

REFLECTION

Merwe-Vierhavens is an old harbor area of Rotterdam, which currently is losing its original function with the relocation of the harbor functions to the 'Maasvlakte 1 & 2', on the outskirts of the City of Rotterdam. The increasing vacancy of the existing buildings and the isolated character – due to disconnected infrastructure, the monolithic existing program and the overall low quality of public space – are the main problems of the Merwe-Vierhavens. In line with the vision of future urban transformations of Rotterdam, these problems ask for a fitting solution, which raises the following questions:

- How can an architectural intervention in the Merwe-Vierhavens give new meaning and bring new life in the area?
- How can the Merwe-Vierhaven be reconnected in its surrounding urban fabric?
- And what does it take to increase the overall quality of the public space?
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The goal of this architectural assignment is to design a building that reconnects – both on a physical as well as on a social level – the port of Merwe-Vierhavens and the project location to its direct surrounding and to the city of Rotterdam. The aim is not only to inject a variety of program and functions – those of which are lacking – into the area, but also to create, transform and shape the public space, in a way the variety of program and use of public space can maintain its own intervention as well as its surrounding in a social and architectural sustainable way.

This graduation project – consisting of a maritime research centre for experimental technologies with a mix of dwellings and supporting leisure and retail – is developed in combination with a cruise terminal from another graduation project. Both projects share the same theoretical framework and have been developed as an integrated whole. It is believed that both projects and their different functions can create a synergy which enacts the idea of a 24 hour use of space and therefore can give the qualities this urban intervention needs. Within this context, three aspects of research and design have been identified:

- Spatial composition: Position and relation between the varieties of new functions.
- Connection infrastructure: Connections based on the relations between the functions and its users and the users themselves.
- Achitectural space: Achitectural design, directly informed by the special composition, the connection infrastructure and other architectural qualities.
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In line with the methodical approach of the Hyperbody Studio, most of the research and design of this project have not been about a fixed composition of architectural spaces and elements, but rather at creating computational self organizing systems. These bottom-up systems, based on certain top-down rules, give the possibility to get a better understanding of complex situations. This in turn can inform the design problems with logical solutions. With this project, the internal relations between the different functions as well as their local surrounding were researched and defined.

Factors, such as proximity to water, possibilities to be placed on top of another function, and noise pollution were also taken into account. The relation between different types of users and their usage of functions were also defined and mapped out as well as architectural criteria, such as the wanted spatial experience of the exterior/interior, solar exposure and the overall aesthetics. In short, the main research was focused on how to embed and combine these relations to inform the architectural composition and design.

This resulted in parametric and computational simulations and models coded in Java. These tools are based on the research of swarm behaviour and interaction of intelligent 'agents', and generate architectural configurations in an emergent way. These agent-based developed tools inform one another; the spatial configuration of simulation X informs the starting point for Simulation Y other and vice versa. Not only is a feedback loop present between the different computational systems, but also between me, during the process of establishing and using these tools. This fits the parametric and computational approach to architectural design of the studio Hyperbody. Top down design strategies will give form to agent bases bottom up design choices.

Especially at the start of the designing process, this chosen computational approach can sometimes give the feeling that you are designing on an 'abstract' or 'meta' level, without any concrete or fixed solutions or outcomes. But in the end, the research I did on these computational simulations helped me a lot to understand the complexity of relations between all aspects and parts of the project. Without these computational methods, it is easy to simplify certain aspects of a design which could make you overlook relations, which can be important for your architectural design.

To summarize, by defining the relations between the functions, its users and the environment, I was able to develop different parametric tools which helped me to not only design an architectural solution to the problem of the Merwe-Vierhavens, but also to understand the complex relations between the architectural and social aspects. This made it possible to design a building that reconnects the Merwe-Vierhavens and the project location to the city of Rotterdam. The developed parametric tools inform not only me, but also each other, and overall the architecture on different levels, and creates and shapes the public space in such a way that the variety of program and use of public space can maintain its own intervention as well as its surrounding area in a social and architectural way.