Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Nona Storm Dalman
Student number	4696255

Studio		
Name / Theme	Architectural Engineering	
Main mentor	Stephan Verkuijlen	Architecture and Building Technology
Second mentor	Mo Smit	Circular Design and Local Biobased Building
Argumentation of choice of the studio	I chose the Architectural Engineering studio due to its hands-on, structured, research approach, which not only aligns with my ambition of practical learning but also promises practical outcomes applicable to a wide range of design objectives. The studio offers the freedom to dive into personal interests and simultaneously provides structured guidelines to research and design.	

Graduation project	
Title of the graduation project	Symbiosis Unearthed *Local, symbiotic regeneration of Dutch postwar garden city neighbourhoods*
Goal	
Location:	Van Suchtelen van de Haarestraat, Osdorp-Oost, Amsterdam
The posed problem,	Urban areas commonly possess characteristics that expose their inhabitants to several health threads like air pollution[1], heat stress[2] and the absence of plants[3]. With the current pressure on the housing market in the Netherlands, the question of how architecture and construction can contribute to healthy living environments becomes very relevant. However, the common approach of demolishing and reconstructing existing buildings contributes to CO_2 emissions[4],

[1] European Environment Agency, *Air Quality in Europe: 2017 Report*, vol. 13, 2017, https://www.eea.europa.eu/publications/air-quality-in-europe-2017, 28.
[2] Piracha, Awais, and Muhammad Tariq Chaudhary. 2022. "Urban Air Pollution, Urban Heat Island and Human Health: A Review of the Literature" *Sustainability* 14, no. 15: 9234. https://doi.org/10.3390/su14159234.
[3] Evelise Pereira Barboza et al., "Green Space and Mortality in European Cities: A Health Impact Assessment Study," *The Lancet Planetary Health* 5, no. 10 (October 1, 2021): e718–30, https://doi.org/10.1016/s2542-5196(21)00229-1.
[4] Khozema Ahmed Ali, Mardiana Idayu Ahmad, and Yusri Yusup, "Issues, Impacts, and Mitigations of Carbon Dioxide Emissions in the Building Sector," *Sustainability* 12, no. 18 (2020): 7427, https://doi.org/10.3390/su12187427.

	waste and the use of scarce and polluting materials. The deficient state of many social housing blocks in combination with the urgent need for more homes calls for building interventions. This offers a context for sustainable and healthy solutions instead of harmful ones. Primarily housing blocks in postwar garden city neighbourhoods, from approximately 1945-1965, are currently in poor condition. The approach of renovating and transforming these buildings precludes the use and waste of unsustainable building materials that comes with demolition and new construction. This building assignment encompasses multiple objectives, aiming to build in a regenerative, non-exploitative way that creates a healthy for environment for the non-human and human inhabitants.
research questions and	Design question: How can Dutch postwar garden city neighbourhoods be transformed into residential forests, which are healthy for all living beings and enable them to sustain themselves in a regenerative way? Thematic research question: How can regenerative forestry processes provide the products for a biobased building system for the circular renovation and densification of Dutch postwar garden city neighbourhoods? Subquestions: 1. What are the renovation (and transformation) requirements of housing typologies in Dutch postwar garden city neighbourhoods? 2. Which biobased building methods are suitable for futureproof renovation and densification projects within postwar neighbourhoods? 3. Which building elements would be needed for the renovation and densification of a postwar portiekflat? 4. What does the ecosystem of an ideal regenerative forest in the Netherlands look like? 5. How can a regenerative forest for biobased building materials be established and managed? 6. What are the characteristics of the biobased building materials used for the building elements? 7. What are the quantities of natural resources that would be required for the renovation and densification of a Dutch postwar garden city neighbourhood?
design assignment in which these result.	The intention of my graduation project is to transform a postwar garden city neighbourhood

	into a healthy, flourishing residential forest, that provides the needed biobased building materials through agroforestry. Tackling a location that is currently ecologically exhausted and unhealthy for its inhabitants could uncover a huge contrast and answer urgent needs. The transformation is meant to bring great improvements for the health of human and nonhuman beings and have a regenerative effect on the ecosystem. Instead of simply taking plants from the soil for material use, the goal is to create a circular system that grows plants for renovation, while building nutrients and life in the soil. The design assignment includes the architectural transformation of the social housing flats, as well as the development of the surrounding landscape.

Process

Method description

(Historical) literature review is used to gain information about the history and characteristics of the Dutch postwar garden city neighbourhood and its typical buildings. Information about current renovation and densification needs is gathered through literature and social housing corporation projects. Exemplary transformation projects are used to determine the possibilities of the portiekflat in particular.

Interviews with employees from the housing corporation that owns the flats in Osdorp-Oost and with residents of the buildings can hopefully provide information about specific needs for the apartments and the environment.

The flats in Odorp-Oost are used as a case study in the thematic research to represent the portiekflat typology. A prototyping method is applied there to provide a model of the required natural resources for the renovation and densification of such buildings. Additionally, this model offers understanding of the spatiality and temporal aspect of building with biobased materials by use of local, regenerative forestry.

The needed information about regenerative forestry and Dutch species and ecosystems is gathered by means of literary research.

Literature and general practical references

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Practical experience
- Interviews with inhabitants of the selected flats and of the surrounding area in Osdorp-Oost
- Interviews with employees of housing corporation Eigen Haard, which owns the selected flats in Osdorp-Oost
- (Audio-)visual analysis of project site through photo- and videography
- Experience of (urban) forests and specific species through site visits

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)?

   The architectural engineering studio stimulates an innovative, tangible approach, that can be applied to multiple contexts and topics. This graduation project specifically focuses on the current housing demand in the social sector in combination with the existing harmful, unhealthy living environments. Addressing the national housing crisis and importance of health for non-human and human beings, the project considers the critical role of the master programme and spatial design to connect the different fields (architecture, politics, ecology) and stakeholders. Eventually, research about these topics will be translated into a spatial design with technical, as well as societal and ecological value. The project, studio and master track share the aim of providing practical, spatial solutions for societal and environmental issues to contribute to a regenerative, inclusive and resilient (built) environment.

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

   The graduation project focuses on the current housing issues in the Netherlands, as well as on the importance of embracing sustainable or rather regenerative materials for construction. The housing crisis has great societal relevance at the moment and a practical, scientific approach,

as is implemented in this project, could contribute to solutions in the professional field. Especially in the social housing sector, biobased materials are not often applied, because other, more known materials offer more certainty.
Additionally, there are many postwar garden city neighbourhoods in the Netherlands with a large stock of similar buildings. The current state of these old buildings ask for interventions on a large scale, which makes the scope of this graduation project relevant.