

# 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](mailto: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                                  | B Versluijs  |
| Student number                        |  |
| Studio                                |  |
| Name / Theme                          | AR3ADI00 Advanced Housing Design /   |
| Main mentor                           | Mooij, H.A.F. Architecture   |
| Second mentor                         | Guis, R. Architecture & Research   |
| Third mentor                          | Eckhardt, H.F. Building Technology   |
| Argumentation of choice of the studio | <p>The main reason for my decision to choose for this studio is my great interest in how the built environment, especially the residential environment, affects people's quality of life.</p> <p>With this studio, I saw an opportunity to combine this interest with my love for nature and my belief that the integration of nature can improve the quality of living environments.</p>  |
| Graduation project                    |  |
| Title of the graduation project       | Dwell Sensory Nature: Towards a Healing and Inclusive Neighborhood   |
| Goal                                  |  |
| Location:                             | Groot IJsselmonde: Hordijkerveld, Rotterdam (NL)   |
| The posed problem,                    | <p><b>1. Housing Crisis in the Netherlands</b></p> <p>Due to a growing influx of migration, an ageing population and a decrease in household size, the number of households in the Netherlands is increasing. Together with a lack of affordable housing, this poses an urgent challenge, the housing shortage. In addition, climate and environmental requirements make this objective more difficult, delaying the production of new dwellings. Overall, the combination of the housing shortage, climate and environmental requirements, changing household sizes, together with growing attention to the variety in needs of different target groups and changing lifestyles requires innovative and integrated solutions.</p> |

## **2. Alienation from Nature (Sensory Deprivation in the Built Environment): Negative Impact on Health and Well-Being**

Another important aspect that should be addressed is the fact that people have never before lived so separated from nature as today. Whereas today we live in a world where we are provided with access to a vast amount of information and products that are available anytime and anywhere, and technology allows us to communicate with each other even over great distances in a matter of seconds. The human body, mind, and senses evolved, for much of human history, within a natural, not human- engineered or -invented, environment. An environment in which people needed to adapt to nature's cues and relied on it for survival.

In the modern urbanized and specifically technological-oriented world, this inborn connection has become increasingly lost and resulted in a society that spends up to 90% of its time indoors. And as most buildings are designed without the awareness of the importance of nature in the built environment as well as the knowledge on how to create a strong connection with nature, this is having a negative impact on people's overall health and well-being.

One of the challenges of today's built environment is that most of the historical urbanization projects converted the variety of nature into large homogeneous landscapes of non-absorbing surfaces, produced enormous quantities of waste and pollutants, and used huge amounts of materials and resources. With this, the dissociation with nature in the built environment not only has a negative impact on human health and well-being, but also led to indisputable threats, like extensive air and water pollution, fragmented landscapes, a significant reduction in biodiversity, climate change, and resource impoverishment. This shows that growth and civilization coexist with alienation from nature.

## **3. Post-Pandemic Living (Changing Patterns of Life)**

Despite the fact that there has been some time passed since the last COVID lock-down, research shows that people continue to seek more natural, quiet and spacious environments. It appears that this shift is reflected in the housing preferences as well. So are more and more people leaving the city to find a less expensive place in a more spacious, green and calm environment. The main

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|   | <p>argument cited for this is that people more often work from home and are, therefore, more willing to live further from work. At the same time, working from home makes the garden, the green in the street, the park in the neighborhood and nearby nature even more important.</p> <p>Overall, densification to complement the current housing stock makes it more difficult to provide sufficient space for nature in the built environment. The integration of nature in design offers a promising approach.</p>  |
| <p><b>research questions and</b><br/>(Updated Version, not yet revised by tutors)</p> | <p><b>Main Research Question:</b><br/>"How can biophilic design strategies be implemented into the design of a post-war neighborhood undergoing densification to stimulate multi-sensory experiences for improved mental health and well-being?"</p> <p>Sub-Question 1:<br/>What are the different biophilic design strategies? And how can these encourage multi-sensory experiences?</p> <ul style="list-style-type: none"> <li>- How do biophilic design strategies relate to the specific needs and developmental stages of different age groups?</li> </ul> <p>Sub-Question 2:<br/>How could the private, collective and public outdoor spaces designed in historical urban (densification) projects be used as enlightening information for the design of outdoor spaces of residential buildings in the Netherlands today?</p> <ul style="list-style-type: none"> <li>- What different types of outdoor spaces exist within residential buildings?</li> <li>- What are the characteristics of these spaces? And how do they contribute to both biophilic design and multi-sensory experiences?</li> </ul> <p>Sub-Question 3:<br/>How can biophilic strategies be implemented into the design of a post-war neighborhood to stimulate multi-sensory experiences?</p> <ul style="list-style-type: none"> <li>- What different types of outdoor spaces exist within the existing buildings?</li> <li>- What are the characteristics of these spaces? And how do they contribute to both biophilic design and multi-sensory experiences?</li> </ul> <p>Sub-Question 4:</p> |

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|   | <p>How can the integration of natural elements in the built environment help reduce stress, improve concentration and promote positive feelings?</p> <ul style="list-style-type: none"> <li>- How can natural elements, such as greenery, water, or daylight reduce stress and promote a sense of calm and belonging?</li> <li>- How can design elements contribute to a sense of safety, comfort and relaxation in the built environment?</li> </ul> |
| <p>design assignment in which these result.</p> | <p>Seek for densification strategies to create a healing and inclusive neighborhood; by rethinking the outdoor spaces in residential projects as well as by implementing biophilic design strategies to enhance a strong connection with nature through the stimulation of multi-sensory experiences.</p>   |

## Process

### Method description

#### Literature Review

- History of the post-war neighborhoods (Garden City philosophy)  
This study will provide insight into the timeline and developments of different views and applications of nature in the built environment. In addition, it will contribute to clarify the story and trajectory of Groot-IJsselmonde, creating a better understanding of the site and its history in order to know how future designs can respond to this.
- Biophilic design strategies  
Literature studies will be done to gain a general knowledge of the subject and more insight into the role of architecture in strengthening the relationship between people and nature, to know better what to focus on when analyzing both the case studies and the context study of the design project. The research on biophilic design uses mainly publications by Kellert, the founder of the concept.
- Multi-sensory experiences  
The human experience and multi-sensory design, publications such as the book 'The Eyes of the Skin' by Juhanni Pallasmaa and 'Creating Sensory Spaces' by Barbara Erwine will be reviewed.
- A sense of belonging  
Literature research is conducted on the influence of architecture on the identity of a place, feeling of belonging, and attachment to place. In this research include: 'Cities for People' by Jan Gehl, 'Soft city: Building Density for Everyday Life' by David Sim, 'From Object to Experience: the new culture of architectural design' by Harry F. Mallgrave, 'A Pattern Language' and 'The Timeless Way of Building' by Christopher Alexander. This research will also address how the integration of nature into the design of both the neighborhood and the home can contribute to enhancing the sense of place.

- Health and well-being  
To understand the overall effect of biophilic design on health and well-being, a literature review will be done. For example by reviewing the books 'Cities for People' and 'Soft city: Building Density for Everyday Life' by Jan Gehl. These books provides insight into principles and practices to design cities with a focus on human needs and experiences.

### **Context Study**

The original design of the neighborhood will be compared with the current state of the neighborhood to find out how it has been modified over time. To get an overall picture of the situation, this analysis will be done at the city, district, and housing scale. This analysis will consist of documenting morphology and typology. In addition, human perception will also be investigated through empirical observation and multi-sensory mapping. The findings from this study will provide a basis for developing design strategies.

### **Case Studies**

Using case studies along with the context study of Groot-IJsselmonde, the integration of natural elements in existing neighborhoods and houses will be studied to see what impact it has had on the identity of the place, the meaning of the place and the sense of belonging and attachment to place. These case studies will be observed and analyzed to serve as empirical evidence. Overall, the outcomes will contribute to a list of applicable elements, wishes and needs of residents, which can be used to design interventions in the existing environment. It will provide insight into how these interventions can contribute to enhancing the significance of a place, identity and sense of belonging in Groot-IJsselmonde.

### **Interviews**

As it is difficult to measure health in an existing environment because of personal perception, in the case of the context study, the wishes and needs of the residents of Groot-IJsselmonde will be examined through semi-structural interviews. In this process, target groups will be formed to gain insight into the eventual overarching wants and needs of the community.

### **Experiments**

Based on the outcomes of the sub-studies, strategies will be designed and tested through experiments, which can be implemented, tested, and optimized in the design project of Groot-IJsselmonde.

## Literature and general practical preference

Alexander, C. (1977). *A Pattern Language: Towns, Buildings, Construction*. Oxford University Press.

Alexander, C. (1979). *The Timeless Way of Building*. New York : Oxford University Press.

Browning, W. D., Ryan, C. J., & Clancy, J. P. (2014). *14 Patterns of Biophilic Design: Improving Health and Well-Being in the Built Environment*. Terrapin Bright Green.

Erwine, B. (2016). *Creating Sensory Spaces: The Architecture of the Invisible*. Taylor & Francis.

Gehl, J. (2013). *Cities for People*. Island Press.

Hiss, T. (1990). *The experience of place*. Alfred A. Knopf, inc.

Howard, E. (1902). *Garden Cities of To-morrow*.

Kellert, S. R. & Calabrese, E.F. (2015). *The Practice of Biophilic Design*. [www.biophilic-design.com](http://www.biophilic-design.com)

Kellert, S. R. (2005). *Building for Life: Designing and Understanding the Human-Nature Connection*

Kellert, S. R. (2012). *Birthright: People and Nature in the Modern World*. Yale University Press.

Kellert, S. R. (2018). *Nature by design : the practice of biophilic design*. Yale University Press. Retrieved 2023, from <https://ebookcentral-proquest-com.tudelft.idm.oclc.org/lib/delft/detail.action?docID=5340626>.

Kellert, S. R., & Finnegan, B. (2011). *Biophilic Design: The Architecture of Life* [Video].

Kellert, S. R., Heerwagen, J., and Mador, P. (2008). *Biophilic Design. The Theory, Science, and Practice of Bringing Buildings to Life*. Hoboken, NJ: John Wiley and Sons.

Mallgrave, H. F. (2018). *From object to experience : the new culture of architectural design*. Bloomsbury Academic, An imprint of Bloomsbury Publishing Plc.

Pallasmaa, J. (1996). *The Eyes of the Skin: Architecture and the Senses*. John Wiley & Sons

Sim, D., & Gehl, J. (2019). *Soft city : building density for everyday life*. Island Press.

Wilson, E. O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.

Zweerink, K. (2005). *Van Pendrecht tot Ommoord: geschiedenis en toekomst van de naoorlogse wijken in Rotterdam [From Pendrecht to Ommoord: history and future of the post-war neighbourhoods in Rotterdam]*. Bussum: THOTH.

## 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 topic focuses on the aspect of the integration of nature in design and specifically on the experiences of nature to improve the quality of housing design in terms of health and well-being. This approach relates to the topic of my design studio, titled 'Advanced Housing: Densification strategies' which aims to find densification strategies to invigorate an existing neighborhood. As densification makes it more difficult to provide sufficient space for nature in the built environment, the integration of nature in the built environment offers a promising approach to this challenge. As this research combines research and design and the topic includes social, ecological and economic matters, it corresponds to the most important aspects of the master program MSc AUBS and the track Architecture.

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

The mentioned issues related to the housing shortage, climate and environmental concerns, changes in household size and lifestyles, alienation from nature and post-pandemic living show the relevance of this study. The proposed design, combined with the research, will contribute to expanding the knowledge on a potential approach to tackle these issues and could provoke further discussion on these topics.