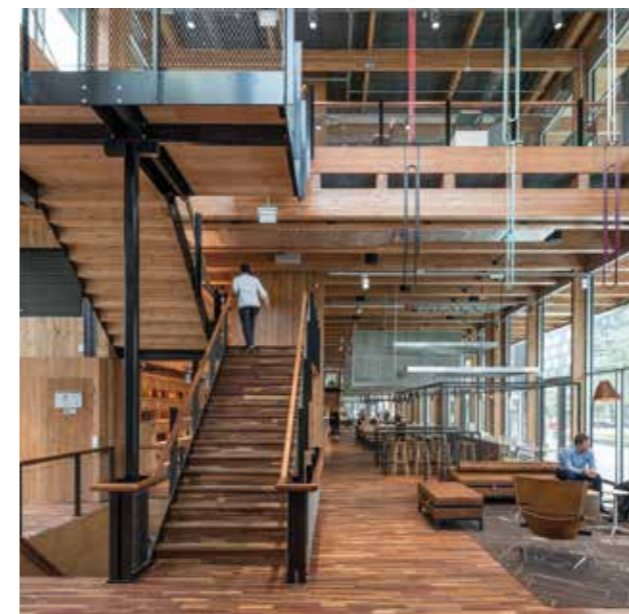


Circl Pavilion | Architekten Cie

Amsterdam, 2016

The 'Circl' pavilion stands as the first fully realized example of sustainable, circular design in the Netherlands. From the beginning, the project incorporated material reuse into its planning process. The collaboration between ABN AMRO, TU Delft, and BAM allowed the team to solve challenges and ensure the building's circularity. The dedication of all involved made the realization of a truly circular structure possible.

Located at Gustav Mahlerplein in the Zuidas district, near Station Zuid and ABN AMRO's headquarters, the pavilion features a prominent glass facade, creating an open and inviting atmosphere. Public access is facilitated by broad steps that lead to a rooftop garden with a bar, offering a space for both employees and visitors to meet. Circl spans over 2,000 m², offering meeting and workspace areas, along with a ground-floor restaurant that highlights a unique circular approach, making it a valuable addition to the Zuidas area.



Circular Program

Zero waste barn | Overtreders W

Lowlands, 2018

Overtreders W designed a temporary barn made entirely from borrowed materials to host Brasserie 2050, a zero-waste pop-up restaurant at the 2018 Lowlands Festival in the Netherlands. Created for catering company The Food Line Up, the restaurant explored sustainable eating to support a global population of 10 billion by 2050. The menu featured eco-friendly dishes like “no waste” bread made from potato peels and pesto crafted from kitchen scraps.

The “barn of the future” was built using rented standard construction materials that retained their value after the structure was dismantled. The design embraced the timeless image of a barn, symbolizing evolving farming methods. With vertical farming cabinets, crates of grain as ballast, and herb boxes integrated into the open facade, the structure demonstrated closed-loop architecture. Inside, recycled plastic furniture and suspended crops such as wheat and onions served both practical and decorative purposes, emphasizing sustainability and resourcefulness.



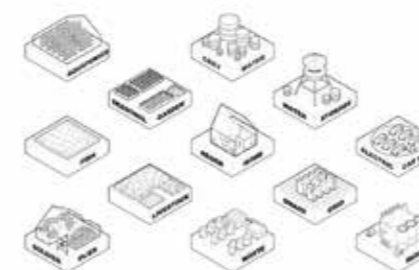
ReGen Villages | EFFEKT

Almere, 2016

ReGen Villages introduces a visionary model for self-sufficient, off-grid eco-villages that integrate systems to power and feed families sustainably. “Regenerative” refers to the design’s circular approach, where the waste from one system becomes the input for another. These villages combine technologies such as energy-positive homes, renewable energy, organic food production through vertical farming and aquaponics, water management, and waste-to-resource systems. This holistic approach aims to tackle challenges like population growth, urbanization, resource scarcity, the global food crisis, and CO2 emissions. By integrating existing technologies into a community-focused design, ReGen Villages provide clean energy, water, and food directly to residents, easing the burden on municipal and national infrastructures. Beyond environmental and financial benefits, ReGen Villages foster social value by empowering families, reconnecting people with nature, and building a shared ecosystem. They create a community framework where sustainable living and production are seamlessly intertwined.



Program Layout



ReGen System

How does the system of the ReGen village work?

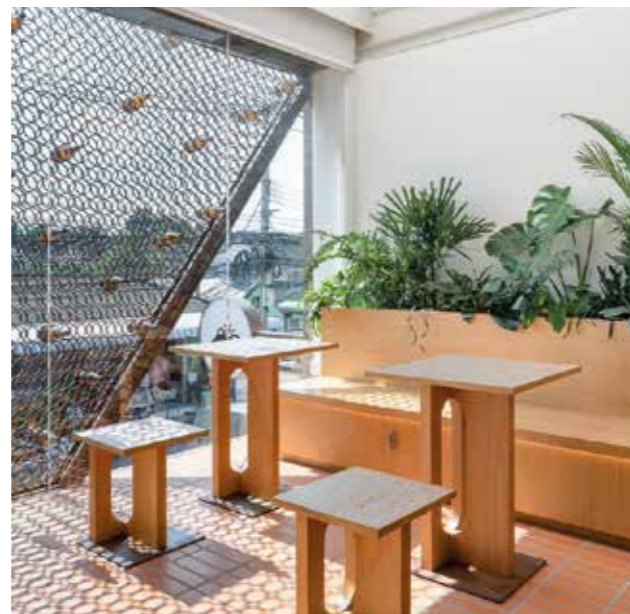


Zero waste community cafe | space+craft

Bangkok, 2022

Early BKK is a community café in Bangkok, founded by Kaytita Chaisuksiri, with a focus on sustainability and green living. Situated in a vibrant neighborhood of multigenerational families and pets, the café aims to promote recycling and eco-friendly lifestyles rather than focusing solely on profit. Upcycled materials play a key role in its design, addressing waste management challenges. Spacecraft, the design team, used local waste materials like milk cartons and beer bottles creatively. Milk cartons were transformed into “re-board” panels used for doors, ceilings, furniture, and interiors in warm orange tones to complement handmade brick floors. Approximately 600 beer bottles were repurposed for the façade, creating captivating light effects, while broken bottles were incorporated into terrazzo countertops, toilet floors, and unique “bottle fossil” wall patterns.

The two-story café features a welcoming courtyard with a pet-friendly area. Inside, the first floor hosts a coffee bar and retail section, while the second floor offers seating and a flexible workshop space with ample ventilation.



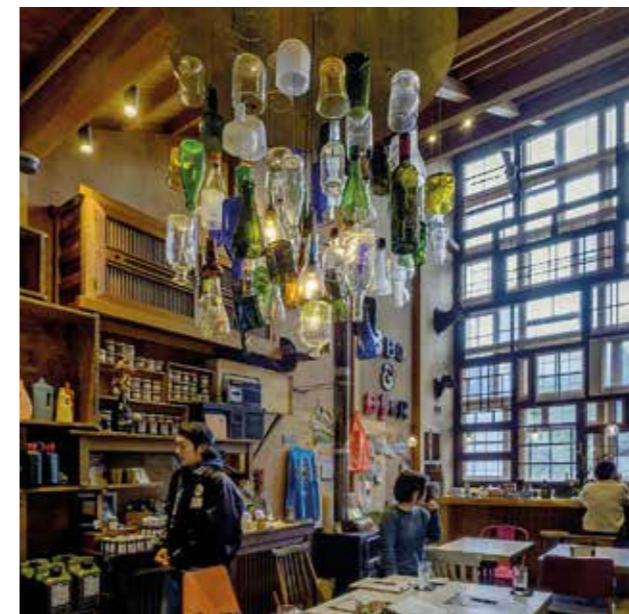
Kamikatsu Zero Waste Center | Hiroshi Nakamura

Kamikatsu Japan, 2024

Kamikatsu, a town in Tokushima Prefecture, is committed to becoming a zero-waste community, with an impressive recycling rate of 80% by sorting waste into 45 categories. Used items are displayed at the recycling center like a store, creating a model for sustainable living that has gained global attention.

The town’s core facility combines a recycling center, trash sorting station, and an educational hub for promoting the zero-waste movement. The building was designed to minimize waste, using locally harvested cedar logs in their original form to reduce wood waste and lower the carbon footprint. Its timber-framed structure can be downsized in the future as trash volumes decrease, thanks to its modular design and bolted joints for easy maintenance and sorting.

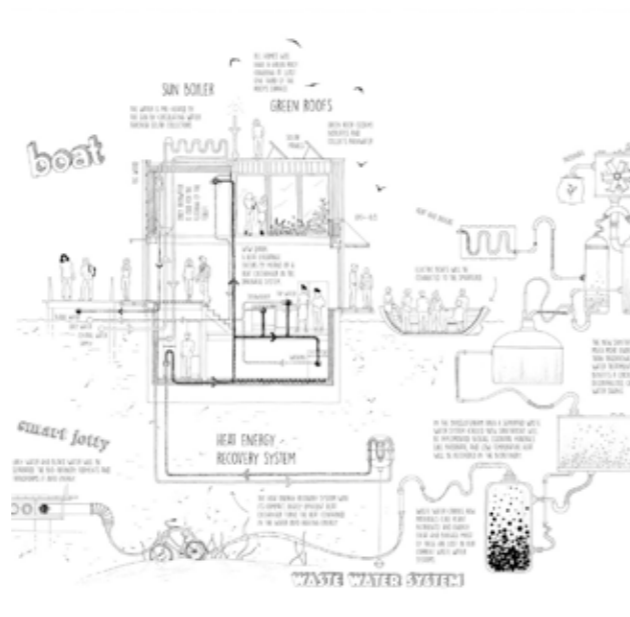
Recycled materials, like discarded furniture and farming tools, were repurposed for the building’s exterior and fixtures. Glass bottle cullets were used in terrazzo, creating a space rich in history and sustainability.



Schoonschip | Space&matter

Amsterdam, 2021

Schoonschip is a visionary circular neighborhood on water, created by a group of enthusiasts striving for a sustainable and close-knit community. Initiated in 2010 by Marjan de Blok, the project aimed to establish an energy-neutral neighborhood, eventually completed in 2021. Schoonschip comprises 30 water plots, housing over 100 residents, with 46 unique houseboats individually designed by each household alongside their chosen architect. Half of the boats are shared by two families, fostering collaboration and connection. The urban plan, developed by Space&Matter with multidisciplinary experts, includes a smart jetty that connects homes and facilitates community interactions while linking essential infrastructure. Residents share resources like electric cars, cargo bikes, and solar-generated energy through a smart grid. The neighborhood addresses climate challenges with eco-efficient homes, decentralised energy and waste systems, and submersed heat exchangers. Schoonschip embodies creativity, sustainability, and community, setting a model for innovative, climate-conscious living.

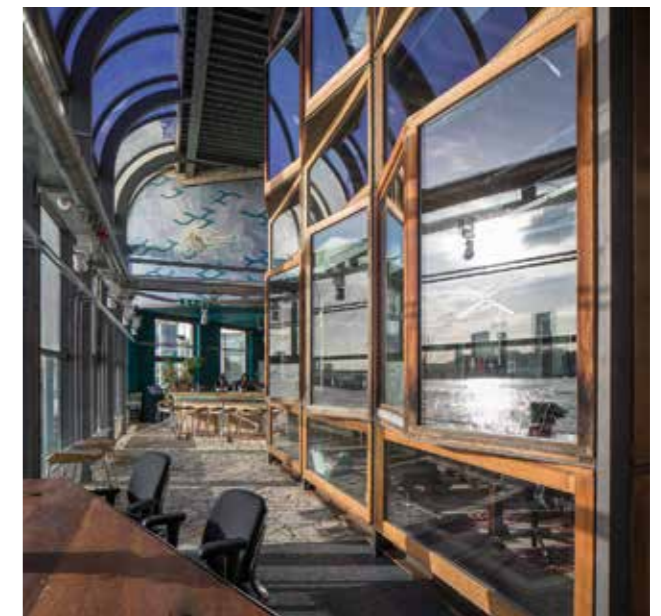
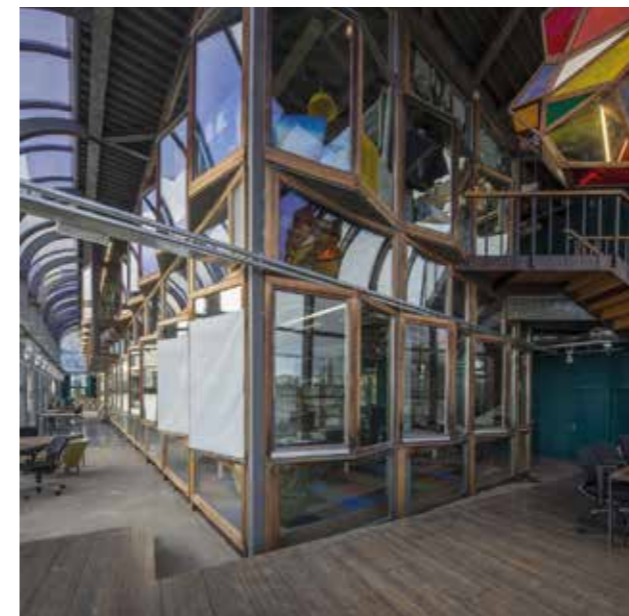


BlueCity Office | Superuse

Rotterdam, 2017

On 31 March 2017, BlueCity opened its office wing in the former Club Tropicana, transforming the first part of the subtropical swimming paradise Tropicana in Rotterdam. This 1300-square-metre space was redesigned into 100 circular workplaces, ranging from shared to private offices. The project, led by COUP, Superuse, and Workspot, supports innovative companies advancing the circular economy. Eye-catching features include partition walls made from repurposed window frames, designed based on the harvested frames' dimensions.

Various circular design offices, freelancers, foundations, and a branch of Rotterdam University of Applied Sciences now occupy the space. The offices complement the production areas and BlueCity Lab within the building. The transformation, 90% circular, prioritizes reused materials such as window frames and steel, along with renewable European structural timber. Broken glass was replaced, and conventional hinges and locks were used, setting a sustainable precedent for the pool-to-model-city redevelopment.



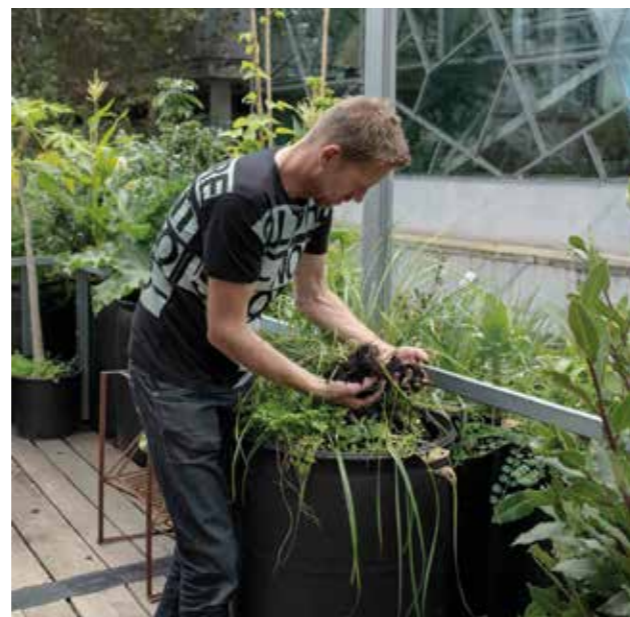
Future Food System | Joost Bakker

Melbourne, 2020

Joost Bakker's futurefoodsystem reimagines the home as an ecosystem that provides shelter, energy, and nourishment. After 25 years of experimentation and five years of planning, this eco-innovative concept showcases how changing the way we build, live, and eat can create a positive impact.

The structure, inspired by ancient homes, features a soil roof that insulates, supports food production, and creates habitat. Built from natural and recyclable materials, it is both organic-certified and resilient.

The system mimics nature by transforming waste into energy and nutrients, growing over 250 species, including plants, fungi, insects, snails, fish, and crustaceans. This closed-loop design demonstrates sustainable living, reducing waste while producing nutrient-rich food.



WasteLand | Lendager

Copenhagen, 2017

Wasteland is a traveling exhibition that has toured Denmark, Sweden, Norway, and Italy, showcasing a future where waste is reimagined as a valuable resource for urban development. Curated by Lendager, it highlights innovative examples of turning residues into primary building materials for cities, homes, and communities.

The exhibition features inspiring projects such as facades made from old newspapers, floors crafted from cork stoppers, and houses relocated from abandoned areas to urban centers. It emphasizes the aesthetic potential of sustainable design, demonstrating how new principles can create modern, detailed, and visually striking architecture.

Using familiar materials like plastic, wood, concrete, brick, glass, and metal, Wasteland follows their transformation from waste into high-quality resources. Through this engaging format, the exhibition aims to reshape perceptions of waste, inspiring visitors to see it as a valuable tool for building a sustainable and aesthetically rich future.



The Green House | cepezed

Utrecht, 2018

In 2014, cepezed transformed the former Knoopkazerne in Utrecht into a modern government office and addressed the adjacent vacant space by creating a temporary, circular building: The Green House. Designed to activate the area for 15 years, this two-storey pavilion houses a circular restaurant concept, meeting facilities, and an 80-square-meter vertical farming greenhouse that supplies the restaurant with fresh produce. The Green House is entirely dismantlable, allowing it to be relocated and rebuilt elsewhere. Constructed with a galvanized steel frame and reusable materials, it incorporates elements from the former Knoopkazerne, such as smoke glass facade panels. The ground floor features street clinkers from an old quay in Tiel, while the first floor uses prefabricated wooden elements.

A transparent glass curtain wall enhances the building's aesthetic, while a green wall and solar panels further underscore its sustainable design. The Green House exemplifies innovative, temporary architecture rooted in circular principles.



Grondstoffenstation | Superuse

Rotterdam, 2023

The Grondstoffenstation in the Netherlands is a pioneering resource station that promotes sustainability and community engagement. Built entirely from recycled materials, it collects and separates residual flows from the Afrikaandermarkt, enabling reuse and recycling. Market vendors bring in waste, which is sorted, while edible leftovers are offered for free to individuals and food banks. The station is also a community hub, featuring a running track, free run area, and a grandstand overlooking the Cruyff court. Rainwater collected in IBC tanks irrigates nearby school gardens and the Tuin van de Wijk. Constructed from reused materials, including stelcon slabs, steel profiles, HPL sheets, and playground safety tiles, the entire structure is demountable to minimize its carbon footprint. The project strengthens the local economy by employing residents in need of jobs and fosters a closer connection between the market and the Afrikaanderwijk neighborhood, making Rotterdam-Zuid more sustainable and socially cohesive.



Waste Management



Nærgenbrugsstationer (Local recycling stations)

A local recycling station is a smaller recycling station located centrally in the city. Here you can give and take free items for recycling (e.g. furniture, kitchen items, toys, books, etc.), and sort selected types of waste for recycling.

You can borrow a tow truck, and in some places a cargo bike, to transport your recyclables to and from your home. Contact the staff at the recycling station about the possibility of borrowing one.

Unfortunately, there is no space for a car or trailer at the local recycling station.

You cannot drop off construction waste and sanitary equipment (e.g. toilets and sinks) at the local recycling station. You must drop them off at one of the large recycling stations.

Genbrugsstationer (Recycling stations)

There are five recycling stations in Copenhagen. Here you can drop off and sort your waste into over 30 fractions.

All major recycling stations also have areas where you can give and take free items for recycling. If you are unsure about what can be recycled, you can always ask the staff.

Nærgenbrugsstationer

There are 12 local recycling stations. A local recycling station is a small recycling station that can accept small amounts of sorted waste and recycling from private households. Commercial waste is not accepted and there is no space for cars or trailers. The local recycling station is for pedestrians or cyclists only. At the local recycling stations you can sort your waste into 12 different fractions:

Recycling, Hazardous waste, Electronics, Large furniture, Metal, Paper, Cardboard, Glass, PVC, Outdoor & Indoor Wood, Plastic food and beverage cartons, Textiles.

Gartnergade is the oldest local recycling station, it opened in 1998 and in September 2020 it was optimized with a new large exchange space and library. The place has the largest share of exchange items exchanged between Copenhageners every day.

At **Langgade**, which is the newest Local Recycling Station in Copenhagen (opened in 2022), there is a large urban space with a playground in connection with the local recycling station. The exchange room has room for lots of swapping items, both inside and outside, and there is a special section just for children. There is a large workshop where it is possible to hold slightly larger events. There is a large room for sorting bulky waste and garbage, where it is also possible to show films on the projector.

Møllegade is the most visited local recycling station in Copenhagen, here you will find the largest exchange room with lots of clothes, books and furniture. Outside there is a shelf where you can put your things for exchange outside opening hours. The local recycling station is part of an open urban space next to ByOasen.

At **Nordhavn** Nærgenbrugsstation you can make use of our repair workshop, where you can repair your bike, or borrow various tools. The space is designed as a circle, so you can easily sort your waste by walking around. In the middle of the circle is the large exchange room.

At the Østerbrohuset, you can visit the pink exchange room and get your own Instagram photo with your new recycled find. There is also the opportunity to poke your head past the colorful workshop with beautiful chandeliers, where activities are held regularly run by active volunteers and associations.



1 | Tingbjerg Nærgenbrugsstation



5 | Gartnergade Nærgenbrugsstation



9 | Hørgården Nærgenbrugsstation



2 | Haraldsgade Nærgenbrugsstation



6 | Langgade Nærgenbrugsstation



10 | Remiseparken Nærgenbrugsstation



3 | Nordhavn Nærgenbrugsstation



7 | Enghave Nærgenbrugsstation



11 | Charlotte Amundsens Plads Nærgenbrugsstation



4 | Møllegade Nærgenbrugsstation



8 | Christiania Nærgenbrugsstation



12 | Østerbrohuset Nærgenbrugsstation

Genbrugsstationer

There are five recycling stations in Copenhagen. Here you can drop off and sort your waste into over 30 fractions. All major recycling stations also have areas where you can give and take free items for recycling. If you are unsure about what can be recycled, you can always ask the staff.

Waste types

Construction waste

- Bricks
- Asphalt
- Concrete
- Sanitation
- Plaster
- Windows
- Wall Tiles
- Mineral wool

Electronics

- Cables
- TVs and Monitors
- Appliances
- Small Electronics
- Medium-sized electronics

Dangerous

- Eternit (Asbestos)
- Hazardous waste
- Car batteries
- Light sources

Recycling

- Clothes

Glass

- Packaging glass

Textile

- Upholstered furniture

- Textile waste

Metal

- Metal

Nature

- Earth
- Garden waste

Cardboard

- Cardboard
- PMDK

Paper

- Paper

Plastic and rubber

- Plastic wrap
- Milk crates
- Tires
- Hard PVC
- Hard plastic

Wood

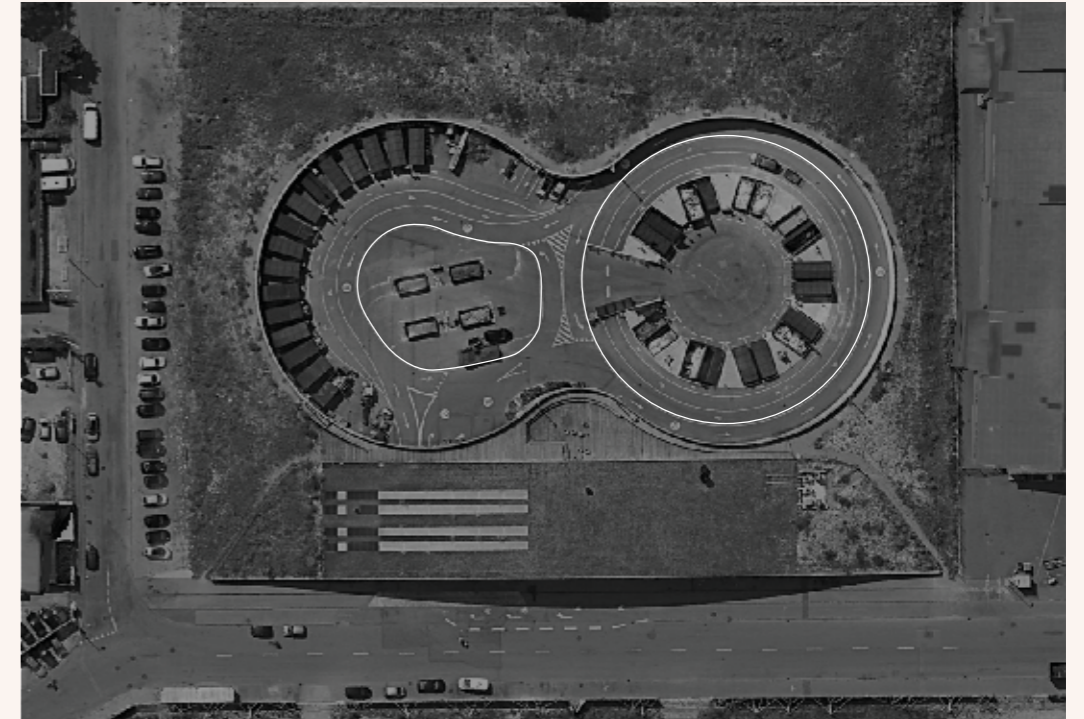
- Unpainted wood
- Painted and impregnated wood
- Euro pallets

Rest

- Remainder after sorting
- Waste to landfill



Vermlandsgade Genbrugsstation



Sydhavn Genbrugscenter



Borgervænget Genbrugsstation

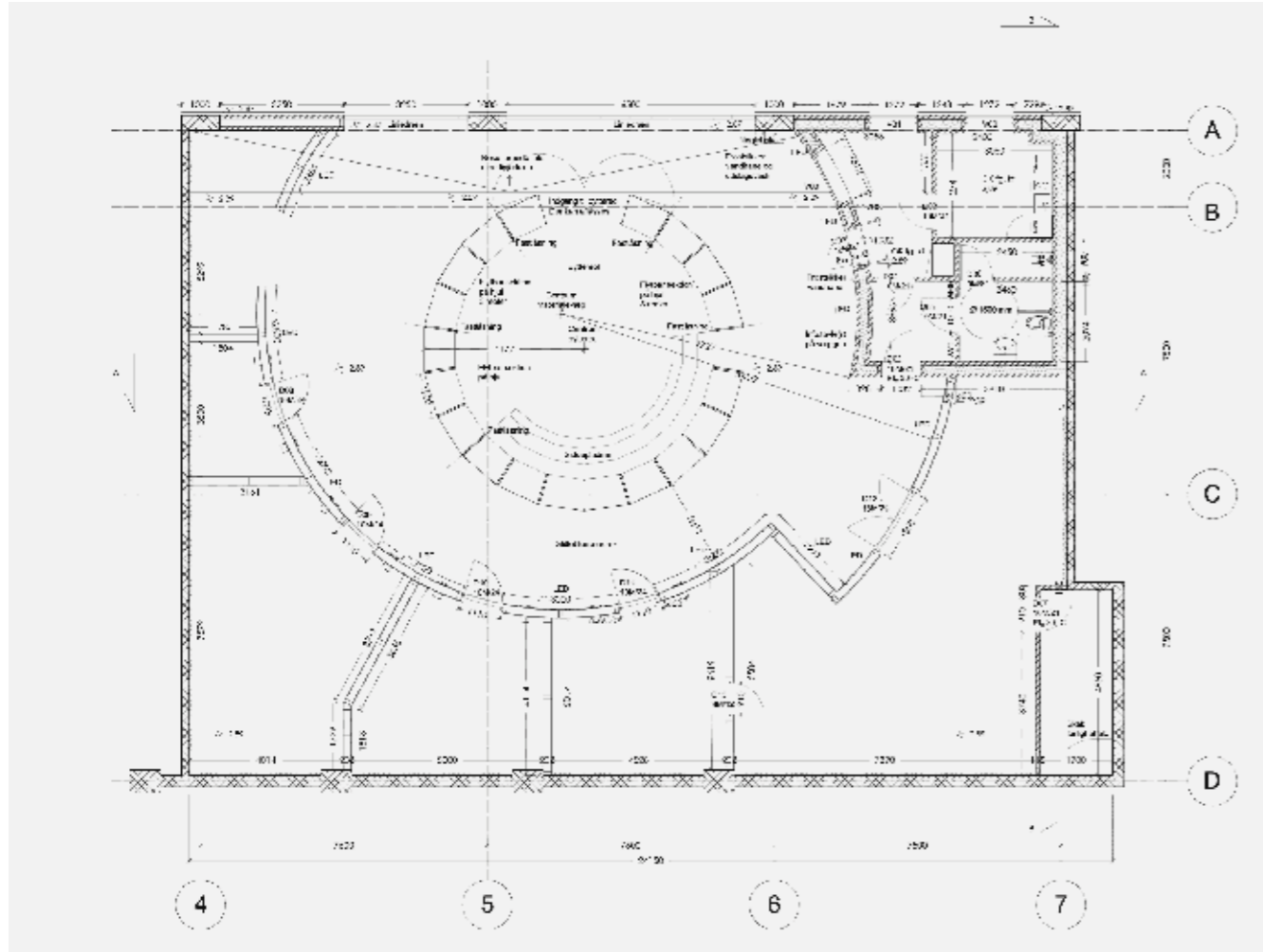


Bispeengen Genbrugsstation

Nordhavn Nærgenbrugsstationer | Lendager

Copenhagen, 2020

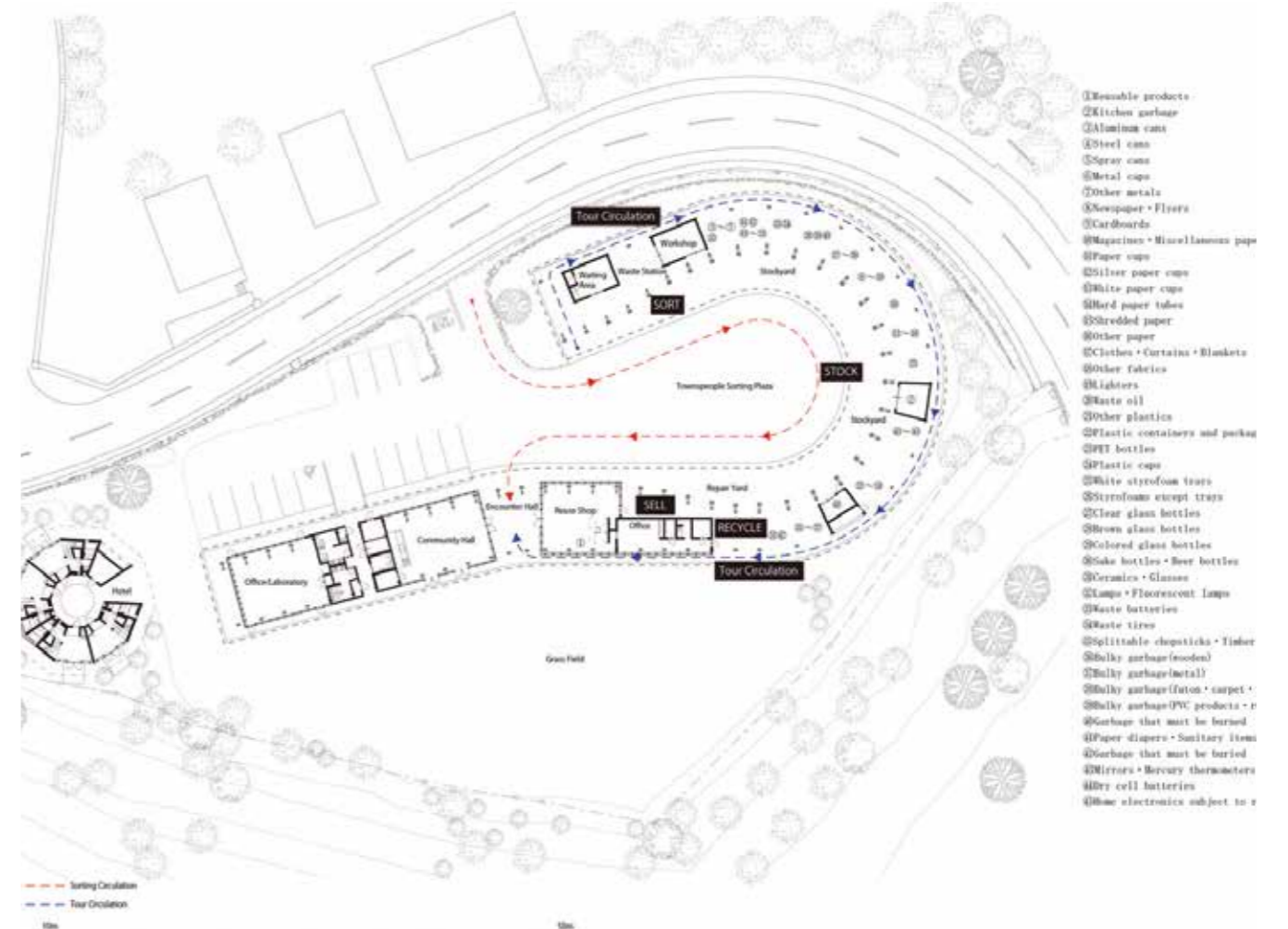
380 m2



Kamikatsu Zero waste centre | Hiroshi Nakamura

Japan, 2020

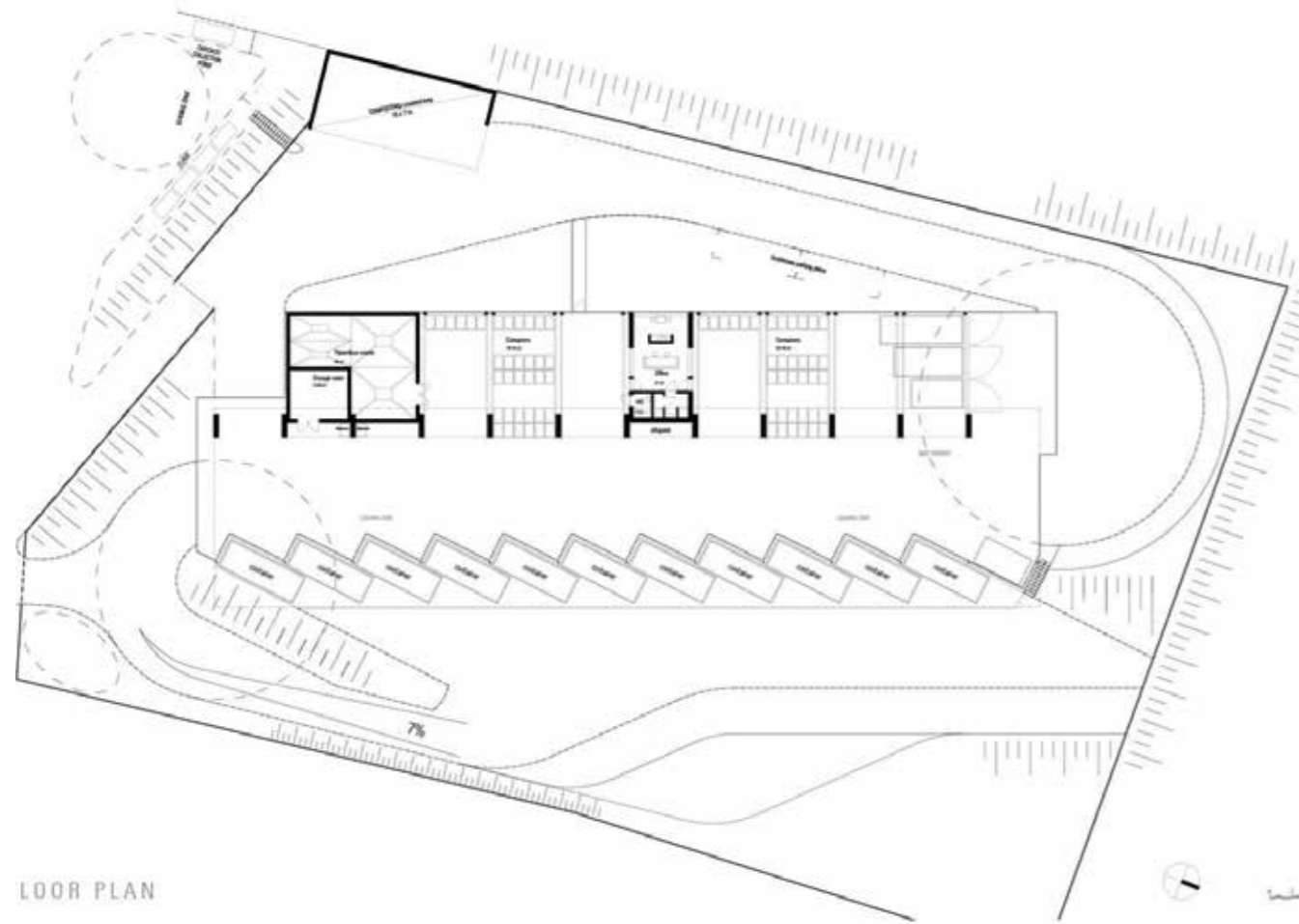
1200 m2



Center for Recyclable Materials | RUHM Architekten

Austria, 2019

1880 m²



Wan Chai Recycling Station |

2021

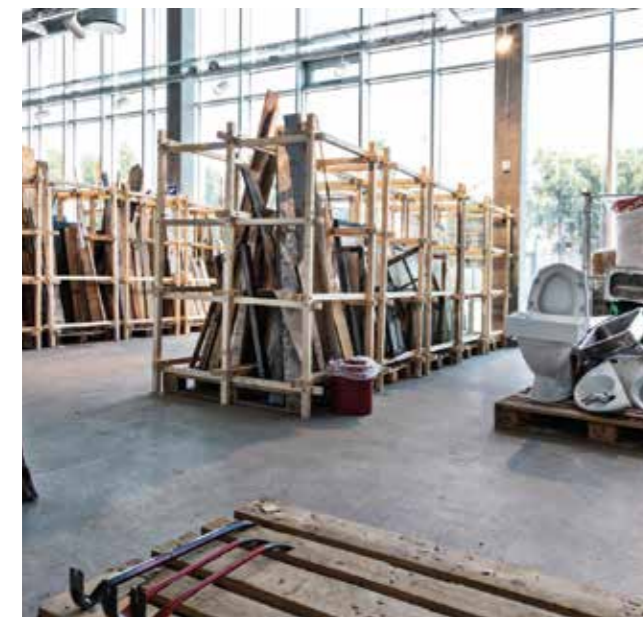
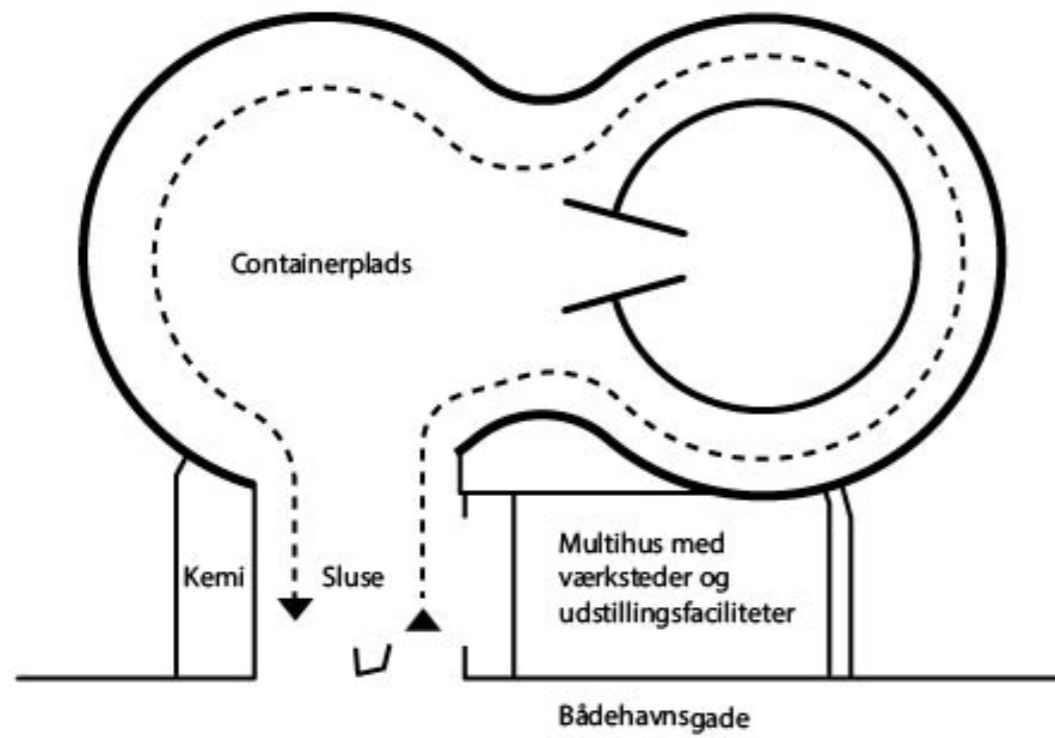
700m²



Sydhavn Genbrugscenter | BIG

Copenhagen, 2018

4.800 m²



Gladsaxe Genbrugsstation | BBP arkitekt

Denmark, 2024



Research-by-Design **Journal**

Design process P3 & P4

Marit Smit

Graduation studio '*Public Condenser in Copenhagen*'

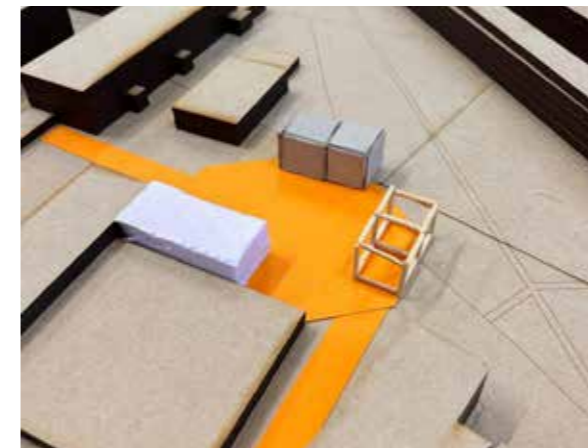
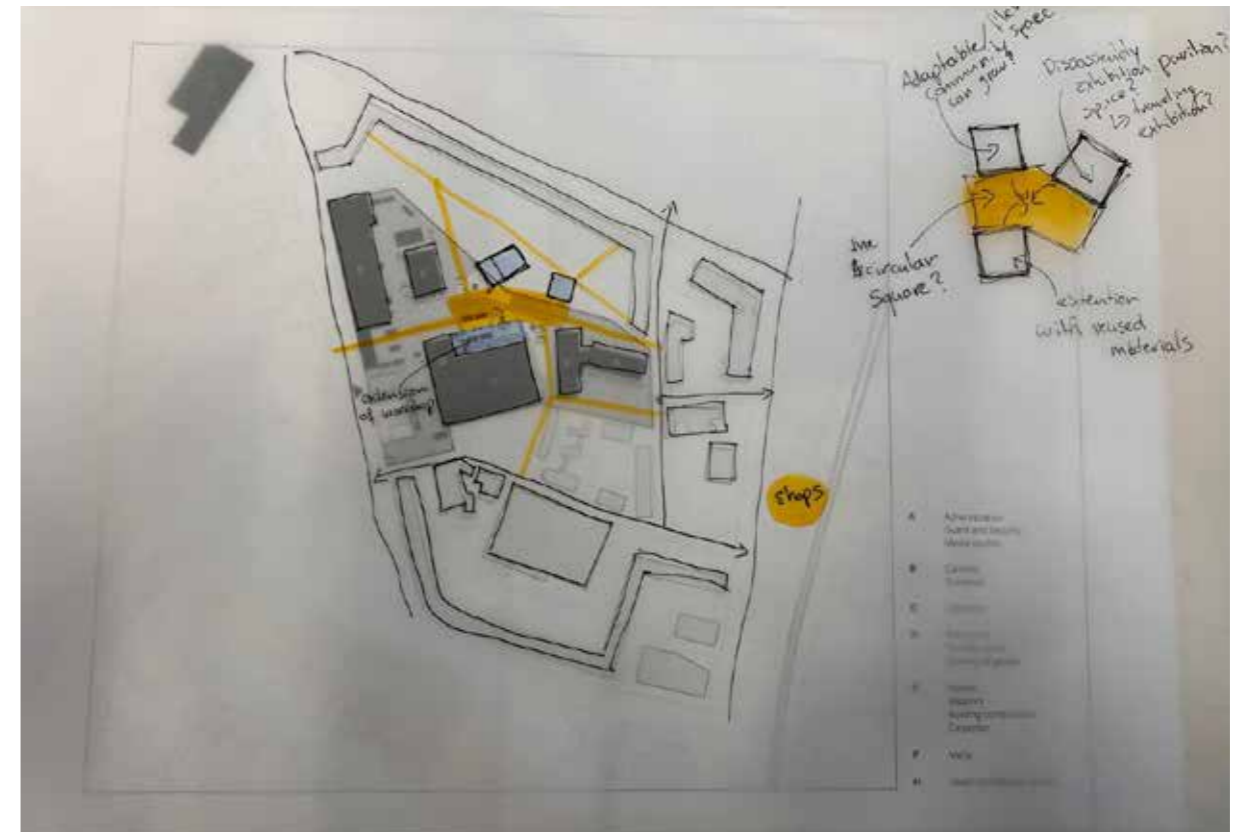
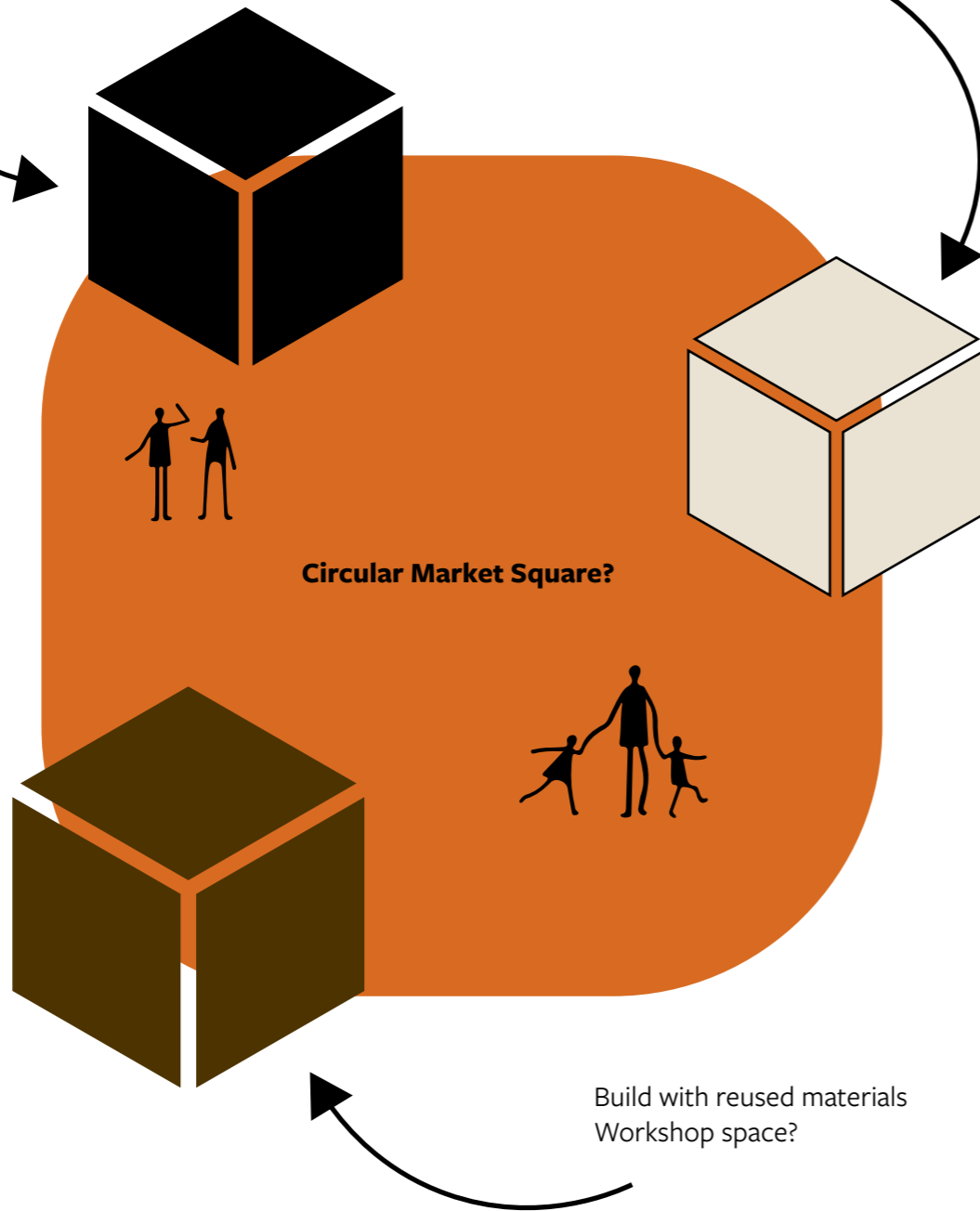
Architecture and Public Building | TU Delft

Paul Kuitenbrouwer, Stefano Corbo, Elina Karanastasi

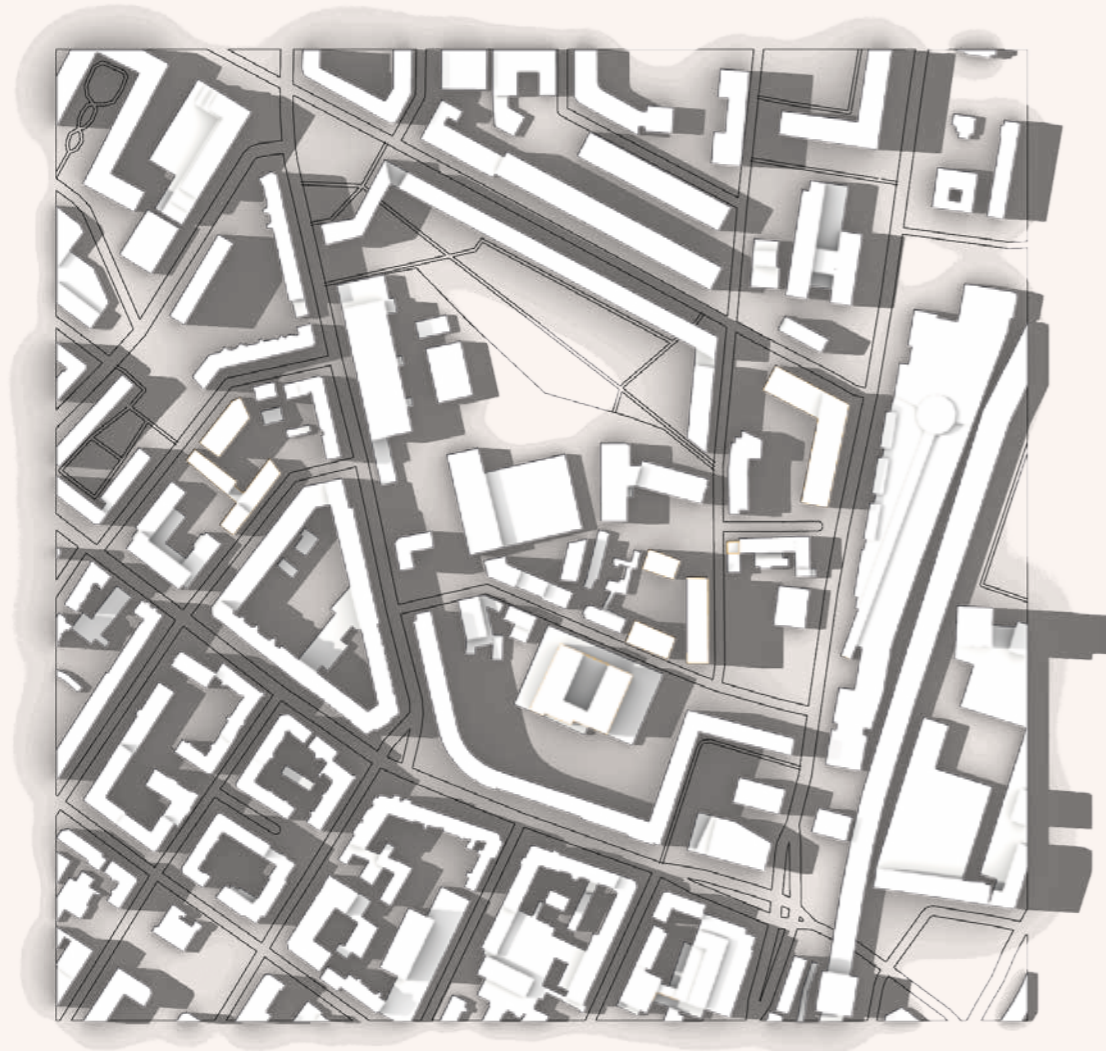
First Building Concept

Adaptable/flexible building?
A community space can
change to the need

Disassembly
Traveling exhibition pavilion?
Contribute to circular
awerness



Sun Analysis



Feb 10h



Feb 16h



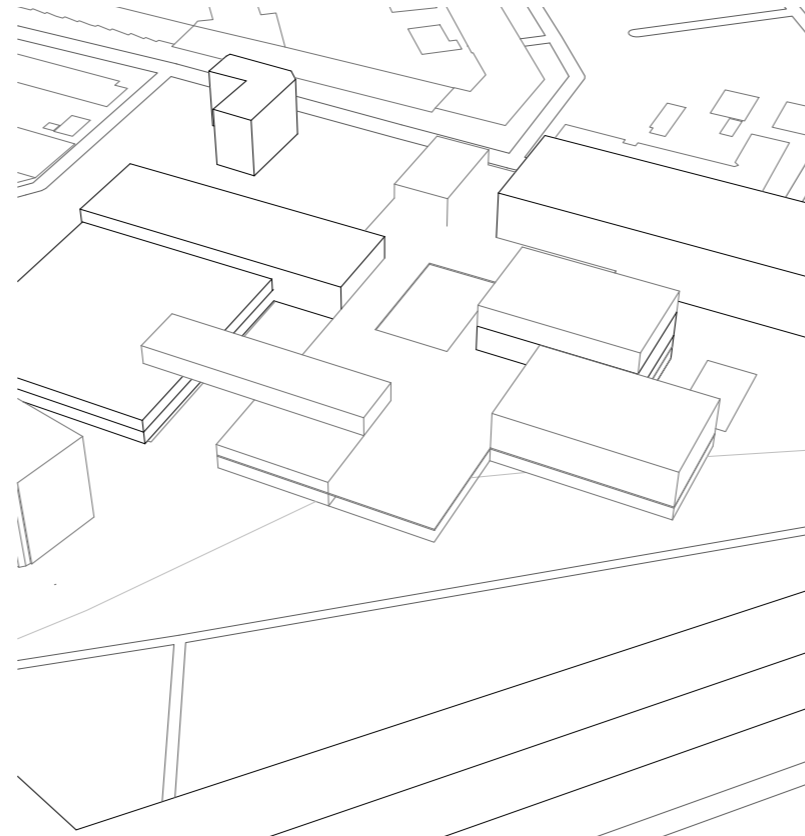
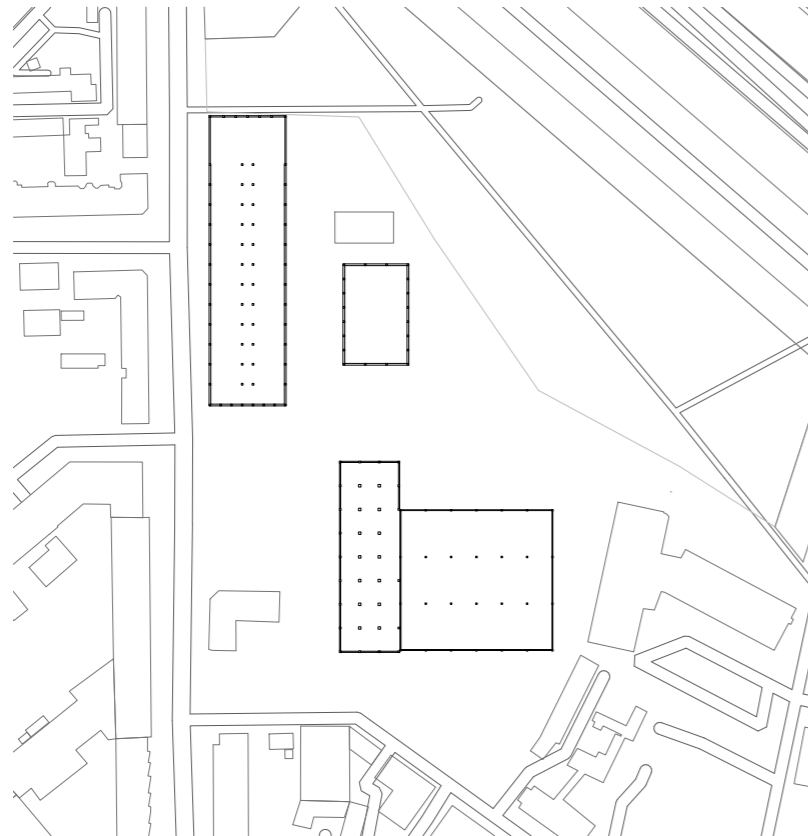
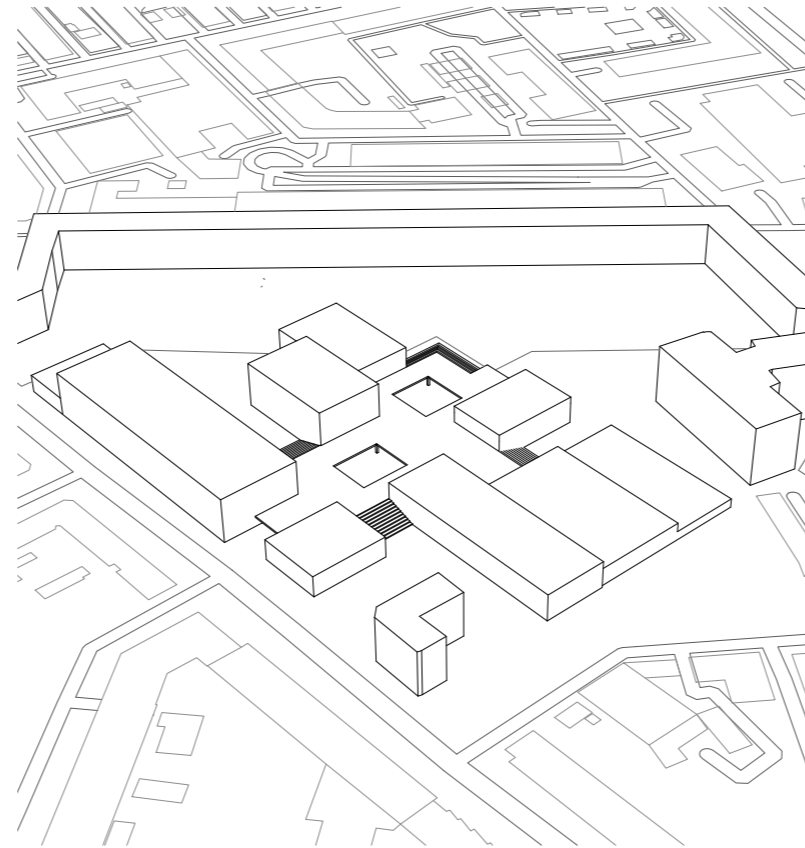
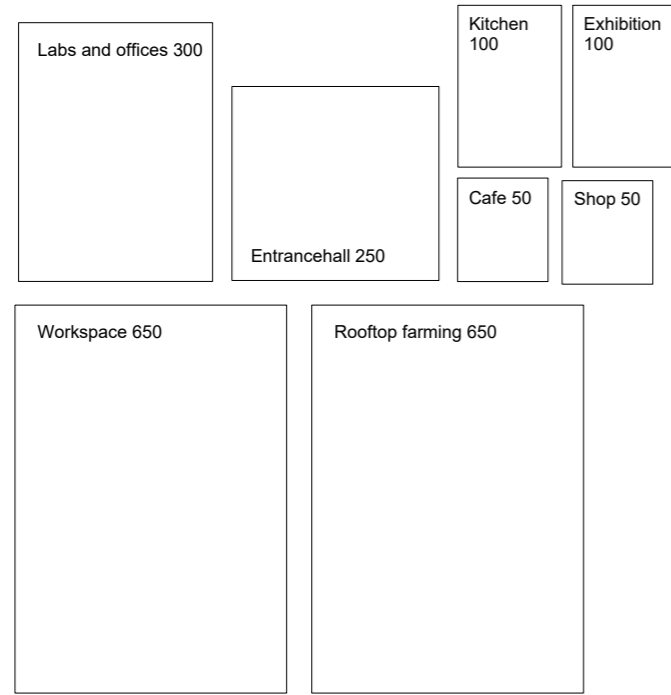
July 10h



July 16h

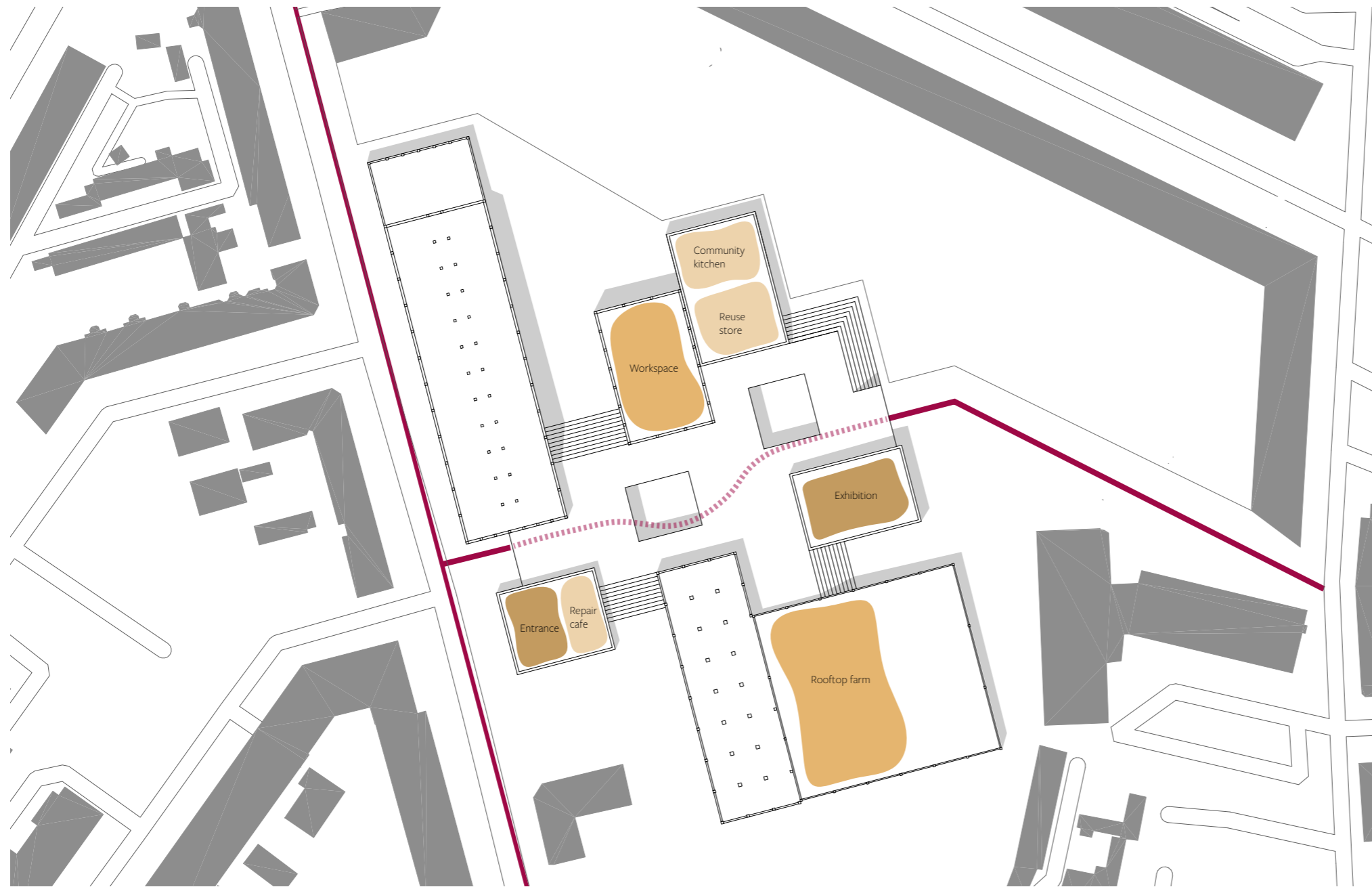


Form studies



This illustrates the program and its scale. The concept involves an elevated square under which waste is collected, with various buildings and functions connected to this central square.

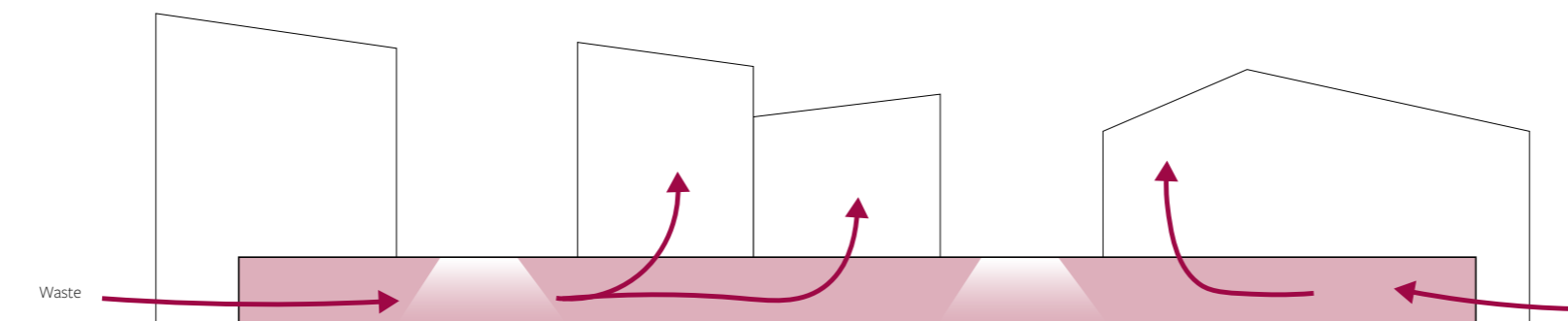
First design proposal

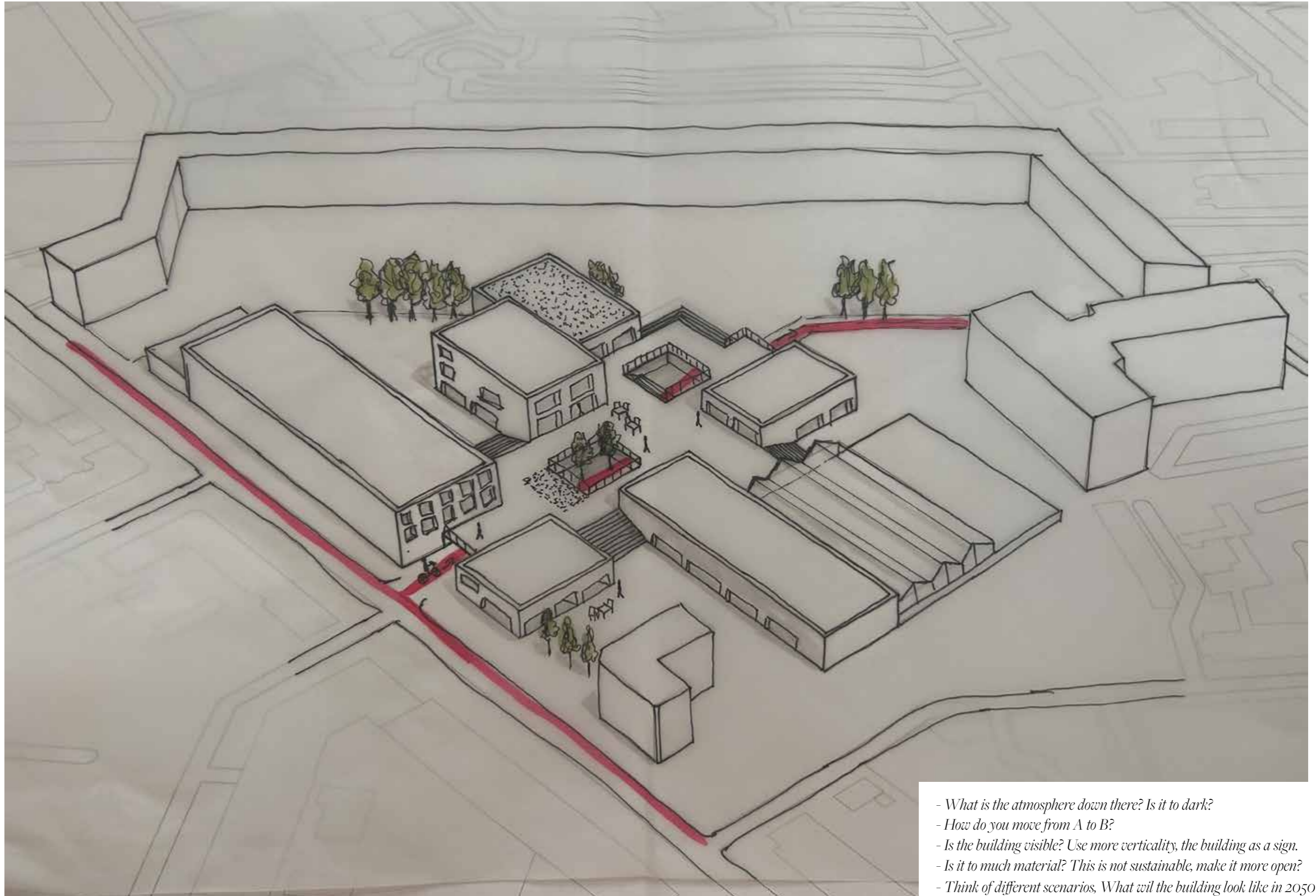


- Waste collecting on the ground floor, entrance for bike

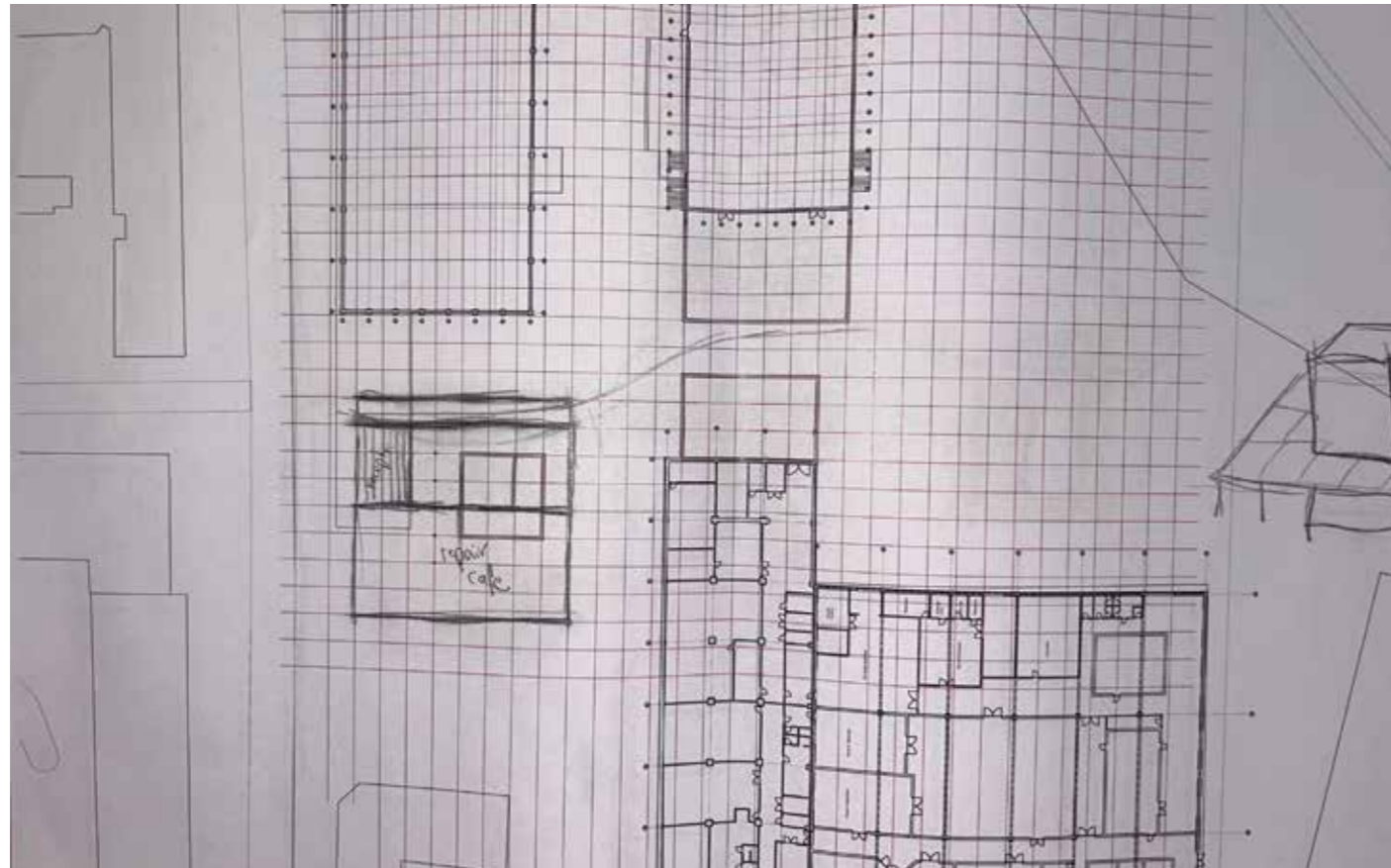
- All buildings connect to the waste collection to make use of the waste

- Elevated square with public functions and open plinth

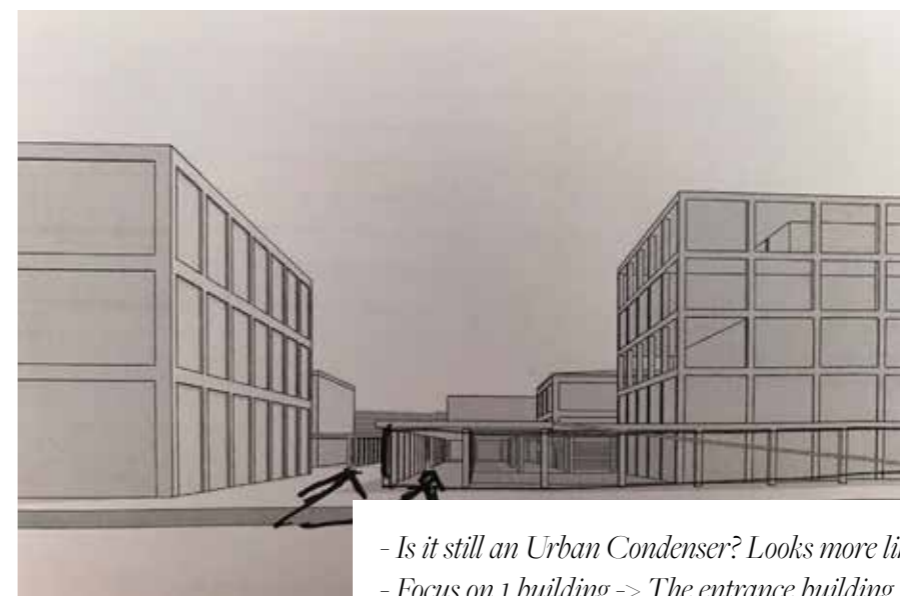
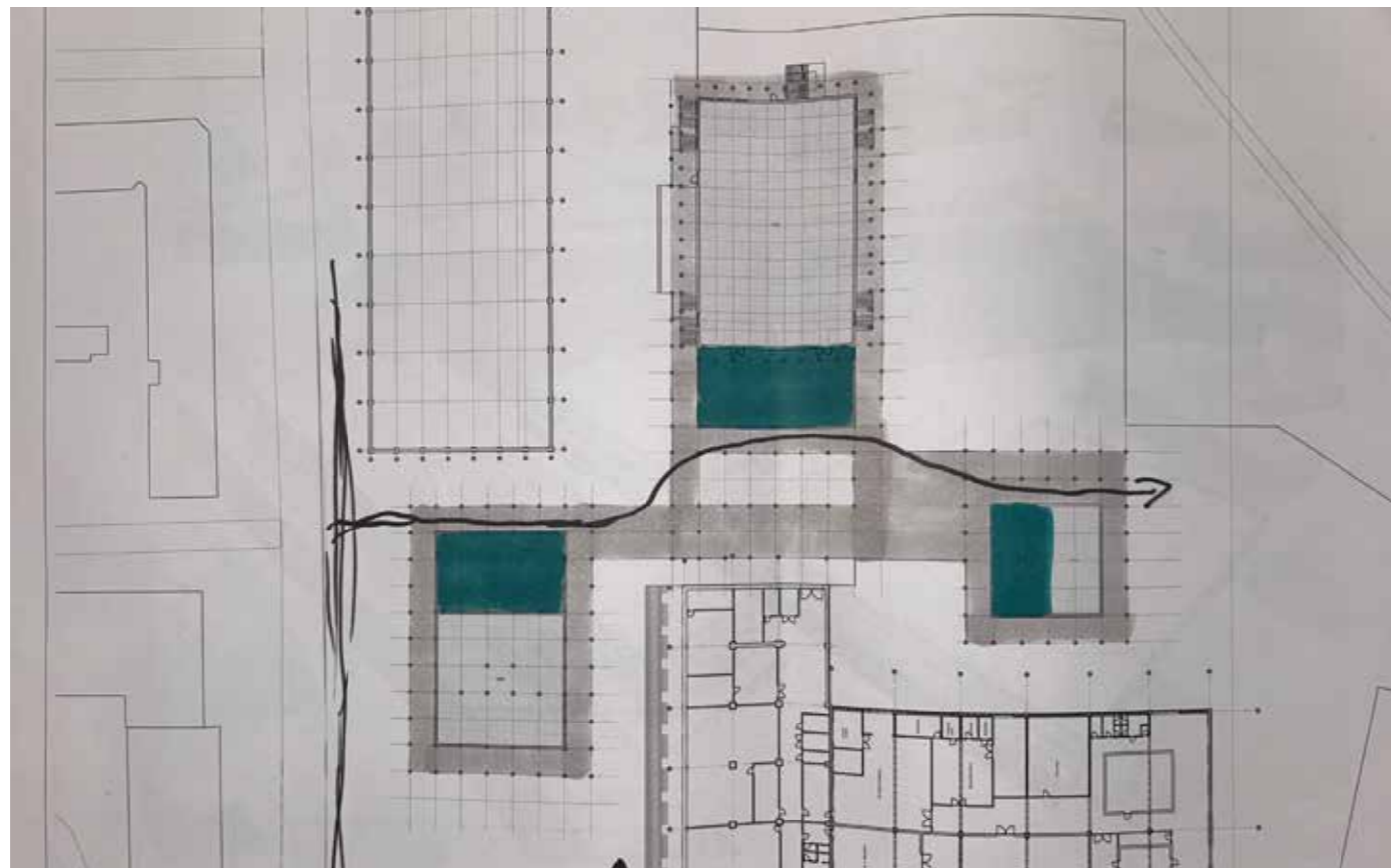
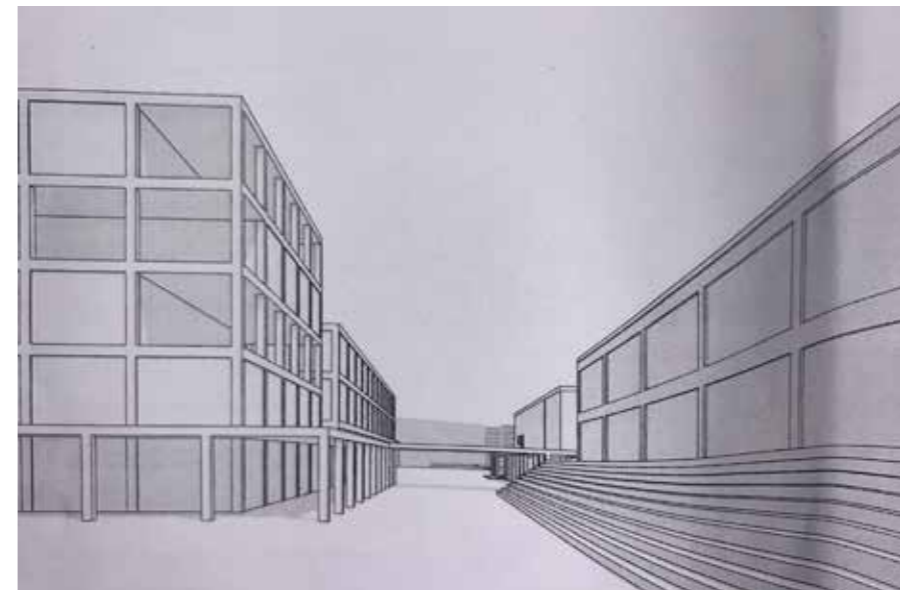
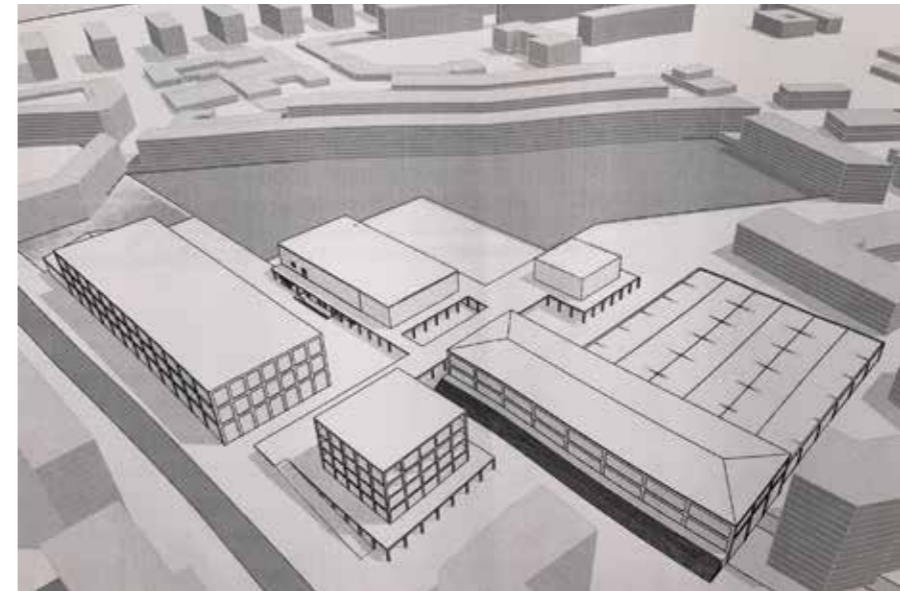




- What is the atmosphere down there? Is it to dark?
- How do you move from A to B?
- Is the building visible? Use more verticality, the building as a sign.
- Is it to much material? This is not sustainable, make it more open?
- Think of different scenarios, What wil the building look like in 2050?



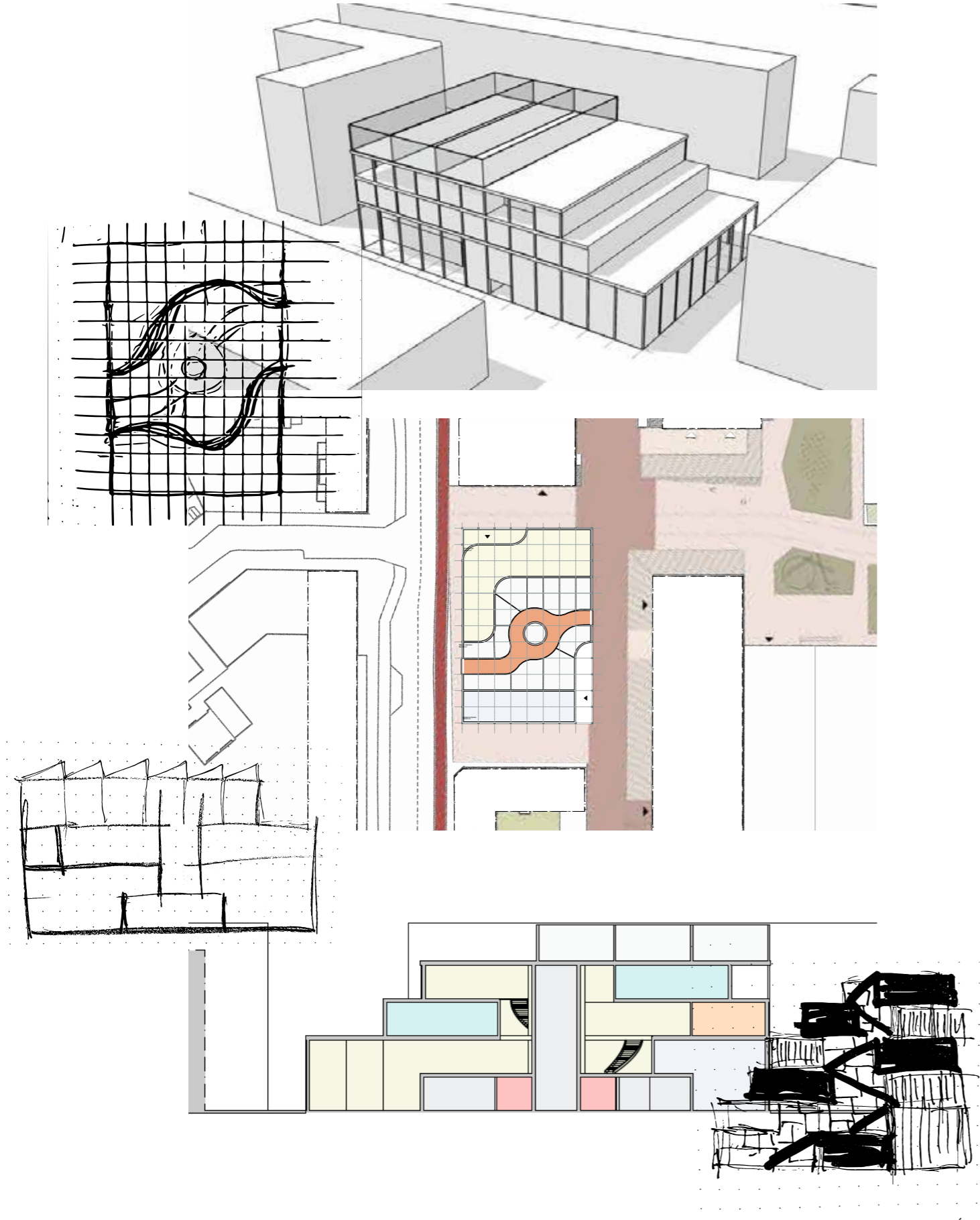
Finding a grid that fits within the site? -> Looking at existing floorplans and their grid.



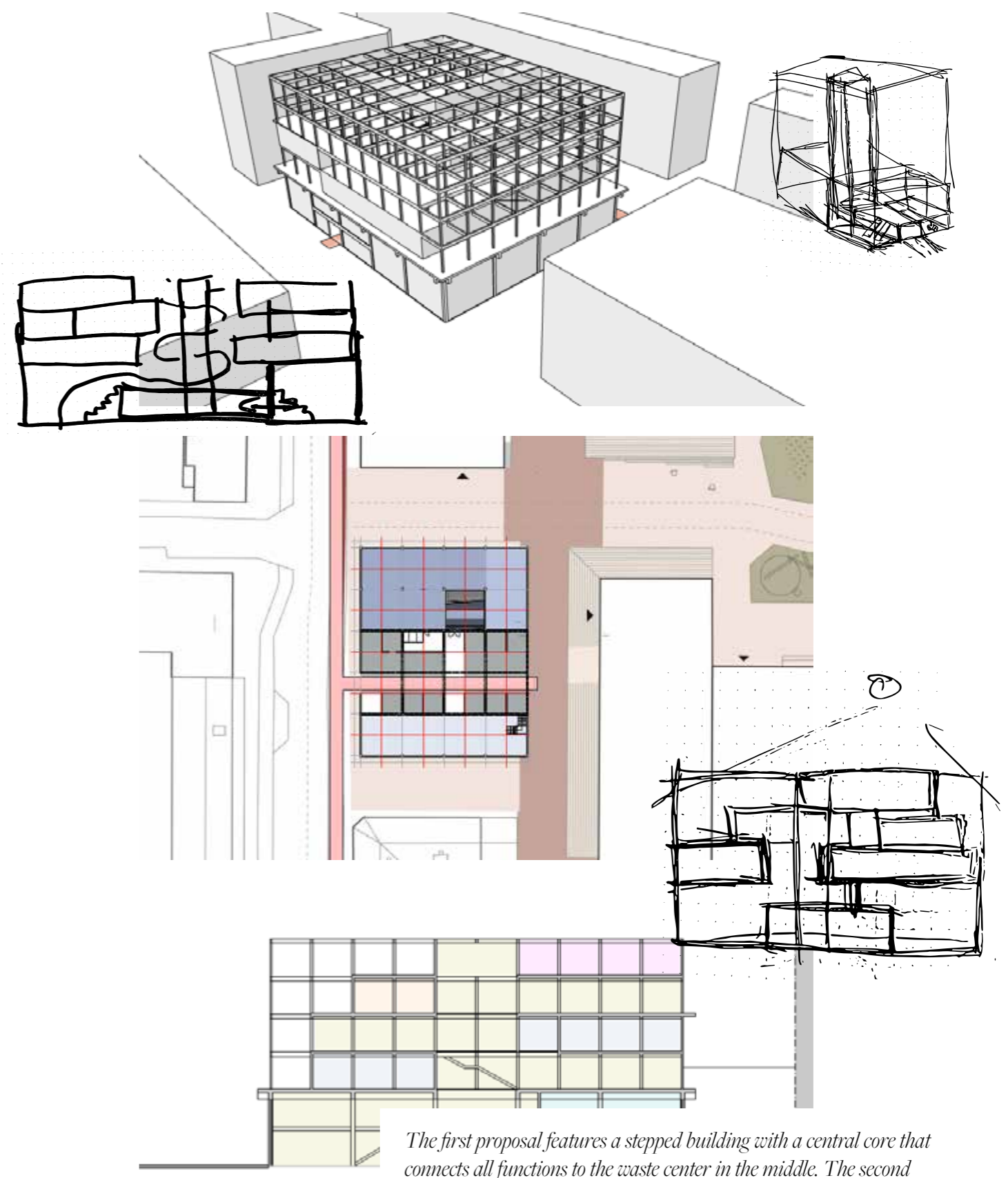
- Is it still an Urban Condenser? Looks more like 3 separate buildings
- Focus on 1 building -> The entrance building.

Design proposal

Version 1

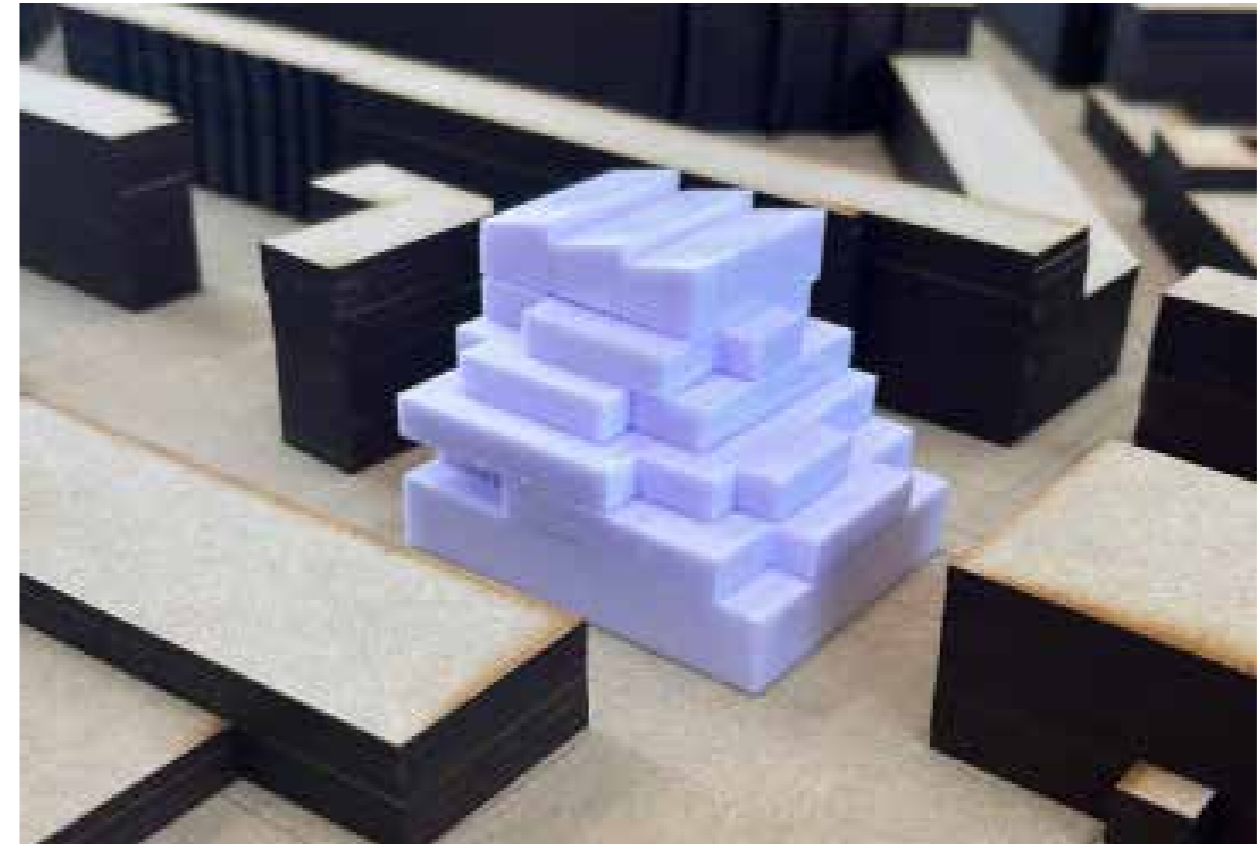
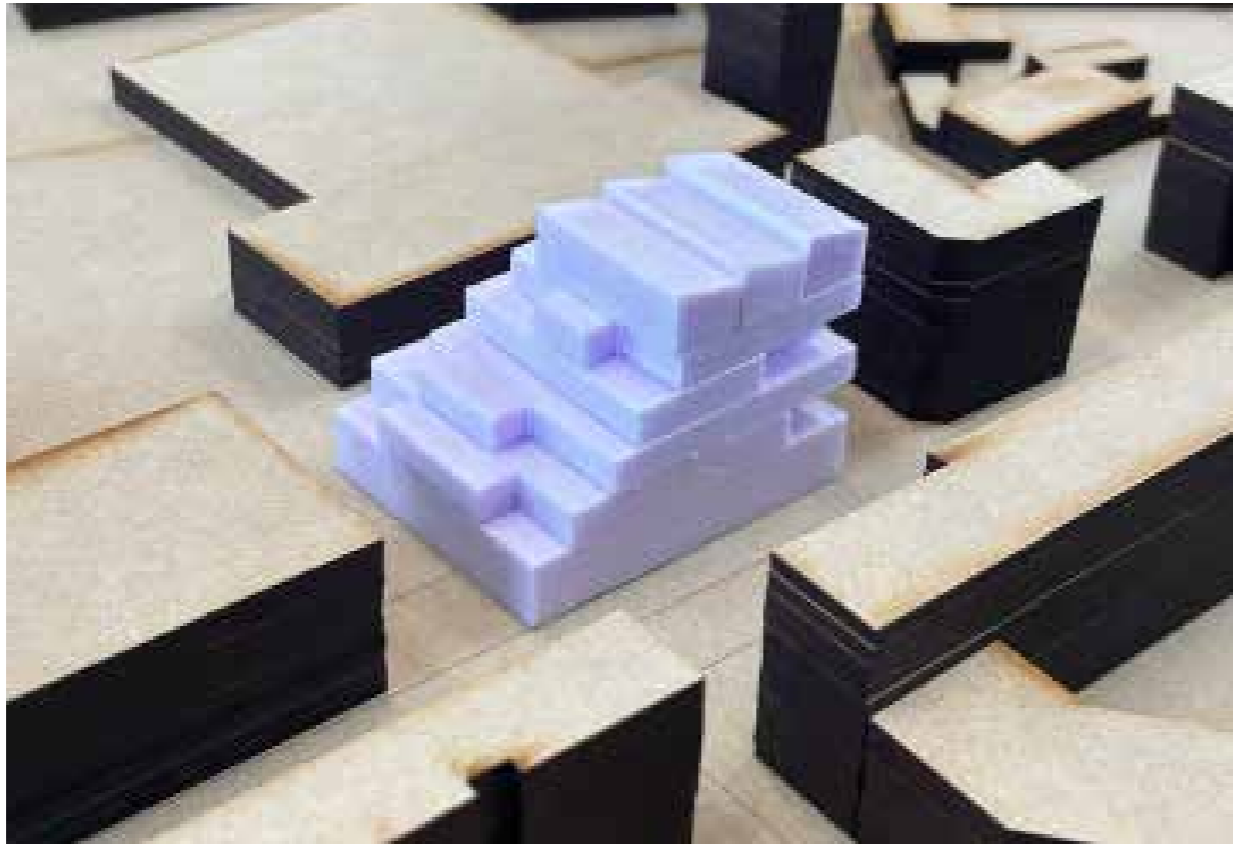


Version 2



The first proposal features a stepped building with a central core that connects all functions to the waste center in the middle. The second concept presents a large open atrium that links all the functions together.

Model P2



P2 Presentation

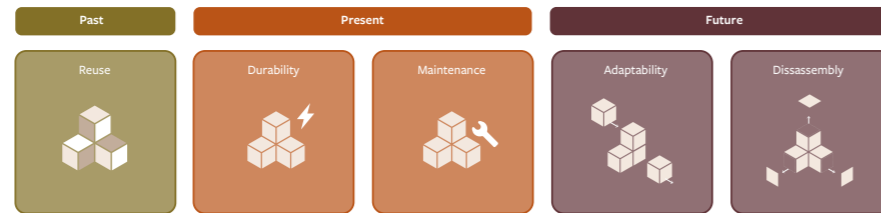
TRASH INTO TREASURE

Designing a **Circular Public Condenser**
in Bispebjerg, Copenhagen

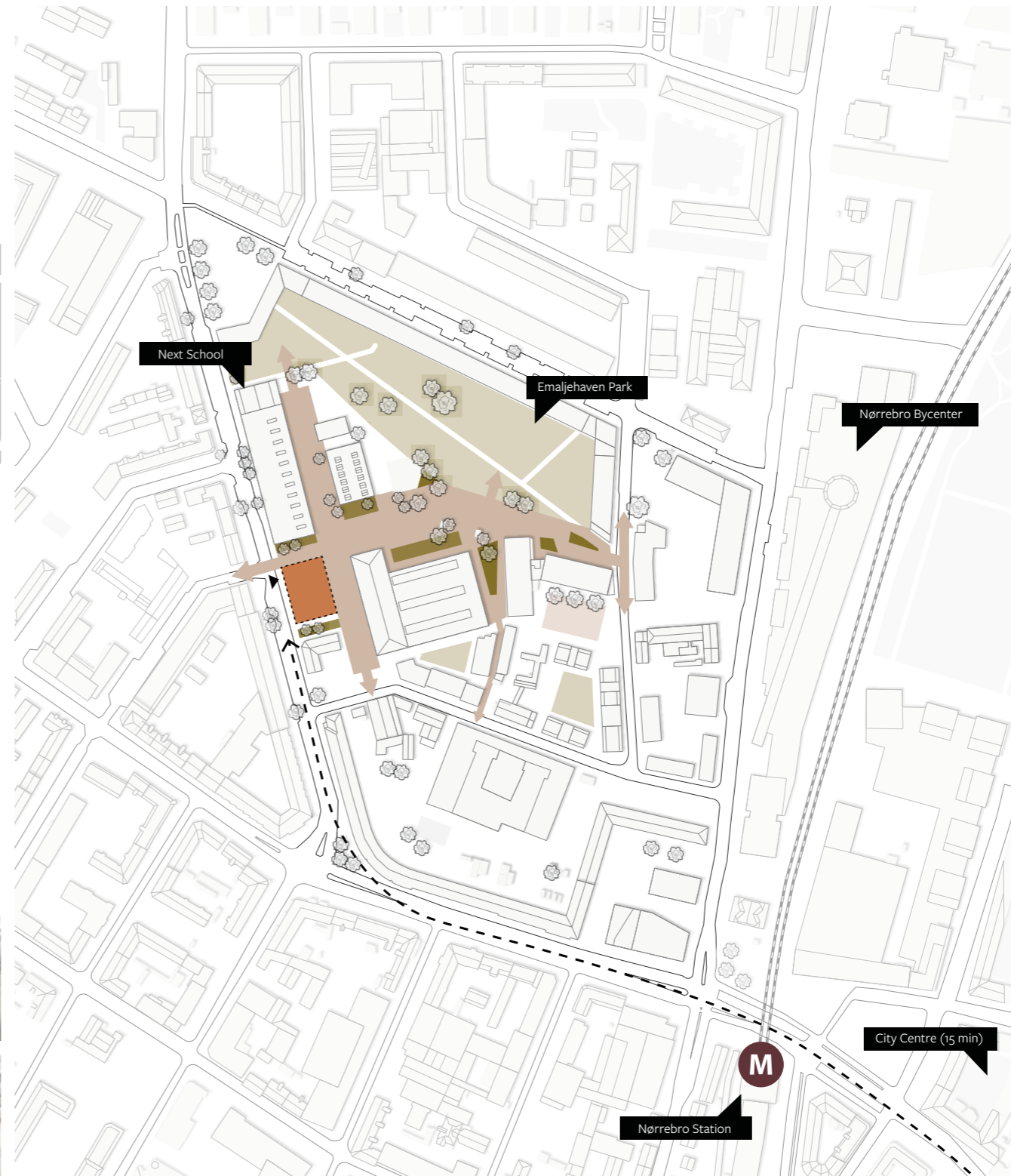
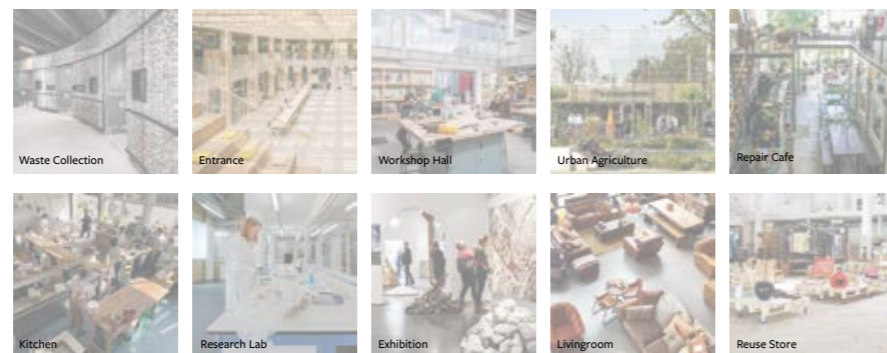
Marit Smit | P2, January 2025



Circular Structure

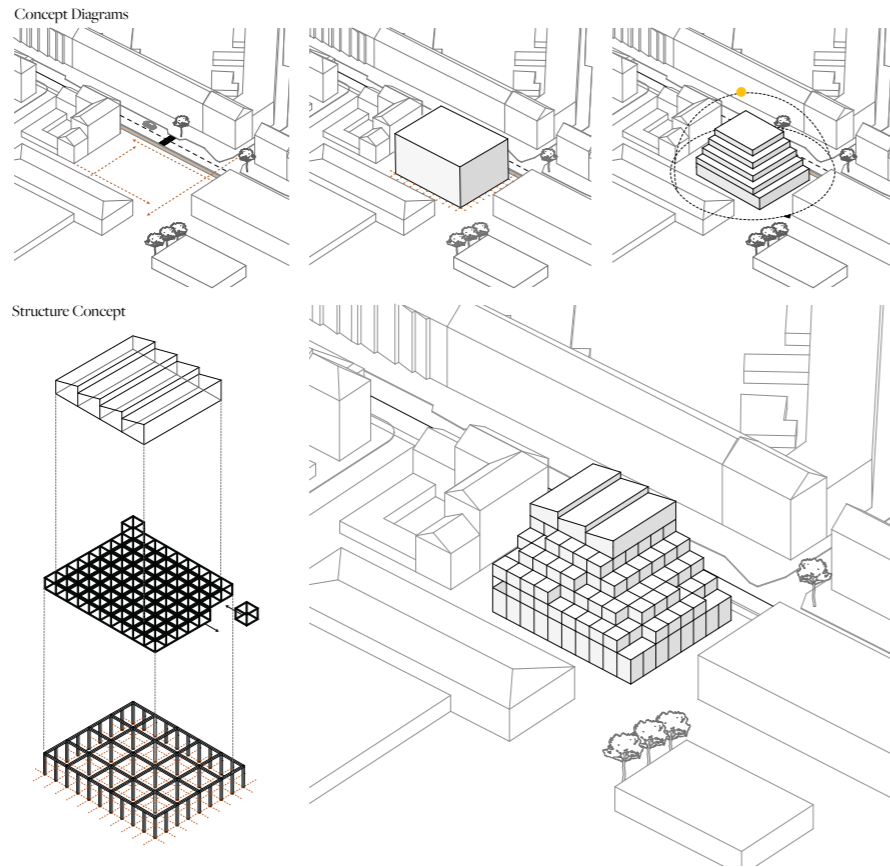


Circular Program

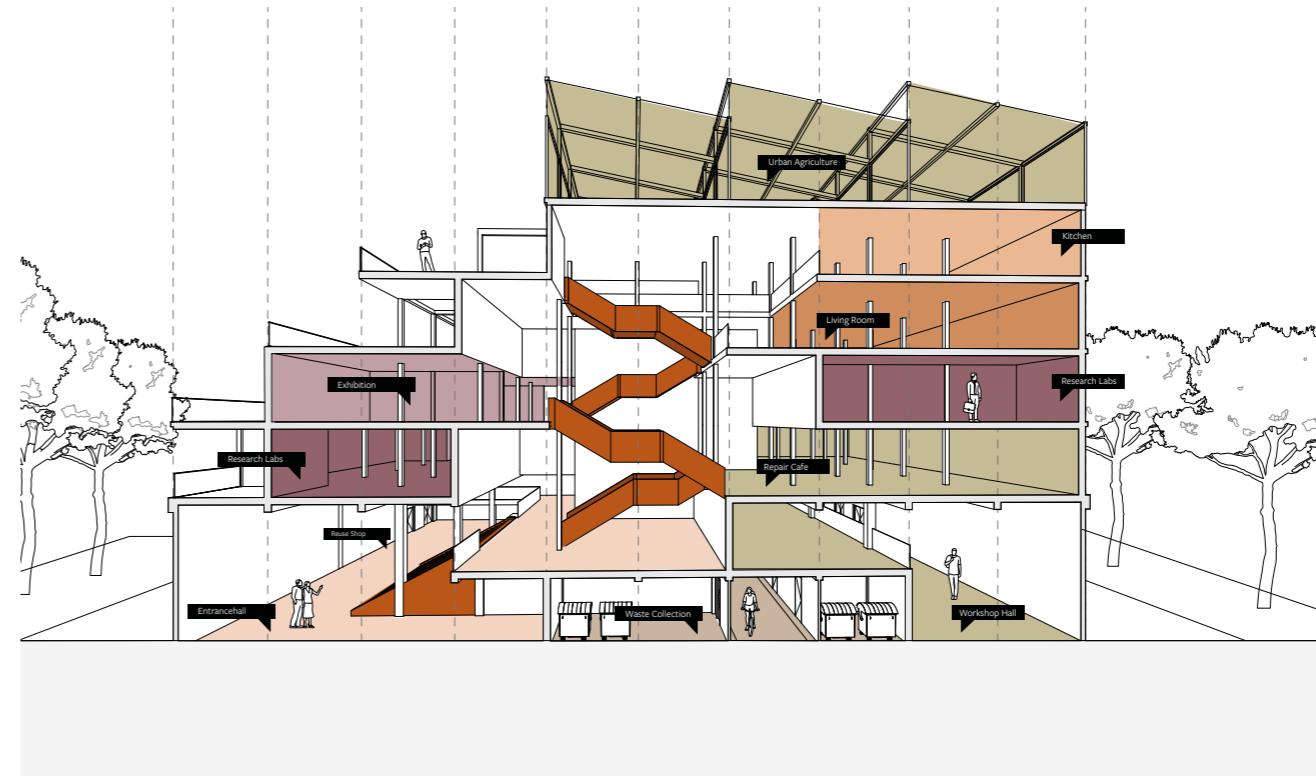


P2 Presentation

Building Design



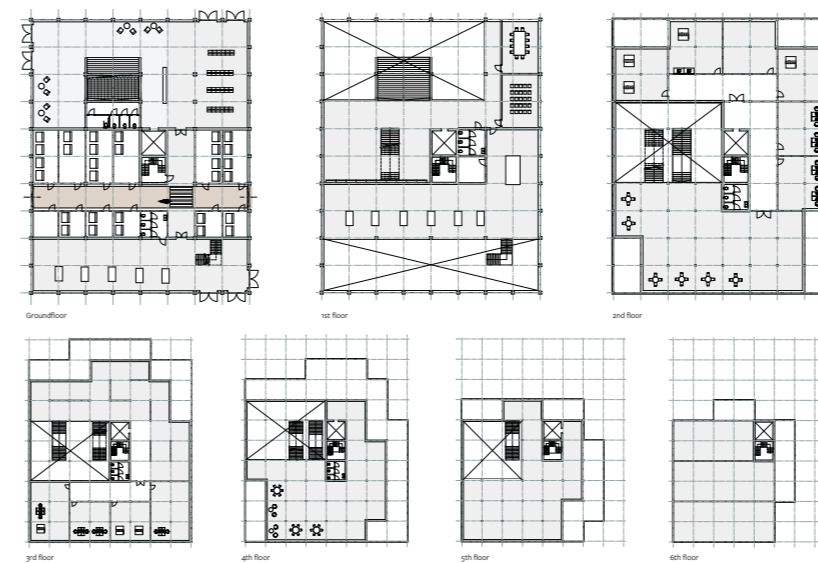
Section



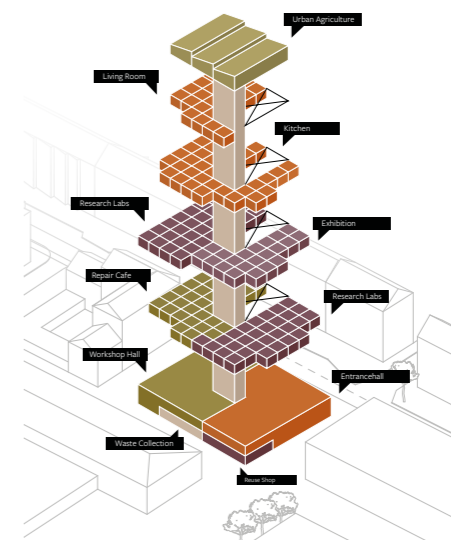
Ground floor



Floorplans 1:200 (scaled)

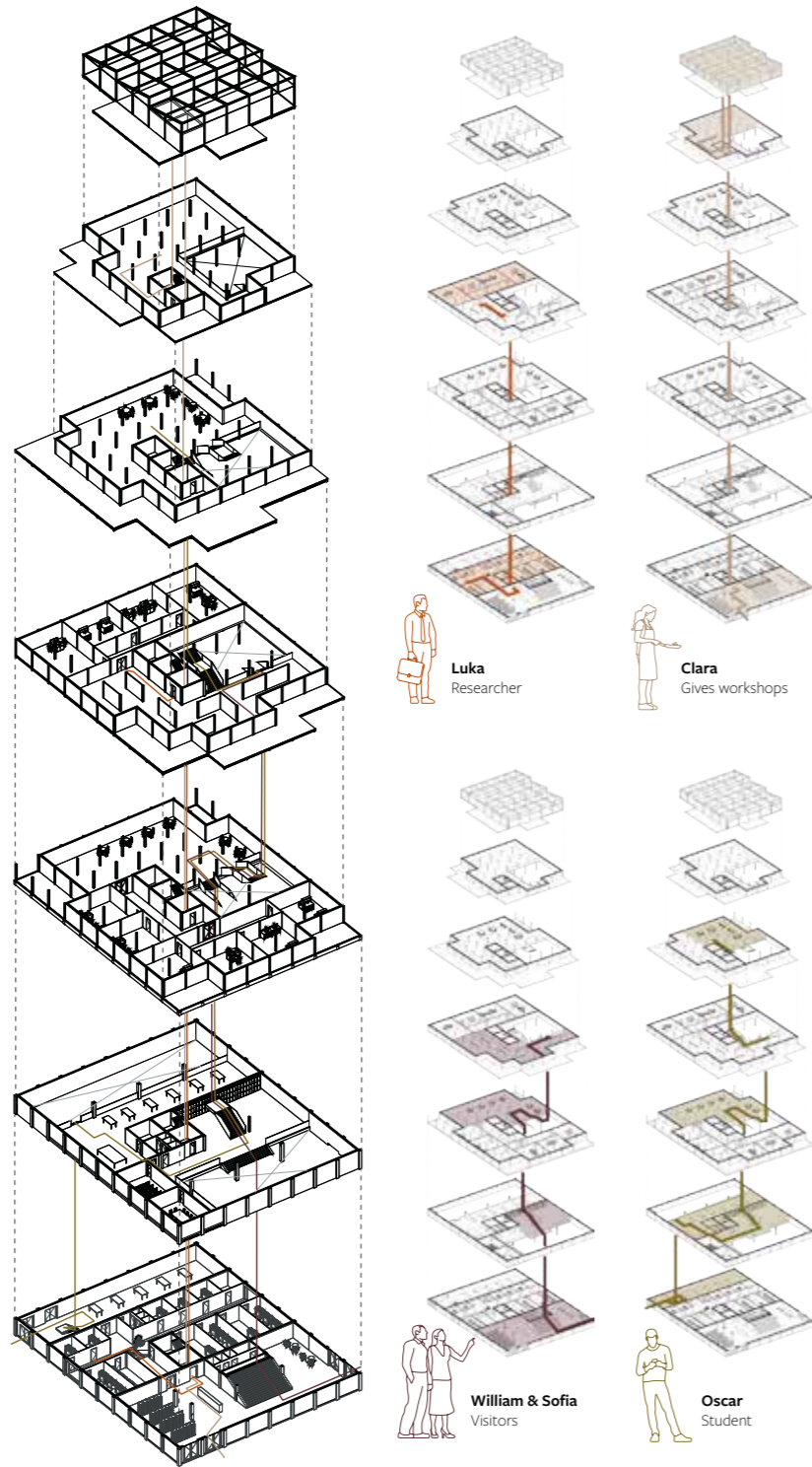


Distribution of the program

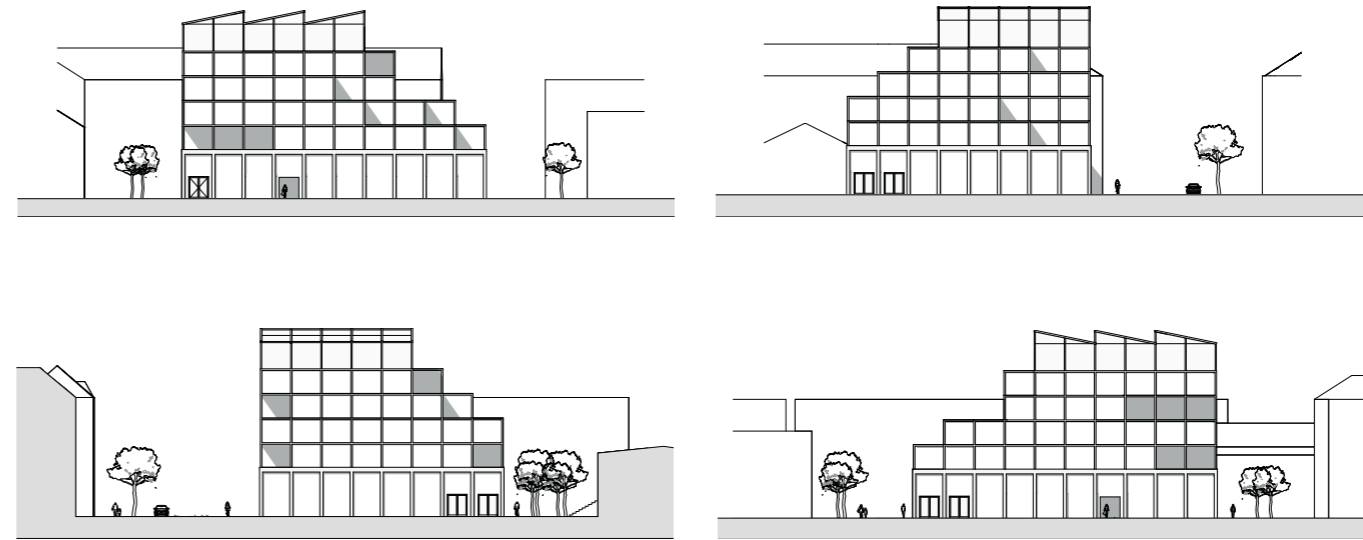


P2 Presentation

Axonomy



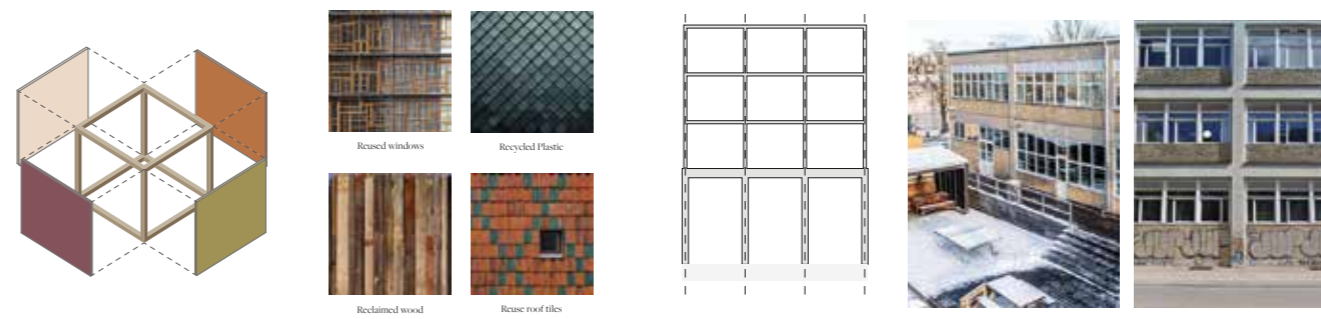
Facades

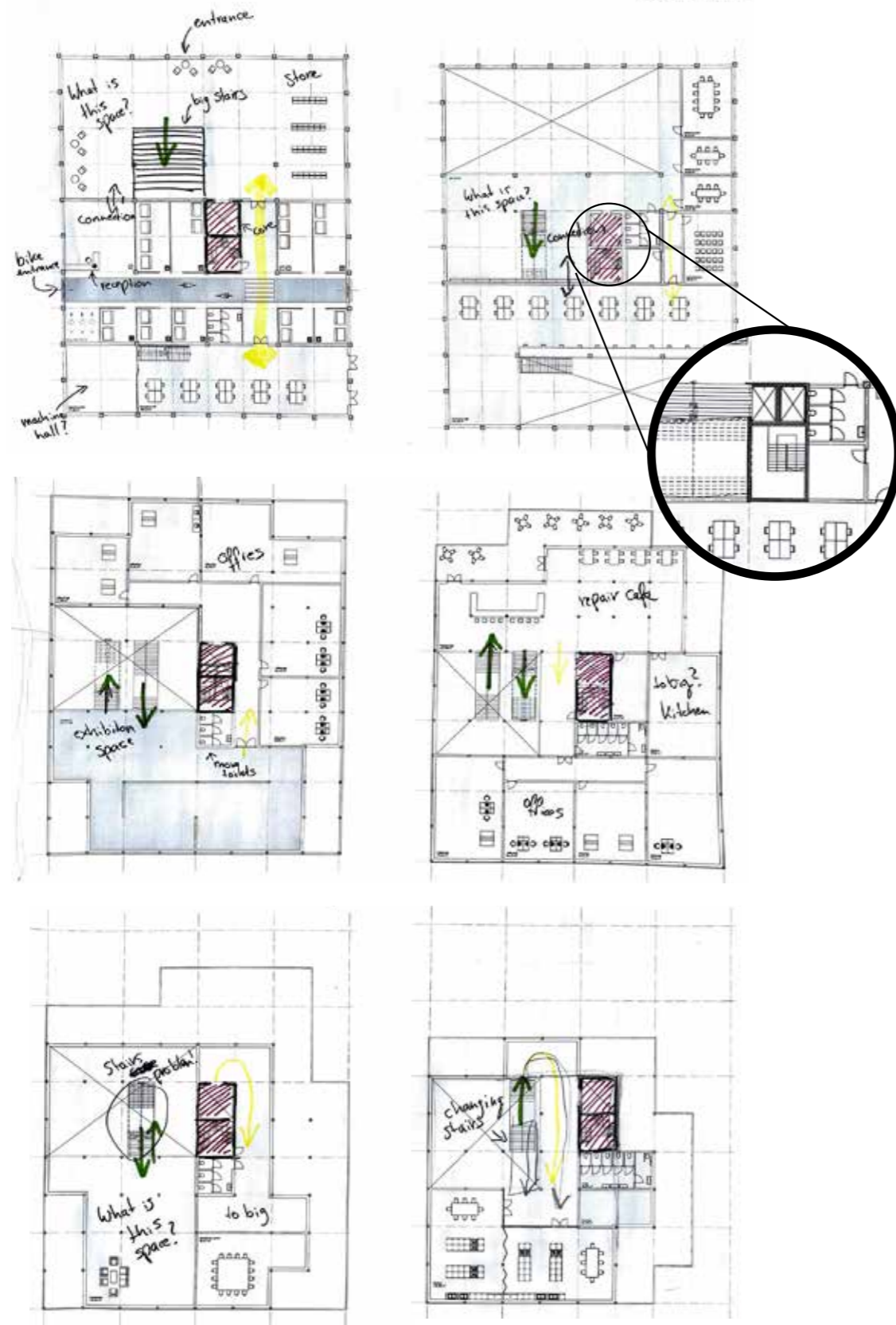


Impressions

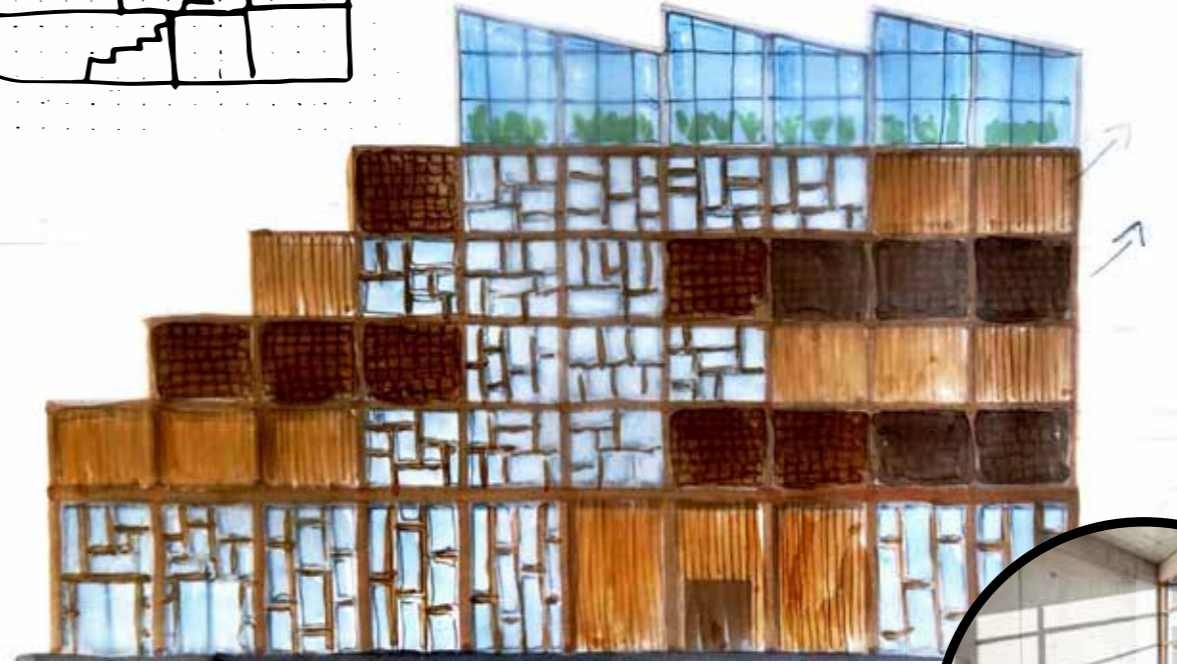


Facade Materials





I also made an initial sketch for the facade. In this design, the building's core is highlighted in the facade using glass. Additionally, reclaimed wood and old roof tiles are used for the cladding. The idea is that the glass will be reused as well.

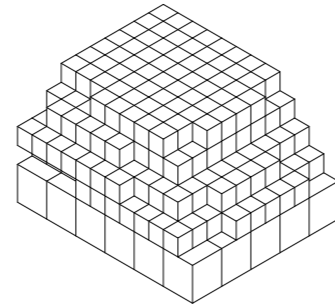
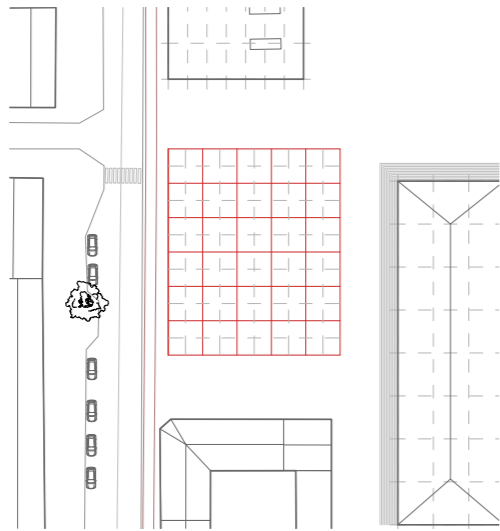


Looking back at the floor plans from P2, many questions remain: Where is the main entrance located? How are the different functions connected? And how is the core of the building organized?

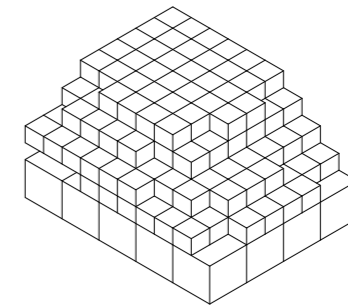
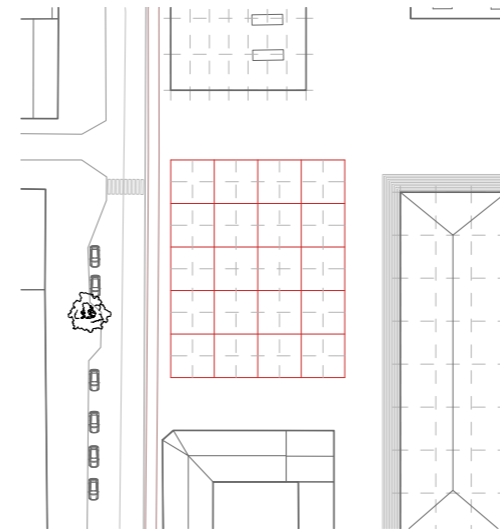
Grid research

As part of my reflection on P2, I experimented with different grid sizes for the building. This showed that some dimensions are too small to create functional spaces, while others are too large in relation to the building's surroundings. Larger grids would also require a thicker structural system.

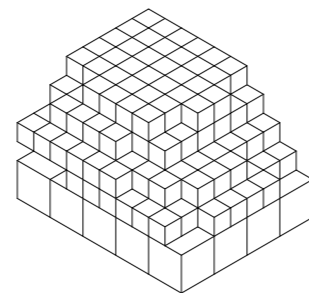
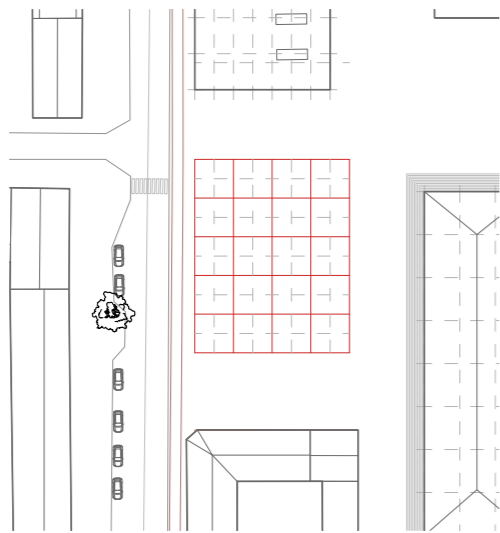
6,4x6,4



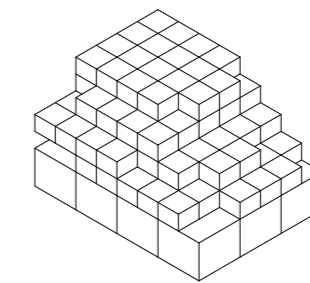
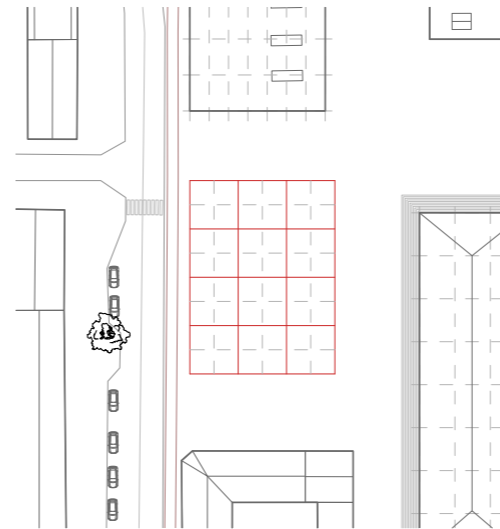
8,1x8,1



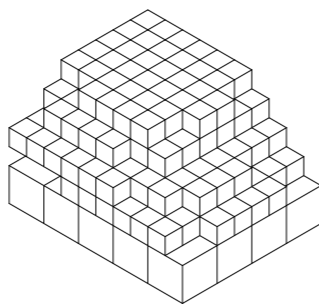
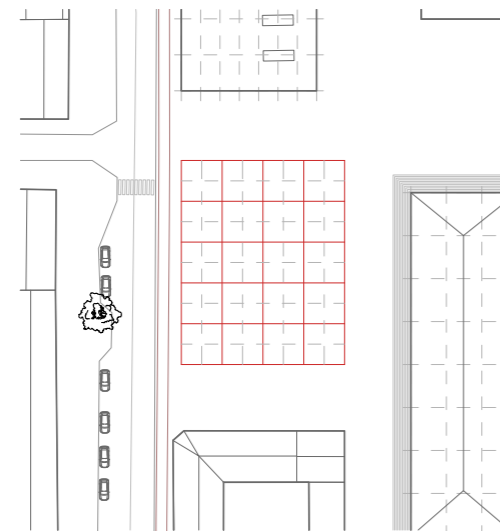
7,2x7,2



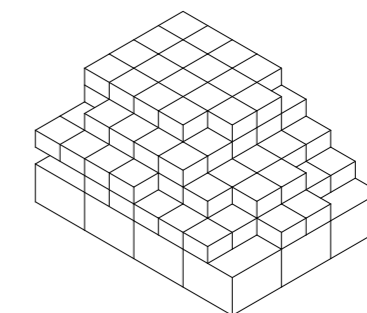
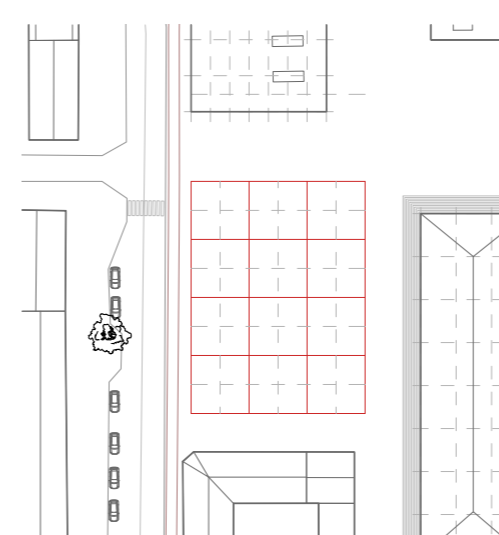
9x9



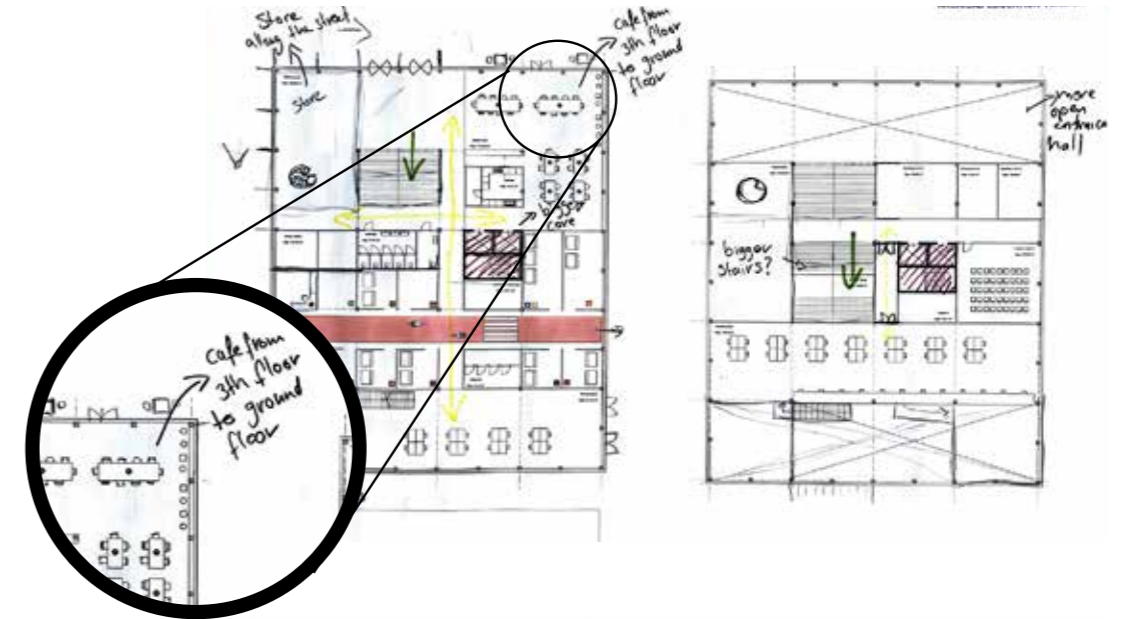
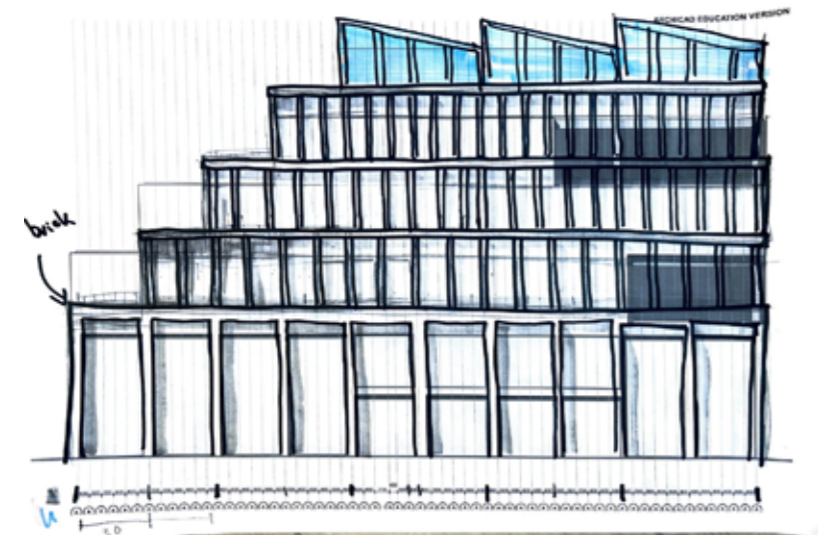
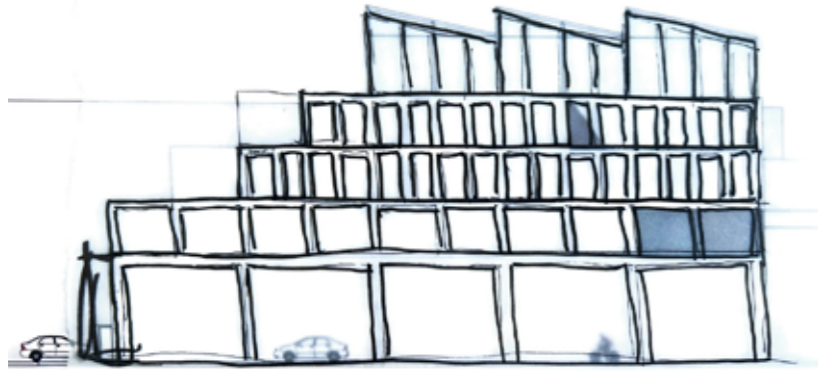
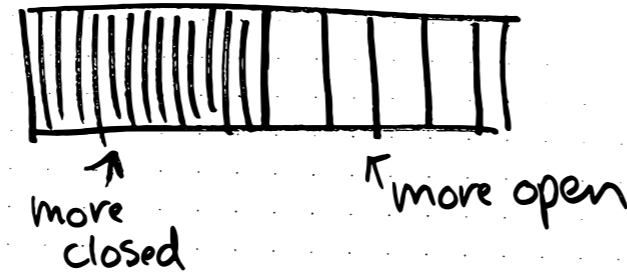
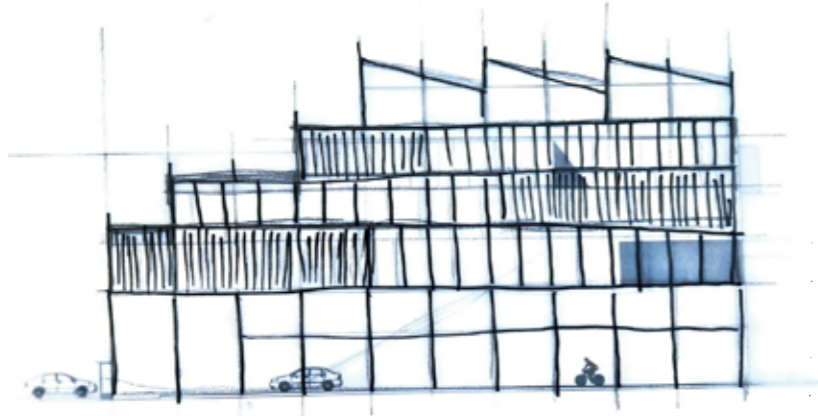
7,6x7,6



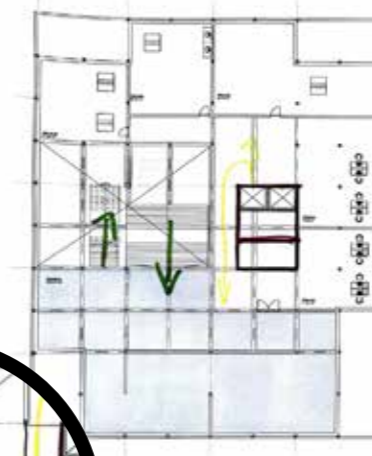
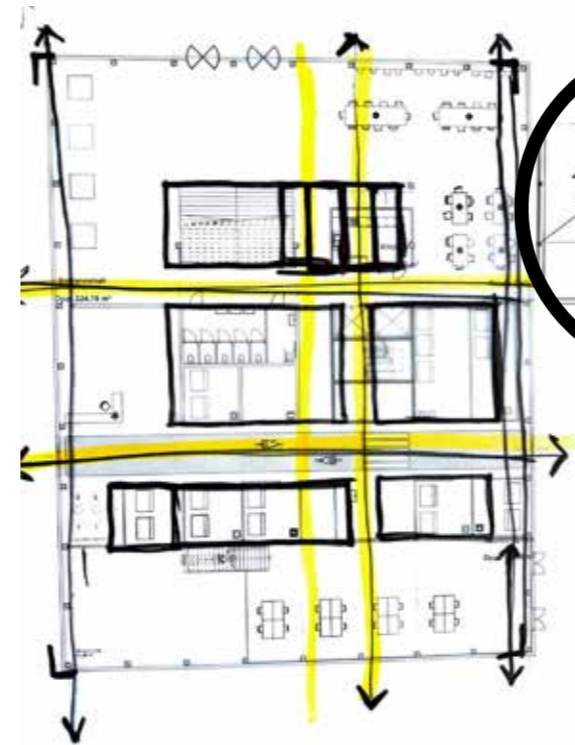
10,8x10,8

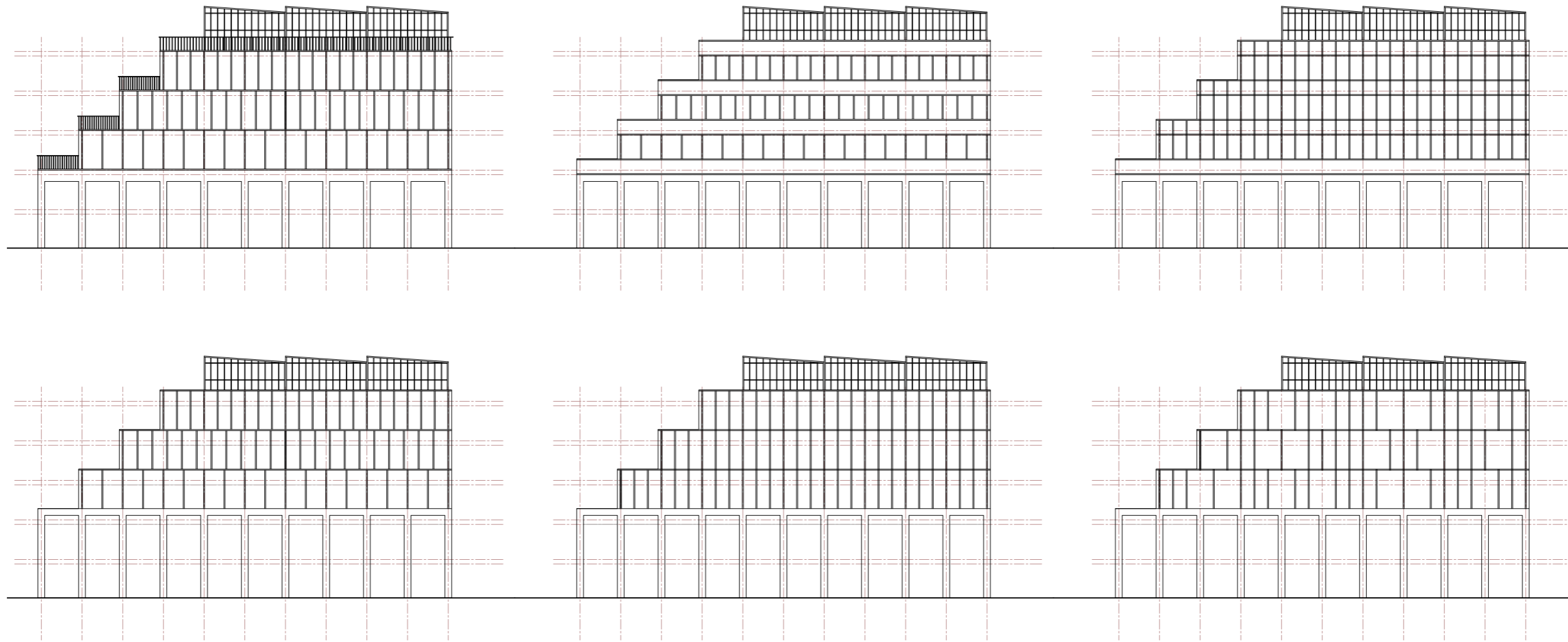


In further facade sketches, I explored several ideas. The first sketch shows that the facade is more open around the public functions and more closed around the private areas. The other two sketches explore different rhythms in the facade: the higher the floor, the narrower the rhythm becomes.



For the floor plan and layout of the building, I studied various sightlines within the design and how these could help define the circulation routes. I also reconsidered the program layout: the café is now placed on the ground floor to create a stronger connection with the street. As a result, one less floor is needed, making the building lower in height—something that actually fits better within the surrounding context.





In designing the facade, I explored different rhythms that could be repeated throughout the building. The ground floor features the widest rhythm.

Materials research

I also conducted additional research into potential materials for the facade, focusing on reused materials, recycled options, and bio-based alternatives.

Reused facade materials



Rooftiles



Metal panels



Windows



Brick
Recourse rows, Lendager



Wood from cable reel
Villa Welpeloo- Superuse

Recycled facade materials



Steel contour plates
residual material from the
automotive industry



Fire treated wood



Recycled Plastic



Bricks made from demolition
waste



Recycled aluminium soda
cans

Biobased facade materials



Recycled granulated paper



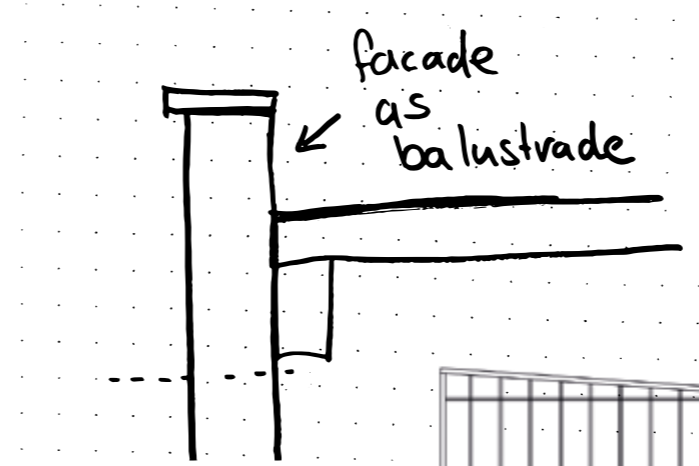
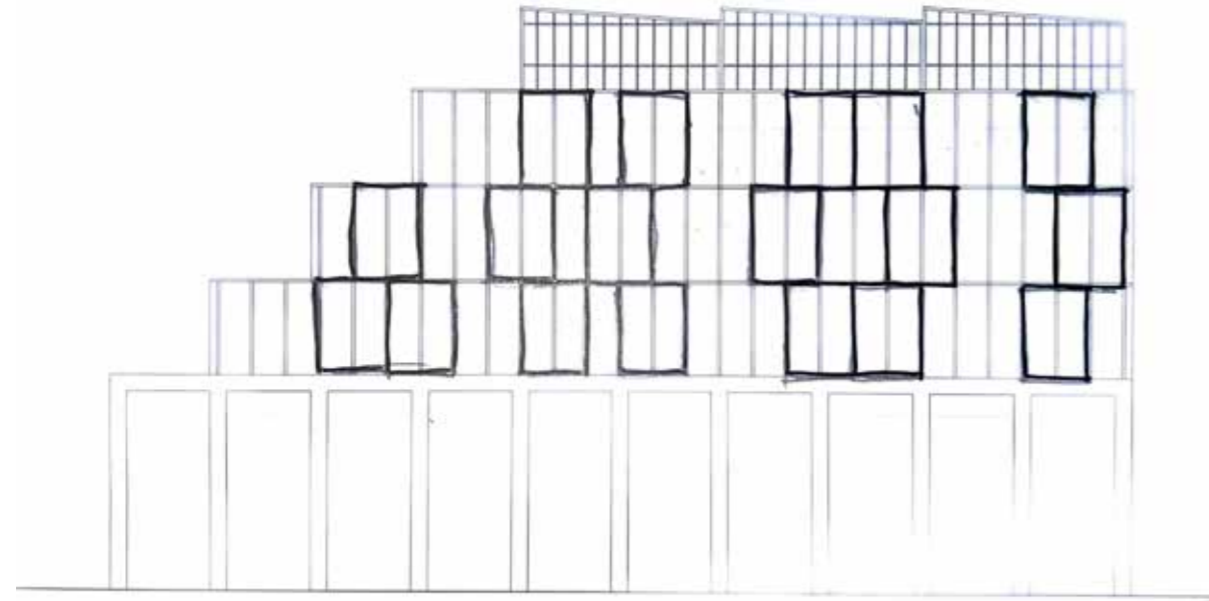
Recycled Glass



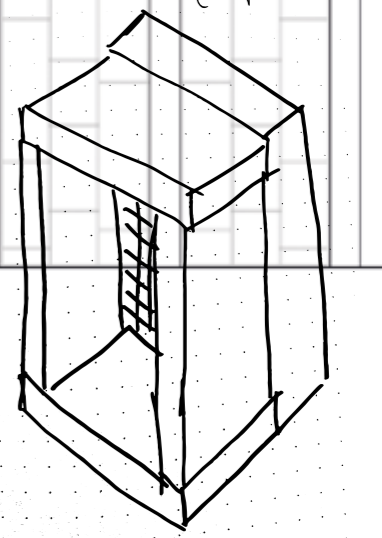
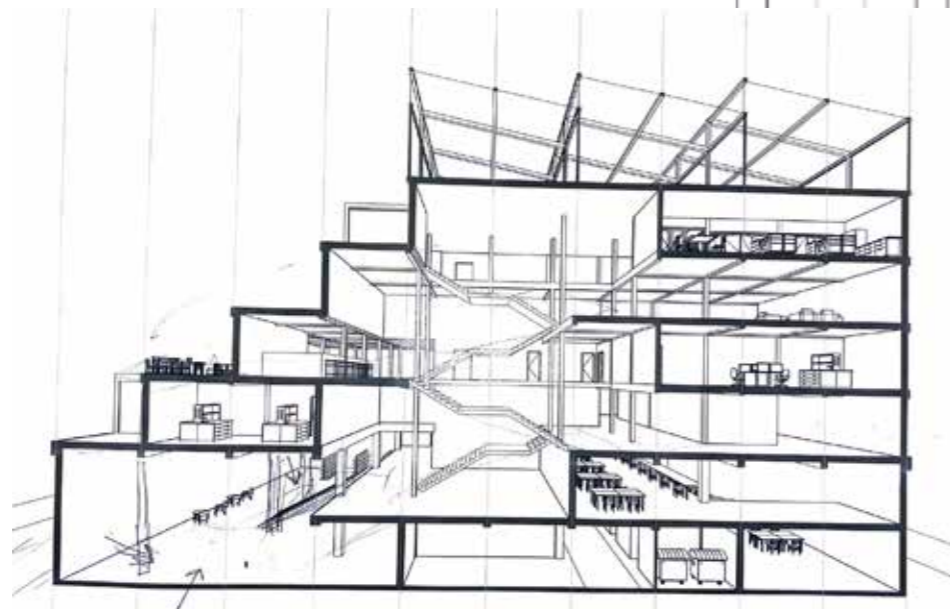
Nabasco Facades
Gevelpanelen van rietmaaisel



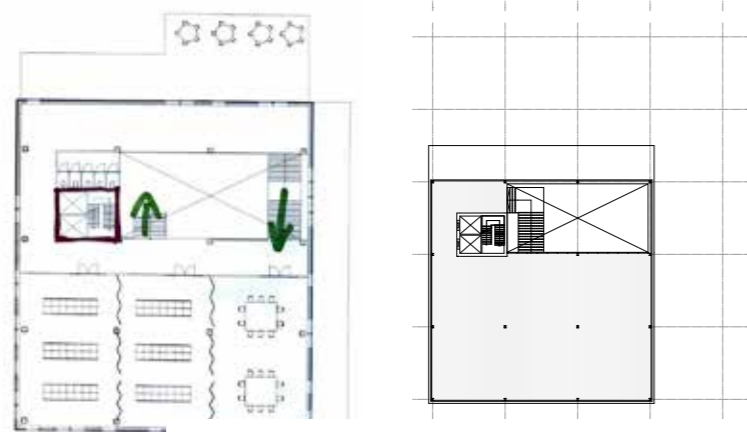
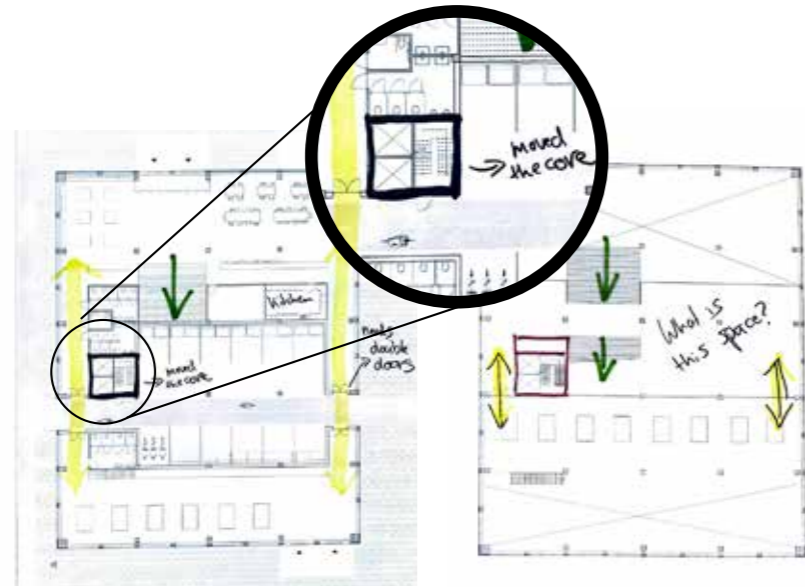
Biolith Tile
concrete tile with bacteria



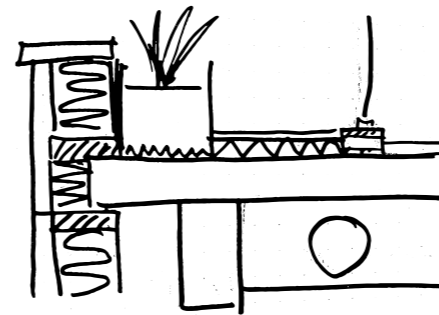
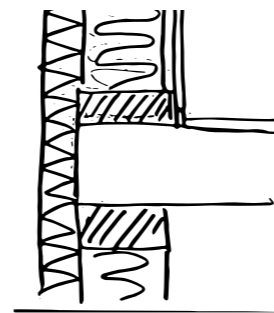
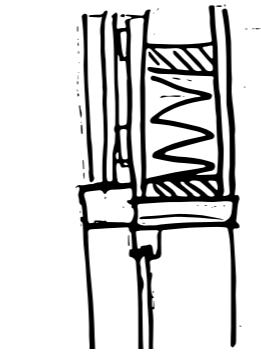
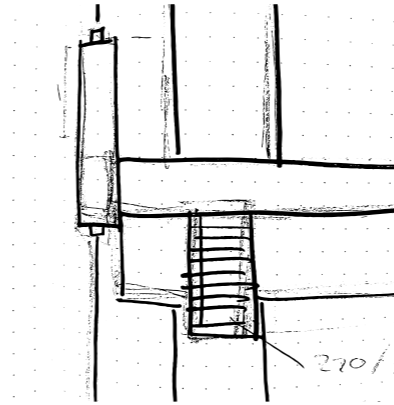
I explored the idea of designing a facade that incorporates the balustrades of the rooftop terraces, eliminating the need for visible railings. This concept uses two different module sizes in the facade. However, several issues remain—for instance, the facade does not align well with the underlying column structure.



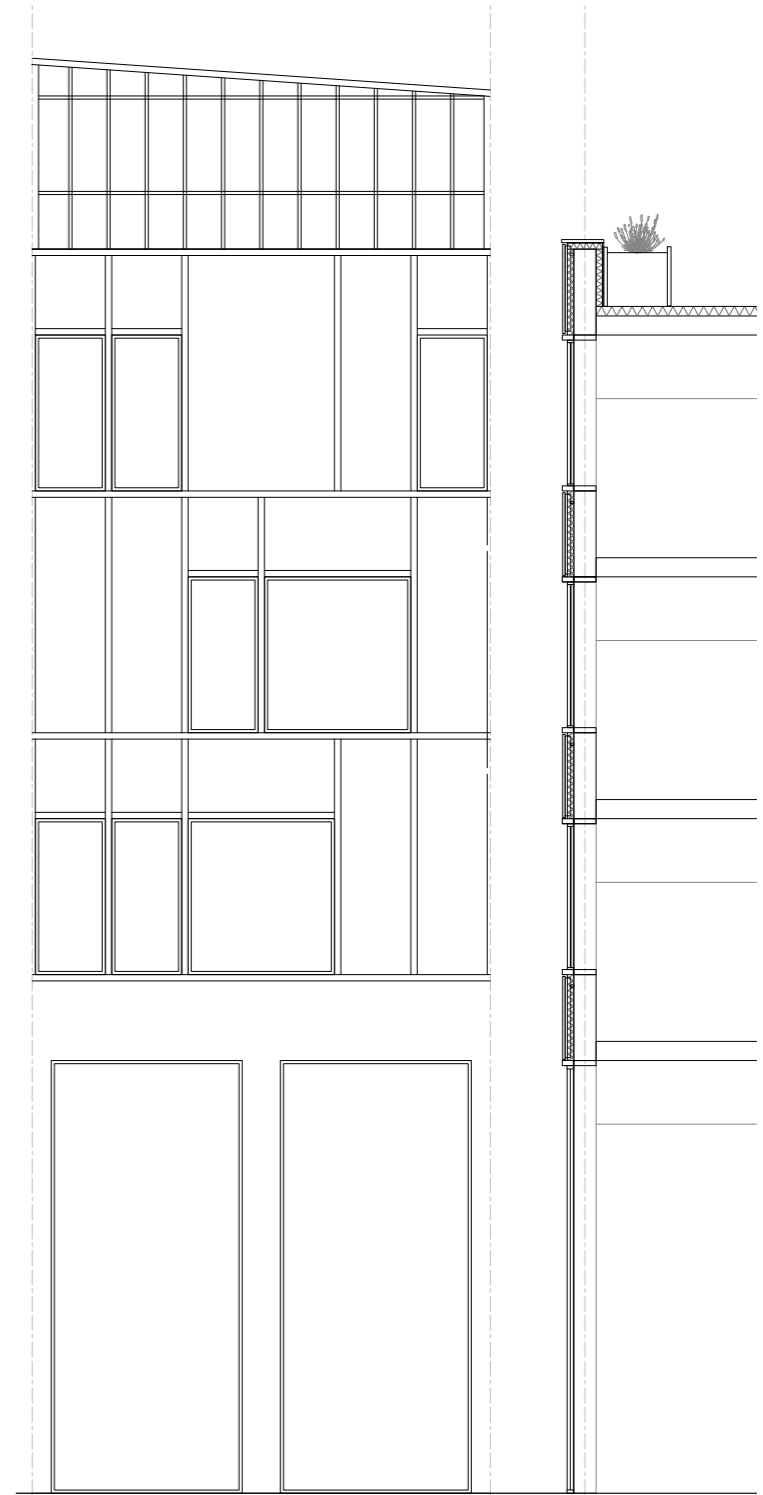
The facade uses a rhythm of wooden vertical slats that separate the different facade materials from each other.

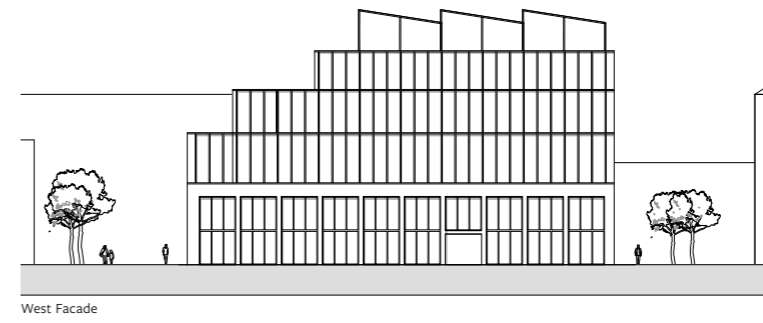
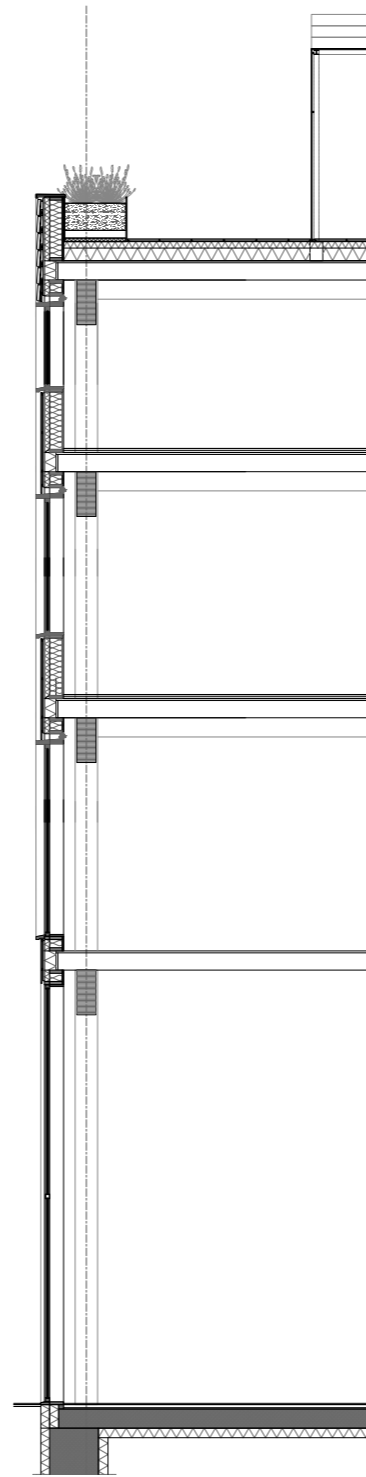


Further developing the floor plans, I relocated the core. Due to the stepped design, the original core didn't align well with the roof, so now the core is positioned more centrally within the building. Additionally, the circulation has been shifted from the center to the edges, with the central atrium connecting the floors.

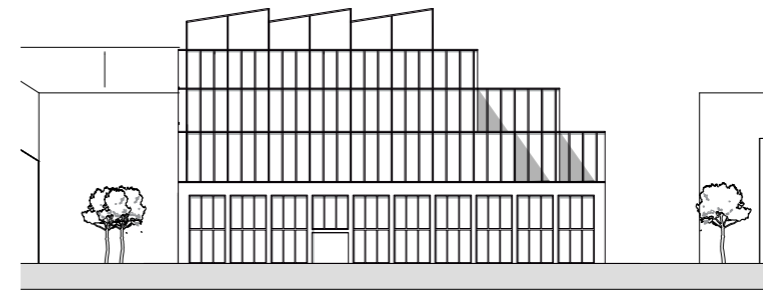


The process of detailing quickly encountered several challenges. By raising the facade at the terraces, this design change had to be extended across the rest of the facade, resulting in an odd rhythm. I also decided to add a wooden skeletal facade against the structure, which could be a prefab element.

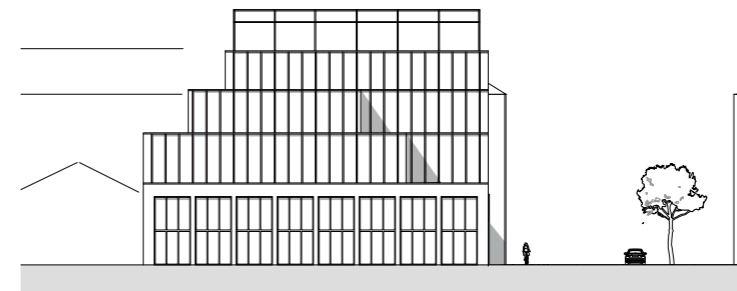




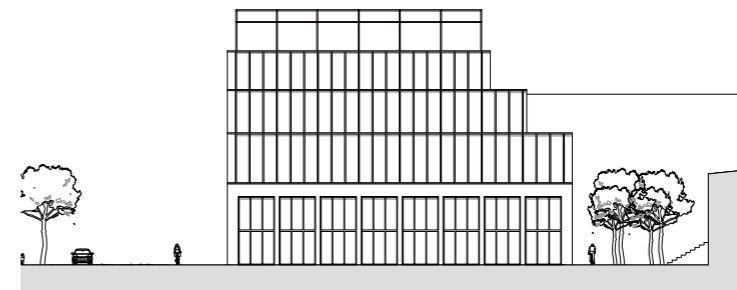
West Facade



East Facade



North Facade



South Facade

I explored the shifting of floor heights for different functions and how this affected the facade. The higher the floor, the lower the ceiling. However, this resulted in very small windows for the upper floors, and it also didn't connect well with the functions within the building.

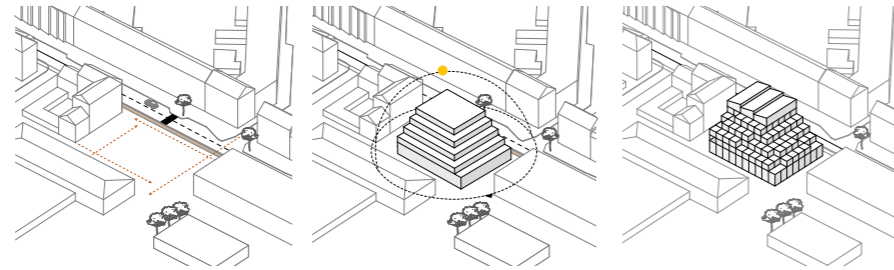
P3 Presentatie

TRASH INTO TREASURE

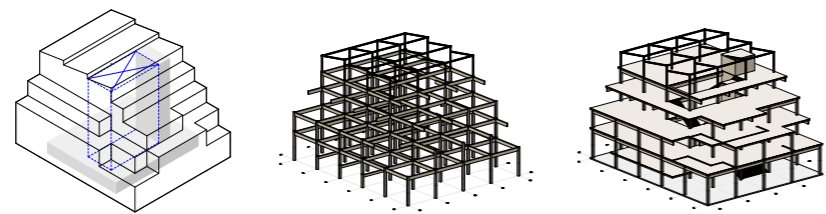
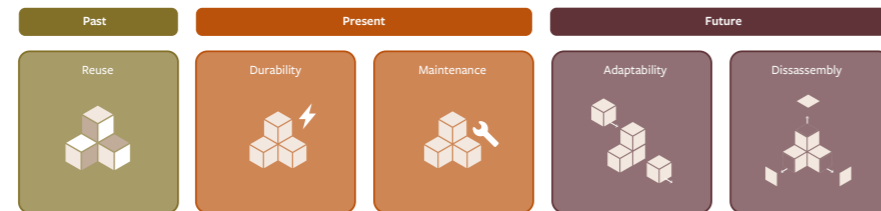
Designing a **Circular Public Condenser**
in Bispebjerg, Copenhagen

Marit Smit | P3, April 2025

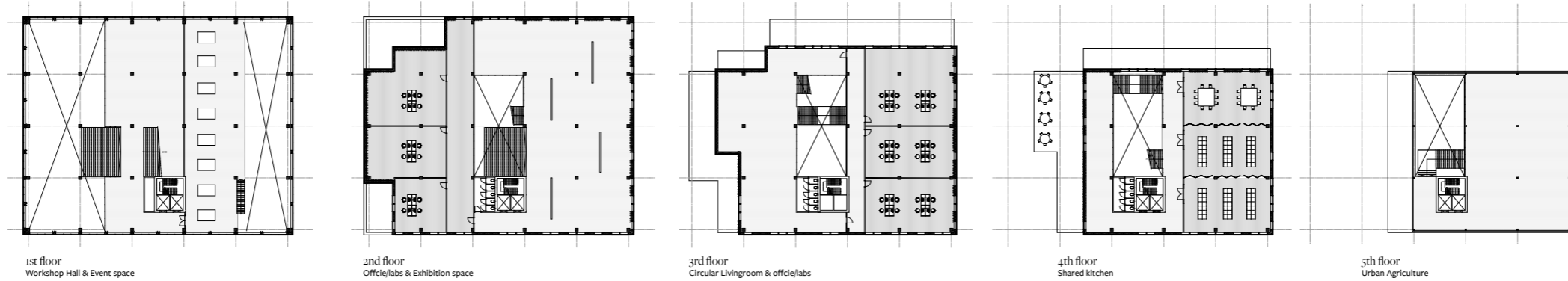
Concept



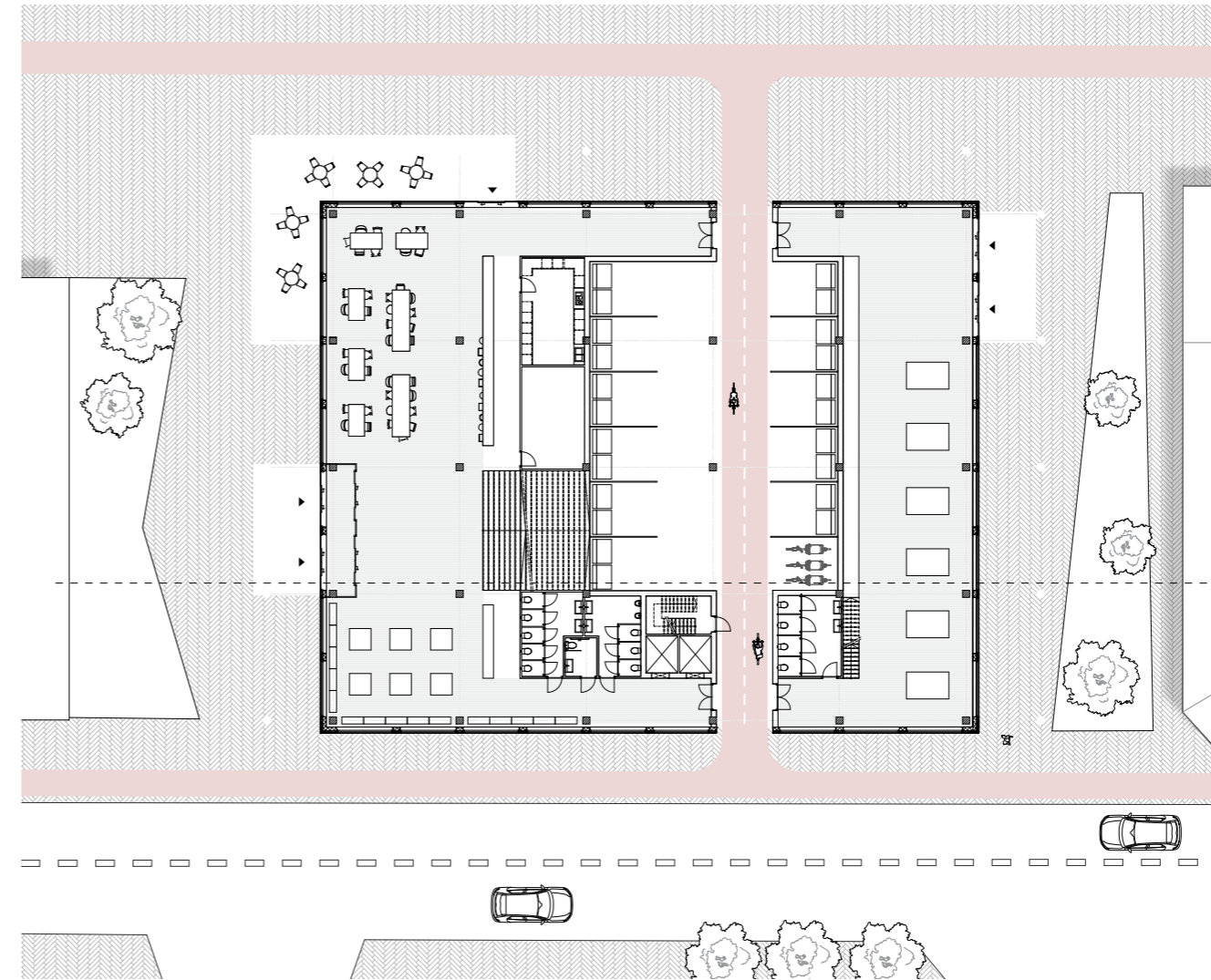
Circular Structure



Floorplans 1:200

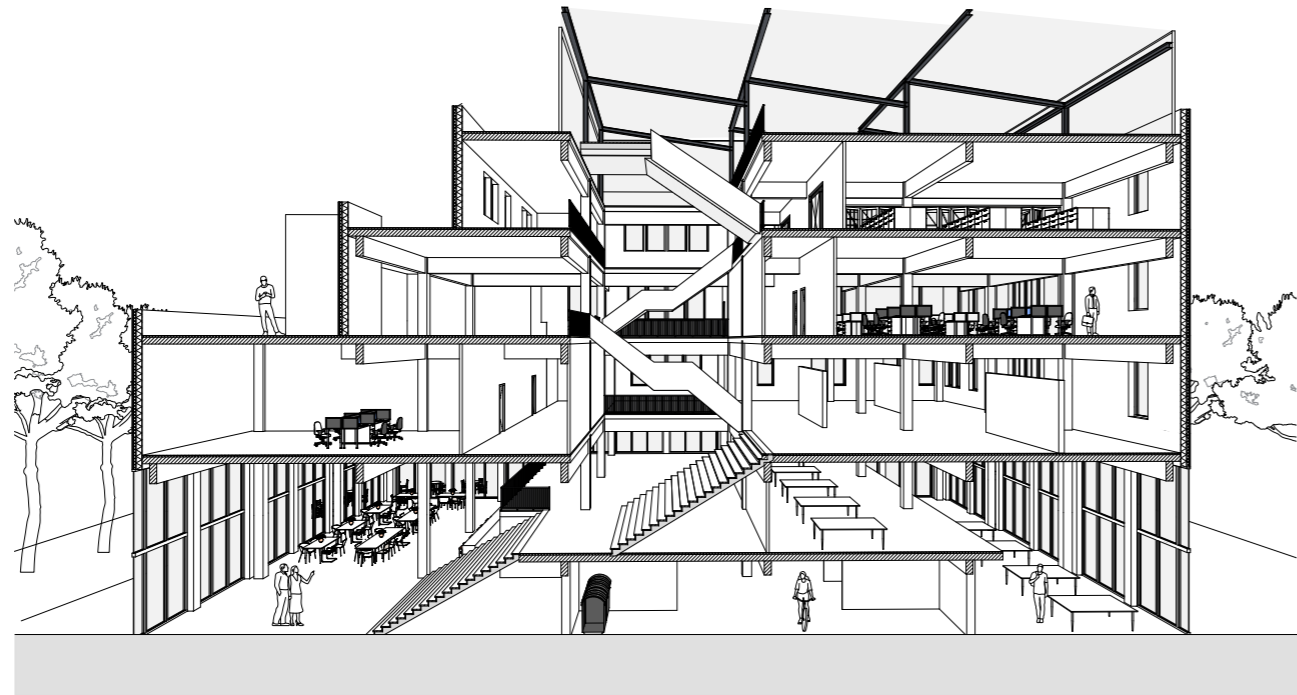


Ground floor 1:100



P3 Presentatie

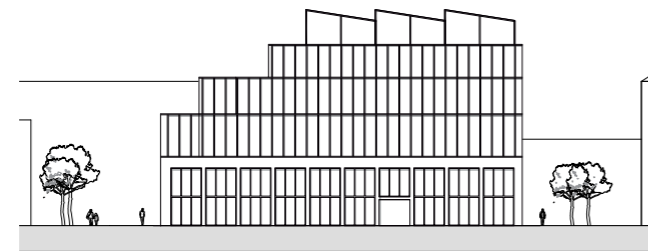
Section A-A



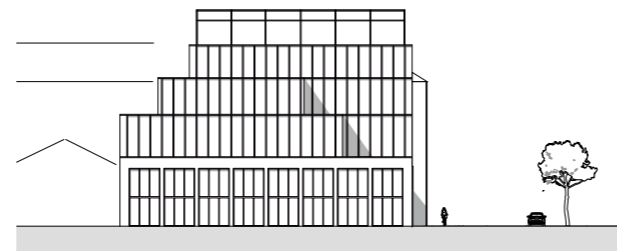
Detail 1:30



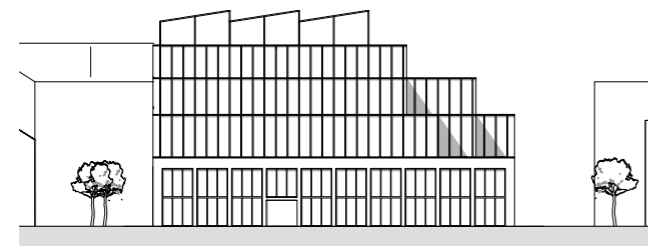
Facades



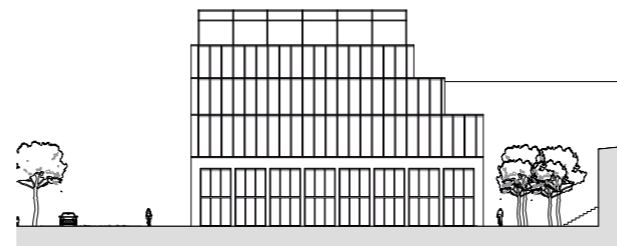
West Facade



North Facade



East Facade



South Facade



Looking back at the P3 presentation, it became clear that the origins of the various materials needed to be more clearly defined. I searched for a potential donor building for the design but was unable to find one. Instead, I looked for companies that collect and resell reclaimed building materials.



Genbyg

A timber store with everything in used building materials from newer thermal windows to used floorboards to unique finds from, for example, the Nimb hotel and restaurant in Tivoli or the old National Bank. - genbyg.dk



jk-recycling

Here you can find new and used building materials, including doors, windows, old floorboards, stairs, bricks, natural slate and granite as well as more special items such as tiled stoves and radiator covers. <https://jk-genbrugcenter.dk/>



J. Jensen A/S

J. Jensen A/S is a demolition company that sells used building materials from demolition contracts. From a 1,000 m2 warehouse, used doors and windows, floorboards, tiles, used bricks, etc <https://jensengenbrug.dk/>



Dem fra Nordlunde

Calls itself a different kind of lumber company. In addition to various materials, it also sells used building materials from demolition and acquisition. <https://demfranordlunde.dk/shop/254-brugt-marked>



Genbrugsbyg

Sells used doors, windows, building materials, electrical items and much more. recycledbyg.dk



Skave Nedbrydning

The site has a stock of new windows and doors from factory warehouses, used and new timber, iron, used interior and exterior doors, roof tiles and miscellaneous items from old houses. skave-nedbrødning.dk



Greendozer

Sells recycled and new basic and surplus goods – everything from demolition workers' building materials to craftsmen's surplus from construction projects and kitchen companies' display kitchens. <https://greendozer.com/>



PO Genbrug

Sale of used building materials. Here you will find, for example, interior and exterior doors, old and newer windows, floorboards, old glass, roof tiles and roof sheets. pogenbrug.dk



Jakobsen Tegl Aps - Bergsten Aps

Jakobsen Tegl is a company with more than 40 years of experience in collecting, sorting and selling used roof tiles and is one of Denmark's largest providers of recycled roof tiles. <https://teglageret.dk/>



Sanderum-Otterup Murerforretning

The company specializes in renovation and repairs of new and old roofs. Large stock of used roof tiles and a website with pictures so you can search for exactly the tile you are looking for. sanderum-otterup-murerforretning.dk



Gamle Mursten

Here you will find used, cleaned bricks for renovation and new construction projects. The company specializes in a special cleaning method and can clean up to 6,000 bricks per hour. gamlemursten.dk



Genbrugssten

Sells recycled bricks, which are cleaned bricks from demolition projects. In addition to selling cleaned bricks and shells. genbrugssten.dk



Klassiske Vinduer

Klassiske Vinduer buys used, preservation-worthy windows and doors, renovates them (including woodwork and new glass, but not always caulking) and resells them. <https://klassiske-vinduer.dk/>



GENTRÆ

GENTRÆ is part of STARK and offers collection of recyclable wood from professionals and on construction sites, which is subsequently cleaned and sold in STARK's hardware stores.



Burnt Wood

Burnt Wood collects and receives untreated recycled wood – typically from recycling stations and businesses – to make their Rewood Facade elements. <https://www.burntwood.dk/>



Dewdrop Tiles

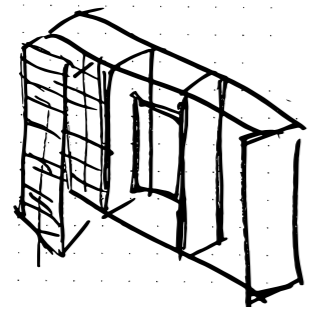
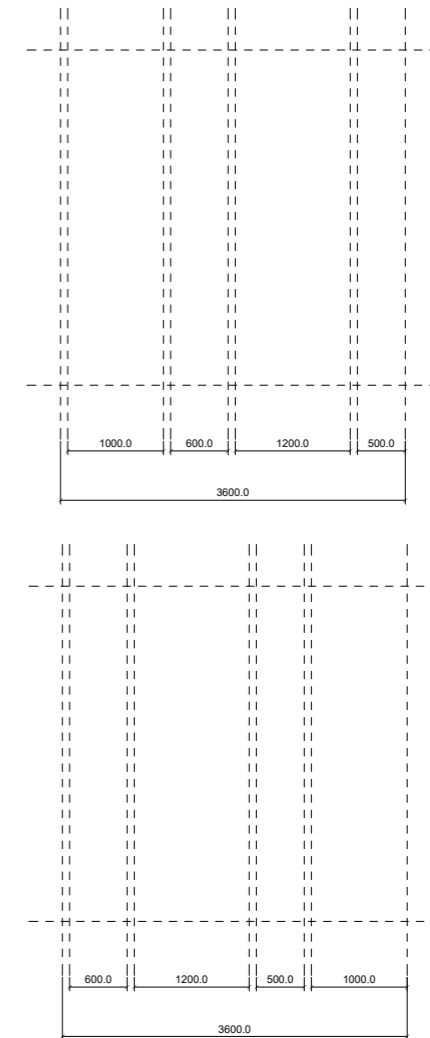
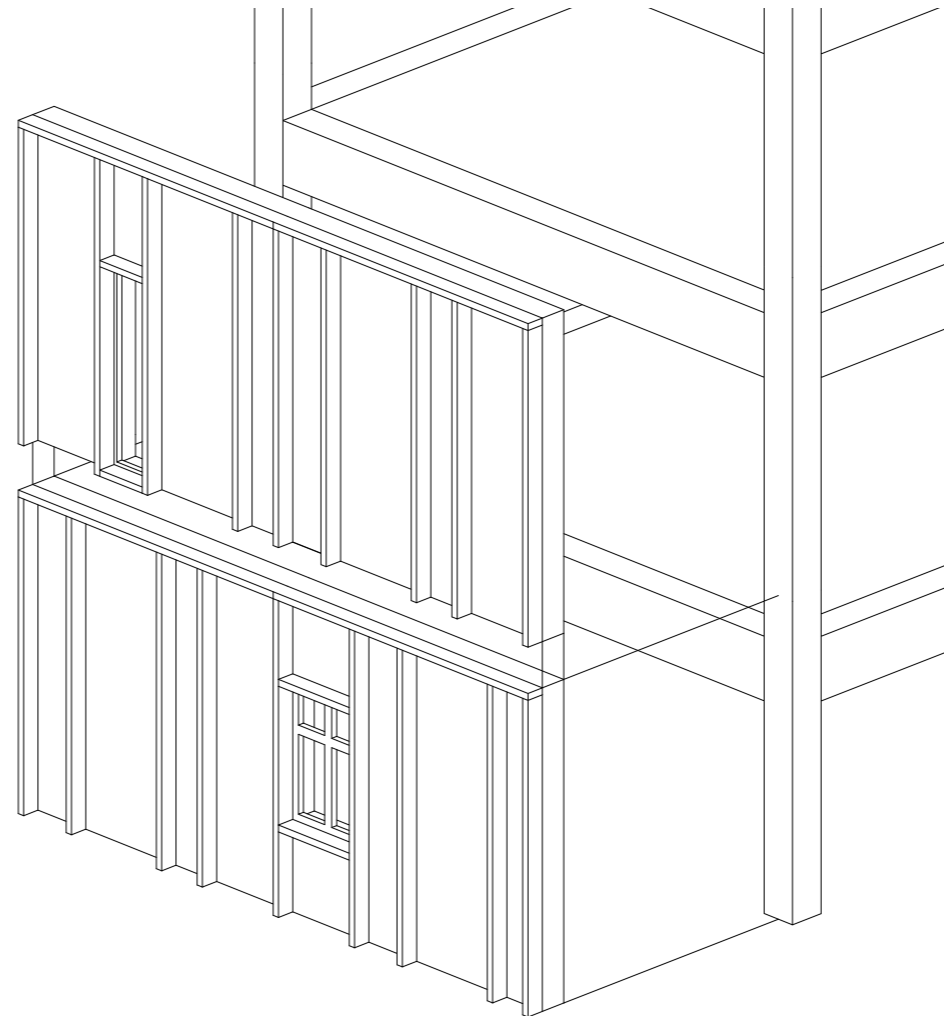
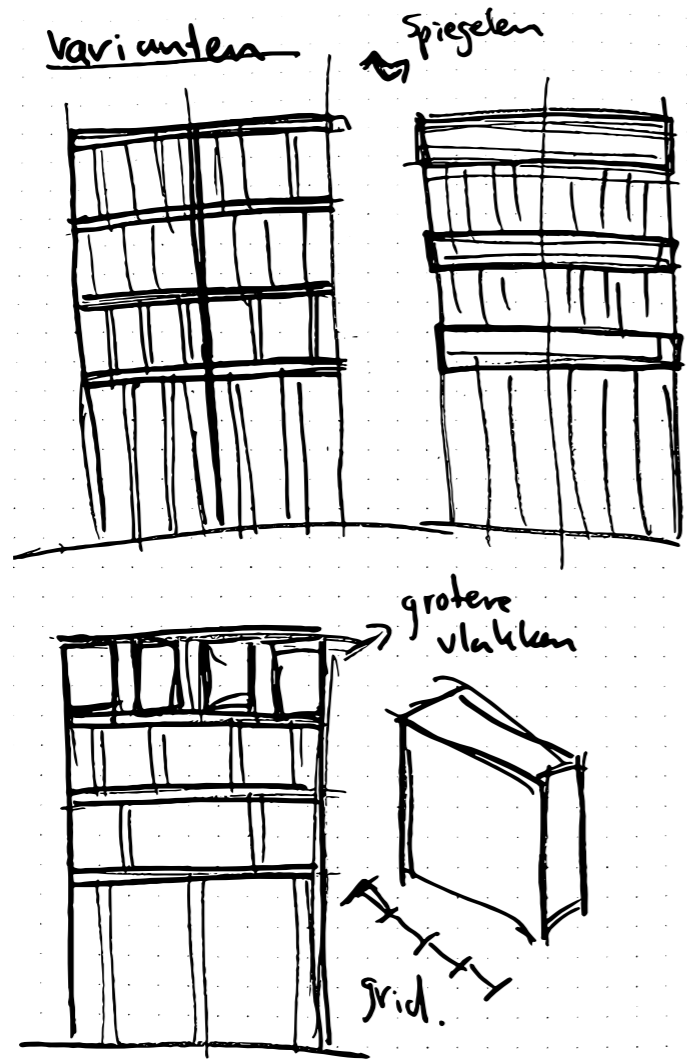
Dewdrop Tiles designs and produces unique circular tile solutions that reduce construction waste. <https://dewdroptiles.dk/>



Fischer Lighting

Fischer Lighting repairs, refurbishes, upgrades to LED and resells used lighting fixtures and components from renovations and demolitions. <https://fischer-lighting.com/>

  <p>40x window 426 cmx1094 cmx71mm 3-layer glass Kattinge, Varmevej.</p>	  <p>15x window 130x218 Greendozer, Hovedgård</p>	  <p>6x window 1458cmx2198cmx124cm 3-layer glass Greendozer, Hovedgård</p>	  <p>21x window 120x212 jk-genbrugcenter</p>	  <p>54x window 1350cmx1480cmx115cm 3-layer glass Genbyg, Amager</p>
  <p>20x window 120x80 skave-nedbrydning</p>	  <p>7x window 958x2498x115 m 3-layer glass Greendozer, Hovedgård</p>	  <p>19x window 130x138 Greendozer, Hovedgård</p>	  <p>32x window 100x132 jk-genbrugcenter</p>	  <p>24x window 1180x1180x125 3-layer glass Genbyg, Amager</p>
  <p>17x window 590x124x2178mm 3-layer glass Greendozer, Hovedgård</p>	  <p>15x window 918x2198x125 m 3-layer glass Greendozer, Hovedgård</p>	  <p>25x window 130x136 jk-genbrugcenter</p>	  <p>49x window 100x139 jk-genbrugcenter</p>	  <p>11x window 1215x1348x210 3-layer glass Genbyg, Amager</p>
  <p>10x window 1000x115x1460mm Greendozer, Hovedgård</p>	  <p>24x window 1182x2321x150 m 3-layer glass Greendozer, Hovedgård</p>	  <p>23x window 130x130 jk-genbrugcenter</p>	  <p>30x window 107x119 jk-genbrugcenter</p>	
  <p>10x window 995x115x1963mm Greendozer, Hovedgård</p>	  <p>10x window 1520cmx2034cmx122cm 3-layer glass Greendozer, Hovedgård</p>	  <p>13x window 120x238 jk-genbrugcenter</p>	  <p>26x window 1180x1480x115 3-layer glass Genbyg, Amager</p>	



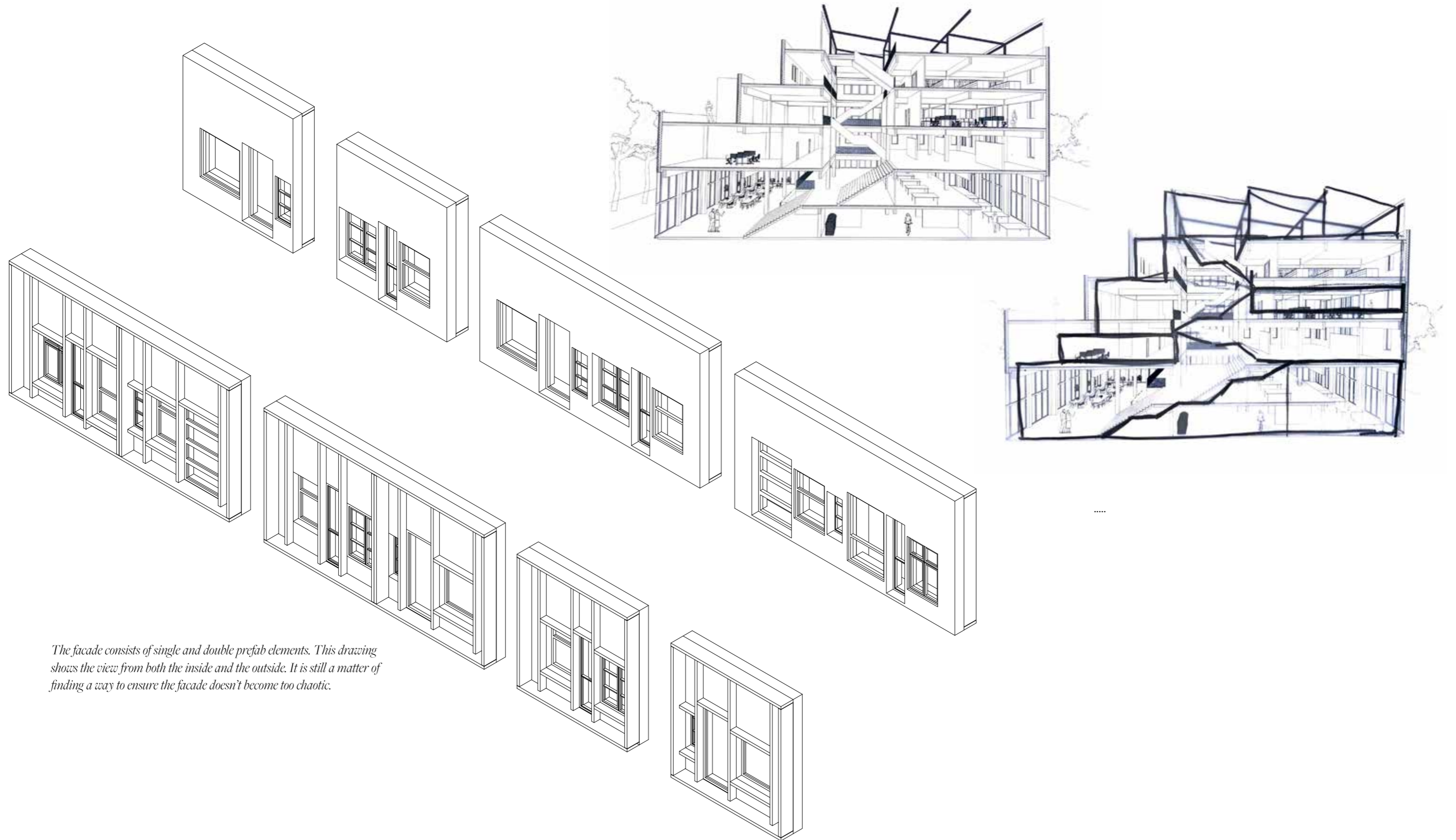
Elys Cultur
 - 40% wood
 frame facade of
 timber salvaged
 from dismantled
 buildings
 - Cut-offs
 Rockwool from
 construction sites



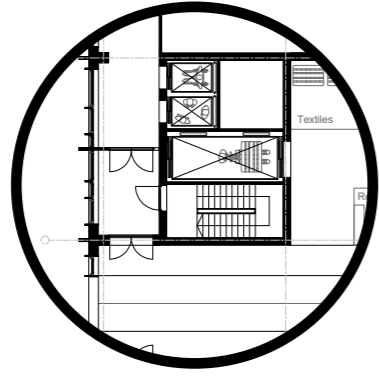
The concept for the facade is a prefab system in which various reused windows are integrated. The elements follow a rhythm based on the most common window widths, allowing for the placement of different windows within each element.



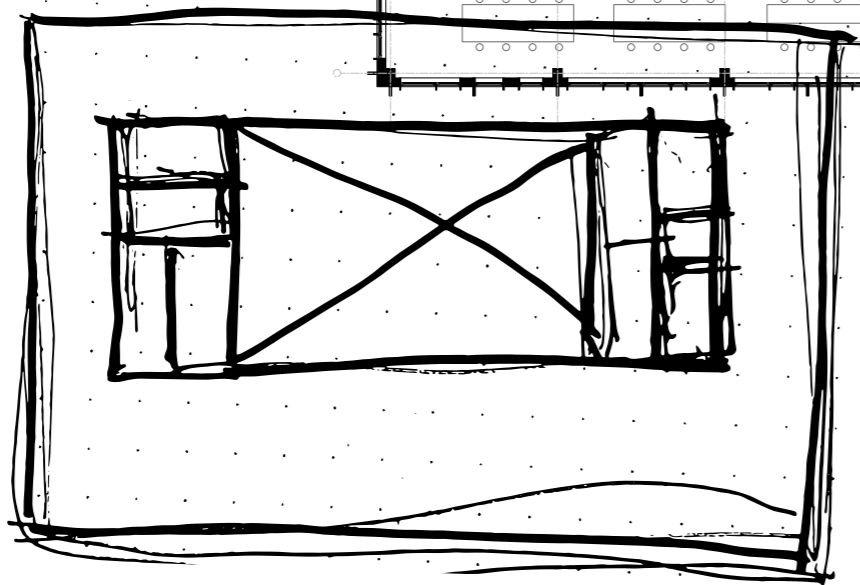
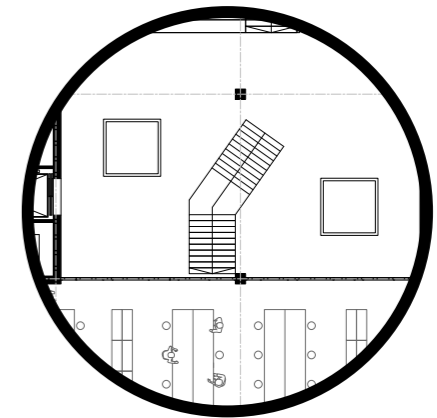
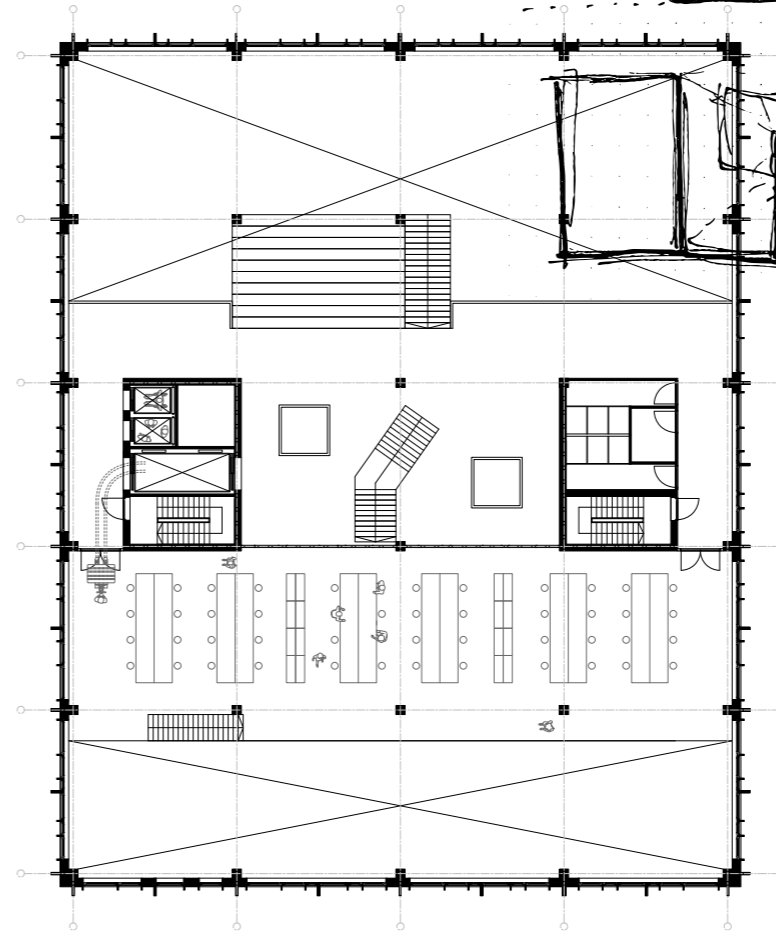
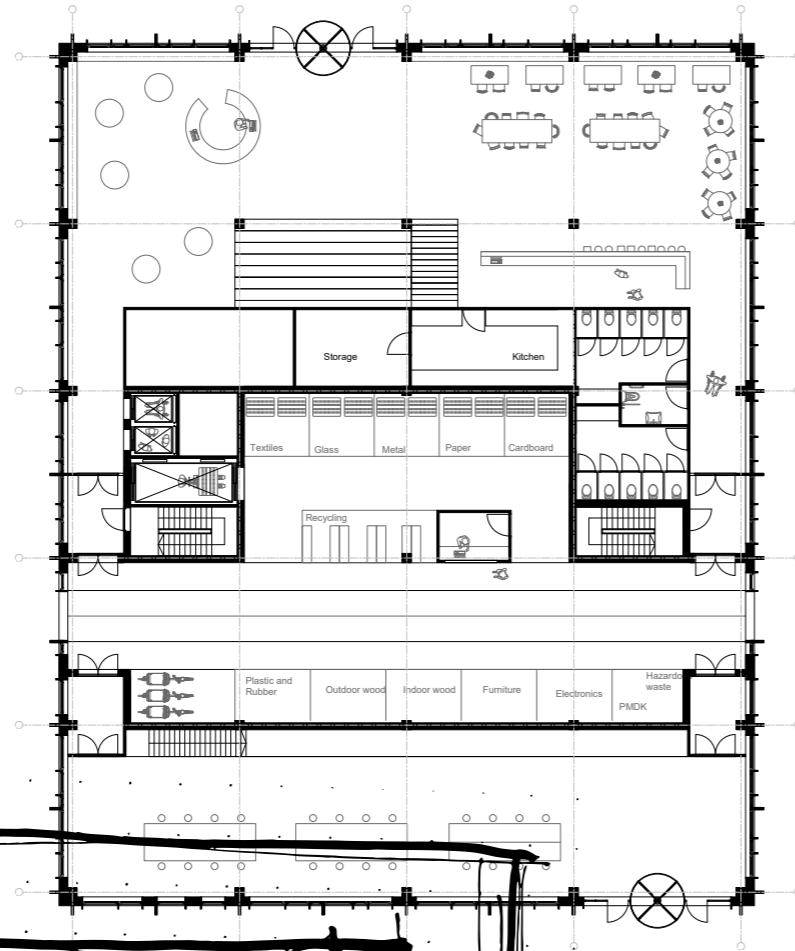
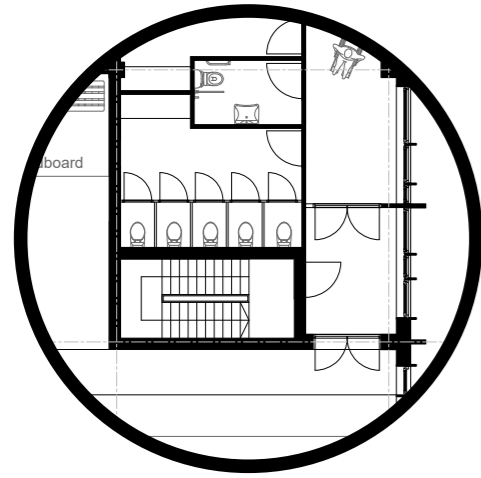
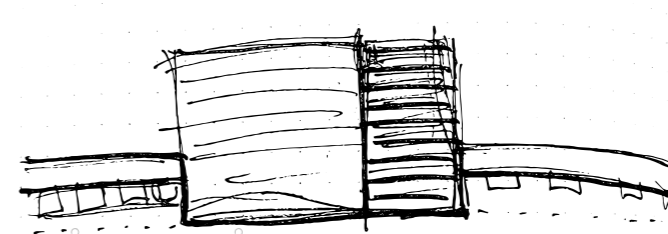
Between the windows, different facade materials are used. It's important to check whether enough windows can be placed without making the spaces too dark. Additionally, it might be challenging to incorporate reused windows on the ground floor, where an open glass facade would be more desirable to create a transparent, welcoming character for the building.



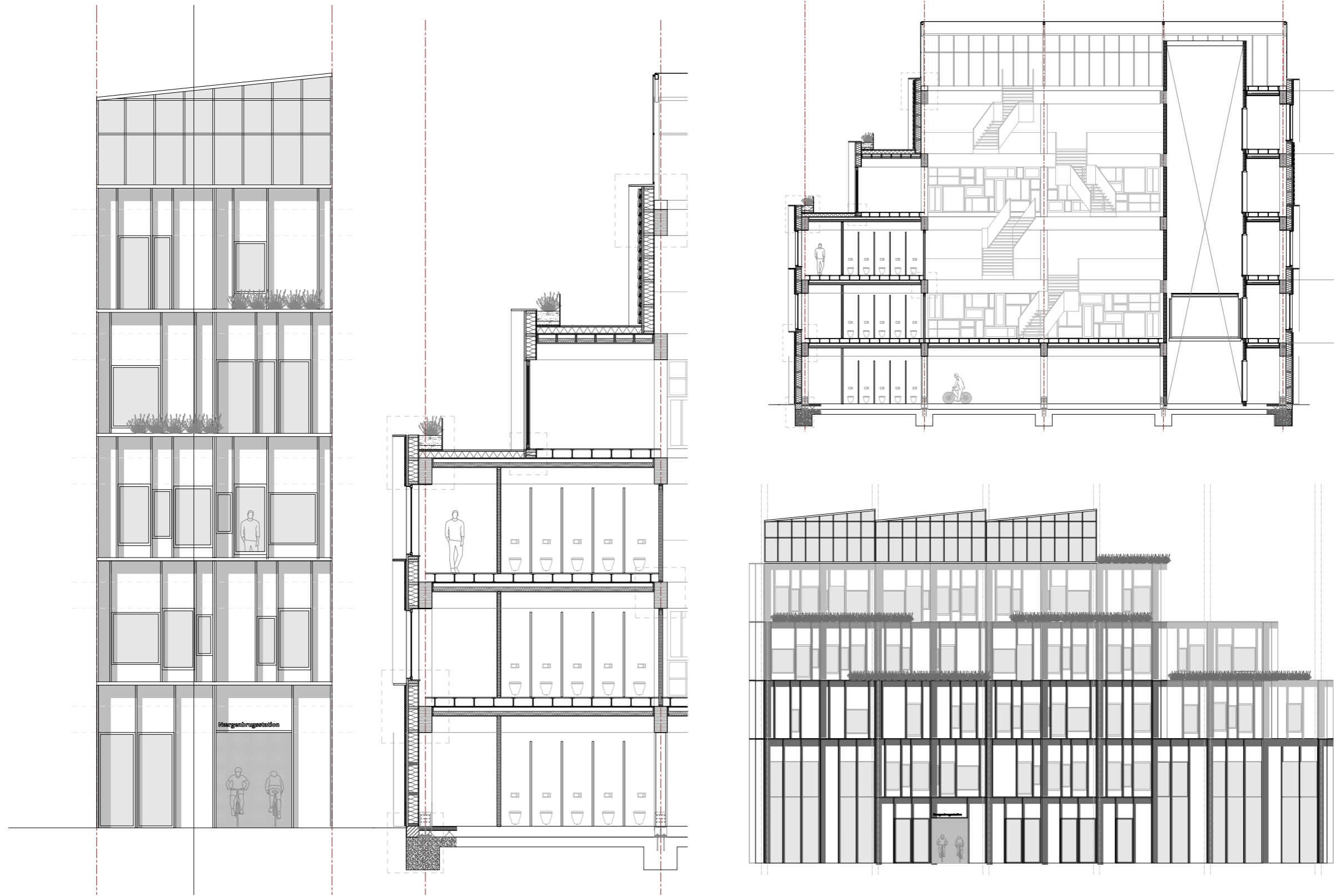
The facade consists of single and double prefab elements. This drawing shows the view from both the inside and the outside. It is still a matter of finding a way to ensure the facade doesn't become too chaotic.

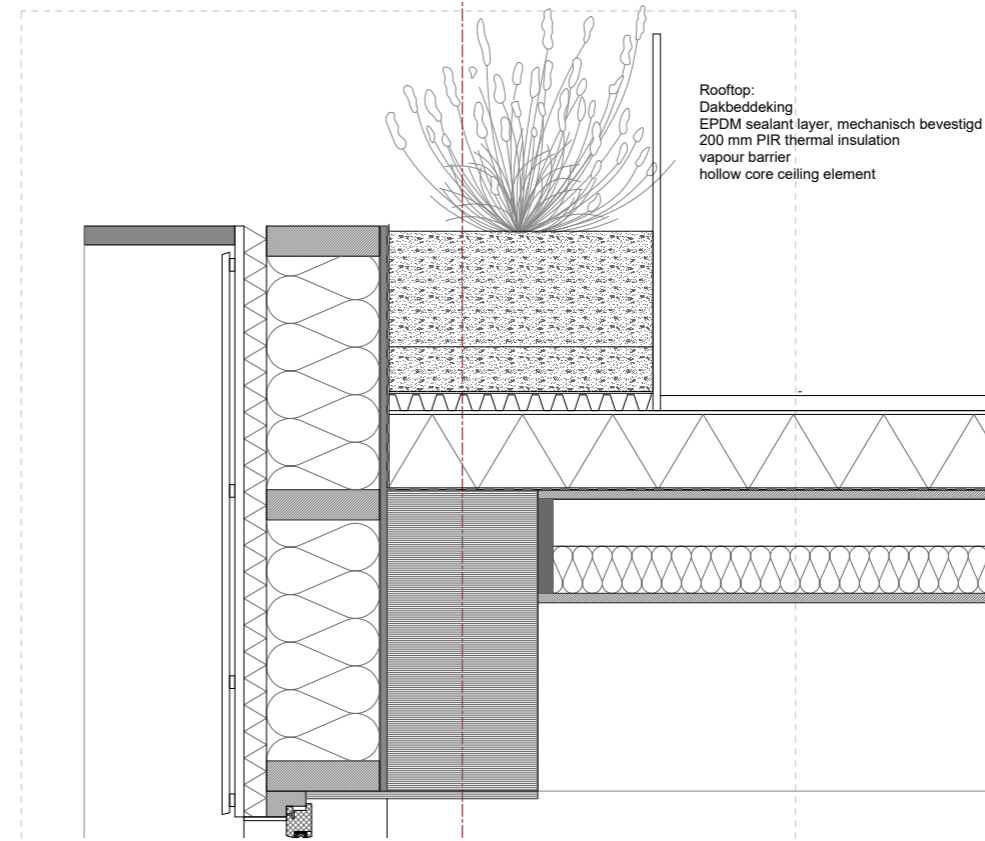
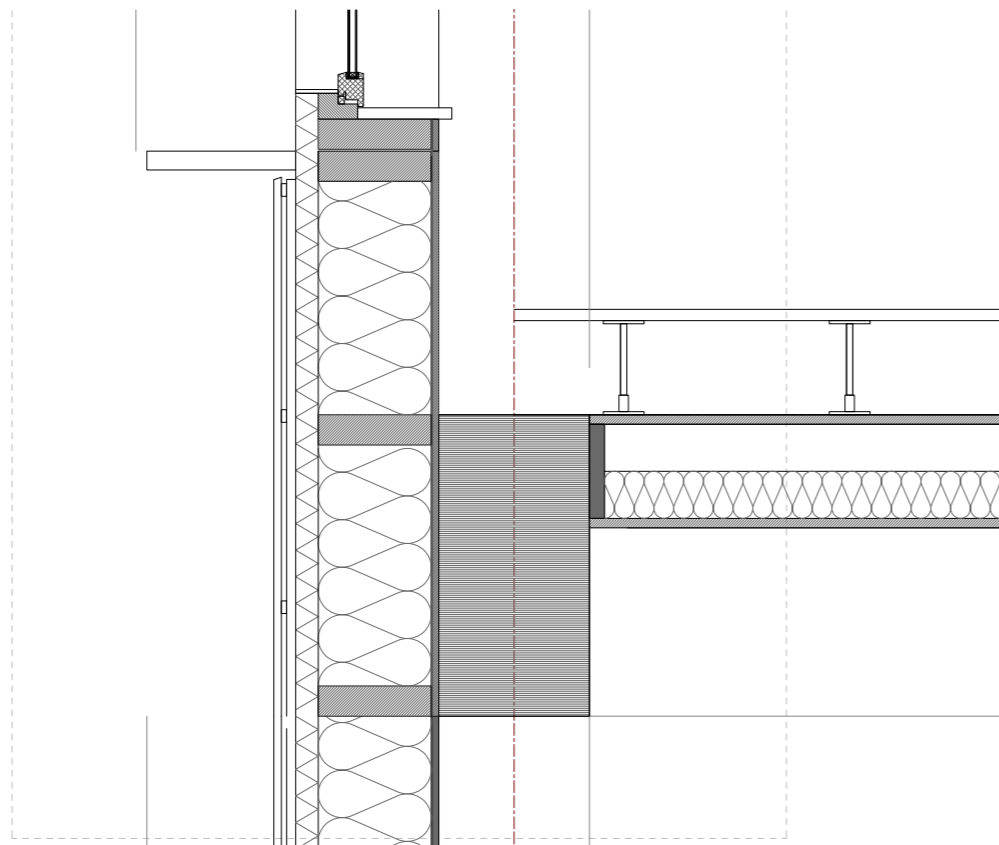
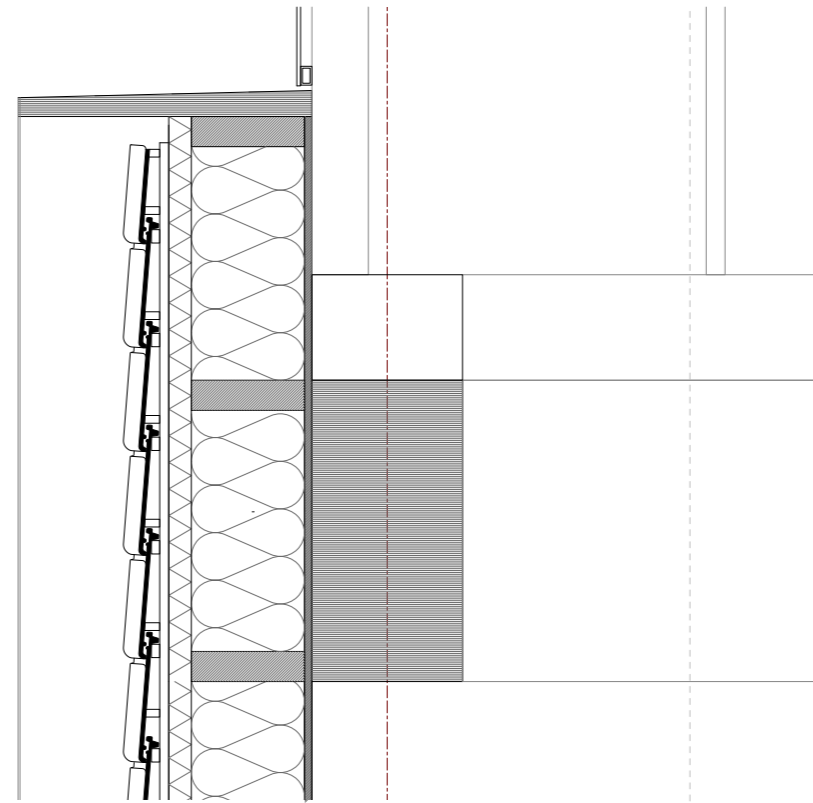
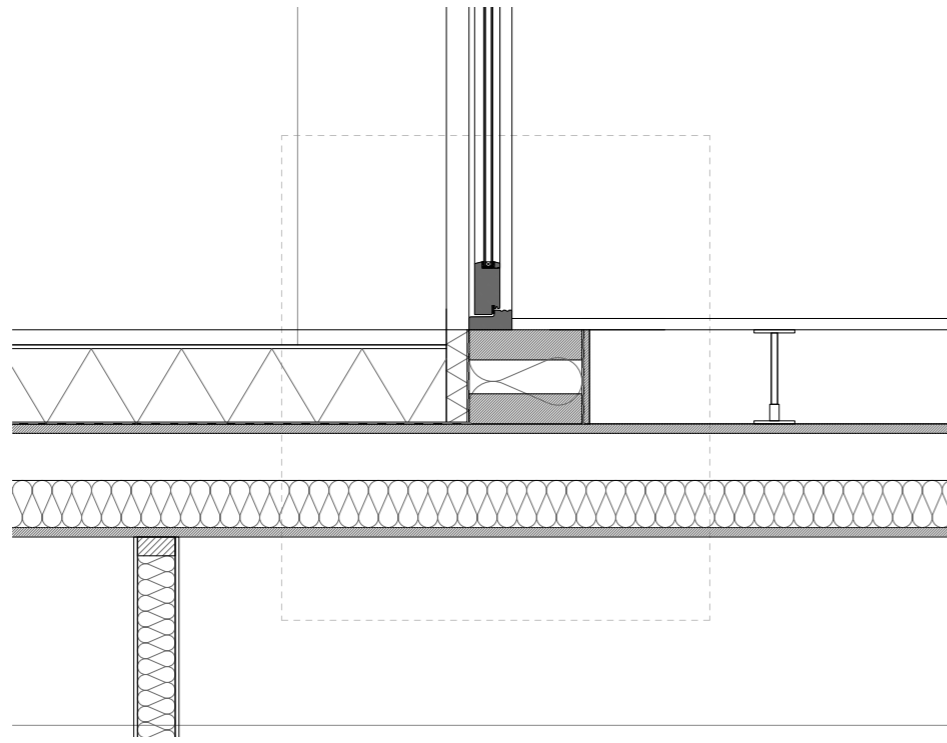


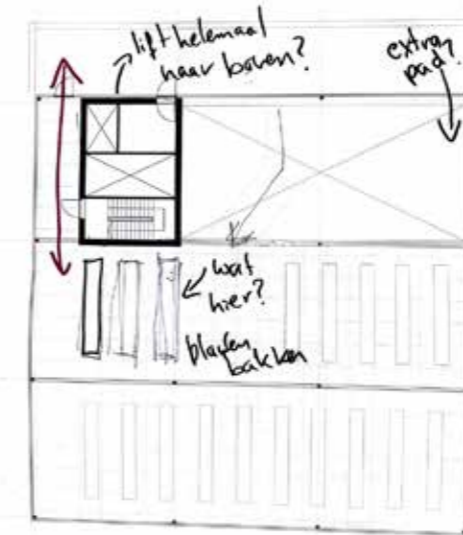
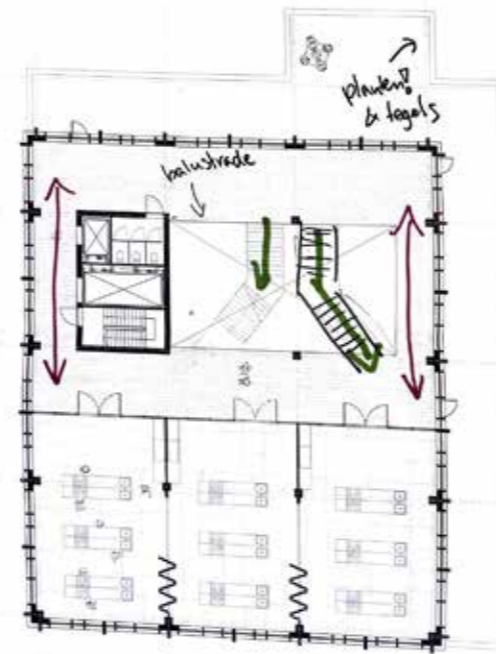
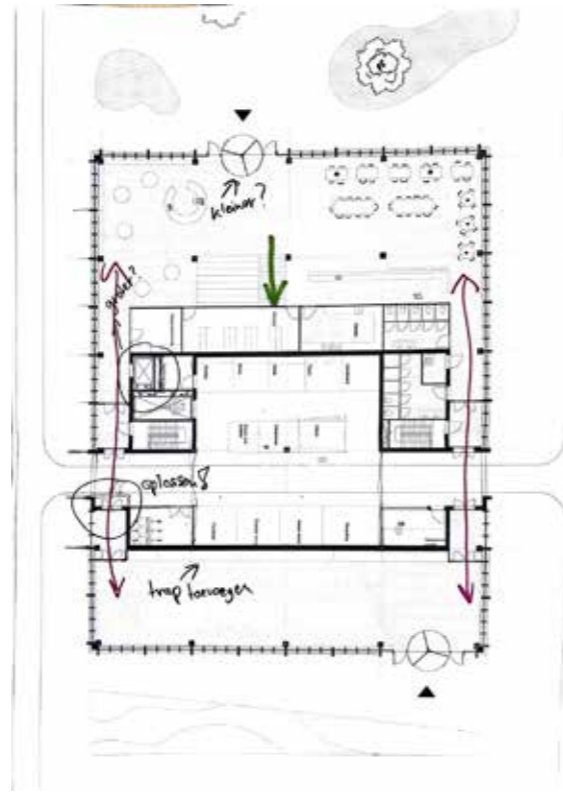
To ensure there are enough escape routes, I added a second core, which extends up to the third floor. Since the facade steps back at this level, the core cannot go any higher. This core also accommodates larger restrooms.



Additionally, I've considered how I want to design the staircases. Currently, they are quite simple, but I believe they could be more exciting and become a statement element within the building.







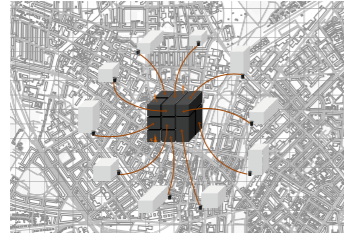
P4 Presentation

TRASH INTO TREASURE

Designing a **Circular Public Condenser**
in Bispebjerg, Copenhagen

Marit Smit | P4, May 2025

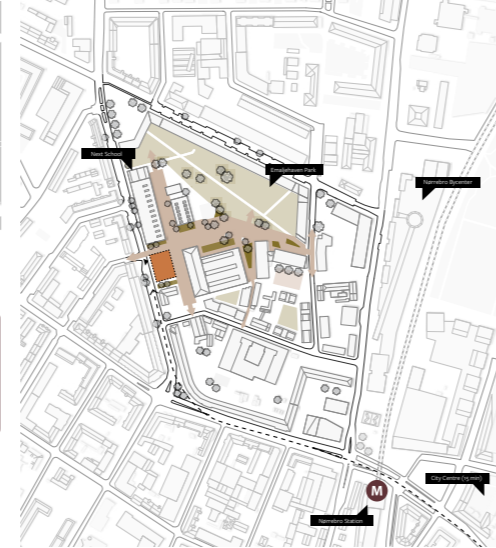
Concept Diagram



Map Copenhagen 1:40000



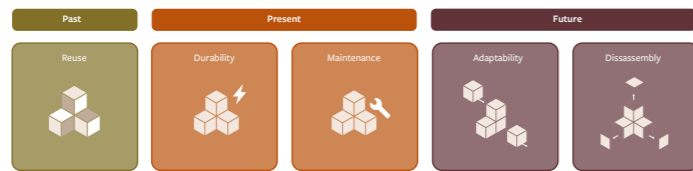
Urban Plan



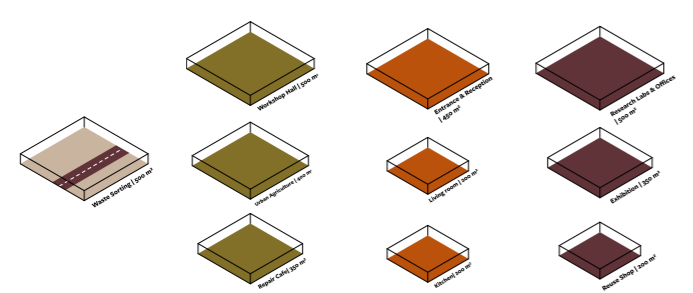
Axonomic view



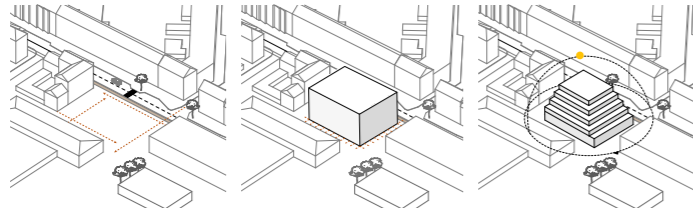
Circular Structure



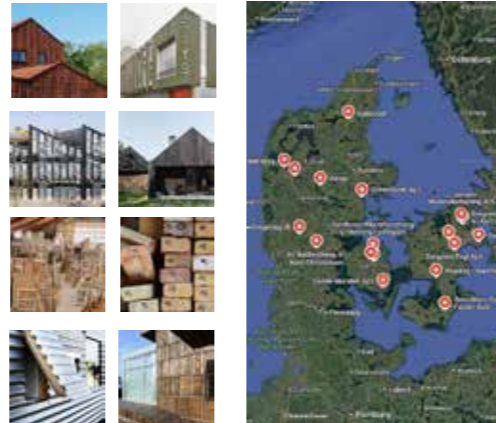
Circular Program



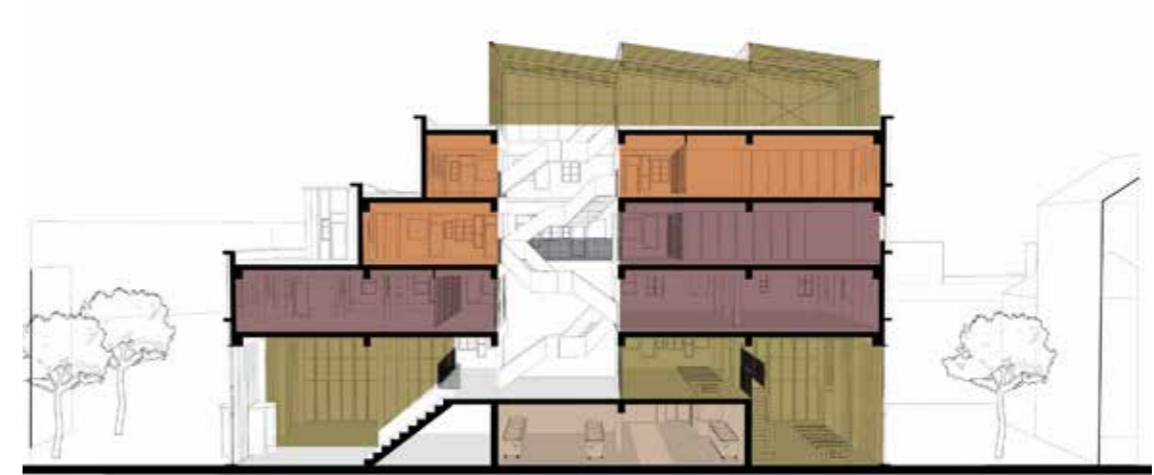
Concept diagram



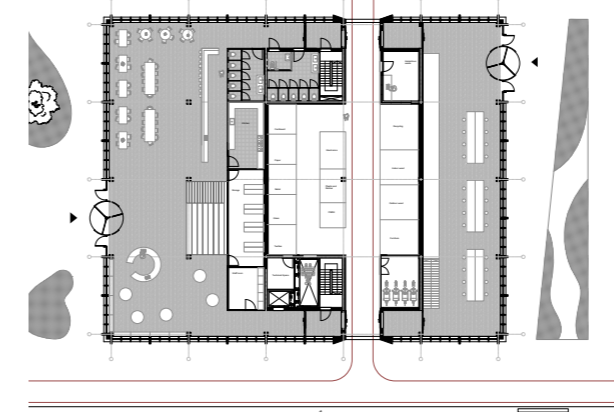
Material Research



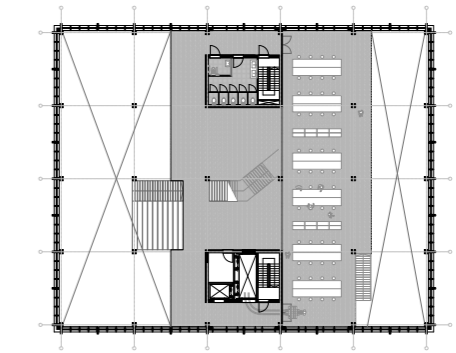
Building section



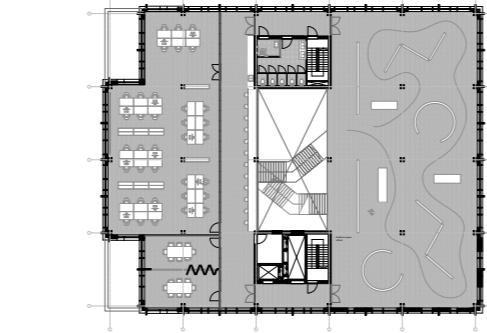
Ground floor, recycle centre, repair cafe, reuse shop and workshop hall



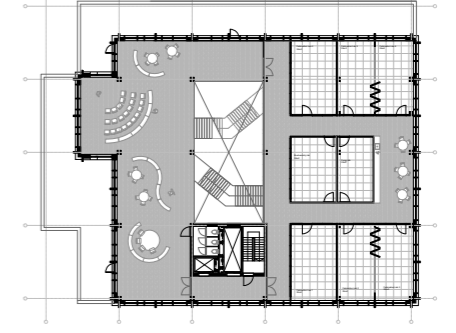
1st floor, workshop hall



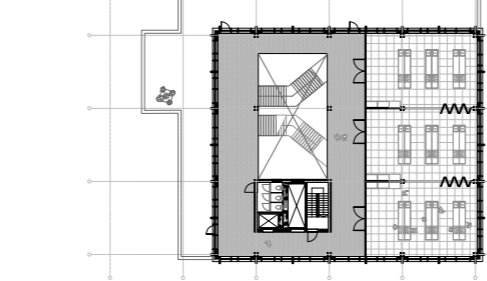
2nd floor, exhibition hall & flex workspaces



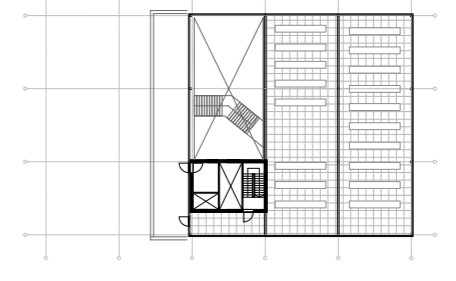
3rd floor, production labs and circular workshop space



4th floor, kitchen



5th floor, greenhouse

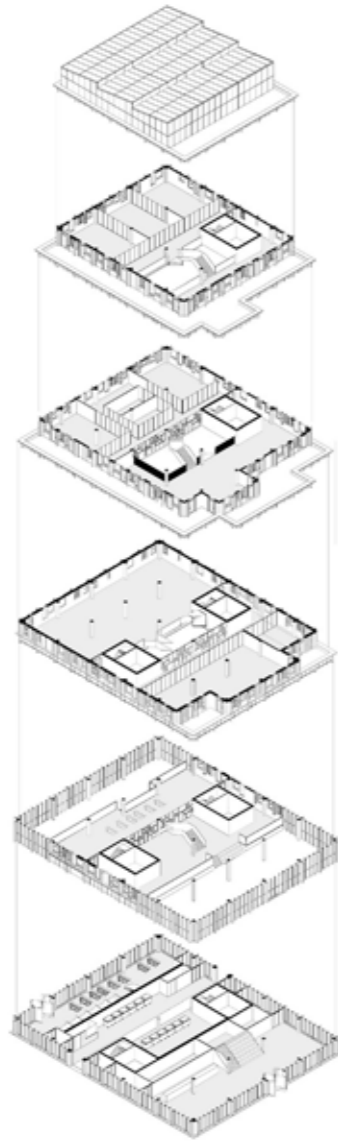


P4 Presentation

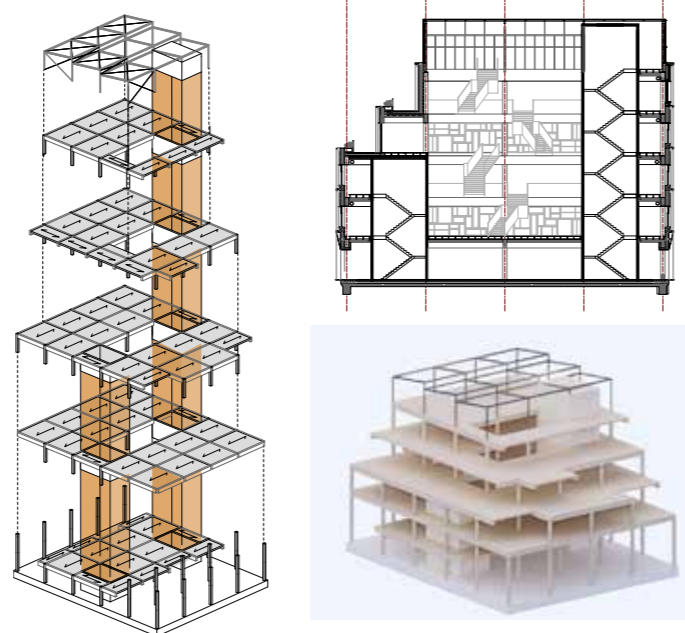
Exterior view



Exploded axo



Building structure



Facade elements

