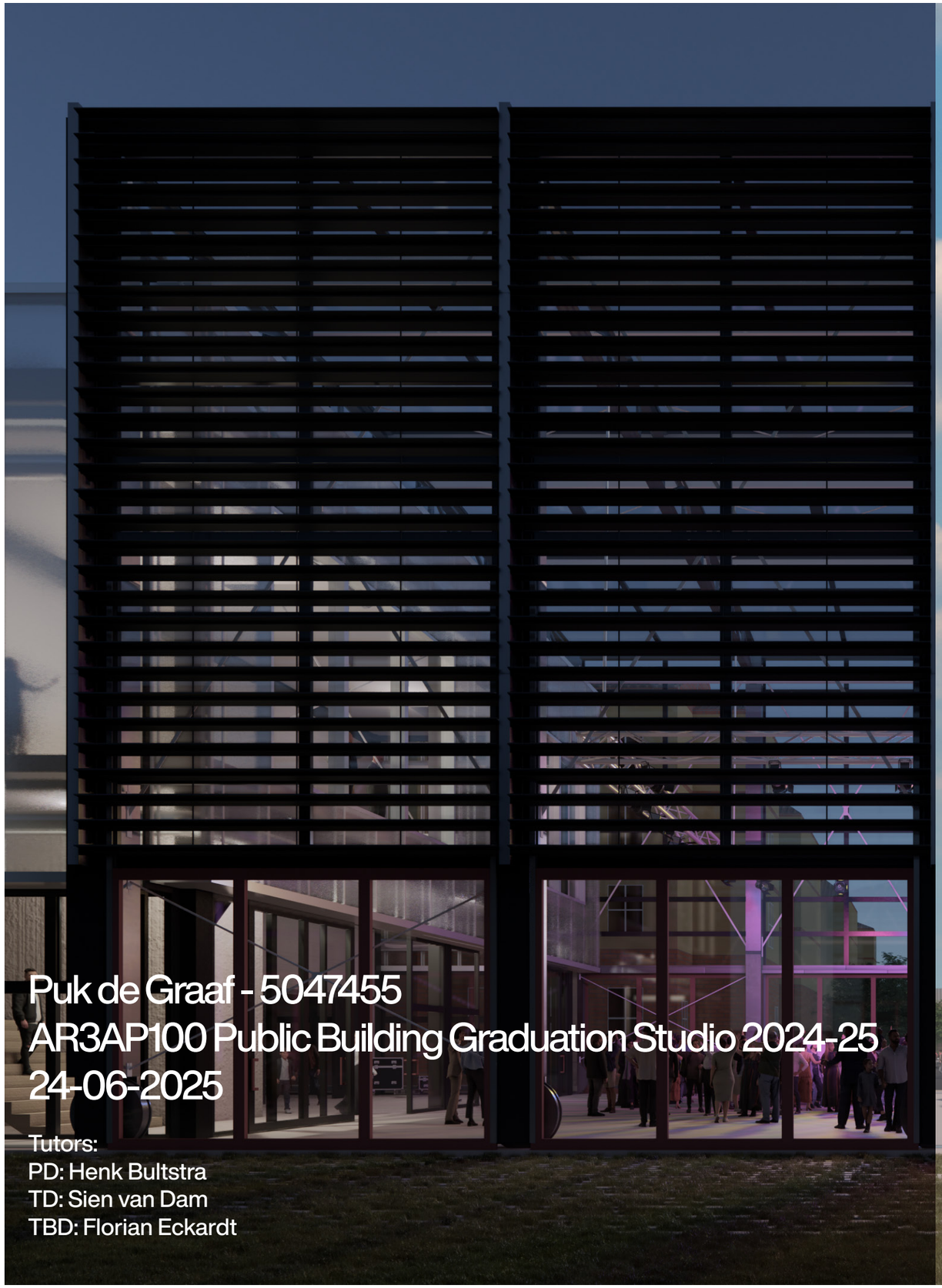
Graduation Report



Puk de Graaf - 5047455

AR3AP100 Public Building Graduation Studio 2024-25

24-06-2025

Tutors:
PD: Henk Bultstra
TD: Sien van Dam
TBD: Florian Eckardt

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Personal information	
Name	**Puk de Graaf**
Student number	5047455

Studio		
Name / Theme	Public Building: Public Condenser	
Main mentor	Henk Bultstra	Project Design
Second mentor Third mentor	Florian Eckardt Sien van Dam	Technical Building Design Theory & Delineation
Argumentation of choice of the studio	I enjoy the inherent complexity of designing public buildings. In my view, mixed-use public architecture should address the social needs of its environment, respond to user requirements, and create spatial relationships between different uses that enhance the overall user experience. Solving this complex puzzle—balancing requirements, user experience, and functional arrangement, while simultaneously creating a large piece of architecture that positively impacts its surroundings—is what I love about designing architecture.	

Graduation project	
Title of the graduation project	**From craft to community**
Goal	
Location:	Sundholm, Copenhagen
The posed problem,	Most public buildings are designed with fixed functions, resulting in limited adaptability to changing societal needs and environmental conditions. This results in suboptimal use of building space and causes the building to have a shorter functional lifespan. This limited adaptability is especially inefficient in today's urban context, where space is scarce and society's needs change quickly. To make public buildings more future-resistant, it is important for public buildings to be designed with inclusivity and adaptability to increase their resilience. This resilience is especially important for public condensers, which are public buildings that serve as social condensers within their community, providing inclusive functionality for their different users. For a public condenser to be truly resilient, it should be able to adapt to its users (social resilience) and environmental needs (functional resilience).
	Through functional resilience, the building stays functional within its changing environmental conditions, time of day, and seasons. Through social resilience, the building stays functional for its users' needs, allowing for inclusive functionality and fostering social cohesion. Creating a truly socially resilient and inclusive public condenser is especially important in the context of a highly diverse and socially fragmented area. This is exactly the case for Sundholm, an area where diverse user groups coexist in isolation caused by mental and physical barriers. A public condenser could provide an opportunity to soften these barriers and create a sense of community. However, for the building to be functionally and socially resilient, it needs to respond to its extremely diverse users' needs while simultaneously being able to respond to environmental changes, which is especially challenging in this complex social context. A resilient and socially inclusive public condenser should be designed to optimize both functional and social resilience. Therefore, a balance between flexible design strategies that promote functional and social resilience should be applied to ensure the public condenser is inclusive and sustainable, both socially and functionally.
research questions and	Main question: "How can public buildings be designed to optimize social and functional resilience through flexible design strategies?" Sub-questions: 1. What flexible design strategies can be used to foster social resilience? 2. What flexible design strategies can enhance functional resilience in public buildings, allowing them to adapt to environmental, seasonal, and long-term changes in use? 3. How can these strategies be combined to create public buildings that are socially and functionally resilient?
design assignment in which these result.	
The research goal is to develop a design strategy for public buildings that achieves social and functional resilience using flexible design strategies. This strategy should optimize the buildings overall functionality and improve its social sustainability, ultimately extending its functional lifespan. Using this strategy, the building should be able to adapt to the diverse users' needs and environmental conditions, facilitating the creation of a new social space while optimizing functionality and fostering community engagement.	

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Process

Method description

Site visit and analysis
The process begins with a site visit to Sundholm and its surrounding area, where interviews with local stakeholders are conducted and an impression of the site and surrounding area is formed. The group data that is collected from the stakeholder interviews and an analysis of the physical and socio-economic context of Sundholm and Copenhagen is combined to determine the neighbourhood's needs, and the role the public condenser could play in serving those needs.

Literature review and Case studies on Social Sustainability
The site visit and analysis are followed up by a literature review on social resilience in urban contexts and public buildings. This literature review will reveal what might influence social resilience in public buildings, and what design strategies could contribute to this. This phase will help form a theoretical framework on social sustainability.
To gain insights into the possible design strategies or architectural elements that contribute to social sustainability, several works and design approaches by architects like Cedric Price will be analysed to gain insights into possible design strategies that enhance social sustainability. Works by Lacaton & Vassal will be analysed to gain insights into architectural elements that might improve social sustainability.

Case studies on Functional Sustainability
Case studies will be used to design strategies and architectural elements that can be used to improve the functional sustainability of public buildings. Examples such as The Shed in New York, The Sliding House, and Centre Pompidou in Paris will be used to gain insights into how adaptable elements can improve functional sustainability.

Research by design
Based on the site analysis, literature, and case studies, different flexible design strategies will be identified and iteratively tested within the context of the public condenser in Sundholm. The goal is to optimize both social and functional sustainability using flexible design elements. This will be done in a process of research by design, testing different strategies and combinations, exploring which strategies might overlap, clash or enhance each other, and refining them to balance the building's social and functional resilience.
This will result in a design proposal that evolves with its community needs and environmental changes through using flexible design strategies that improve social and functional resilience. The findings will be presented as a framework for designing adaptable public buildings in diverse urban contexts.

Literature and general practical references

The literature review mainly focuses on identifying architectural elements and flexible design strategies that contribute to social sustainability.

Richard Sennett's *The Public Realm* (2008) and *The Open City* (2006) explore the idea of open systems and show the importance of public spaces in fostering social interaction. Franck and Stevens' *Loose Space* (2007) and Venturi's *Complexity and Contradiction in Architecture* (1965) explore different interpretations around non-determined functionality (ambiguity) and its potential to improve inclusivity and create spaces that evolve with their users' needs. Bentley et al.'s *Responsive Environments* (1985) provides design strategies for creating spaces that respond to their users' needs. Burton and Mitchell's *Inclusive Urban Design: Streets for Life* (2006) shows how inclusive design strategies can enhance social flexibility to improve the inclusive functionality of public spaces.

To explore Cedric Price's vision on adaptable design, non-determined functionality, and user-driven flexibility, Mathews' exploration of Cedric Price's *Fun Palace* (2006) and Herd's (2021) exploration of Cedric Price's *Inter-Action Centre* will be used to gain insights into possible design strategies that can be used to improve social sustainability.
Next to the literature review, case studies on Cedric Price's work, like the *Fun Palace* and the *Inter-Action Centre*, will provide inspiration into how user-adaptive architecture could be used to improve social sustainability. Furthermore, Lacaton & Vassal's projects, like their work on Nantes School of Architecture, can provide insights into architectural elements and flexible design strategies that improve social sustainability.

This literature review and case studies will provide a comprehensive understanding of possible design strategies that can be used to improve the social resilience of public buildings.
The review will also include case studies of flexible design strategies or architectural elements that improve functional sustainability. *The Shed* in New York and *The Sliding House* show how technical adaptability, like movable building parts, creates functional and temporal flexibility, allowing the building to change based on different needs, weather conditions, and seasons. The *Centre Pompidou* in Paris can provide insights into flexible design strategies that create adaptable spatial configurations and foster functional sustainability.

These insights from the literature review and case studies will lay the foundation for identifying and applying flexible design strategies that improve social and/or functional sustainability of public buildings.

Bentley, I., Alcock, A., Murrain, P., McGlynn, S., & Smith, G. (1985). *Responsive Environments: A Manual for Designers*. Architectural Press.

Burton, E., & Mitchell, L. (2006). *Inclusive Urban Design: Streets for Life*. Architectural Press.

Franck, K. A., & Stevens, Q. (2007). *Loose Space: Possibility and Diversity in Urban Life*. Routledge.

Herd, T. (2021). From cybernetics to an architecture of ecology: Cedric Price's Inter-Action Centre. *Footprint: Delft Architecture Theory Journal, 15*(1), [Issue #28, Spring/Summer 2021]. *All is in Formation: Architecture, Cybernetics, Ecology*. https://doi.org/10.7480/footprint.15.1.4946

Mathews, S. (2006). The Fun Palace as virtual architecture: Cedric Price and the practices of indeterminacy. *Journal of Architectural Education*, 39–48.

Sennett, R. (2006). *The Open City*. Urban Age.

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Sennett, R. (2008). *The Public Realm.* Oxford University Press.

Ursprung, P. (2015). Out of Bologna: Lacaton and Vassal's Nantes School of Architecture. *e-flux Journal, 64.*

Venturi, R. (1965). Complexity and contradiction in architecture. *Perspecta, 9*, 17–56. *The Museum of Modern Art.*

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

My graduation topic aligns closely to the five pillars of the studio: resilience, hybridity, multiplicity, sustainability, and healthiness.
Resilience is the central topic of my project; it aims to optimize both social and functional resilience through the implementation of flexible design strategies. This directly relates to sustainability, since improving the building's social and functional resilience extends the building's functional lifespan, which is an important part of sustainable design. Furthermore, the multifunctionality embodied in the public building is what will make it a hybrid, and its programmatic flexibility will allow the building to adapt to various needs and functions and create opportunities for social interaction and urban activation. Through the project's goal of creating social sustainability through user-adaptive design, the building's form and function will partially be shaped by its users, allowing the building to be shaped by its diverse users' cultural identities and let the building embody the neighbourhood's identity through it. Finally, healthiness is promoted through the building's program, with the inclusion of urban gardens, spaces to play, sport, learn crafts, and be inspired. The building will create opportunities for homeless people to work on skills, crafts, and make money, ultimately encouraging active participation and fostering a sense of community and well-being.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

The relevance of this project lies in its contribution to social, functional, and environmental sustainability in public buildings. As the world changes rapidly and cities become increasingly dense, there is a growing need for flexibility in public buildings.
This research can provide architects with insights into how public buildings can be designed to be more resilient and inclusive through flexible design strategies. It offers a design framework for integrating social and functional flexibility into public buildings, ultimately helping architects develop adaptable, inclusive, and sustainable public buildings that better serve their various users' needs.

Design position & brief

From Craft to Community

Qualitative brief

1. For whom do you design the Public Condenser?
My public condenser is designed for local residents and marginalized groups in and around Sundholm. It aims to be inclusive by providing a diverse program of craft spaces and opportunities to share these crafts through events or performances. A combination of a diverse program and non-programmed, user-adaptive spaces provides functionality for everyone.
2. What is the role of this public building in the Copenhagen societal context?
It should act as a social and economic catalyst for the neighbourhood, offering marginalized communities the chance to develop skills and earn money. This public condenser aims to bring purpose to the community, improve its negative reputation, and ultimately unite the currently fragmented neighbourhood.
3. Which core elements define your Public Condenser as a HYBRID?
My public condenser in Sundholm is a hybrid because it embodies multifunctionality, programmatic flexibility, and social condensation. It integrates diverse uses—art, gardening, workshops, and public events—into adaptable spaces that can transform based on users' needs. Unprogrammed, free spaces further enhance flexibility, allowing multiple interpretations without structural changes. This ensures the building remains functionally and socially resilient for Sundholm's diverse community.
4. What are the key sustainability and future-proofing measures you include in your project?
By maximizing the functional lifespan and prioritizing functionality with simple, durable construction materials, the building will be resilient. Incorporating flexible design strategies will also increase the building's social and functional resilience, extending its lifespan.
5. How does the neighborhood and site research inform your Public Condenser brief?
I have identified the social and spatial causes of the main problems the neighborhood is facing. My program aims to address these social issues, while the building's position and site design will address the spatial factors contributing to these problems.
6. How will your design merge elements of green, blue, sensory, sociable, and inclusive spaces to enhance overall HEALTHINESS?
The program focuses on inclusive design and provides opportunities for marginalized communities to improve their lives by learning new skills, ultimately enhancing their quality of life. The surrounding area will be redesigned to incorporate green structures that support biodiversity and well-being.

Quantative brief

Craft (180m^2)
- Woodworking space: Workbenches, seating areas
- Pottery space: Pottery wheels, kiln space, drying areas, handcraft workspace.
- Repair workshop: Workbenches, assembly areas, repair stations.
- Storage: materials and finished products, tools.

Music (253m^2)
- Small practice rooms: instrument storage, seating.
- Recording studios: Soundproofed zones, mixing areas, recording stations.
- Large rehearsal room: storage for instruments, seating.

Art (286m^2)
- Workshop space: Work tables, easels, storage for materials.
- Art studios: Individual artist spaces, shelving for ongoing works, storage.

Cooking (108m^2)
- Kitchen: stoves, counter space, fridge, freezer. dishwashing.
- Bar: fridges

Toilets (90m^2)
- Toilet stalls

Free Space (1600m^2)
- Entrance
- Circulation
- Exhibitions
- Performances
- Eating
- Events

In/outdoor event space (432m^2)

P1 Journal

Week 1
2 – 8 September

We started this studio on Thursday by presenting our studio passports. It was a nice start since it allowed us to get to know our fellow students a little bit. This was followed by two lectures from both the PD and TD, explaining the structure of the course and giving a nice introduction to Copenhagen. This gave a good warmup for the coming weeks, as we learned more about the city and country where we will be designing. After the lectures, we were assigned to different site areas. I was assigned to Site Area 3, which I am very excited about. We met with our site area group, Sien and Henk, and were introduced to our topics: People, Power, and Planet. We subdivided into groups of 4, and I chose the topic of Planet.

From the Theory and Delineation (TD), we were given an assignment to combine the readings of Sennett on the public realm and Feinberg on the urban commons with our topic of Planet. We had to create an analysis and images related to our topic. We worked on this over the weekend and met again on Monday to discuss our ideas.

P1 Journal

Week 1 output

Puk de Graaf
03-07-2001

Country of Origin The Netherlands
Student number 5047455
Mobile number
E-mail

My first Public building design project was my final Bachelor project, a design for a mixed use music venue repurposing an old factory in Delft. This project made me realize that I enjoy the inherent complexity of designing public buildings. In my view, mixed-use public architecture should address the social needs of its environment, respond to user requirements, and create spatial relationships between different uses that enhance the overall user experience. Solving this complex puzzle—balancing requirements, user experience, and functional arrangement, while simultaneously creating a large piece of architecture that positively impacts its surroundings—is what I love about designing architecture. This led me to choose this graduation studio, so I can deeply explore this complex puzzle of mixed-use public architecture.

Throughout my bachelor's degree, I have developed several skills in infographics/ data, mapping, diagram creation, and architectural visualization. If I were to rank my skills, I would say that architectural visualization is my strongest, followed by diagram creation, then mapping, and finally, infographics.

2019 - 2023 **Architecture, Urbanism and Building Sciences** Bachelor of Science
Delft University of Technology, Delft

2023 - present **Architecture** Master of Science
Delft University of Technology, Delft

MSc1 The Why Factory
MSc2 Complex Projects

P1 Journal

Week 2
9 – 15 September

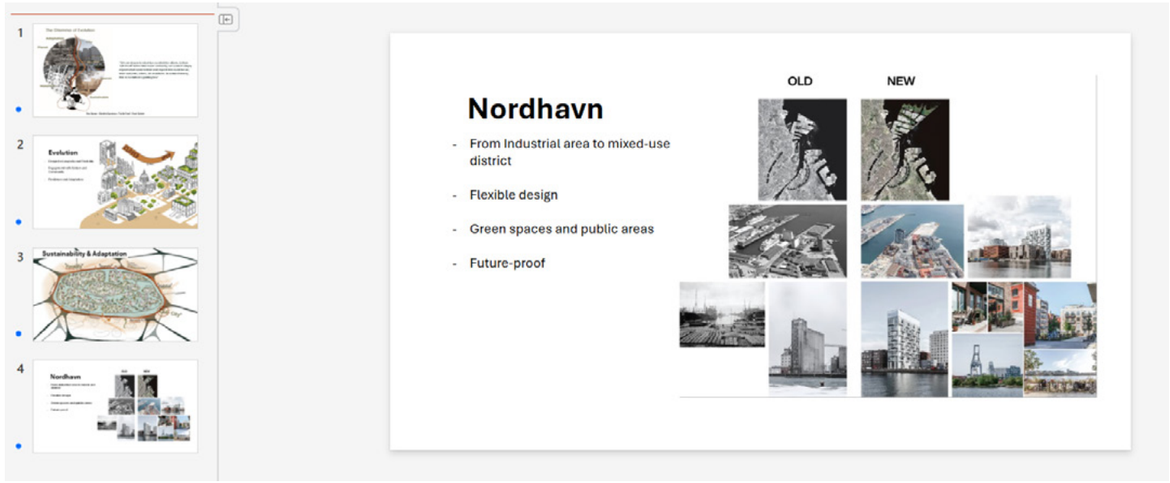
After reading the literature and coming up with some ideas to analyse it from the perspective of Planet, we met up with our Planet group to discuss our ideas. This was really interesting, as we discussed topics like sustainability, evolution, and social sustainability. We decided to stick with these topics for our assignments and talk about what sustainability really is, how buildings can withstand time by creating open systems, keeping borders open, and reducing boundaries. I worked on finding an example that fit this ideology of a sustainable city and looked at Nordhavn, an urban project in Copenhagen that aims to be the most optimal, sustainable work and living environment.

On Thursday, we had our studio day again, starting with research on our sub-themes, followed by a very interesting lecture by Sang about mapping. This in-depth review of the meaning and evolution of maps gave me new perspectives I hadn't considered before. He also introduced us to psychoanalysis maps, and we were assigned to create one before our visit to Copenhagen. The idea was to compare our imaginary view of Copenhagen with the reality we would encounter. This assignment was complemented by some interesting literature about mapping. Over the weekend, I read the literature and started working on the PD assignment, which involved case studies related to our topic and site area. This was also to start producing content for the excursion. I worked on a case study of Børnekulturhuset Ama'r, a famous children's culture house designed in collaboration with children, serving as a good public condenser.

Since next week was the final week before our excursion, we needed to produce and combine the content for the excursion booklet. Each group of 12 needed to have 2 compilers responsible for compiling the content and making the templates. I didn't want to be a compiler, but since no one else volunteered, I didn't mind doing it. Unfortunately, I was working during the first compiler meeting on Friday, so I didn't get to work on the templates, which left me feeling a bit uninvolved.

P1 Journal

week 2 output



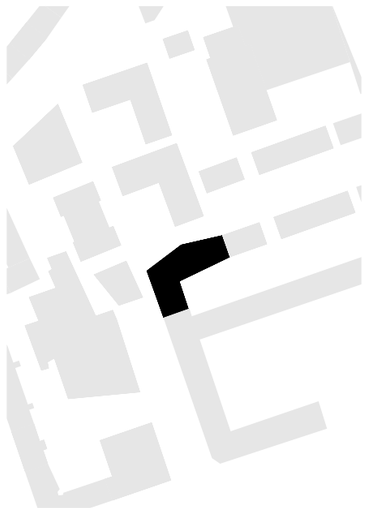
CASE 01

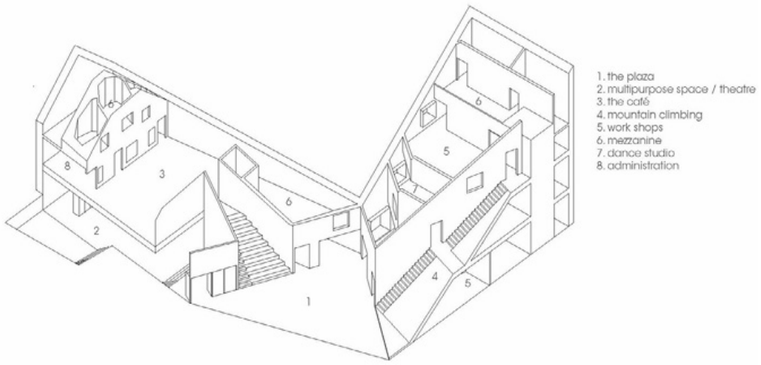
Børnekulturhuset Ama'r

Børnekulturhuset Ama'r, literally meaning "the children's culture house," is a building designed specifically for children with a focus on creativity, play, and learning. It is designed together with its users by involving children through several workshops, where they contributed ideas for the structure and interior spaces. This building creates a playful environment that aims to enhance the cultural landscape of the neighborhood.

Architecturally, the building is shaped by its surroundings, forming a connection between a tall block building and a smaller longhouse. Its slope preserves natural light and views for its surroundings, and its interior is all about dynamic, flexible spaces that can be used for various activities. The interior is designed to encourage exploration and imagination.

Overall, this building is a good example of integrating architecture and functionality, offering children an interactive environment where they can play, learn, and grow. It functions as a public condenser, encouraging families to stay in the area.





P1 Journal

Week 3
16 – 22 September

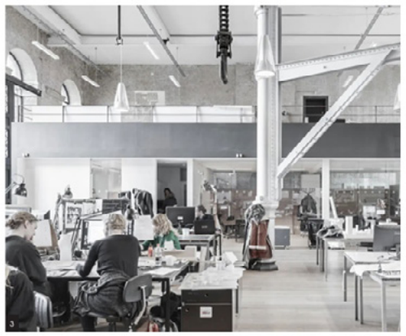
This is the final week before the excursion, and the goal was to complete all the content for the book so Paul could review it, allowing time for changes next week. This week, our Planet group worked on the psychoanalysis map. Everyone made a sketch individually at first, and we later combined them onto a larger map. This really showed how different people have various ideas about what Copenhagen is and how it's shaped on a map.

The compilers had another meeting on Monday, which I unfortunately could not attend due to work. This was frustrating as I didn't want to be seen as uninvolved, but I couldn't change my work schedule. I did send my apologies to the other compilers for missing the important meetings. To make up for it, I worked with my group on producing the maps, case studies, and COBE tour for the excursion booklet. On Thursday, I sat with the compilers to coordinate the final booklet changes, communicated the changes to the rest of the Planet group, and worked on the final adjustments.

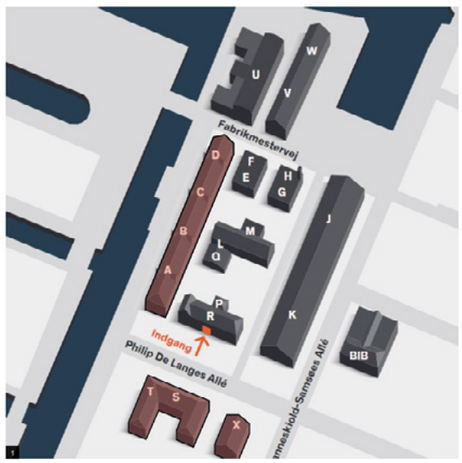
On Friday, we had a very interesting workshop on ArcGIS. I already knew some things about the program, so not all of it was new, but I did learn some very useful tricks!

P1 Journal

week 3 output



itineraries 138



1 KADK Campus
2 - 5 KADK Faculty of Architecture, Design and Conservation, Vilhelm Lauritzen Architects 1997

itineraries 137

Current interpretation of Copenhagen from memory

The black lines represent the city structure, ranging from old organic layouts to newer patchwork neighborhoods. The red layer depicts the city's growth over time, beginning from the center. The green areas highlight what I believe were once industrial zones—previously the city's economic engine—but are now being transformed into sustainable residential districts. The image also illustrates the connection to Sweden, making Copenhagen a shared working space for people from both Denmark and Sweden.

KADK
The Royal Danish Academy

Kongelige Danske Kunstakademis Skoler for Arkitektur, Design og Konservering

The Royal Danish Academy of Fine Arts (KADK), founded in 1754 in Copenhagen, is now a top institution that shapes Denmark's artistic and architectural heritage. It was originally created to promote painting, sculpture, architecture, and graphic arts, but has since grown to include design and conservation. Through its School of Architecture, School of Design, and School of Conservation, KADK focuses on artistic freedom, critical thinking, and collaboration across different fields.

History of KADK

KADK was founded as part of King Frederick V's plan to promote fine arts in Denmark during a time when national academies were being set up across Europe to formalize art education. At first, it focused on traditional arts, but it quickly became an important part of Denmark's cultural growth. It produced famous figures like sculptor Bertel Thorvaldsen and architect Jørn Utzon, who designed the Sydney Opera House. Over the years, KADK has continued to adapt to new artistic trends while staying connected to Denmark's artistic heritage.

The Campus Today

In 1997, KADK moved its School of Architecture to Holmen Campus, which used to be a naval station in Copenhagen. The Philip de Langes Building, at the centre of the campus, reflects KADK's balance between preserving history and meeting modern needs. Renovated from old naval storage buildings, it keeps its original high ceilings, brick walls, and iron windows. The design emphasizes a minimalist look with neutral colours, pine floors, and exposed wood beams. Outdoor areas were turned into green spaces with granite walkways and lime trees, creating a peaceful atmosphere. This renovation won the Copenhagen Award for Best Renovation in 1997 for respecting the building's history.

KADK's Architecture Education

KADK's School of Architecture is a leader in architectural education, combining theory with hands-on learning. Students explore architecture from many angles, including history, urban planning, sustainability, and new technologies. The program promotes critical thinking, creativity, and responsibility toward social and environmental issues, focusing on challenges like climate change and urbanization. TStudents often work with international partners on real projects, helping KADK continue to shape the future of architecture in Copenhagen and around the world.

itineraries 136

P1 Journal

Week 4
23 – 29 September

On Monday, we had an online introduction to the Design Thinking lecture by Stefanie Holzheu. This assignment will be taken with us to Copenhagen, where we will map different personas in the site area by conducting interviews. We will create the questions for this in Copenhagen.

This was the week of the excursion. The booklet was finished, but we were also asked to submit an individual research draft, which I hadn't expected since we weren't given much time or mention of this earlier. Luckily, I had some general ideas and interests already. These ideas were sparked by our discussions on social sustainability and how buildings should be socially sustainable in order to be truly sustainable. This reminded me of a story about a ping pong table photographed over five years, showing how it was used for many different purposes, making it socially sustainable. This concept of unintended use made the table function in various ways, and I explained this in my first research draft.

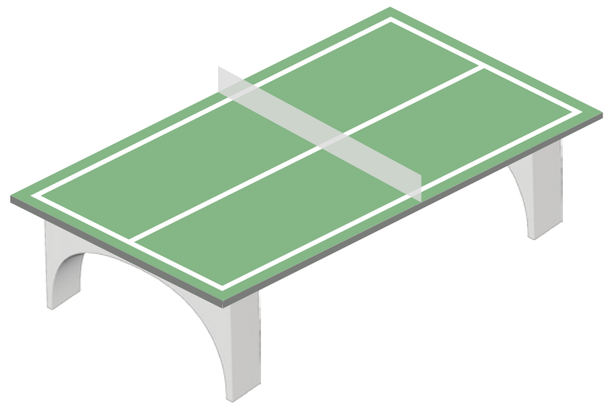
On Wednesday, I left early in the morning for the excursion. While I won't dive into all the details, I'll share some general thoughts on what I learned and experienced in Copenhagen. Overall, I greatly valued the lectures. It was truly inspiring to see and learn from experts in this field. The building visits were a bit chaotic, mainly due to the weather. We also planned too much in a short time, which made it feel rushed. The city walk was really nice though, as Paul explained a lot about what we were seeing with great passion, making it a very engaging experience.

The site visit was a bit shocking at first, as I didn't realize we would be designing something to address a social situation, which seemed to be the case after our visit. However, after talking to Henk and revisiting the site while conducting interviews, my perspective changed, and I actually started to enjoy the challenge of designing for this neighborhood. Apart from learning about Copenhagen and the site area, I really valued the time spent with the tutors and fellow students. It was an important part of building a group feeling and interacting with people I wouldn't normally engage with in class. Overall, it was a great experience of learning, exploring, making friends, and simply enjoying the process.

P1 Journal

week 4 output

PUBLIC CON-DENSER



P1 Journal

Week 5
30 September – 6 Oktober

On Tuesday, we started working on the psychoanalysis map to add our real analysis. We incorporated images, diagrams, texts, and quotes from interviews, locating them on the map where they fit best. This created a nice juxtaposition of imagination/expectation and reality/analysis.

We also met with our research plan instructors on Tuesday. Aart made some really helpful comments about my part of the research, providing detailed feedback and suggestions to strengthen my ideas. I began looking for additional literature right away and further developed my concept. For Thursday, we had to prepare a presentation about our site area from all perspectives, summarizing our findings, research, and observations. This was a bit difficult since we hadn't engaged much with the C and H themes.

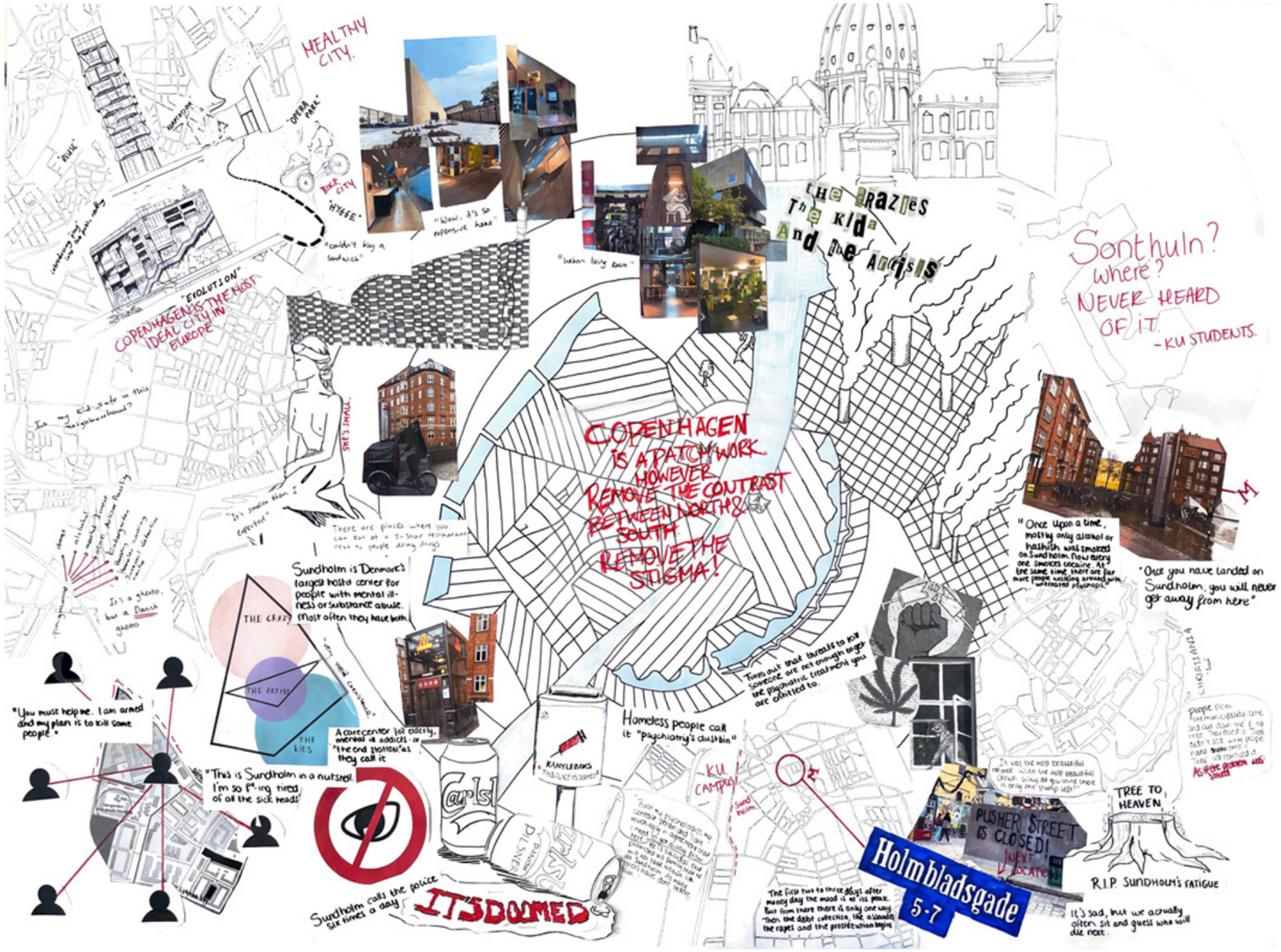
On Thursday, we had our presentations about the site areas, which gave a very good impression of each group's visit and findings. We also had an inspiring lecture by Nathalie de Vries, where she showcased different public building projects from around the world. This provided a reality check on what all this research is for—creating a public condenser.

In the afternoon, we had some very interesting lectures by Sang and Sien. Sang's lecture reinforced my ideas for my research question. He talked about multiplicity and mentioned the term "ambiguity," meaning something without a fixed meaning or use, open to interpretation. This term perfectly captured what I was trying to describe with the ping pong table in my research. I decided to rewrite my research question to focus more on designing functional ambiguity to encourage creative use, making the design flexible.

Sien's lecture on diagrams was also very insightful, as it introduced different types of diagrams and theoretical frameworks. This linked to an assignment to create a 3D diagram, complemented by interesting literature that will inspire the assignment.

P1 Journal

week 5 output



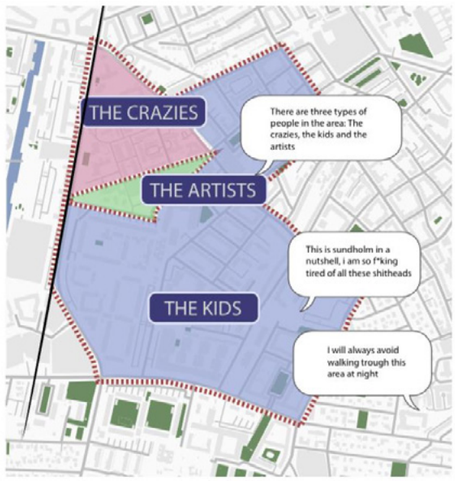
City

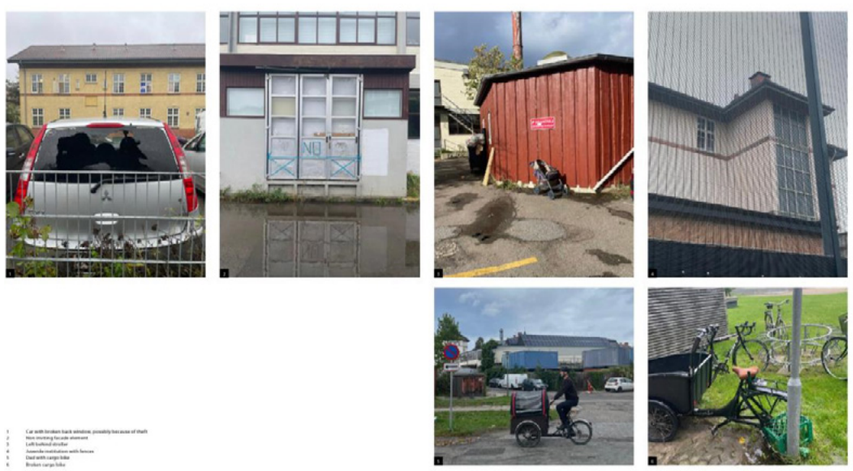
southeast - amager vest

sønderbro - sundholm

Sundholm does not have a great place in the city. The reputation is broken and the people don't have faith in the recovery of their neighborhood. The reputation is partly helped into existance by the municipality. It is a place where all the 'unwanted' of Copenhagen were placed. A juvenile jail, a place for the refugees and homeless and a designated drug using bin. It looks like the city has put this neigborhood away in the darkness. Sundholm seems to be treated with the idea of; out of sight, out of mind. There are initiatives to create a better reputation by incorporating art for example, but in interviews with residents, it has become evident that the residents seem to have lost hope. Nevertheless, the spirit of the people is not broken. They talk about their neighborhood with sarcasm and mockery, but not with disgust. It is a community within a community with many more layers then first meets the eye. As a resident told us; It is diverse and spcial this place, you have the crazies, the kids and the artists. They are all living together.

map legend





P1 Journal

Week 6
7 – 13 Oktober

This week, we need to submit the research draft and present our research conclusions from the Planet group. This made us realize we don't have enough statistical data, maps, or factual research on Copenhagen as a whole from a Planet perspective yet. So, we decided to focus first on producing new research that can also be useful to other groups.

We decided to divide the presentation into an introduction, followed by Copenhagen's image as an environmentally friendly and highly livable city, etc., and then combine this with relevant statistics and mapping data. My role was to focus on the statistical part, so I researched various environmental statistics on Copenhagen and Denmark, comparing these to other countries to assess whether they truly live up to their claims. I found this part of the research very valuable and believe we should have been assigned this earlier in the course, especially as the presentations from other groups also offered factual insights on Copenhagen and specific site areas. This approach could create a highly informative research document that everyone could use to formulate their own opinions, insights, and design ideas based on factual data, instead of relying on more interpretive studies as we have done before.

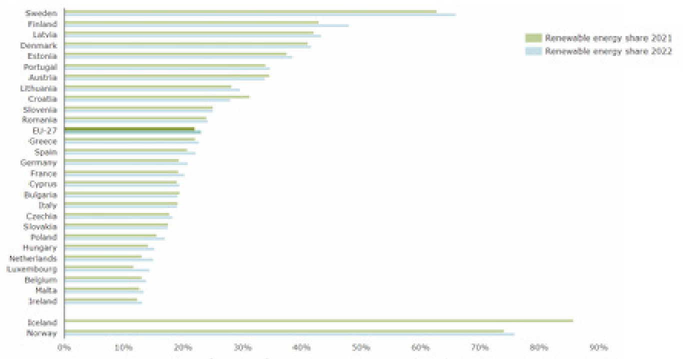
Apart from this research, we also needed to submit a draft of our research. Fortunately, I anticipated this and worked on it over the weekend. During that time, I solidified my research question and direction, and found some interesting literature to support these questions. The next step is to wait for feedback.

The presentations on Thursday were very informative, and Martin Søberg offered some valuable insights. This day truly felt like a conclusion, where the different sub-groups' site areas and research came together into a comprehensive documentation of our initial weeks.

P1 Journal

week 6 output

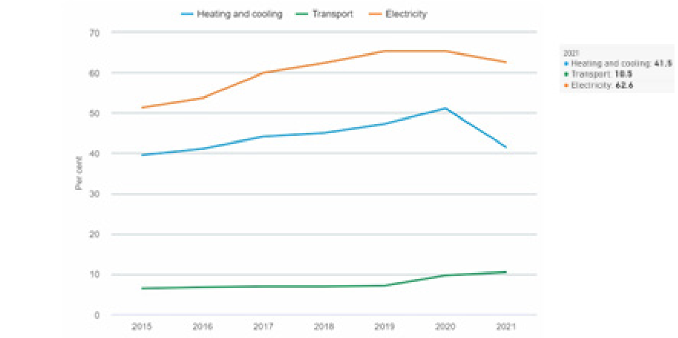
Percentage of energy from renewable sources



Data source: Share of energy from renewable sources [NRG_IND_REN], Statistical Office of the European Union (Eurostat) - link: https://www.eea.europa.eu/en/analysis/indicators/share-of-energy-consumption-from/?activeAccordion=546a7c35-9188-4d23-94ee-005d97c26f2b

The expansion of renewable energy use brings various societal benefits, including mitigating climate change, reducing air pollutant emissions, and enhancing energy security. The updated Renewable Energy Directive raises the binding target from 32% to 42.5% of renewables in the EU's energy consumption, with an aim to reach 45%. Over time, Sweden, Denmark, and Estonia have seen the most significant growth in renewable energy shares, each increasing by more than 20 percentage points since 2005. In 2023, Denmark exceeded its target by achieving 45.2% renewable energy (statbank.dk). Currently, the Netherlands only generates around 15% of its energy from renewable sources.

Share of total energy consumption from renewable energy sources in Copenhagen , by purpose.

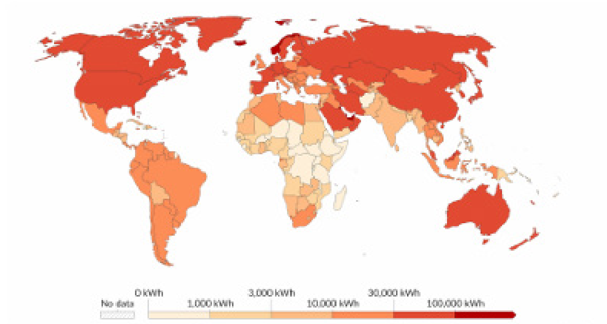


Data source: Share of total energy consumption from renewable energy sources, by purpose. Statistics Denmark. - link: https://www.dst.dk/en/Statistik/temaer/SDG/danske-maalepunkter

To understand which sectors utilize renewable energy the most, we can look at the percentage of renewable energy consumption across various categories in Copenhagen. The graph illustrates the distribution of renewable energy use across three main sectors: heating and cooling, transport, and electricity. Currently, Denmark sources 45.2% of its total energy from renewables. As shown, electricity accounts for the largest share, with 62.6% powered by renewable sources, followed by heating and cooling at 41.5%, and transport at 10.5%.

Total energy use per capita per country (2023)

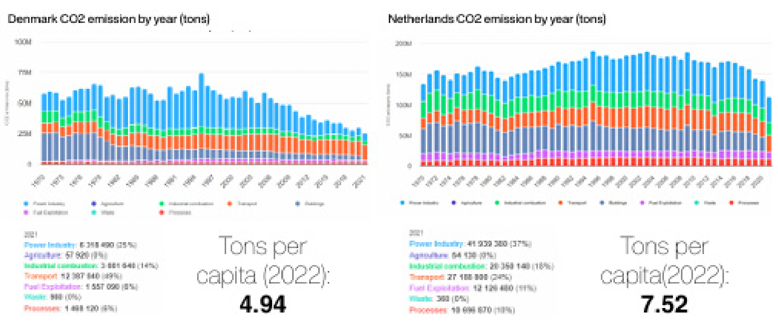
Measured in kWh per person



Data source: U.S. Energy Information Administration (2023); Energy Institute - Statistical Review of World Energy(2024); Population based on various sources (2023) - link: https://ourworldindata.org/energy-production-consumption

Globally, primary energy consumption has increased nearly every year for at least half a century. But this is not the case everywhere in the world. Energy consumption is rising in many countries where incomes are rising quickly and the population is growing. But in many countries — particularly richer countries trying to improve energy efficiency — energy consumption is actually falling.

Denmark's CO2 Footprint compared to the Netherlands

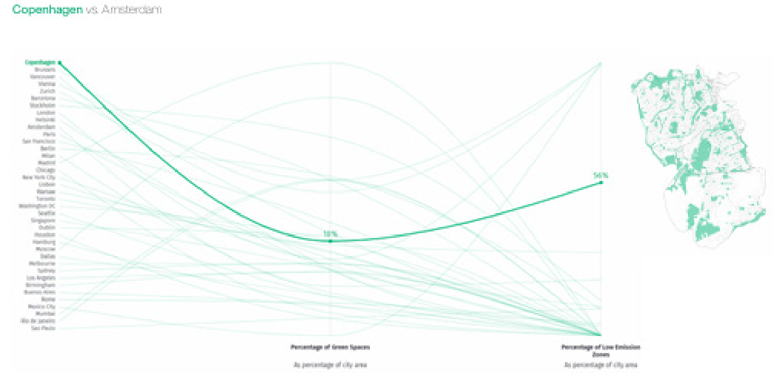


Data source: Share of total energy consumption from renewable energy sources, by purpose. Statistics Denmark. - link: https://www.dst.dk/en/Statistik/temaer/SDG/danske-maalepunkter

The CO2 emissions per capita in Denmark stand at 4.94 tons, with transport being the largest contributor at 49%, followed by the power industry at 25%, and industry at 14%. In comparison, the Netherlands has a higher per capita CO2 emission of 7.52 tons. In the Netherlands, the power industry accounts for the largest share at 37%, aligning with its relatively lower use of renewable energy, as highlighted in previous analyses. Transport contributes 24% of emissions, which is significantly lower than Denmark's transport emissions. The fact that nearly half of Denmark's emissions come from transport explains why Copenhagen is heavily focused on reducing transport-related CO2, promoting cycling and public transport as key strategies to curb emissions. This emphasis reflects the city's broader commitment to sustainable urban mobility.

Green areas & low emission zones

Copenhagen vs. Amsterdam

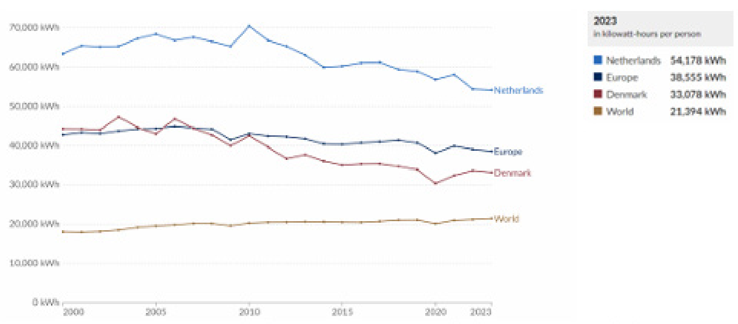


Data Source: Green spaces and low emission zones. Urban Mobility Index. Link: https://urbanmobilityindex.here.com/city/copenhagen

Copenhagen is a green city, with approximately 18% of its area dedicated to green spaces. These green areas provide numerous benefits, such as improving air quality, enhancing biodiversity, and offering residents recreational spaces that promote well-being and mental health. Additionally, 56% of Copenhagen is designated as a low-emission zone, meaning that stricter regulations are in place to limit pollution from vehicles and industrial activities.

Trend of total energy use per capita

Measured in kWh per person

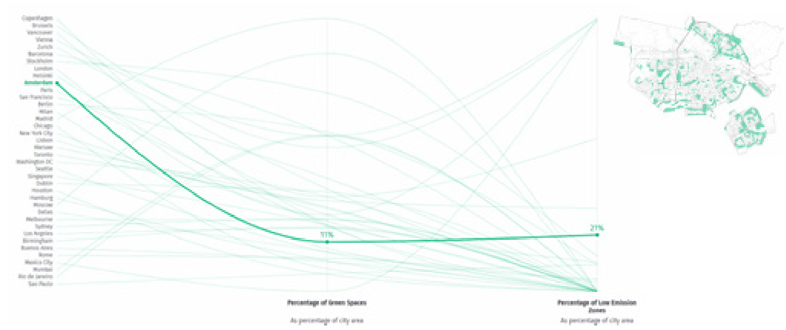


Data source: U.S. Energy Information Administration (2023); Energy Institute - Statistical Review of World Energy(2024); Population based on various sources (2023) - link: https://ourworldindata.org/energy-production-consumption

The analysis of energy consumption trends reveals that the global average continues to rise, while Denmark, the Netherlands, and Europe as a whole are experiencing a decline. Denmark's per capita energy consumption remains notably lower than the European average and significantly lower than that of the Netherlands. However, since 2010, the Netherlands has shown greater progress in reducing its per capita energy consumption compared to Denmark.

Green areas & low emission zones

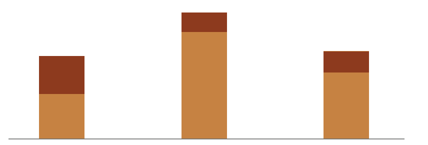
Copenhagen vs. Amsterdam



Data Source: Green spaces and low emission zones. Urban Mobility Index. Link: https://urbanmobilityindex.here.com/city/copenhagen

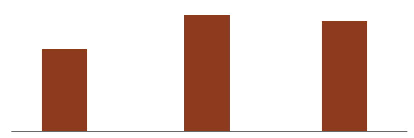
Amsterdam has 11% of its area covered in green spaces, which is notably lower than Copenhagen's 18%. Additionally, Amsterdam has designated 21% of its area as low-emission zones, significantly less than Copenhagen's 56%. This indicates that while Amsterdam is working towards reducing emissions, Copenhagen has implemented more elements to restrict pollution from vehicles and industry.

Energy use per capita (kWh)



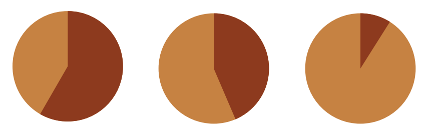
Denmark: 33.078 — 45% Renewable
Netherlands: 54.178 — 15% renewable
Europe: 38.555 — 23% renewable

CO2 emissions per capita (Tons)



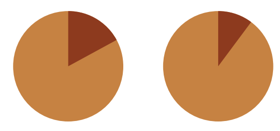
Denmark: 4.94 — Netherlands: 7.52 — Europe: 7.25

Copenhagen renewable energy % per category



Electricity 62.6% — Heating & Cooling 41.5% — Transport 10.5%

% of green area per city



Copenhagen 18% — Amsterdam 11%

P1 Journal

Week 7
14 – 20 October

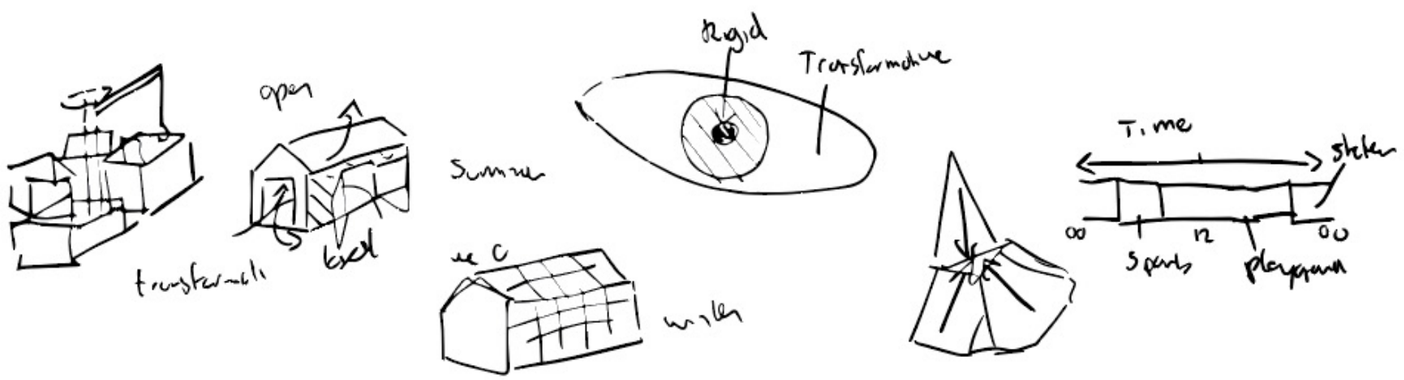
his week, we started developing our 3D diagram that summarizes the Planet research. We decided to create a three-in-one diagram, using different configurations to tell various stories. Our approach involved working with light and shadows to reveal the hidden aspects of Sundholm we discovered. We combined this with diagrammatic drawings on the outside of the box, which represented the area's image. This was a lot of work, honestly, and it felt like the effort put in was more than the outcome we received, as the process didn't really help us finalize our research conclusions. While it didn't provide any definitive insights, it was a cool way of consolidating what we had done into a single conceptual 3D diagram.

Aside from the group work, I finally began my individual design brief, which involves translating our research into a design framework. This week, I mainly focused on gathering the most interesting elements and developing general ideas for my design. I sketched out these ideas in quick diagrams to refine over the weekend.

Unfortunately, I fell ill on Wednesday and remained unwell over the weekend, so I couldn't accomplish much. However, I asked my group to update me on Thursday's presentation, which they gladly did, so fortunately, my work up to that point wasn't wasted. Overall, this week was a bit chaotic as we started some new tasks, but I managed to set up a solid foundation for next week.

P1 Journal

week 7 output



P1 Journal

Week 8
21 – 27 october

On Sunday, as I started feeling better, I began working on the qualitative and quantitative aspects of the design brief, which I further developed towards Thursday. After listing the main problems, I dove deeper into Rasmussen's documents. This gave me a clearer understanding of the root causes of these issues, and I came up with a promising concept to address—or at least mitigate—them. I believe that providing a financial incentive would be beneficial for this neighborhood, and that creating opportunities for people to connect through collaborative activities would be a good fit here. I continued to develop this design brief and became increasingly excited about the potential within this area. I documented my ideas alongside the identified problems and started looking for case studies that could support these conceptual ideas.

One key idea from the beginning was technical adaptability, which is crucial in a building concept like mine, where diverse functions are accommodated and a bottom-up approach allows users to determine its use. Not only technical adaptability, but also social adaptability—something I was interested in from the start of my research—are essential here. The role of ambiguity in fostering socially flexible environments aligns with my concept of adaptability, though in a non-technical sense.Alongside this, I refined my research plan, particularly on the literature side, by reading more documents to find historical perspectives on ambiguity that could strengthen the foundation of my research.

On Thursday, I presented the design brief I had prepared, showing the main problems I identified and the concept that emerged from them, supplemented by case studies that represent these concepts. The feedback was positive and inspiring. However, it was noted that I hadn't fully grounded each design step. Questions like "Why do I need flexibility?" prompted me to take a step back to further develop the conceptual foundation with logical reasoning and research, preparing for my P1 submission. I aim to solidify this concept so I can seamlessly translate it into a design.During the research plan discussion with Sien, I was a bit confused, as she suggested broadening my research question. Changing it from focusing on how ambiguity can be used as a design strategy to foster social sustainability, to simply "how to foster social sustainability," seemed counterintuitive to me. This broader question could encompass a wide range of factors beyond my intended scope. However, she did recommend some insightful literature from Venturi on my topic, which proved valuable. After reflecting on her feedback, I understood her perspective and decided to keep ambiguity a bit more open, focusing on non-technical flexibility, which includes ambiguity. This approach allows for a broader scope without becoming too vague, letting me consider other strategies for enhancing social sustainability without relying solely on technical adaptability.

On Friday, we wrapped up the design thinking workshop with a short presentation on our problem statement. Although it felt a bit redundant, as we had already developed this, it provided a good review of our progress.

P1 Journal

week 8 output

Design concept/positioning

Problem statement

- The inhabitants of Sundholm are financially disadvantaged
- Sundholm consists of diverse user groups which are divided by physical and mental borders
- This causes a lack of social cohesion and engagement with the neighbourhood

Current Situation

Map, showing the division of sundholm inhabitants

Opportunity

- The site area is centrally placed in between the different user groups, providing an opportunity to act as a social buffer between the zones

Design ideas

- Goal: Community engagement
- Goal: Financial sustainability

- Creating a space where people can participate different activities: Music, Sports, Cultural, play. And encouraging people to work on a crafting skill like Woodworking, creating art, gardening, cooking.
- Allowing people to sell their crafts, organize events.

P1 Journal

Week 9
28 oktober – 3 november

This week, we had time to work towards the P1 presentations. My main goal was to solidify the design concept within the framework of my research. I spent significant time delving into previous research from our group, other groups, and Rasmussen's work to clearly identify the problems in the area and understand their root causes. I decided to categorize these into social and spatial causes. By dissecting them this way, I could map the spatial causes and find correlations between certain spatial factors that might enhance these social issues. This approach provided valuable insights, clarifying and informing my design brief, problem statement, and reasoning.

This week focused heavily on visualizing this data and drawing conclusions by making a programmatic translation of these problems. I also worked on incorporating the feedback I'd received, broadening some of the research questions as suggested. Having time free from TD assignments was helpful, as the first few weeks felt cluttered with so many different aspects to focus on. This break allowed me to clear my mind and set a strong foundation for my P1 presentation next week.

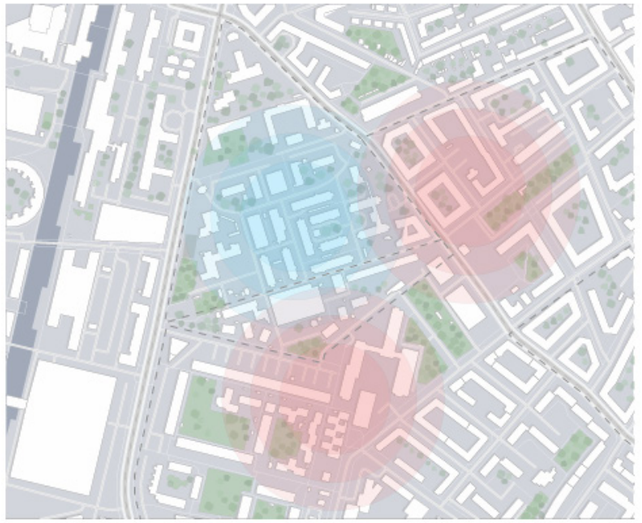
With the deadline set for Monday, I aimed to be well-prepared before the weekend—and I managed to stay on track.

P1 Journal

week 9 output

Sønderbro functions

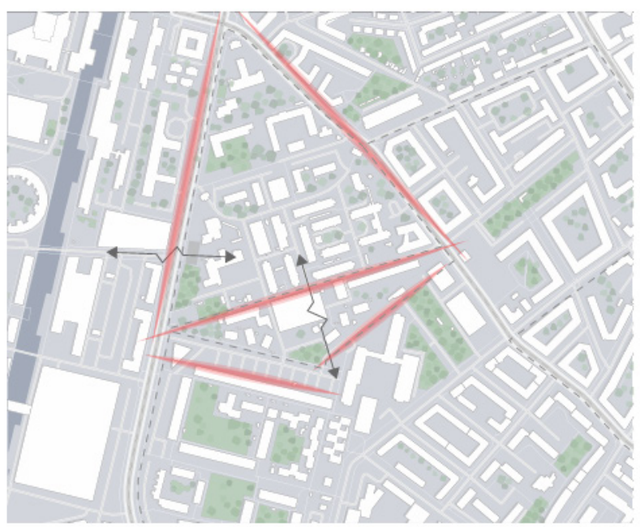
Problem Identification



Main issues:
- Lack of social cohes
- Safety concerns

Social cause
- Mental boundaries
- No community ident
- Financial problems

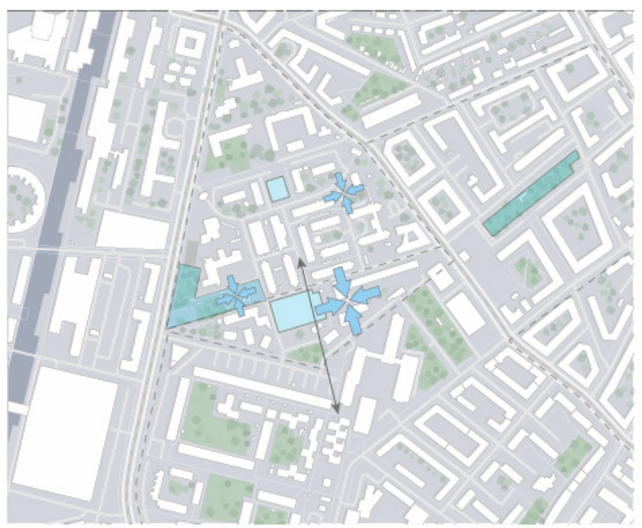
Problem Identification



Main issues:
- Lack of social cohesion
- Safety concerns

Spatial causes:
- Physical boundaries
- Poor connections
- Lack of meeting spaces
- Uninviting back areas

Potentials



Main issues:
- Lack of social cohesi
- Safety concerns

Spatial poten
- Creating new meetin places
- Strenthening current assets
- Improving Connectio between Sundholm an Hørgården

Social potent
-Increasing networks exposing children and to possibilities and role models
- Promoting positive narratives and identity, creating a purpose.
- Unite the neighbourh trough cultural offerin

P1 Journal

Week 10
4 – 10 November

This was the P1 presentation week, and we received an additional two days on the deadline, which gave me some breathing room to reflect and make improvements for the P1 presentation. It also allowed me extra time to work on the slides for the group presentation. Coordinating this was a bit challenging since we couldn't meet with the entire group, so we decided to keep the same structure as our previous P – P – P presentations. However, we focused on making everything more conclusive and added linking slides between topics to improve coherence.

For my personal presentation, I remade the base map to ensure a cleaner look, finalized the slides, and prepared everything for Thursday. The P1 presentation on Thursday went well, and it was great to receive constructive feedback, which will help me as I move forward into the design phase. It was also valuable to see other students' work and gain insights into what they've been focusing on. Overall, these 10 weeks have been a good start, and I feel I'm concluding with a strong and interesting foundation for my graduation project.

P1 Journal

week 10 output

Programamtic concept - from craft to community

Design goals:

- Inclusive Functionality, creating meeting spaces for the diverse user groups

- Foster community feeling and purpose

- Provide financial incentive

Programmatic translation:

Craft

The main concept lies in creating a **purpose trough the means of craft**, a place to work on a skill, **share** it and earn some **money**. This allows the diverse groups to **meet trough their interests**, learn from each other and overall create a **narrative** for the neighbourhood.

These crafts could be:
cooking, gardening, art, music, woodworking, knitting, pottery, etc.

These crafts are then shared trough:
markets, exhibitions, performances

Culture

Celebrate the neighbourhoods diversity by **sharing culture** trough crafts, music, religion, language.

Sports

including sports to **promote physical activity** and create a space for **meeting** and **group activities**

Play

Create a safe, welcoming space for children to **explore and experiment**, from traditional play to hands-on crafts. Here, children can discover new passions, engage creatively, and build relationships with **positive role models**, possibly creatign lifelong interest.

Architectural concept

Adaptability —— **Trough:**

Incorporate a diverse range of functions while allowing for different uses troughout different times of the day, wheater conditions, seasons and users. Creating a functionally resilient building

Troughout of the week parts of the building can change from creative spaces to sharing spaces.

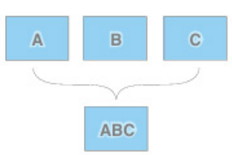
From art workshop to market space
From sports hall to music venue,
From crafting space to exhibition space

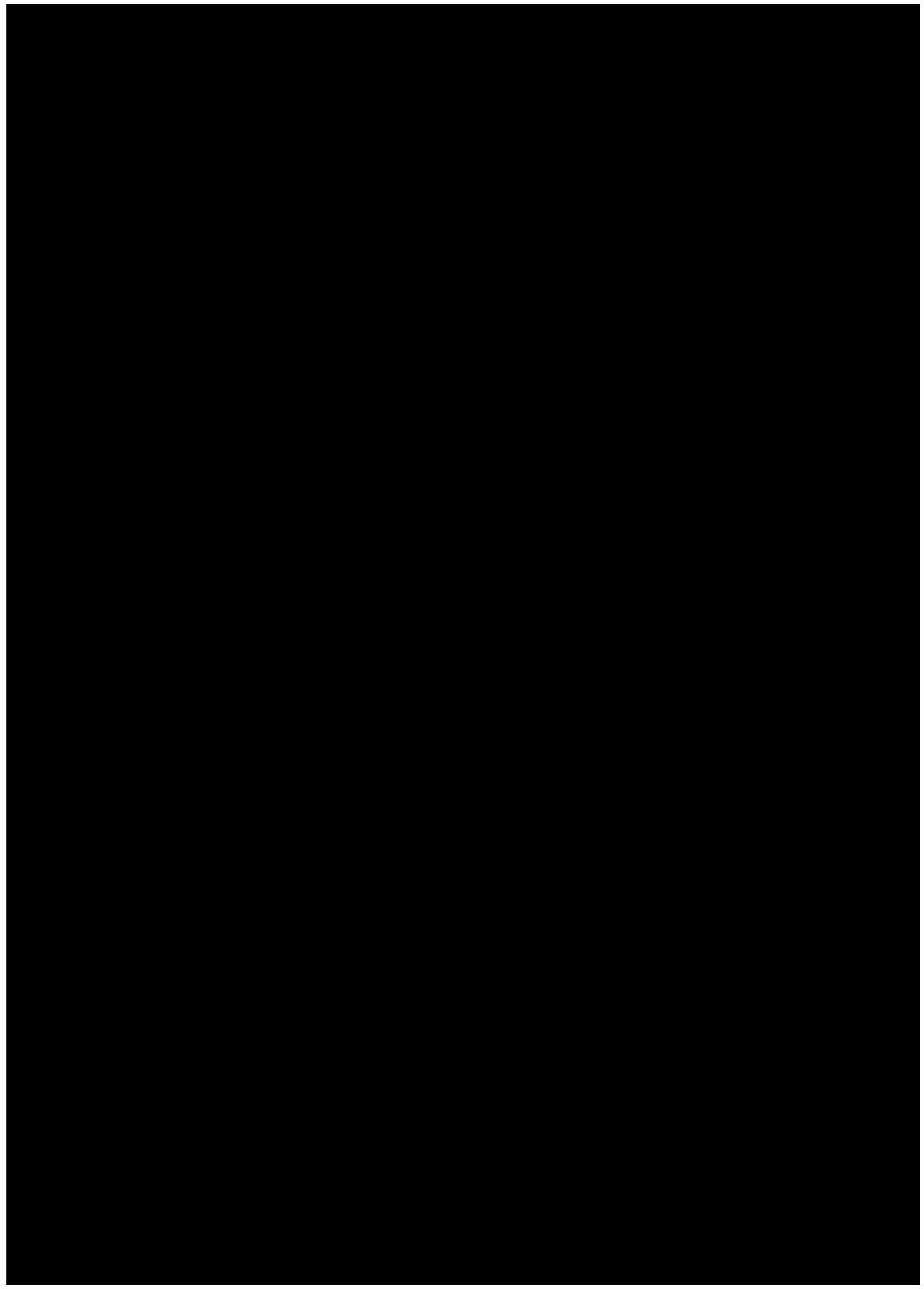
Technical flexibility

The spaces are able to physically change according to its users needs, environmental conditions and time of day.

Social flexibility

Without physical transformation, the space can be used in multiple ways by multiple users





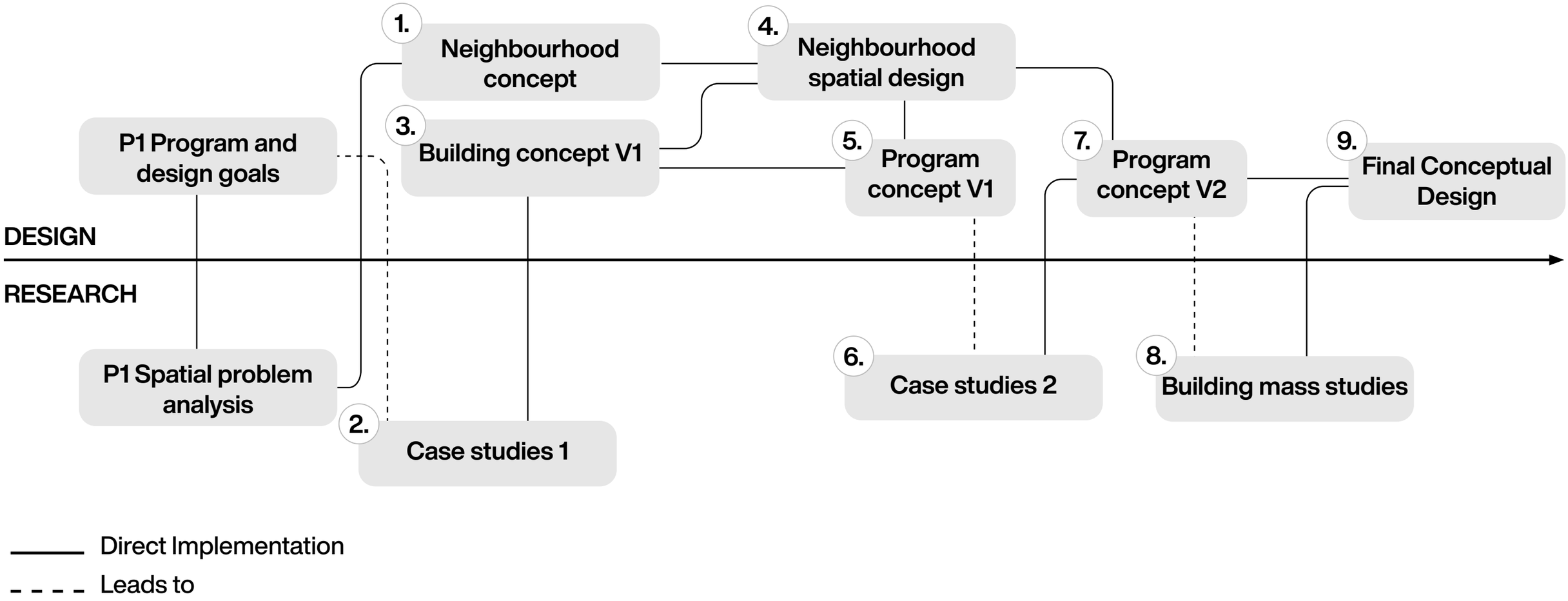
Process - From P1 to P2

Introduction

From P1 to P2, my process will not be documented as a week-by-week journal. Instead, I will present it as a step-by-step documentation of my research and design process. This approach will highlight the main steps taken and demonstrate how each research influence shaped the design. The main steps are listed in the table of contents below, and the next page shows a research and design timeline, providing a visual guide to the influence of each step.

Table of Contents

Research & design timeline

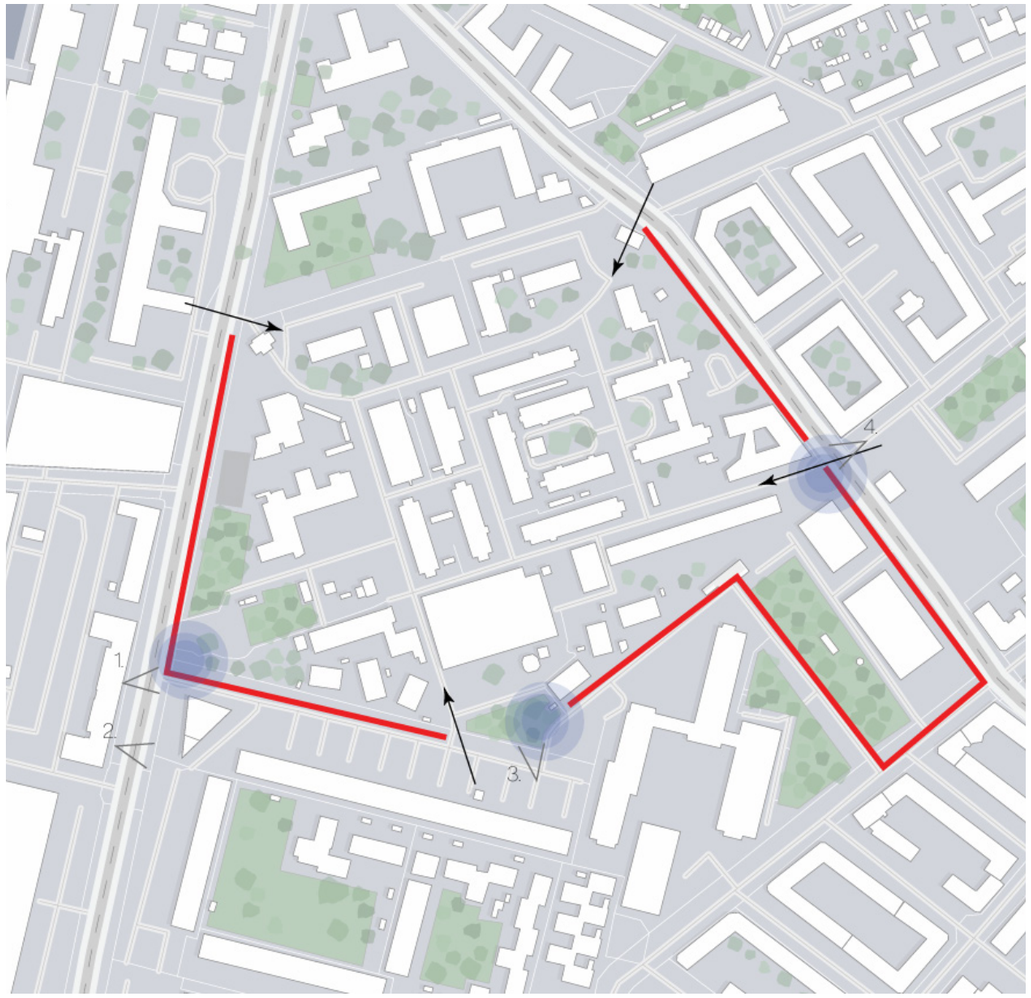


Direct Implementation

Leads to

1. Neighbourhood Concept

Spatial boundaries

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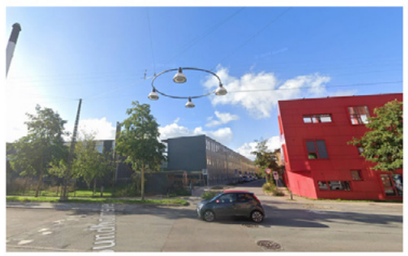

4.

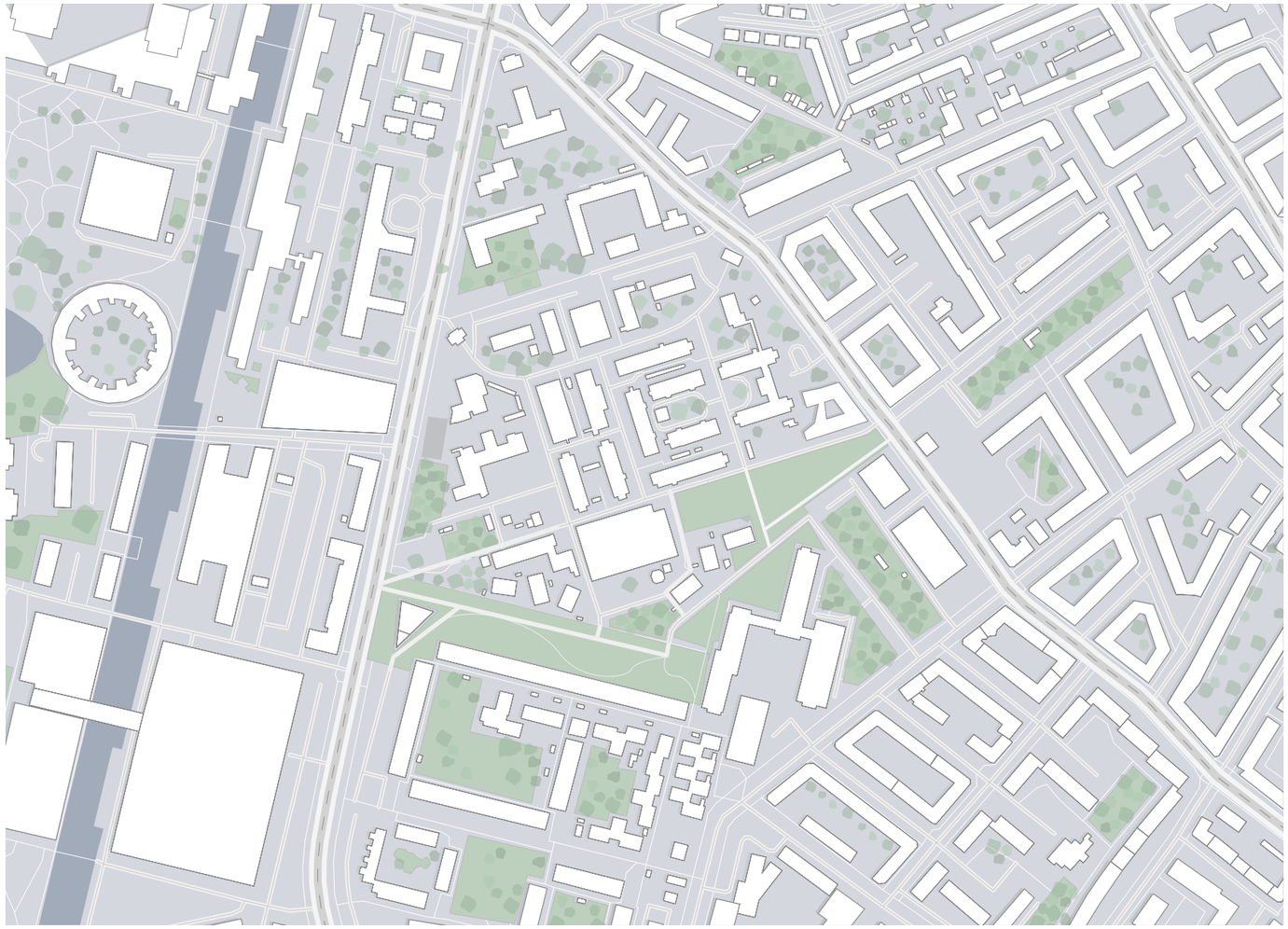
Based on the identified spatial challenges, I documented the boundaries and designed a new routing plan for the neighborhood. In this plan, horizontal connections are improved by extending the main road through the Byhaven Garden, linking the two major roads framing the area. To the south, a new horizontal bicycle connection has been added to link these points and simplify movement through the neighborhood. Each of these horizontal access points is currently unattractive (see Google Street images 1, 2, 3, 4). The goal is to enhance these entry points and make them more appealing.

Additionally, vertical connections from Sundholm to the south are introduced to improve pedestrian and bicycle access. Cars are removed from these routes to unify the neighborhood into a green area, connecting social functions such as the community house, Byhaven Garden, and playground through a visually cohesive, park-like structure.

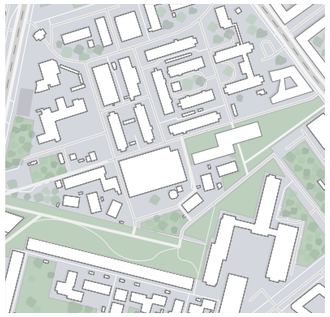
I tested several extreme building variants to evaluate different options, allowing me to identify the potential of each and assess a compromise that combines the strengths of all. This approach helped determine the optimal building mass and positioning. The final neighborhood spatial arrangement and building variants are shown on the following page.

1. Neighbourhood Concept

New neighbourhood design



Extreme building variants



Variant 1 - Split & Connect

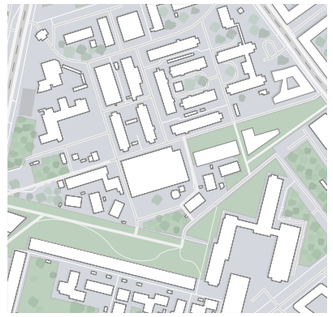
Pros:
- Creation of green islands
- Open line of sight from east entrance
- Connection trough building promotes engagement

Cons:
- Creates a boundary, making the green feel more private and less open

Variant 6 - Scattered & Open

Pros:
- Very open green structure
- Soft spatial relationship with surrounding buildings
- Open field creates interesting lines of sight and openness
- Attractive neighbourhood entrance point

Cons:
- Functional division reduces diverse interactions
- Multiple buildings is less sustainable
- Smaller buildings allow for little flexibility



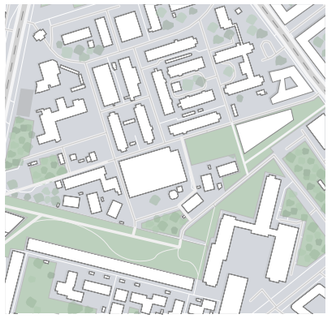
Variant 1 - Split & Open

Pros:
- Continuous green structure
- Very open line of sight from east entrance
- Open line of sight from Sundholm
- Spatial relationship with surrounding buildings

Cons:
- Split building requires functional split

Variant 5 - Demolish & Repurpose

Pros:
- Continuous green structure with central park
- Create direct visual connectivity with sundholm and horgarden
- Maintaining existing structure for flexible indoor and outdoor space
- Centraly located functionality



Variant 1 - Single & Divided

Pros:
- Creates centrally located green area, which might be used more for activities directly related to building function
- Big park allows for flexible and diverse outdoor activities
- Open line of sight from Sundholm
- Stimulates movement troughout the green structure
- Allows for creating an attractive facade towards the east to serve as a landmark for attracting people

Cons:
- Makes the east entrance less open

Variant 3 - Single & Centered

Pros:
- Creates open east park which stimulates movement trough the green structure
- Big park allows for flexible and diverse outdoor activities
- Single building next to fabrikken creates simple functional relationship
- Open line of sight from Sundholm

Cons:
- Very built up centre area

2. Case Studies

Concept development

I continued developing my building concept by identifying design themes that could contribute to achieving my main goals and conducting case studies based on these themes. These included social resilience through functional flexibility, non-determined functionality, user-adaptive architecture, temporal flexibility, and sustainability or future resistance.

One architect well known for his work on flexibility, temporality, and user-adaptive architecture is Cedric Price. His approach is particularly relevant today in the context of creating sustainable designs. Price viewed buildings as evolving systems, seeing architecture as something that could grow, adapt, and even dismantle itself when no longer needed. He emphasized flexibility in both program and form, avoiding rigid definitions of how spaces should be used, instead focusing on adaptable frameworks. Additionally, he believed that architecture should empower users to make decisions about their environments, fostering a sense of ownership and creativity.

These ideologies align closely with my vision for the public condenser in Sundholm. Price's conceptual projects represent an extreme architectural expression of these principles, offering valuable insights into potential design solutions for creating resilient architecture.

2. Case Studies

The Fun Palace

The Fun Palace is a huge, industrial-looking structure designed to accommodate a wide variety of functions. Its structural grid is incredibly flexible, making it possible for the space and its elements to change based on users' needs. This idea of extreme flexibility and user-adaptive architecture makes the design capable of handling the ever-changing demands of the people using it. It promotes functional sustainability and inclusivity in a way that feels ahead of its time. This project also inspired a range of other designs based on similar ideas, and one of these, the Inter-Action Centre, was actually built.

2. Case Studies

Inter-Action Centre, London (1972)

The Inter-Action Centre, built in London in the 1970s, focused on creating flexible, user-driven spaces that could be reconfigured to support different social, educational, and cultural activities. It reflected Cedric Price's philosophy of responsive and participatory architecture, aiming to empower users by providing a dynamic environment that could evolve with their needs.

Looking through its design archives and sketches gave me a better understanding of Price's design thinking and the practical solutions it inspired. He saw the Inter-Action Centre as part of a larger system, connecting what happened inside the building to the activities outside it. Because these interactions were constantly changing, the design was kept simple, using an open framework that allowed modular, prefabricated elements to be added or removed as needed.

2. Case Studies

Temporal Flexibility

The Shed, New york: Diller Scofidio + Renfro (2018)

To explore past Cedric Price's ideas on long-term flexibility and user-adaptive architecture, I looked at case studies of flexible architecture that incorporate temporal flexibility.

The Shed in New York is a great example. Its movable structure and openable façade transform outdoor spaces into indoor ones, allowing the building to support a wide variety of activities. This level of adaptability makes it perfect for responding to changing needs and conditions.

Sliding House: DRMM Architects (2009)

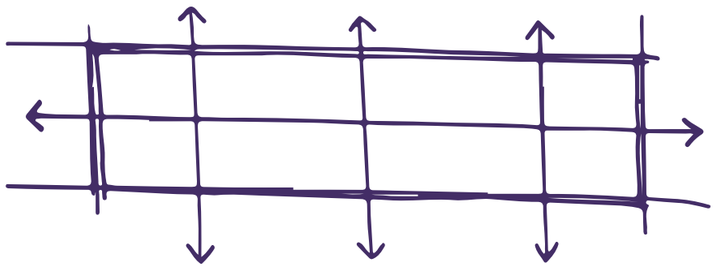
Another project, the Sliding House, uses a similar sliding structure. In this case, a closed outer skin slides over a glass façade. This design allows spaces to transition between open and closed configurations, adapting perfectly to seasonal changes. In the summer, the closed skin can create shade, while in the winter, sliding it back allows the building to act as a greenhouse, using the sun's warmth to reduce the need for mechanical heating.

Rooftop Greenhouse

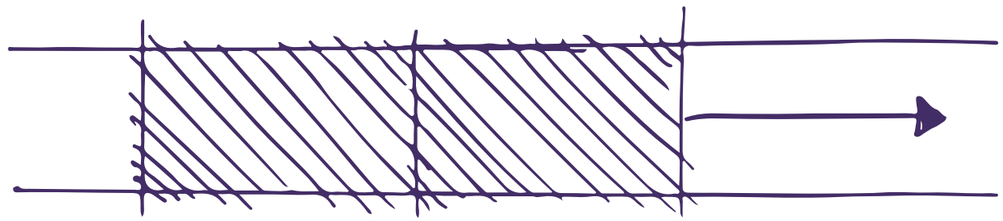
The idea of temporal flexibility as a tool for climate control inspired me even further, especially since I want to include rooftop gardening in the building's program. A flexible rooftop greenhouse would enable food production year-round and could also act as a thermal buffer, improving the indoor climate and reducing energy use.

3. Building Concept V1

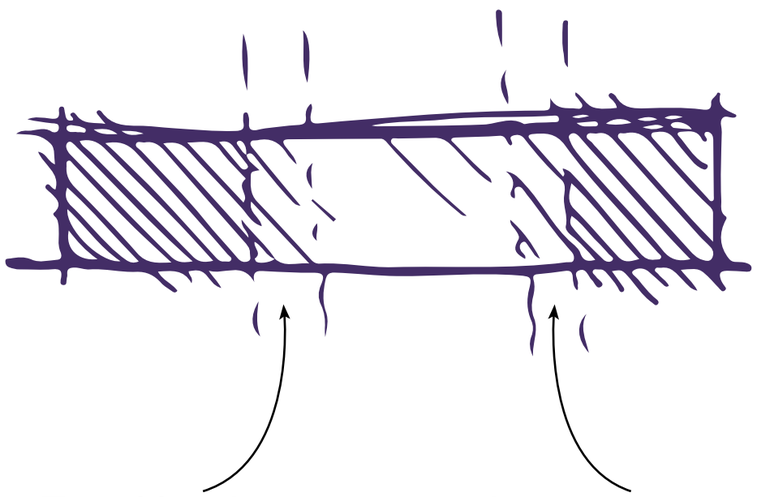
Principle sketches



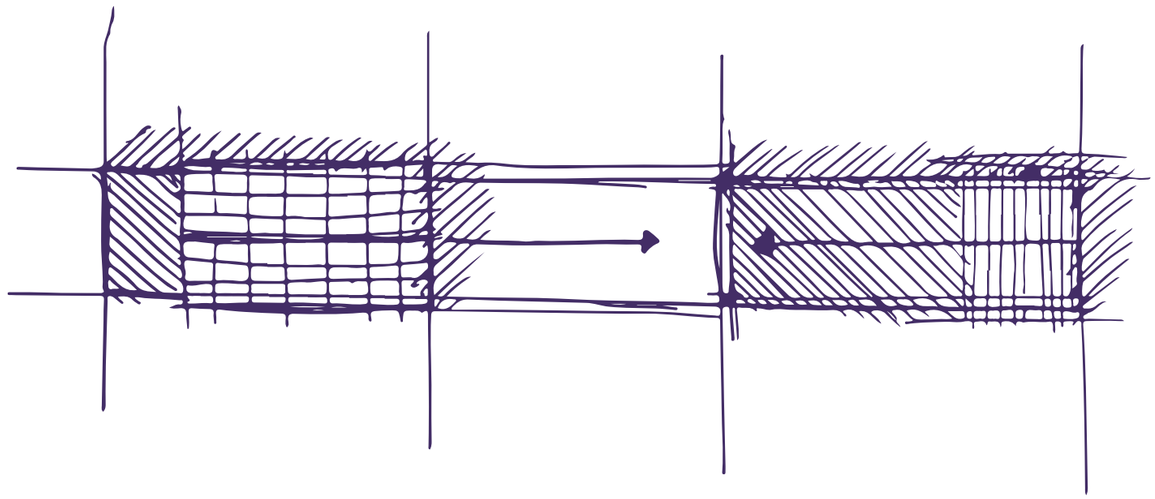
Connectivity Troughout



Expandability



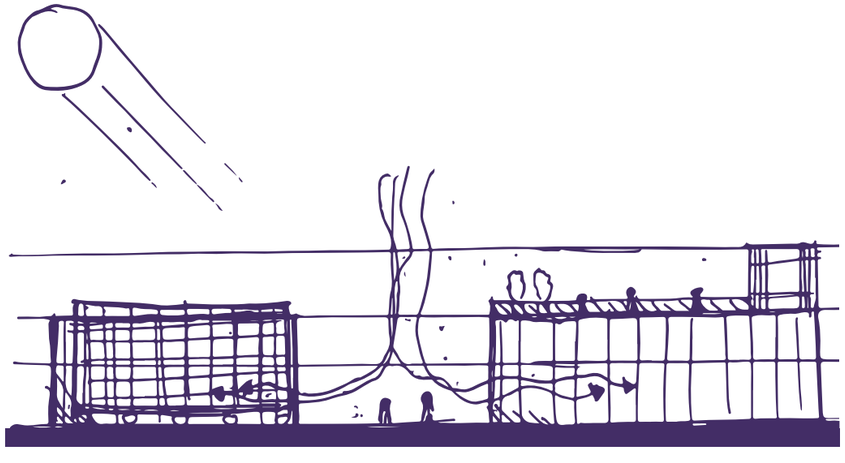
Transitional spaces towards open courtyard



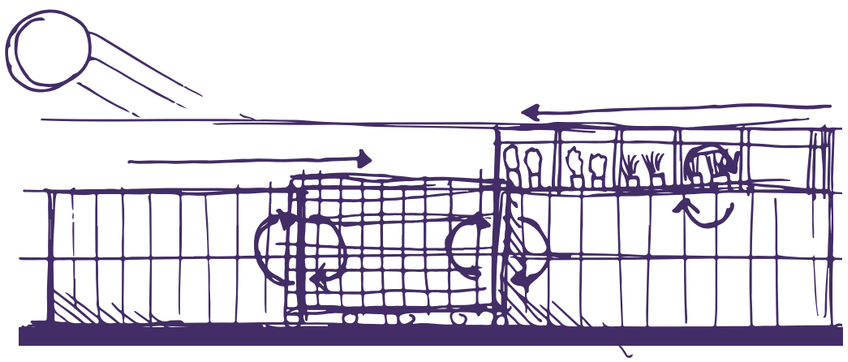
Movalbe systems for outdoor/indoor transformations

3. Building Concept V1

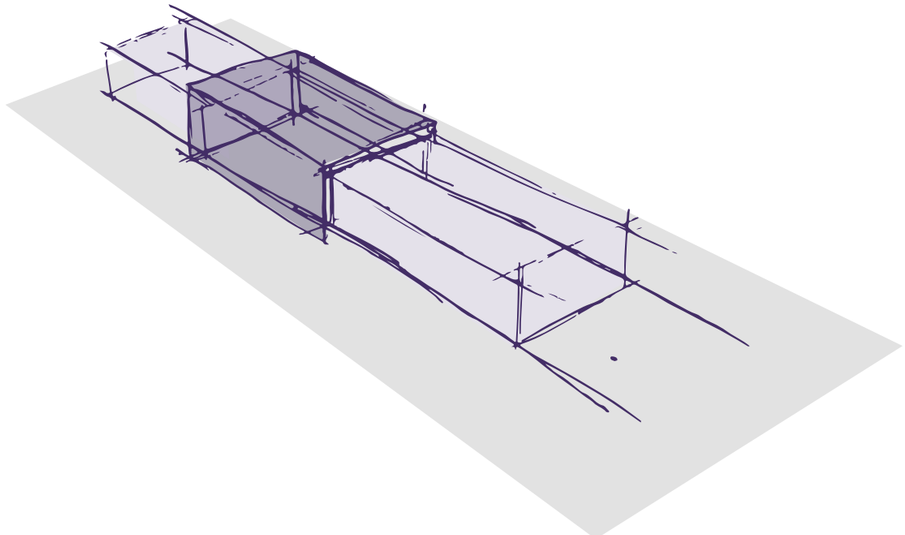
Temporal flexibility for passive climate control using sliding glass construction



Summer: Open courtyard and roof terrace



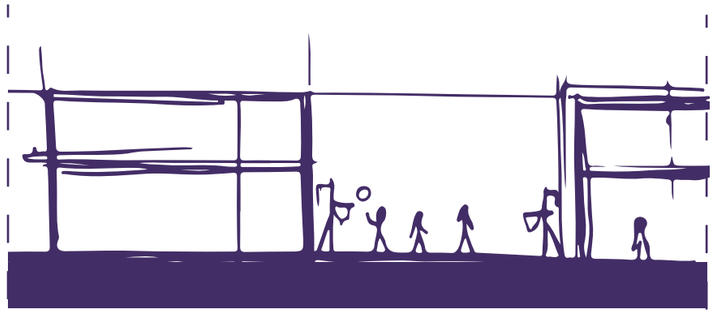
Winter: Closed courtyard and greenhouse



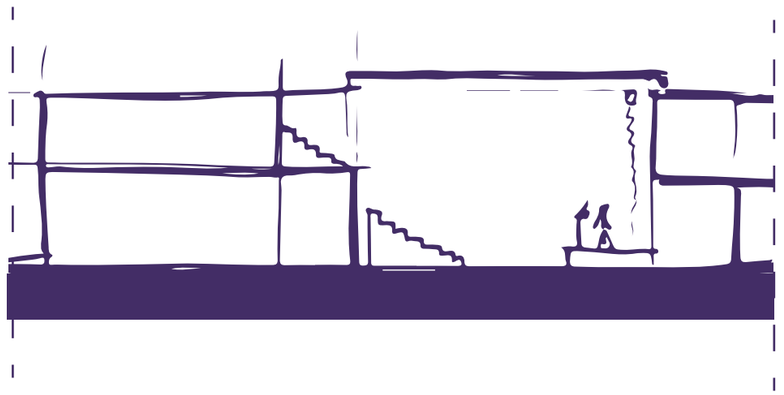
3D Concept Sketch

3. Building Concept V1

Functional flexibility trough flexible walls and roof



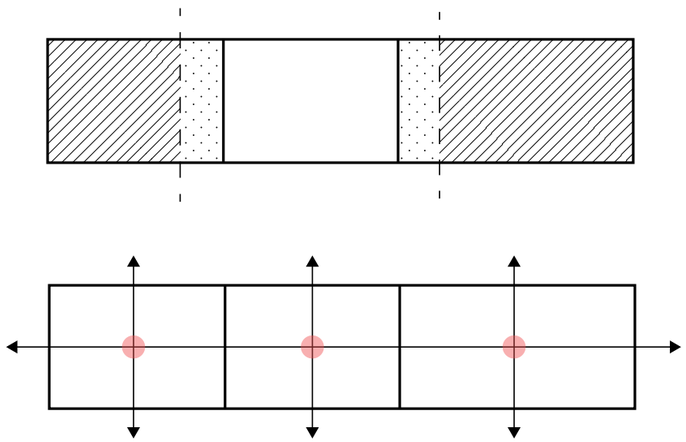
Open roof



Closed roof

3. Building Concept V1

Final building concept v1

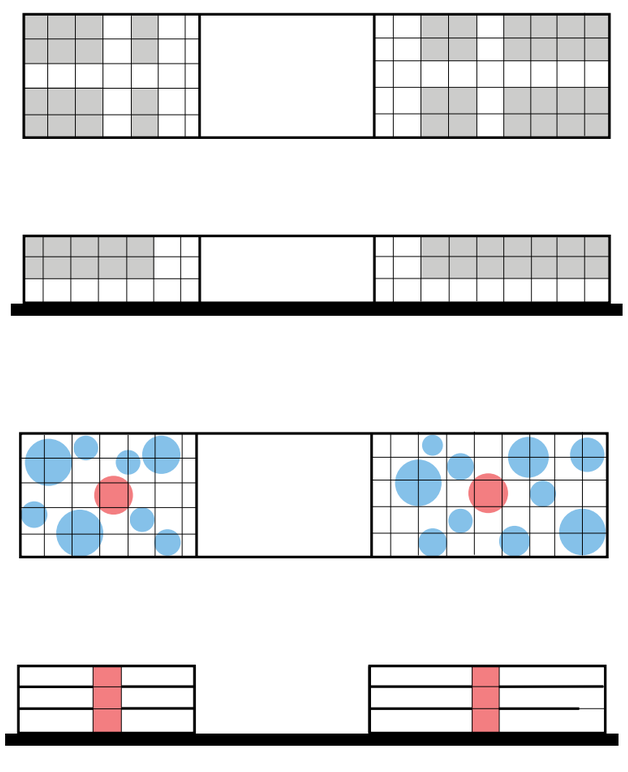


Transitional space

Serving as the connection between the indoor and outdoor area, but also as the extension of either the main building or the event hall.

Connectivity Troughout

A main central conenction troughout the length of the building intersects with the horizontal connections trough the center of each of the three building parts



Permeability (Floorplan)

A visual representation of the buildings closed and open parts, showing its connectivity to the out- and indoor

Permeability (Section)

A visual representation of the buildings closed and open parts, showing its connectivity to the out- and indoor

Scattered functions

Functions scattered within the grid, creating a diverse spatial arrangement with a lot of space between functions, which can serve as flexible spaces

Central vertical connection

Serving as the vertical connector between floors, but also as an open

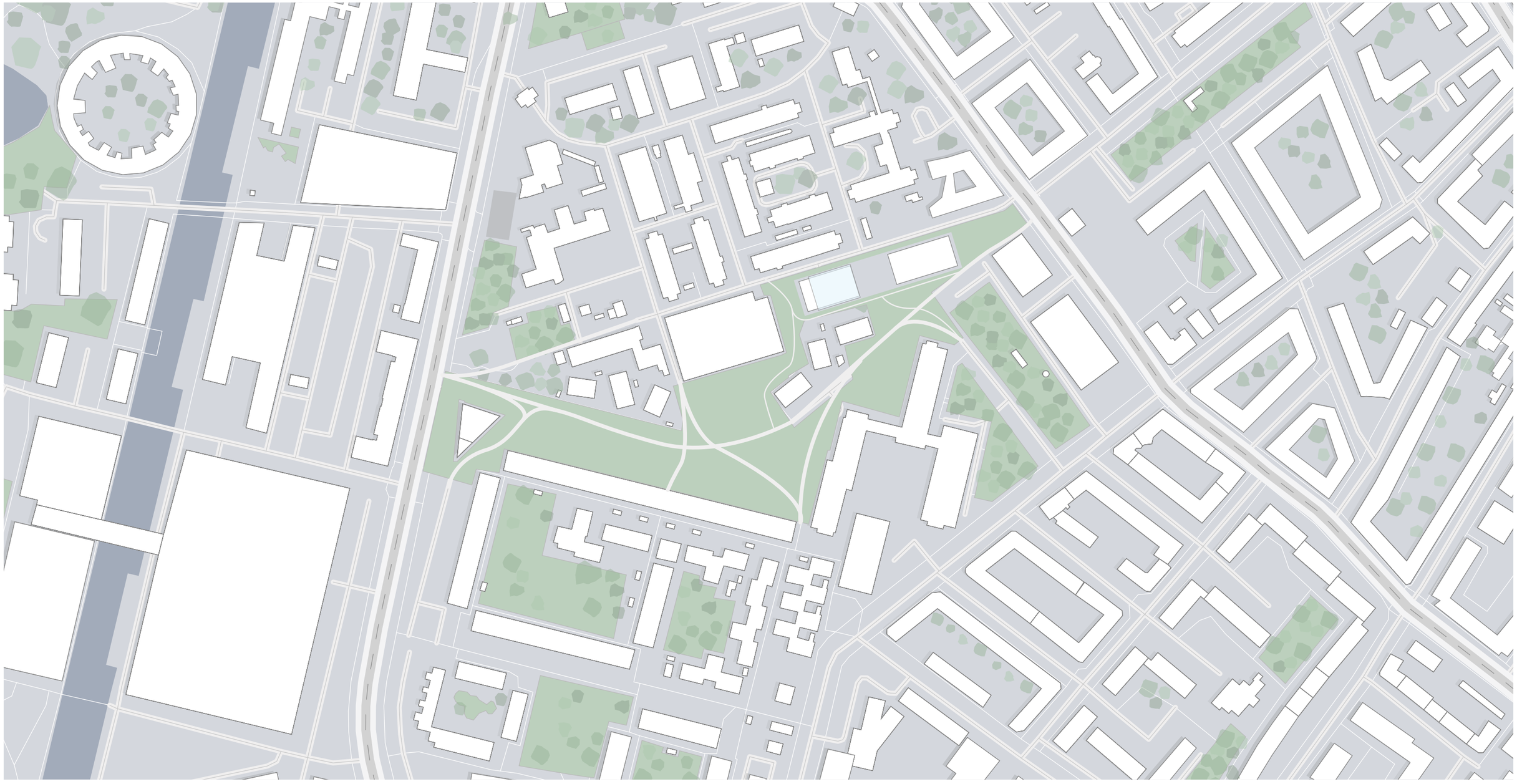
I took inspiration from Cedric Price's Inter-Action Centre, where the building adopts a simple form within a straightforward structure. This approach allows for easy construction and modularity inside, enabling functionalities to be added or removed over time.

Secondly, based on my site concept, where creating a vertical connection across the plot area is important, the building's permeability plays a crucial role. This permeability also serves as a transitional boundary between indoor and outdoor spaces, allowing functionality to extend outward. This concept is illustrated in the permeability diagram.

To achieve temporal and functional flexibility, I drew inspiration from the Shed to create a flexible event space, incorporating the sliding concept from the Sliding House to enhance its functionality as a passive climate solution. This sliding mechanism can also be applied to the roof terrace/ greenhouse.

4. Neighbourhood spatial design

Functional flexibility trough flexible walls and roof



4. Neighbourhood spatial design

Functional flexibility trough flexible walls and roof

After finalizing the building concept, I revisited my original site design and applied the building to this conceptual framework. During my conceptualization process, I always had the plot area in mind, of course. A few key considerations were central to this process: the need for a vertical connection across the plot boundaries, which I integrated into the sliding system. This system aligns with the vertical street leading to the plot from Sundholm.

The plot's long, stretched form and its relationship with the important entrance street on the eastern side, as well as its proximity to Fabrikken, were also important factors. The building concept fits within the original site plan, though the routing could benefit from improvements. The previously sharp angles have been replaced with smoother transitions, enhancing the original plan's goals of making the routing more enjoyable for cyclists and pedestrians. This adjustment facilitates movement through the area and reduces the physical barriers that currently exist.

The building’s relationship to its environment is based on two important principles. The first is maintaining and creating new north-south connections. The second is ensuring the building's position relative to the remaining open outdoor space enhances the overall public realm and routing around it. For example, the north-south connection between Fabrikken and the building should create an inviting outdoor space that supports activities and improves the spatial quality of this connection.

Towards the eastern side of the plot, the building should form an attractive open outdoor space that allows for functional extensions and improves visibility from the most important access point of this area. The building's positionality cannot be considered without addressing its internal program. With these goals in mind, I began developing the programmatic concept to align with both the building and site concept.

5. Program concept v1

Program relationships

I took several approaches to better understand the programmatic requirements, their relationships to each other, and their interaction with the environment. This process helped me develop a thorough understanding of the programmatic relationships within the building and its surroundings.

Program Temporal Flexibility and Relationships

Firstly, I analyzed the program requirements and their temporality to assess the potential for multifunctional spaces and those that could benefit from temporal flexibility. This analysis allowed me to categorize the spaces into three distinct categories: Crafts, Events, and Gardening.

- Crafts/Arts functions require more fixed, indoor spaces.
- Events and Sports are flexible functions that can benefit from temporal adaptability.
- Gardening spaces are fixed but can either be located indoors (e.g., on the roof) or outdoors, depending on the design.

Program	Outdoor or Indoor?`	Usage times	Fixed or Flexible?
▪ Event space:	Outdoor/Indoor	24H (depending on event)	Flexible
▪ Sports area:	Outdoor/Indoor	24H	Flexible
▪ Playground:	Outdoor/Indoor	non-school times	Flexible
▪ Gardening area	Outdoor	24H	Fixed
▪ Art workshop:	Indoor	24H	Fixed
▪ Woodworking shop:	Indoor	24H	Fixed
▪ Repair shop:	Indoor	24H	Fixed
▪ Cooking area:	Indoor	24H	Fixed
▪ Music space	Indoor	24H	Fixed

Crafts/Arts

all indoor fixed spaces, since these functions have specific requirements

Sports/Events

These spaces allow for diverse functionality in different conditions, therefore functions can overlap in the same space, and this part should be able to adapt to the wheather, allowing for indoor and outdoor use

Gardening

The gardening space will have fixed functionality. It may be placed on the ground-level, or on the rooftop and can possibly have a greenhouse to provide for gardening trough-out winter

5. Program concept v1

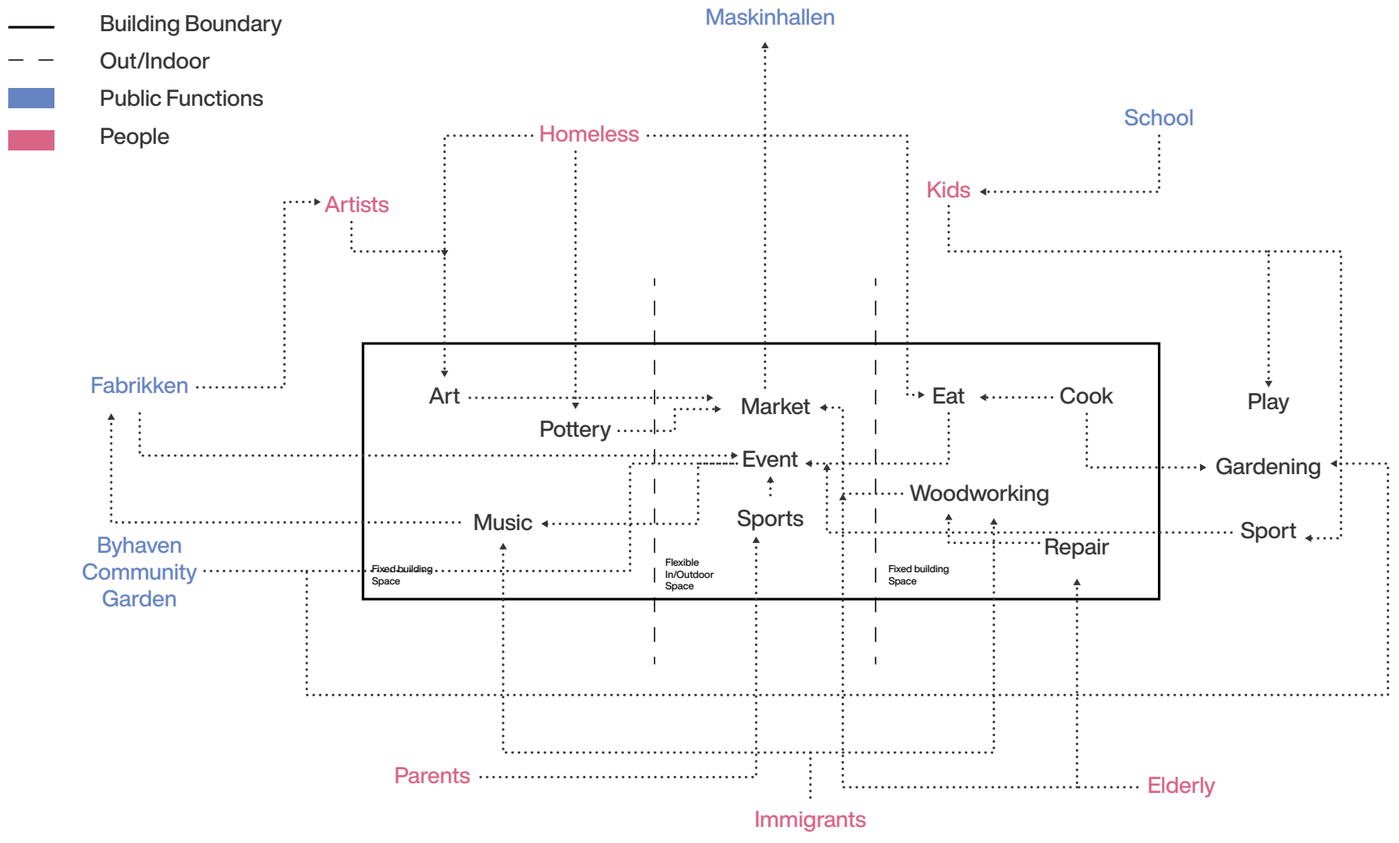
Program relationships

Cedric Price's Inter-action centre diagram showing the building as a system

Program development using system thinking

The building's program is rooted in the existing functionality of the neighborhood, aiming to enhance what is already present and extend the neighborhood's program to include more inclusive activities. To better understand the program's relationship to its surroundings, I adopted an approach inspired by Cedric Price's system thinking. He viewed a building's program as interconnected with its external functionality.

By creating a diagram inspired by Price's work, I was able to visualize the programmatic relationships within the building and their connection to the neighborhood. I also incorporated the role of users into this program to ensure that the building aligns with their needs and supports their activities effectively.

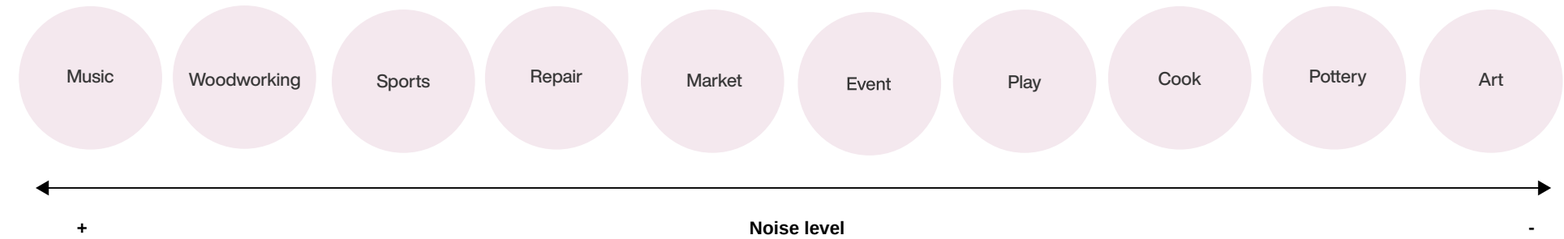


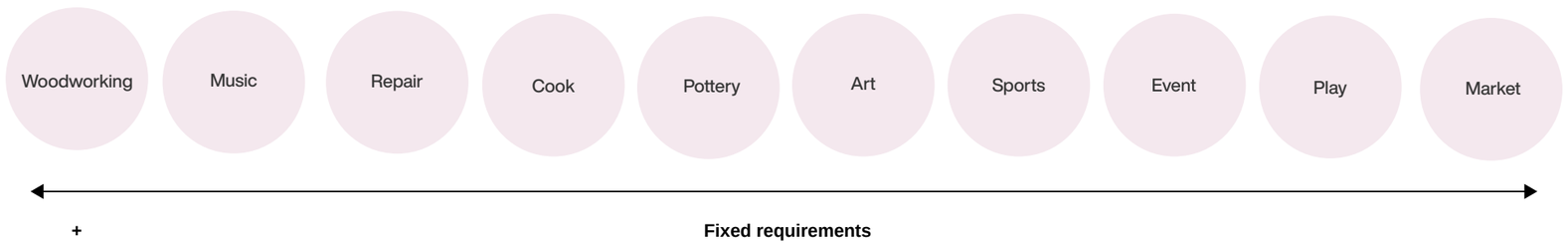
5. Program concept v1

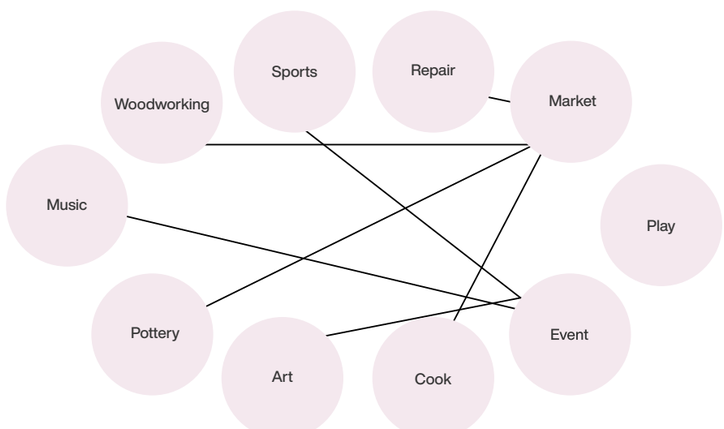
Program relationships

Program Orientation Based on Technical Requirements

Next, I adopted a practical approach, aligning the program with technical requirements such as noise levels, fixed infrastructure, and the relationships between different functions. This gave me valuable insights into the internal logic required for designing the program layout effectively.







5. Program concept v1

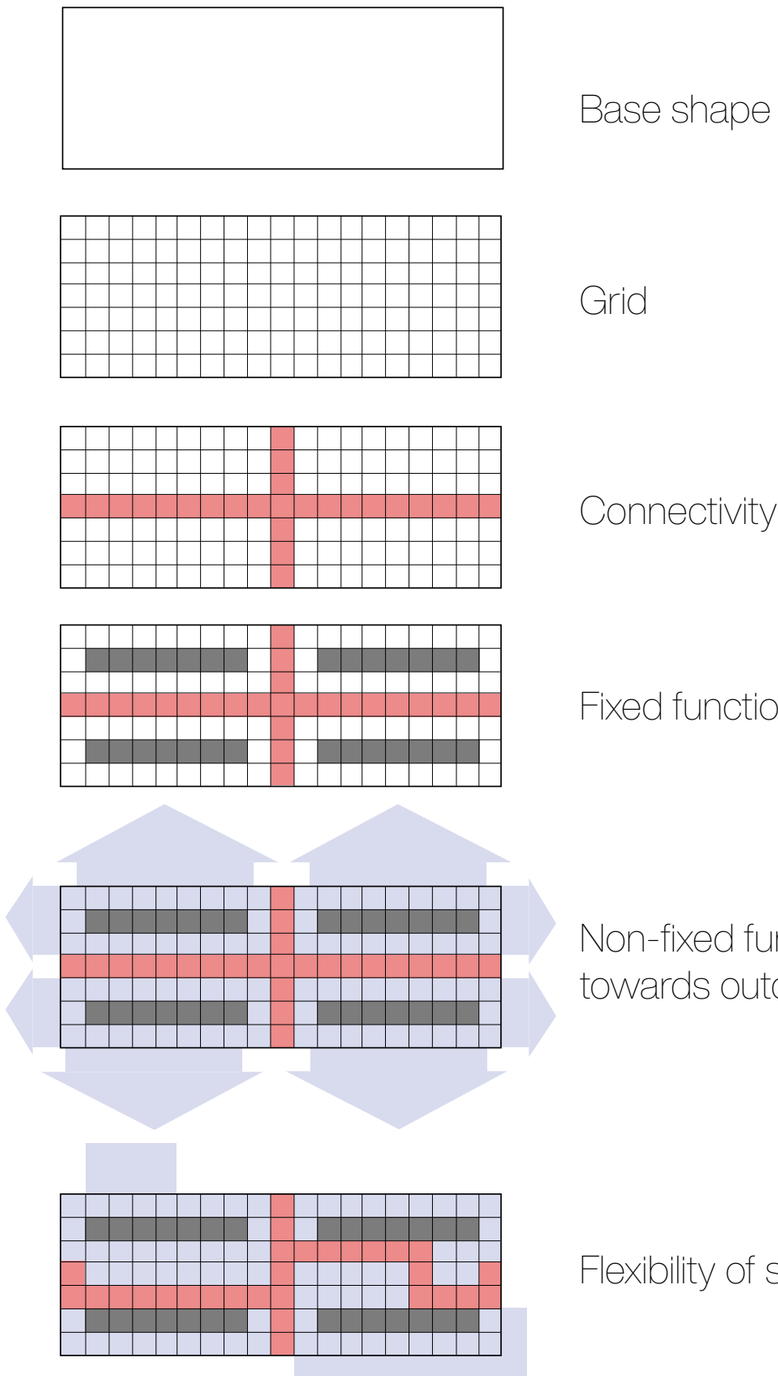
Program relationships

Non-Fixed vs. Fixed Functionality Layout

After gaining a deeper understanding of the building program, I revisited my building concept, which focuses on creating flexible and adaptive spaces. I continued developing the idea of fixed functionality paired with non-fixed functionality to create spaces that adapt to user requirements.

This approach allows fixed functionality spaces to extend into non-fixed spaces, enabling flexibility based on user needs. To visualize this concept, I worked with a grid system, where I mapped circulation, non-fixed spaces, and fixed spaces as the grid's primary components. While circulation may overlap with non-fixed spaces, I highlighted it in red to emphasize the importance of connectivity throughout the building.

The diagram shows how this connectivity shapes the space. Fixed functionalities are centered within the fragmented grid, allowing non-fixed spaces to surround and encapsulate them. To illustrate flexibility toward the exterior of the building, non-fixed spaces are depicted with extensions beyond the building's boundaries, demonstrating their potential to integrate with the outdoor environment.



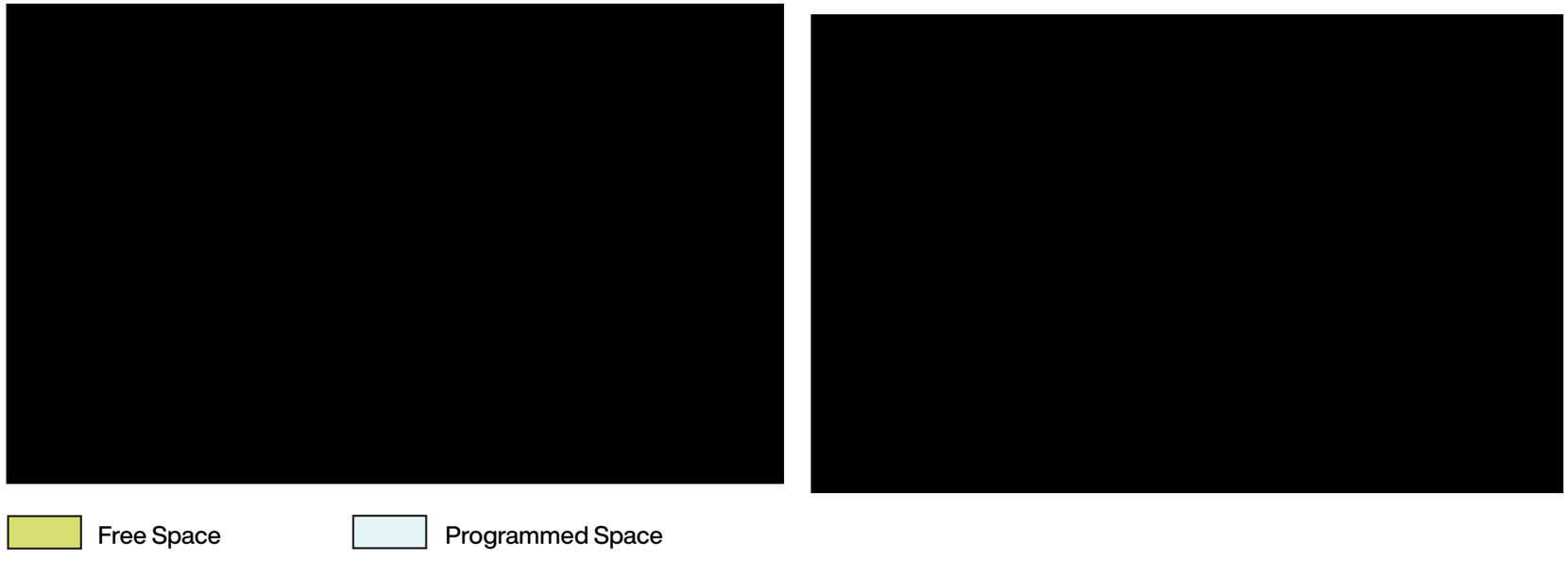
6. Case studies 2

Nantes School of Architecture, Lacaton & Vassal

After presenting and discussing this concept, I found references to buildings designed with a similar ideology: fixed spaces served by non-fixed spaces, allowing the functionality of the fixed spaces to extend based on user requirements. Architects Lacaton and Vassal promote this concept of “free space” in their projects, such as the Nantes School of Architecture and the FRAC in Dunkerque. These projects are highly inspiring and demonstrate how this concept can work in practice.

I noticed a key difference in the orientation of free space in relation to fixed space within my concept. In my design, the free space was conceived as a buffer or boundary surrounding the fixed spaces. However, in their projects, the free space intersects with the fixed spaces in a more natural and integrated manner, almost as if it is an inherent part of the programmed space.

Nantes School of Architecture images, source: https://www.archdaily.com/254193/nantes-school-of-architecture-lacaton-vassal



Nantes School of Architecture drawings, source: https://www.archdaily.com/254193/nantes-school-of-architecture-lacaton-vassal

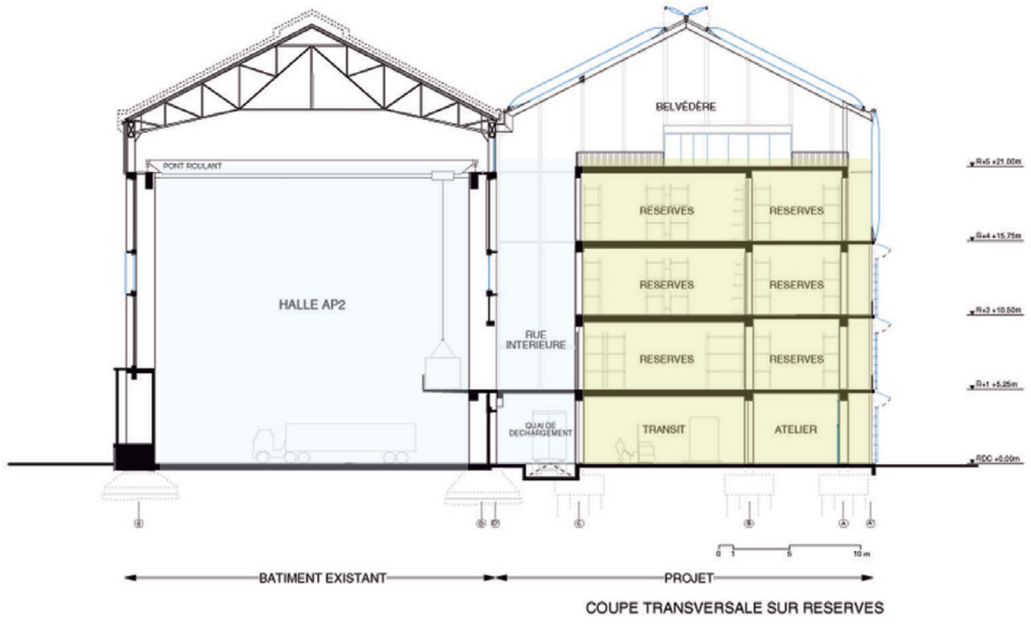
6. Case studies 2

FRAC Dunkerque, Lacaton & Vassal

In the case of FRAC, this concept is taken to an extreme: the free space is essentially a mirrored copy of the programmed space. This example shows that simply positioning free space adjacent to programmed space is enough to provide functional flexibility and enhance the functionality of the programmed areas.

These case studies have inspired me **to rethink the previously developed diagram and explore a more integrated relationship between free and fixed spaces in my design.**

FRAC Dunkerque images, source: https://www.archdaily.com/475507/frac-of-the-north-region-lacaton-and-vassal



FRAC Dunkerque section, source: https://www.archdaily.com/475507/frac-of-the-north-region-lacaton-and-vassal

7. Program concept v2

Defining the program

Rethinking Fixed and Free Space Relationship

To rethink the relationship between fixed and free spaces in my design, I realized I needed to specify the programmatic requirements in terms of size and assess their potential connections to the free spaces. Additionally, to understand these possible relationships, I assigned complementary functions required by the fixed spaces to the free spaces. For example, the kitchen space requires an eating area, the music space needs a performance area, and the art space requires an exhibition area.

All these complementary functions do not require fixed infrastructure, so they can belong to the free space. The free space will consist of circulation areas, complementary functionalities, and service functions such as the entrance area.

Specifying the Program

To create the programmatic layout, I defined the size of each space, its relationship with free spaces, and its spatial and technical requirements. I approached this by ensuring sufficient space for public activities. Starting from the number of people I envisioned participating in workshops for each function, I estimated the amount of functional space needed to accommodate them.

This process resulted in the following program:

Total indoor floor area (2 floors) 3620m2

- Kitchen space 150m2
- Art space 250m2
- Music space 190m2
- Crafting space 300m2
- Circulation 900m2
- Free Spaces 1500m2
    - Entrance
    - Exhibition space
    - Eating space
    - Play space
    - Meeting Space

Flexible indoor/outdoor area 600m2

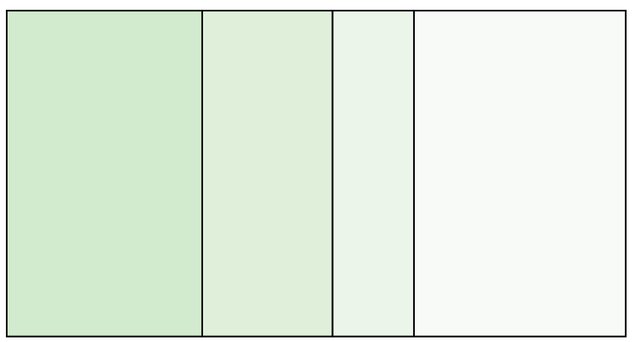
- Sports area
- Events area
- Exhibition area

Rooftop program 1080m2

- Garden
- Greenhouse
- Terrace

7. Program concept v2

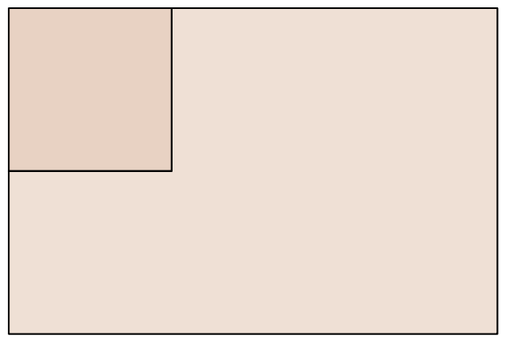
Defining the program



Music space 190m2
- Practice rooms 6x10m2 = 60m2
- Group rehearsal rooms 2x20m2= 40m2
- Workshop room (30 people) 50m2
- Recording studio 25m2

Capacity: 50 people

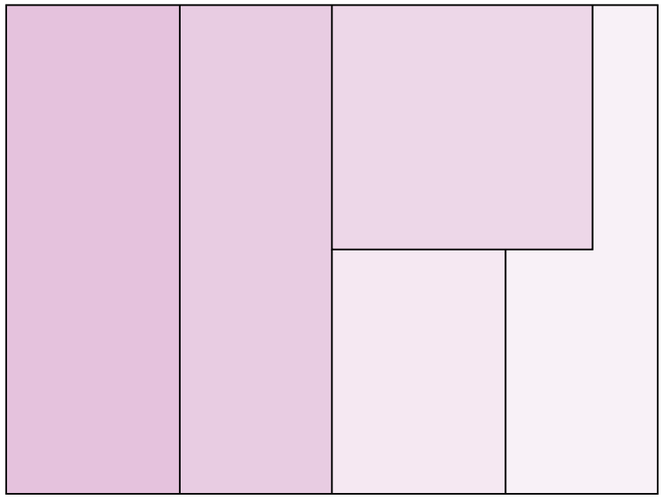
Connection to performance space



Kitchen space (150m2)
- Kitchen area (125m2)
- Storage (25m2)

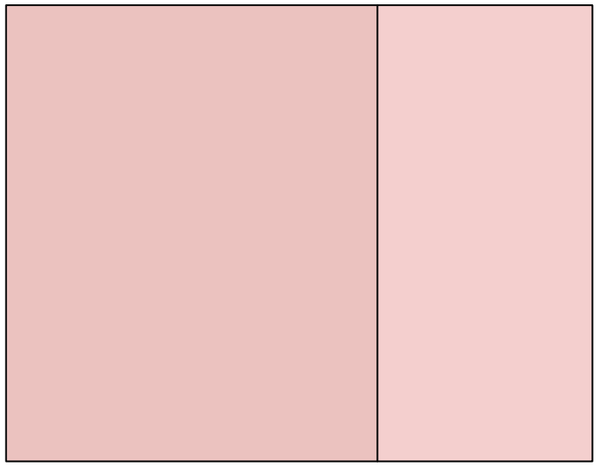
Capacity: 20 people

Connection to free area as eating space



Crafting space 300m2
- Pottery (15 people) 80m2
- Woodworking space (10 people) 70m2
- Repair workshop (8 people) 60m2
- Flexible classroom (15 people) 40m2
- Shared Circulation 50m2

Capacity: 48 people



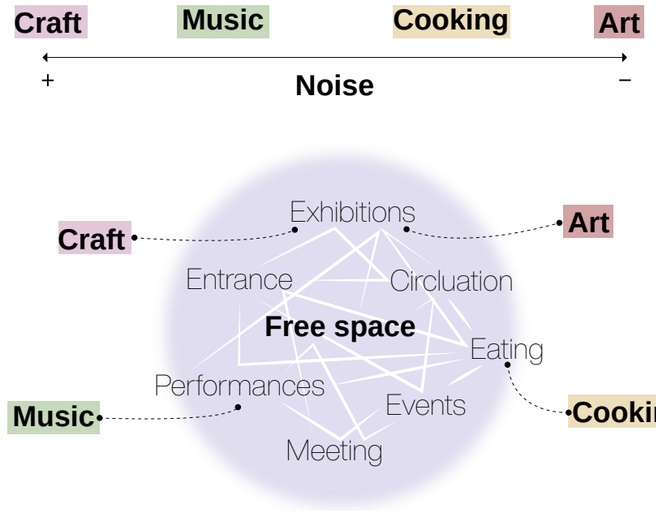
Art space 250m2
- Workshop space (30 people) 90m2
- 20 Private Ateliers 160m2

Capacity: 50 people

Connection to free space as exhibition space

7. Program concept v2

Defining the program



To create the programmatic orientation, I combined my initial programmatic relationship analysis with the site analysis.

The smaller building part, oriented towards Fabrikken, occupies a more secluded position, with its relationship to the outdoor area being less impactful than the other building section. This building part will also house the sliding structure, which will be placed over the indoor space when opened. This design creates a double-layered façade that serves as an additional thermal buffer and an extra layer of sound insulation. These insights, combined with the internal program logic, led to the decision to place the most noise-producing spaces—the music and crafting spaces—within this section. Positioned at the far west of the building, these spaces minimize noise disruption to other areas. Additionally, the free space, where most public functionality will occur, is located towards the centre to serve as a hub of activity.

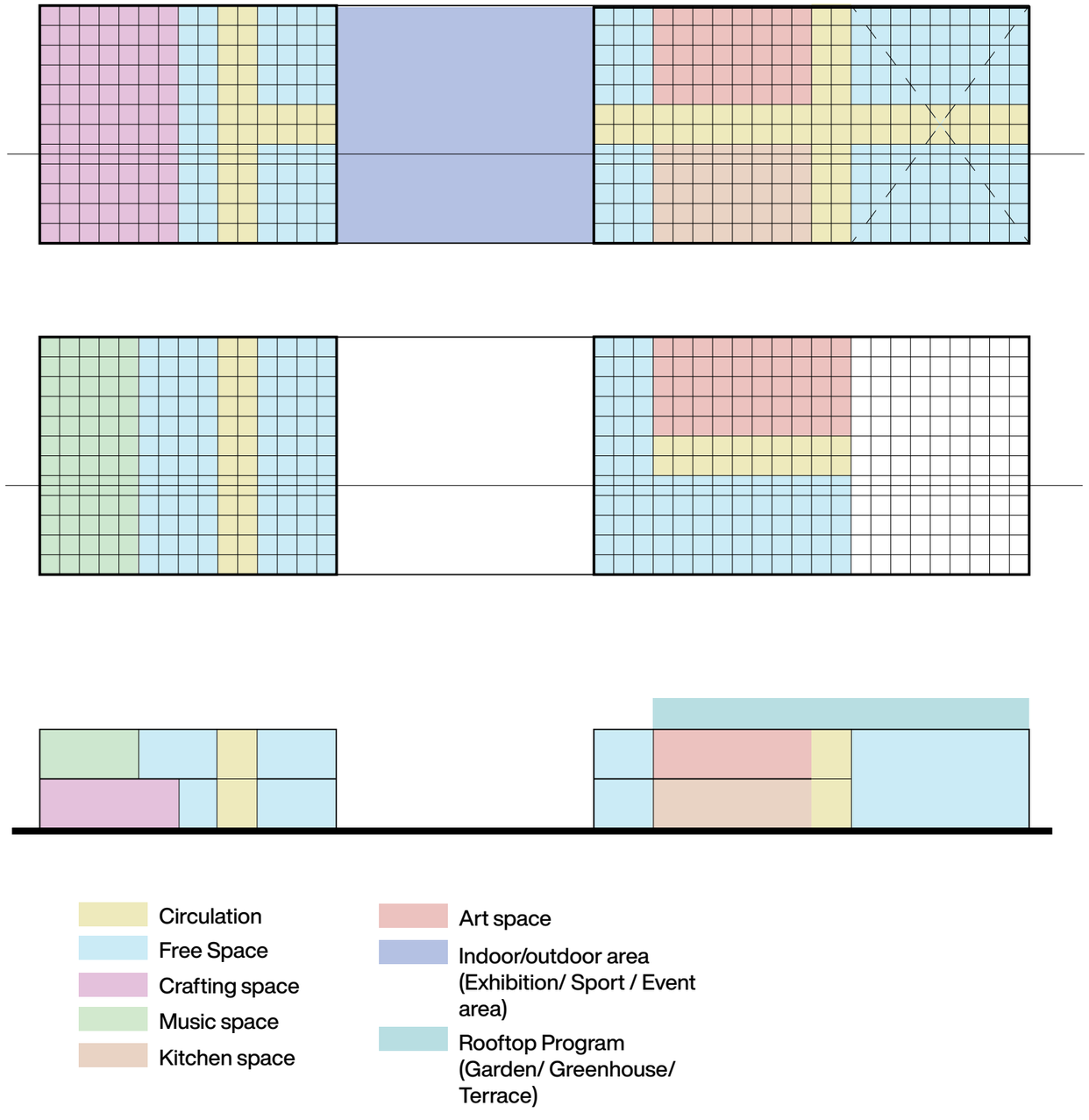
7. Program concept v2

Defining the program

The free space will act as a performance area, a flexible extension for crafting workshops, and an integral part of the central circulation. The crafting space is placed on the ground floor to accommodate the heavy machinery required and ensure accessibility for its public functionality as a repair shop.

The eastern building part houses the art and cooking programs and serves as the main entrance to the building, oriented toward the important access point at the western intersection. The visibility of this section is crucial to showcasing activity and attracting visitors to the site. The roof is also designed to emphasize this activity, providing opportunities for rooftop functions to be visible and inviting.

The cooking area is oriented towards the south, as the outdoor space in this direction is of higher quality. This allows cooking activities to extend outdoors, fostering a connection to outdoor events and benefiting from a food-selling function. The art space spans both floors and connects to the large upstairs free space, accommodating various creative activities and exhibitions.



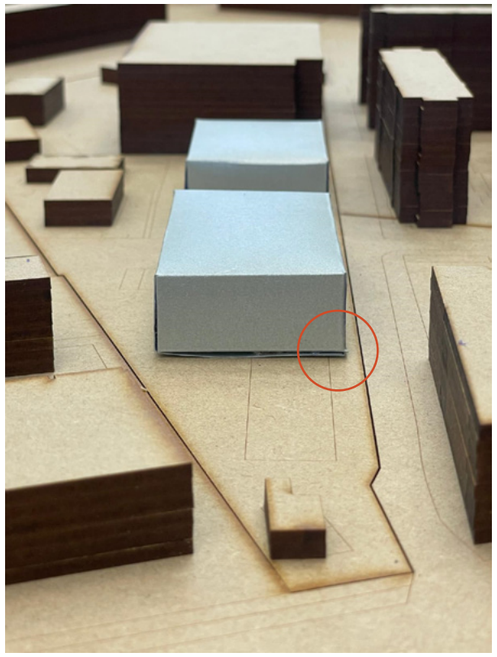
8. Mass studies

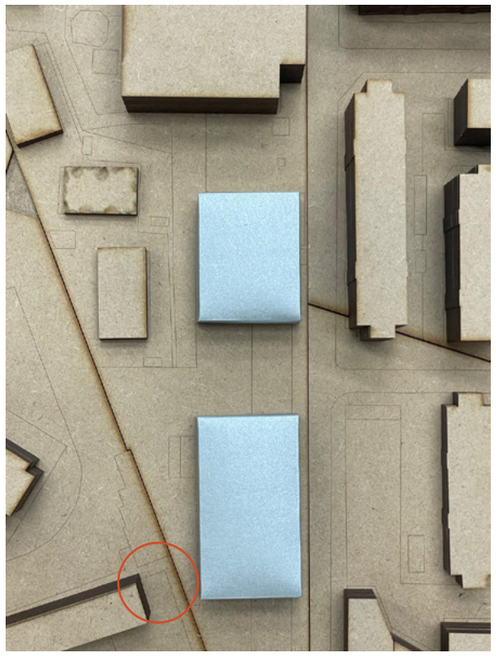
Initial mass & grid

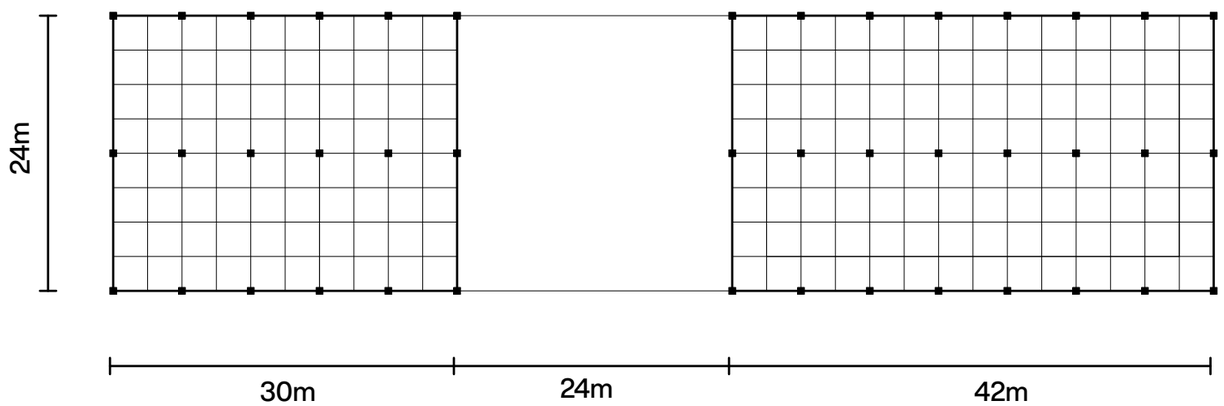
This spatial arrangement of the program feels logical, but its spatial quality seems static and uninspiring, especially when compared to the dynamic and fluid spaces created by Lacaton and Vassal in the Nantes School of Architecture. Their design demonstrates how free spaces can create interesting transitions and relationships between areas.

To better understand and evaluate the indoor spatial qualities of my design, I decided to model it in 3D. I started with the building's construction by establishing a grid of 3x3 meters within a building width of 24 meters, creating a span of 12 meters from the outer columns to the central ones, repeated every 6 meters.

To test this arrangement in relation to the site, I conducted physical massing studies within a 3D site model. I quickly realized that the 24-meter building width was slightly too large, limiting the surrounding space.





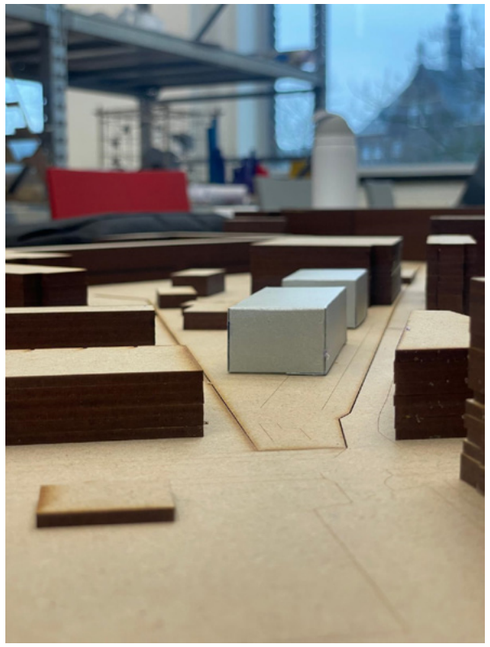


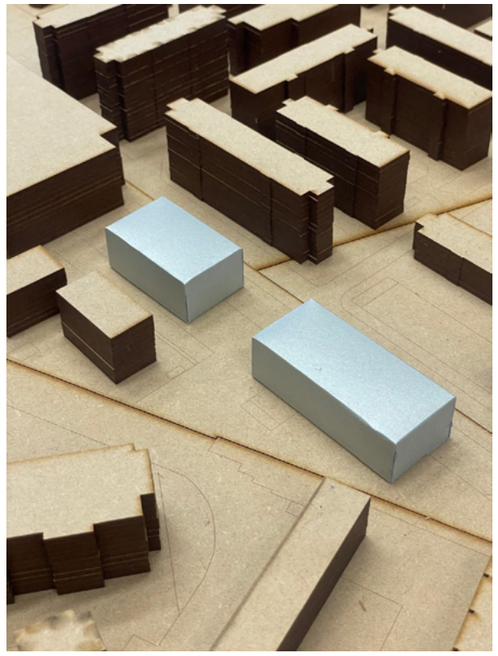
8. Mass studies

Improved mass & grid

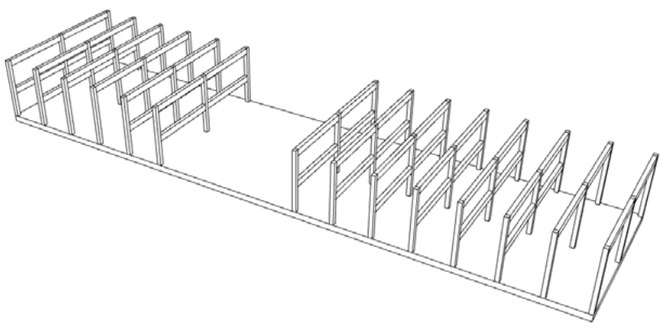
As a solution, I created a variant where the building width was reduced by 6 meters, and the height was increased by 2 meters to compensate for the lost floor area with additional levels.

This adjusted variant fit the site much better, providing more breathing room near the road and additional open space towards the housing on the south side of the building.

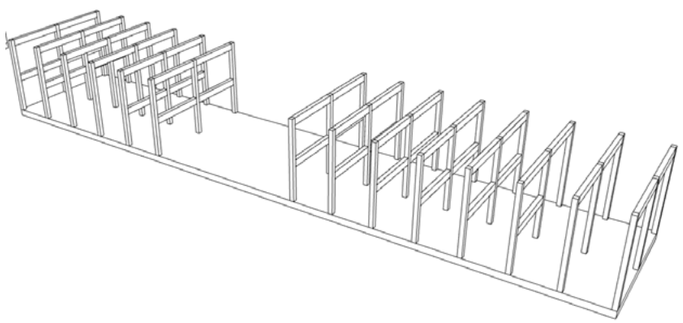


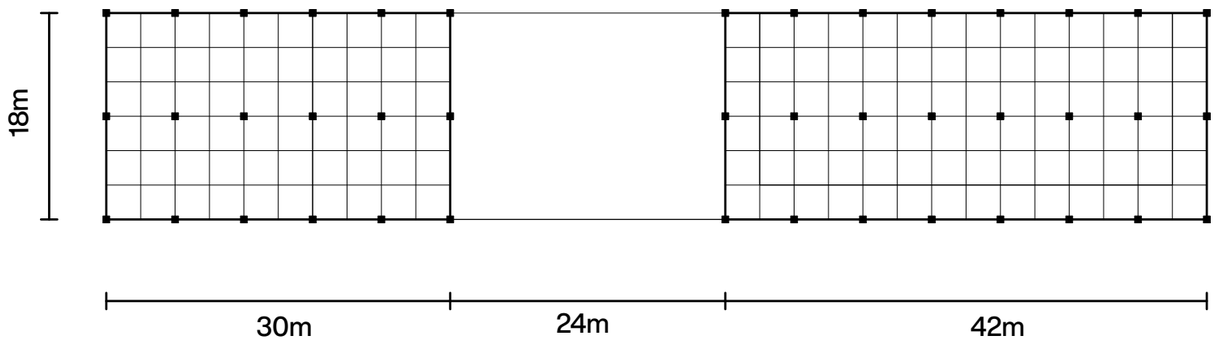


Initial structure:



New structure:





9. Final conceptual design

From concept to final conceptual design

The step from 8. Mass Studies to 9. Final Conceptual Design is a significant one. In this phase, I finalized the conceptual design while tweaking earlier elements based on new realizations that arose during the preparation for the P2 presentations. This section documents the finalized design concept using the drawings and images produced for the P2 presentation.

Since receiving feedback on my conceptual design, I've been inspired to think more critically about my building's programmatic relationships in 3D. Previously, my concept imagery was very static, showing relationships in a 2D grid diagram. While clear, this approach lacked dynamism. In contrast, my inspirations, such as the Nantes School of Architecture, demonstrated a more dynamic 3D interplay of spaces—where spaces flowed into one another, and a balance of dark, intimate areas with open, light spaces created a unique architectural quality. I wanted to break free from the constraints of 2D conceptualization and experiment with what is possible within the grid structure I had created.

I began by translating the grid structure into 3D and mapping the program-specific areas with height requirements. I realized that many spaces, such as art and music studios, did not require 5-meter-high ceilings and actually functioned better with lower ones. This sparked the idea of introducing multi-layered floors within the structure. Building on earlier massing studies, I decided to raise the overall building height to 12 meters, enabling the inclusion of double floors with 4-meter heights—ideal for the studios.

With this in mind, I oriented the program based on the previous conceptualizations and began shaping the free spaces, such as the entrance and performance areas. Large stairs became a key element in these free spaces, creating dramatic transitions between floors while doubling as raised seating for lectures or performances. I was inspired by the TU Delft Orange Hall, which I see as a perfect example of a multipurpose space.

By combining the program logic derived from site orientation, internal orientation, functional height requirements, and a vision for dynamic, playful spaces, I developed a 3D spatial concept for the building's interior. The first image here shows the overall spatial layout and routing in 3D, providing an overview that is hard to capture in a floorplan alone. Subsequent images present detailed floorplans, explained below.

9. Final conceptual design

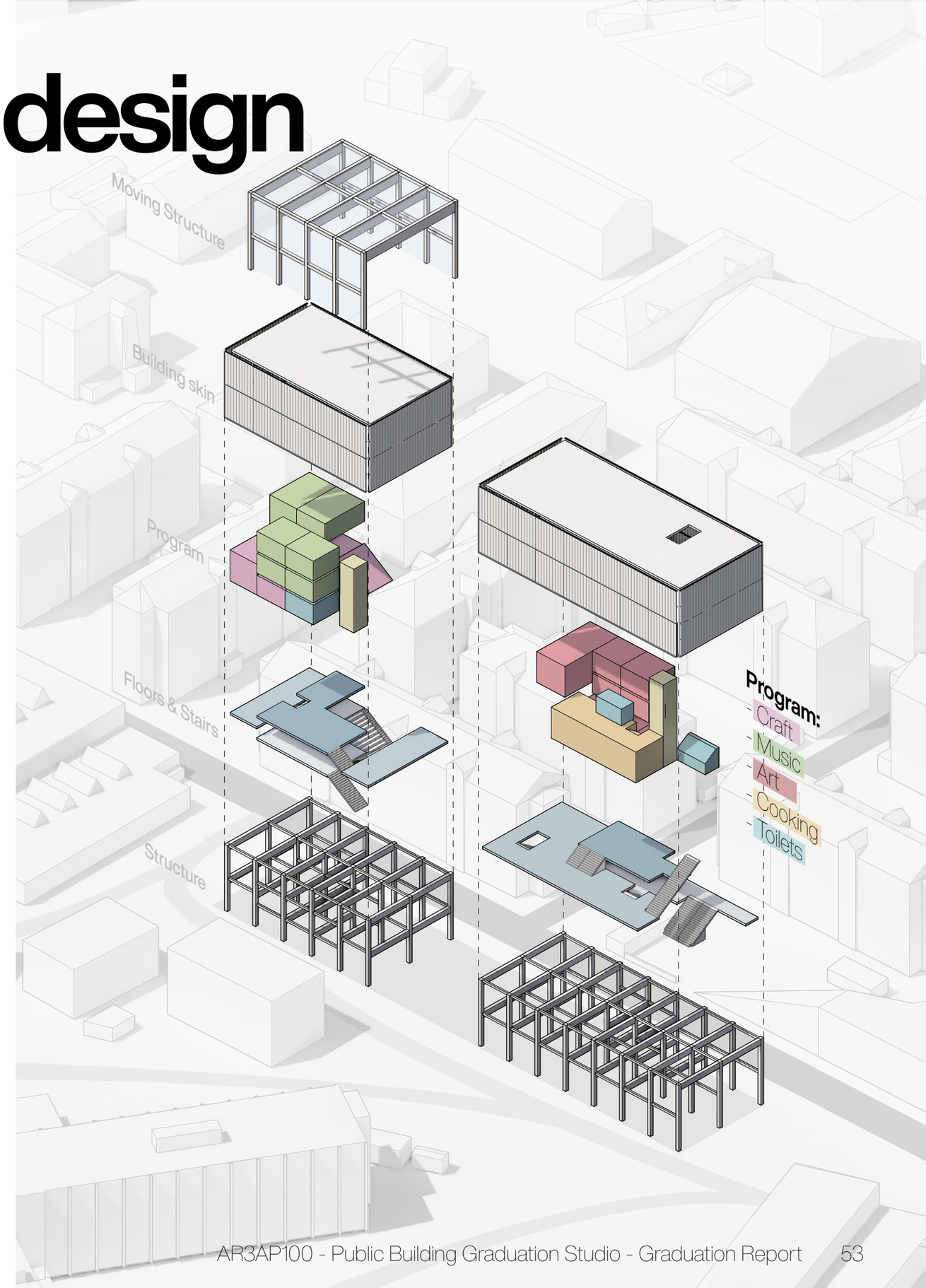
Moving structure
Glass and steel structure that connects two building parts & creates flexible in/outdoor space

Building skin
Semitranslucent with translucent cutouts & openable parts

Program
The west part of the building (music & crafts) houses a large, flexible performance space facing the roadside. Craft spaces are located on the ground floor, while music spaces occupy the first and second floors. The music spaces are oriented towards the nearby apartment buildings, as they require less daylight due to acoustic requirements . The east part of the building (arts, cooking & roof terrace) serves as a vibrant hub, exposing its activity to the outside. Its free space is oriented towards the building edges and includes a main entrance hall that functions as a flexible space for various activities.

Floors & Stairs
The building features a large floor height of 6 meters, with double floors creating 4-meter-high spaces. These floors form dynamic, playful areas, while voids provide high ceilings and interesting sightlines. Large staircases connect floors and are embraced as part of the the free spaces, oriented towards open areas for multifunctional purposes.

Structure
Columns are spaced every 6 meters, spanning 9 meters across, supporting lightweight steel floor structures between levels. This large grid system enables high ceilings and future program adaptations.



9. Final conceptual design

Programmatic logic

I will explain the floorplan logic for each building part individually:

West Building (Crafts & Music)

The ground floor houses crafting spaces and a performance area. The crafting area includes pottery and repair workshops on the quieter south façade, while the woodworking space is on the north façade. The space under the stairs serves as material storage. A free space functions as a workshop and entrance to the crafting area, accessible via openings in the façade or a door on the north side.

The ground floor transitions into the performance area through a sliding wall, which can be closed during performances. The free space also connects to the outdoors via a sliding door, allowing a continuous flow when the façade is open. The free space stairs lead to a lowered first floor, which includes two music studios with lower ceilings. From this level, additional free spaces on the east and west of the building connect to a large rehearsal space, allowing their functions to merge. The top floor contains two music studios and a large recording studio, accessible by elevator or a staircase near the performance space to avoid interference during events.

East Building part (Arts & Cooking)

This building features a centrally located fixed program surrounded by circulation spaces leading to the façades. This arrangement ensures activity is visible from the exterior, important as this building is highly visible from various routes. The kitchen is on the lower floor for easy access to both the entrance and the central indoor/outdoor space, facilitating food-related events or catering. The bar, part of the kitchen area, faces the main entrance hall.

The entrance hall features a large void with high ceilings, floating staircases, and bridges, creating dynamic views and visible movement across multiple levels. From the entrance, visitors can access the first half-floors (4 meters high), housing art studios. These floors connect to a large free space on the west façade, which can function as an exhibition area, allowing the art program to expand into this space. A high-ceilinged art workshop accommodates group lessons and workshops. The second-floor art studios are accessible via small staircases that also serve as seating areas, adding dynamic height variation.

From the second floor, a large staircase leads to the roof, whichserves as free space. It can serve as a relaxation area, a place for outdoor events, or a gardening space.

9. Final conceptual design

Floorplans & Program

Craft (180m2)
- Woodworking space 54m2
- Pottery space 36m2
- Repair workshop 54
- Storage 54m2

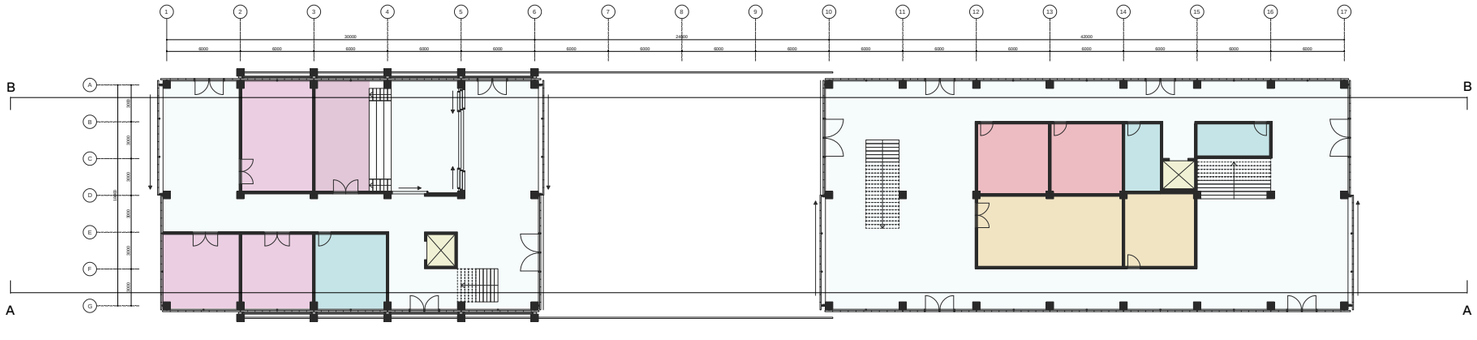
Music (253m2)
- Small practice rooms 8x 18m2
- Recording studios 2x 27m2
- Large rehearsal room 54m2

Art (286m2)
- Workshop space 70m2
- Art studios 6x 36m2

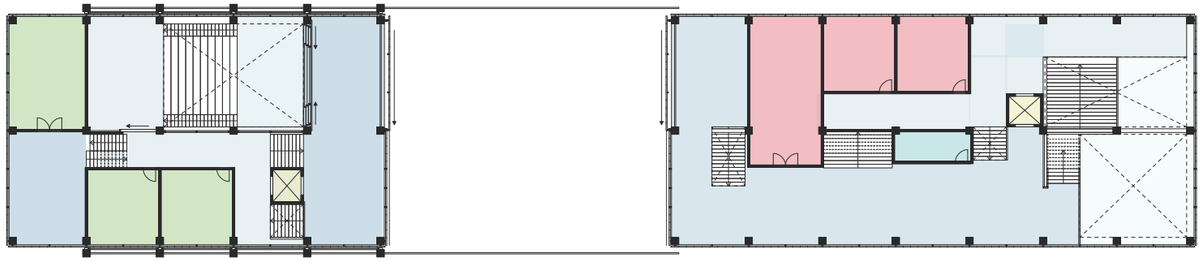
Cooking (108m2)
- Kitchen 72m2
- Bar 36m2

Toilets (90m2)

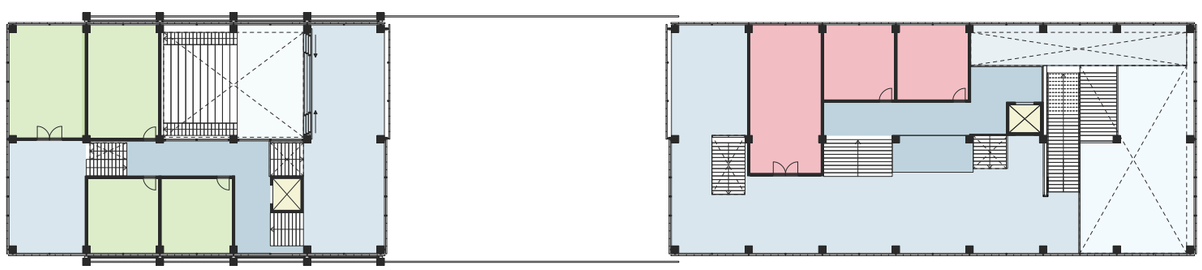
Free space (1600m2)
Functions for: entrance, circulation, exhibitions, performances, eating, events, meeting.



Ground Floor



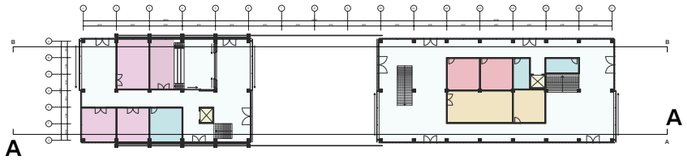
1st Floor



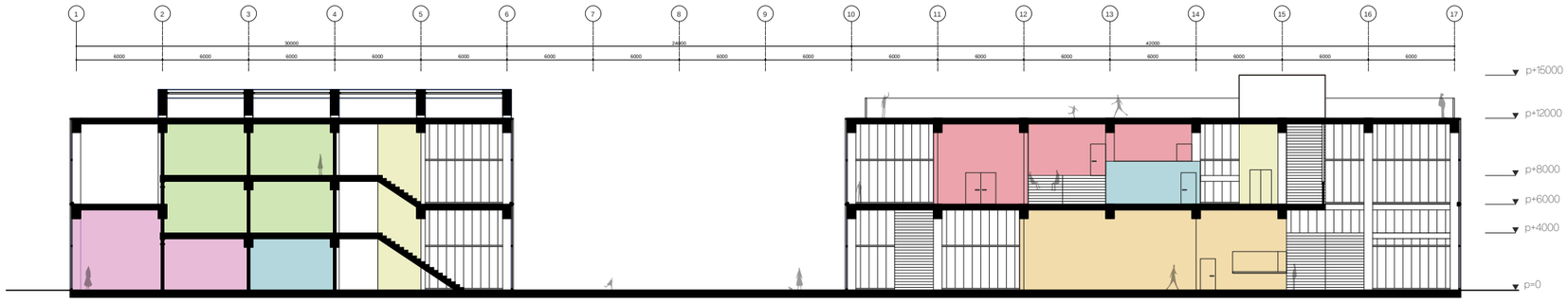
9. Final conceptual design

Sections & program

Program:
- Craft
- Music
- Art
- Cooking
- Toilets

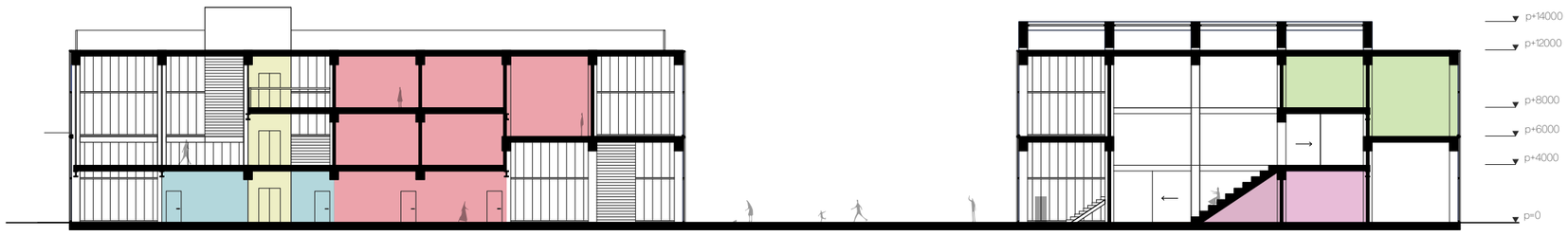


Section A-A: This section highlights the vertical organization of the music and craft spaces, illustrating how free spaces flow into the central areas. It also shows how the arts building's dynamic spaces are suitable for exhibitions and the effect of the ceiling height and voids in the entrance hall.



Section AA

Section B-B: This section demonstrates the circulation spaces along the northern façade and their connection to the performance and central areas in the other building part.



Section BB

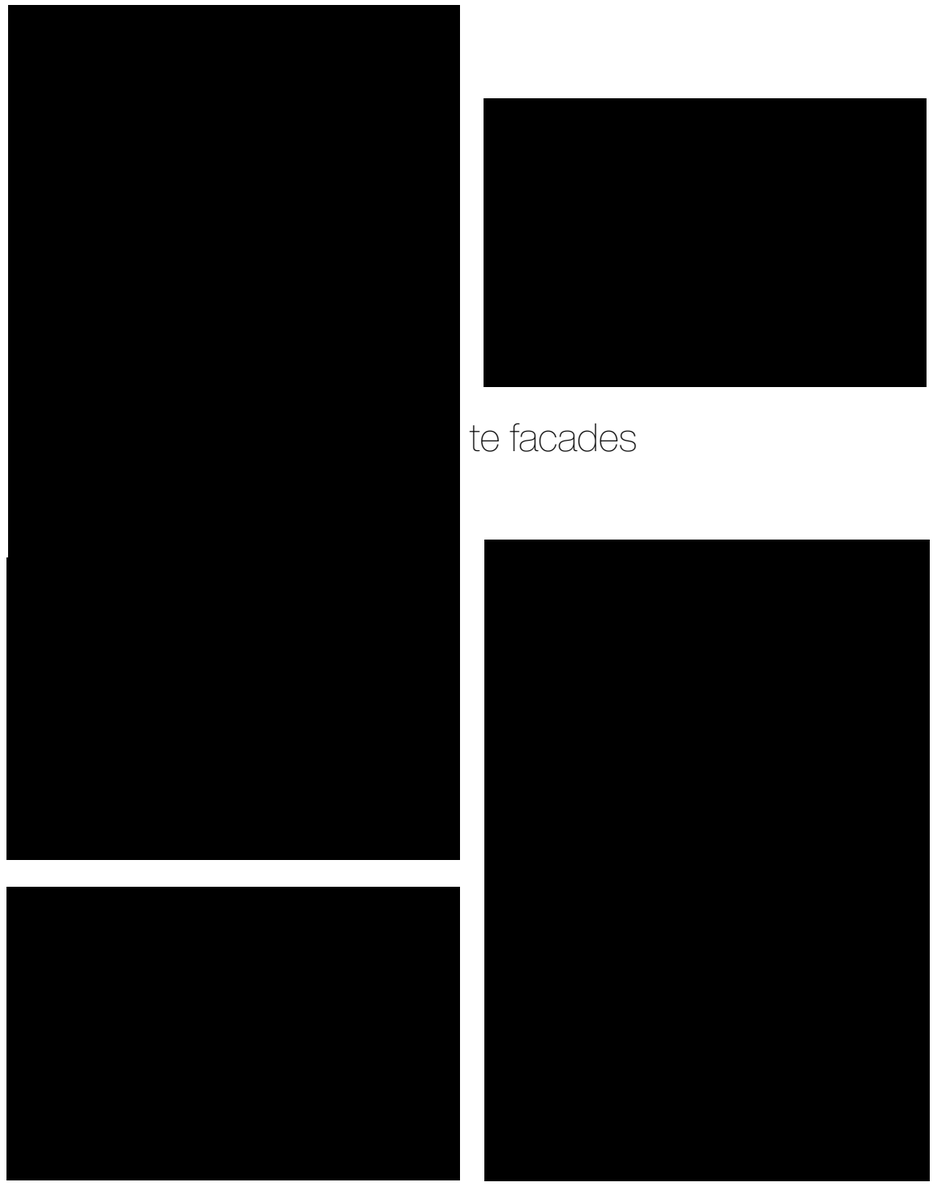
9. Final conceptual design

Material speculations

The material choices are inspired by Lacaton and Vassal's approach, prioritizing simplicity and adaptability to create spaciousness and light. They use inexpensive industrial materials like polycarbonate sheets, concrete, and steel. By using these materials, they create cost-effective buildings, which allows them to include extra spaces "for free." While Lacaton and Vassal mainly use thin, single-layered transparent polycarbonate, I want my building to expose its indoor activity to the outside, especially the crafts building part.

Therefore, I plan to use semi-translucent polycarbonate sheets. To create dynamism and depth in the façade, I will strategically include translucent cutouts to provide exterior views and allow direct sunlight penetration. The use of polycarbonate is especially useful for movable parts since it is a much lighter material than glass.

I am not yet sure if this material will be sufficient throughout the whole building as a facade material since the thermal resistance is not high enough for a single-layered facade. In Lacaton and Vassal's Nantes School of Architecture, they leave the free spaces unheated and without climate control, insulating only the other interior fixed spaces, this could also be an option



te facades

Lacaton & Vassal flexible polycarbonate facades

9. Final conceptual design

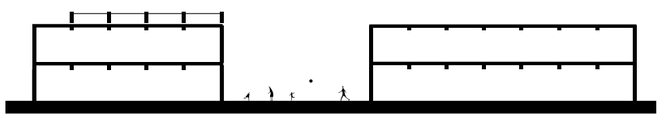
P2 presentation conceptual drawings

This concludes my final step. I created some new illustrations that better represent my concept, so I will include them at this final phase for documentation.

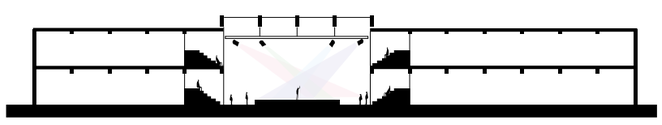
The first set consists of conceptual illustrations demonstrating the building's temporal flexibility. These show how the open/closed configurations of the façades, combined with the open/closed state of the central structure, can enable a wide variety of functions. These drawings highlight the adaptive capacity of the building's core and how the program extends into the outdoor spaces. Additionally, they illustrate the climatic benefits of the system:

Flexible space options:

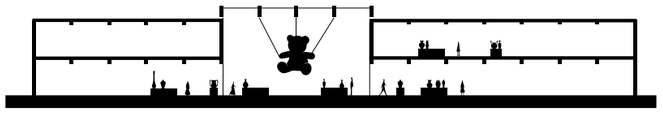
1. Market



2. Playground

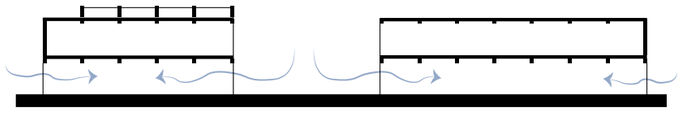


3. Event space

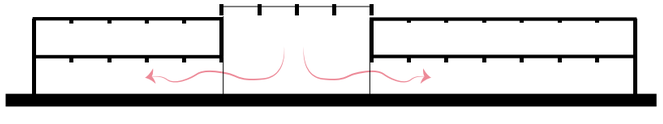


4. Exhibition space

Climate benefits:



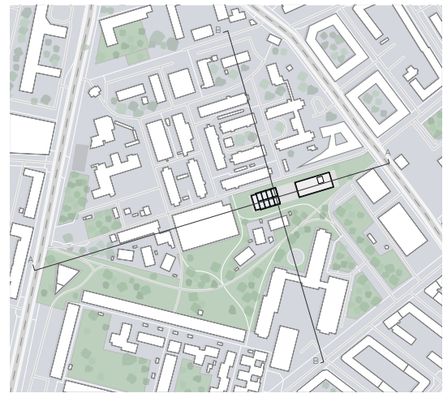
Summer: open center and facades enable natural ventilation troughout the building



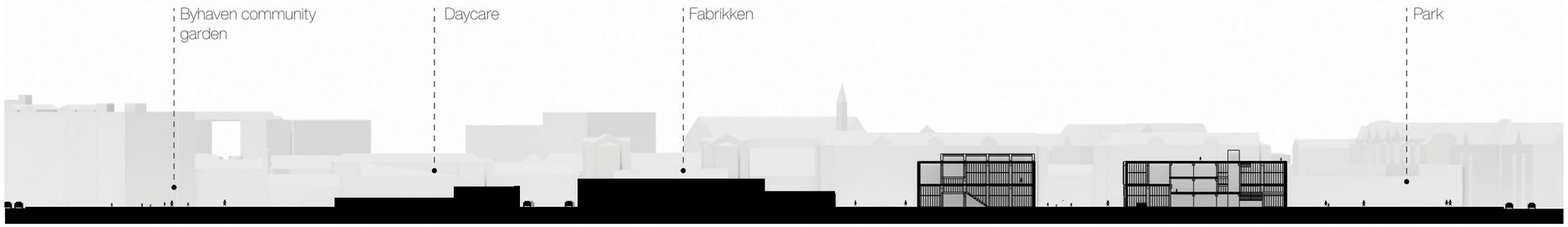
Winter: closed center traps heat, creating a thermal buffer which can be used troughout the building.

9. Final conceptual design

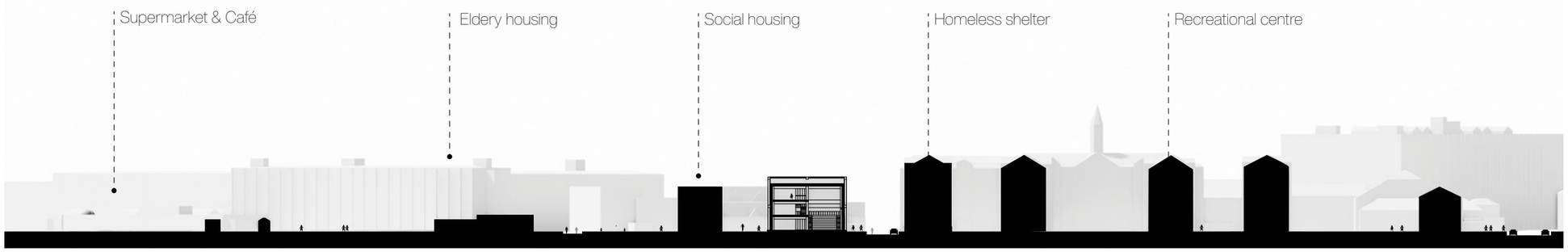
Floorplans & Program



Secondly, a neighbourhood section illustrates how the building mass integrates into its surrounding structure. In the AA section, along the main connection road, it reveals the relationship of the building within the social program grid as well as its massing. The building is slightly taller than Fabrikken but aligns more closely with the height context of the north-south structures, which is clearly visible in the BB section. Furthermore, the AA sections show the public spaces created, forming a connection from north to south. This is important for breaking down the physical boundaries that currently divide the neighborhood.



Section AA



Section BB

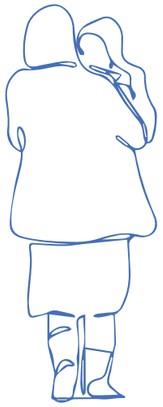
Schematic design proposal

Sundholm functions

Schematic design proposal

Local stakeholders & Issues

1. Families



3. Immigrants

2. Elderly

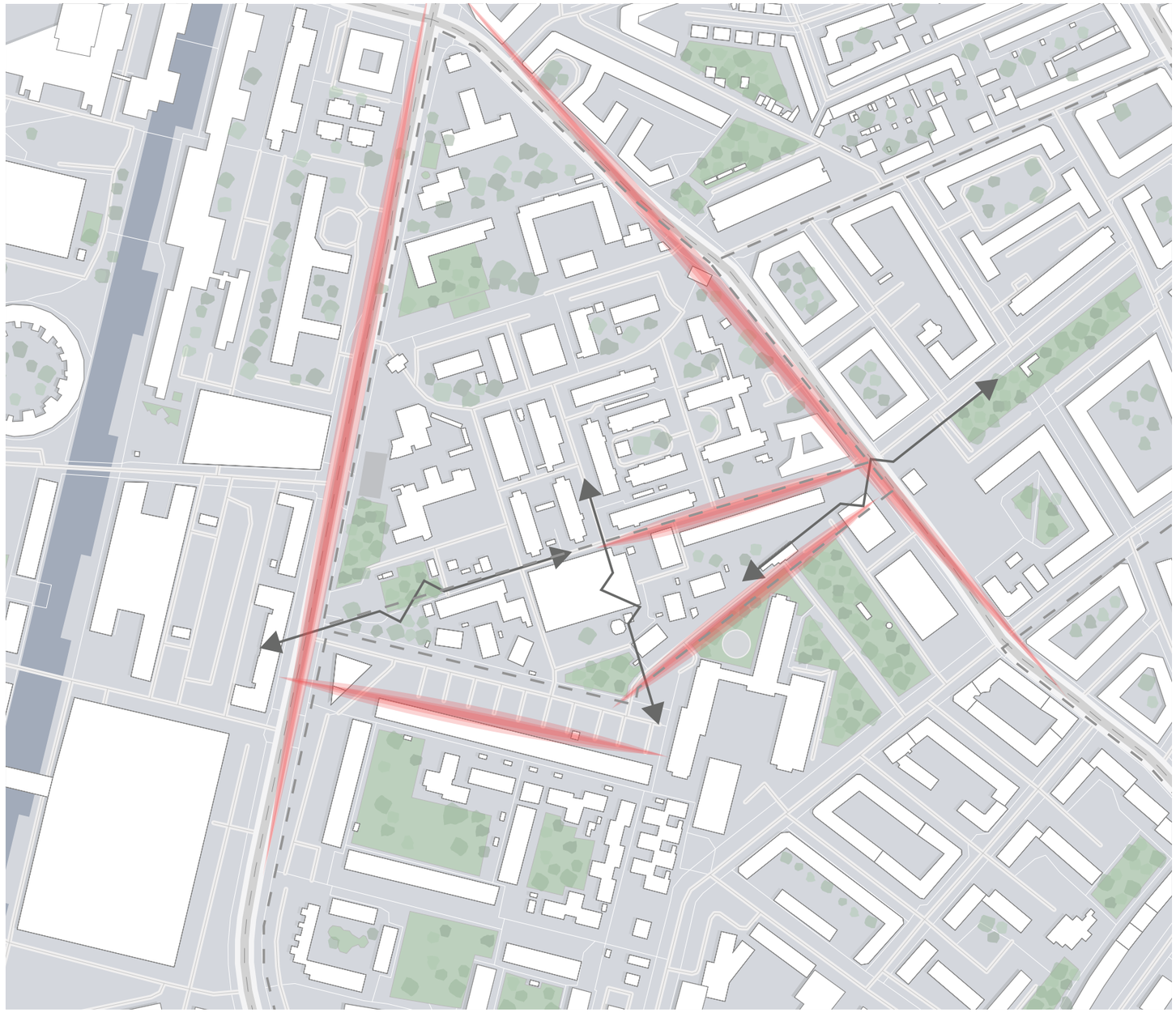
4. Artists

Main problem:
- Lack of social cohesion
- Safety concerns

Social causes:
- Mental boundaries
- No community identity
- Financial problems
- Drug use

Schematic design proposal

Spatial causes

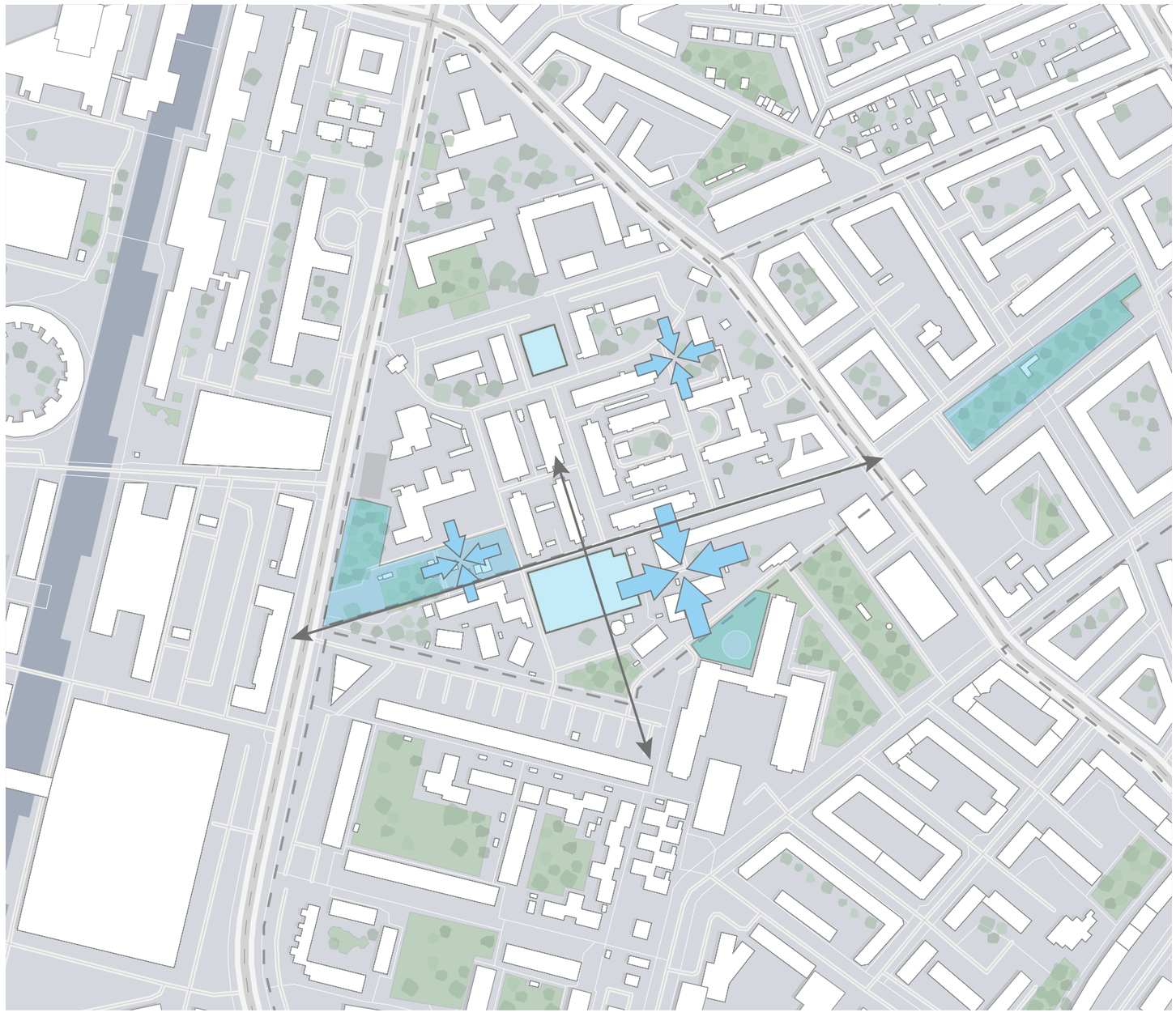


Main problem:
- Lack of social cohesion
- Safety concerns

Spatial causes:
- Physical boundaries
- Poor connections
- Lack of meeting spaces
- Uninviting back areas

Schematic design proposal

Opportunities



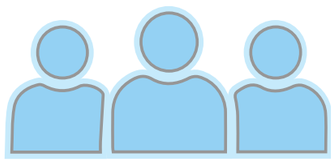
Spatial potential:
- Improving Connectivity troughout the neighbour-hood
- Creating new meeting places
- Strenthening current assets

Social potential:
- Exposing children and youth to possibilities and role models
- Promoting positive narratives and identity, creating a purpose.
- Unite the neighbourhood trough sharing culture

Schematic design proposal

Design goals & Programmatic concept

Inclusive Functionality,
creating meeting spaces for
the diverse user groups



Foster **community feeling**
and purpose

Provide **financial incentive**

From craft to community

The main concept lies in **creating a purpose trough the means of craft**, a place to work on a skill, share it and earn some money. This allows people to meet trough their interests, learn valuable skills and create a positive narrative for the neighbourhood. These crafts could be: **cooking, gardening, art, music, woodworking, pottery.** These crafts are **shared trough: markets, exhibitions, performances**. This program aligns with the exitsting program in Sundholm and is **adaptable** to change with its users' and environment's needs to create a functionally and socially resilient public condenser.

Schematic design proposal

Research & References

“How can public buildings be designed to optimize social and functional resilience through flexible design strategies?”

Goal: Incorporate flexible design strategies to extend the building’s functional lifespan by adapting to diverse users’ needs and environmental conditions.

1. Inter-action centre, Cedric Price.

Concepts: Responsive and participatory architecture, user driven flexibility, industrial construction.

2. Nantes School of Architecture, Lacaton & Vassal

Concepts: Fixed functionality & Free space. Openable facades, cheap construction.

3. The Shed, Diller Scofidio + Renfro

Concepts: Sliding construction for flexible & multifunctional event space

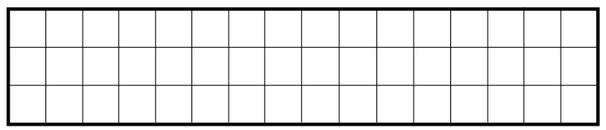
4. The Sliding House, DRMM Architects

Concepts: Sliding construction for changing indoor conditions & climate control

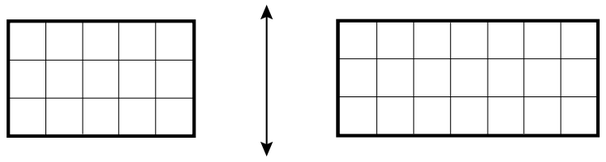
Schematic design proposal

Building concept

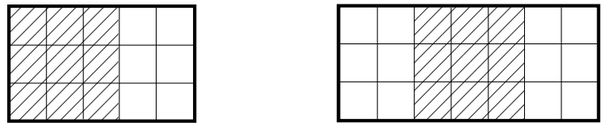
1. Long stretched building plot



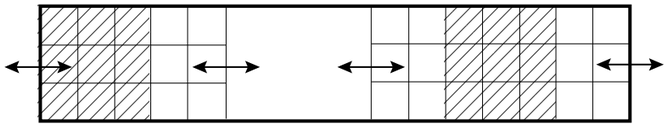
2. Grid structure for flexible and reconfigurable layout



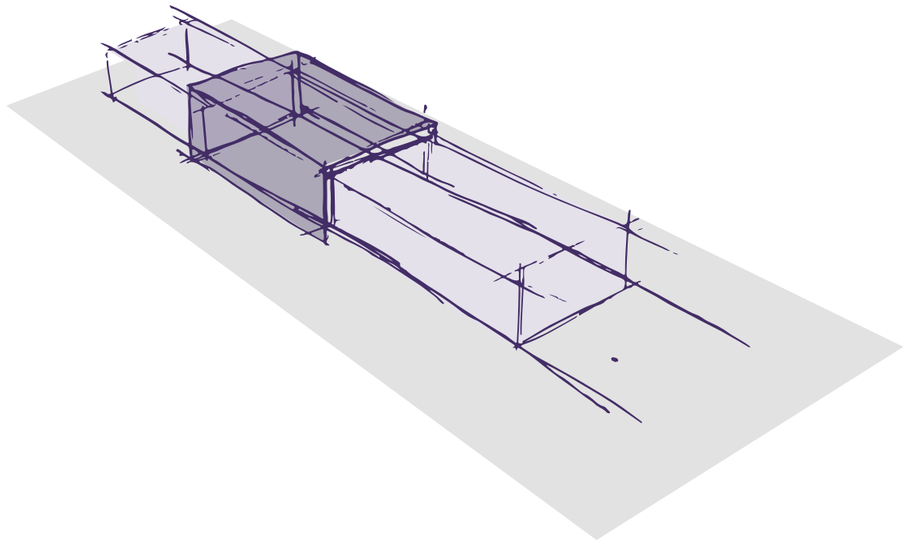
3. Cutout for flexible out/indoor space & connectivity



4. Centered fixed functionality & free spaces towards towards building edges



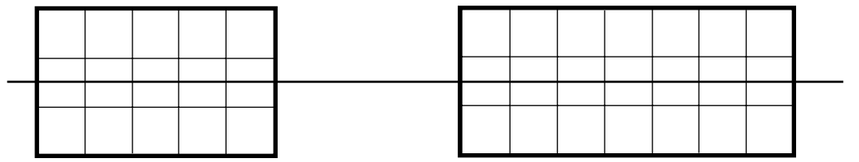
5. From out- to indoor space using glass structure & openable facades



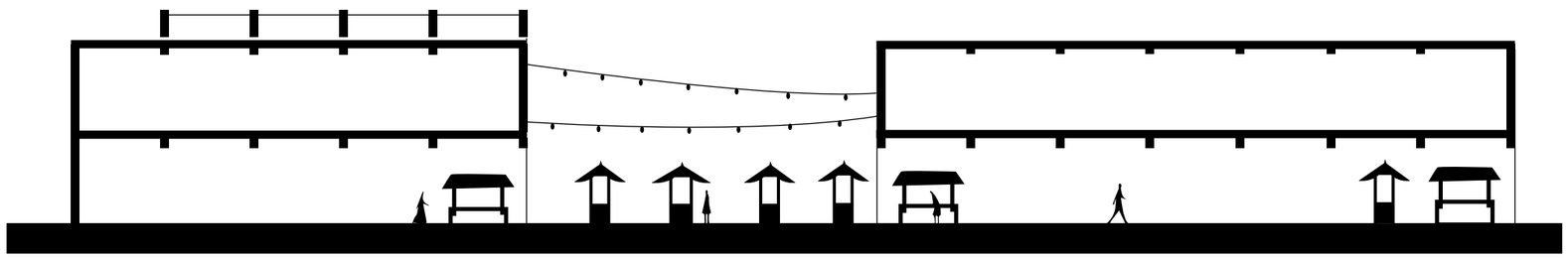
concept sketch

Schematic design proposal

Flexibility sections

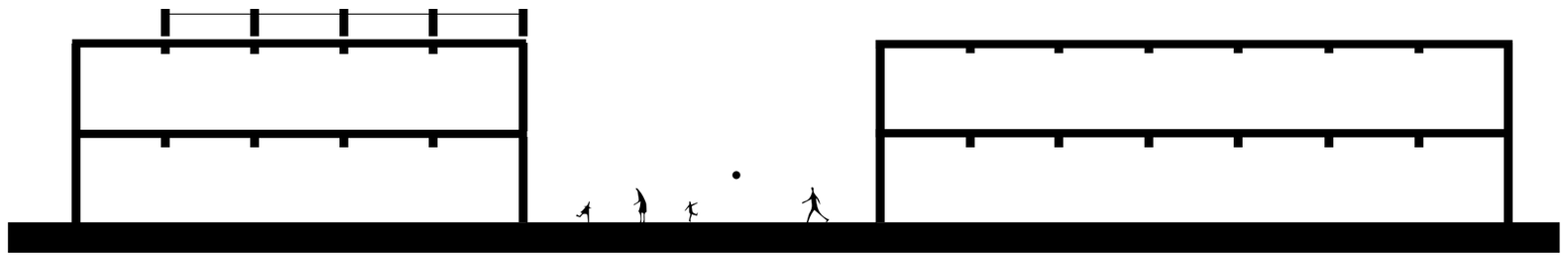


Open center



Flexible space options:

1. Market

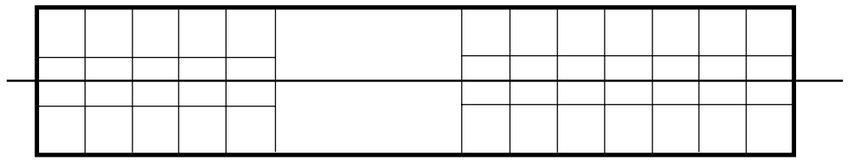


2. Playground

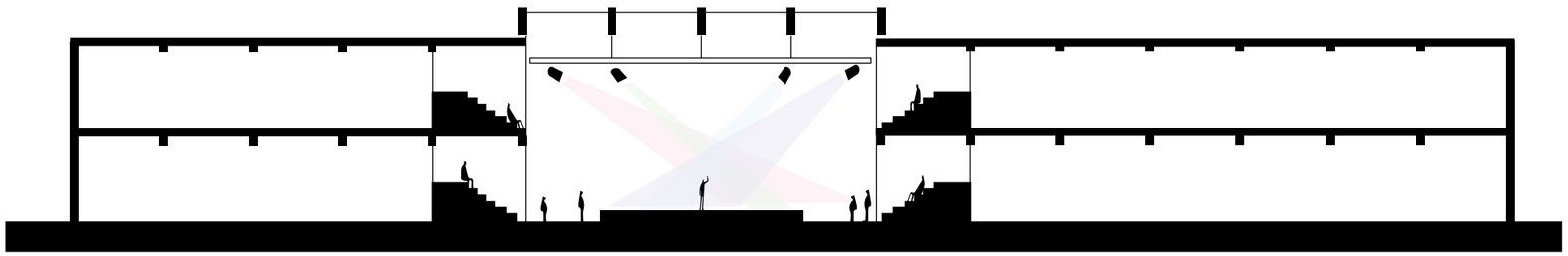
The open center and facades enable the program to extend into the outdoors, increasing the buildings overall adaptive capacity and functionality, while the closed facades allow for an open space that can be used for sports, play or simply as a shortcut for pedestrians

Schematic design proposal

Flexibility sections

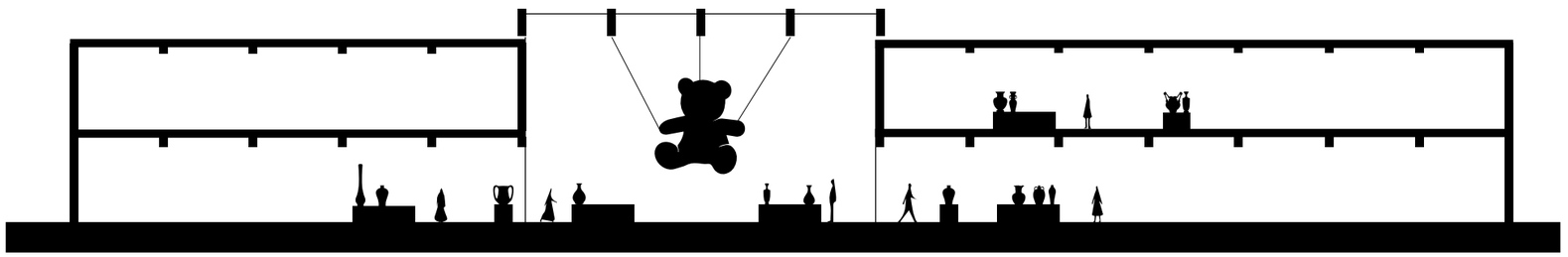


Closed center



Flexible space options:

3. Event space



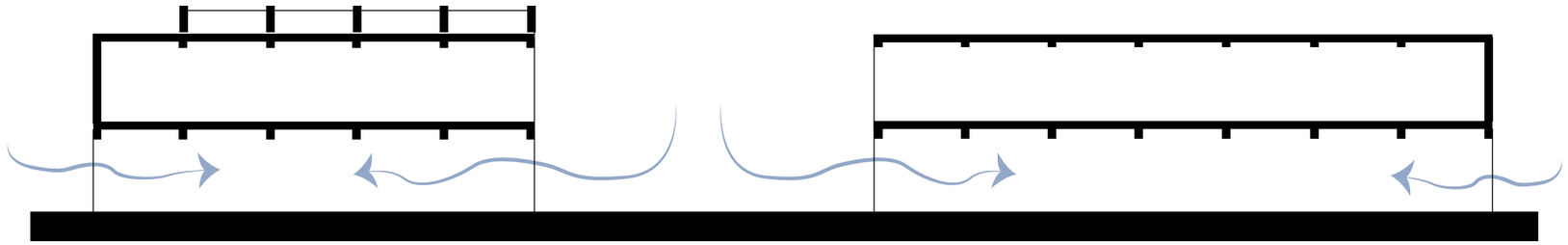
4. Exhibition space

The closed center with open facades allow for a large event space with raised seating areas, and exhibitions extending troughout the entire building.

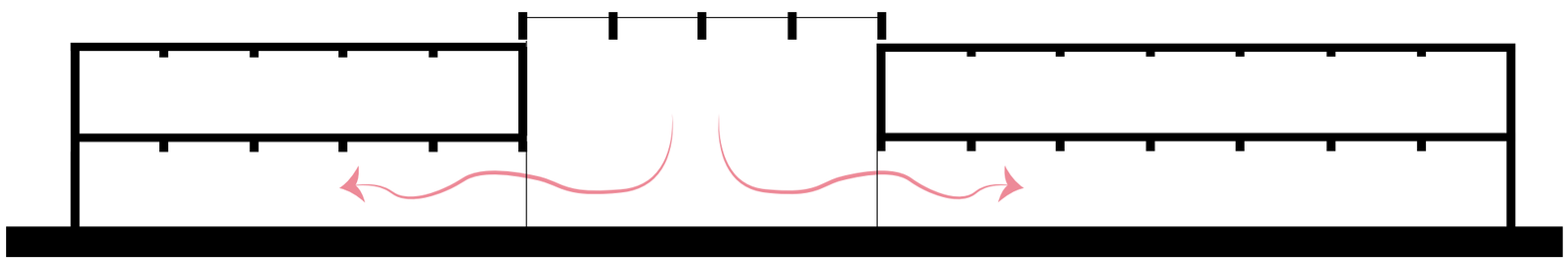
Schematic design proposal

Flexibility sections

Climate benefits



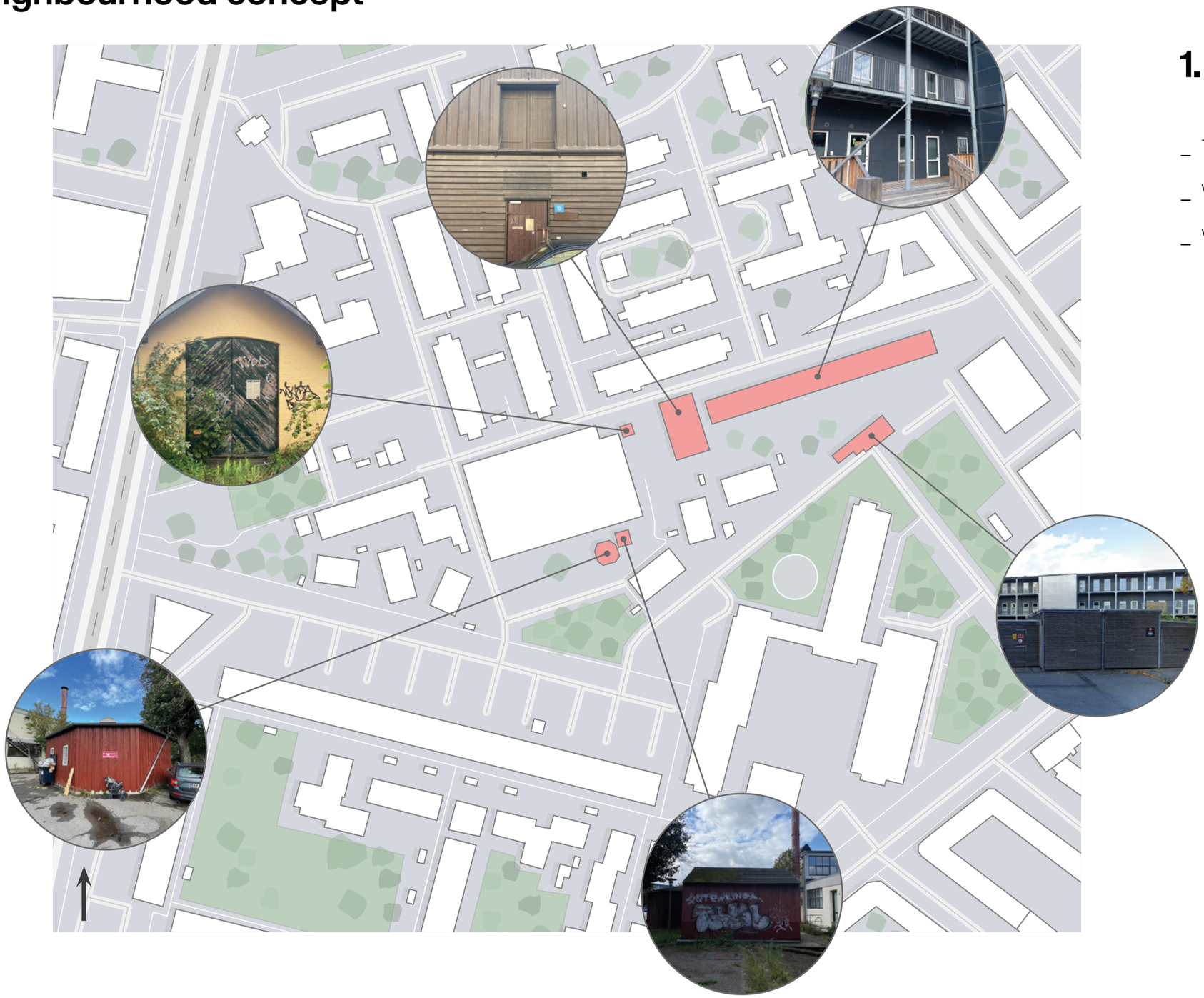
Summer: open center and facades enable natural ventilation troughout the building



Winter: closed center traps heat, creating a thermal buffer which can be used to heat the building

Schematic design proposal

Neighbourhood concept

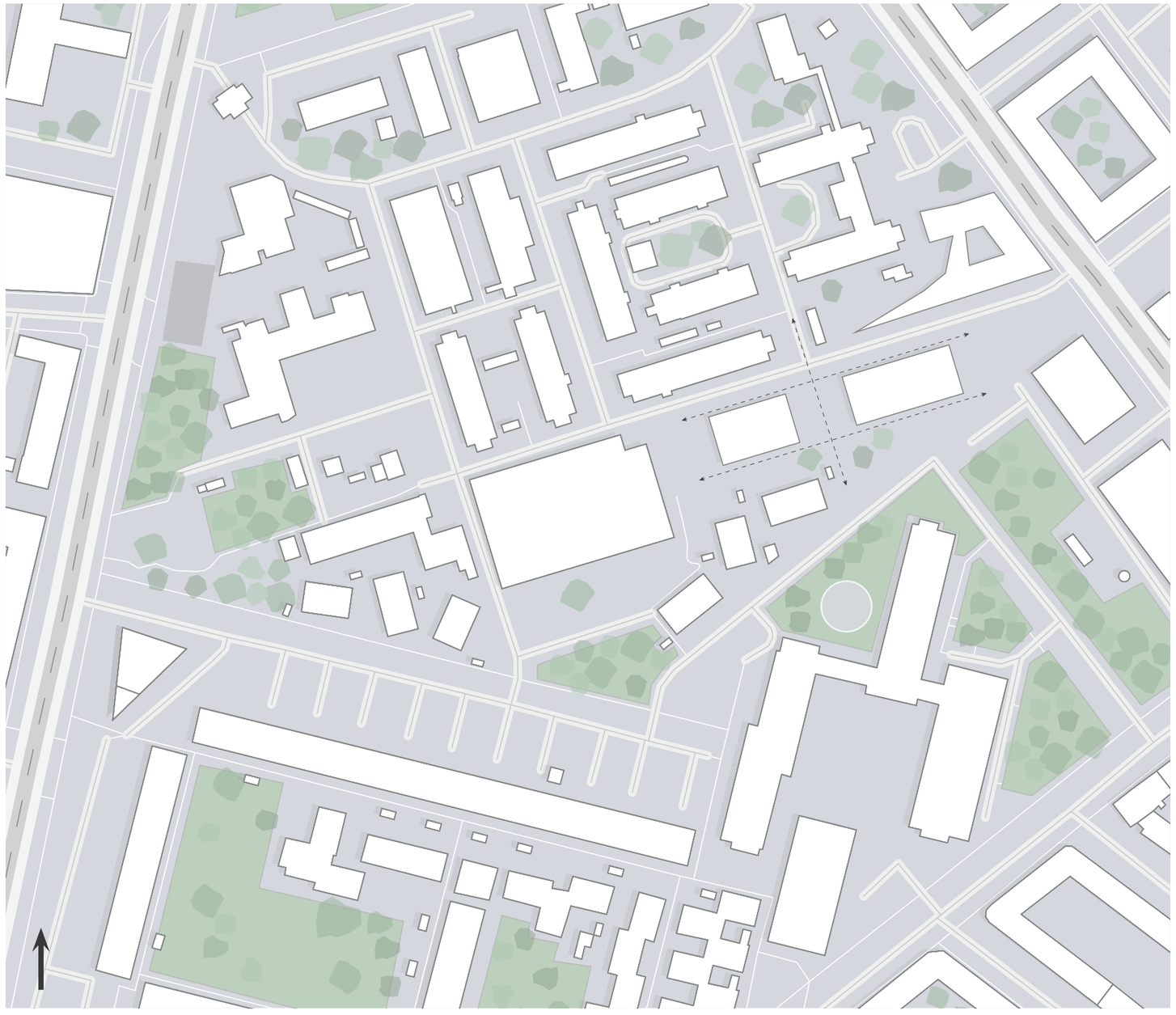


1. Remove buildings

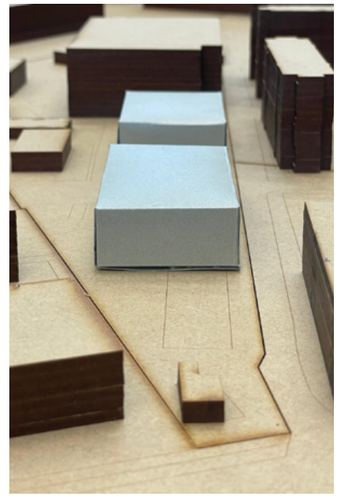
- Temporary school
- Wooden sheds
- Wooden bike storage

Schematic design proposal

Neighbourhood concept

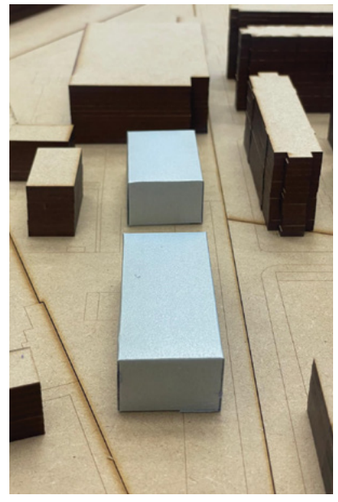


2. add building mass



V1

the initial grid was 24 metres wide and 10 metres high. Resulting in a building mass too close to the connecting roads, leaving little open space

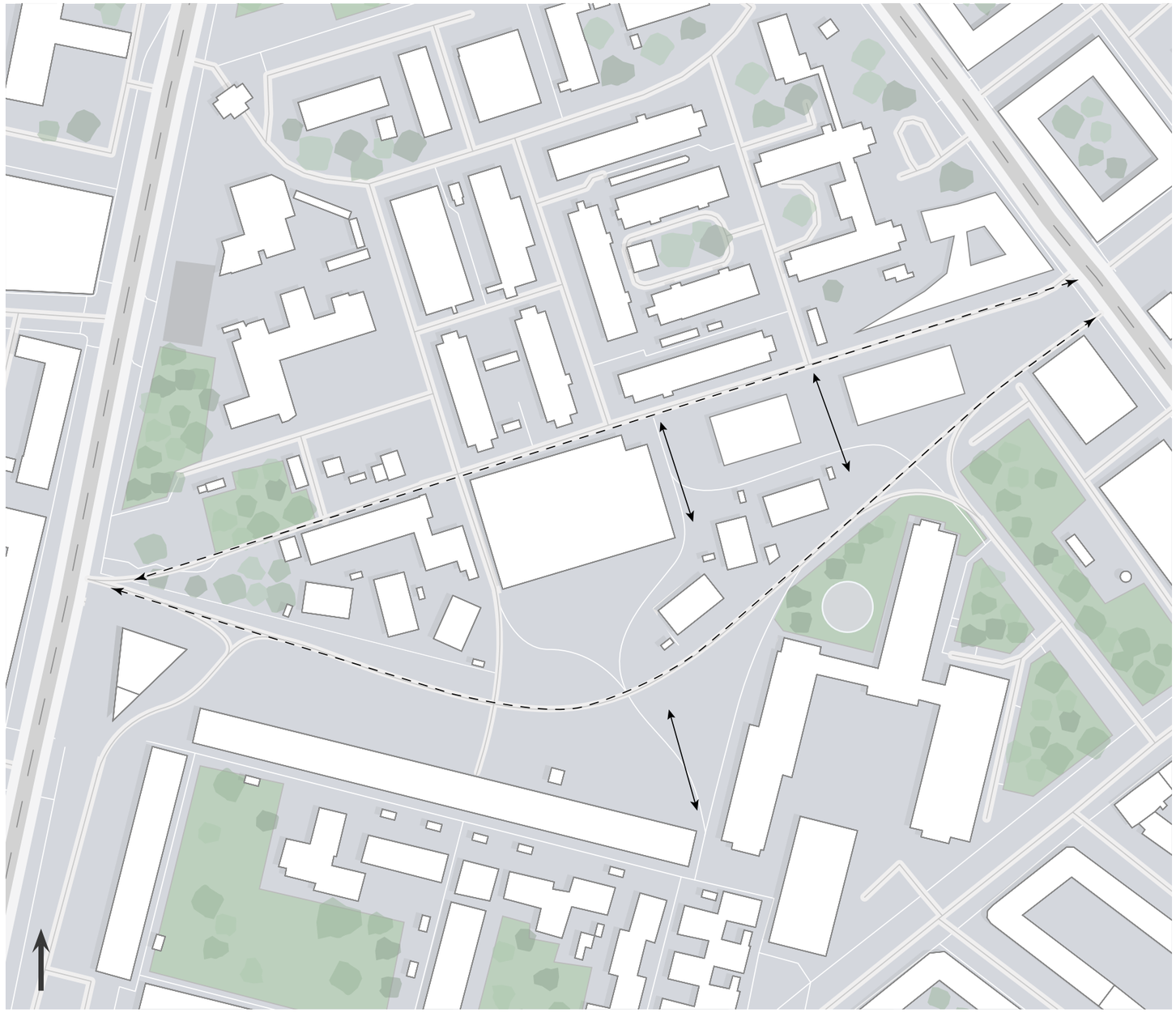


V2

variant 2 is 18 metres wide & 12 metres high. This leaves space on both sides, and has a more subtle positioning, respecting the public space.

Schematic design proposal

Neighbourhood concept

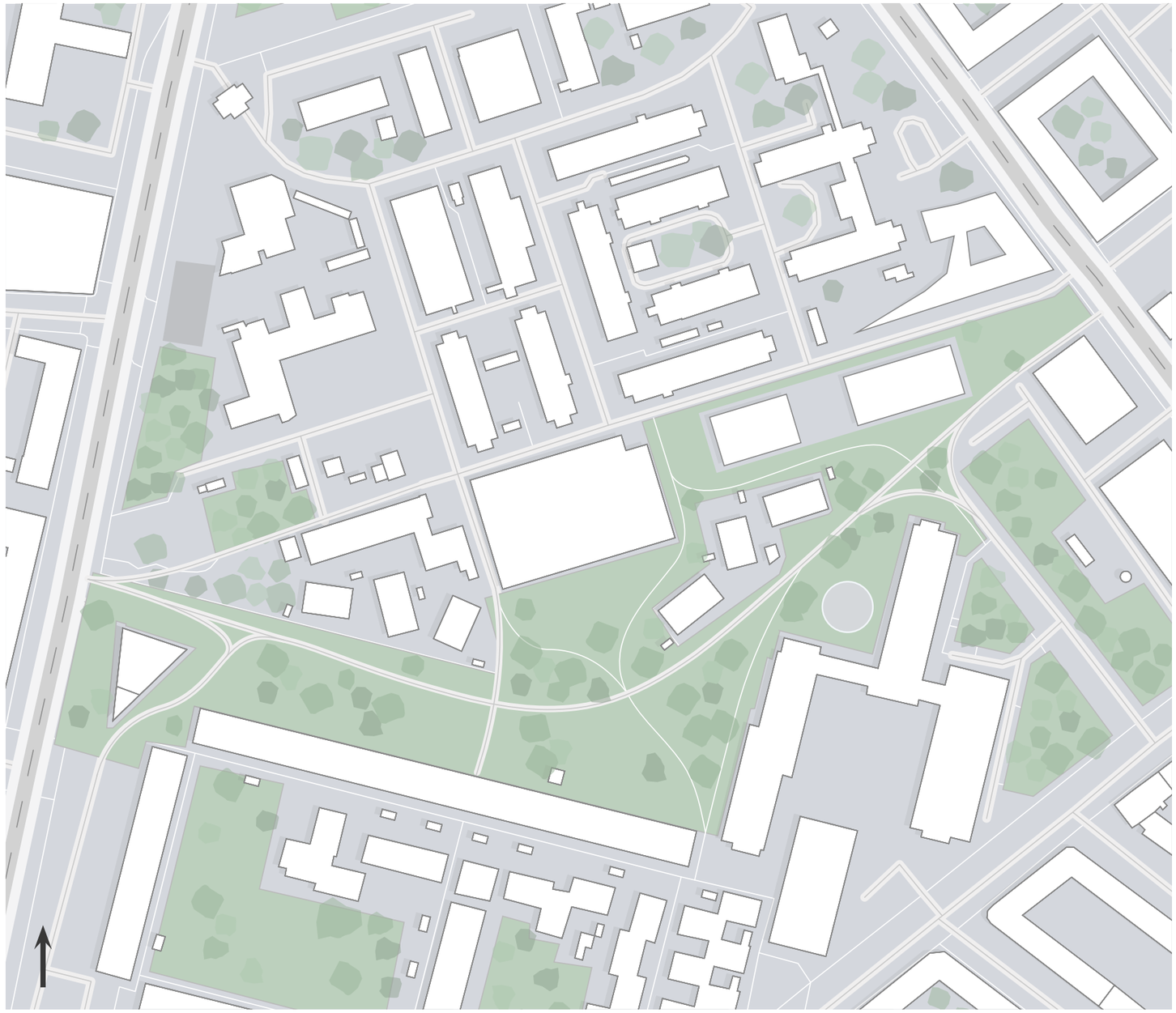


3. Improve connectivity

-Improve horizontal connectivity by adding access points
- Improve vertical connectivity by adding connective open spaces. which also enhances the spatial quality of the horizontal main road
- new horizontal bicycle connection

Schematic design proposal

Neighbourhood concept

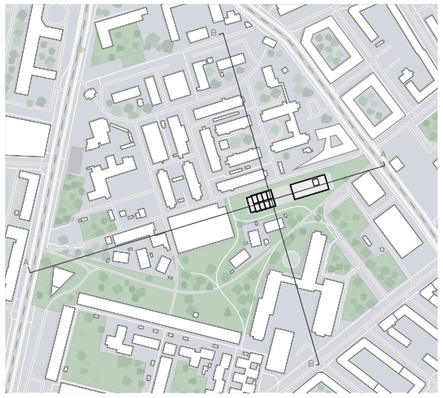


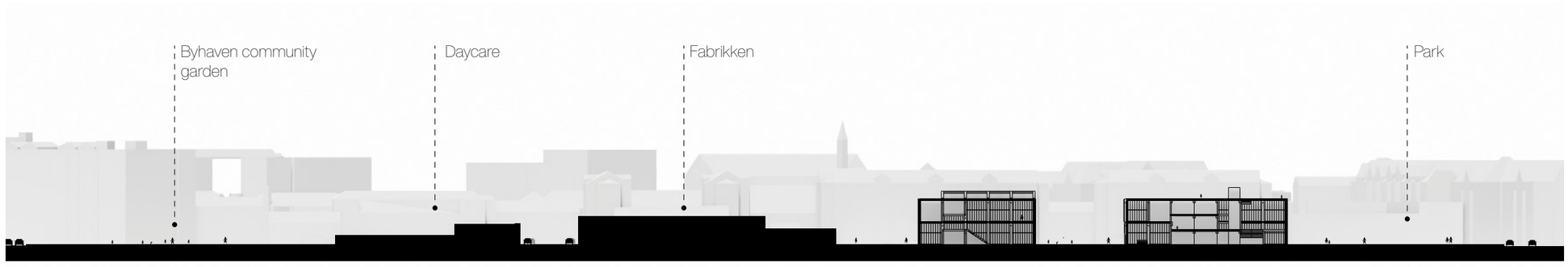
4. Green structure

Remove parking spaces and integrate an continuous green structure troughout the neighbourhood, enhancing its outdoor space and creating a seamless connection to the building plot.

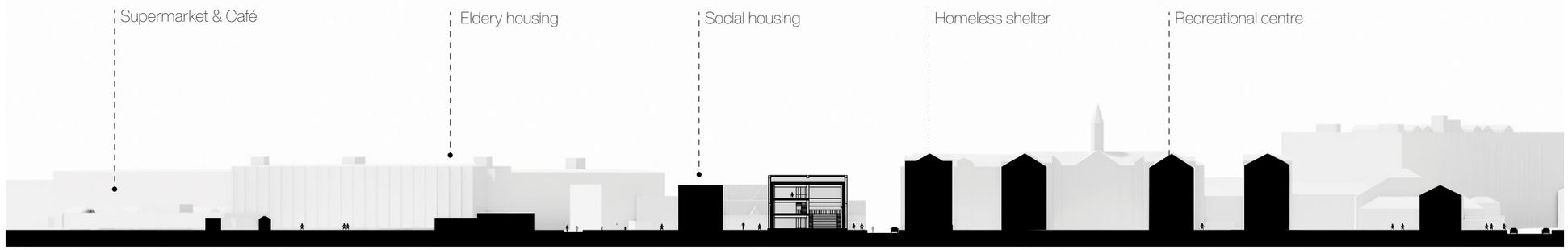
Schematic design proposal

Neighbourhood sections





Section AA



Section BB

Schematic design proposal

Program & Internal positionality

Craft (180m2)
- Woodworking space 54m2
- Pottery space 36m2
- Repair workshop 54
- Storage 54m2

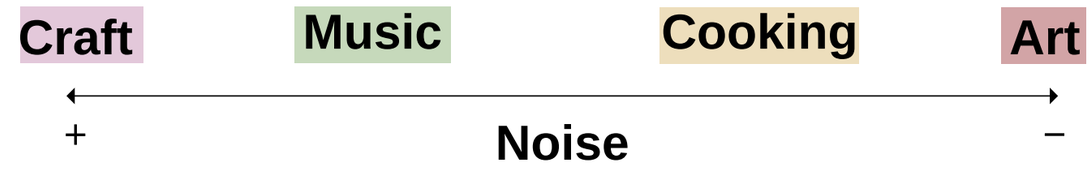
Music (253m2)
- Small practice rooms 8x 18m2
- Recording studios 2x 27m2
- Large rehearsal room 54m2

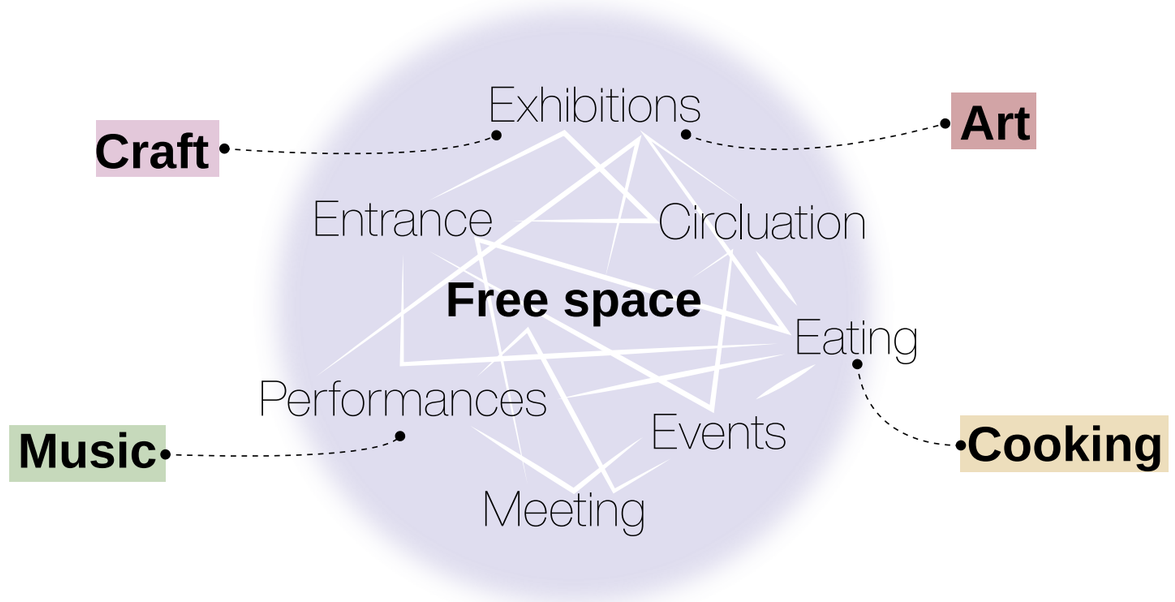
Art (286m2)
- Workshop space 70m2
- Art studios 6x 36m2

Cooking (108m2)
- Kitchen 72m2
- Bar 36m2

Toilets (90m2)

Free space (1600m2)
Functions for: entrance, circulation, exhibitions, performances, eating, events, meeting.





Schematic design proposal

Programmatic orientation

Neighbourhood Positionality

The building program is split into two parts, one part is more in the open and is visible from many points, therefore, the east part should contain an open program, with visible activity to attract people.

The western part is situated next to the social housing and public space between the fabrikken, it is a more secluded part which does not need to be very visible and should not contain as much windows towards the south

Schematic design proposal

Program on site

Neighbourhood Positionality

Craft & music are located in the western building part due to its inherent closed requirements. The free space is located towards the building centre, with its performance space located towards the road.

The eastern building part hosts the Art & cooking functions and main entrance hall towards the west. It is accessible from all sides and surrounded by free space on the ground floor, allowing for visible movement from outside.

Schematic design proposal

Program in floorplans

Craft (180m2)
- Woodworking space 54m2
- Pottery space 36m2
- Repair workshop 54
- Storage 54m2

Music (253m2)
- Small practice rooms 8x 18m2
- Recording studios 2x 27m2
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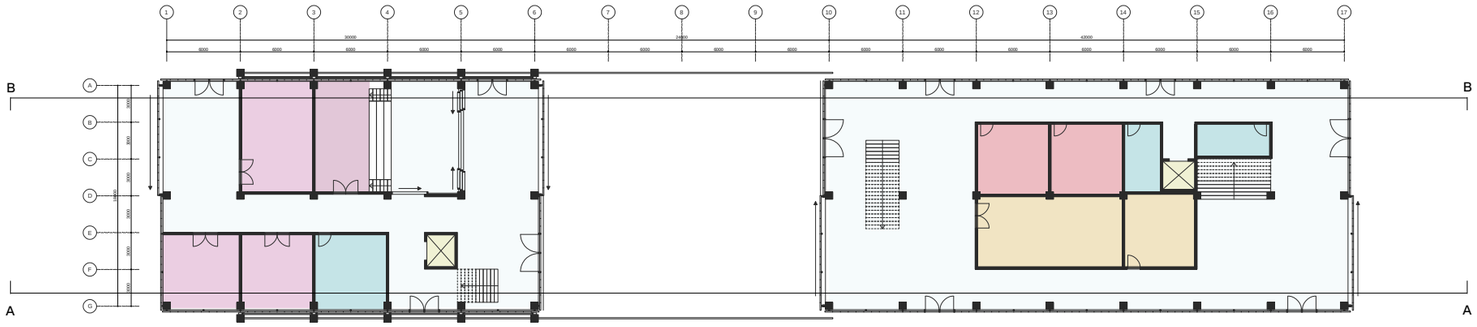
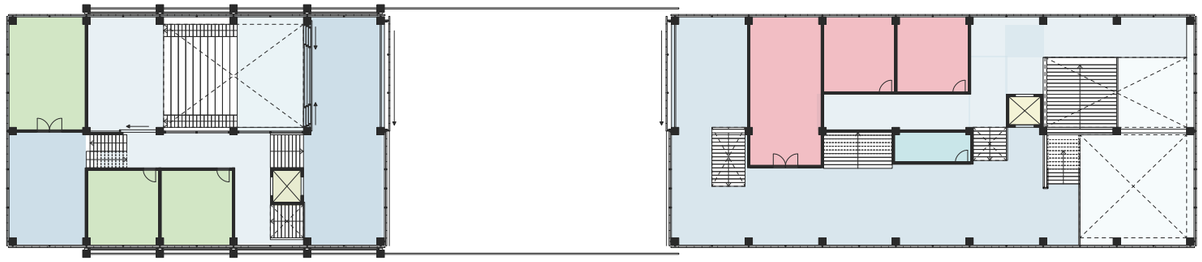
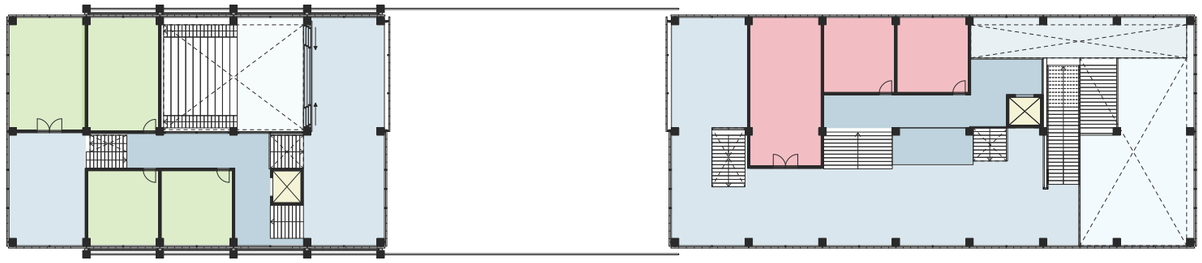


Ground Floor



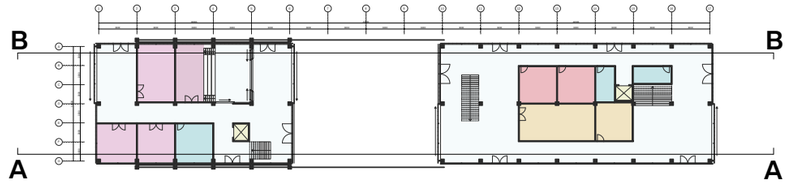
1st Floor



2nd Floor

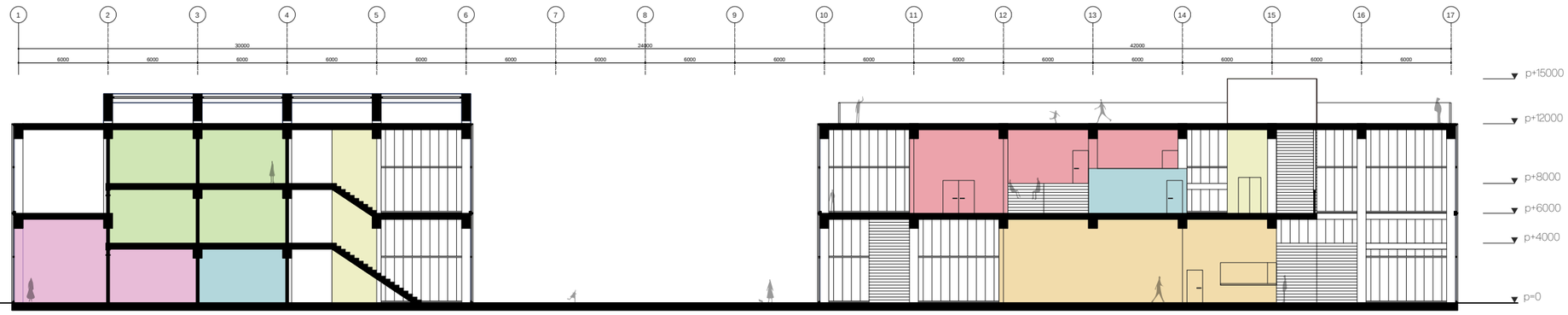
Schematic design proposal

Program in sections

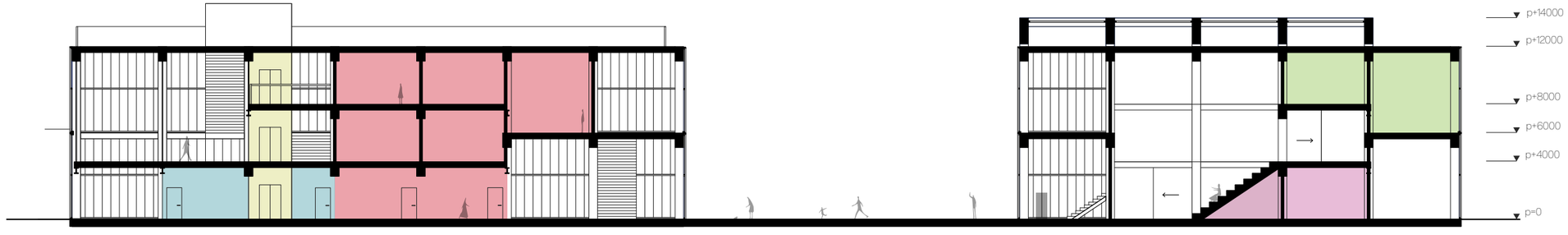


Program:

- Craft
- Music
- Art
- Cooking
- Toilets



Section AA



Section BB

Schematic design proposal

Building axo

Moving structure

Glass and steel structure that connects two building parts & creates flexible in/outdoor space

Building skin

Semitranslucent with translucent cutouts & openable parts

Program

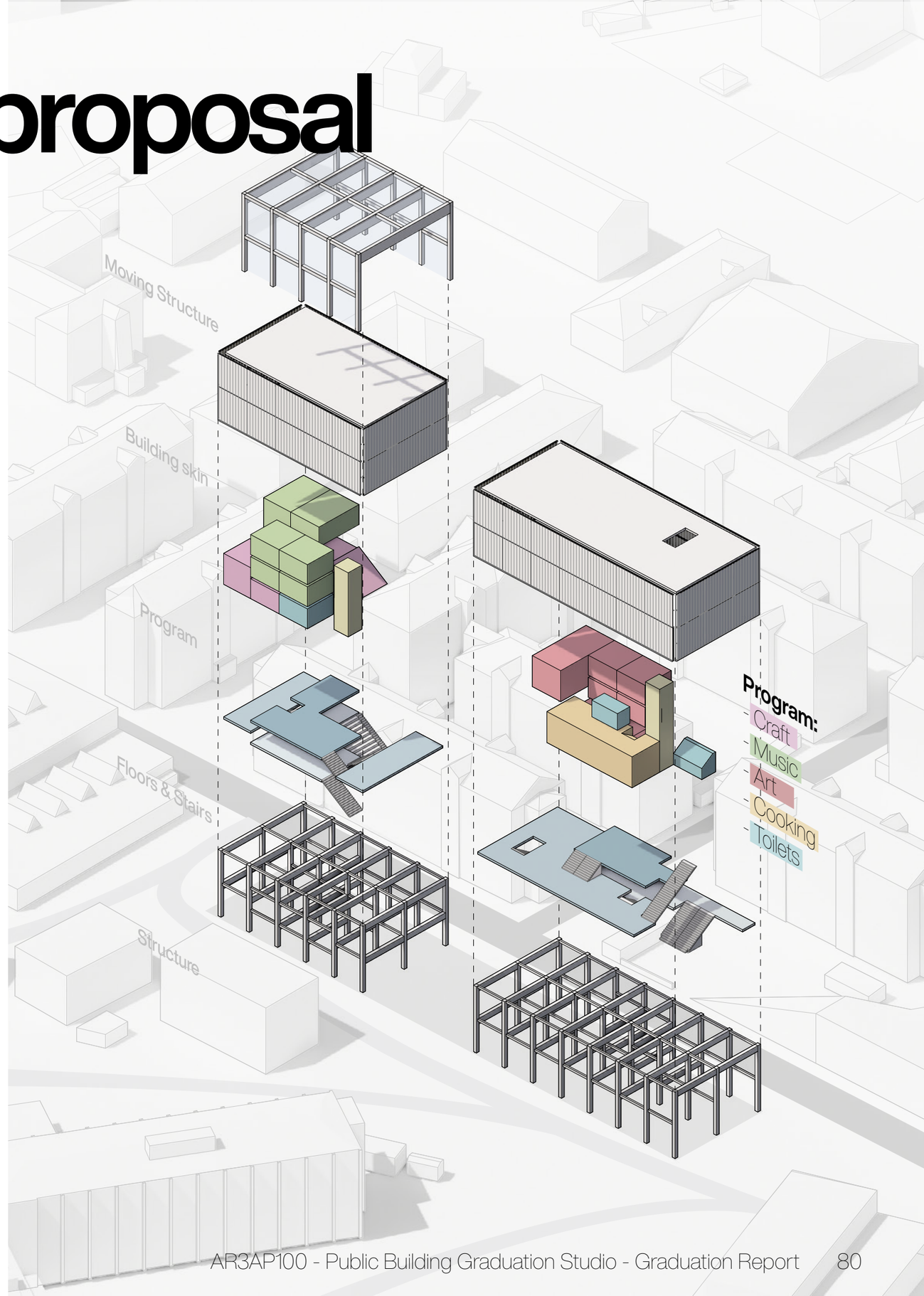
The west part of the building (music & crafts) houses a large, flexible performance space facing the roadside. Craft spaces are located on the ground floor, while music spaces occupy the first and second floors. The music spaces are oriented towards the nearby apartment buildings, as they require less daylight due to acoustic requirements . The east part of the building (arts, cooking & roof terrace) serves as a vibrant hub, exposing its activity to the outside. Its free space is oriented towards the building edges and includes a main entrance hall that functions as a flexible space for various activities.

Floors & Stairs

The building features a large floor height of 6 meters, with double floors creating 4-meter-high spaces. These floors form dynamic, playful areas, while voids provide high ceilings and interesting sightlines. Large staircases connect floors and are embraced as part of the the free spaces, oriented towards open areas for multifunctional purposes.

Structure

Columns are spaced every 6 meters, spanning 9 meters across, supporting lightweight steel floor structures between levels. This large grid system enables high ceilings and future program adaptations.



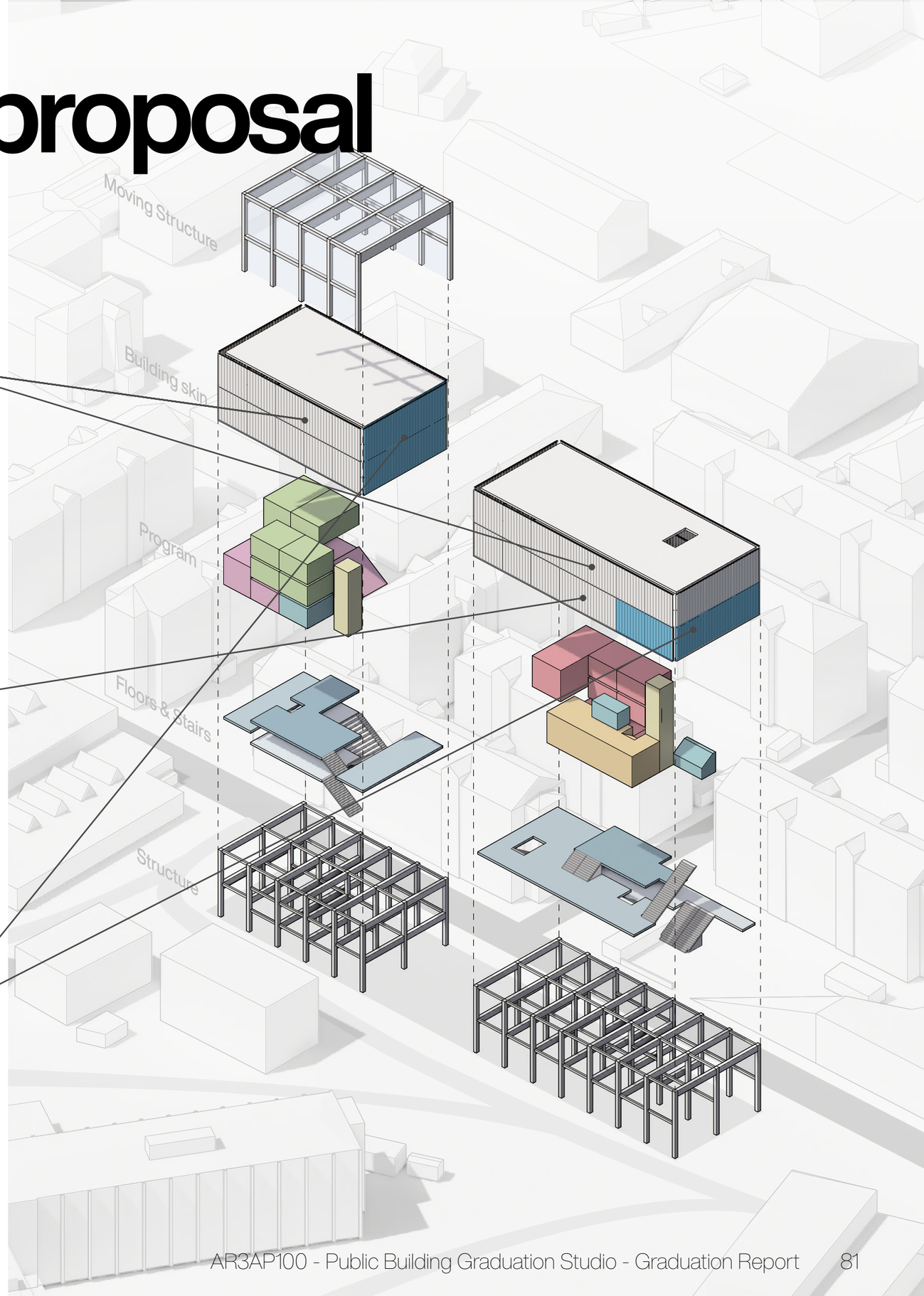
Schematic design proposal

Building facade

A semi-translucent polycarbonate facade creates diffused, soft light in the interior during the day, while creating a glowing exterior at night. Strategically positioned translucent cutouts create outdoor views adds depth and breaks the uniformity of the monolithic facade.

Shows indoor activity & provides natural daylight troughout the building

This example shows the flexible facade of the Nantes school of architecture by Lacaton & Vassal. The translucent polycarbonate sliding facade doors allow the free spaces to blend with the outdoors.



Schematic design proposal

conclusion

Where?

the area of sundholm, home to a diverse fragmented community which is caused by mental barriers due to its bad reputation of drug activity and homeless people. Its community generally financially disadvantaged, causing a lack of engagement with the neighbourhood, ultimately enhancing its fragmentation.

What?

A public condenser with a program of craft and sharing, allowing people to learn valuable skills and share them for money, creating an incentive for self improvement and find purpose. Its program is adaptable and flexible to increase its social and functional resliience

Why?

Social resilience to provide inclusive functionality and bridge the gaps between the fragmented communities. Functional resilience to optimize functionality by adapting to different times of day, weather and future societal & evironmental changes, ultimately improving its functionality.

How?

Hybridity: A multifunctional program with free space for creative use allow for inclusive functionality
Resilience: Its functionally flexible program & user adaptive spaces stimulate functional & social resilience
Multiplicity: Its diverse creative functions and spaces for events allow the different cultures to be represented trough creativity
Sustainability: trough maximizing functional lifespan by prioritizing functionality and using simple and durable constructions materials.
Healthiness: The building promotes well being trough its program focused on providing opportunities to develop valuable skills and find purpose.

P2 Results & Reflection

1. Feedback
The main feedback from the P2 presentation focused on the contradiction between the building's intention and its current design. The concept is about adaptability and openness—creating something that can serve many different users and uses—but the current plan still feels quite rigid. There's a strong division between functions and blocks, and while there is some flexibility (especially in the crafts & music building with the sliding system), the rest of the design doesn't fully carry that ambition yet.

Another important point was the relationship to the outdoor space. Right now, the outdoor area is just... there. It's connected through the openable facades, but it doesn't actively invite use or participation. The transition between indoor and outdoor is too passive. It needs to become a space that reacts, supports activities, and pulls people in—just like the building is meant to do on the inside.I also got written feedback about the connection to context, specifically to Fabrikken. The tutors suggested I think more about how my building interacts with its neighbor—not just spatially, but also in terms of use and atmosphere. Lastly, they reminded me of the ping pong table reference—a simple object that offers endless interpretations and uses—and challenged me to bring more of that spirit into the design.

2. Position
Honestly, I think the comments are fair. I've been focusing a lot on the concept of freedom in space, but in practice, that freedom mostly comes from removing things: keeping spaces open, using sliding walls, and allowing for different arrangements. But real adaptability—especially in the way I'm aiming for—shouldn't just be about emptiness or openness. It should be about possibility.

So I do think I need to take the concept further. Not just leave space open, but actively design tools, objects, and elements that help people shape the space themselves. Right now, the design gives the potential to be flexible, but not enough to actively invite people to do something with that potential. I want to make that shift.

Same goes for the outdoor space. If the façade opens up, what happens then? There needs to be a reason for someone to sit outside, do something, or walk in from the street. It's not just about opening a wall, it's about opening a space for activity. The outdoors should be just as intentional and usable as the interior—and the boundary between the two should be more than just a line. It should be a zone where things overlap.

On the topic of connecting to Fabrikken—I'm less convinced. A physical link feels like a stretch. It would require redesigning part of Fabrikken, and even then, I'm not sure what it would actually add. The outdoor space between the two is currently a public path for bikes and people, and I think that's valuable. For now, I'd rather explore how the two buildings can relate visually or functionally without needing to build a literal bridge between them.

3. New Goals
So, based on all this, here's what I want to focus on moving forward:

- Push adaptability further. I want to design more elements that actually do something—not just static flexibility, but spatial tools people can engage with.
- Make the outdoor space matter. It needs to become a usable, welcoming, active space that blends into the building. It should be able to reach inward, just like the building can open outward.
- Avoid generic free space. Every part of the building should feel like it has a purpose—even if that purpose is open-ended. I want to steer clear of dead zones or leftover space.
- Keep the project future-proof and connected. Without forcing a link to Fabrikken, I still want to consider the building's broader context, now and in the long term.

4. First Ideas

- **Liftable floors.** Imagine a ceiling element that can lower to become an extra floor or enclosed space—kind of like unfolding a bunk bed from the ceiling.
- **Façades that do something.** Not just open or close, but change the space—like a tilting façade that creates a roofed outdoor area, or a fold-out element that becomes a bench, roof, or wall.
- **Extend the interior outward.** Maybe a floor that stretches out over the outdoor area when the façade is open, or interior elements that push out and become usable outside.
- **Everyday-object logic**. Translate the concept of a bench, table, or swing into architectural elements. Something like a table that sticks halfway through the wall, usable from both inside and outside.

Conclusion

The main takeaway is that I need to be more radical and specific in how I approach adaptability. The idea of doing more with less is still central, but now it's about making "less" smarter, more inviting, and more interactive. I want this project to feel like a ping pong table for public life—a space that isn't just neutral, but one that actively asks to be used, played with, and reinterpreted. To do that, I need to move from general flexibility to user adaptability, and make sure the outdoor and indoor areas are working together as part of one dynamic system. It's time to experiment more, get hands-on, and test how these ideas actually play out in space.

Process - From P2 to P3

Design stratgy 1

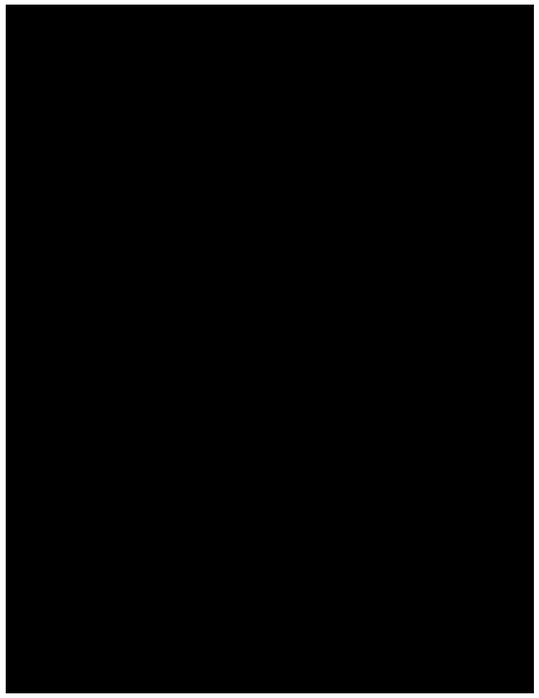
The goal of this phase was to explore new design strategies for “designing the free space.” Currently, it exists as an open area without objects or adaptive elements, which limits its potential. By introducing adaptive features, I aim to make it more usable and encourage creative use by a wider range of users. The second goal was to improve the relationship between the building and its surrounding public space. At the moment, the design focuses inward, creating an adaptable indoor space. While the outdoor area around the building serves its own purpose, the challenge lies in how these two spaces can connect. How can the outdoor space be activated and integrated with the building?

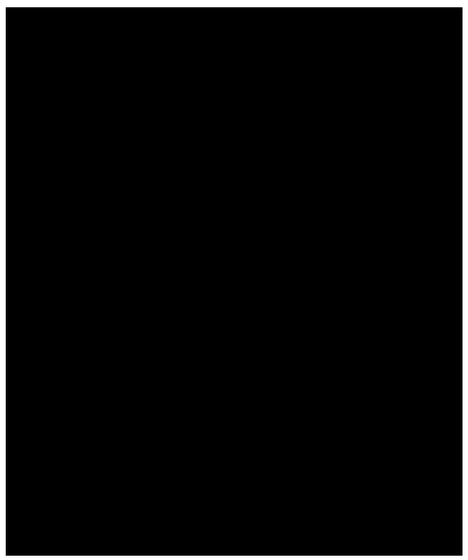
Through the use of references, I will identify design strategies that contribute to different goals. Once I have these strategies, I will apply them strategically to achieve specific effects within certain spaces or boundaries.

The first focus is on designing the free space, using adaptive boundaries. These boundaries could be soft or rigid, using elements such as hinges, wheels, curtains, or rotating components. By framing the space in different ways, the free space can be redefined, allowing users to create more intimate settings, open areas, or to separate or connect parts of the space according to fixed functions or free-form activities.

Process - From P2 to P3

1. Framing of space





Movable devider, Curtains, Sliding walls, rotating walls, driving walls

Process - From P2 to P3

Design strategy 2

The second design strategy focuses on enabling the use of free space. One approach is through adaptive furniture—movable, modular elements that can be stacked and rearranged. Another idea is using the walls as functional elements. For instance, walls could pivot to form tables, or they could store furniture, creating a dynamic boundary interaction. This concept made me realize that it could also be applied to outdoor spaces. These objects are relatable, and their purpose is immediately clear. A wall of furniture, for example, could signal that the space around it is intended for seating and relaxation. This creates an interaction between the wall and a plaza, activating the area.

The final idea, which I've been considering for some time, involves using the ceiling to store elements like furniture. This creates a similar interaction as with the furniture wall—it's visible but out of immediate reach. People could pull items down from the ceiling, allowing them to shape their own use of the space.

Process - From P2 to P3

1. Enable Use

Modular furniture, ceiling& wall funriture storage, flexible multifunctional elements.

Process - From P2 to P3

Design strategy 3

The third design strategy focuses on the contextual integration of the building through interactions at its boundaries. By opening facades in specific ways, the conditions of the outdoor space can be altered, fostering interactions between the indoor and outdoor programs, as well as between indoor and outdoor objects. Using different methods of opening—whether through sliding, pivoting, or folding elements—can activate the surrounding outdoor space in a dynamic way. This approach encourages a seamless transition between the indoor and outdoor environments, creating a more integrated and responsive relationship with the context.

Process - From P2 to P3

3. Interactive Boundaries

Boundary interactions trough openable facades (Sliding, tilting, swinging, pivoting), changing conditions and programmatic interactions.

Process - From P2 to P3

Design strategy 4

To further shape the surrounding public space, various outdoor elements that enable use and foster interaction with the boundaries can be implemented, creating adaptive use in the outdoor area. This concept ties back to my initial inspiration for the design—the ping pong table. By placing elements within specific conditions and scales, human creativity will transform these objects into multifunctional features. By incorporating certain structures or elements, as seen in the references, the outdoor space can achieve the same level of multifunctionality as the building itself. Combining these elements with interactive boundaries will allow the outdoor space to function as an extension of the building, amplifying its overall adaptability and user engagement.

Process - From P2 to P3

4. Outdoor elements

Flexible use-inviting objects, Building-object interactions, multifunctional elements, changing conditions/space

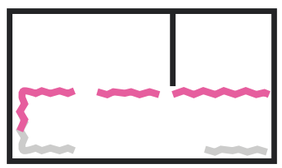
Process - From P2 to P3

Adaptable/interactive design concepts (indoor)

In order to make the building user adaptive, and enable diverse uses , i have identified the design strategies that can be applied to design the free space in and around the building. These concept will be applied based on the local needs in and around my building, i have devided these strategies in Indoor, boundary and outdoor strategies.

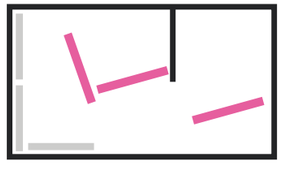
The first indoor adaptive strategy is the flexible framing of space, this can be done trough installing soft or hard flexible boundaries, The second is trough modular and adaptable furniture, that allows the users to take whatever they need from the space, enabling various uses. the different design concepts are illustrated below

Framing of space trough:

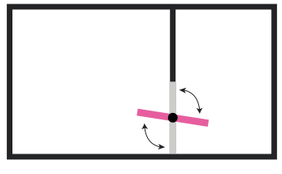


1. Curtains

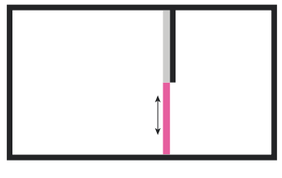
2. Divider



3. Driving wall

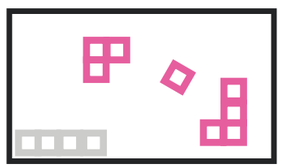


4.. Rotating wall

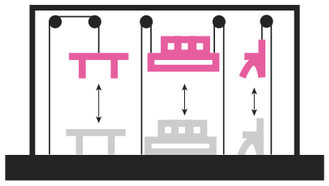


5. Sliding wall

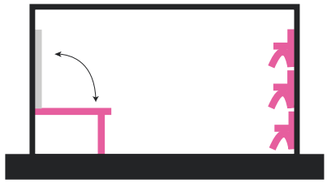
Enable use trough:



1. Modular furniture



2. Ceiling stored furniture



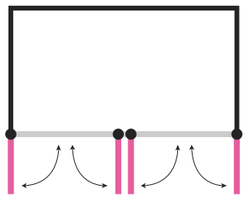
3. Wall stored Furniture

Process - From P2 to P3

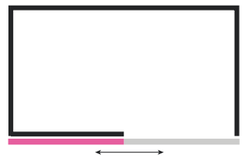
Adaptable/interactive design concepts (outdoor)

To seek contextual connection and allow the free space to merge with the exterior, the following boundary concepts illustrate how different openings and elements can create varying conditions and framings of space, allowing functionality to emerge in different states (open/closed). These diagrams demonstrate various ways of creating openings that can be applied. The last column highlights how this can generate different conditions for existing exterior objects. The final two diagrams show how exterior elements can serve multiple functions, creating connections to the building and enabling users to shape the space within a given structure.

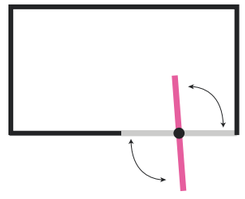
Boundary openings:



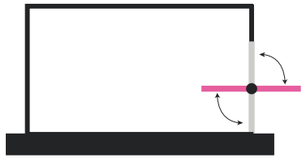
1. Horizontal swinging facade



2. Siding facade



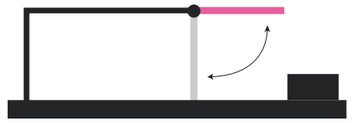
3. Horizontal pivoting facade



4. Vertical pivoting facade

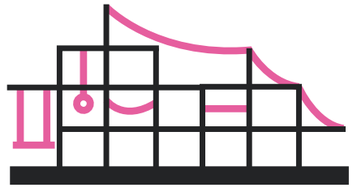
5. Vertical swinging facade

Exterior relationships:



1. Facade - Object

2. Object - Building



3. Ambiguous structure

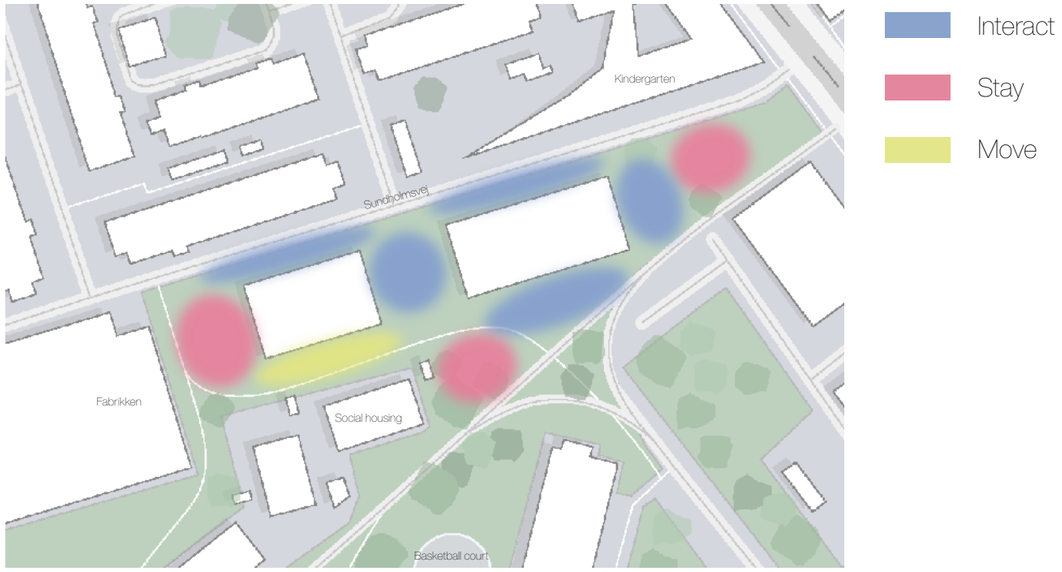
Process - From P2 to P3

Contextual definition

Since the contextual integration of the building was a major concern during P2, I began by applying the design strategies to my building concept. These boundary strategies first required a clear understanding of the surrounding public space. So, I began by identifying the intended uses for this public area.

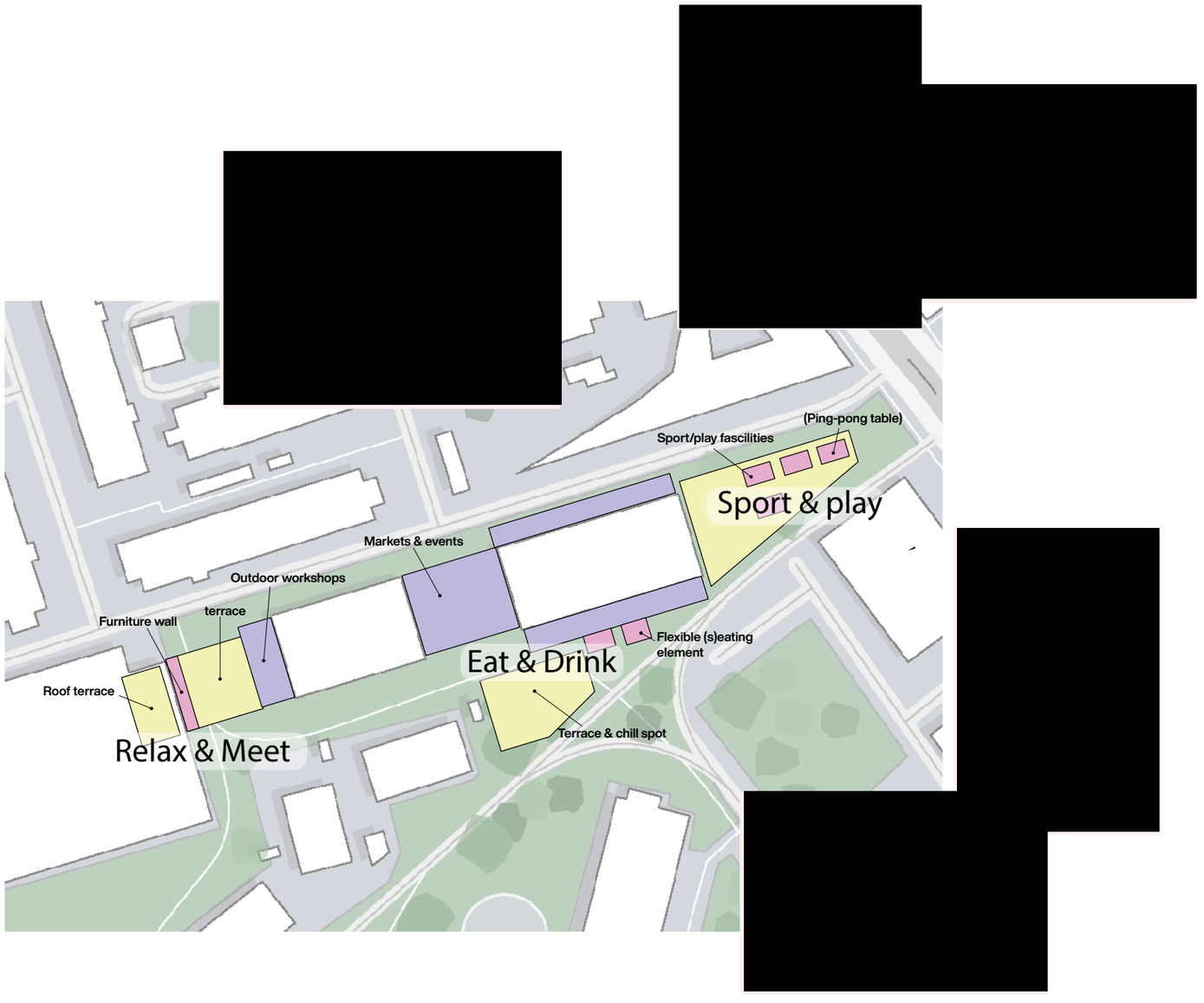
I identified three key zones surrounding the building. The first is the space between the building and the Fabrikken, which is a more secluded area. This space has the potential to be transformed into a roofed terrace on the Fabrikken, providing a place for relaxation and passive use, allowing people to both pass through and stay. The other two public spaces also need to offer areas for people to stay, but their functions will differ. These differences are related to their position relative to the indoor program of the building and the level of interaction needed between the indoor and outdoor spaces. These "stay" zones should serve as outdoor meeting spaces, while the "interactive" zones will be flexible spaces that engage with the building boundaries.

After identifying the key spaces and boundary goals, I marked the adaptive boundaries in pink. These boundaries shape the conditional space, which changes depending on the state of the boundary. By adding objects or elements that enable certain uses within the meeting areas, an interactive space is created. The interactive elements help define the space just as much as the adaptive boundaries. For example, when the boundaries are closed, the interactive element will shape the space's conditions.



Process - From P2 to P3

Public functions



Using these two spatial distinctions, I mapped out the functional programming around the building. The area between the Fabrikken and the building could become a relaxation and meeting zone, where outdoor workshops can be held and where interaction with the music spaces can take place. This area should also be a place for sitting and relaxing. The space to the south, which is the largest public area, is framed between the road and the building and faces the kitchen and bar areas. This outdoor space should serve as an extension of the indoor program, allowing for outdoor food services, with the building opening up to function as a food truck offering drinks and food at the boundaries. It should also facilitate outdoor cooking workshops or large-scale events. This space will include one of the interactive objects identified in Design Strategy 4.

The final public space is on the east side of the building, near the large entrance space, and is visible from the large grounds framing Sundholm. This area should be an active zone, as it will be the most commonly used route from the outside to the building. It should be open, potentially featuring a grass field with sporting spaces, picnic tables, ping pong tables, and poles that can be used for various sports, or as supports for nets or coverings.

Process - From P2 to P3

Boundary interaction concept

With the urban design goals in mind, I was able to define the interactive relationships between the main public spaces—specifically between the Fabrikken and the building, where the craft and music programs meet the boundaries, and towards the south, where the bar and kitchen programs engage with the exterior.

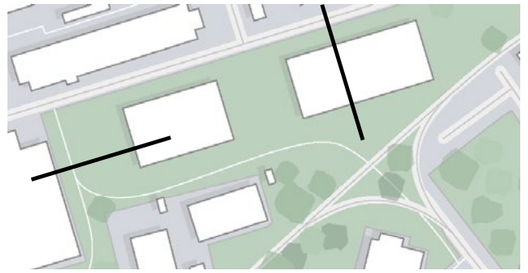
These relationships are illustrated in sectional drawings that visualize how the boundaries respond to both spatial and programmatic intentions.

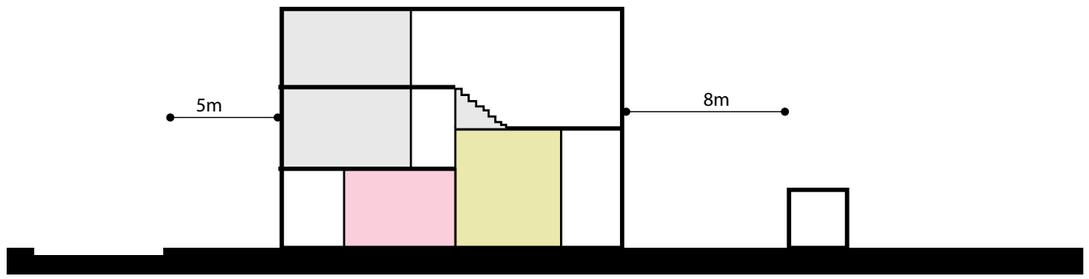
In Section 1, which cuts through the kitchen, a pivoting façade is shown interacting with the adjacent road on the left, creating openness and a visual/physical link toward the north. Another opening in the façade near the kitchen engages directly with an outdoor element, shaping the space between them. This configuration allows the indoor program to extend outward—turning the kitchen into something akin to a food truck, serving food and drinks along the boundary.

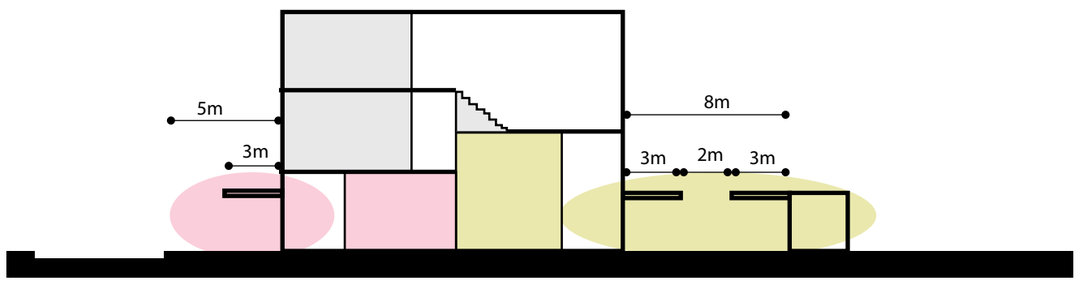
Section 2 focuses on the plaza between the building and the Fabrikken. Here, the interaction is layered and multifaceted. Objects placed in the space connect with the tilting façades, creating dynamic spatial conditions. The music and craft programs allow for performance and production to flow outward—people inside the building can give performances directed toward the roof terrace of the Fabrikken and the shared plaza below. This is also where the wall furniture concept becomes especially relevant. It enables people who are just passing by to grab a chair, sit down, and enjoy the performance—effortlessly turning circulation space into a momentary gathering spot. Additionally, the façade openings on the lower level allow the craft programs to extend directly into the outdoor space, turning the plaza into a flexible workspace or stage.

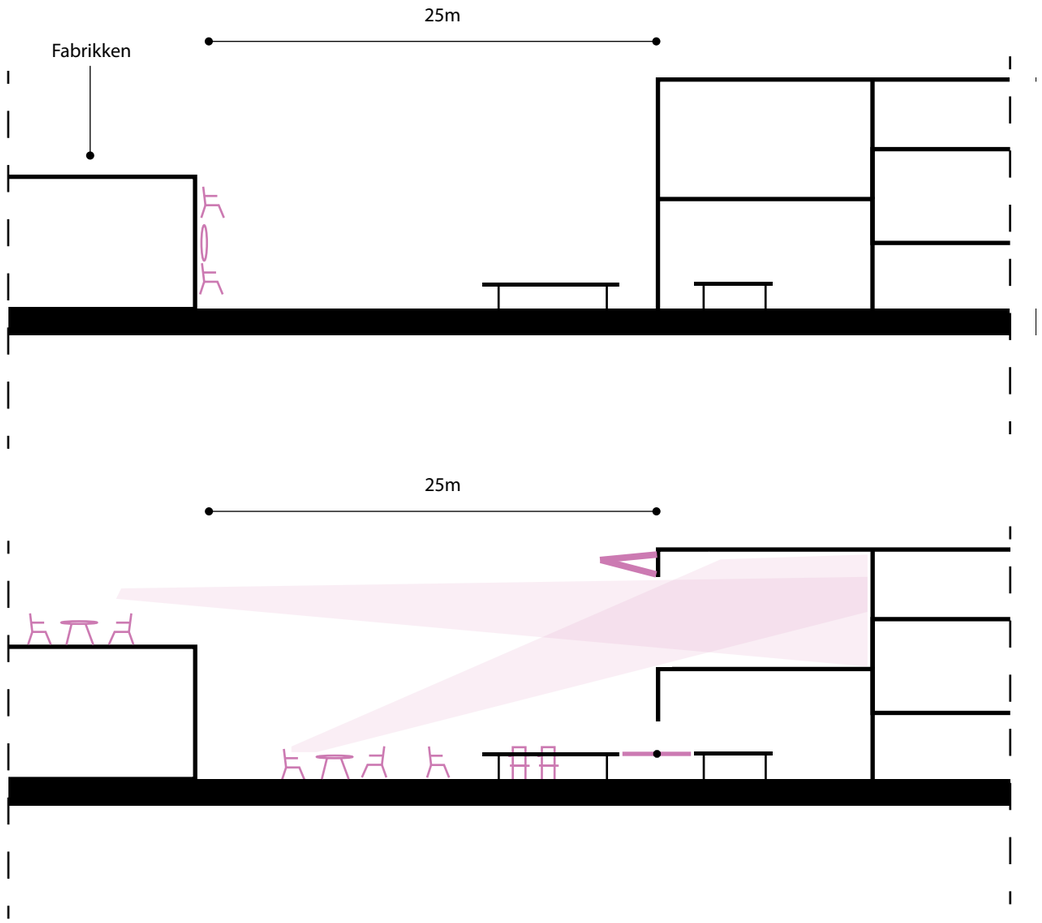
Process - From P2 to P3

Boundary interaction concept









Process - From P2 to P3

Floorplan boundaries

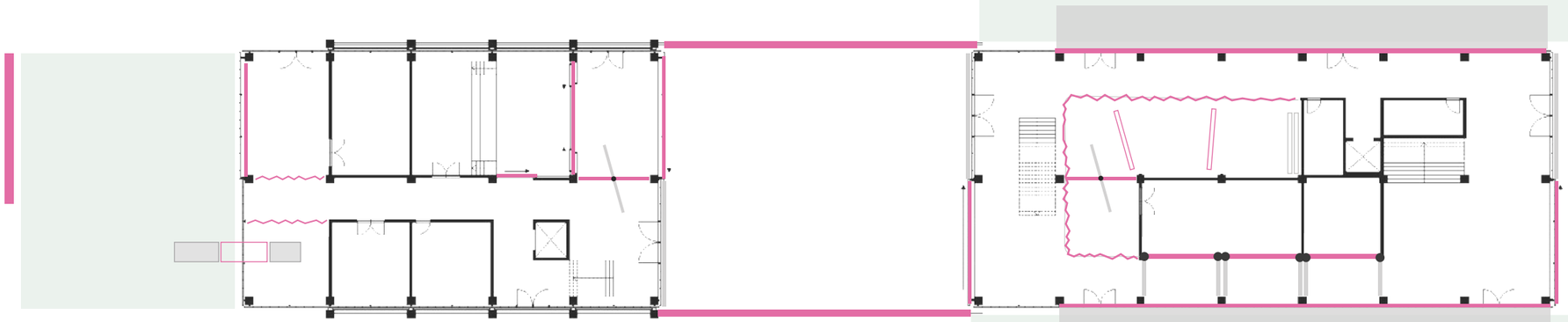
After defining the boundary requirements based on the exterior relationships, I moved on to designing the adaptive boundaries within the interior. While identifying strategic locations for these boundaries and thinking through the types of adaptation—soft, hard, pivoting, etc.—I realized something interesting. Because the floorplan is organized on a grid, I could use adaptive boundaries from fixed spaces (like the kitchen or bar) to connect directly to the exterior.

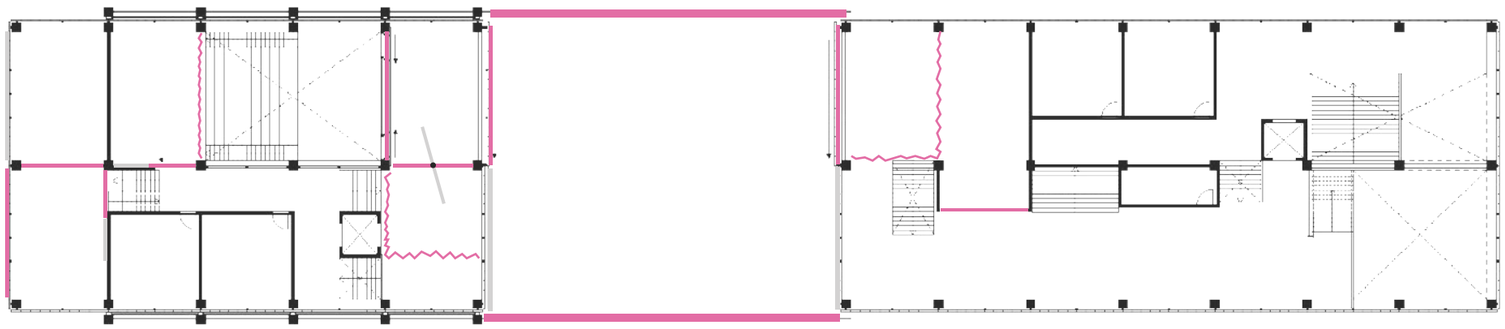
This sparked the idea of linking the kitchen and bar to the façade by opening up the interior walls, and then continuing this connection by opening the façade itself. This effectively extends the functionality of the space right up to the exterior edge—allowing for outdoor interactions like selling food or drinks, making the building operate like a food stand or café during events. Because the interior walls align with the columns, these boundaries can open independently, so the façade can open without compromising the flexibility of the surrounding free space.

As I worked through the plan, I started distinguishing areas that benefit more from soft boundaries (like curtains or movable partitions) versus hard boundaries (pivoting or sliding walls), and I drew those distinctions accordingly. The image on the right shows my sketch over the original floorplan—pink lines indicate the adaptive boundaries, while the grey shaded areas represent their closed positions.

Process - From P2 to P3

Floorplan boundaries





Process - From P2 to P3

Adaptive concept - section

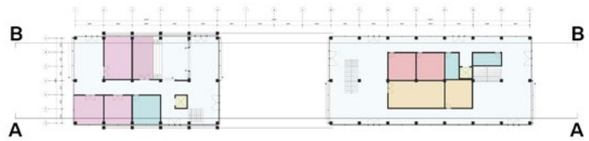
I also translated these adaptations into sectional drawings to show how the boundaries influence spatial continuity and flow. After showing this in the meeting, we talked about the potential of implementing more of these individually openable zones throughout the building—like what's happening at the kitchen.

That conversation made me realize that with a few smart boundary choices, parts of the building could remain usable even in colder seasons. By selectively closing off certain zones while keeping others open, the building could still engage with the outdoors without losing comfort or functionality inside.

The section also visualizes the idea of hanging storage—a concept I've been thinking about for a while. The ceiling height is used to suspend equipment, furniture, or instruments, keeping them visible and accessible, but out of the way. This not only supports the flexibility of the space below but also strengthens the user's control over how they use and shape the space.

Process - From P2 to P3

Adaptive concept - section



Process - From P2 to P3

Facade concept

My façade concept is based on the core idea of the building: simplicity, openness to interpretation, and inclusive functionality. Aesthetics are not the priority here—use comes before appearance. I want the use to define how the façade looks and behaves. That's why the idea started from a fully transparent façade, one where the indoor activities blend with the outside, are visible from the exterior, and create the sense that something interesting is happening inside.

Overall, the façade should be minimal, allowing the openings to do the talking. These larger breaks in the façade act as activators. In summer, the building almost grabs the outside and pulls it in. In winter, the closed, uniform look puts the focus on the interior and lets the building step back from the public space—giving both indoor and outdoor areas space to function independently, without always being connected.

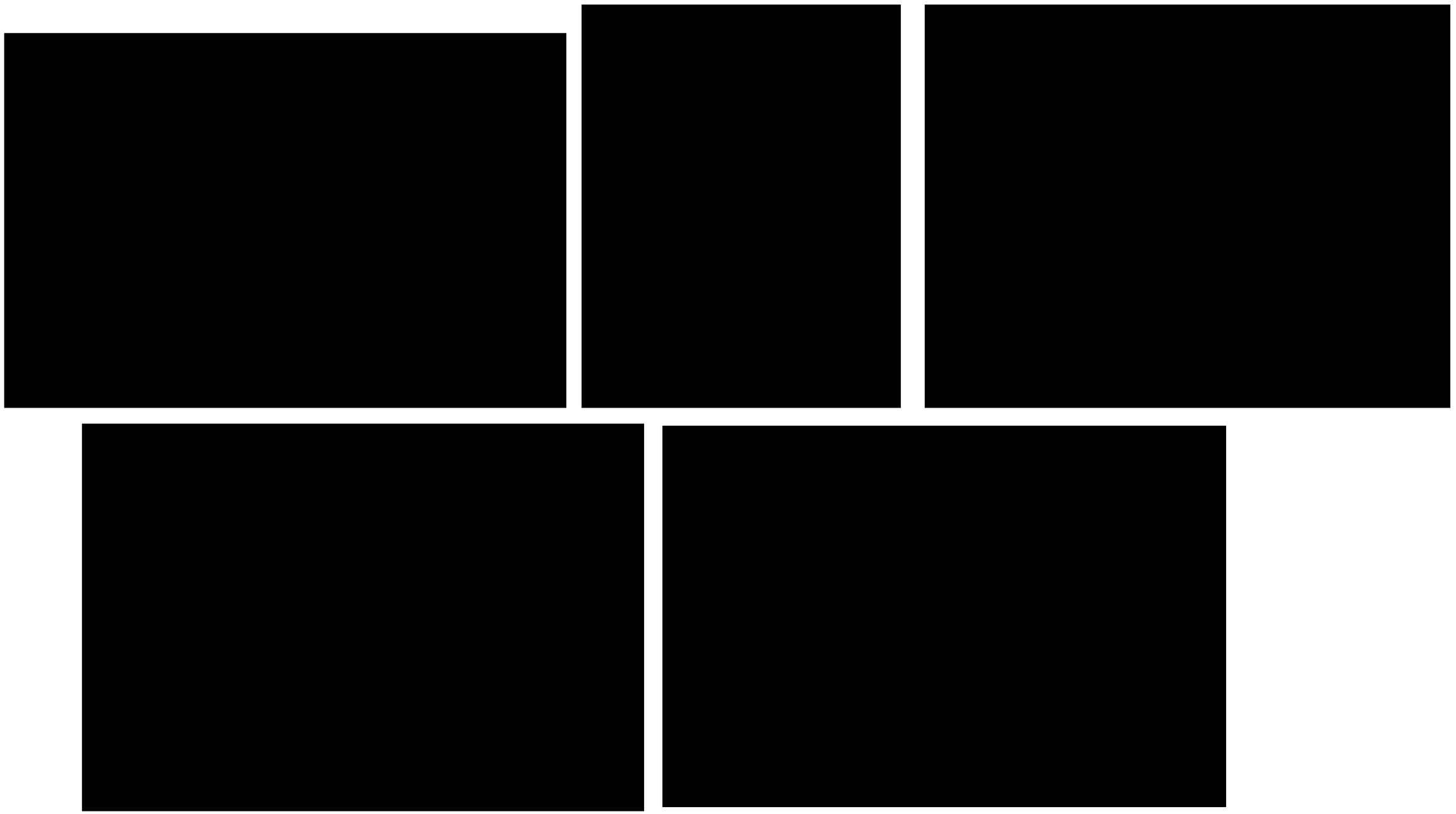
The ground floor can open up almost fully in every direction, so it should be the most porous part of the façade. Glass makes the most sense here, since this is the level that's most visible and approachable for people walking by.

For the upper levels, I wanted to use something semi-transparent—to keep some visual connection, but more abstract. This helps create a calm, unified look between the two buildings, while also offering better insulation and strength. Polycarbonate fits this well: it's lightweight, strong, well-insulated, and gives off a clean, simple aesthetic.

So I started collecting references on different opening techniques, trying to figure out how to make the polycarbonate façade fully transparent when needed, while still keeping good thermal performance.

Process - From P2 to P3

Facade concept

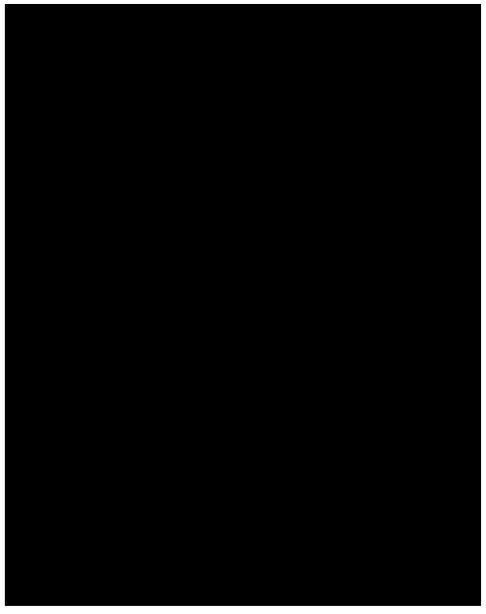


Process - From P2 to P3

Facade reference 1

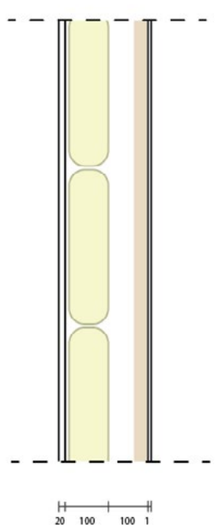
I started collecting references and researching the possibilities of creating a fully transparent façade while still maintaining thermal performance. I found several interesting examples—one of them is from the Naked House, where the two main parallel walls are made of two layers of corrugated plastic laid perpendicularly on the outside, filled with an insulation layer of polyethylene strings in clear bubble wrap bags, and a nylon fabric membrane velcroed to the structure on the inside.

What I found beautiful about this system is that the insulation can be adapted—something that could work really well with the climate adaptability I'm aiming for in my own building. But after testing its performance and looking more into it, I realized that this approach probably wouldn't perform well in a colder climate like Copenhagen.



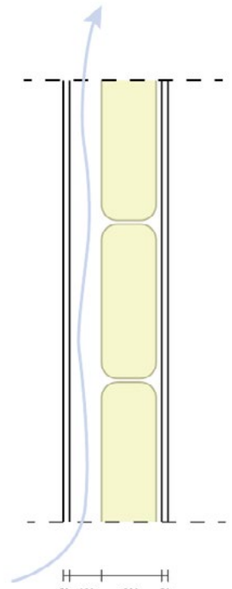
Diffusing natural light, the two main parallel walls are comprised of two layers of corrugated plastic laid perpendicularly on the outside, an insulation filling of polyethylene strings in clear bubble wrap bags, and a nylon fabric membrane that is velcroed on to the structure on the inside.

The naked house



2x 10mm transparant Polycarbonate sheet
100mm Bubble bags with foamed polyethene strings
100mm air cavity
wooden studs
1mm Nylon membrane

Proposal



50mm aerogel filled polycarbonate sheet
100mm air cavity
200mm Bubble bags with foamed polyethene strings
50mm aerogel filled polycarbonate sheet

Aerogel-filled Polycarbonate Sheets: U= 0.48 W/m^{2}K

Bags with foamed Polyethylene Strings: assume 0,5x mineral wool = 0.07

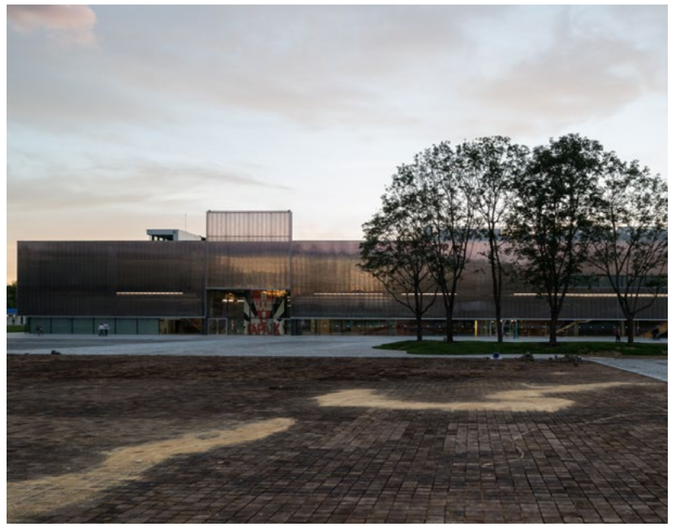
Rtotal= 1/0,48 + 1/0.07 + 0,5/0,48 = 5,93

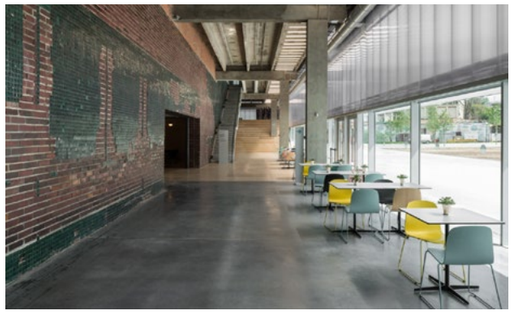
Utotal: 1/5,93 = 0,168

Benefits:
- Recyclabe packaging material as insulation
- Fully translucent facade
- Adaptable insulation

Process - From P2 to P3

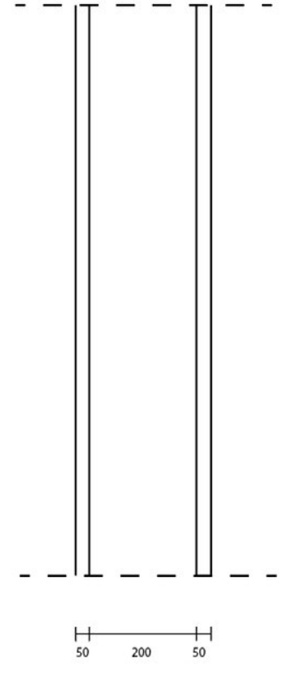
Facade reference 2





While exploring references, I came across a building that really resonates with the ambitions of my project—the Garage Museum of Contemporary Art by OMA. It has a fully glazed ground floor and a top level made of polycarbonate, which already fits quite well with the kind of material approach I'm thinking of. What makes it even more interesting is that it's located in Moscow. So even in a cold and unpredictable climate, a fully translucent façade like this is still possible.

They used a mechanically ventilated, airtight façade system with a double layer of polycarbonate. It performs really well thermally—the air cavity can be mechanically ventilated to help regulate the indoor climate and reduce the need for extra heating in summer. The heat that builds up in the façade can actually be used to warm up the inside, making the whole system both adaptive to climate conditions and energy-efficient.



50mm aerogel filled polycarbonate sheet
200mm air cavity (air tight)
50mm aerogel filled polycarbonate sheet

Aerogel-filled Polycarbonate Sheets: U= 0.48 W/m^{2}K

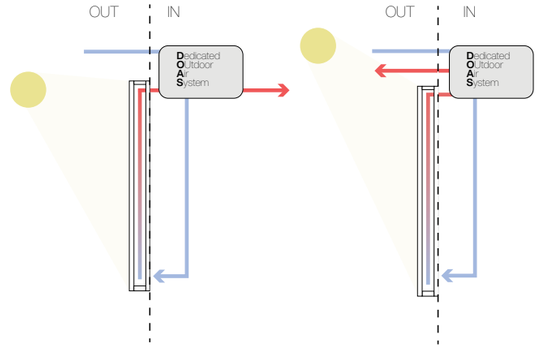
Air - U = 0.025 W/m^{2}K

Rtotal = 1/0.48 + 1/0.025 + 1/0.48 = 2.08 + 8 + 2,08 = 12,16

Utotal: 1/12,16 = 0,08

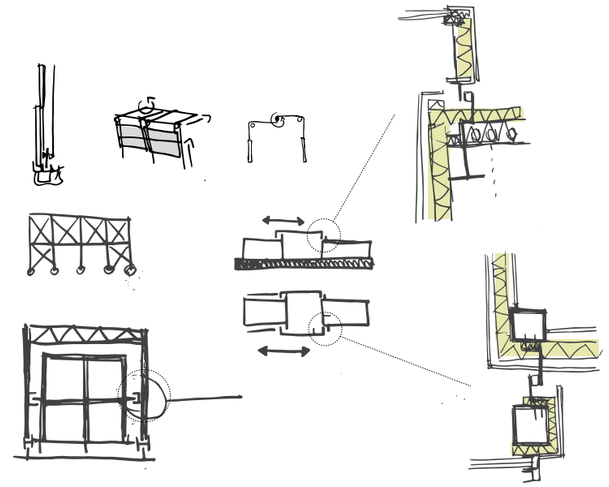
Benefits:
- Great insulation performance

Negatives:
- Techncal complexity



Process - From P2 to P3

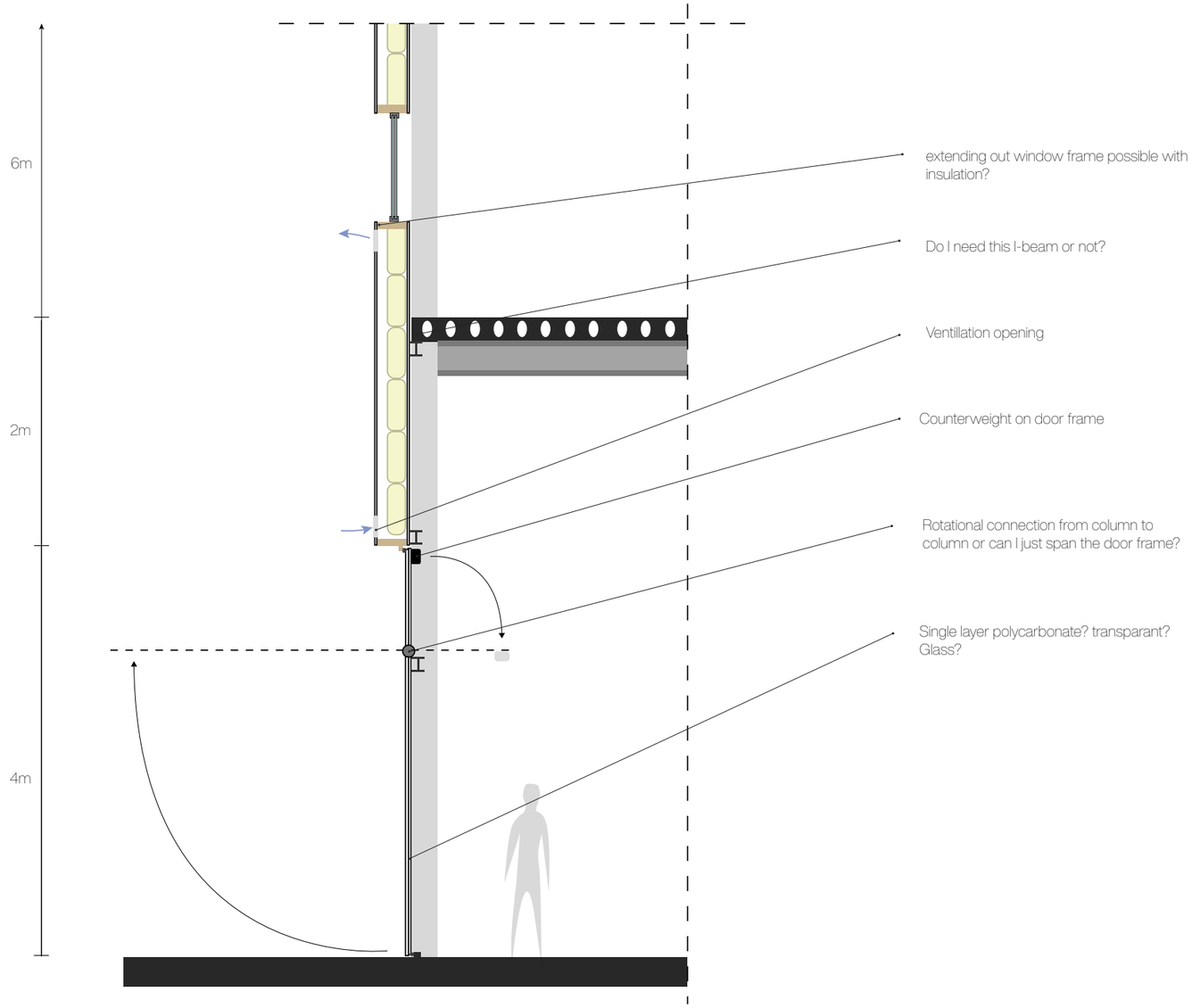
Technical detailing sketches



During this façade design process, I was also sketching out other ideas for the technical design of my building—especially for the dynamic parts, which are an integral part of my concept and definitely deserve some attention in terms of how they're actually going to work.

First, the tilting façade panels. The main reason they tilt is to create an inviting aspect when opened, and to form a small roofed area around the edge of the building. But in order to create a tilting façade that you can walk under, you need quite a bit of height. So after looking at some references, I decided that in order to reduce the overall height of these panels while still having enough clearance to walk under, you could shift the tilting mechanism off-centre. By placing it higher and balancing the panel by adding weight to the shorter part, the panel remains operable by the user since it's in balance—and at the same time, it reduces the total height needed for the openable panels, making it possible to have a 4-metre-high window running across the building.

For the technical detail, I started sketching some of the connections between the moving structure and the building, and figuring out how to make this connection (somewhat) airtight and sealed. I was also trying to understand how the moving structure stays stable while being attached to the main building.



Process - From P2 to P3

Structure sketches

For the structure, I started by calculating the required thickness and defining the floor structures. The main struggle was with the wind braces. The façades on the long side of the building could easily be stabilized by using wind braces between one part of the structural grid. This would mean that there wouldn't be any openings possible on that part of the façade.

But this became a problem for the short side of the building—the façade facing the Fabriken, the central part, and the entrance. I wanted all of this façade to be able to open up. Using wind braces in this large grid system would make that impossible. So after this, I decided to use corner braces on the lower floors to allow the entire ground floor to open up.

Building

Kolommen (rand): breedte = L/25 → 6.000 / 20 = 300 mm
(HEB 300)

Kolommen (midden): randkolom x 1,5 → 240 mm × 1,5 = 360 mm
(HEM 360) of geeoon HEM 300 want andere belasting

Liggers (vloer): hoogte = L/20 → 9.000 / 20 = 450 mm
(IPE 450)

Liggers (dak): hoogte = L/30 → 9.000 / 30 = 300 mm
(IPE 300)

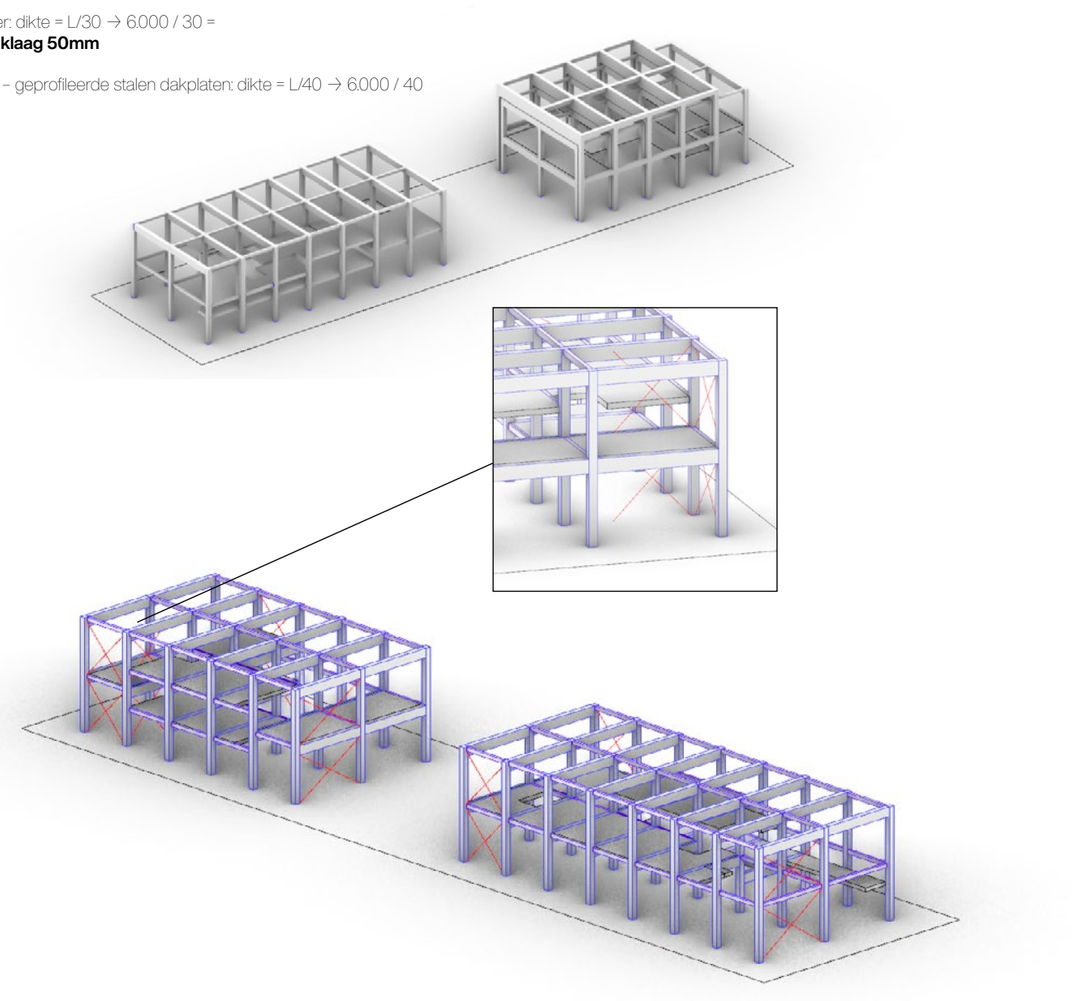
Kanaalplaatvloer: dikte = L/30 → 6.000 / 30 =
200 mm + druklaag 50mm

Dakconstructie – geprofileerde stalen dakplaten: dikte = L/40 → 6.000 / 40 = **150 mm**

Moving Structure

Kolommen: breedte = L/25 → 12.000 / 25 = 480 mm
(HEB 500)

Vakwerkliggers (dak): hoogte = L/20 →18 / 15 =
1200 mm
Hoofdprofiel = HEA 240
Tussenprofiel (stijlen en diagonalen) = Kokers 80

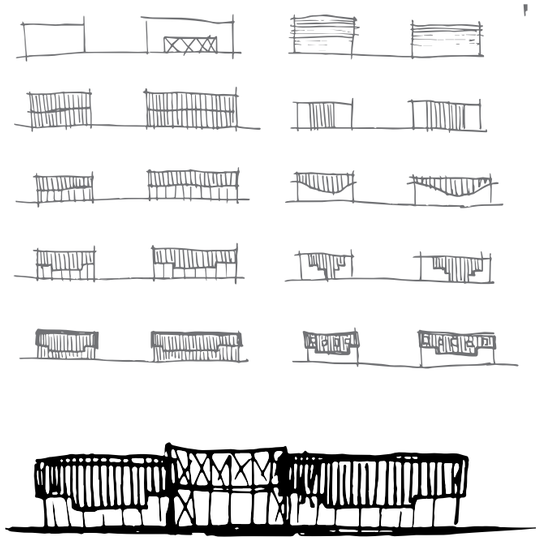


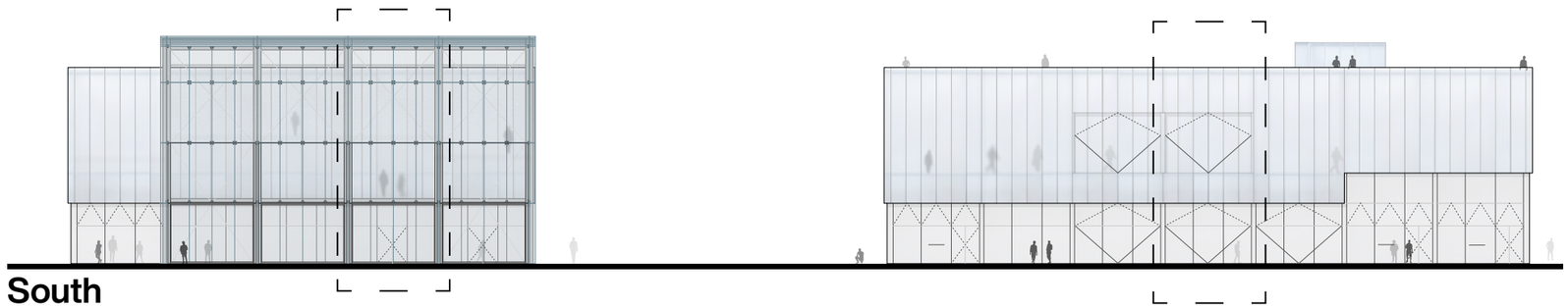
P3 Products

Facade design

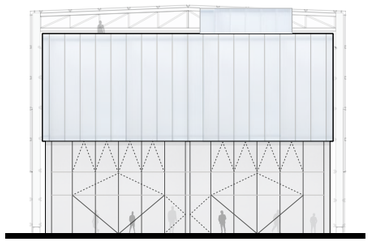
The technical detailing, structure, floorplan, and public space design were all developed further in relation to the façade design, since the placement and possibility of openings all influence each other. I started by sketching out the overall look of the façade, the heights of certain parts, and how the two building volumes are connected through the structure.

The images on the right show some of the initial sketches, where I was trying to find a balance between the lower glass layer and the upper polycarbonate layer in a way that feels visually coherent. The lower image shows how all these aspects come together in the final façade design: a 4-metre-high ground floor made entirely of glass to allow for transparency and eye-level visibility, with the upper floors fully clad in a double layer of polycarbonate. Around the entrance, the glass layer jumps forward to highlight accessibility and create a stronger sense of transparency.

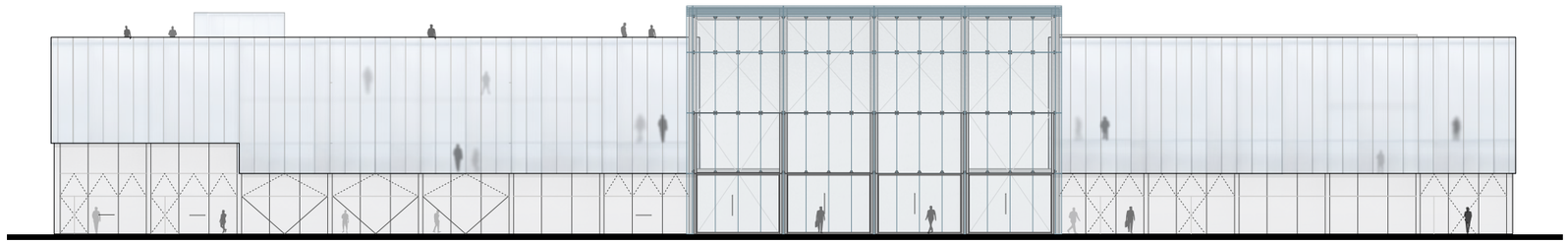




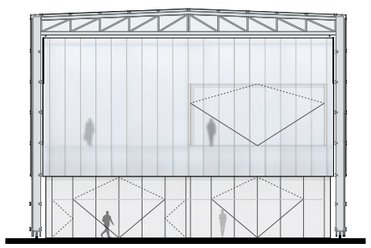
South



East



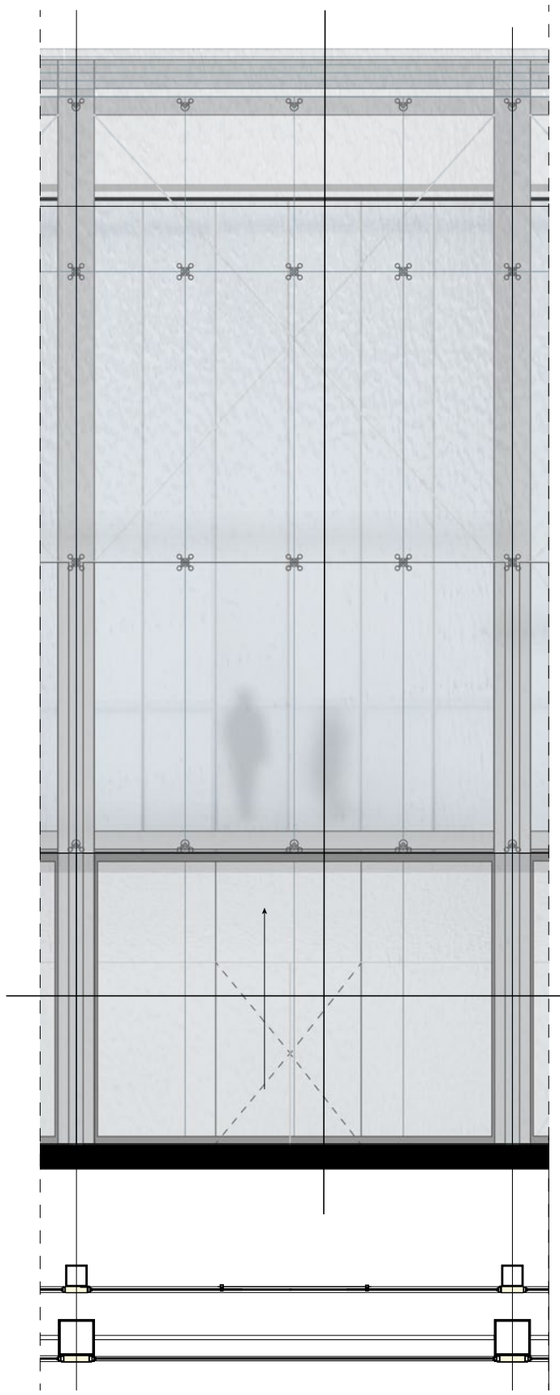
North

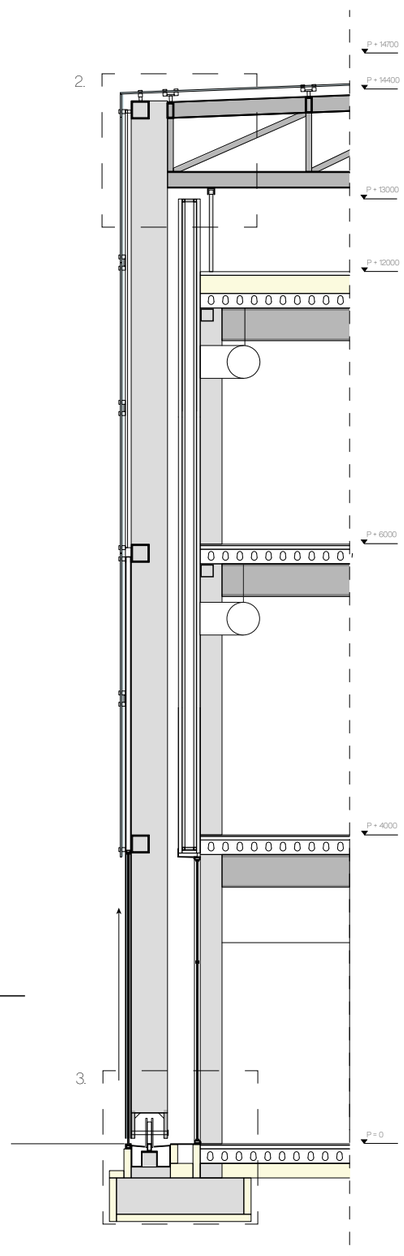


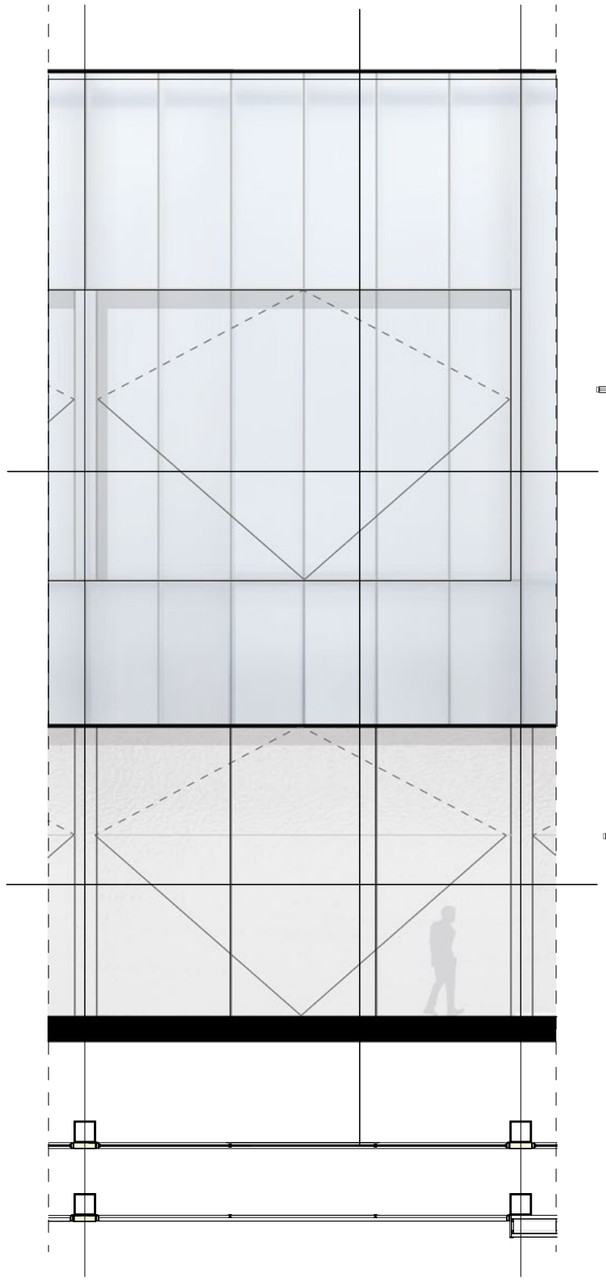
West

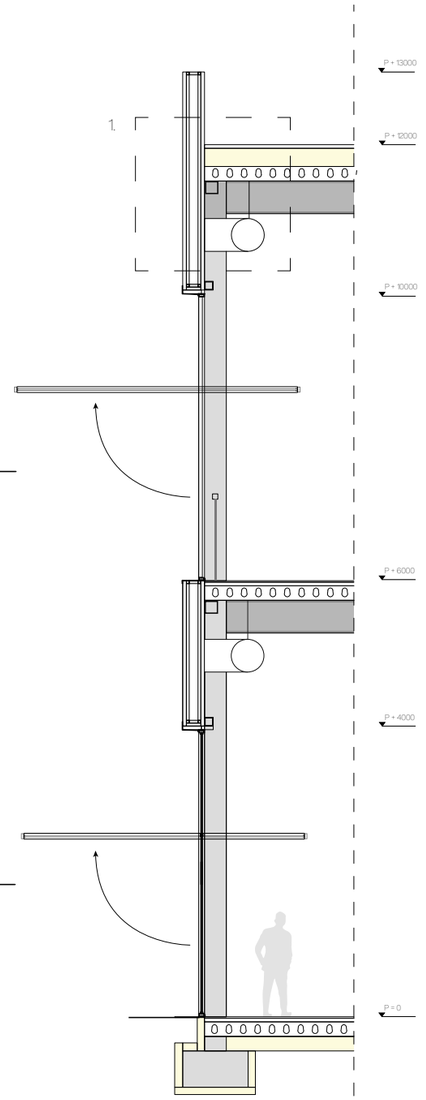
P3 Products

Facade fragments



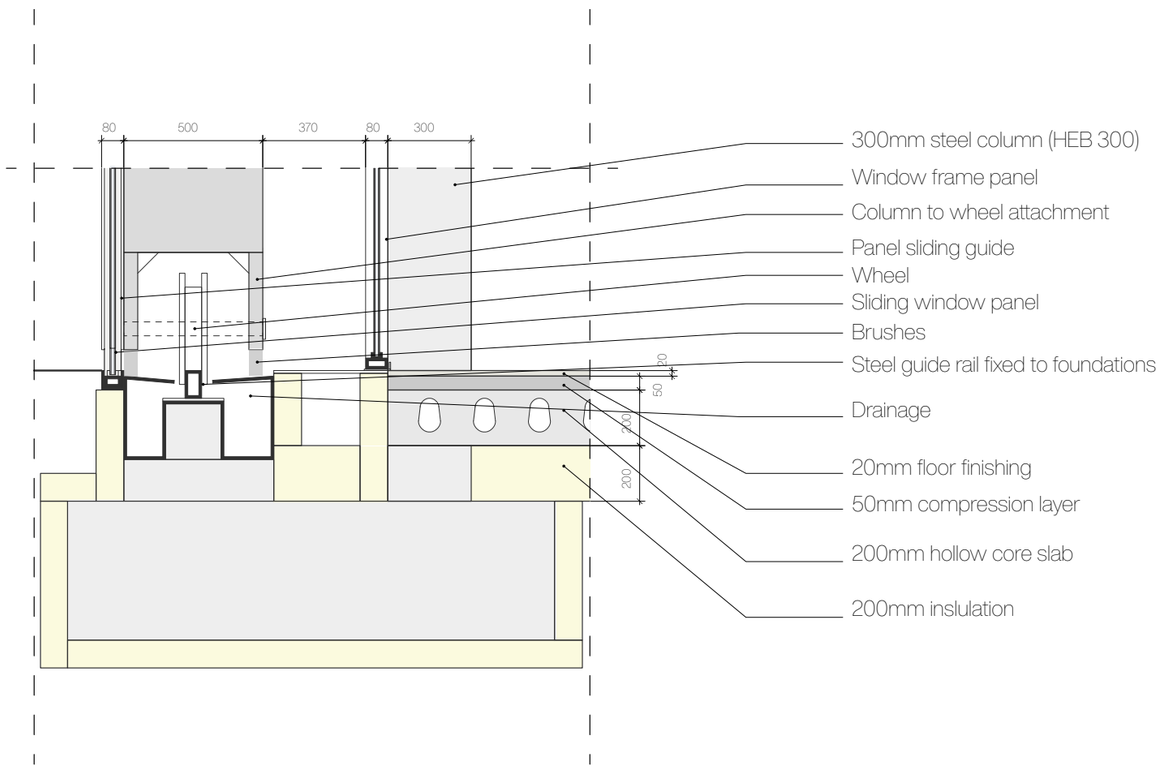


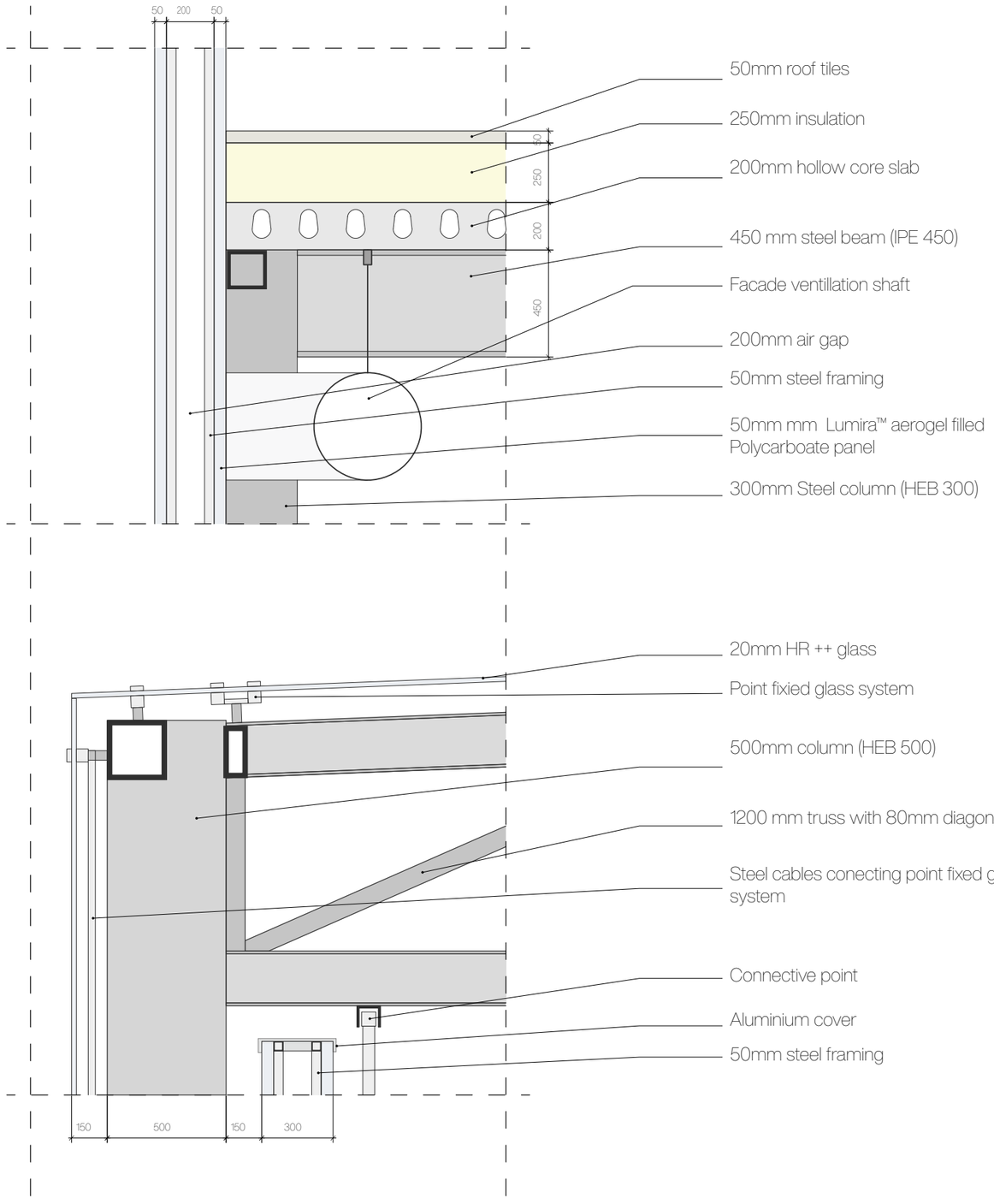




P3 Products

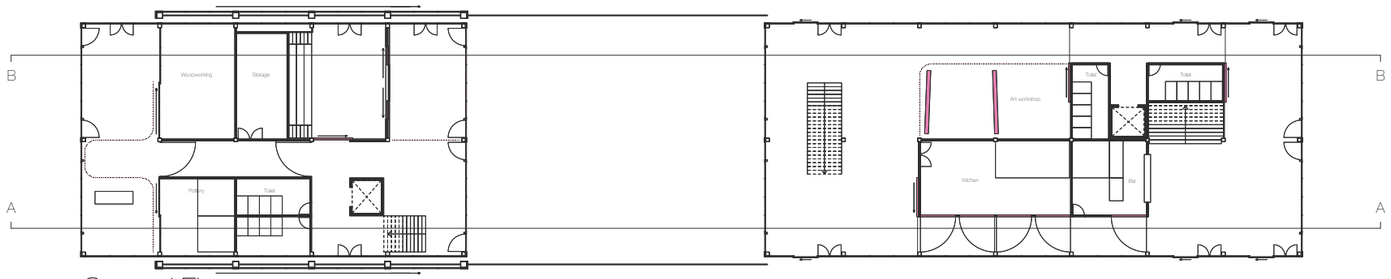
Details



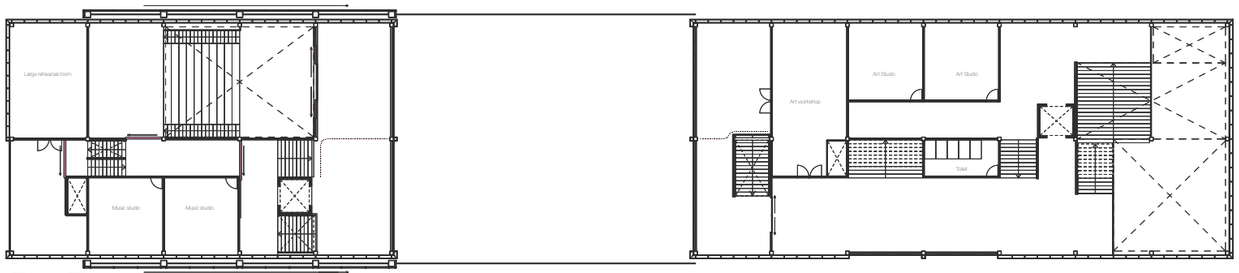


P3 Products

Floorplans



Ground Floor



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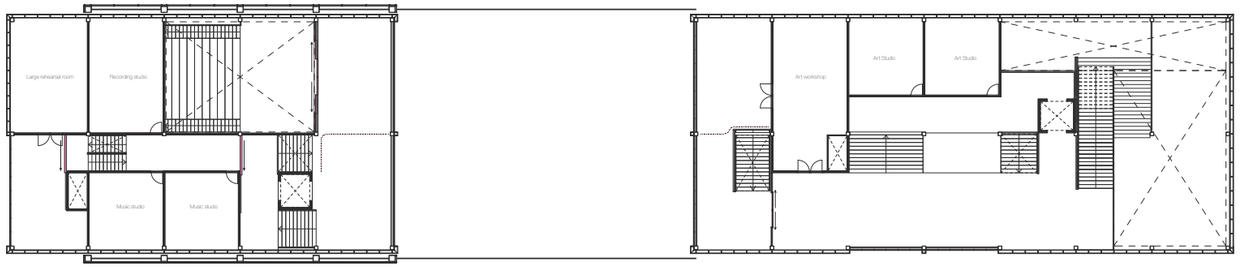

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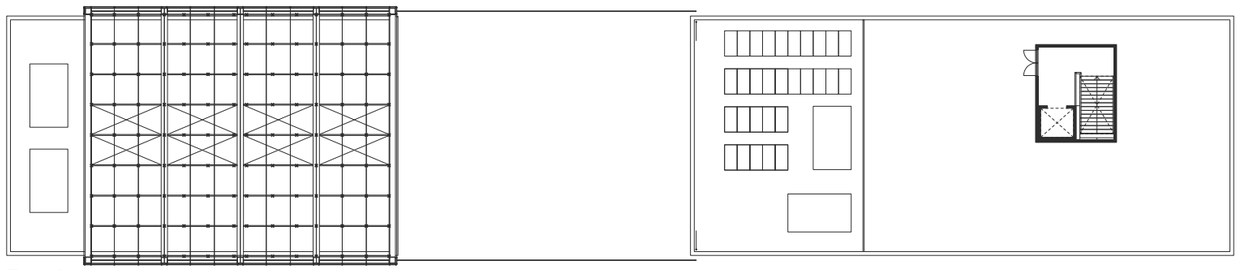
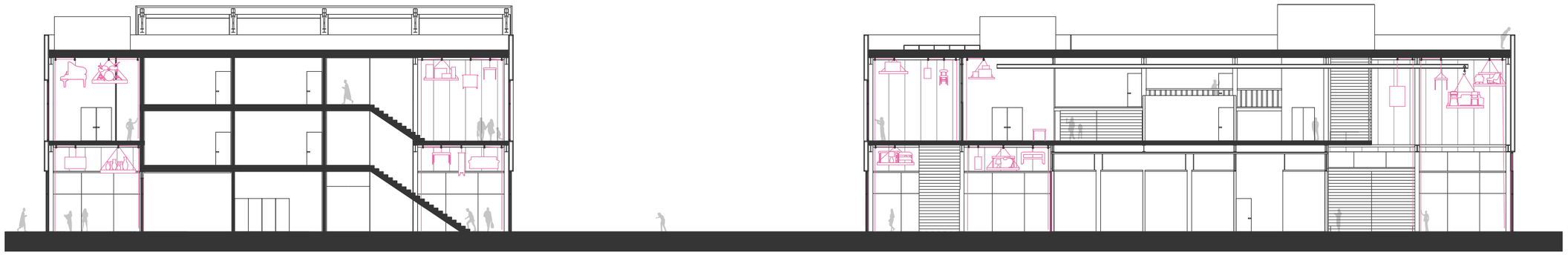


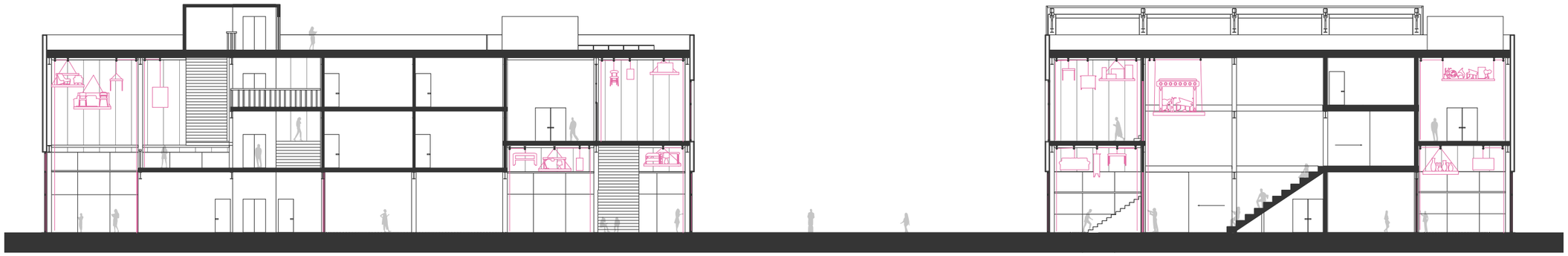
Roof

P3 Products

Sections



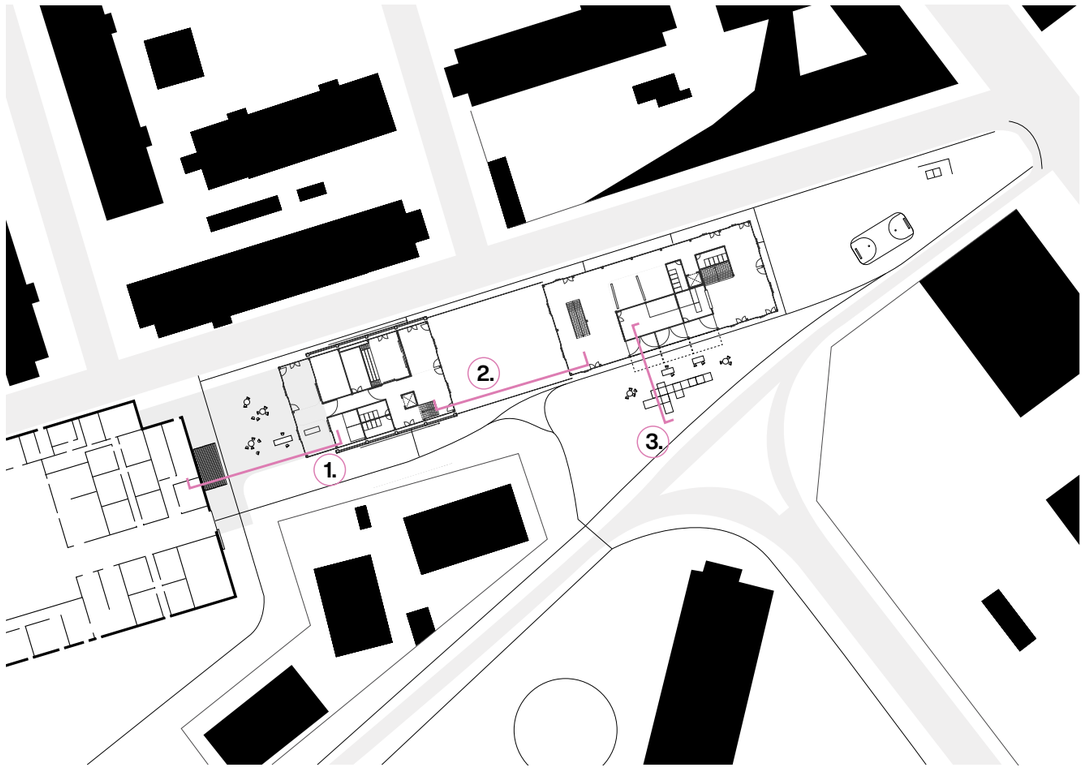
AA

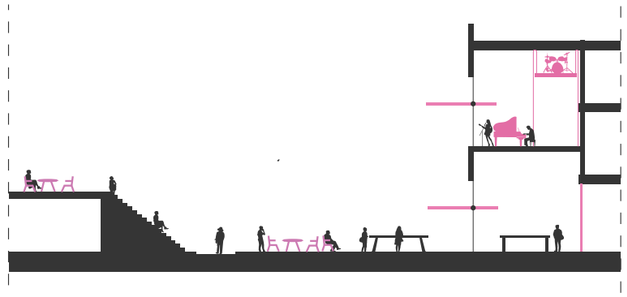


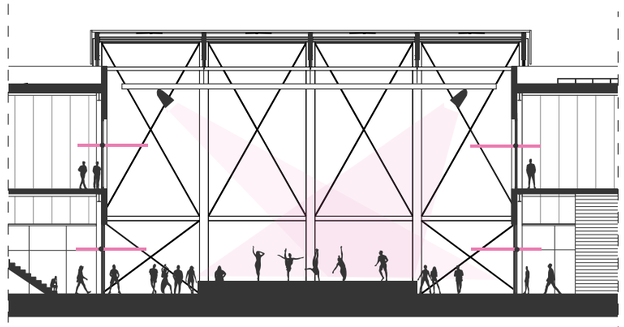
BB

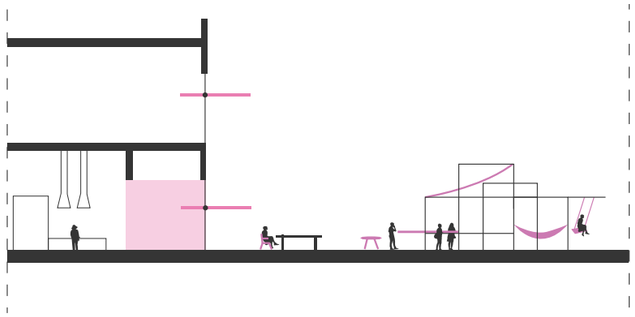
P3 Products

Public space integration & facade connections









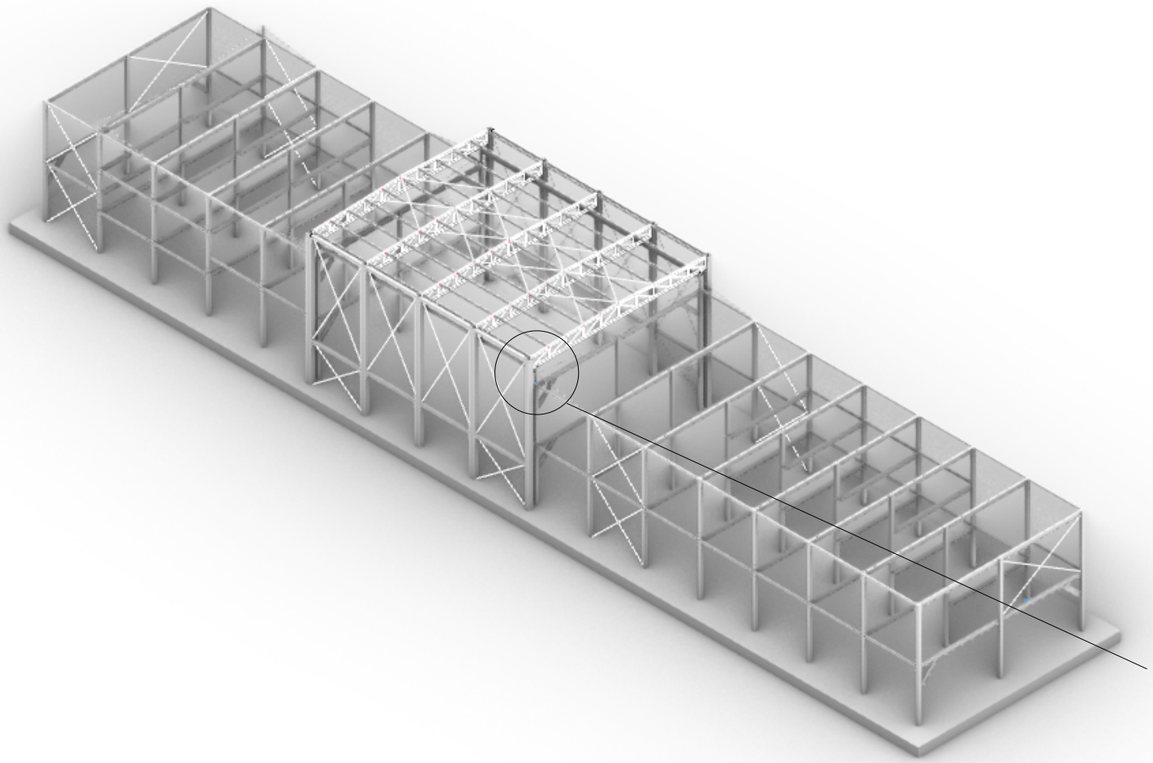
1. Fabrikken roof terrace, outdoor workshop and seating area
The space in between the Fabrikken and the building interact trough the openings in the facade. The music space can serve as a performance space and the workshop area can extend outdoors.

2. Central space as an event area
when connecting the two buildings and opening the facades, a central event stage with elevated viewing areas is created. the open facades alllow the central program to extend into the free space of its adjacent buildings.

3. Kitchen & bar extending outdoors
By opening the facade and walls of the kitchen and bar, the outdoor space is activated, offering areas for relaxation, dining, and enjoying drinks. The structure and outdoor tables can be used for workshops, play,ing and provide a space for people to host their own activities and events

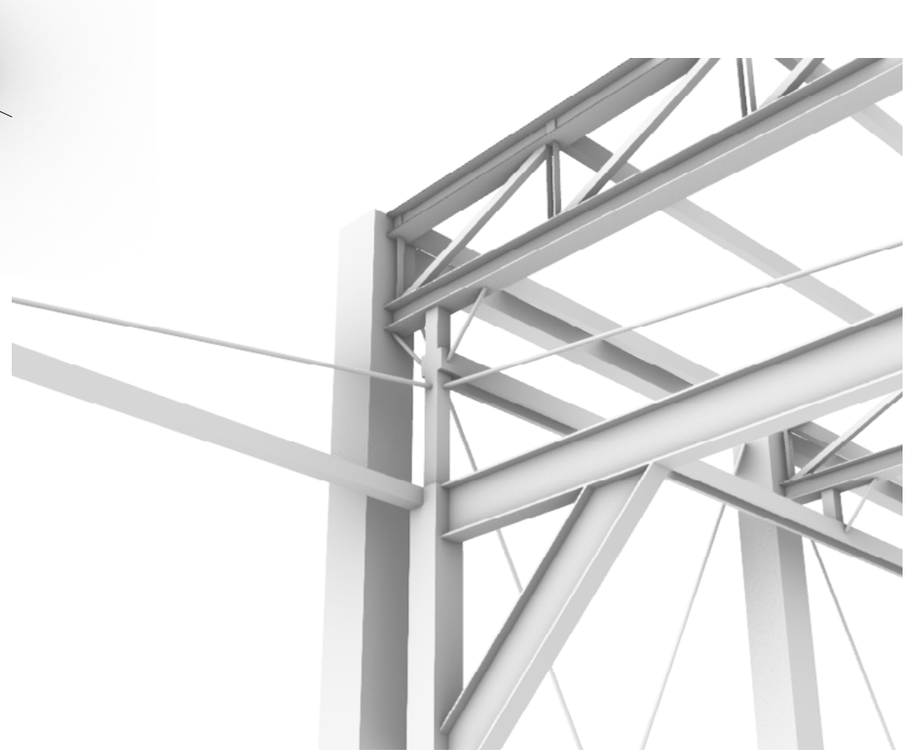
P3 Products

Structure



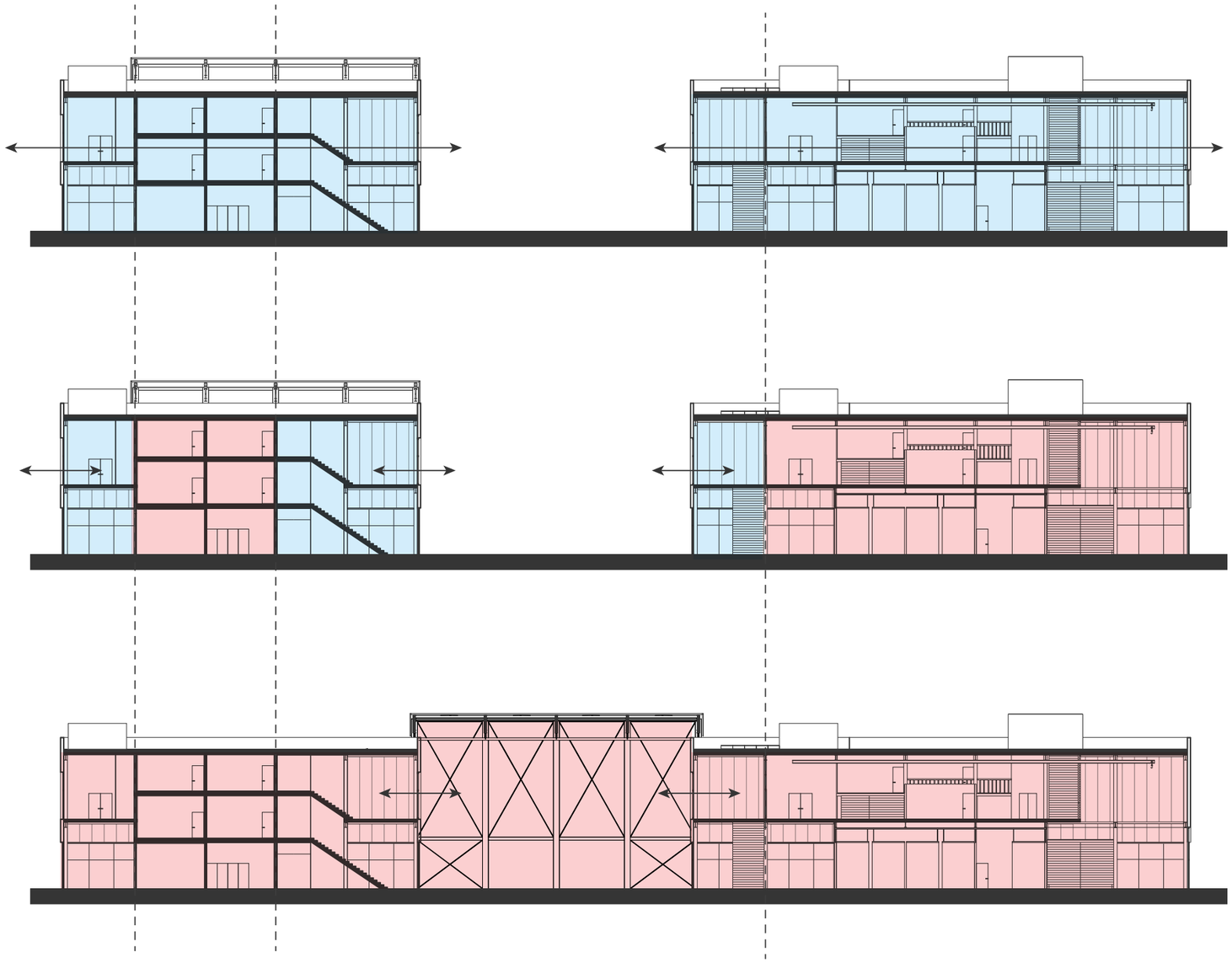
Structure Axo

The entire building consists of a steel frame structure and hollow core slab floors. The buildings have wind braces on the long side and corner wind structures on the end walls, which are related to the facades that can be opened on the end sides of the buildings. The movable structure consists of a steel frame with truss beams spanning 19 meters. This structure is attached to the building using a sliding structure that is connected to the building to lean on it, transferring the wind load through the building.



P3 Products

Climate zoning concept



Summer
Facades can be fully opened to provide natural ventilation trougout the entire building

Spring/Autumn
Parts of the building can be closed of when opening one of the facades, enabling out/indoor functionality in transitional seasons.

Winter
When closing off the central space and opening the facades, the glass structure can act as a heat buffer on sunny winter days

Process - From P3 to P4

P3 Feedback & Next steps

Main problems:
- Facade acts and looks too much like a boundary while the intent is to blur boundaries and stimlate creative use..
- The facade has a uniform and bland character which creates a non approachable design, contrasting the building concept.

The façade currently feels too static and uninviting, especially when closed. Relying on transparency alone isn't enough to express the building's dynamic and inclusive intentions. Moving forward, the goal is to make its transformative potential visible through depth, material richness, and subtle cues of interaction so that it feels open and welcoming, even in its passive state.

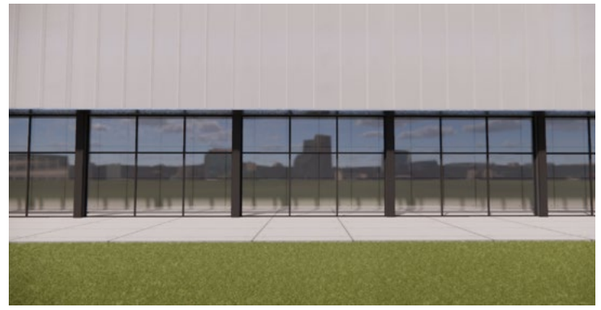
The next steps should focus more on the user experience rather than purely on the façade's technical capabilities. That means shifting attention toward how the building communicates openness and interaction, especially when it's in a closed state. This leads to the guiding question:

How can I guide the passerby or user to sense a connection between inside and outside, even when the façade is closed?

Initial Ideas:

- Visual connectivity and approachability - By adding more depth and dimension in the facade.
- Indoor character - Trough using colours, textures in the layer behind the facade, the buildings diverse identity can be shown behind the facade.
- Material connectivity - Continue outdoor materiality towards the indoor spaces where connection is important.
- Hint on adaptability - Tangible, human scale elements - By adding tangible elements to the facade panels, a hint of touch is created, inviting the user to touch, move, interact with the boundary.

Glass tilt vs visibility & approachability



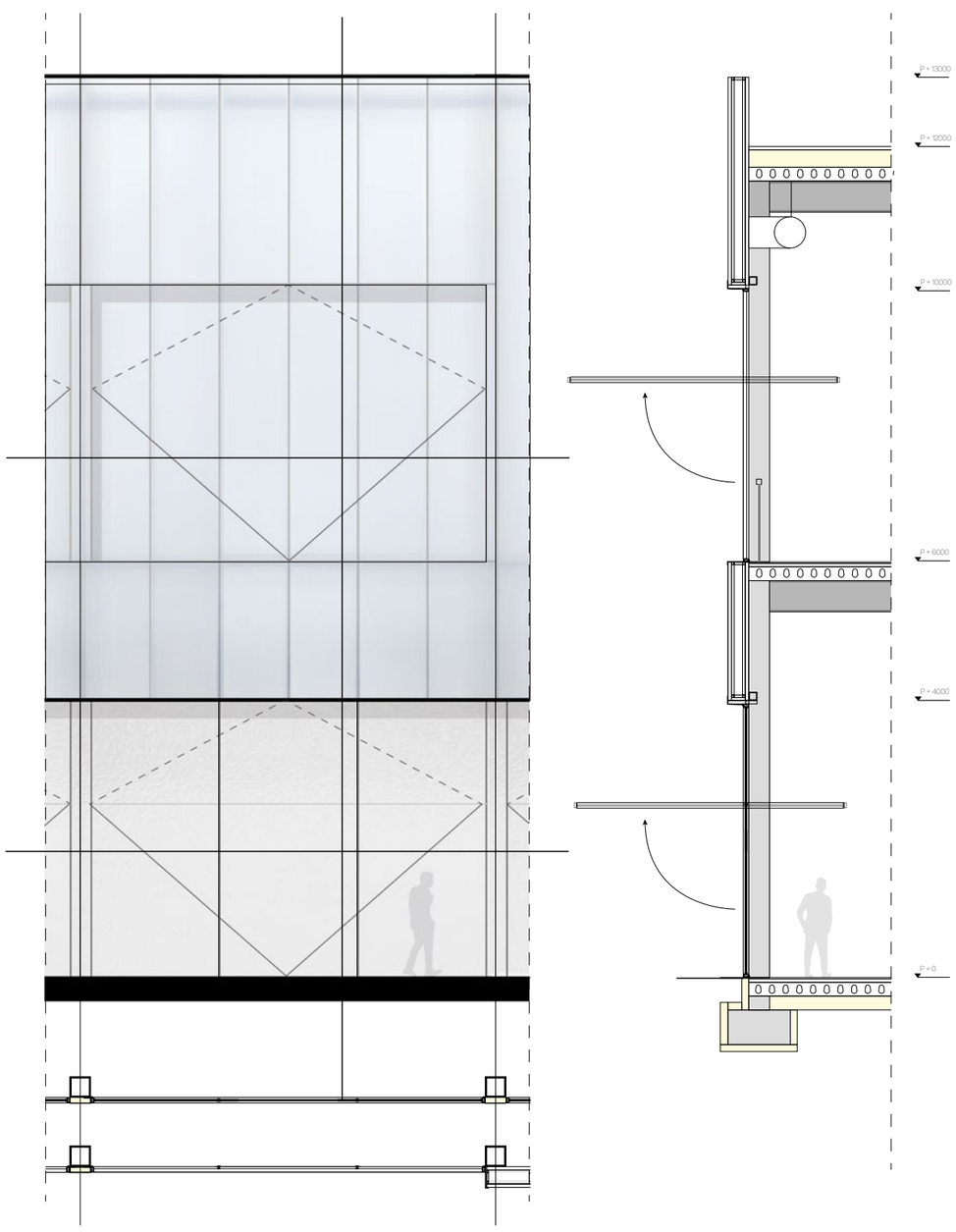
0% TILT

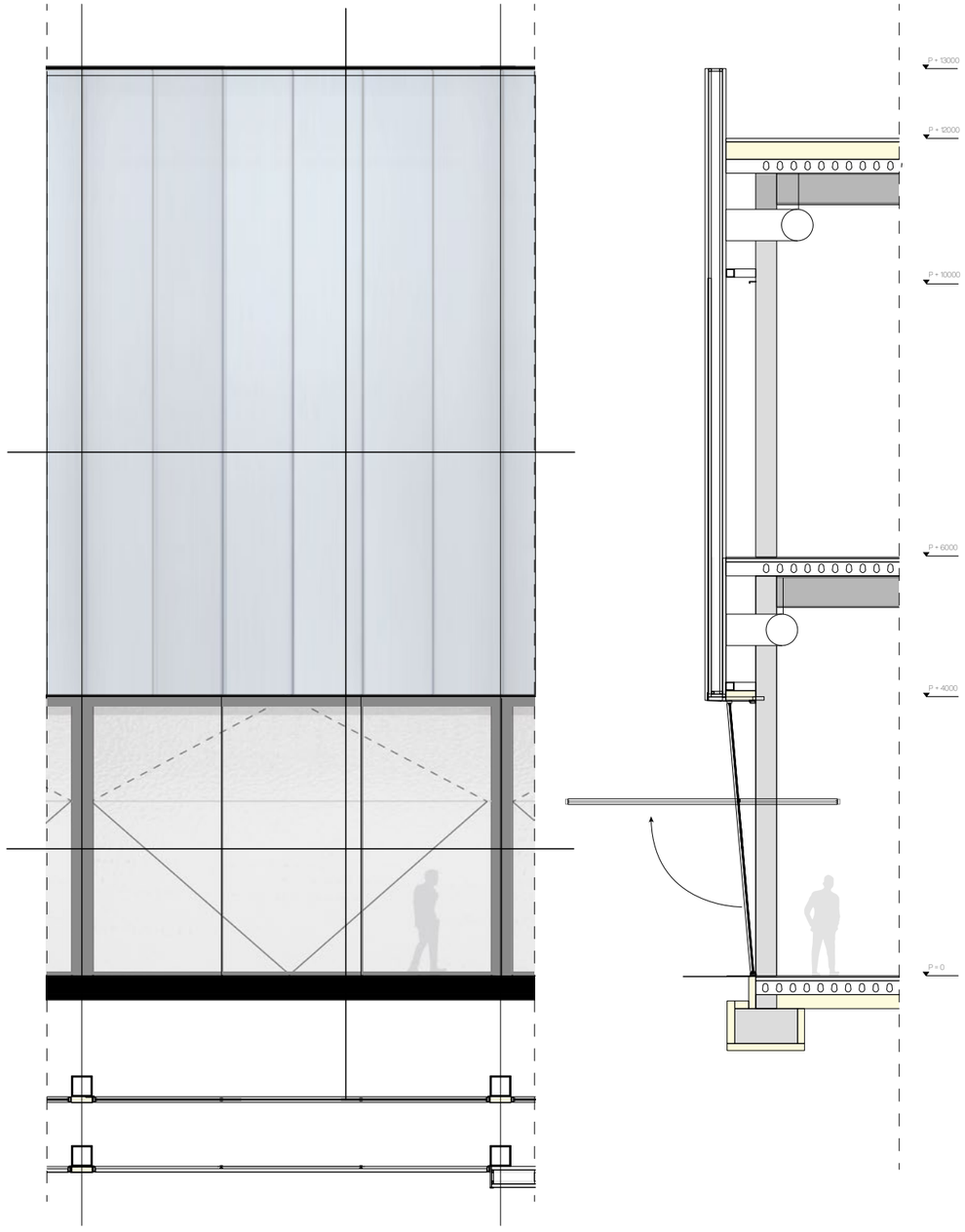
5 % TILT

-5 % TILT

Process - From P3 to P4

Visual connectivity and approachability





Process - From P3 to P4

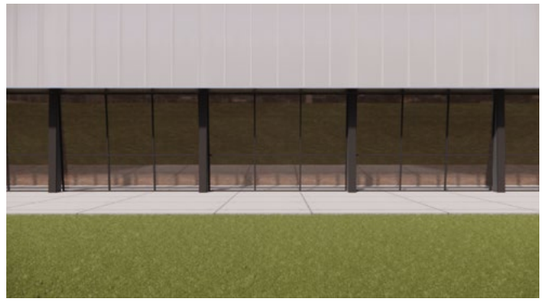
Material concept

After adjusting the façade itself to improve its visibility by tilting the windows, and adding more depth and approachability by extending the overhang of the polycarbonate layer, I started diving into the materialization concept. The idea is that by giving the interior more character, the program can take on its own identity—certain uses can be suggested through material—and by extending some of those materials towards the outside, a visual and physical link to the outdoors can be created, even when the façade is closed.

I started by exploring how different flooring materials, colours, and wall finishes behind the façade could influence the visual connection between inside and outside, and how that affects the approachability and the sense of boundary the façade creates.

What I found is that bold colours work best for catching the eye and hinting at activity inside, while overall darker tones help shift the building's appearance away from a high-tech look, making it feel more grounded and a bit more rustic.

Texture variations



Brick

Colour

Wood

Ground material transitions

Grass

Wood

Light wood & organic shape

Process - From P3 to P4

Program & material identity

After doing these experiments, I started to realize how much the character of the ground and wall surfaces—both inside and outside—can contribute to the building's readability and overall approachability. By using materiality to subtly suggest programmatic functions and imply connections between indoor and outdoor spaces, the building starts to communicate more clearly. It gains depth and identity without needing to be overly expressive on the outside.

I've written down my goals, how I want to achieve them, and the kind of identity I want each program to express to the user below.

Goals

- Use materiality strategically to hint at how the program works and how spaces relate to each other.
- Create contrast and visual richness behind the neutral façade.
- Stimulate curiosity and engagement through textures, colours, and visible layering.
- Allow material choices to suggest function without relying on signage or explanation.

How?

- Give each programmatic function its own material identity, adding character and atmosphere.
- Let flooring materials "bleed out" into adjacent or free space, creating subtle gradients and program transitions.
- Use material continuity to blur the line between inside and outside, making boundaries feel softer.
- Contrast tactile, expressive interiors with a minimal, neutral exterior to keep the façade understated but layered.
- Incorporate surfaces that invite touch, hinting at movement and interaction.

Material identity per use

Free space - Neutral, adaptive, Inviting
Crafting space - Raw, industrial, robust, Earthy
Music space - Calm, inspiring, warm
Kitchen/Bar area - Warm, cozy, social
Art (worshop) - Flexible, inviting, Informal, adaptable, robust

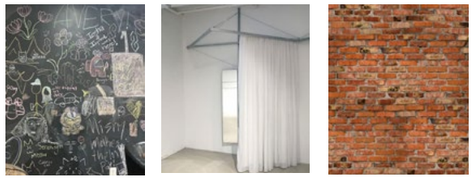
Process - From P3 to P4

Program & material identity

Free space Neutral, adaptive, Inviting

Floor & outdoor flooring

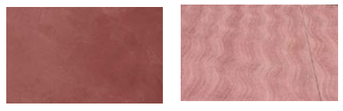
Walls, divisions



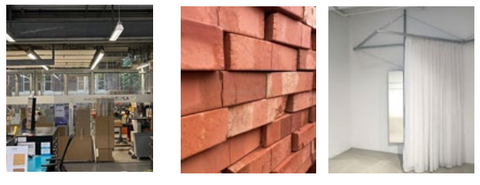
Details

Crafting space (woodworking & pottery) Raw, Industrial, Robust, Earthy

Floor & outdoor flooring



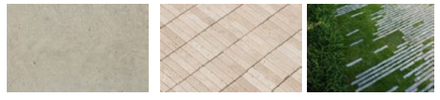
Walls, divisions



Details

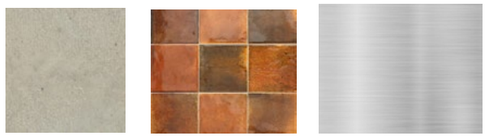
Kitchen & Bar Warm, cozy, social

Floor & outdoor flooring



Walls, divisions

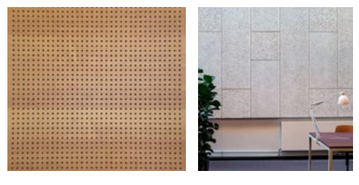
Details



Music space Calm, inspiring, warm

Floor

Walls, divisions



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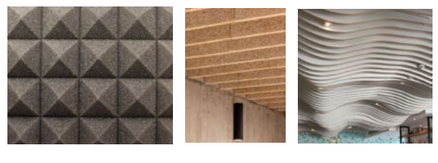
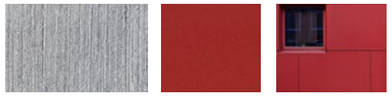
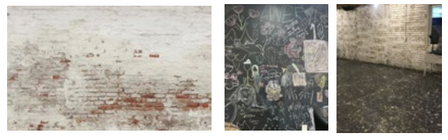


Art space (workshop) Flexible, inviting, Informal, adaptable, robust

Floor



Walls, divisions



Details

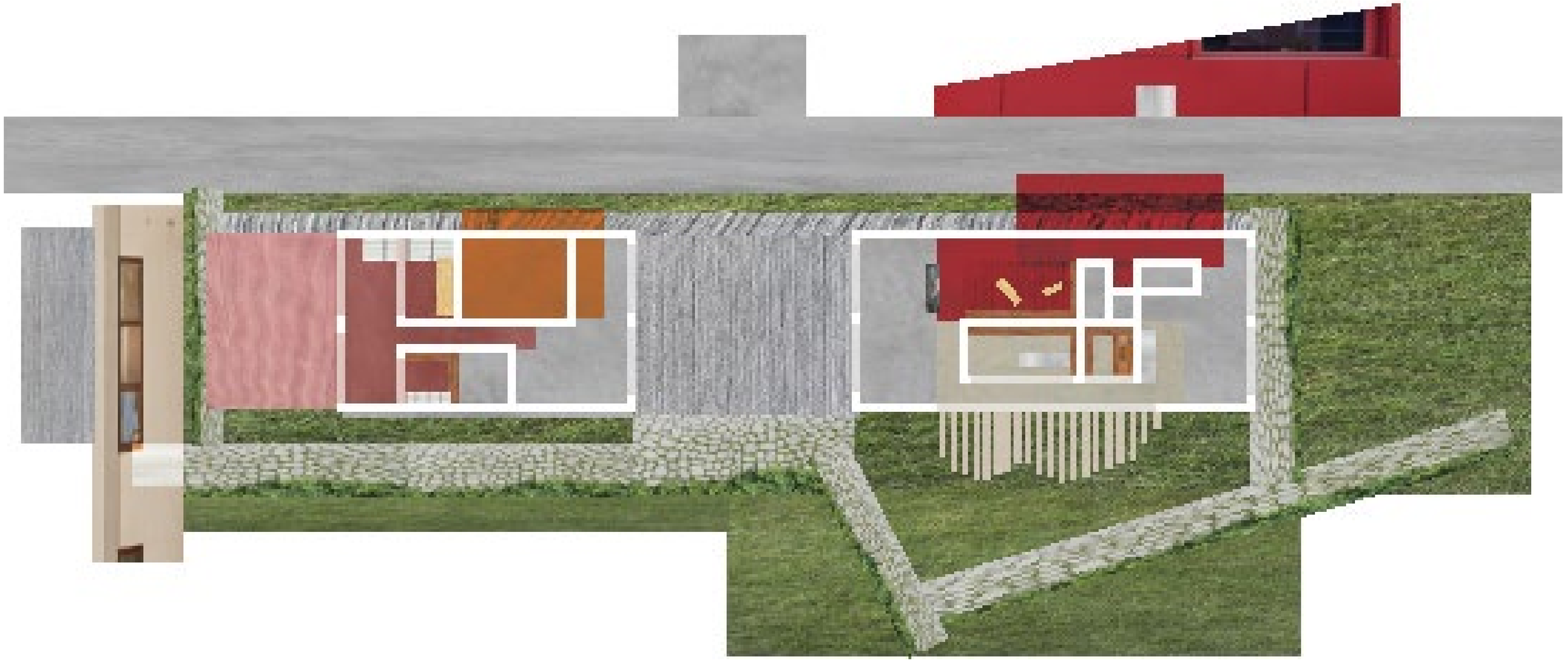
Here, I've identified materials based on each program's goals and how they should express themselves to the user. This is reflected in the choice of flooring, how it transitions into the outdoor space, the wall or division materials, and specific detailing. All of these choices are grounded in the overall identity I want to create for each space—mainly trying to let the materiality speak for itself rather than relying on signage or explanation.

For example, using floors that can be painted on or splattered, or walls made of wood that can be bumped or marked, already starts to suggest what kind of activities happen there. The material becomes a quiet invitation, hinting at how the space is meant to be used. And by extending this material expression into the outdoor areas—especially in places where the function can spill outside—I can continue that visual identity beyond the façade, reinforcing the sense of openness and continuity.

Process - From P3 to P4

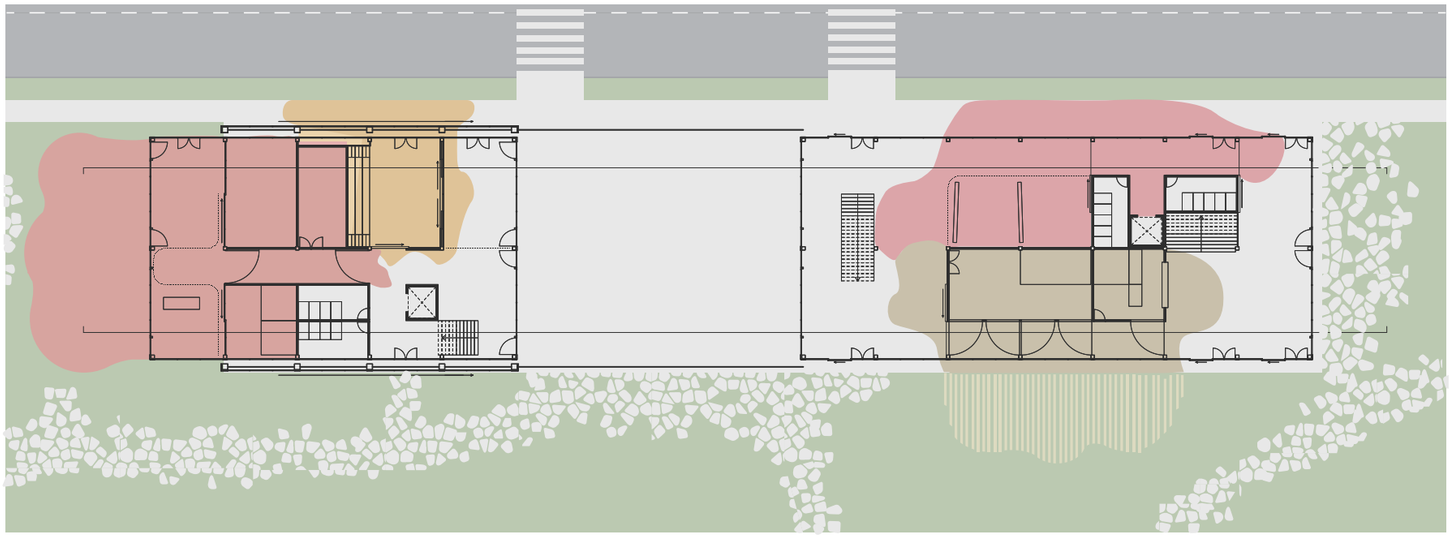
Program & material identity collage

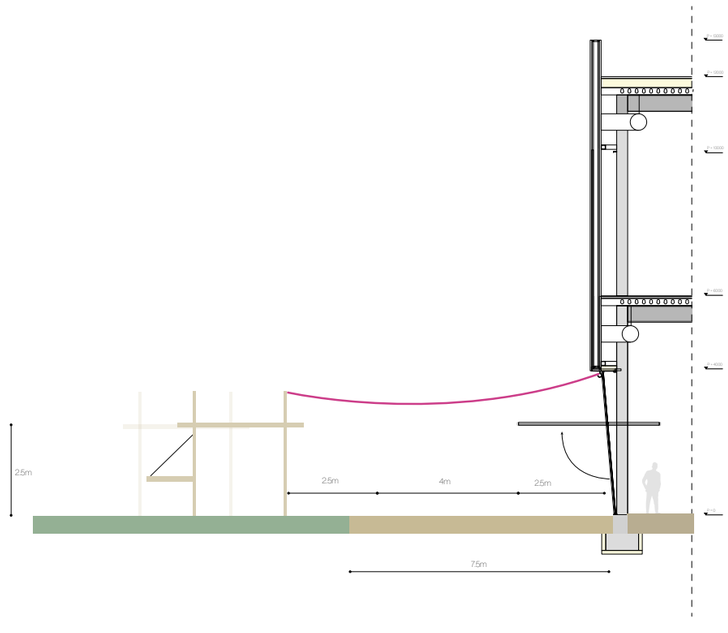
After this, I combined the images of the materiality and applied them onto the floorplan structure—to map out my vision of material continuity beyond fixed boundaries. Just like how the free space allows the fixed functions to flow into it, the same happens with the materials. The materiality suggests where a program can expand, where it can connect—threading across boundaries, even extending beyond the façade itself. It's not just about zoning, but about creating soft transitions through material, hinting at overlap, flexibility, and movement.



Process - From P3 to P4

Program & material identity in context

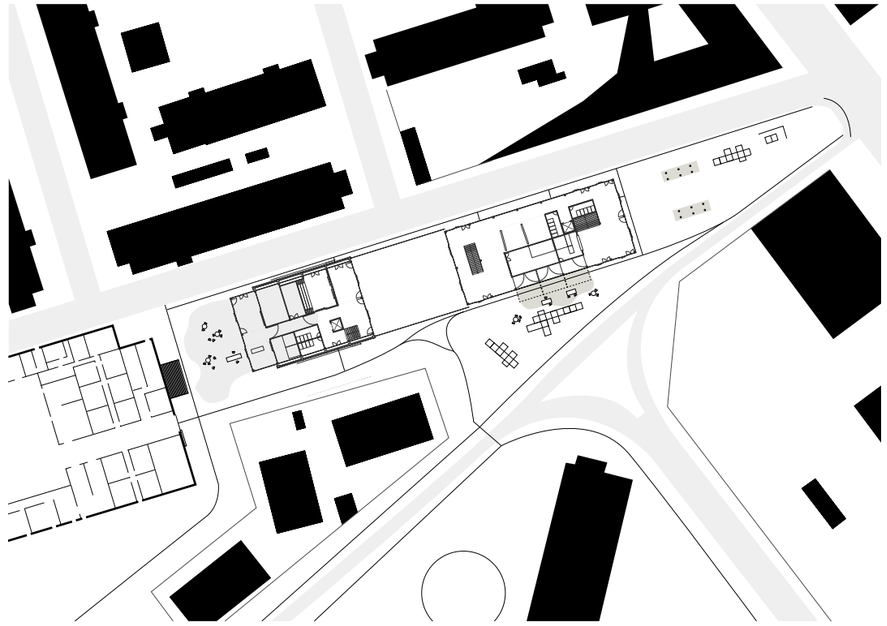




After making the material collage, I applied the colour scheme to the floorplan to get a better sense of how it could work at full scale. This brought me back to the unresolved public space on the south side. I discussed this with my tutor, who suggested pushing the material flow much further—extending it into the landscape, even across the road.

He also pointed out that the southern façade openings don't really interact with anything, unlike those facing the centre and Fabrikken. I had started designing an ambiguous structure there, but it still lacks a clear spatial relationship. The façade needs something bigger to respond to.

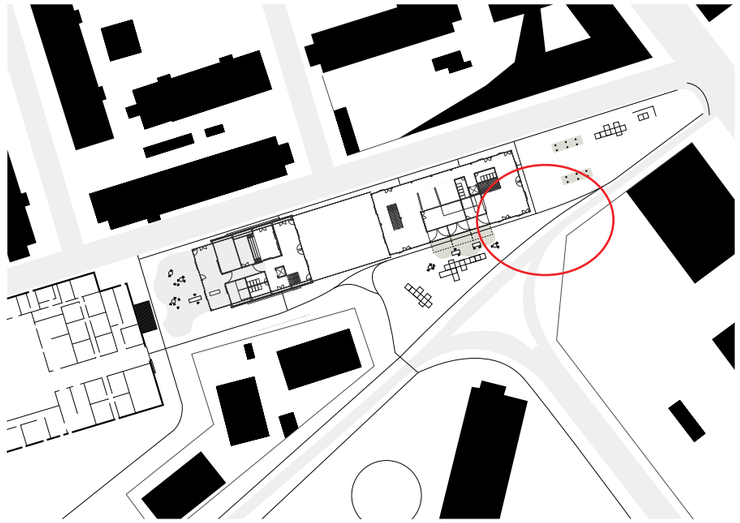
Next step:
How can I design the southern triangular public space—between my building, the road, and the social housing—to feel intentional, inviting, and activated by the façade?



Process - From P3 to P4

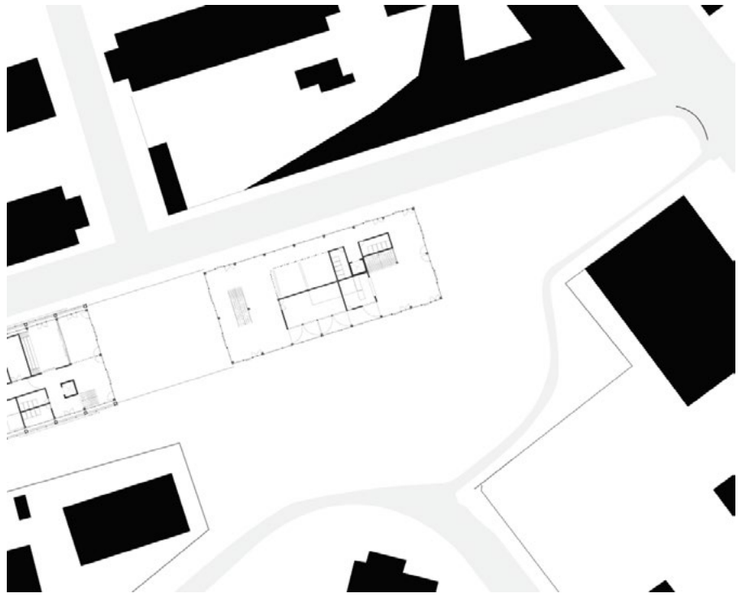
Public space redesign (south)

The meeting about the material concept and public space relationships concludes in several key points which I need to address. The main points can be distilled down to two things:
1. Make the material gestures that thread across the façade into the outdoor space more extreme and legible — this allows for a clearer outdoor space expression and a more defined relationship between the building and its surrounding public spaces and buildings.
2. The triangular public space that is created between the building, social housing, and the bike road needs to be designed in a way that it creates the same dynamic of space in relation to the open/closed states of the building. This dynamic already happens in the spaces towards the Fabrikken and in the middle of the building, since here the public space is in between elements — and the changing states of these elements directly impact the use and potential of the space between them.



Right now, the opening elements on the south side speak to a space of “nothing” — a grass field, or a small undefined structure. The gesture needs to be more clear, and the space more dynamic.

So, how will I reapproach this public space design? Possibly by changing the shape of the space, the ground level, or by placing another object or building.
Goal: Improve the quality and flexibility of the triangular public space towards the south. I found that in my spatial design, the layout is really limited by the bike connection. This bike route shapes the space into a triangle and creates tight corners and cuts in the public space.
To improve the space and make room for a new element, part of the adjacent industrial building's car parking will be removed to free up more space for the public realm. The bike route will be rerouted along the edge of the site, creating a more generous and flexible area.



Now that this space is cleared up, I needed to find an element that is dynamic, adaptive, and in dialogue with the façade, in order to shape the in-between space.

Process - From P3 to P4

Public space redesign (south)

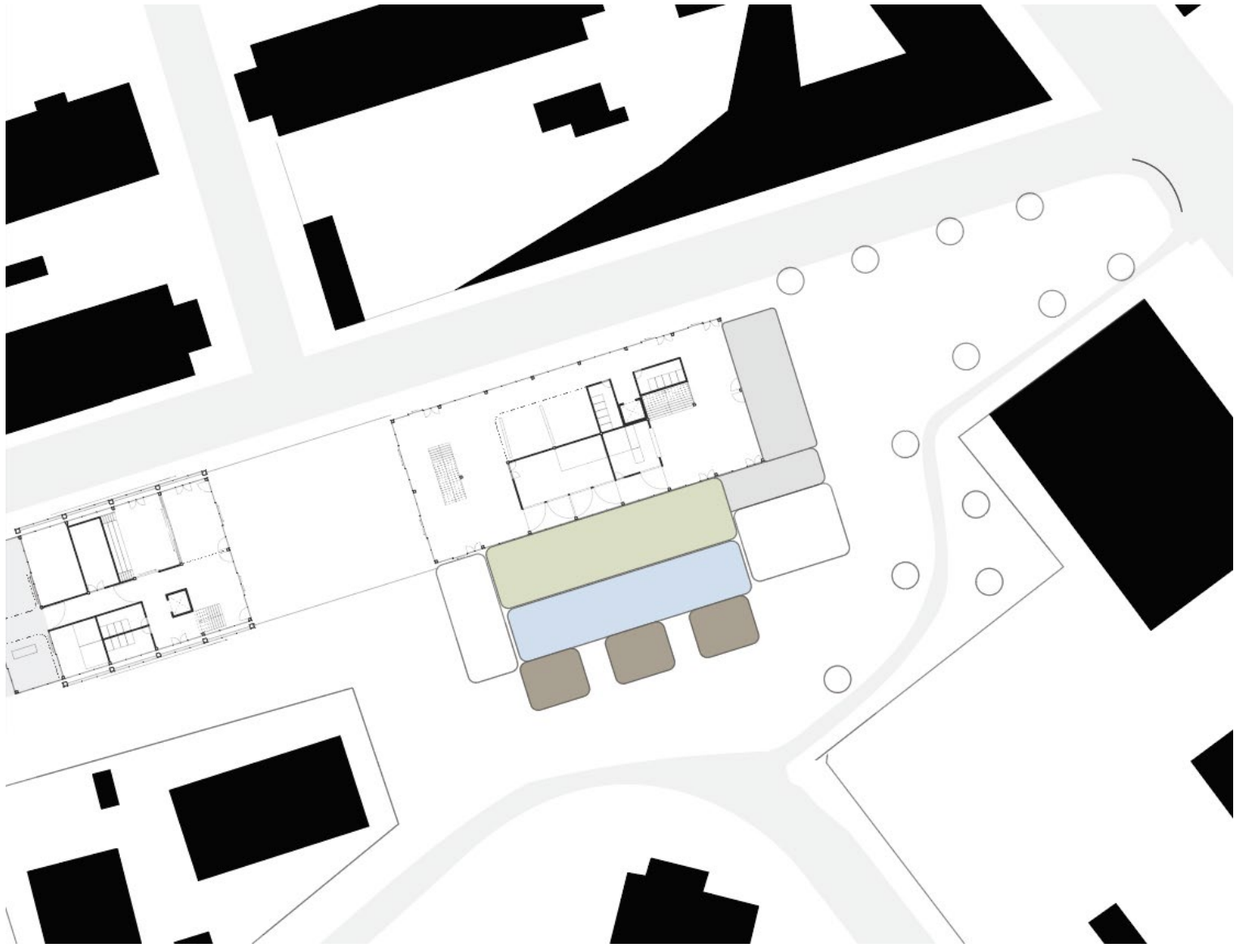
I came up with the idea of integrating a greenhouse, which I initially wanted to place on the roof in an earlier version of the design, but later scrapped. Now it returns — in a more strategic position. The idea of a flexible greenhouse provides the perfect object to act as a buffer between the opening façade next to the kitchen and bar area.

This greenhouse would respond directly to the climate and operational state of the façade. Meaning:

When the weather is good and the façade opens → the greenhouse also opens, functioning more like a semi-indoor terrace.

In winter, when the façades are closed → the greenhouse becomes a fully enclosed urban farming space.

The greenhouse is not necessary in summer for farming — and that's where its flexibility kicks in. It can fully transform into a social, shaded, open-air space while still maintaining a meaningful spatial and material connection to the building.

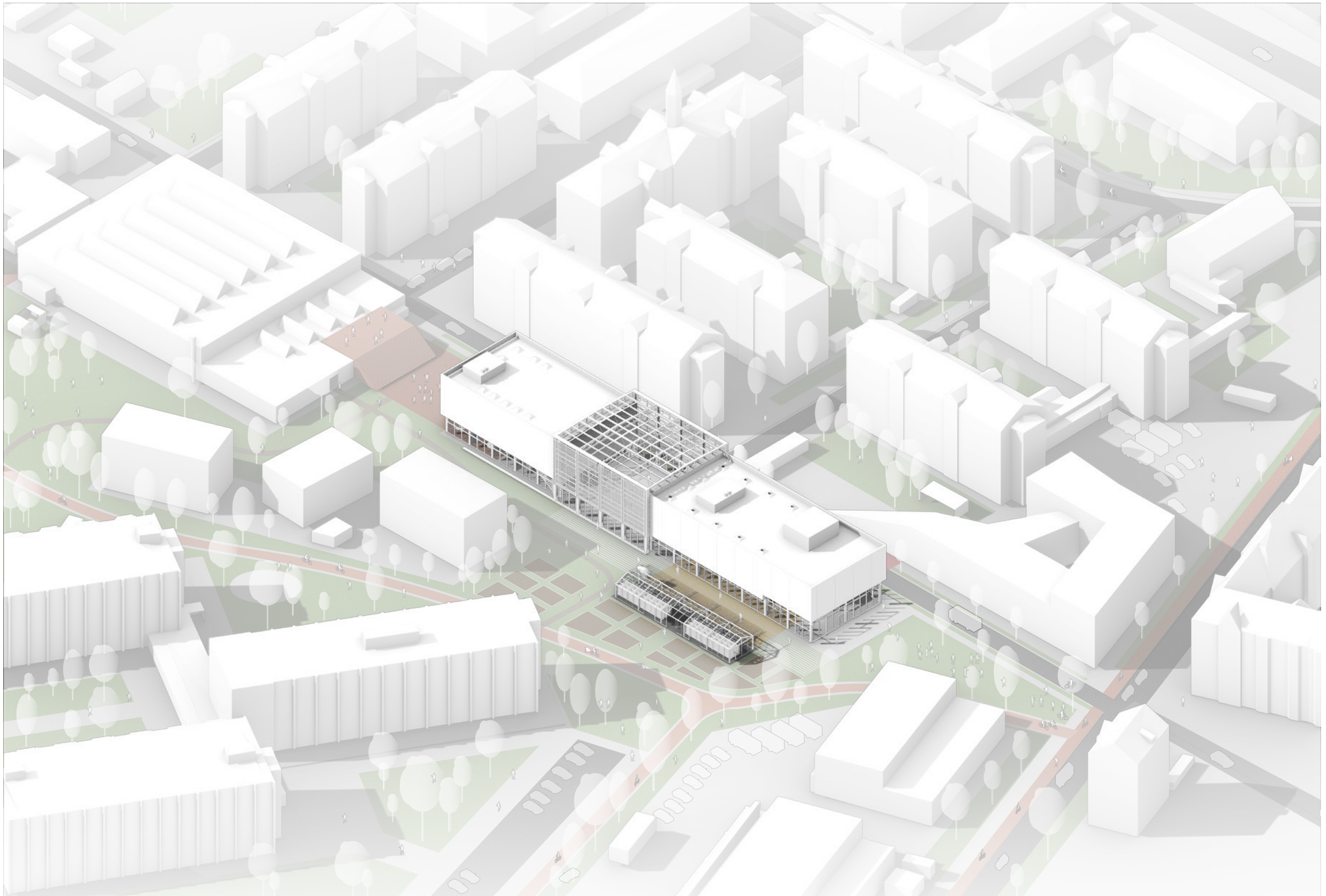


Final design documentation

From this point on i've mainly worked on immproving visuaisisation, detailing, structure and materialization. These final products will be showed in the order of large to small scale, to give an understanding of how this concept came to an conclusion from the urban idea to material expression.

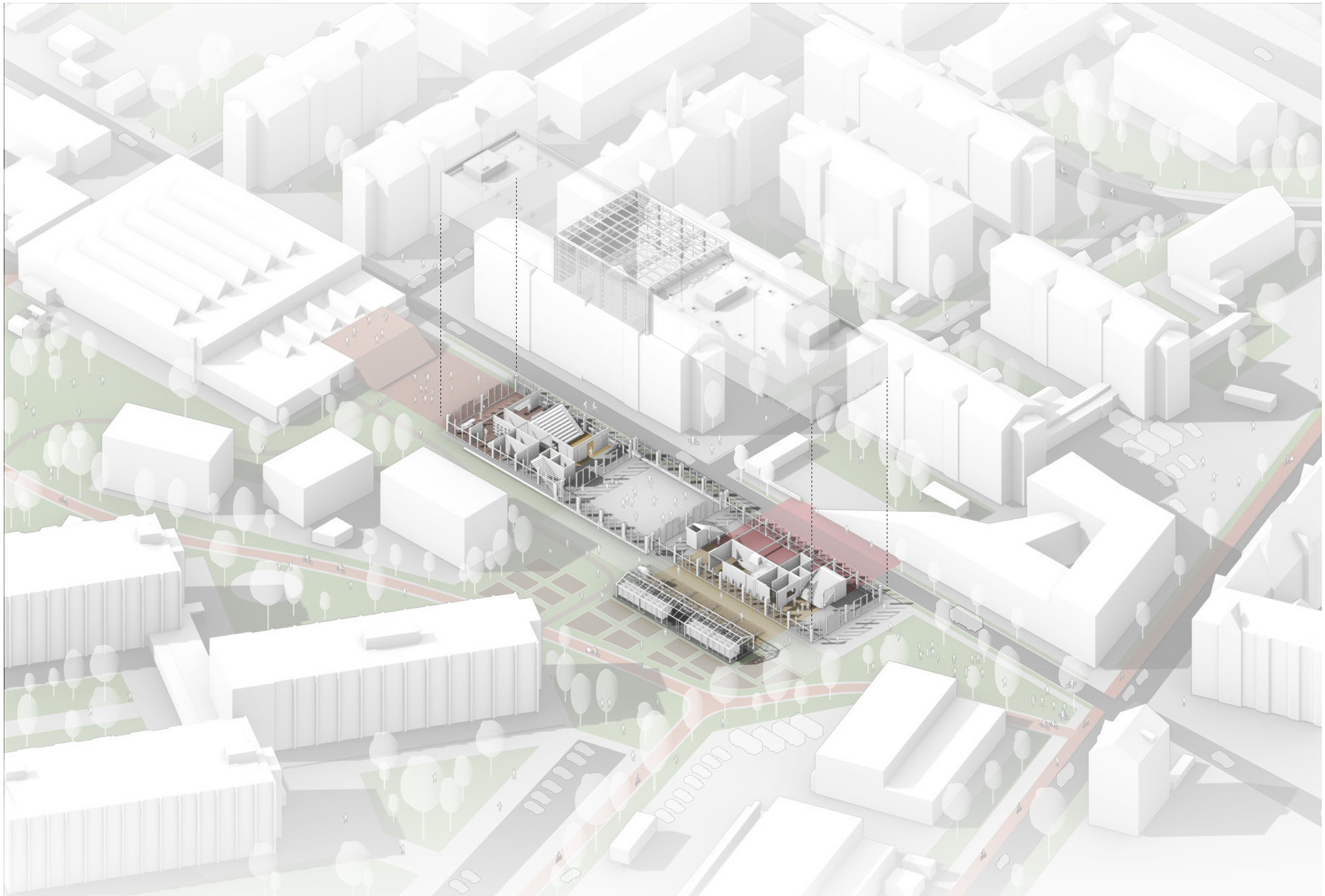
Final design documentation

City integration axo



Final design documentation

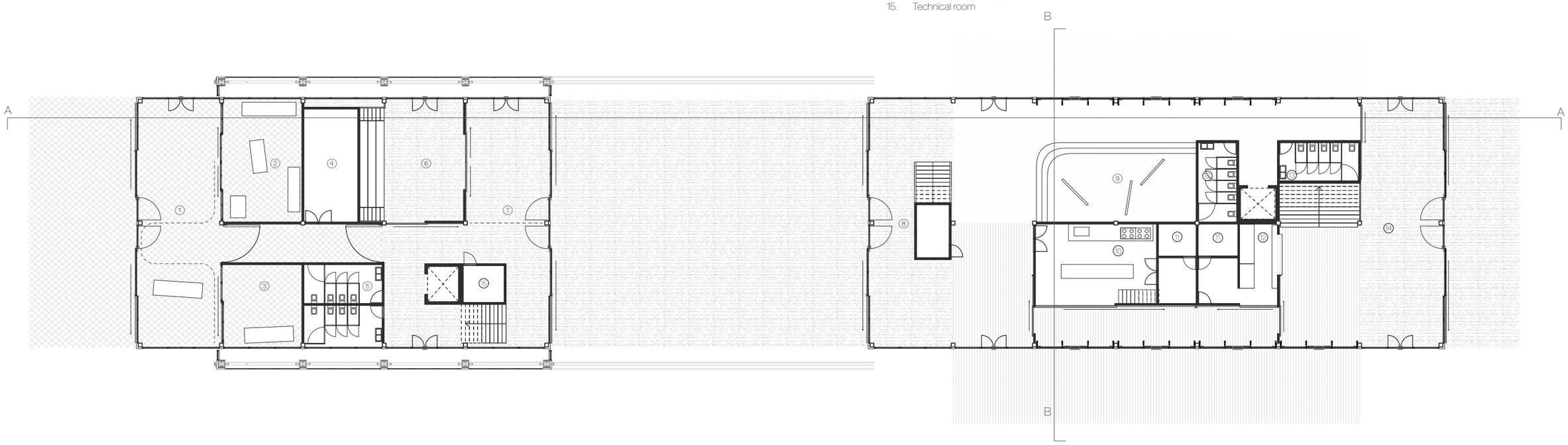
City integration exploded axo

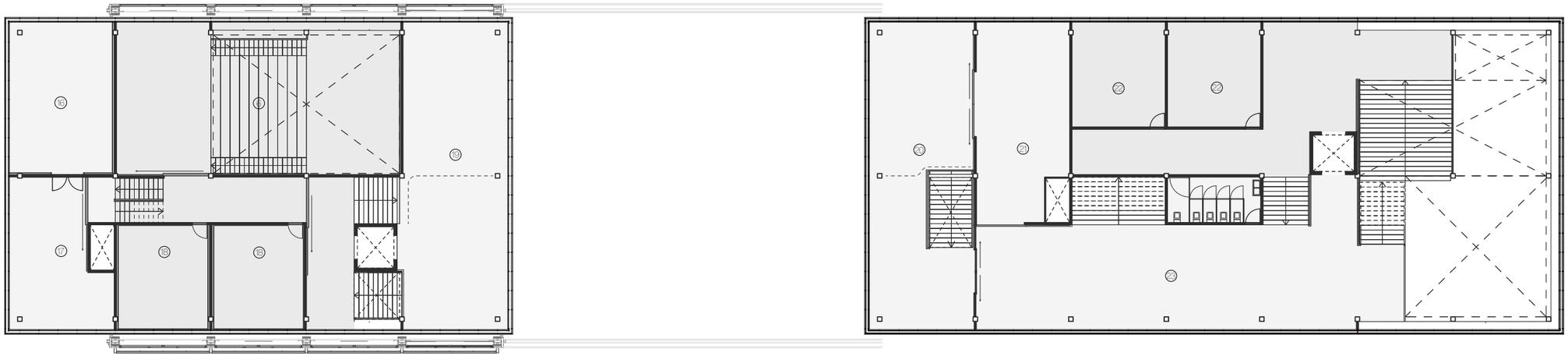


Final design documentation

Floorplans ground floor & 1st

1. Free space (workhsop)
2. Woodworking
3. Pottery
4. Storage
5. Toilets
6. Free space (lecture hall)
7. Free space
8. Free space
9. Free space (art)
10. Kitchen
11. Cold storage
12. Bar
13. Toilets
14. Free space (entrance)
15. Technical room
16. Rehearsal space
17. Free space (music)
18. Music studio's
19. Free space
20. Free space (art workshop)
21. Art workshop
22. Art studio's
23. Free space





Final design documentation

Floorplans 1st/second (split level) & roof

1. Free space (workhsop)
2. Woodworking
3. Pottery
4. Storage
5. Toilets
6. Free space (lecture hall)
7. Free space
8. Free space
9. Free space (art)
10. Kitchen
11. Cold storage
12. Bar
13. Toilets
14. Free space (entrance)
15. Technical room
16. Rehearsal space
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20. Free space (art workshop)
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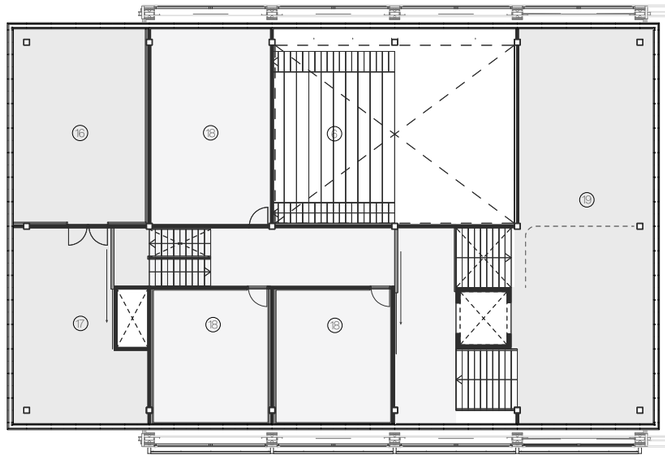
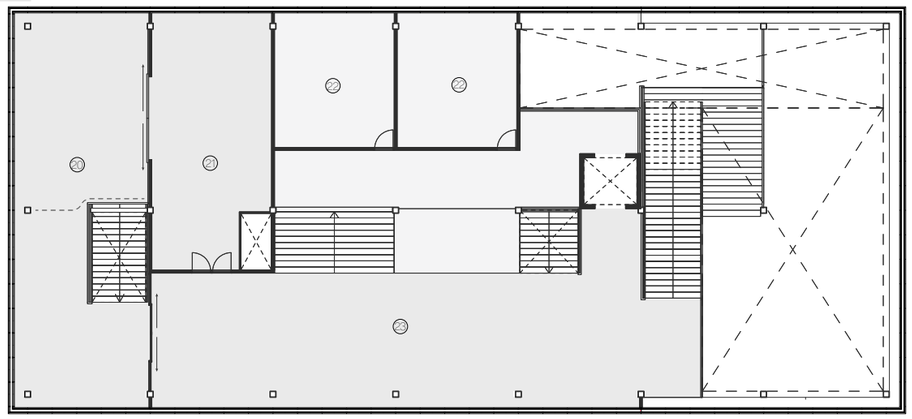
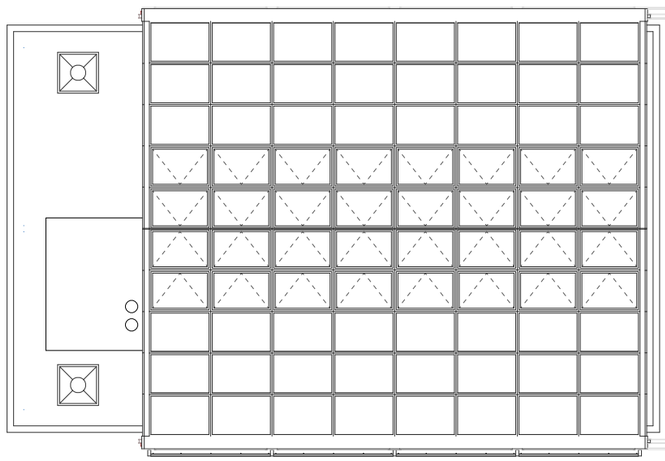
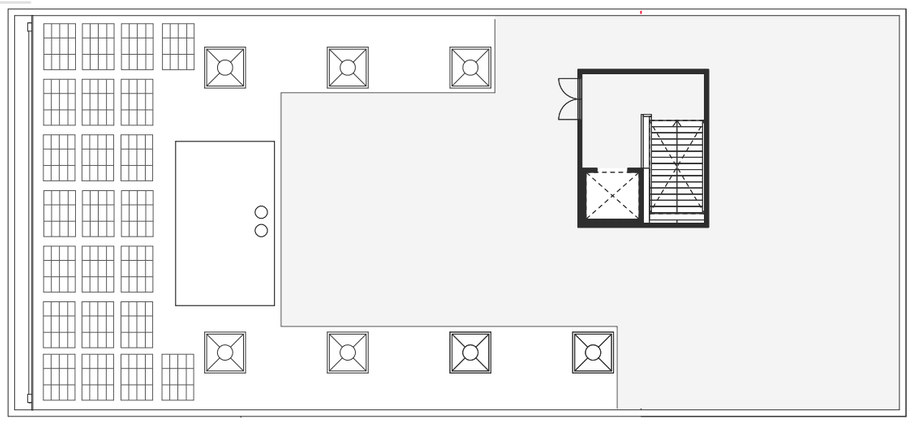
22. Art studio's
23. Free space









Final design documentation

Facade (south)

Final design documentation

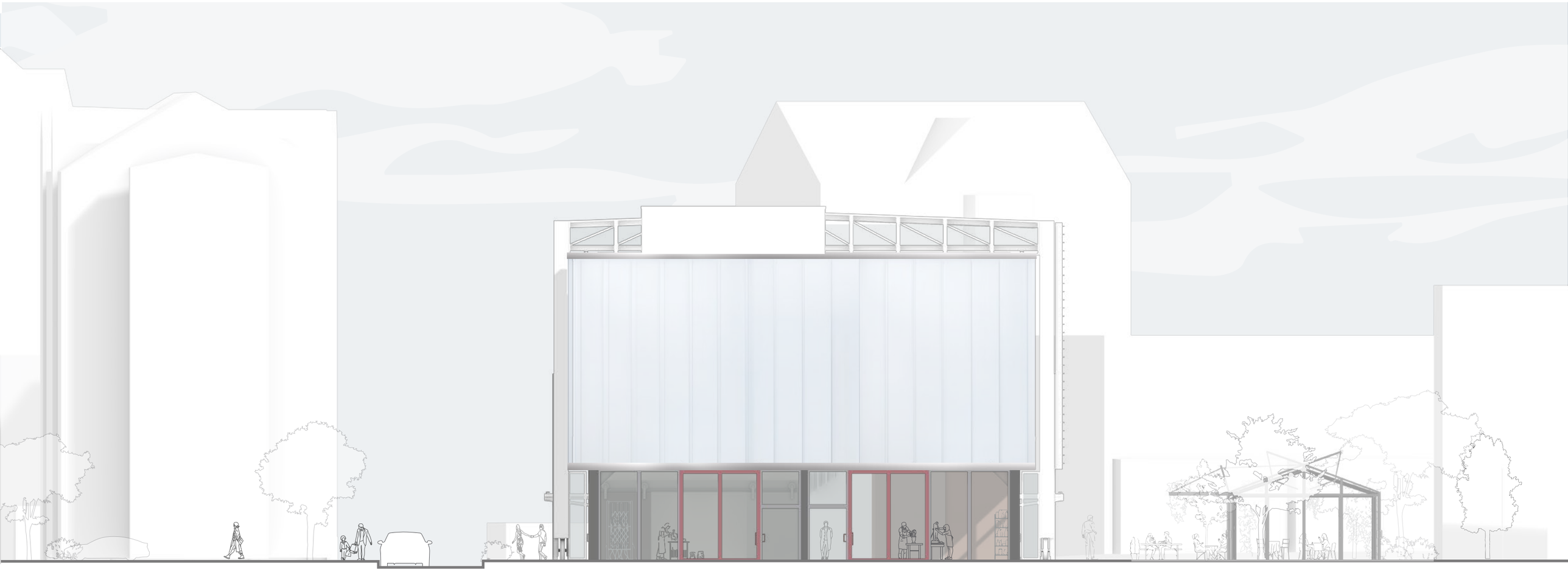
Facade (north)

Final design documentation

Facade (east)

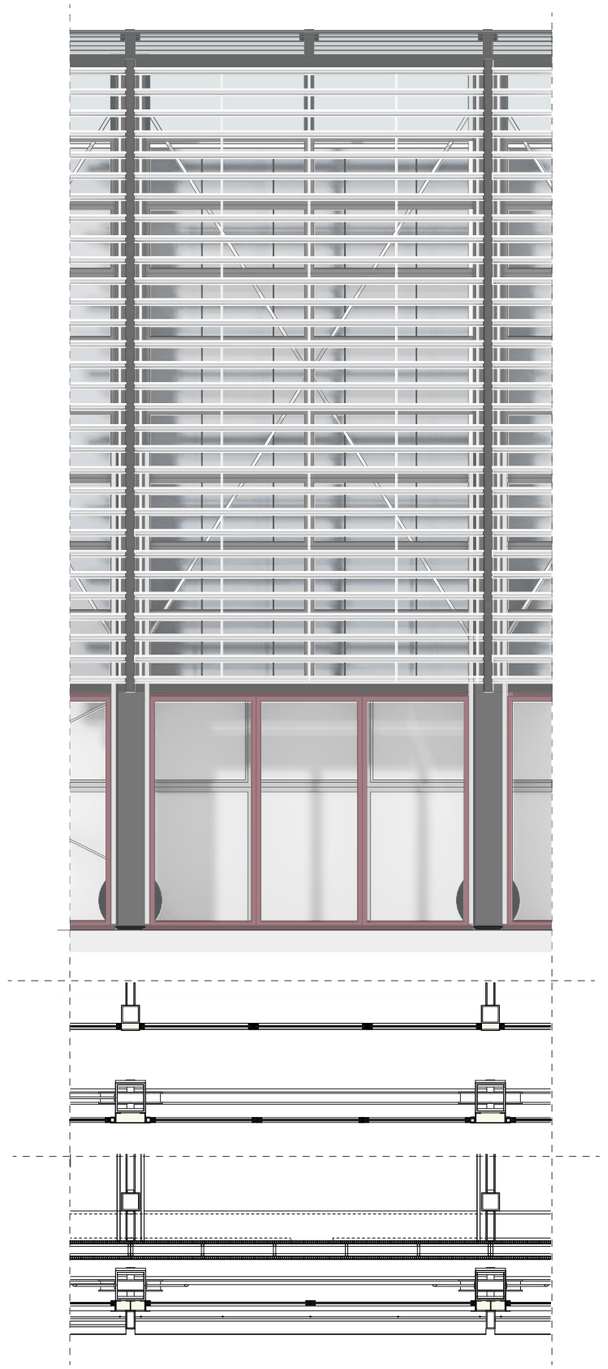
Final design documentation

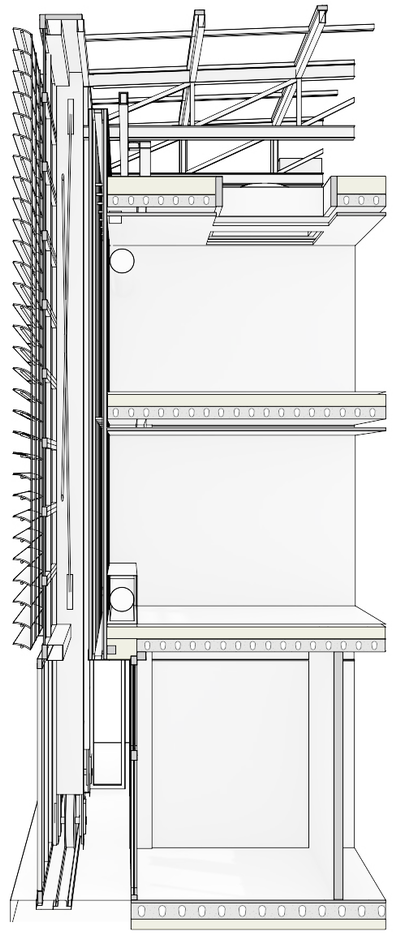
Facade (west)



Final design documentation

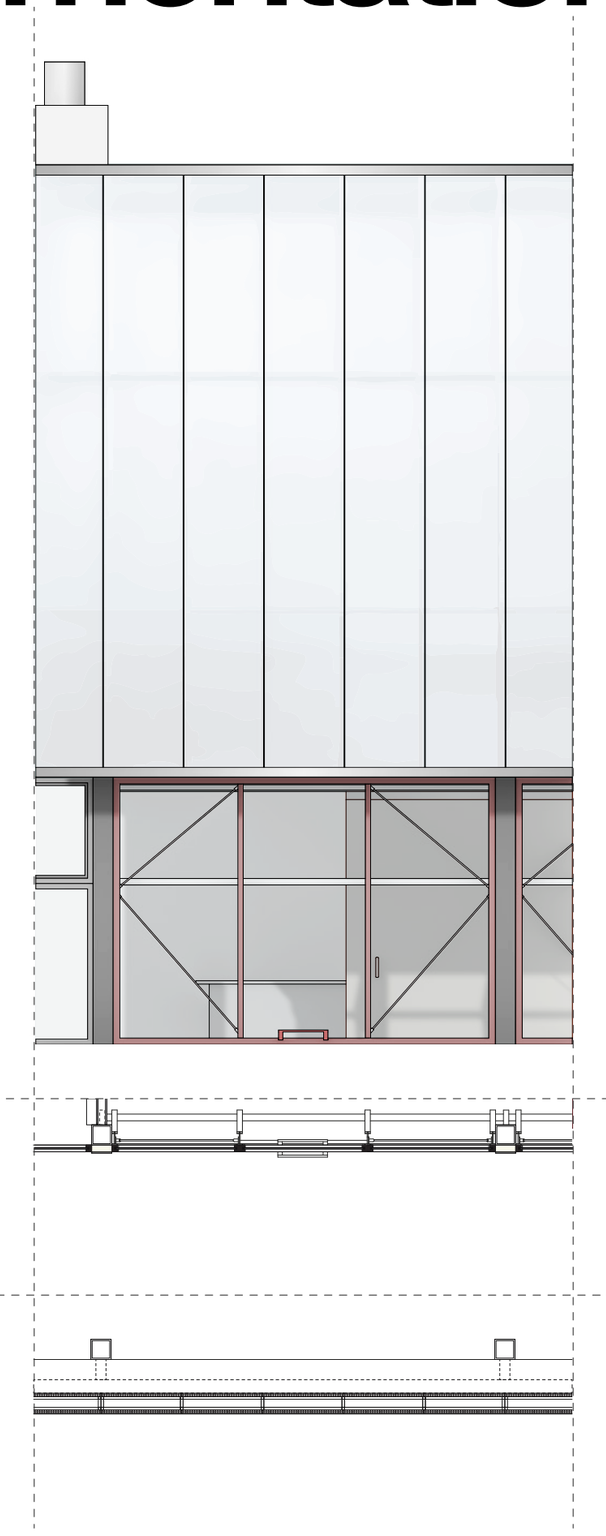
facade fragment 1

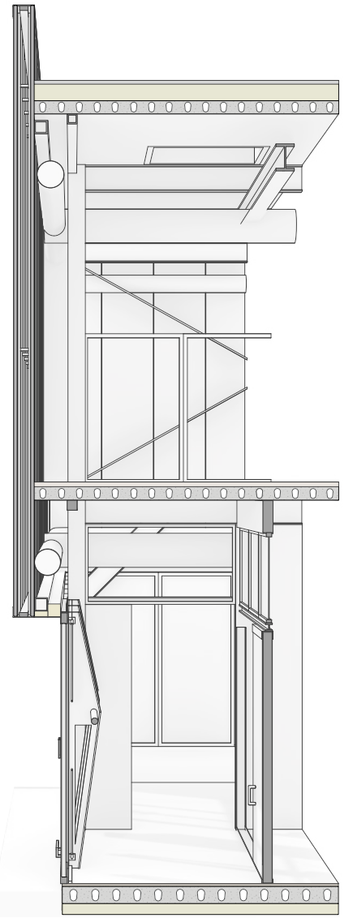




Final design documentation

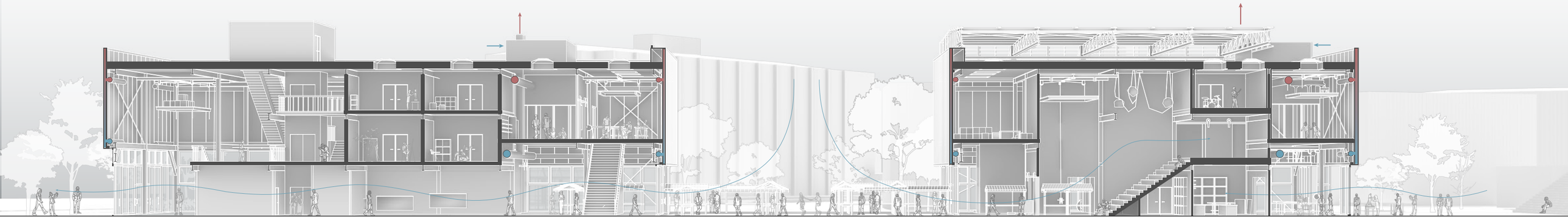
Facade fragment 2





Final design documentation

Section AA (summer)

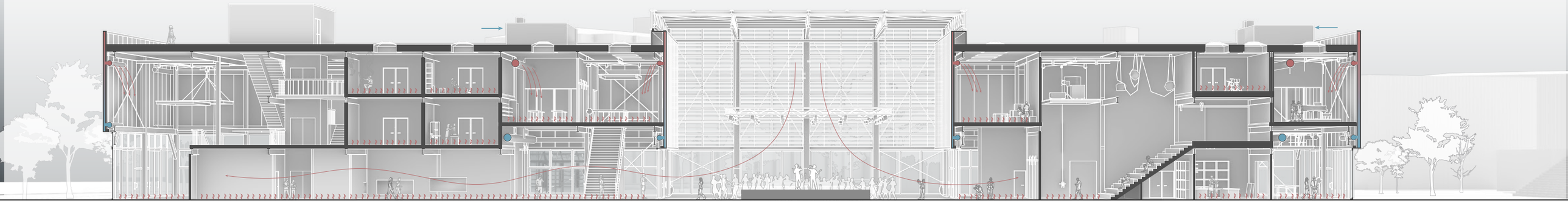


Final design documentation

Render (summer)

Final design documentation

Section AA (winter)

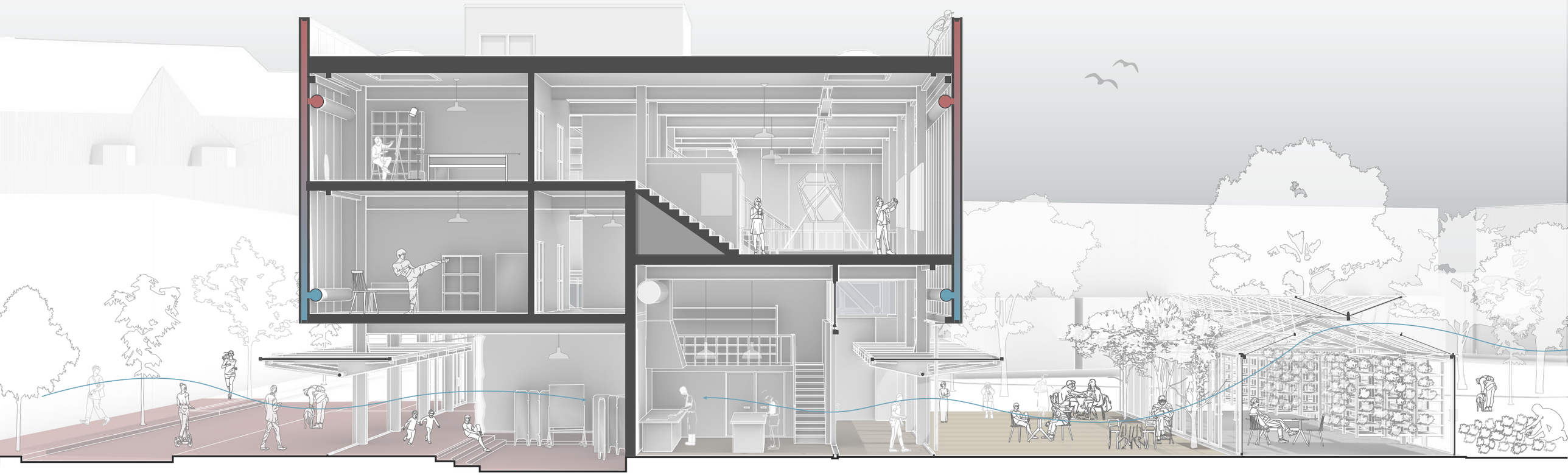


Final design documentation

Render (night)

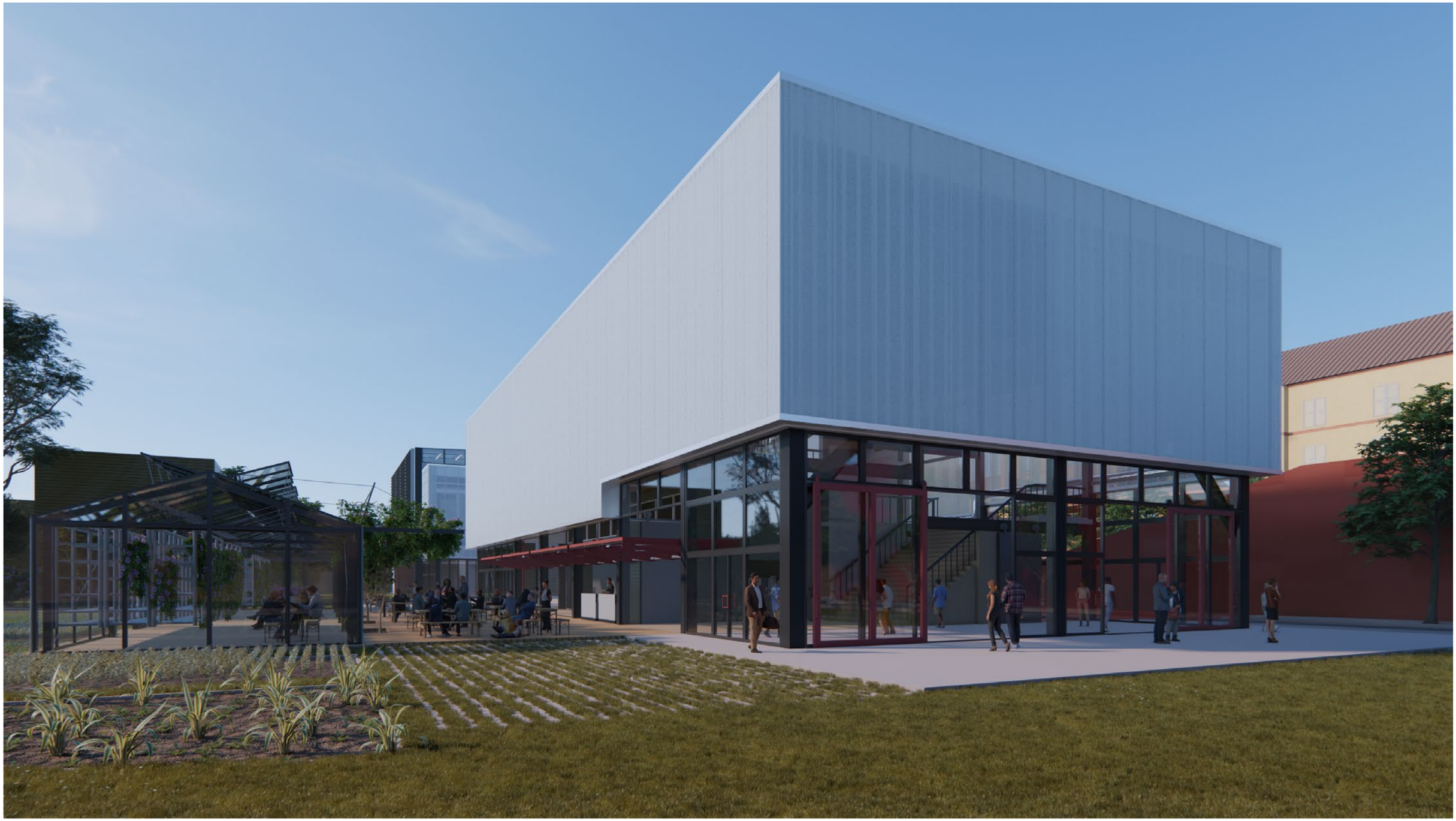
Final design documentation

Seciton BB (summer)



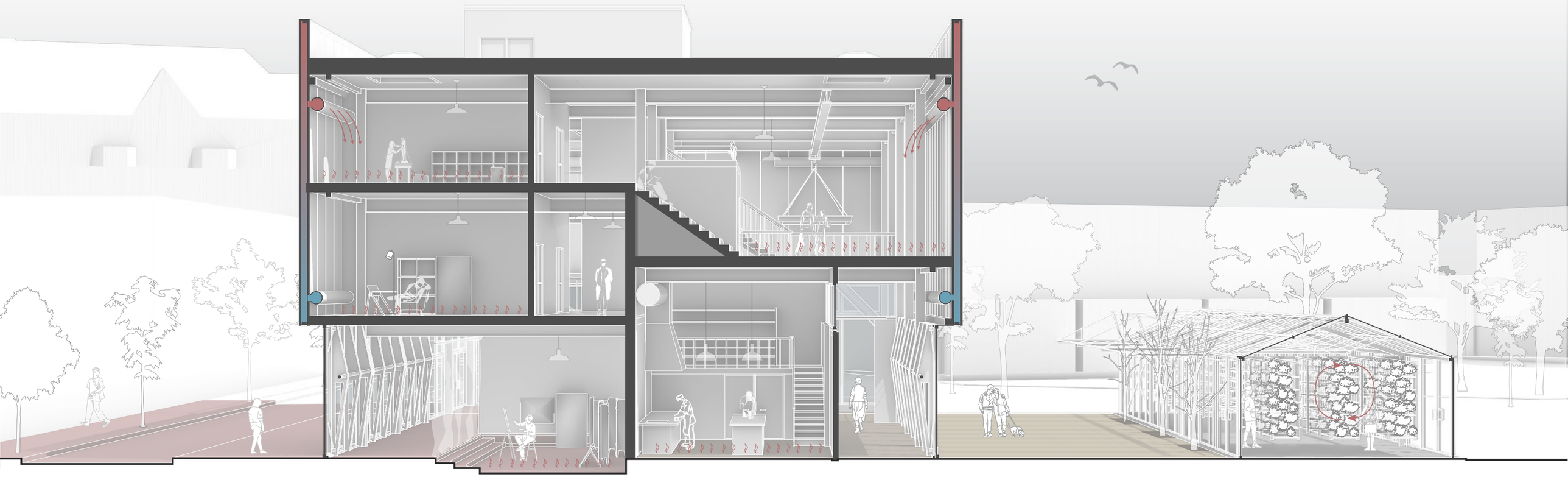
Final design documentation

Render (summer)



Final design documentation

Seciton AA (winter)



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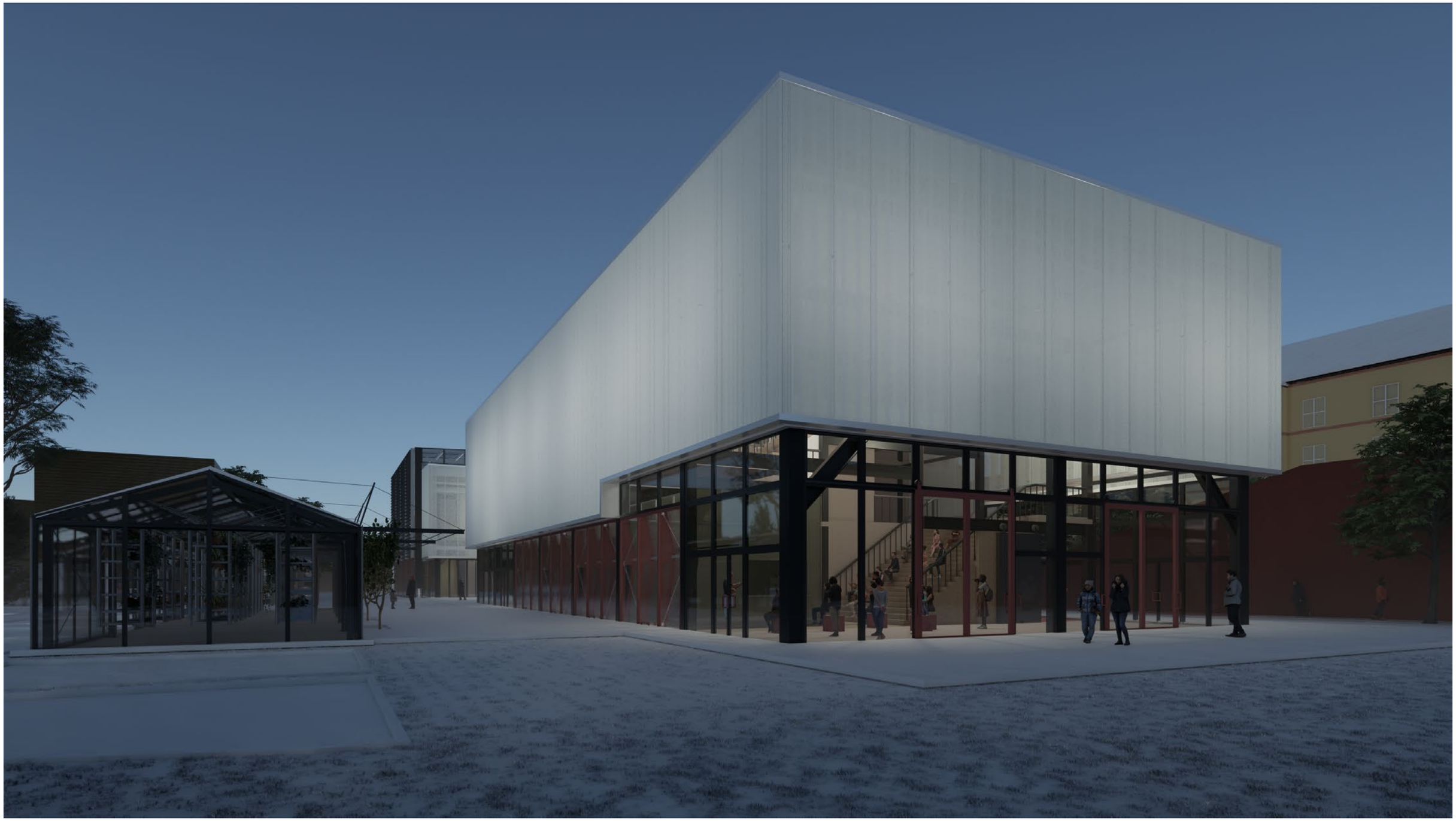
Render (winter)

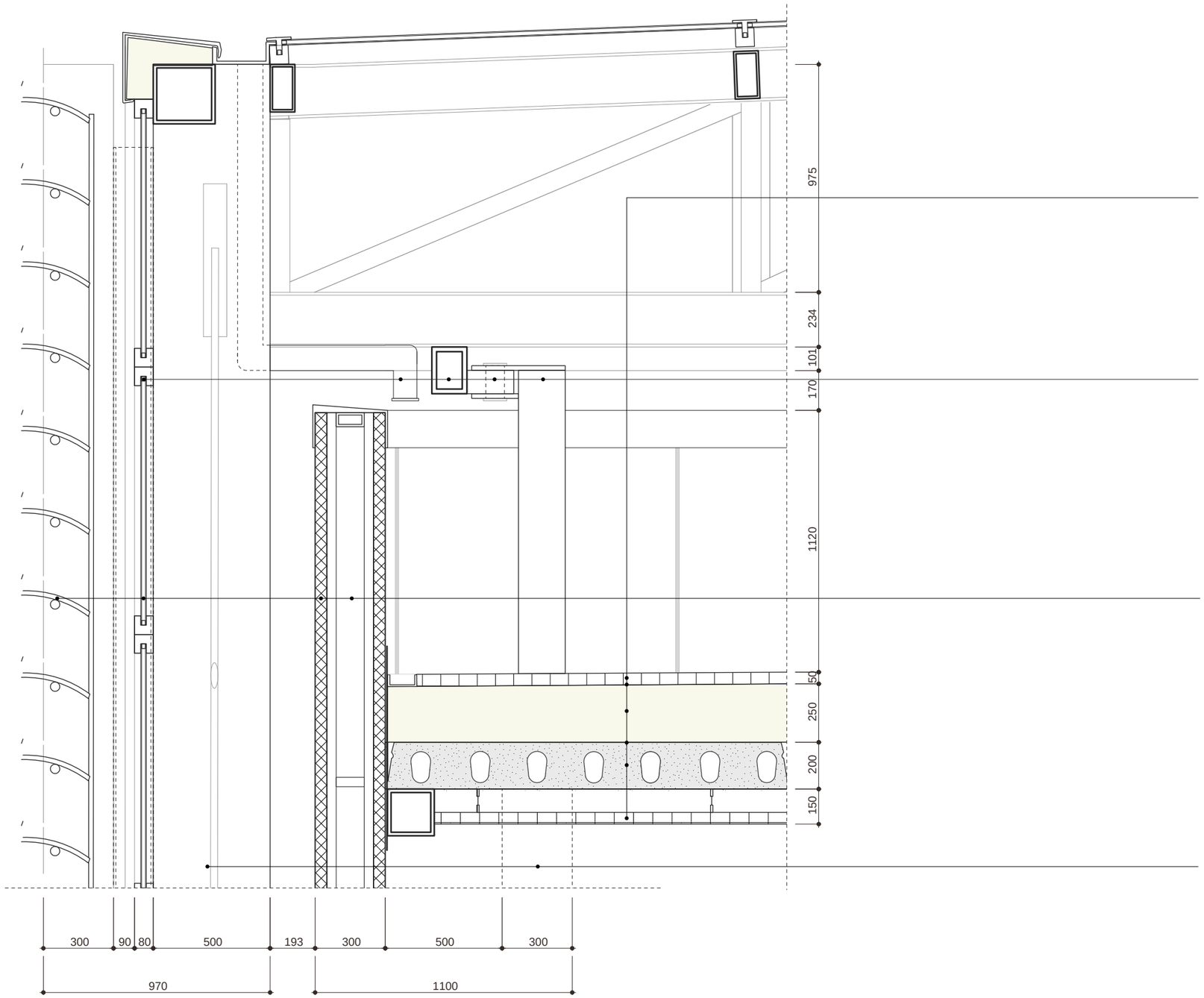


Final design documentation

Details positions

Final design documentation

Detail 1.1



50mm paving tiles
Waterproofing membrane
250mm mineral wool
Vapor control layer
200mm hollow core slab
50mm Acoustic ceiling panels

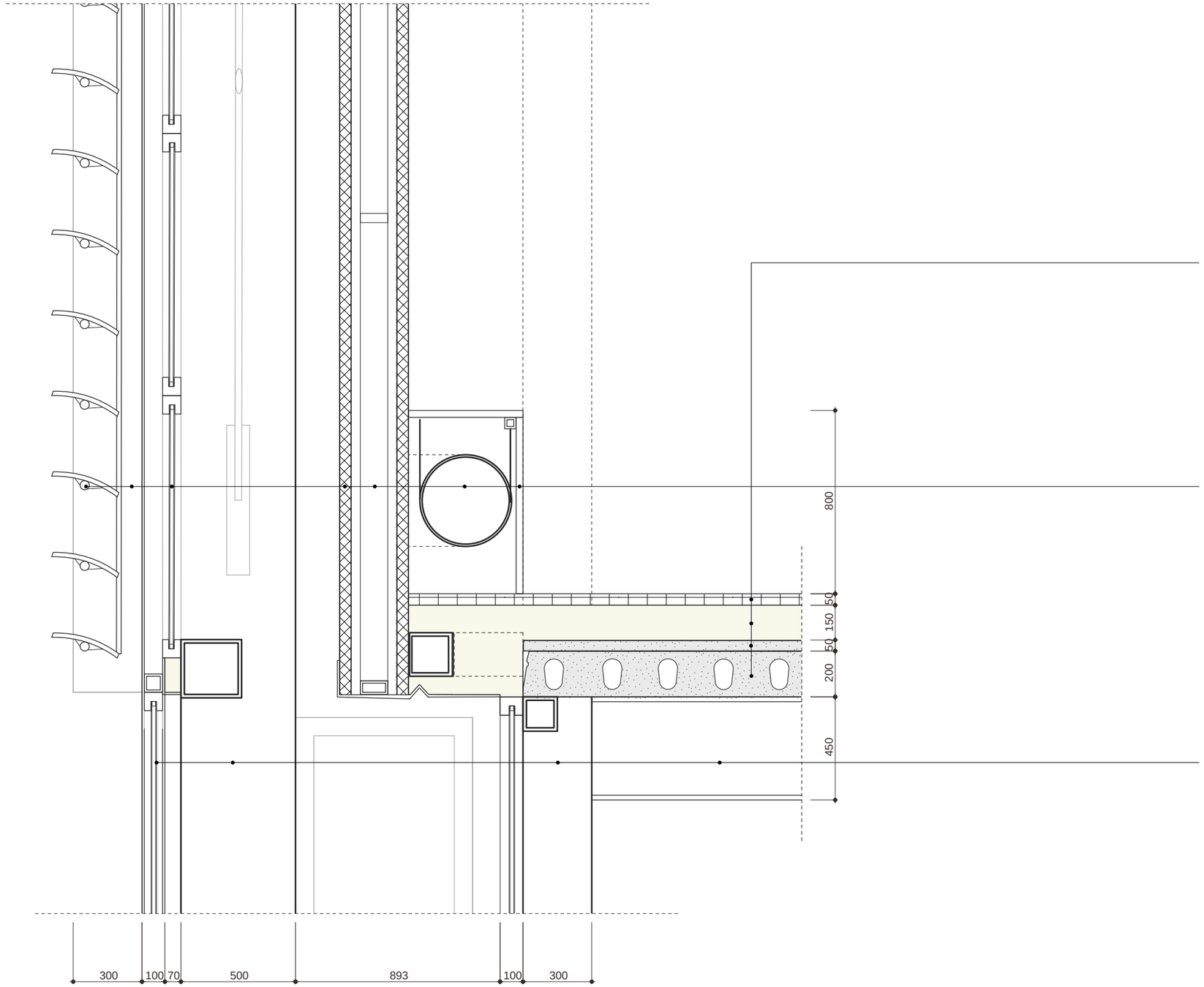
100mm Aluminium window frame
Drainage pipe
150mm Connective beam
200mm wheel
200mm structural stabilization connection

300mm Sun-shading louvres
24 mm HR++ double glazing
2x 50mm LUMIRA™ Aerogel facade panels
200mm Air cavity with steel subframe

HEB 500 (column)
HEA 300 (column)

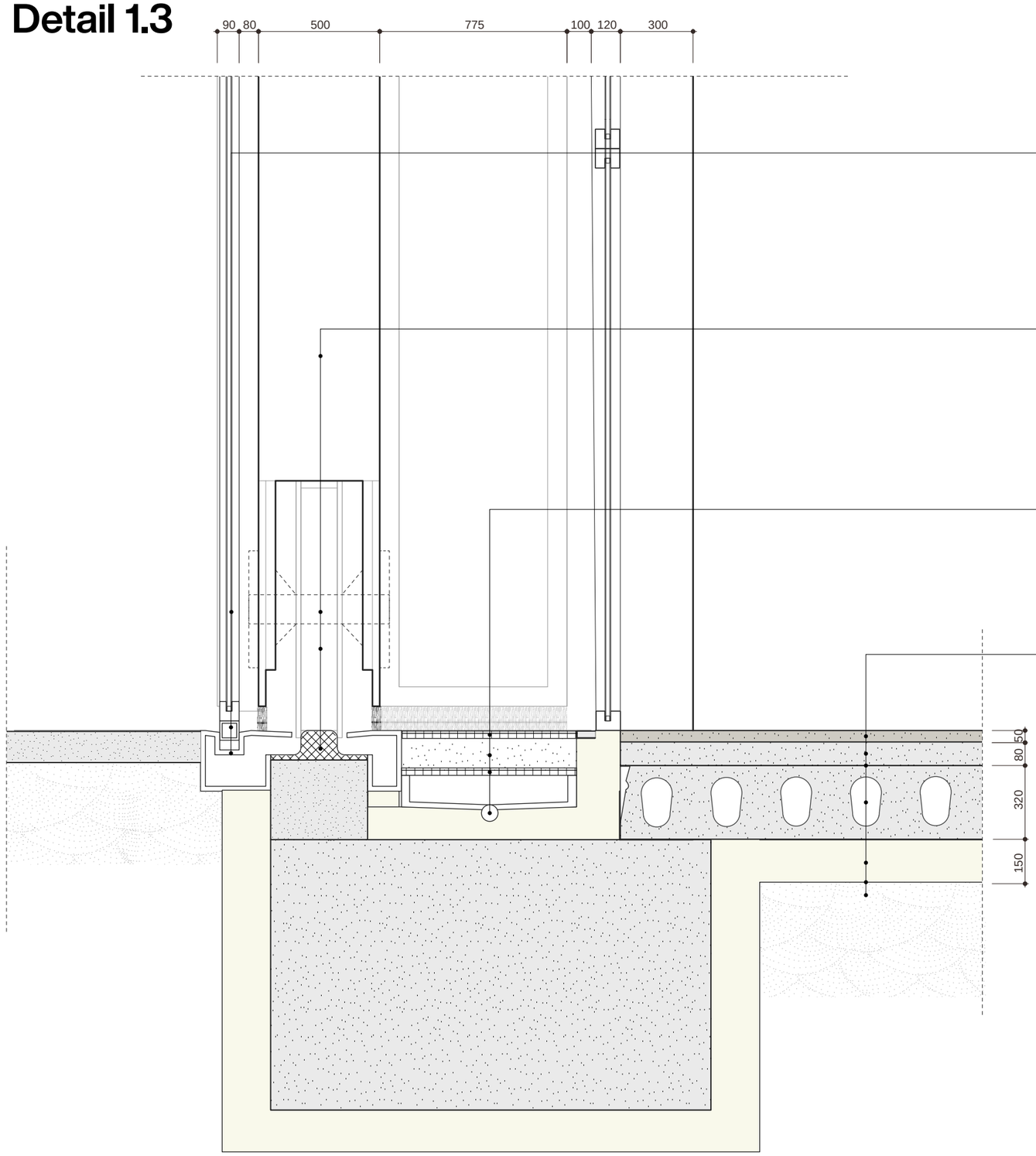
Final design documentation

Detail 1.2



Final design documentation

Detail 1.3



HR ++ double glazing
80mm Sliding Facade panel
Vertical panel docking rail

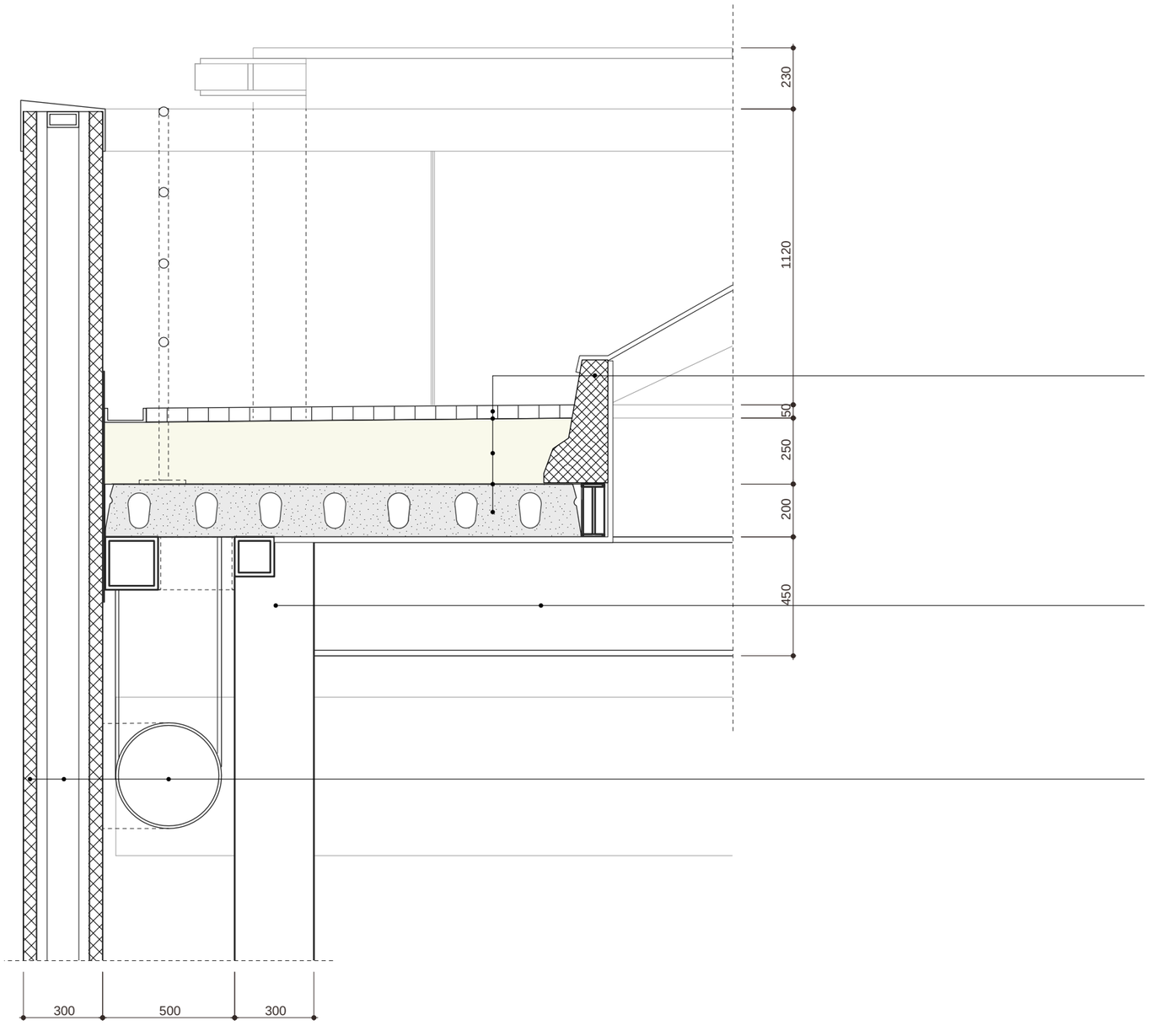
Heavy duty rail track
1000mm industrial crane wheel
120mm bolt
HEB 500

Perforated paving stone
Gravel drainage layer
Perforated drainage cover
Drainage system

50mm Pigmeted concrete
80mm Concrete topping slab with underfloor heating
320mm Hollow core slab
150mm Mineral wool
Damp-proof membrane
300mm Compacted sand

Final design documentation

Detail 2.1



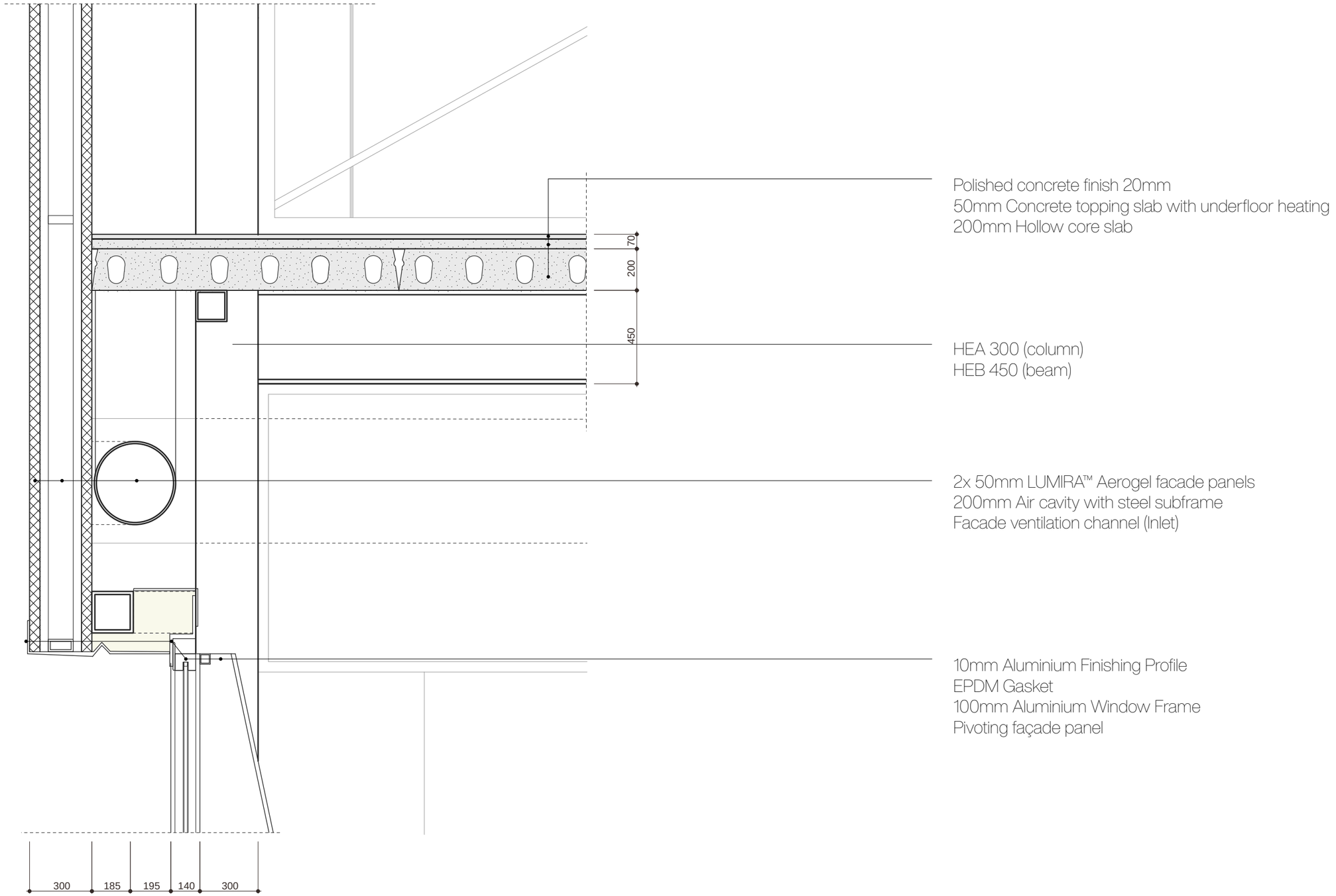
Roof window
50mm paving tiles
Waterproofing membrane
250mm mineral wool
Vapor control layer
200mm hollow core slab

HEA 300 (column)
HEB 450 (beam)

2x 50mm LUMIRA™ aerogel facade panels
200mm air cavity with steel subframe
Facade ventilation channel (exhaust)

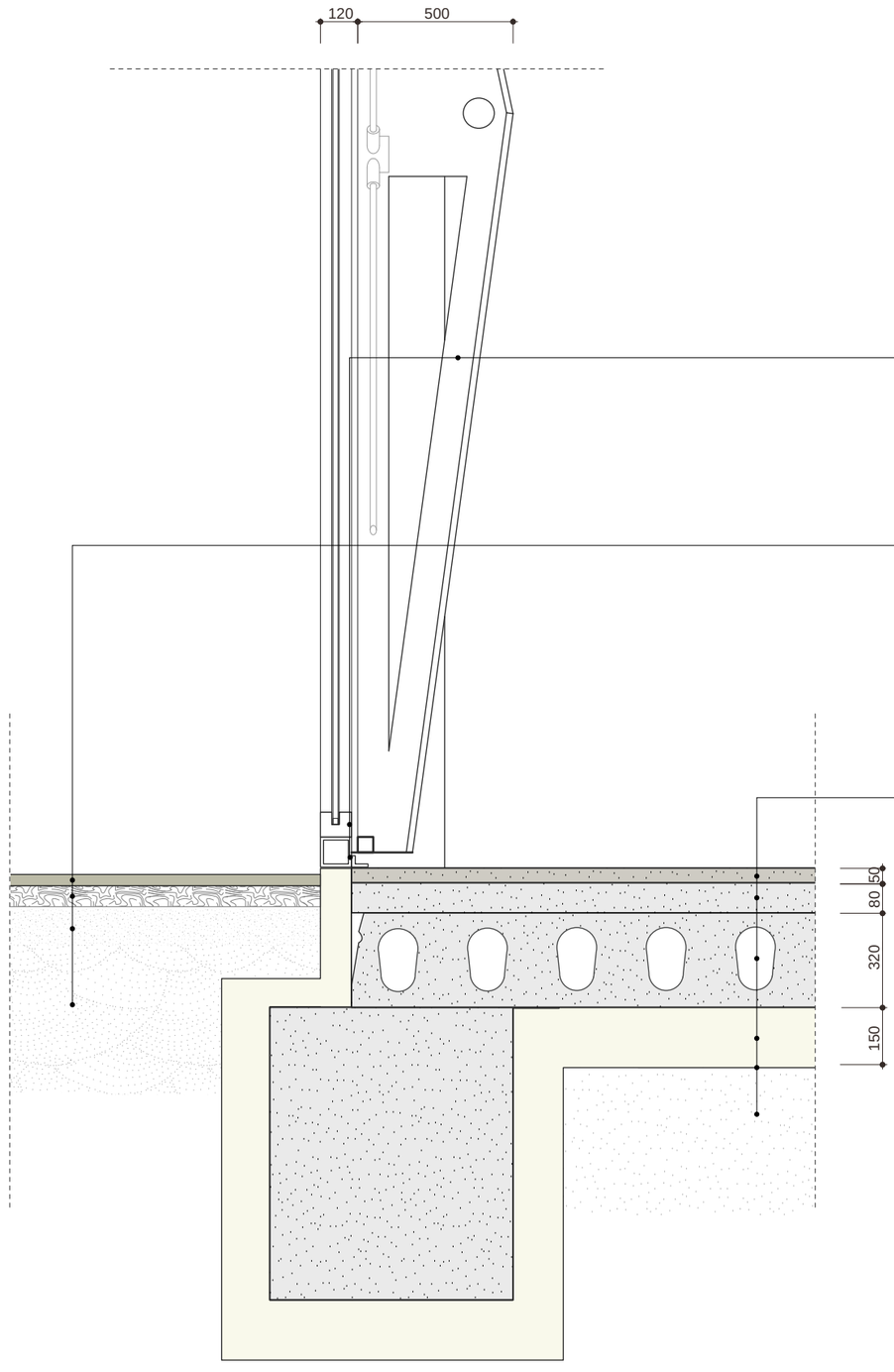
Final design documentation

Detail 2.2



Final design documentation

Detail 2.3



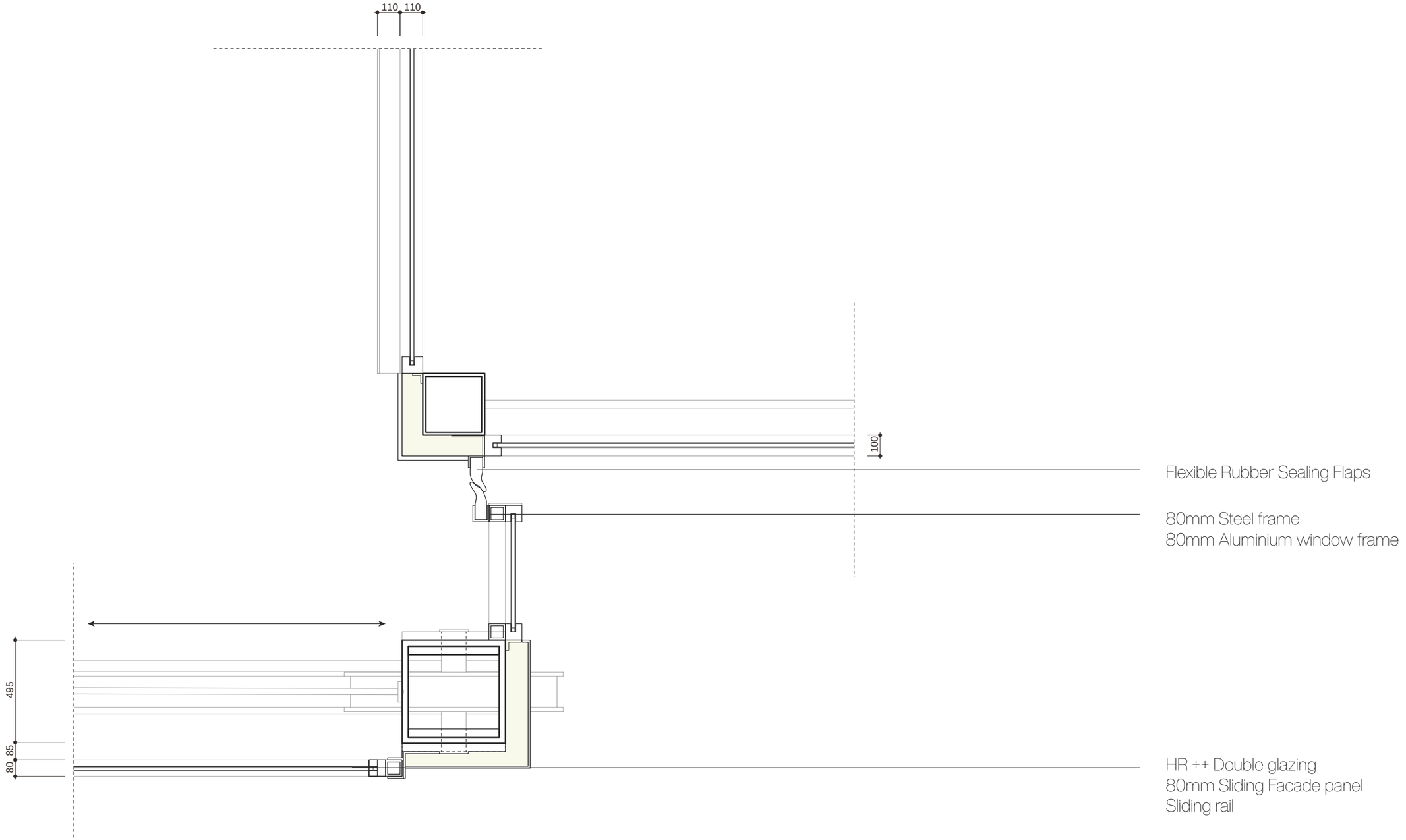
EPDM Gasket
100mm Aluminium Window Frame
Pivoting façade panel

40 mm Wooden decking planks
50 mm Joists
200mm Gravel
200mm Compacted sand

50mm Pigmeted concrete
80mm Concrete topping slab with underfloor heating
320mm Hollow core slab
150mm Mineral wool
Damp-proof membrane
300mm Compacted sand

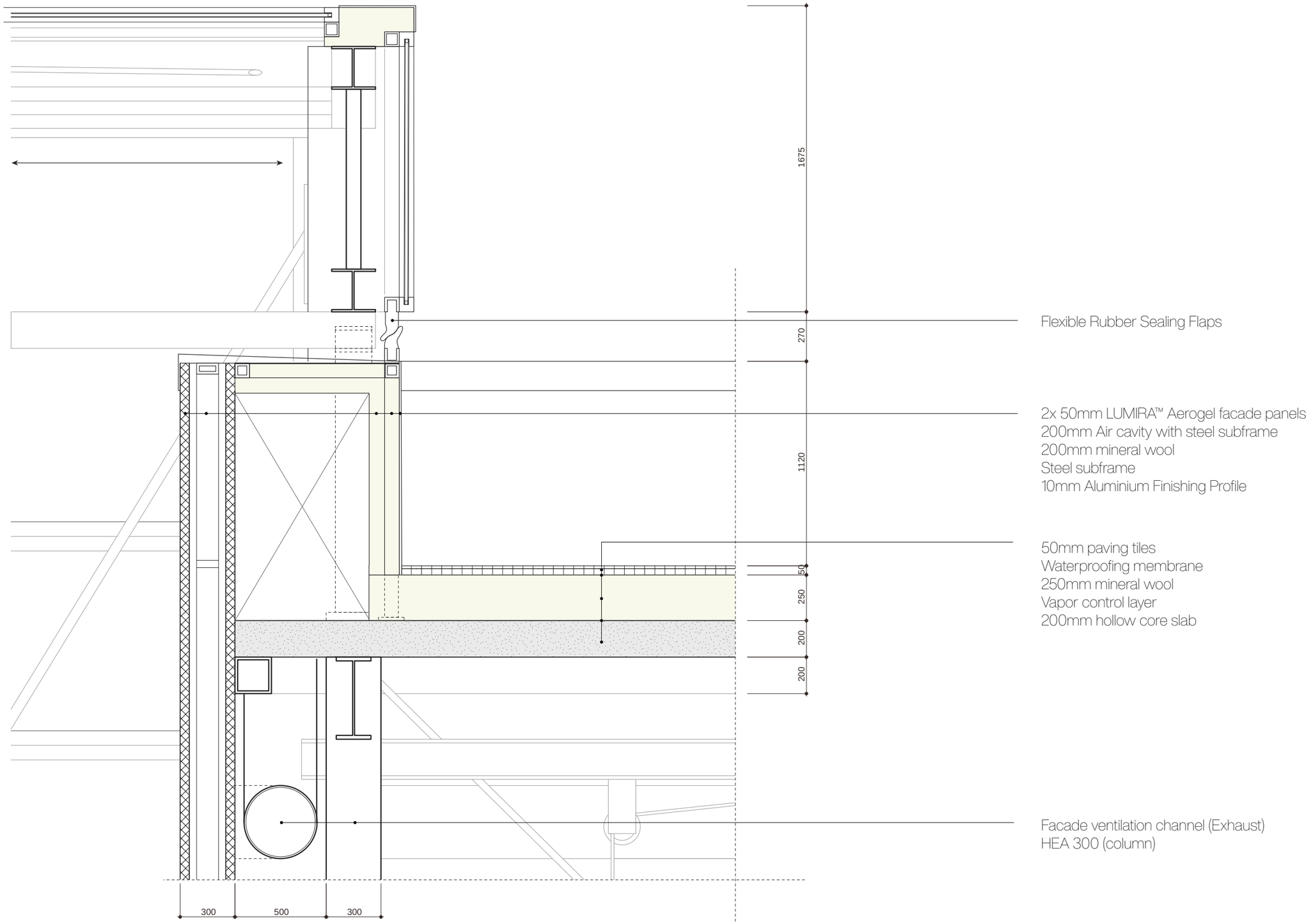
Final design documentation

Detail 3.1



Final design documentation

Detail 3.2



P4 to P5 product development

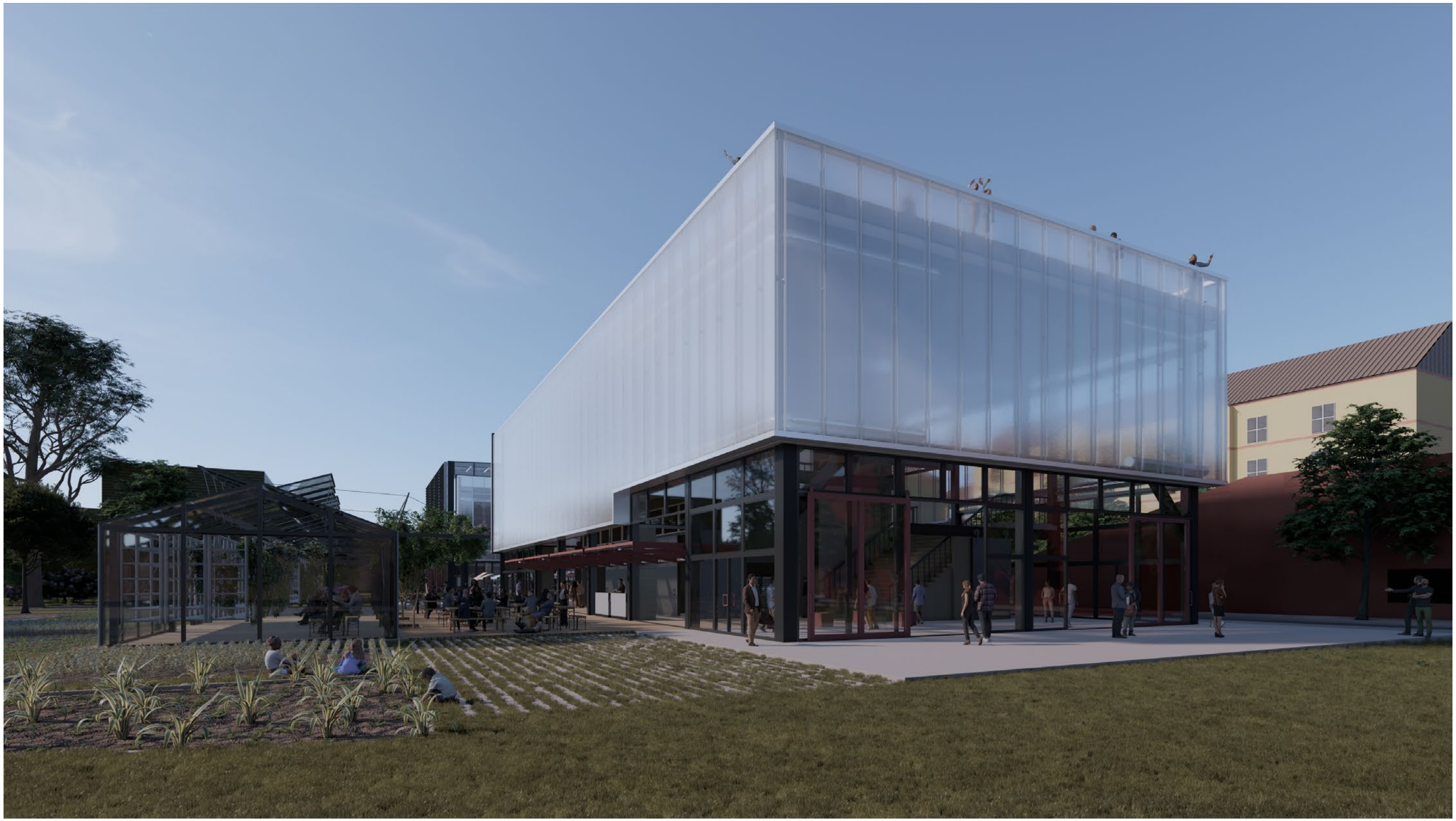
Facade transparency change, new renders

P4 to P5 product development

Facade transparency change, new renders

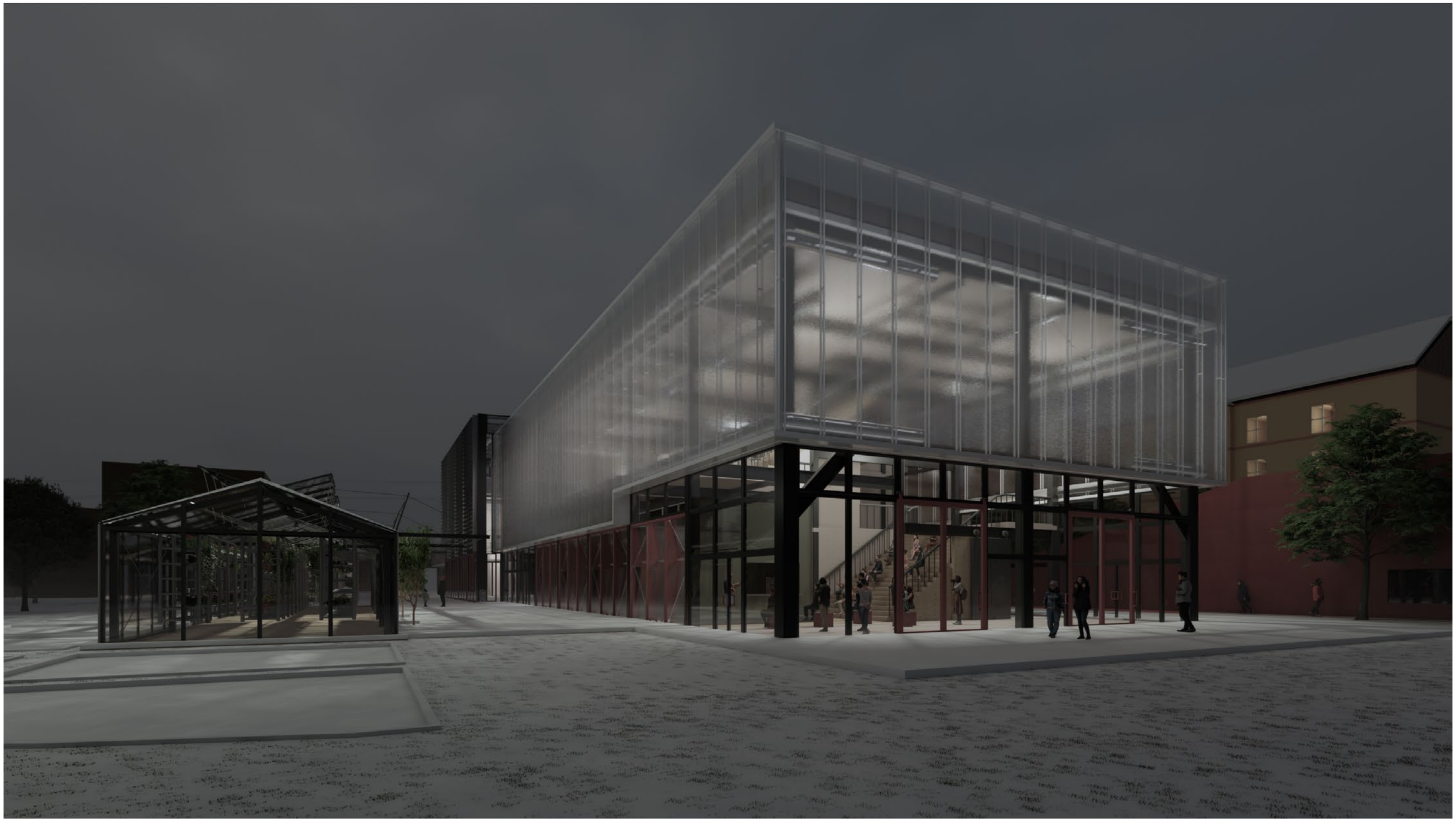
P4 to P5 product development

Facade transparency change, new renders



P4 to P5 product development

Facade transparency change, new renders

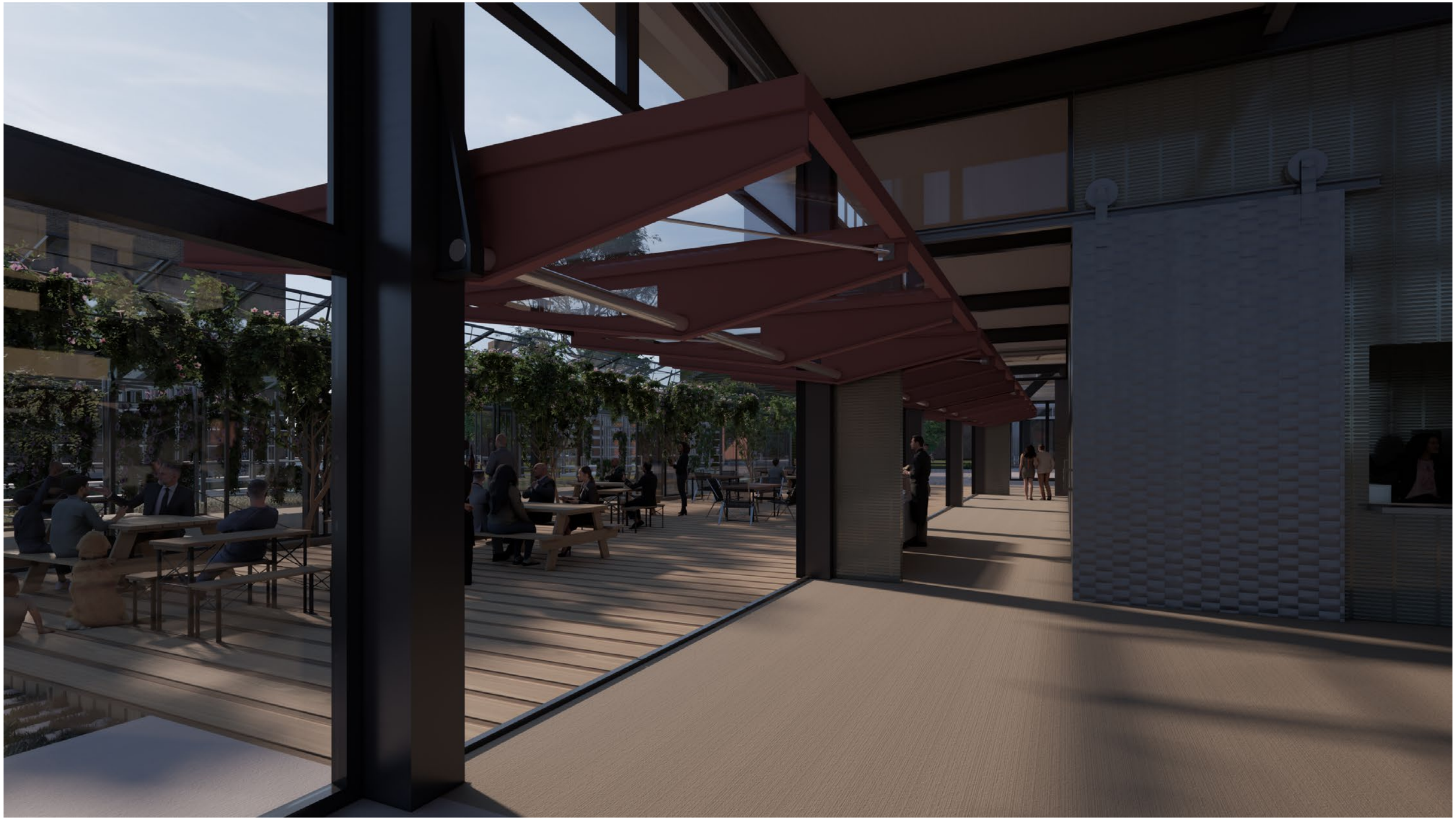


P4 to P5 product development

Additional renders

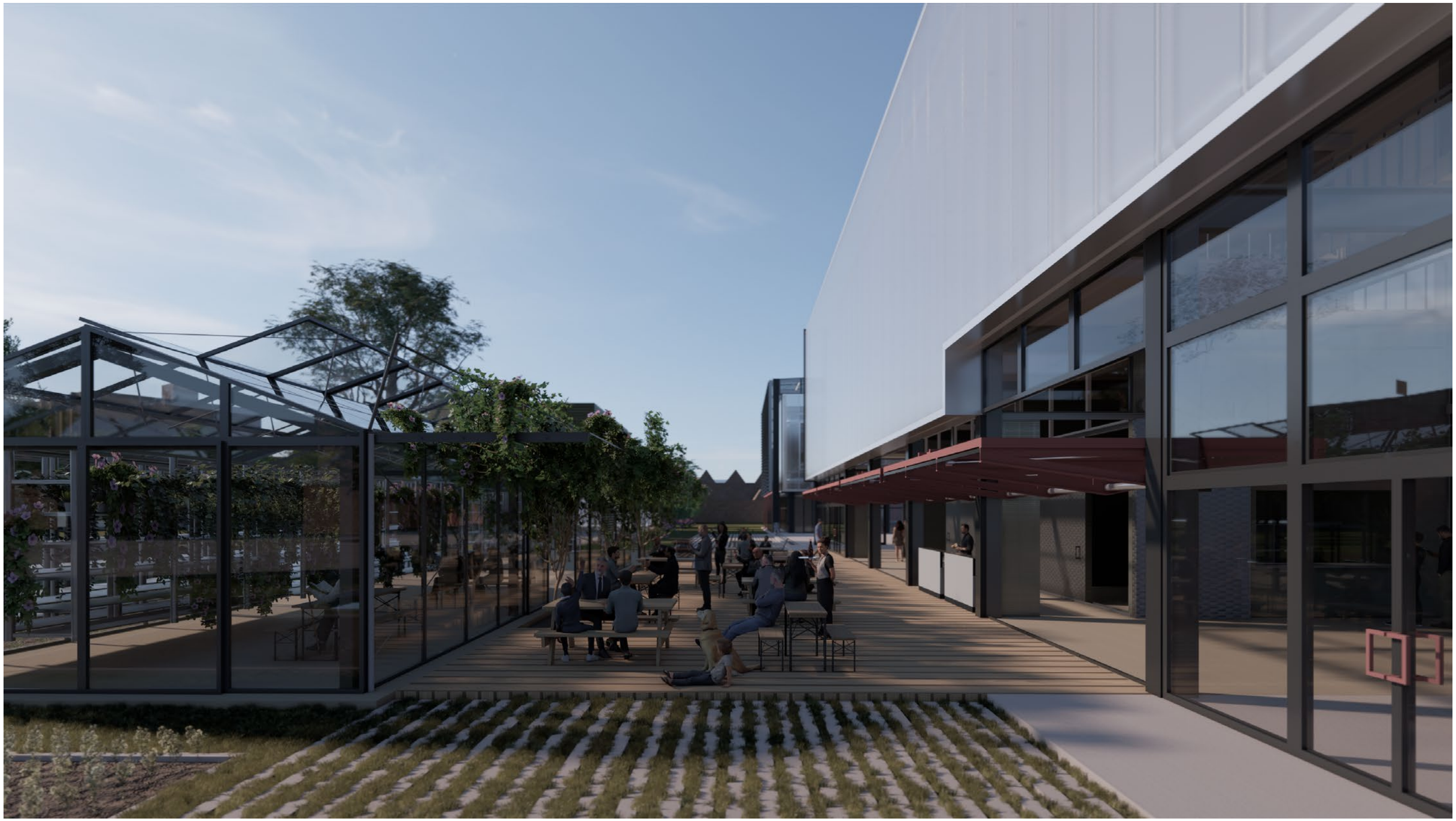
P4 to P5 product development

Additional renders



P4 to P5 product development

Additional renders



P4 to P5 product development

Additional renders

P4 to P5 product development

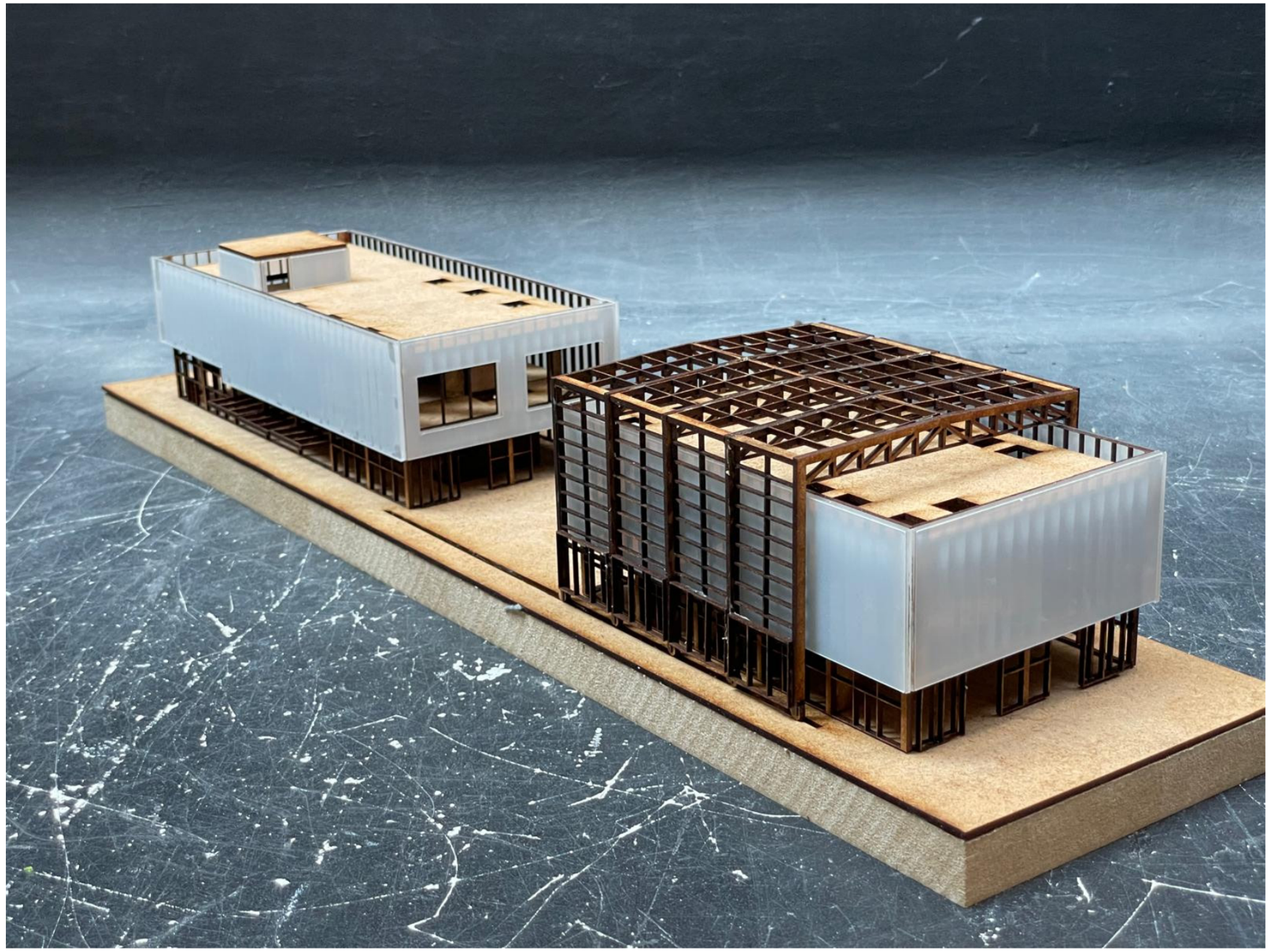
Additional renders

P4 to P5 product development

Additional renders

P4 to P5 product development

1:200 scale model



P4 to P5 product development

1:200 scale model

Final reflection

Puk de Graaf - 5047455
AR3AP100 Public Building Graduation Studio 2024-25
12-05 -2025

Tutors:
PD: Henk Bultstra
TD: Sien van Dam
TBD: Florian Eckardt

Introduction

This graduation project aims to create a public condenser in the neighbourhood of Sundholm, Copenhagen. In my eyes, a public condenser means a public building that addresses its context by fitting to the needs of its surroundings, with the goal of bringing positive change or improvement. It should act as a buffer in several realms. It should improve its social context through its program, and its spatial context through its form and position.

By looking at the context as a social system, a programmatic system, and a spatial system which are all connected, the public condenser should be able to fit within the system, and where possible, try to improve the connections between the different realms that comprise it. By providing a program that fits the social structure, a position that fits the spatial structure, and an identity that fits the context, it should be able to create a positive impact on its surrounding environment.

And most importantly, it should be able to withstand the test of time. As a designer, you work with the current context and try to address all the realms in order to fit the building into the existing system. But this system changes over time, society changes, the target group changes, the spatial context shifts, and the climate evolves. So to design a public condenser that maintains its positive impact, it must be adaptable to contextual changes, on a social level, a spatial level, and a climate level.

Sundholm is home to a very diverse community and hosts several social facilities. This is rooted in its history, where Sundholm used to function as a gated institution designed for vulnerable people like the homeless, the mentally ill, and criminals. While the walls surrounding the neighbourhood have been removed and its function as a gated institution has disappeared, the neighbourhood still seems stuck in its past, lacking accessibility and connection to its surrounding social context.

After visiting Sundholm and talking to residents, we concluded that the neighbourhood still faces many problems. Mainly social problems like drug abuse, homelessness, and financial struggles, combined with its lack of connection to the wider city and its bad reputation, causing Sundholm to feel isolated from its surroundings. These social issues are also enhanced by its spatial structure, where once there were walls, now there are wide roads framing the neighbourhood, cutting it off and limiting access throughout.

Initially, I was shocked by the current state of the neighbourhood and thought to myself: how can a public condenser ever solve problems like these? I didn't feel like it was my role as a designer to intervene in such a major issue. But after reflecting on my position as a designer, I realized that even by making a small impact, a change of narrative, a slight push in the right direction, the public condenser could contribute to Sundholm's future.

Sundholm's diverse functions and users

Process

A public condenser should bring positive change to its social and spatial context. In a neighbourhood like Sundholm, where the social context is complex and diverse, the program should respond to current issues and be inclusive. One of the root causes behind many of the problems here, like drug abuse and homelessness, is financial struggle and a lack of purpose. That's why I believe that providing a program that helps people earn money and find meaning could be a strong starting point in shifting the neighbourhood's narrative.

I developed a program based on diverse crafting functions—creating a space where people can learn crafts and share them through markets, exhibitions, and performances. This concept led to the idea of a transformative space, since the sharing functions (like markets or performances) are temporary and the same spaces can also be used for crafting. I was initially inspired by a photo series of a ping-pong table, where the object was shown in various social settings. The table's use changed depending on the people using it. In a way, the ping-pong table functioned as a public condenser, it adapted to the needs of its users, improving its social resilience.

I started out with the research question: How can I intentionally design a building as an ambiguous object, so that the program is shaped by the users themselves? The idea was to give ownership to the users and create a building that could adapt to changing social contexts. Eventually, I took a broader approach, exploring other strategies to achieve this social resilience, not just focusing on the social realm, but also on the spatial and environmental realms.

This led to the final research question that defined my project: How can public buildings be designed to optimize social and functional resilience through flexible design strategies?

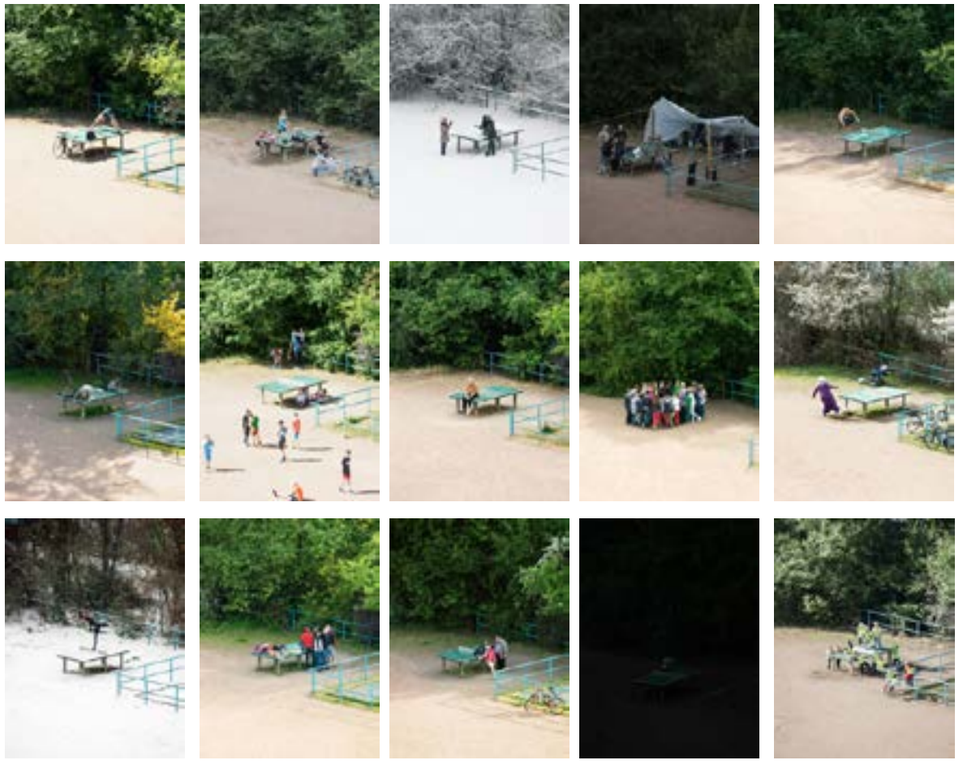
The goal was to define and implement design strategies that improve the building's resilience to all aspects of its context—social, spatial, and environmental. Functional resilience allows the building to adapt to environmental conditions, time of day, and seasons. Social resilience ensures the building remains useful for its users, allowing for inclusive functionality and fostering social cohesion.

Method

To answer the research question, I used a research-by-design approach, studying case studies and extracting key ideas. Throughout the design process, I looked at various architects' methods for improving social and functional resilience, applying and testing them in my own project through an iterative process.

I started with Cedric Price, who approached architecture functionally, designing spaces where users could take ownership. He saw buildings as systems within a context, and placed the user at the center of design. Lacaton & Vassal also played a big role—they use simple materials and create generous, flexible spaces, allowing users to shape their own use.

Other case studies, like The Sliding House, helped identify strategies for adapting buildings to changing seasons and times of day. These ideas were then applied and adjusted to suit the context of Sundholm. The tutoring sessions with both the PD and TD tutors were essential. They helped me translate case study



Hayahisa Tomiyasu - Ping-Pong table

Cedric Price - Inter-Action Centre

Lacaton & vassal - FRAC Dunkerque

dRMM Architects - Sliding House

Process

strategies into relevant ideas for the design. TD tutoring especially gave me inspiration through literature and case studies, while the PD tutoring helped in shaping the architectural implementation.

This loop—case study → design → feedback—pushed me to go beyond my initial ideas. My P2 design focused on flexible indoor spaces and the use of “free space.” After feedback, I was encouraged to look beyond the building’s walls and strengthen its relationship with the context. This led to new explorations of public spaces along the building’s edges and how these could merge with the indoor environment—especially in warmer seasons. This shift took my design from being inward-oriented to outward-oriented.

After P3, I received valuable feedback on how the building looks versus what it does. It made me realize that the things I was trying to express—like inclusive functionality and user interaction—weren’t yet coming through clearly in the materialization. So the final phase of the design focused on refining material choices and spatial relationships to better reflect its intention. Even when facades are closed, I wanted the building to remain visually and spatially connected to the public realm. The material relationship between exterior and interior became a key focus. Another aspect was making its functionality more visible. If a façade can open—shouldn’t it look like it can? I tried to express function through form and materiality: no hiding, just raw, honest architecture. The goal was to make the building legible to its users.

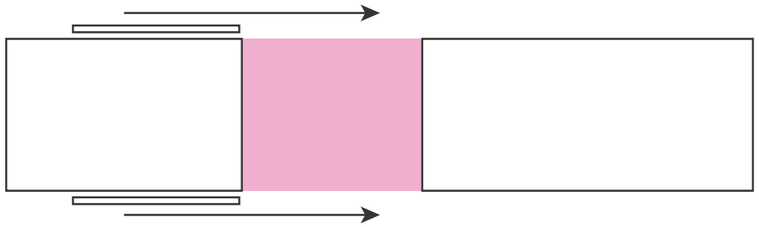
All the design decisions were made in a constant loop of feedback, research, and design. Looking back, I think that this process helped my project keep evolving in the right direction. Every phase between the P-moments had a clear theme:

- P1 to P2: How do I make this space as flexible as possible?
- P2 to P3: How do I make this space respond to its context?
- P3 to P4: How do I make this design more legible?

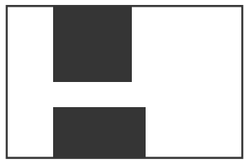
These overarching questions came from the main feedback moments and pushed me to keep exploring new layers and improve the design across different scales.

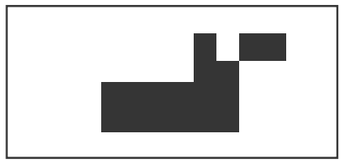
Through this design process, I’ve explored many design strategies to improve both functional and social resilience. I’ve answered my research question by defining what these strategies can be, and how they can be combined into one architectural concept. My public condenser incorporates several of these ideas and could be seen as an example of how these strategies can be combined to create a public building which is able to respnd to its contextual changes. For instance, combining openable façades, free space, and sliding walls allows indoor spaces to become outdoor spaces. Pairing fixed functions with adjacent free space enables the program to expand and shift.

In short: I believe I successfully identified and applied design concepts that improve a public building’s social and functional resilience. And my project illustrates how these concepts can be applied into a public building that responds to its chxanging context.



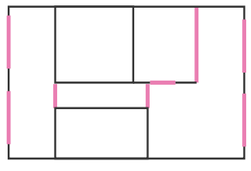
Flexible out/indoor space

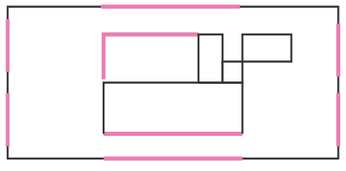




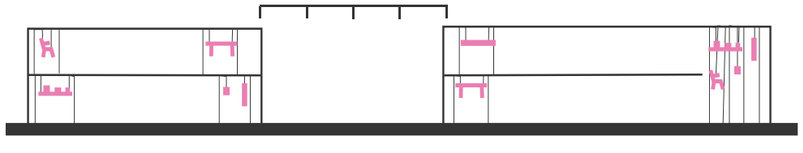
Free space / Fixed space

In/outdoor connectivity





Adatpive boundaries



“Plug” use

Enable use trough:

1. Modular furniture

2. Ceiling stored furniture

3. Wall stored Furniture

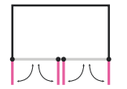
Exterior relationships:

1. Facade - Object

2. Object - Building

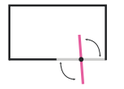
3. Ambiguous structure

Boundary openings:



1. Horizontal swinging facade

2. Siding facade

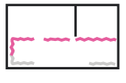


3. Horizontal pivoting facade

4. Vertical pivoting facade

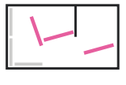
5. Vertical swinging facade

Framing of space trough:

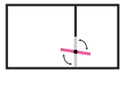


1. Curtains

2. Divider



3. Driving wall



4.. Rotating wall

5. Sliding wall

Relation to Studio & Relevance

Studio Topics
My graduation topic aligns with the five pillars of the studio: resilience, hybridity, multiplicity, sustainability, and healthiness.

Hybridity: A multifunctional program with free space for creative use allow for inclusive functionality.

Resilience: Its flexible program & user adaptive spaces stimulate functional & social resilience, optimizing use over time.

Multiplicity: Its diverse creative functions and spaces for events allow the different cultures to be represented and shared trough craft, music, art, cooking.

Sustainability: trough maximizing functional lifespan by prioritizing functionality and using simple and durable constructions materials.

Healthiness: The building promotes well being trough its program focused on providing opportunities to develop valuable skills and find purpose.

Master Programme
The master track of TU Delft encourages its students to develop creative and innovative building projects that use design as a means to deal with the technical, social and spatial challenges encountered in the built environment. This project aligns with these goals by exploring flexibility as a design strategy to address changing social and environmental conditions. This project investigates how to maximize technical and social adaptability to address public building design in socially complex neighbourhoods. This way, this project aims to show an example of how public buildings can be designed as resilient as possible, to deal with the ever-changing context of urban environments.

Relevance
As climate change continues and cities are becoming denser and more diverse, there is a growing need for public buildings that are flexible — able to adapt to shifting social, spatial, and environmental demands.

This project explores how public buildings can be designed to adapt to their changing contexts, both socially and environmentally. Instead of prescribing fixed uses, it advocates for architects to step back and design spaces that enable use through openness. By designing open-ended spaces, users are encouraged to interact creatively with the space. This is especially relevant when designing in an extremely diverse neighbourhood.

At the same time, the project addresses environmental flexibility. It optimizes the building's use throughout seasons by blending indoor and outdoor boundaries. Openable facades and strong programmatic relationships allow the building to extend into its surrounding public spaces in summer, activating its urban context. In winter, some of these outdoor spaces can be enclosed to create additional indoor use, allowing for year-round functionality.

By combining these social and environmental flexibility strategies, a socially and functionally resilient public condenser can be created. By incorporating these strategies in public building design, the use of the building and its surrounding urban space becomes more resilient, enhancing its use and improving its functional lifespan. This reduces the need for future adaptations and improves the building's sustainability.

Conclusion

For architects, this project could offer insights into how different flexible design strategies can be used to create more resilient public buildings. This project could be used as an example of how different flexible design strategies can be combined to make public buildings fit better to its dynamic urban context. Furthermore, it provides an example of how to design for an extremely diverse user group by not prescribing use, but by enabling use.

Transferability
In this project, several flexible design strategies have been identified and combined. While the design developed here is specific to Sundholm, the underlying principles — combining different flexible strategies to meet specific goals — are transferable. They can help architects in other contexts design resilient public buildings and spaces. By applying and combining these different design strategies in public building and public space design, the overall functionality and resilience of public buildings can be improved.

Conclusion
This graduation project was really shaped by a constant cycle of research, design, and feedback. In every cycle, new themes popped up, which all contributed to the goal of improving the resilience of the public condenser. The feedback I got along the way really helped me, it made me move from just applying one design strategy to exploring multiple strategies, and looking deeper into how the building's interior could adapt. It also pushed me to combine everything with the context around the building. Because of that, I feel like I got a much more complete view of what it means to design for flexibility in public buildings.

This project really made me rethink my role as a designer. It forced me to look at everything from the user's perspective and focus way more on functionality, instead of falling back on my own ideas of what "good" architecture should be. I realized that in some situations, architecture can be all about aesthetics — but when you're designing for complex, disadvantaged communities, it's not about making a shiny, perfect building. It's about making something useful, and designing it so it stays useful over time.