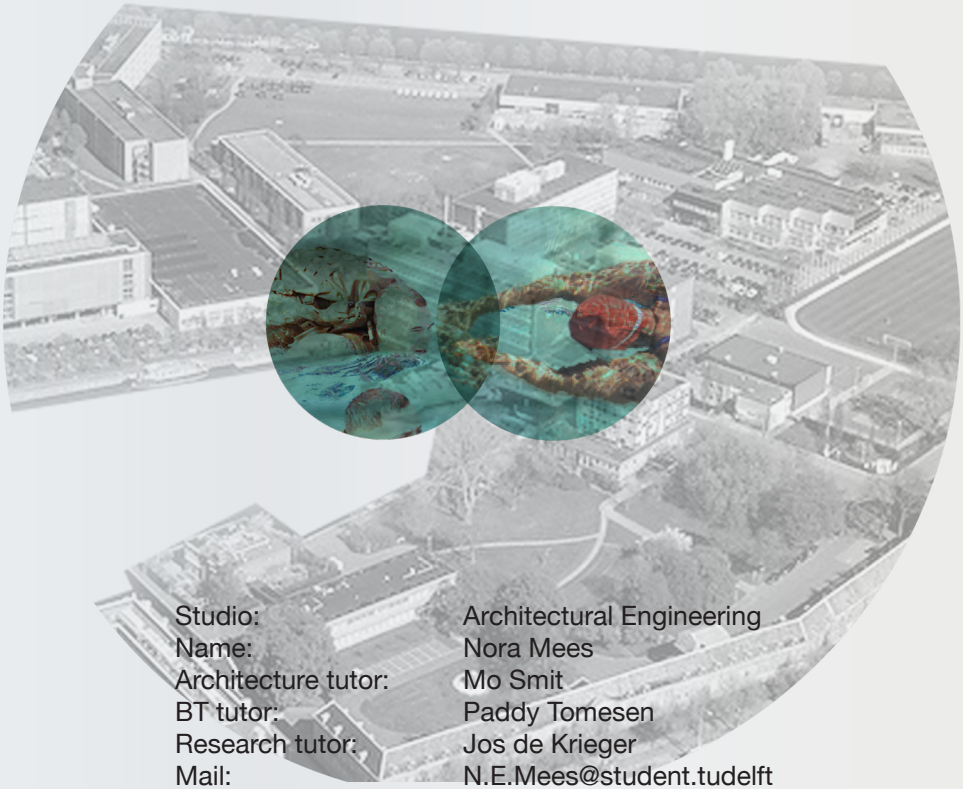
Reflection paper

***Integrated movement**, the reintegration of the marine establishment into the public space of Amsterdam*



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Reflection paper

The architectural engineering studio consists of two phases; a research part and a design phase. The graduation starts with both research and design, however in the beginning the majority part is research. The research continues and develops into the design in the second phase. In the second phase the majority of the work is design.

My graduation project is located in the marine area of Amsterdam. This area is currently transforming from a closed military area towards a publicly assessable area. To make this a vital part of Amsterdam, new functions need to be introduced to activate this area. A thorough analysis has been performed on the location taking into account the vision of Amsterdam, the historical context and the identity of the area and the different functions in the neighborhood. This analysis showed that a swimming pool in this part of Amsterdam would be a great addition to the marine area. As a transition zone, both the military and the public can use this function that is closely related to the marine identity of the area. The problem regarding swimming pools is that they have a high energy demand due to their high indoor temperatures and large required ventilation rates to control the humidity. There is a big challenge in reducing this energy consumption as this is mostly provided by natural gas. This has led to my research question:

How can a swimming pool with a sustainable energy design bring the vitality of the city into the marine area?

With a thematic research question: What interventions can be applied to a(n) (existing) swimming pool to eliminate natural gas consumption and reduce the overall energy consumption?

To answer the latter question, an overview was made of existing interventions that can be used in swimming pools which where categorized based on the Trias Energetica (Figure 1). This showed clear measurable results regarding the insulation values of the building and technical installations that can be applied (active interventions in Figure 1). Because these measurable interventions already showed that the energy demand of a pool can be significantly reduced, the focus of the research became more towards the active interventions instead of the passive interventions.

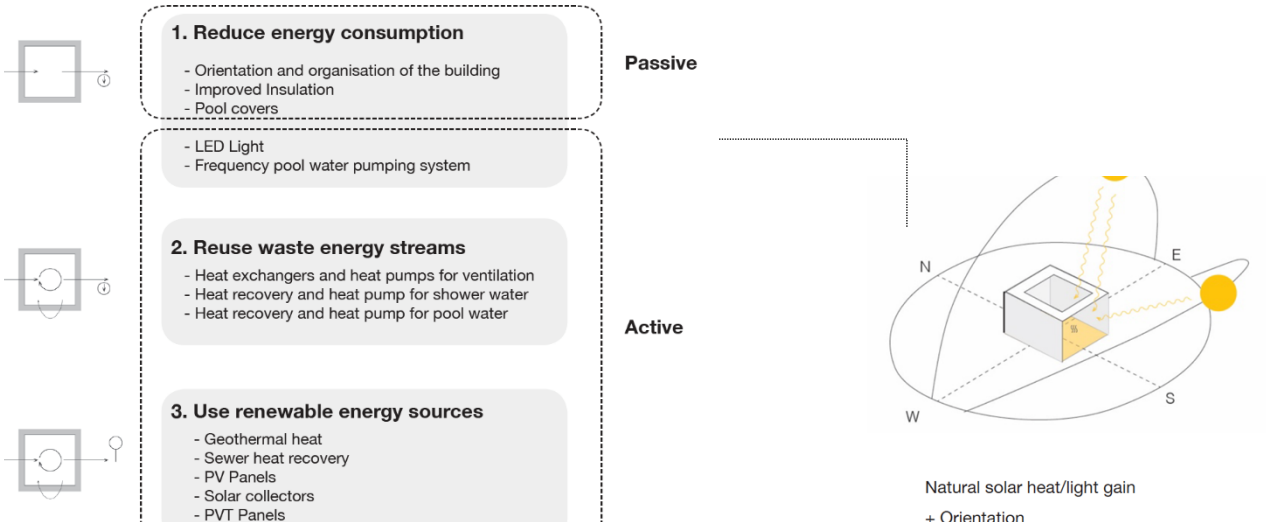

Figure 1: Interventions categorized according to Trias Energetica.

The research that has been done regarding the energy use of swimming pools needed to be reinterpreted when the design started. I found out that, especially in the beginning of the design phase, great energy savings can be achieved by considering the heat of the sun and orientation. Therefore, in the beginning of the design phase, the focus shifted more towards the passive interventions rather than the active interventions. This led to the research of using the orientation of the building in combination with thermal mass. Additional research performed in the concept of energy saving by using thermal mass resulted in materials that are capable of absorbing a large amount of energy whilst also strengthen the function of the swimming pool / spa. This has shown me that looking to a problem from another perspective, and trying to find a solution in a more natural way, can lead to better inputs into the design process. This resulted in me using Rammed Earth, a very sustainable product, that is able to absorb and transport heat and is able to regulate the humidity level in humid areas. Especially for swimming pools this is a very suitable material, as the humidity level is one of the main reason that swimming pools are such an energy consuming buildings. This shows that this passive intervention that is able to absorb heat from the Sun, regulate the humidity level, and transport heat within the building, can lead to great reductions in the energy consumption leading to a sustainable design.

Besides this energy saving aspect of the wall, there are other functions integrated in this wall. It serves as a passage for people and it offers the infrastructure for the installations in the building (water, fresh air etc.). This is one of the most important aspects that I have learned during this graduation project. First, I was struggling with the infrastructure throughout the building. There needed to be a corridor next to the rammed earth wall, and the infrastructure for the climate installations. I have learned that when I look at such a wall not as an single element but as an opportunity to integrate different functions that will lead to a special element. The rammed earth wall shows how all infrastructure is integrated in this wall, where it results in an extra architectural experience. This is one of the important things that I have learned in this design process. This way of thinking helped me with the design of the roof of the building. I started out by placing a large amount of solar panels on the roof, which left little space for a green roof or a rooftop terrace what I had in mind. By again looking separately at the different functions the roof should serve and thinking layering the different functions within the roof a new roof concept was found. Where the solar panels started as obstacles on the roof, they turned in to the roof of a pergola with a daylight pattern which results again in an extra experience on the roof. Underneath this solar energy pergola, a rooftop garden could be designed.

This graduation project has thought me to take a second critical look at the design solution that I would initially think of, and to put it in a new perspective. I learned to change my way of thinking from, how can I fit all these solar panels on this roof?, to, what functions should this roof have, and how can solar energy be an additional value to these functions? So instead of creating a solution to a problem, you find an architectural intervention based on the required functions that results in an added value rather than a solution to a problem.