

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	Robin Sebastiaan Simons
Student number	5210038

Studio		
Name / Theme	Heritage & Architecture: Vacant Heritage	
Main mentor	Lidy Meijers	Design
Second mentor	Frank Koopman	Building technology
Third mentor	Hielkje Zijlstra	Research
Argumentation of choice of the studio	<p>I am fascinated by monumental buildings. These buildings tell a story and possess many cultural, social, architectural, technical and environmental values. A large number of these buildings are not or hardly used. In addition, a large part of these buildings has a poor energy balance. This is often due to poor insulation and old installations. I see it as a challenge to make such buildings part of society and let visitors experience these values. Partly as improving the energy performance of these buildings. I also find it interesting to discover the history of a building or location. I'm curious about the traditional building methods, such as the purpose of certain elements, the materials used and how details are constructed. In the studio Heritage & Architecture: Vacant Heritage, buildings with (monumental) values are the subject. For this reason, this studio fits well with my personal interest.</p>	

Graduation project	
Title of the graduation project	The Nature-Inclusive Redesign: The possibilities of nature-inclusive redesign in a Dutch urban monumental buildings

Goal	
Location:	Koudenhorn former police building in Haarlem,



Figure 1: Monumenten.nl. (n.d.). Koudenhorn 2, Haarlem

The posed problem

The graduation studio concentrates on revitalising the buildings owned by the Dutch police. The fusion of the police into a national unit has created an enormous real estate challenge. 30% of the police buildings must be redeveloped. The studio challenges to reflect on this assignment by doing research and making a design. The emphasis is on eight police buildings with heritage values that need to be redeveloped. The collective research of the Spatial Building Typology (S.B.T.) research line, which is part of the graduation studio, looks at spatial aspects of these buildings and how this impacts the design. In the Individual research, one or more spatial aspect(s) are analysed in-depth and is investigated how this can be improved. The subject and posed problem of the Individual research is introduced in the next paragraph. In addition to the research, a design is made for one of the eight buildings. The police station Koudenhorn in Haarlem is used for this (Figure 1). With this, the results of the research are tested and validated. (Heritage & Architecture, 2021)

There is a wide range of nature-inclusive options that can be applied to make a building more nature-inclusive (Arcadis, 2018; Gemeente Amsterdam, 2018). The application of nature-inclusive aspects in the design of new buildings are easy to implement, and relatively inexpensive through minor adjustments, because of the blank canvas (Helling, 2020). However, the aspects are more difficult to integrate into existing buildings. Especially in monumental buildings, where multiple constraints have to be considered. Monumental buildings possess values that must not be substantially affected. The adaptations must be structurally and spatially possible. In addition, there is an existing plot and building

	<p>shape (form, height, and orientation). It also depends on the presence of certain building elements and the facade materialisation.</p> <p>The pressure on biodiversity remains high where a large part of the same biodiversity depends on cities and vice versa (FLO Legal, 2021). The above shows that implementing nature-inclusive options in new buildings is easy. On the contrary, for monumental buildings it is currently unclear if and if possible what should be considered in order to make this group more nature-inclusive.</p>
<p>Research questions</p>	<p>The collective Spatial Building Typology study focuses on the following main question: How and why do the spatial aspects of police real estate influence the redesign options? (Heritage & Architecture, 2021)</p> <p>The central research question is: How can Dutch monumental buildings in an urban context be redesigned to be more nature-inclusive?</p> <p>The sub-questions involved are:</p> <ol style="list-style-type: none"> 1. What are the benefits of a nature-inclusive building for its users? 2. For which fauna species that occur in the Dutch urban environment should there be more nature-inclusive buildings? 3. What are the possibilities to make a nature-inclusive design and are they applicable to a Dutch monumental building? 4. Which nature-inclusive options could be applied in a redesign of a Dutch urban monumental building to make it more nature-inclusive, and what could be learned from this? <p>Delimitation The research is done for a Dutch urban context, because of location dependency. For example, the climate affects the choice of vegetation types, but also the kind of animal species that forage in the Dutch cities and for whom the design will be made. Besides, in cities the problems are more intense, because of increasing building density, used materials and lack of green-water structures (Deltares, 2016; Fenger, 1999). Monumental buildings are selected. This research focuses on nature-inclusive aspects regarding both the exterior façades, and the immediate surroundings of a building. Vegetation,</p>

	water, and fauna possibilities for birds, mammals and insects are investigated. The specific animal species will follow from the study in sub-question two.
design assignment in which these result.	How can the monumental building like Koudenhorn in the urban context of Haarlem be redesigned to be more nature-inclusive, while retaining its heritage value?

Process

Method description

Collective research

Several steps will be taken to answer the main question of the collective research: "How and why do the spatial aspects of police real estate influence the redesign options?". First, case studies will be analysed. The spatial aspects of eight Dutch police buildings will be studied on four different scale levels in text and image. This will be done according to the Haussmann method (Jallon, Napolitano & Boutté, 2017). Next, through observational research, the results of the different locations will be compared to discover generalisations. Afterwards, the different individual studies will be described, and the distinctive redesign options resulting from the same study will be added. In the following step, again through observational research, the redesign options will be grouped to define types. Finally, a conclusion will be drawn about the spatial building typology of the Dutch police real estate. (Heritage & Architecture, 2021)

Individual research

The first question will examine the benefits of nature-inclusive building for its users. This concerns both humans and animals. This will be done by means of literature research in books, academic papers, reports, web articles and websites. Afterwards, a residential building by landscape architects Buro Harro located at the Groenmarkt in Amsterdam, still to be realised, will serve as a case study.

For the second question, a literature research will reveal for which fauna species the design will be made and on what this choice will be based.

Then, by means of literature and observation research in books, scientific articles, reports, internet articles and websites, an overview will be made of the possibilities to include nature. First, each possibility will be briefly described and visualised with a hand sketch. This will be followed by an explanation and then a description of what needs to be considered when applying them to a monumental building. Finally, a toolbox will be designed based on the applicability of the different possibilities to a monumental building.

In the last sub-question, a case study will be used. The earlier designed toolbox will be applied on a monumental building from the Spatial Building Typology research. The analyses concern building and location studies and a value assessment based on the matrix of Clarke, Kuipers and Stroux (2019). The green-water structure, sun orientation, plot, volume, façade layout, façade construction and materialisation are all aspects that will be addressed. Images and documents will be consulted for this

purpose. The analyses will be visualised and make clear which nature-inclusive methods could be applied in a redesign. Lessons can then be learned from the results. The used case study is the Koudenhorn police building in Haarlem. This building is a national heritage site, built in 1768 as a deacon's house (Monumenten.nl, 2020).

Finally, the central research question will be answered by a summary with the toolbox and a recommendation.

Design

By visiting the case study location, making emotional mapping drawings, creating models of the building essences, and derived from the individual research question, the design question was formulated. This is: How can the monumental building like Koudenhorn in the urban context of Haarlem be redesigned to be more nature-inclusive? This question will be answered through a case study. To test the research outcomes a redesign will be made of the monumental building Koudenhorn in Haarlem to make it more nature-inclusive. The design process consists of specific research into various aspects to make design decisions. The decisions made will be reflected in a repetitive loop on the original principles and regulations.

The design process consists of the concept phase followed by the preliminary design phase that results in an elaborated design. In the concept phase, situation analyses will be started, including a value assessment according to the matrix of Clarke et al. (2019). Based on the findings, the new function(s) with additional requirements will be defined. The personal vision and especially the results of the research will serve as a basis for the design proposal. In this phase, sketching, drawing, modelling, and making schematic illustrations will be performed.

Subsequently, the design will be further developed under the influence of four disciplines. These disciplines are design, technology, values, and nature-inclusiveness. In this phase, sketching, drawing, modelling, making schematic illustrations and calculations will be central. These results will be processed in a preliminary design that becomes an elaborated design through a reflection process.

Finally, the design will validate the results of the research. This will show whether a Dutch monumental building in an urban context could become more nature-inclusive. To this end, the ecological value assessment of the existing situation will be compared to that of the new situation. Also, quantitative, and qualitative data from both situations will be compared. Such as, the surface of greenery and water. The number of trees and housing places for fauna and the quality of the greenery.



Research and design structure
An integral process

- Direct flow
- ↔ Both influence each other
- ⋯ One influences the other
- Reflective cycle

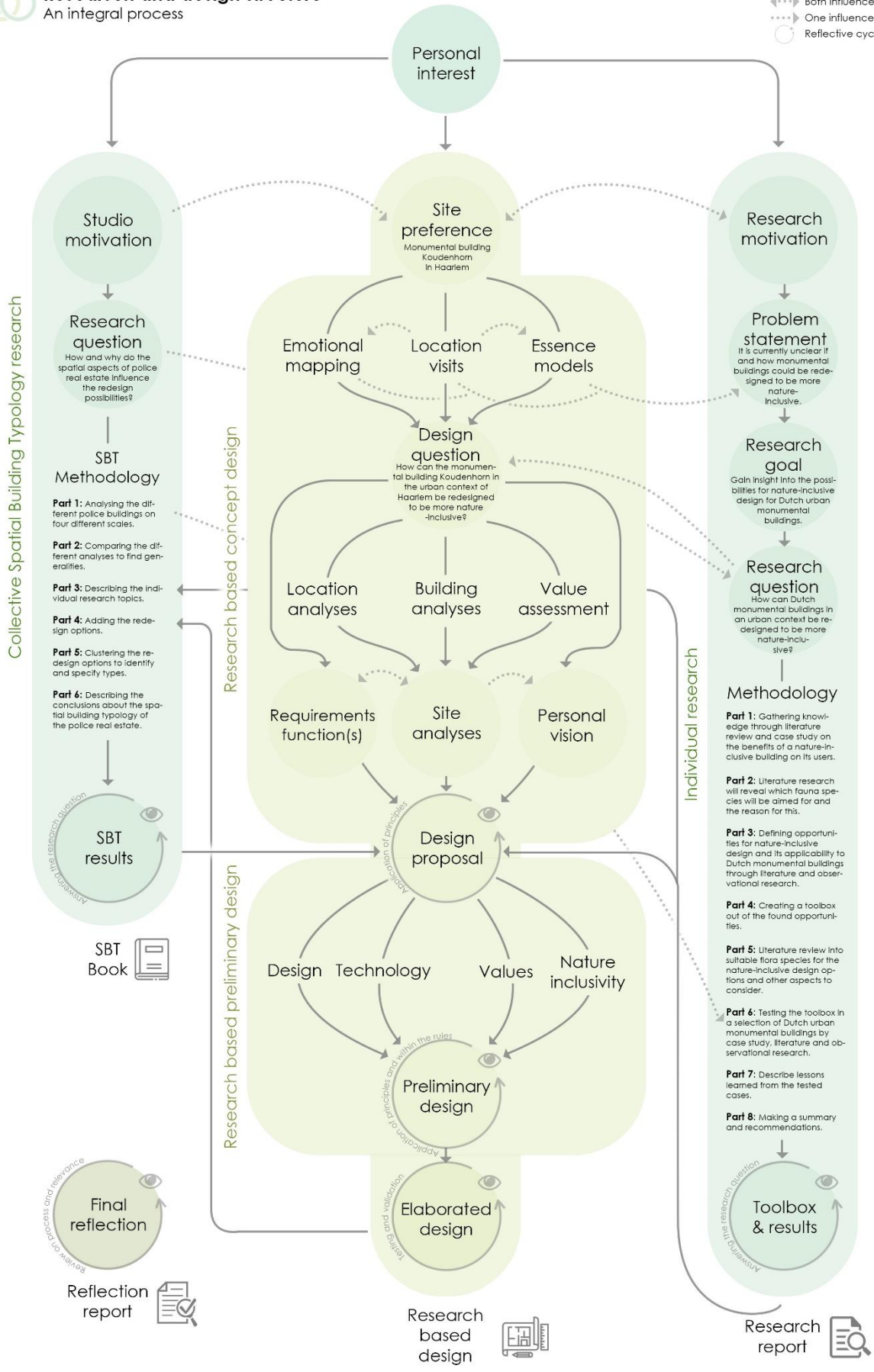


Figure 2: Structure graduation project

Literature and general practical preference

The various benefits of flora and fauna have been studied previously. For example, research by professors Petter Jenssen, Trine Hvoslef-Eide and Andreea Oarga (2014) shows that vegetation makes a building and thus a city more attractive, and therefore increases the well-being of citizens and tourists. The research of researchers Nadja Kabisch, Horst Korn, Jutta Stadler and Aletta Bonn (2018) also shows that vegetation has a positive effect on health, social interaction, creativity, and productivity. Wageningen University & Research (2018) describe the benefits for animals. The researchers limited themselves to a single or few advantages of flora and fauna. The different studies combined could be used to identify the benefits of a nature-inclusive building for its human and animal users. Many studies have been carried out on the various animal species, including their lifestyles and distribution (Zoogdierenvereniging, n.d.; Vogelbescherming, n.d.). In addition, the Ministerie van Landbouw, Natuur en Voedselkwaliteit (n.d.) has drawn up lists of suppressed species. However, these lists fluctuate over time. The results of these studies can be used to determine for which animal species nature-inclusive options are designed. Reports and websites could be used to provide a comprehensive overview of the possibilities of nature-inclusive building and their applicability in monumental buildings like Arcadis (2018) and Gemeente Amsterdam (2018). Observations in various case studies form an extension to this. The basic principles for dealing with monuments is described by Federatie Welstand (2008) and form an important guideline for redevelopment. Various research has been performed about the different vegetation varieties, including their popularity among fauna (Vogelbescherming, n.d.; Schoenmaker, 2021). The results of these studies can be used to determine the plant species to be used and the points of attention involved.

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

1. The Heritage & Architecture studio considers sustainable development as a goal for the coming time. It wants to improve the connection between reuse and building development, while preserving the heritage value of the built environment. It sees the preservation and use of vacant built heritage as a good alternative to meet the great market demand for functional space. Making built heritage sustainable and functional are important factors for its preservation. (Heritage & Architecture, 2021)

My graduation project fits well with the main idea of the studio, as it examines how a monumental building can be reused and/or redeveloped in a more nature-inclusive way (sustainable) and with the preservation of its values to meet the current functional demand. In addition, nature-inclusive building is an emerging theme in architecture.

2. The collective research results of the S.B.T. research line resulted in the research book: *Spatial Building Typology on Dutch police real estate*. This will be the second volume in the S.B.T. book series. (Heritage & Architecture, 2021)

The individual study clearly lists a wide variety of nature-inclusive possibilities. In addition, this study analyses the applicability of these possibilities to Dutch monumental buildings in an urban context. The study of this specific group is an extension of the existing literature.

The involved group of Dutch urban monumental buildings is large, because it concerns three different types of built monuments: national, municipal, and provincial. In August 2021, there were 61,809 national monuments in the Netherlands, which are mainly houses and residential complexes (Rijksdienst voor het Cultureel Erfgoed, 2021). The number of municipal monuments was estimated at 55,801 (in 2015) and the amount of provincial monuments was 811 (in 2019) (Rijksdienst voor het Cultureel Erfgoed, 2020). A large proportion of these monuments are in an urban environment. This shows that the research is carried out for a relevant number of buildings.

This individual research is of practical relevance. The toolbox helps designers and owners of Dutch urban monumental buildings to make their buildings more nature-inclusive. The design tests the results of the research. The more far-reaching goal is to be socially relevant. Making these monuments more nature-inclusive will help nature and reduce the pressure on biodiversity. Not to forget, the research also contributes to solving other serious environmental problems. Furthermore, it has a positive effect on the users of the city and the redesigned estates (Wageningen University & Research, 2018; Jenssen et al., 2014; Kabisch et al., 2018).

Source list

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Figures list

- Figure 1: Monumenten.nl. (n.d.). Koudenhorn 2, Haarlem [Picture]. Monumenten.NL. <https://www.monumenten.nl/monument/19499>
- Figure 2: Simons, R. S. (2021, October 21). Structure graduation project [Illustration]. Own image.