Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

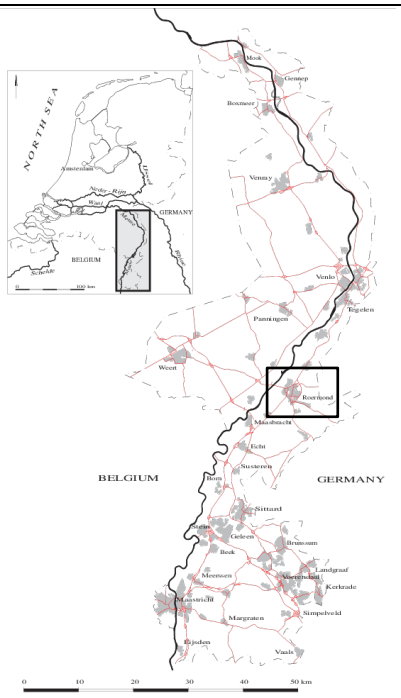
Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

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

Personal information	
Name	Xiaoling Ding
Student number	5292751

Studio		
Name / Theme	Transitional Territories	
Main mentor	Fransje Hooimeijer	Urbanism; Interdisciplinary design;
Second mentor	Marcin Dąbrowski	Spatial planning systems and tools; Climate adaptation and flood resilience
Argumentation of choice of the studio	Cities are becoming increasingly vulnerable to water-related hazards such as flooding, rainstorm and water pollution. To my surprise, in today's highly modern and urbanized world, hundreds of people are still dying because of climate disasters. This forced me to think in the context of climate change urgencies, which spaces and facilities in a city can endanger lives in floods? How to mitigate the impact of floods and rainstorms on cities by design? As for cities themselves, how to mobilize stakeholders and resources to respond adequately when catastrophic events happen? Facing the uncertainty of extreme weather, spatial, ecological, socio-economic, cultural and other aspects need to be transformed. I believe that Transitional Territories Studio, with crisis consciousness and abundant studio activities, could guide me explore flood adaptive design strategies by transdisciplinary approaches.	

Graduation project	
Title of the graduation project	Towards a Flood-Resilient Civil Society: Explore Flood Risk Adaptive Design and Governance Strategies in Roermond
Goal	
Location:	Roermond, Limburg Province, the Netherlands

	 The Meuse River in Limburg, The Netherlands. (Van Noortwijk et al., 1995)
The posed problem,	As climate change intensifies, coastal cities are no longer the only ones at risk from hydrological hazards. Since 12 July 2021, one of the worst floods in European history severed infrastructures in Belgium and Germany, damaged telephone and electricity systems, killed 242 people, and resulted in total property damages of €2.55 billion. Within a month, extreme precipitation also occurred in Turkey, China, India, Afghanistan, Pakistan, the United States, and New Zealand. Landward cities are suffering from an increased frequency of typhoons, intensive rainstorms, and storm surges (Webster et al., 2005). However, most countries around the world still rely on physical geographical indicators to predict flood risk, with little regard for the uncertainties of rapid urbanization and extreme weather. The same is true of Flood Risk Management (FRM) strategies, which focuses on flood control measures through the construction of dikes and weirs, whilst the potential role played by the other sciences, such as spatial planning and social sciences, has been somewhat neglected. Limburg, located in Meuse riverine areas, is highly exposed to fluvial floods and pluvial floods. The 'Ruimte Voor de Rivier (Room for the River)' Project in the Netherlands has greatly reduced the damage of floods over the years, but Limburg was still devastated by the flood in the summer of 2021, suggesting there is room for improvement, especially in non-structural measures implemented in partnerships between the public, private and civils. Sometimes complete engineered measures may create more risks as both the citizens and decision-

	makers may put too much faith in engineering, while paying comparatively less attention to flood preparedness and awareness as well as a contingency plan (Birkholz et al., 2014). This project aims to take Limburg as an example, unite the available forces of the private sector and civil society, and explore flood adaptive design measures as additional FRM strategies.
research questions and	The primary research question is: "What role can Public-Private-Civil Partnership (PPCP) play in facilitating the mechanisms of a Science-Policy Interface (SPI) that aim at flood resiliency?" The secondary questions are: SUB 1: What is the relationship between public-private-civil partnership and science-policy interface? SUB 2: What impact can public-private-civil partnership have on flood resiliency? SUB 3: In what way does a science-policy interface help with flood resiliency?
design assignment in which these result.	1. A new concept of Public-Private-Civil Partnership (PPCP) By broadening and theorizing existing conceptual structures of Public-Private Partnership (PPP), the PPCP innovatively emphasizes the focus of the subject, which is civil society. This theoretical innovation can also be applied to other urgent crises, such as pandemics, droughts, earthquakes, etc., rather than just flood risk. 2. Science-Policy Interfaces (SPI) A series of models that can be expanded and tested. There are different ways to build relationships between policymakers and other stakeholders that can facilitate information exchange and co-evolve knowledge to enrich decision-making. 3. Thematic atlas A series of maps that depict the geographic pattern in the field of flooding mitigation around Roermond. Using four lines of inquiry as a clue, the atlas tells a story of Roermond's development and change in Matter, Topos, Habitat, and Geopolitics, and is thus a useful tool for the broad target audience, which includes researchers, officials, and the public at large. 4. Regional FRM strategies Policy recommendations for improvements in flood risk management in Limburg. The focus is on the intervention of civil society and spatial planning sciences. 5. Local environmental vision

	A proposal for Roermond from a flood mitigation perspective, including renderings and guidance document. 6. Local urban design A plan for Roermond urban renewal, reuse, and adaptation that takes into account flood risk. It includes policies, priorities, programs, and land use. 7. Microscale design toolkit A collection of best practices internationally on effective measures as concerns flood preparation, flood recovery, flood risk mitigation, and flood adaptation. It can be used for stakeholder engagement, partnership establishment, spatial design, etc.

Process

Method description

1. Research by design

A method of academic investigation, which promotes the progress of research by means of design and also uses research results to promote design.

2. Literature review

A holistic approach to demonstrating knowledge and theories on a specific topic placed in context. Sources covered in the review include scholarly journal articles, books, government documents, policies, spatial plans, etc.

3. Analytical mapping

A means of spatial analysis that attempts to make it clear and easy to identify patterns and trends in the field concerned. It includes digital processing and visualization of data.

4. Multi-scale analysis

A method of studying complex problems, usually a particular problem at multiple times, spaces, or other scales.

5. Stakeholder analysis

A process of identifying target actors before design. Group them according to their power, interest, and attitude, and then decide how best to engage and communicate with each group.

6. Case study

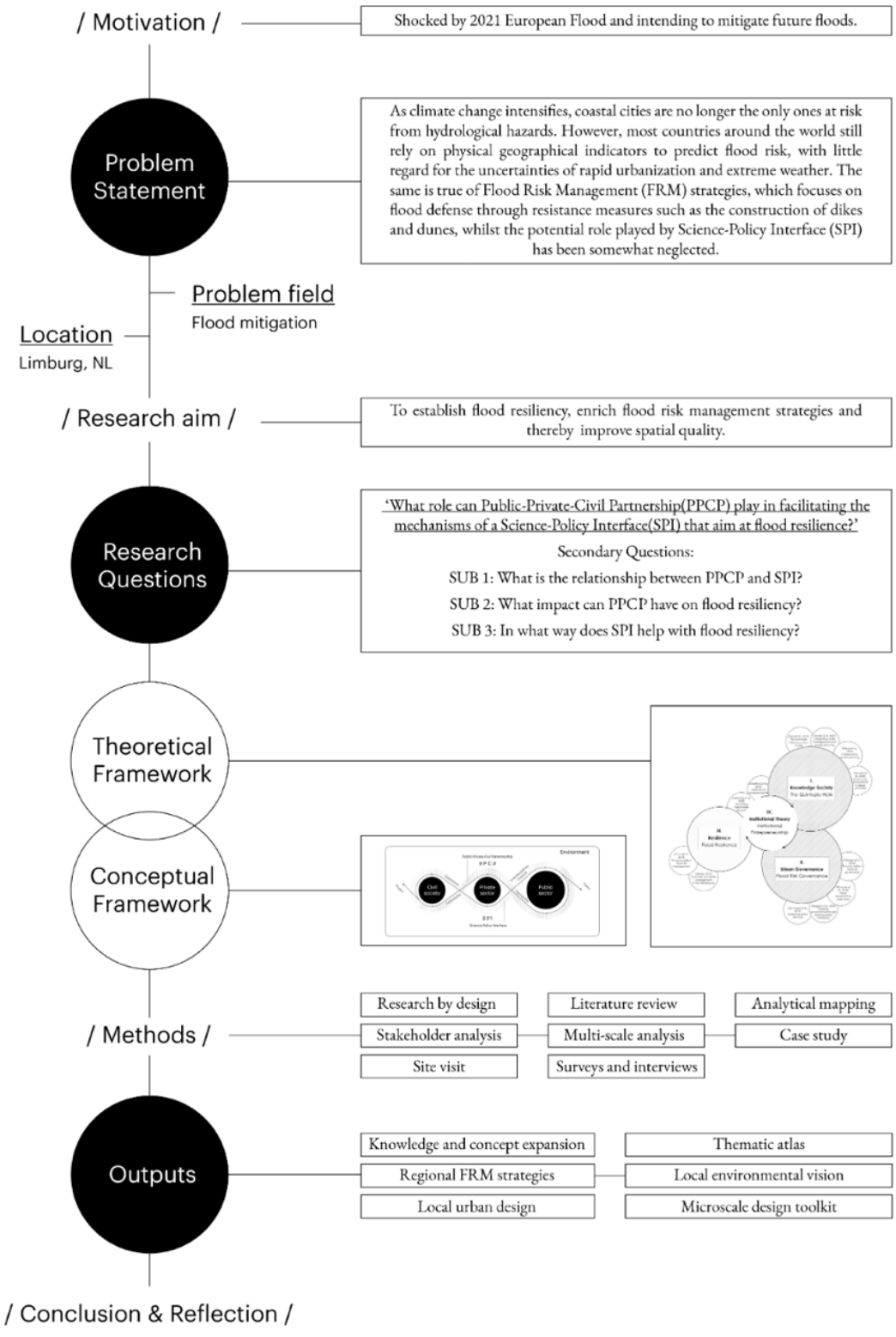
A detailed approach to a particular topic, such as flood organization, flood mitigation strategies, climate adaptation design, etc.

7. Site visit

Often lasting several days, including the site of the proposed design, the site of the case study, etc. The goal is to get real, in-depth information.

8. Surveys and interviews

A survey is a questionnaire in which people are asked to write down their answers to questions. Interviews, which involve asking people questions and recording their responses, usually have a higher response rate than surveys. These two methods are suitable for selecting representative stakeholders for qualitative analysis.



Literature and general practical preference

Literature:

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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 project focuses on flood risk management in riverine areas, including pluvial flooding and fluvial flooding. Studies on fluvial flood management need to pay attention to the relationship between upstream and downstream, and studies on pluvial flood management requires awareness to the urgency of climate change. While enriching flood risk management strategies and bringing in more stakeholders, the function and form of the relevant space will change, which is the "accumulation" and "clearance" process that Transitional Territories Studio stresses.

From a theoretical point of view, the project combines knowledge and concepts from design practice, social science, technology and engineering to explore innovative approaches to greater flood resilience. This kind of thinking stems from the MSc Architecture, Urbanism and Building Sciences programme, which cultivates my ability to solve problems across disciplines. In addition, one of the cores of the project is the integration of spatial planning tools into flood risk management. This process involves urban analysis tools such as multi-scale analysis and research by design, which are emphasized by Urbanism Track.

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

Social relevance：

This project's findings will redound to social benefits, considering that flood is a problem that threatens everyone's interests. Thus, municipalities and provinces that apply the recommended approach derived from the results of this study will face less human and property loss when floods do come. Decision-makers will be guided on what extra policy options should be considered. For the researchers, this investigation will shed light on key areas of collaboration in water management and urban planning that many researchers have yet to explore. For landowners, the

results of this study can help build flood awareness and provide a selection of guidelines for flood adaptation measures.

In general, since the project outcomes are optimal solutions proposed from the standpoint of the public sector, private sector, citizens, academia, and the environment, they can promote mutual understanding among different groups, improve the efficiency of design measures, and thus enhance social cohesion.

Scientific and professional relevance：

Policy transition is often stimulated by flooding events in the real world while neglecting the role played by Science-Policy Interface (SPI). Recent research in the field of flood risk management demonstrates how SPI fostered the uptake of knowledge and technologies in practice (Liefferink et al., 2018). Also, previous studies have emphasized the importance and necessity of planning in flood affairs to promote flood resilience, but few have mentioned specific interventions (Waylen et al., 2018). This thesis will address this gap by analyzing flood risk management policies and partnerships under the Dutch context, and look for ways in which spatial planning can be involved in flooding issues to enrich flood risk management strategies.

This thesis also documents several key contributions made to the fields of public engagement. By analyzing the actors behind each design strategy, the research can identify the scope of stakeholders in flood issues and propose more targeted incentives. With more solidarity, it also helps to promote the implementation of top-down policies to adapt to flood resilience.