

# P4 Reflection paper

## Studio

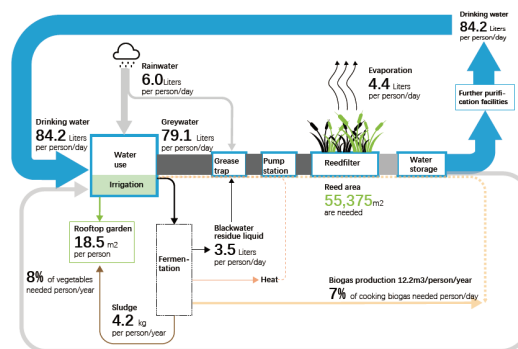
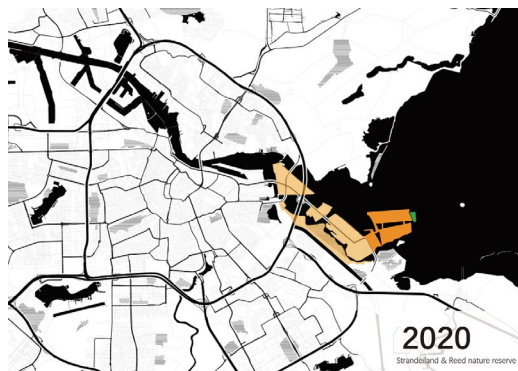
Name of studio: Architectural Engineering

Design tutor: Mo Smit

BT tutor: Ferry Adema

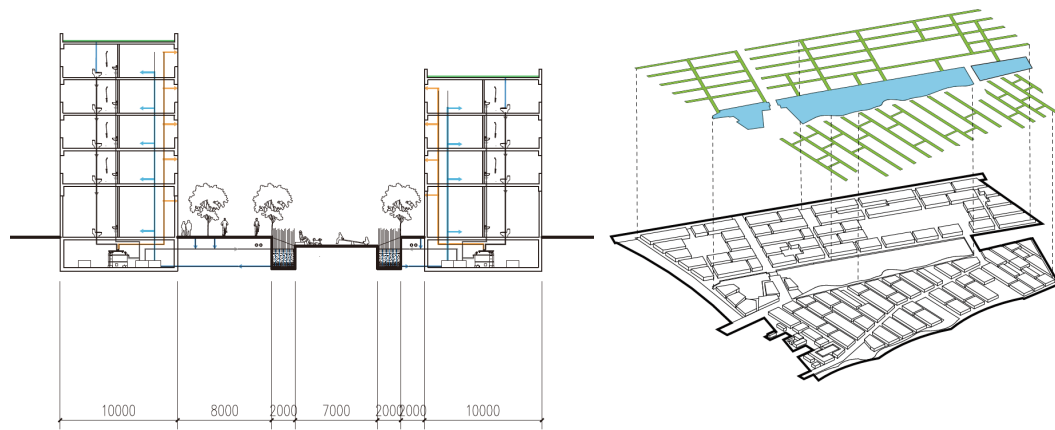
Research tutor: Jos de Krieger

My fascination is to build a reed island for future Strandeiland that achieves water and building materials circularity. Reed bed purifies water, provides lively living environment for people. Reed materials can be applied in the house construction as important by-products. There are some tough times after p2 for me due to a lot of uncertainties. I was still not making up my mind about where to put both expanded reed area and the building site. But uncertainty brings opportunities, pushing me to think like a real architect and make logic choice.

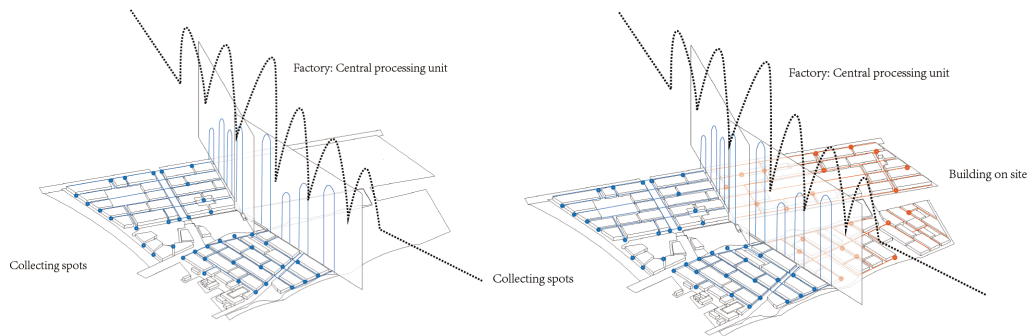


## 1. the relationship between research and design.

Research focus on the water flowing direction and water amount in the island level. By implementing reedbed filters, circular economy replaces linear economy. Future Strandeiland don't have to import fresh tap water from outer water plants, itself being fully self-sufficient with purified wastewater and rainwater. The research points out the mathematic connection on the capacity of reed planting area and population, which helps me to know the exact hectares of reed area I need to design in the future. More research is on the reed materials as building materials, clarifying the producing process and the practical usage for construction. The core of my design is to let people live with reed and realize the unreplaceable role that reed plays in their daily life. Considering both urban scale and architectural scale, I put up two strategies for creating a valuable neighbourhood. 1. Make reed road instead of vehicle road and decentralize the water purifying process. 2. Build reed factory on the centre water, doubles as footbridge, functionally combing manufacturing, education and meeting.



Strategy 1 (urban scale): reed road



Strategy 2 (building scale): reed factory

2. **the relationship between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master program (MSc AUBS).**

My graduation project aims to achieve a water circular neighbourhood by making urban and architectural interventions in the system level. In the neighbourhood level, I would suggest a reedbed-based watercycle system, which involves multiple strategies in the whole neighbourhood, including greenway, rooftop garden, biogas plant and expanded reed zone. In the architecture level, a reed factory demonstrates the local identity of a reed island and reuse waste reed materials. The studio topic is to research how circular design strategies can contribute to both the architectural and ecological value of buildings and neighbourhood as one. I think my graduation project gives a possible answer to the studio topic in a specific context. In the end, I focus on the architecture design of a reed factory, so it's closely related to my track and master programme.

3. **Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.**
  - a. **Position: what is my building?**

In the p2 presentation, in order to achieve 100% water-sufficient by recycling household wastewater, a water building, that mainly accommodates water purifying facilities, and a reed factory, that combines storage and small-scale handmade workshops are necessary in future Strandeiland island. Relevantly, the reed zone is also centralized but isolated from the island. Obviously, this highly centralized strategy aims to build a central processing unit dealing with all water-reed problems together.

But is it the best solution?

The drawback mainly comes from the minimis extra value that an isolated reed zone brings to the whole island. Letting residents living there realize the circular economy is essential. However, an independent reed reserve is not the best choice in response to that attention.

Then I came up with an idea to design the reed road that replaces the original vehicle street. The vehicles are prohibited in the future with more cyclists and pedestrian proposed. Hectares of reed will be planted along the streets, creating a public linear eco-park for residents. The water purifying equipment, such as biogas conductor, water pump and water tank will be implemented in the basement of street side building. It's good to involve people join in the social life with reed plants surrounded. Assisted with more educational methods people can be conscious of the key importance of this type of plants.

Then we get a reed road network that branches the whole neighbourhood and adds big extra value for the daily life. We don't need a centralized water plant anymore. Instead, the neighbour now needs a reed hub that combines reed materials producing and educational interacting. And I name it reed factory.

#### **b. Location: where is my building?**

There was a time that I restricted myself in choosing the site on the solid land. Then I think it could be a good solution to build my building on the water, double as a footbridge. First, the well-marked central location in the middle of the whole island makes it symbolic. Second, it presents a strong connection between the two islands. Third, ships can help to transport. Further research is about floating building, in terms of waterproof, foundation, etc.

#### **c. Process: how will the island benefit from my building?**

First benefit is that the latter construction phase can apply the building materials made from those harvested reeds from previous phase. The whole island will be constructed in five phases. Phase 1, the west part of Muiderbuurt, is the preparation period, accommodating around 3,500 residents. Reed factory will also be built up in this period. Houses in phase 1 will not be built with reed materials. Once the water-reed system starts functioning, growing reed can be harvested every winter. As the number of functioning reedbed filter keeps increasing, the rate of houses applying reed materials also rises. In final phase, Buiteneiland, the byland will be constructed only with reed materials, achieving 100% self-producing, biodegradable and sustainable.

Second benefit is the educational impact on the residents. The walking route across the building gives a completed visiting view from exhibition on water-reed purifying system to workshops on reed products manufacturing. It's also equipped with experience centre for better communicating and interacting. People are acknowledged that what's happening around them is now changing their life.

Third benefit is that the construction of my building tries different types of reed production, making it a showcase for residents getting to know the advantages of using reed materials as

building materials.

**d. Structure: how to make my building practical?**

Main learning points and detail drawings develop around how to build with three reed products, thatch roof, reed panel, and reed chipboard. So basically, creating different spatial quality based on the space identity and material identity is the key point. I make a big thatch canopy and all functional boxes are inserted underneath with independent structural systems. Reed panels work as roof inner layers-ceilings while good texture and bare timber structures reflect the vernacular characteristic of reed factory. Reed chipboard works as separation walls and infilling panels between structural components.

**4. Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.**

The project explores water flows within the neighborhood and possible ways to recycle wastewater to form a circular neighborhood. By calculating the water demand for each step within defined boundaries, it proves the whole system can function with only extra rainwater supplied, which is competitive. It aims to improve the social awareness that wastewater is valuable resources and should not be seen as disposable. Hopefully, the methods of research and part of the watercycle system that I develop for this project could also be applicable to other general neighbourhoods in the Netherlands.

**5. Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.**

As the design and research going further, I make inquiries to my fellows. Most of them can't accept drinking or showering with the water purified from wastewater. Not to mention blackwater, even reusing grey water sounds crazy to them. The acceptance reflects social awareness, for now, there is adequate water storage, but it won't last for long. I hope that people can gradually try small tricks on water saving and reusing. And it's far better to make proactive choice by understanding the circumstances rather than being forced to do it one day in the future.