Graduation Plan

Master of Science in Architecture, Urbanism & Building Sciences

MSc Landscape Architecture 2023 - 2024

[your name]

Graduation Plan

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

I Personal information	
Full name	Svana Rún Hermannsdóttir
Student number	5849942

II Studio / Lab information		
Name / Theme	Flowscapes - Resilient Coastal Landscapes	
Main mentor	Steffen Nijhuis	Landscape Architecture
Second mentor	Fransje Hooimeijer	Urbanism
Argumentation of choice of the LA graduation lab	This studio allows me to shape a graduation project with incorporated themes of Landscape-based urbanism, water sensitive design, resilience and a watershed approach.	

III Graduation project	
Title of the project	Re(f)used Resources: A Landscape-based Approach for Reykjavík's Climate Resilience
Context and aim of the project	

Location (region / area / site)	Reykjavík, Iceland
Problem statement	Reykjavík has been experiencing rapid growth since the end of the 19th century and population estimations are still on the rise. The convergence of climate change impacts, increasing urbanization, and overwhelmed infrastructure in the Capital Region of Reykjavík presents a pressing stormwater management problem leading to a deterioration in urban ecology and quality. An increase in extreme weather events and amount of stormwater runoff from urban areas is challenging the existing stormwater infrastructure. The current methods disrupt the local water cycle, causing an ecological decline in Reykjavík. These challenges that Reykjavík is facing require a shift in focus where stormwater is treated as a valuable resource. The strategy involves analyzing and studying the landscape and its ecological processes as a foundation to improve climate resilience and promote sustainable stormwater management. The approach relies on integration of infrastructure planning and urban design across the hydrological context, ultimately delivering a more sustainable and climate resilient city for people in Reykjavík.

Research question(s)	The main objective is to explore the potential of a landscape based green-blue network for Reykjavik for sustainable urban development and to then strategize and identify design principles for water-sensitive and ecological inclusive public spaces. Raising the subquestions: 1. How has the socio-ecological system in Reykjavík evolved from its historical functioning to its present state, considering the impacts of urbanization, and what are the main challenges and potentials associated with the current dynamics? 2. How can landscape-based solutions systematically serve as a crucial tool to address water management challenges in Reykjavík, leveraging their potential to contribute to urban development and exploit the city's spatial capabilities? 3. How can the translation and application of these principles and strategies be incorporated into landscape architectural design?
Design assignment	

1. Understanding the different processes that construct the various systems and the site's context, what are the landscape functions today and how did it used to function. How has urbanization affected Reykjavík's development by analyzing different layers and throughout the scales. Resulting in various maps, sections and diagrams that express such findings. The design locations chosen are 1. The existing pond, Tjörnin in Reykjavík, 2. A wetland patch south of the pond, Vatnsmýri; a former larger wetland area that used to expand into the area where the domestic airport is located today. That whole area will be the heart of the blue-green network. Lastly the forest located on the hill, Öskjuhlíð where the focus will be on green connections worked in gradients from the forest towards the wetland and the shore.

2. Next step is to design a matrix or a toolbox with a set of landscape architecture principles and strategies that comply with the research theories from the theoretical framework and are applicable at different scales with different function and purposes for a landscape-based blue-green network in Reykjavík.

3. Lastly, a detailed design to support a landscape-based blue-green network, by applying principles from the matrix and make a spatial design. The design result will be a wetland park to foster sustainable water management and therefore the cornerstone for urban development in the city. The focus will be on 3-4 different location mentioned before and are chosen for their potential to establish a functioning blue-green network within the city and to ensure interconnectedness between the systems using gradients as an approach; from forest to shore, small building typologies to larger and stormwater treatment; capture to filtration to recharge.

For this thesis, the previously asked research questions will be answered with different methodologies. In figure 1 on the next page, a visual map of the theoretical framework and methodology is shown to demonstrate how various aspects from the applied theories are used to shape the final product, a landscape based blue-green network. Then each research question is briefly described, and the methods used.

For the first subquestion the research methods mainly consist of a thorough analysis of the site, abiotic vs biotic features and literature review on the history of Reykjavík, infrastructure development as well as contacting local water authorities to gather data and information. An interesting article I found in a newspaper article from 1963 emphasizing the tension about the location of the domestic airport which gave me a lot of insight.

2. After identifying potentials and challenges of the site followed by a more thorough literature review on the applied theories in order to develop design strategies and principles as well as gaining a profound knowledge on relatable case studies and other significant readings. A site visit happened in December 2023, although having a personal relationship and general knowledge about the area I was able to study it from a different perspective after the previous research took place.

After reading about the history of the low-lying area where the present-day domestic airport, Reykjavíkurflugvöllur is located I was able to look at the landscape through a different lens during my visit and learned how much this former natural wetland area has been interfered with throughout the urban development of the city.

3. The whole design area, spans from the south end of the pond in the historical center of Reykjavík, Tjörnin, across the low-lying airport that is built on landfill and all the way to the shoreline and includes the urban forest up in the hill, Öskjuhlíð. All of which will be important aspects to support the design of a blue-green network for Reykjavík. Methodological approach here will be detailed spatial design derived from a landscape-based urbanism point of view and expressed with various visualizations and techniques. Design by research takes place here.

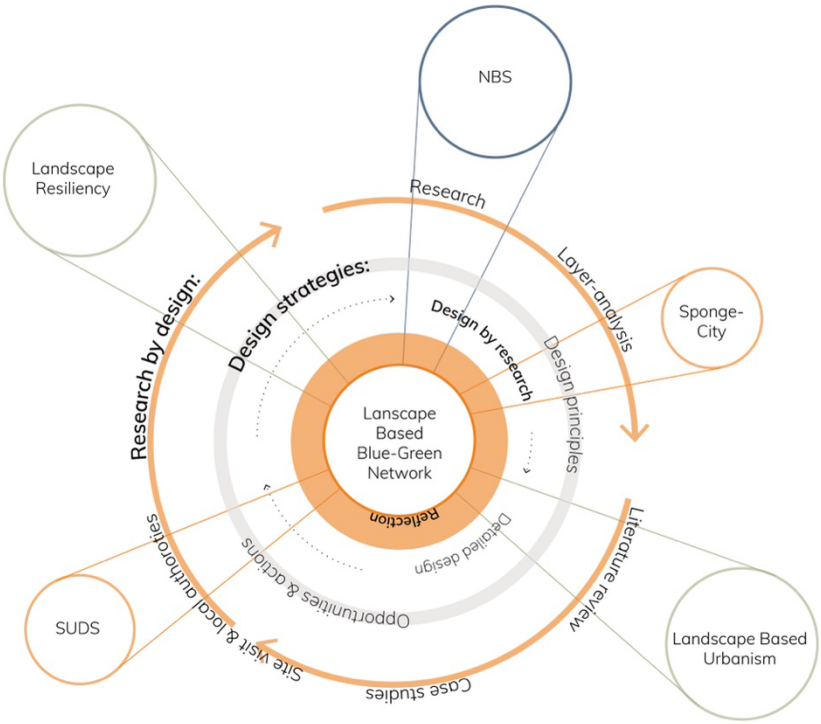

Figure 1 Theoretical Framework and methodology.

Literature and more applied references

[The literature (theories or research data) and general practical experience/precedent you intend to consult]

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V Reflection on the project proposal

1. What is the relation between your graduation topic, the lab topic, and your master track?

The Flowscape design studio for the master's track of Landscape architecture aims to develop innovative systems and processes for urban and rural development by looking at the landscape at its basis and work comprehensively through its various layers at different scales in order to develop a design framework.

My thesis is built on the previously mentioned approach, by starting to look at the landscape at its basis and analyzing its systems and processes to proceed towards a landscape framework for the future of urban development of the city of Reykjavík, Iceland by fostering a landscape approach for sustainable water management.

My thesis is very well fit for the emphasis of the resilient coastal landscape studio in such way that its main focus is landscape-based urbanism in Reykjavík, a coastal area that is experiencing an increased need for resilience due to climate change impacts, increased urbanization and failing infrastructure of the city. Resilience theory is applied by developing design concepts and a framework to create a system that tolerates disturbance, can undergo change and still retain its function, structure and identity, a cornerstone for sustainability.

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

According to the municipal plan for Reykjavík 2040 few of the main priorities are: Increased urban development within the existing boundaries of the city, a greener city where air quality, water management and access to green areas play a big role, an emphasis on sustainable public transportation and the overall goal on creating a better city environment for the people. All of which are supported in this thesis along with other significant sub-goals for the city in the municipal plan.

Iceland aims to achieve carbon neutrality before 2040 and to cut greenhouse gas emissions by 40% by 2030 under the Paris Agreement (Iceland, 2020). The Climate Action Plan for Reykjavík outlines the goals and the wide range of projects needed to create a carbon-neutral society (Reykjavik, n.d.-a). The energy transition is important here where people can use other ways of transportation than fossil-fuel driven private cars. A blue-green network provides options and creates a more desirable environment for other modes of transportation. Adequate treatment of stormwater from streets is also related to carbon neutrality goals.

Another larger relative aspect of this thesis project is that the EU has tightened the requirements regarding wastewater treatment and Iceland, being a member of the EU, has fallen behind in that matter and needs to implement improvements accordingly. That marks an interesting time for Reykjavík where important decisions need to be made for the future of wastewater treatment.

Therefore, a resilient landscape framework in the shape of a blue-green network in Reykjavík supports the goals of the municipal plan of Reykjavík and results in strategies towards achieving carbon neutrality in the city before 2040 as well as it provides an option for a landscape-based approach in stormwater management for the city. The thesis can provide a framework for long term resiliency and become a practical example.