

# 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	Cas Goselink	
Student number	4463811	
Studio		
Name / Theme	Transitional Territories	
Main mentor	Fransje Hooimeijer	Urbanism (Environmental Technology and Design)
Second mentor	Denise Piccinini	Landscape Architecture
Argumentation of choice of the studio	<p>As stated in the Transitional Territories studio brief, it is an interdisciplinary studio that is concerned with the territorial project in lowlands regions. On the interface between water and water-related territories, in the light of a changing climate, it is the object of architecture, urban design and spatial planning which interrelates nature, society and geopolitics. This suits the thesis project exactly, as it focusses on the delta system in the Netherlands, in relation between spatial riverine regimes and a changing hydrological cycle. Especially in these projects, related to environmental design and infrastructural objects, the interdisciplinary platform provided by the TT studio in collaboration with the Delta Futures Lab and faculties of CEG and TPM allows for an urbanist view in a cross-domain research.</p> <p>The particular focus of the studio on the contemporary anthropogenic environment is a second reason to choose the TT studio. Taking several different perspectives on the current state of matter allows for a temporal scale within the project, projecting a time-sensitive interference within the territory. Especially in the Dutch context of integrated urbanism and landscape architecture, the highly adapted landscape cannot be dealt with without paying attention to the how and why of the current state.</p>	

	<p>Lastly, it is the way in which the studio represents itself which attracts me, in both word and visualization. Through several different ways of representing the work in a coherent, abstract and stylized manner, in combination with a constant process of questioning, considering and analyzing, the works of previous years show a deep and fundamental understanding of the objects and matter addressed in the thesis projects.</p>
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<b>Graduation project</b>	
<b>Title of the graduation project</b>	Perspectives on the IJssel: an urbanist reconceptualization of water management in the anthropogenic riverscape
<b>Goal</b>	
<b>Location:</b>	IJssel River basin, Netherlands
<b>The posed problem,</b>	<p>In recent years, mostly since the extreme drought in the Netherlands of 2018, the fragility of the Dutch river system has become apparent in common discourse. The Rhine, which constitutes most of the Dutch delta system through its branches, is becoming increasingly influenced by climate change.</p> <p>The riverscape has been continuously adapted to increase usability over the past centuries, focusing on riverine regimes of flood control, navigation, fresh water supply and eco-hydrology (Sijmons, 2002). In the face of a rapidly changing climate regime, the extreme pluvial events in catchment basins, alternated with periods of water shortage or even drought, form a real threat to the riverscape and its uses (Tol et al., 2003). In order to be able to maintain the intricate riverine systems, adaptation to the new climate regime and hydrological cycle is paramount. The water levels in the rivers will become highly dependent on the amount of precipitation in the catchment basin, and therefore discharge levels will fluctuate increasingly high and sudden (Attema et al., 2014).</p> <p>The typical Dutch landscape, characterized by its austerity and functionality, has always been planned along the confines created by water management systems (Sijmons, 2002). When the Rhine is becoming a rain river, it could lead to the complete de-naturalization of the system in order to sustain our economic needs in relation to the</p>

	<p>EU Green Deal (Kraaijvanger &amp; Lindeboom, 2019). On the other hand, it would create possibilities to rethink the relation between human and natural systems, leading to a more nature-based approach towards managing water (Baptist et al., 2019). The IJssel, being a branch with a set discharge of 1/9<sup>th</sup> of the total flow of the Rhine, is especially interesting as it does not only support a riverine transport system, but also plays an important role in the fresh water supply to the drought stricken east of the Netherlands and supplying the IJsselmeer fresh water storage. This duality of the problem for the IJssel River basin adds to the stress the territory is about to experience, and underpins the importance to rethink the anthropogenic riverine water system and its territory.</p>
research questions and	<p>Primary research question:</p> <p><i>How can water management systems of riverine territories be synchronized with a new hydrological cycle of droughts and peak discharges, while increasing its performance to society?</i></p> <p>Secondary research questions:</p> <p><i>1: How can the spatial representation of the contemporary riverine water management system be characterized?</i></p> <p><i>2: How do riverine regimes react to the pending changes in the hydrological cycle?</i></p> <p><i>3: Which alterations are needed in riverine territories in order to adapt to the new hydrological cycle?</i></p>
design assignment in which these result.	<p>At the base of the thesis lies the assumption that an urbanist (and designerly) perspective on the reconceptualization of the spatial dimension of the water system can be a valuable addition to contemporary discourse concerning riverine climate adaptation strategies and water management structures.</p> <p>Currently, the system is managed by placing objects, after which the surrounding territory can be planned accordingly (Sijmons, 2002). By</p>

reversing this process, a spatial design with more positive externalities to society can be created, after which the management of the water system can be implemented. Especially focussing on the issue of drought, the spatial dimension of the surrounding territory has to be taken into account from the start.

As has become apparent during the theoretical research into the contemporary discourse regarding riverine climate adaptation strategies, there are gaps in the scales on which the plans are proposed, and an integrative approach containing different views is needed. This design proposal aims to provide an integrative strategy regarding the 4 identified spatial riverine regimes (Flood control, drought management, navigation and eco-hydrology) and show the impacts of the proposal on the object-, ensemble- and territorial scale. The idea of either integration or separation of the 4 riverine regimes is a guiding principle throughout the scales. In order to increase performance to society, it is paramount not to compromise when it comes to the separate needs of the regimes, and therefore the current state of the integral riverscape (all regimes in one system/flow path) is questioned. A parallel system might be better suited to adjust to site specific conditions, which would lead to a set of junctions between environment, infrastructure and waterscape. By elaborating on the territorial scale, and showing the implications on the architectural scale, the changes in the water management system become apparent and clearly visible for a larger audience. This way, discourse can be stimulated in more detail, involving a broader audience.

Territorial scale:

The strategy to adapt the riverine territory to the new hydrological cycle and climate regime (based on research into the expected flow rates and precipitation) will identify how the water system should be managed on the scale of the entire river. This will be a quite abstract level of strategizing, focussing mostly on the systemic functioning and less on the spatial conditions the strategy will engage with. This strategy will be mostly made up of diagrammatic drawings.

	<p>Ensemble scale:</p> <p>The embedding of the more abstract overall strategy into the actual territorial conditions of the different sites along the river will take place on the ensemble scale, where the superimposed strategy will be adapted to the conditions of soil, habitat typology, economic importance and urban developments. A special focus will be placed on the integration of the current geopolitical regime of the energy transition, trying to interact with this (invasive) spatial landscape typology. The representation of this scale will result in sections and transects, taken along the river to identify local conditions combined with the hinterland-relation of the river in a set of lateral trenches.</p> <p>Object scale:</p> <p>The lowest scale, bordering the architectural level, will show the spatial integration of the water management objects needed by the system to perform, in relation to the newly created territorial form. This will clearly show the implications for users, inhabitants and other actors in the riverine territory, in order to enhance the level of detail of discussion, and engage a broader audience within the decision making process concerning climate change adaptation strategies. Up till now, these have been on a large and abstract level, the object oriented small scale will provide an insight in the changes this will lead to for the local people involved. The visualization of the object scale will result in maps and sections, but mostly isometric spatial models and birds- and eye-level views.</p>
<p>[This should be formulated in such a way that the graduation project can answer these questions. The definition of the problem has to be significant to a clearly defined area of research and design.]</p>	

## Process

### Method description

In order to obtain the necessary information to create an understanding of the IJssel riverscape, several methods and lines of inquiry will be used. A special focus is placed on Research by Design, one of the fundamental understandings of the Transitional Territories studio. A second focus will be places on the co-creation of knowledge, which is more challenging during this COVID-19 pandemic, however now maybe more important than ever.

The methods used in order to obtain the information, and the methods of representing this information, differ per line of inquiry. The research into the hydrological cycle consists of a literature review, combining several sources and predictions in order to obtain a detailed overview of the pending changes and their impact on the hydrological system. The outcomes will be visually represented in a hydrographic- and hydrologic model. The spatial representation of the identified riverine regimes is identified through the monograph series, in which the riverscape is analysed in regards to Matter, Topos, Habitat and (geo)Politics. By creating critical cartographies and spatio-temporal analysis of the development of the riverine systems, the scale of time can be integrated into the work. Through site visits, the monographs series will be enriched with photographic material.

In relation to the riverine regimes, the concept of co-creation of knowledge is the leading way of inquiry. Especially in this line, it is important to combine knowledge from practitioners coming from different fields. The min - max method consists of creating a preliminary model of a scenario in which the spatial environment is completely adapted to maximize 1 riverine regime (max), and a scenario showing the minimum requirements (min). By discussing the outcomes with experts in their fields, new knowledge can be created, leading to new concepts in the design. As already explained, the research by design strategy is deeply embedded in the TT-studio works, which allows for constant iteration and manipulation of the design. The last method is semi-structured interviews with practitioners, which will allow for comparison through a set baseline of questions, but is open to the specific viewpoints and interests of the practitioners, thereby increasing depth and detail in the obtained answers. The design will, in accordance with the results of the theoretical framework, go from the territorial, through the ensemble, to the object scale. This will ensure the clarification of the impact of the proposed strategy on the very local scale in order to increase debate on the topic for a wider audience.

In order to evaluate the research aims and outcomes, success criteria will be set with the experts of the riverine regimes. They will be able to pinpoint what, from their specific perspective, will be an outcome that will, in accordance with the aim of increasing performance to society, be reaching this

goal. The overall strategy, from the large to the small scale, and the integration of the regimes in a balanced way, will be made visible through the Tohoku method, in which the presence of several elements and their influence in the overall design, can be shown on scales in relation to each other. Limitations to the project will be posed mainly by the allotted timeframe. For the Dutch delta region with its extensive man-made water management systems and legislation, an extremely large amount of information is readily available, and many considerations have to be taken into account. This is not doable within the given timeframe of the thesis project, and therefore the first steps are related to abstracting the system to the core principles from a spatial viewpoint.



## 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 is focused on the interface between water and water-related territories, located in a lowlands environment. This is aligned with the Transitional Territories studio, which focusses on the relation between natural environment, culture and politics, specifically in relation to marine and riverine territories. The studio provides a platform for interdisciplinary research into the territory and the changing climate regime. The role of urbanism in this cooperation with engineering and planning disciplines, is to provide a view on the spatial implications of interventions in the environment, posed by (geo) political regulations and infrastructural

objects, while keeping livability, performance and other societal demands in mind. In relation to the overall MSc AUBS program provided by the Faculty of Architecture and the Built Environment, it is the object of architecture, urban design and spatial planning which physically constitutes the living environment, posed onto the territory and subject to interior- and exterior forces of change. In the case of this specific project, it is the exterior force of the changing hydrological cycle, and the interior geopolitical force of the energy transition and EU Green Deal.

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

As explained throughout the previous parts, the relevance for the project is threefold.

Firstly, the problems caused by both extreme peak discharges, as well as droughts with extreme low discharge rates, have been increasing over the last few years. The predictions show that this is only the beginning of a complete change in the hydrological cycle, and therefore an adaptation strategy is necessary.

Secondly, the literary review concluded that there is a gap in discourse concerning riverine climate adaptation strategies. The separate riverine regimes of flood control, drought management, navigation and eco-hydrology, all propose ideas and strategies related to their own specific needs and values. Integration of those often opposing plans in discourse is not common, and due to the abstract and high scale level of the strategies the details of the plans are often not thought of. It is paramount to visualize the plans, as the problems which have to be solved in order to make the plans viable become clear and apparent.

Thirdly, discourse concerning riverine strategies is often limited to the related practitioners and scholars. As can be seen with the publication of the plan by Baptist et al. (2019), a visualization can lead to a widely spread debate in a broad audience. This is why the project proposes a fundamental reconceptualization and visualize this through the scales, in order to captivate a larger audience and show how a new view on a centuries old system might lead to new concepts. Again, it is the sharing of knowledge and views which will lead to the co-creation of new knowledge.