Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Personal information	
Name	Tim de Boer
Student number	4731166

Studio		
Name / Theme	Architectural Engineering	
Main mentor	Thomas Offermans	Architecture Design tutor
Second mentor	Mo Smit	Research tutor
Argumentation of choice of the studio	With architecture and the built environment you cannot only have design or only have engineering. There needs to be a combination of both. Lots of times, in my opinion, designers are only looking at the conceptual part or the part that is 'beautiful', but when something needs to be built in the real world it also needs to be technical right. What if we make sure that this step of controlling in between can be a lot more quicker by making architects the multidisciplinary designers like they were before? In every aspect of design and every day products I am interested in how something is build. Without knowing how something is build, how can you design something nice and useful? I like simple solutions for, maybe, big problems. Why over-engineer when something easy is the answer? This is what I want to discover and apply in the Architectural Engineering Studio: Solving an important issue with logic, hopefully smart, but 'easy' solutions.	

Graduation project	
Title of the graduation project	Even for social housing?
Goal	
Location:	Crailo, The Netherlands
The posed problem,	The Netherlands is facing multiple problems concerning the build environment. Firstly there is the housing shortage. With the demand of 1 million new houses in 2030 there is a huge demand for new building. This process is (among other) held back by the nitrogen crisis, prices of materials and personnel shortage. Another issue is climate change and the contribution of the build environment on the pollution. The building sector is contributing around 37% to the CO2 emissions, where at least 9% is from (mostly non-circular) materials. While there are good efforts to use bio-based materials in projects, this is often only done in expensive housing projects,

	projects in the corporate world or public buildings. But the big win can be done with the houses that are now needed: social housing. On top of that, biobased materials are better for the living conditions, so in this way the living conditions of people in social housing can increase as well. The problem is that biobased materials are often not used in such projects, because of knowledge and price. So what if we can change the way of thinking and calculation of business cases - what if we can add more value than only now is calculated in the business case? So, from business case to value case.
research questions and	Research question: In what way will the investment costs / value case of social housing change (compared to the conventional business case / standards) if projects would be constructed with regional resources and labour forces, using passive housing principles, while CO2 tax will be included?
design assignment in which these result.	Design question: How can affordable (social) housing be built with high quality standards (space, materials and living conditions), with the use of local biobased materials and co-housing/community building principles?

The design assignment will be designing an affordable (majority social housing) housing project focussed on community living. The project will be mixed-use and will also include the 'Buurthub' set by 'Buurtschap Crailo'. The high quality standards will be achieved with the use of community building principles, like a big shared kitchen, living room, community garden and hobby space. In this way, the smaller homes can have the comfort of big kitchens and living rooms as well and the inhabitants will meet each other which will contribute to social values.
The affordability will be achieved by designing smart and by using a value case instead of a business case. An example is saving money on installation- and maintenance costs when designing at passive-house standards. Also value will be added with smart floorplans and interiors. The building will be climate positive, with the use of biobased materials from the area and contributing to the biodiversity of the neighbourhood.

Process

Method description

The thematic research consist of a quantitative comparative analysis and prototyping.

A case study of a conventional timber frame building project will be done, where the amount of materials, costs, source of the materials will be found. Then CO2 calculations will be done.
From this case study, 3 different options from local biobased materials will be constructed on passive house level and analyzed on the same aspects. Then the extra values will be found focused on CO2 taxation, maintenance and installation costs, and local jobs. Per material there can be more extra values (needed). The result of this research will be shown visually in a scheme.

The design process will be done by doing site visits to Crailo, literature reviews on community living and biodiversity in buildings. Also, other cohousing and community living projects will be analyzed, like Iewan in Nijmegen to grasp what it means to build a community in a building.

First a program of requirements will be determined, which is already done. Then with mass studies and whishes and analyzing the area some concepts will be made. An important part of the design will be the interior and the connection to the outside and the shared spaces. 2D and 3D techniques will be used, together with model making to test spaces and flow in the building(s).

Literature and general practical references

For the research a lot of people, companies and corporations from practice are interviewed. Some of these are Bouwgroup Dijkstra Draisma for information on prefab timber building systems and the use of Cattail in their projects, WoonFriesland and BrabantWonen for information on how corporations are dealing with biobased building in de social sector. As said a case study will be done. This will be 'Reade Húskes' in Stiens from Woonfriesland en BGDD.

For the reference list, see the literature list and the end of the research paper.

Multiple literature will be used on cohousing, community living and biodiversity.

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)?

As architects, we can have a lot of influence on the world and society. That is what this master program is about. In the Architectural Engineering Studio technology will be used to solve a societal problem (in the build environment). My project is focusing on environmental issues, biodiversity and social housing problems and solving this with local biobased materials. In this way this project is contributing to and in line with what the architecture (and AUBS master) is about. Namely, responsibility to design with the earth, people and society in mind.

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

With my project and research, multiple problems that the Netherlands is facing are taken into account and bettered. Climate change, material use, housing shortage and biodiversity are all researched and designed for. This project can be an example of how to use biobased materials in social housing projects and using community living principles to increase housing quality. Especially in an expensive area like Crailo, this can be an example of how social housing can also add quality to an area and that social housing can be placed on 'premium' places.