P4 Reflection

Graduation Studio: Delta Interventions
Title of Graduation Project: The Water Institute
Mentors: Prof. Frits Palmboom / Jan van de Voort

The process of the graduation design is an experiment of the interaction between research and design; a practice of setting up the designer’s own theme base on the studio’s theme and personal research; and an exercise of trying different possible research and design methods to search for the most suitable one.

Different from the architecture design whose design assignment is given, participants in the graduation studio have to set up our own theme including the location and architecture type within a border theme of the design studio. The “Guiding Theme” of Delta Interventions Studio is to design an architecture related to water when facing sea level rise, increasing peak discharges of the rivers and intensification of rainstorms due to climate change. Location can be chosen within both the Southwest delta near Rotterdam, and the Ijsselmeer area near Amsterdam, however, other locations between cities and their water-landscapes are also acceptable. Under this frame, the research and design began by a serious of self-questioning: What kind of architecture is the best to study the relationship between water and architecture? Where is the best location to perform the design?

The theme of the graduation studio is wide enough to give flexibility for students to explore different possibilities, but the flexibility also gives difficulties on choosing architecture type, the location and related design issues. As a result, research is necessary not only for building up personal design theme, but also for supporting the following design.

The research began with the history of human interventions towards water and how Dutch citizens protect their land and properties from being flooded. One of the most valuable discovery during this procedure is people’s changing notion from “Building against Water” to “Building with Water”.

The Dutch created canals and artificial watercourses; manipulated and drained water in lands; and built structures like dikes and dams to prevent the country from being flooded and increase habitable land area. However, the increase of flood frequency and severity and the limited land for urban expansion lead to the reconsideration of current flood defense strategy. Facing such situation, new strategies like “Room for the River” project in the Netherlands (Fig.1), a project to manage increasing water level by increasing river conveyance by opening up more room for the water to flow through, is designed to increase flood resilience ability by a more natural way.

Figure 1: Illustrations of the river’s course before and after the project. [Source: Room for the river Waal Nijmegen]
From my perspective as an architect, hard defense structures like dams and dikes creates a disconnection between water and land, decreasing the water accessibly for inhabitants living in the protected areas. Therefore, I set up the main theme of my graduation design which is to design an architecture to reactivate the relationship between water and land.

![Figure 2: Current Situation of Dike between Water and City](image1)

![Figure 3: Future Development with "Building against Water" Strategy](image2)

![Figure 4: Purposed Future with "Building with Water" Strategy](image3)

In order to achieve the theme, the chosen location is in a juncture between water and land. The site locates in the east point of Zeeburgereiland, a triangular polder constructed in 1912, in a juncture between Amsterdam city and Ijsselmeer area. The polder is to the east of Noorder IJdijk, a lock that separated Markermeer and North Sea Canal. As a result, the polder is protected by a series of locks in the North Sea Canal. Moreover, the chosen location is also protected by Afsluitdijk which dammed off Ijsselmeer in 1932. The site is to the east of Zeeburgertunnel, a road tunnel connects the Zeeburgereiland (East Amsterdam) and Amsterdam-Noord with each other built in 1990. The site is separated by the Zeeburgertunnel from the main polder, leaving it isolated and a problem of traffic noise. The site is currently empty and not used.

To further elaborate the “guiding theme” which is to design an architecture to reactivate the relationship between water and land, the “3x3x3 Analysis” of the chosen location was carried out. It is an analysis of comparing maps of the location in 3 different scale (Ijsselmeer Region; Amsterdam City; Zeeburgereiland), 3 different time (1630; 1940; 2016) and 3 different layers (Occupation; Infrastructure; Landscape). By comparing these 27 maps, the changing relationship between Amsterdam and Ijsselmeer area is discovered. The relationship reduced due to the construction of North Sea Canal and the change of main transportation from ship to train. However, along with the development of Amsterdam city, the position of the chosen site changed as well. Originally, it was a place of filling with dredged sediment coming from the IJ and the Eastern Docklands and a place to dispose sewerage from Amsterdam to Ijsselmeer. It became the new connection between north and south of Amsterdam and the connection between Amsterdam and Ijsselmeer area (Fig.5). As a result, the theme of the project is further developed from merely reactivate the relationship between water and land to reactivate the relationship between
Markermeer and Amsterdam and the relationship between water and architecture users. The theme is inspired by the boarder theme of Delta Interventions Studio and is developed by a series of personal research.

With the theme to reactivate the relationships mentioned above, the design assignment was made. It is to design a water institute to use Amsterdam, an international port where talented scholars could gather, to deal with water related issues, especially ones happen in Ijsselmeer. The water Institute is an educational facility which focus on the sustainable use and management of water resources to support health and prosperous communities. In the same time, public events would be held in the institute to raise the attention of citizens in Amsterdam to the issues mentioned above. With the increasing attention to the Ijsselmeer region, the connection between Amsterdam and Ijsselmeer is hoping to be reactive. In the perspective of architecture, water-related architecture will be explored to strengthen the relation between water and architecture users.

The design assignment which is to design a water institute in the east point of Zeeburgereiland is finally set up after different researches of water related issues. However, as architecture design begin, research is still required for giving guidance. For example, the research of chosen site such as noise analysis, terrain analysis, surrounding water level and vehicle accessibility (Fig.6) helped to design a site plan that could handle the situations happen at site (Fig.7). And with the attention of introducing the outdoor views to indoor, the shape of architecture is guide by researching surrounding views. Furthermore, the research of existing architecture projects especially research institute, library and campus not only gives inspiration of the architecture design but also its programs. However, the arrangement of plans and ideas of interior atmosphere also influence the settlement of programs.
Although research give guidance to design, design also determine what kind of research is needed. For example, a harbor and central park was first designed to link the urban district and the institute to reactivate the relationship between Amsterdam and Lake Markermeer (Fig.7). However, the research of surrounding water level, wind setup, the current route of shipping at site hold back the former proposal and a reconsideration of the design is needed. With the hope of maintaining the initial idea which is to reactivate the relationship between Amsterdam and Lake Markermeer and also create an outdoor areas for architecture users to have a closer relationship with water, former idea of designing a harbor was reformed to function as a “water purification landscape” (Fig.8)(Fig.9). Then, the research of relevant projects create a landscape to increase the relation between the architecture and the context. Moreover, the relationship between architecture and water is strengthened in a sustainable way. The collected rain water and gray water from the institute will be purified by stairs planting reeds and the purified water will be reused back to the building.
During the design procedure, although some methods work during the design process, some approaches failed to achieve the expect outcome. One example is the design of harbor need to be reconsidered and redesigned to a “Water Purification Landscape” as mentioned before. Another similar example is the façade design. The proposal of façade design in P3 (Fig.10) is too geometrical and requires adding the character of water. In order to add character of water into the architecture, different approaches such as changing the initial shape to curve lines and adding curve panels to the façade were tried but failed to fit the original design. I also tried to use different triangular panels to form curve lines to imitate the shape of water waves (Fig.11). But such strong character weaken the initial architectural concept and it requires a stronger geometrical order. After different trials, the final proposal is to have regular rectangular panels but create changes in section (Fig.12). In such case, although the façade is guided by a certain order, it has horizontal curve lines when it is observed from the side. Besides, as the grass panels have different angles towards sunlight, the light guided into the interior can be referred to the sparkling reflected light on water. From these experiences, I learned that although some design approaches may not work as expected, they are necessary and essential. The failed approaches could give guidance for the following research and design. Thanks to the unworked approaches, different design possibilities are tried and the design develops through such procedure.

In the wider social context, we are not only facing problems of sea level rise, increasing peak discharges of the rivers and intensification of rainstorms due to climate change but also facing sustainable problems such as environmental pollution and energy depletion. The architecture
design began with the intention to solve the problem of water related issues. The initial intention of the Water Institute is to raise people’s attention towards water related issues but also use architecture to weaken the disconnection between water and land. However, as the design developed, other sustainable issues are also considered. For example, the design of “Water Purification Landscape” and the recycle water system intentions to solve water pollution. The use of solar cells in façade design intentions to solve the problem of energy depletion. All in all, the architecture design intents to solve sustainable problems not only in water related issues but in a wider environmental range.

In conclusion, the graduation design is an experiment of the interaction between research and design. Research firstly helped to establish the design assignment. Within the design procedure, some issues and questions are to be answered. As a result, new research is needed and it could either reinforce the initial idea, hold-up the idea or give new ideas to the design. Research and design interact with each other and gradually contributes to the establishment of the final result. The most valuable lesson is to always keep the design flexible. Some methods and approaches during the design may not work as expected. But design is not about setting up the “correct approach” from the beginning but to try and compare different approaches in order to find the most suitable approach. During this procedure, more and more research and design are required and the product is developed.