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# Vertical Garden-city

Designing a green living environment in the centre of  
Amsterdam

## Relationship between research and design

With my background studying MBO and HBO Bouwkunde before my studies at the TU Delft my choice for a more technical studio was easily made. My main interests for choosing this studio was to learn how to identify something as environmentally friendly and how this can be combined with a green living environment.

My research on how we can apply green on buildings in an environmentally friendly manner taught me how to judge the environmental friendliness of materials and products in general. The method which I used in my research to assess environmental friendliness I also used to make material choices in my design process.

Before my studies at the TU-Delft I studied MBO and HBO Bouwkunde. When studying HBO Bouwkunde I learned how to make buildings with standard materials and how they are supposed to be used. In my time at the TU-Delft I learned to question how and why materials are supposed to be used. I also learned to experiment with these materials in different uses. During my graduation project I mainly learned to change the way we built from a mineral technological building system to a more environmentally sustainable natural Bio Based building system.

I struggled to find a research topic at the start of my graduation. My interest were mainly towards building a nature inclusive building like Bosco Verticale by Stefano Boeri but with environmentally friendly structural materials. This raised the question of how green on buildings can be made with natural materials. I assessed the environmental impact by scoring them based on their embodied CO<sub>2</sub>. I learned a lot about natural materials and ways to make materials last longer.

Next to this main research topic there were many little research topics that weren't all documented but I learned a lot from them. I explored several ways of creating facades and masses by building models. One of the most important research topics for this design was how to design with mass timber products. The light weight of the material makes it possible to create whole apartments off site and ship them in to be stacked on site as also the structural elements are relatively lightweight materials.

## The relationship between the graduation topic, studio topic and the master track

My graduation topic mainly focusses on introducing greener in and on top of housing that are built in an environmentally friendly manner. This resulted in a building method which mainly uses bio based materials to create a CO<sub>2</sub> negative Footprint. The graduation topic suits the studio as it is a search to a new way of building in which we think about every material and their effect on the environment.

The danger in designing a building with greenery on it is often seen as a form of greenwashing. For research and analysis I wrote a paper on greenwashing in architecture which helped me design a building with greenery on it which is green in both plants and environmentally friendliness.

The relation to the Architectural Engineering studio in my project is mainly found within the technical aspects of building environmentally friendly with low carbon emissions. Secondary the social issues Architectural Engineering deals with is represented in my project trying to fill the discrepancy Amsterdam is facing with a rise in demand for ground bound homes whilst there is no ground space left to expand to anymore. This made me want to create an in between option between apartments and ground bound houses by creating a vertical version of the western garden cities that are being appreciated for their open space and green character en social relations within streets. This social relation is found within my project as the gallery are more designed as streets where personal expression is possible to identify yourself with your home.

## Elaboration on the research method and approach chosen in relation to the graduation studio methodical line of inquiry

The graduation track of Architectural Engineering is split into two parts, one part research and one part design. The design part runs the full two semesters but the research part is focused in the first semester. This research part was a large struggle for me as I had many ideas but no clear goal where to go. Pieter Stoutjesdijk was a great help in focussing my research question and helping me focus on how to attack my topic. As I had many interests I found, read and learned a lot of information about a wide array of topics surrounding bio based building and building nature inclusive. With every topic I wanted to go deep into detail which made every topic too much to handle this was also one of the reasons I needed an extra semester to finalise my research. Once I finished my research I was really happy with the chosen path and the results.

As I had an extra semester to do my research I had also worked ahead on my design. This resulted in a design based upon utopian ideas not financially applicable in the real world. With the feedback from my tutors at P2 I was able to rethink my strategy towards what kind of homes would be possible and how this would add quality to the inhabitants and my project. This resulted in a flexible building system where many configurations are possible and future inhabitants can arrange their homes prior to construction to their personal preferences. As I had an extra semester compared to the other students from my group I felt like I missed the support to be able to discuss my design with other students. With the Corona measures in place this became even more apparent as studying from home makes it hard to bounce ideas off other people.

My main struggles were in finding a way to clearly communicate my ideas to my public. I struggled with this in all presentations as I had so many ideas that it was hard for me to find the headline of my project and relate my design decisions to that. My tutors Mauro Paravicini and Engbert van der Zaag were a great help with this. Mauro helped me find the headline of my project and explore the limits of my ideas. Engbert van der Zaag pulled me back to earth and helped me distill to the core of the information by making abstract representations of my ideas.

## The relationship between the graduation project and the wider social, professional and scientific framework

Every project built now and forward will face the impact on the environment in CO<sub>2</sub> emissions of their design. Especially when Europe starts to implement CO<sub>2</sub> taxes this becomes more and more important and relevant. There are many studies being done at the moment on reducing CO<sub>2</sub> emissions of the building industry. My graduation project takes this one step further by focussing on CO<sub>2</sub> sequestering materials. This relates the project to building with bio degradable materials as well as most bio degradable materials also sequester CO<sub>2</sub>. I believe we are at the start of reducing CO<sub>2</sub> footprints and that in the future our buildings will be seen as long term CO<sub>2</sub> storage units.

This project is strongly related to the nature inclusive topics that the council of The Hague and Amsterdam are focussing they're urban-plans on. The Hague is currently experimenting with a point system to increase the number of nature inclusive interventions to be applied in new projects. The council of Amsterdam has released a document on how architecture and buildings can improve their nature inclusiveness.

The social aspect of my project is related to the growth of city populations and a need to increase the density in urban landscapes. Nature is often set aside to increase the density. With this project I want to show it is possible to create a high density building with the spatial qualities of a low density areas like in the Westelijke Tuinsteden in Amsterdam.