

The possibilities for BwN in the city of Groningen

By

Laura van Warmerdam

University of Groningen

FSS

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Supervisor: B.J. Kuper, MSc

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l.e.van.warmerdam@student.rug.nl

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Abstract

In recent years, coastal populations experience an increasing risk of flood disasters due to climate change (Bouma et al., 2013). Concepts as Building with nature are of increasing interest, since these concepts regard cost-effective coastal protection and incorporation of ecology and ecosystem services into coastal protection (Markus-Michalczyk et al., 2016; Swann, 2008). Building with nature in the city is a project of Ecoshape, Deltares and Witteveen+bos that focuses on Building with Nature measures in the urban environment (Ecoshape, 2018). There are two primary aims of this study: to investigate if these measures are applicable in Groningen and contribute to the water safety in a cost-effective way and to ascertain what is the contribution of these measures to the spatial quality in the case of Groningen. The central research question thus is as follows: How can Building with Nature in the city contribute to the water safety and spatial quality in Groningen? For this qualitative research six in-depth interviews were conducted with experts on the concept, two residents of Groningen, the municipality and the water board Noorderzijlvest. The results suggest that the measures are applicable in Groningen, as long as the measures contribute to the set goals or solve the defined problem and minor changes are taken into account. For the residents that were included in this research, adding green increases the experienced spatial quality. It is found that the water board Noorderzijlvest stresses the possibilities for multi-functionality. New construction projects at the Reitdiep open new possibilities. The need for BwN projects is assessed higher in urban areas, while the available space is found outside the city. The Eemskanaal is not spacious enough due to for example shipping. The municipality of Groningen stresses the possibilities for spacious areas. The amount of space in urban areas as the inner-city is assessed as too little. The preference of the municipality is the Eemskanaal, but space is a problem here.

Keywords: Climate change, Building with Nature in the city, experienced spatial quality.

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Introduction

Coastal populations as the Netherlands experience an increasing risk of flood disasters due to climate change. Sea level rise induced by climate change and land subsidence challenge coastal engineering in these coastal populations (Bouma et al., 2013). In addition, climate change induced extreme weather events require effective flood protection strategies as engineering based on nature and shore wetlands since continuing to raise dikes possibly results in instable dikes, adverse effects for the landscape, greater consequences of a dyke breach due to the different in height and is expensive (Temmerman and Kirwan, 2015; Rijkswaterstaat, 2019). Concepts as Building with nature are of increasing interest, since these concepts regard cost-effective coastal protection and incorporation of ecology and ecosystem services into coastal protection (Markus-Michalczyk et al., 2016; Swann, 2008). Building with nature is a philosophy of respecting and using the forces of nature as much as possible in order to develop new environmental qualities (Salet, 2014). Chen & Ku (2018) state that the idea of BwN is to promote natural development of the environment to reduce the ecological footprint of engineering measures. It is hoped ultimately that this will benefit humankind. Whilst a fair amount of research has been carried out on Building with Nature measures as the sand-engine, few studies have attempted to investigate the use of this concept for measures within the city. However, Building with nature in the city is an existing project of Ecoshape, Deltares and Witteveen+bos that is already executed in Rotterdam and Dordrecht (Ecoshape, 2018). Both Rotterdam and Dordrecht are cities that are situated along rivers. (Ecoshape, 2018).

The aim of this research is to investigate three applications of Building with Nature in the city and the applicability of these measures in Groningen. Groningen is a city in the north of the Netherlands where the municipality desires to create more attention for the water in the city (Gemeente Groningen, 2017). Groningen differs from Rotterdam and Dordrecht since the city is not situated along a river. The city is however situated at the Eemskanaal and the Reitdiep. (Provincie Groningen, 2018). The three measures this paper investigates are: keeping dikes lower with willows, natural breakwaters and tidal parks. These measures include adding green to spaces as well as increasing contact with the water which contribute to the experienced spatial quality (Smit, 2012).

There thus are two primary aims of this study:

1. To investigate if these measures are applicable in Groningen and contribute to the water safety in a cost-effective way.

2. To ascertain what is the contribution of these measures to the spatial quality in the case of Groningen.

The central research question of this paper thus is as follows:

How can Building with Nature in the city contribute to the water safety and spatial quality in Groningen?

This question will be answered making use of the following sub-questions:

- a. Are the 'Building with Nature in the city' measures applicable in a safe and cost-effective way in a city that is situated at canals or channelled rivers instead of natural rivers?
- b. How can these measures improve the experienced spatial quality?
- c. Where and how could the 'Building with Nature in the city' measures be implemented in the city of Groningen?

The first chapter will discuss the theory on Building with Nature, spatial quality, the specific measures and the applicability in Groningen. In the second chapter the methodology is explained. The third chapter discusses the results and the last chapter is concerned with the conclusion and discussion. Throughout this paper the term 'BwN' will be used to refer to Building with Nature.

Theory

BwN is a concept that is of increasing interest. Concepts as BwN regard cost-effective coastal protection and incorporation of ecology and ecosystem services into coastal protection or other planning solutions (Markus-Michalczyk et al., 2016; Swann, 2008). Climate change induced extreme weather events require effective flood protection strategies as engineering based on nature and shore wetlands since continuing to raise dikes possibly results in instable dikes, adverse effects for the landscape, greater consequences of a dyke breach due to the difference in height and expensive (Temmerman and Kirwan, 2015; Rijkswaterstaat, 2019). Chen & Ku (2018) state that the idea of BwN is to promote natural development of the environment to reduce the ecological footprint of engineering measures. It is hoped ultimately that this will benefit humankind (Chen & Ku, 2018). Beside the need for innovative, sustainable and cost-effective solutions there is thus need for measures that minimize anthropogenic impacts of planning structures as coastal protection structures on ecosystems (Day et al., 2000; Borsje et al., 2011). Planning practices, once delivering promising perspectives for a better future, are now being considered part of the problem rather than the solution and can be seen as for example an ecological threat. (Salet, 2014; Markus-Michalczyk et al., 2016; Swann, 2008). Salet (2014) mentions that new planning practices have to be invented are based on self-regulation of society or even the self-guiding forces of nature. When for example ecological concerns are included in the project design, the design process opens to include a wide range of stakeholders from the initiation phase onward (Korbee et al., 2014). In search of successful solutions, urban planners might learn a lot from the experiences of nature development. Coping with the uncertainties and self-guiding forces of nature might be even more challenging than dealing with self-guidance in social systems. However, the similarities of the two different systems is what we may learn from (Salet, 2014). Korbee et al. (2014) state that BwN is a philosophy of respecting and using the forces of nature as much as possible. This in order to develop new environmental qualities for for example the coastline. Opportunities to use natural processes or to positively support natural ecosystems are identified and integrated into the planning and designs, balancing natural ecosystems and human intervention (Van Dalmsen and Aarninkhof, 2009). The BwN design principles thus promote the use of natural materials and dynamics, such as sediment, vegetation, wind and currents, while exploring opportunities for nature development (Van Dalmsen and Aarninkhof, 2009). De Vriend et al. (2015) state that the collaboration with other disciplines, such as ecology, economy, social sciences and administrative sciences is crucial to come to solutions. The concept BwN is a form of ecological

engineering (Mitsch and Jørgensen, 2003) that is about meeting society's infrastructural demands. These demands will be realized by starting from the functioning of the natural and societal systems (Salet, 2014; De Vriend et al., 2015) in which this infrastructure is to be realized, where the aim is not only to comply with these systems, but also to make optimum use of them and at the same time create new opportunities for them (De Vriend et al., 2015), which is in line with the statements of Korbee et al. (2014).

The Dutch national program 'Building with Nature' started in 2008 as an innovative research program. The program is aimed at developing new design concepts for river, coastal and delta areas (Van Raalte et al., 2008) and is dedicated to research on the role of natural processes in design and management of (coastal) projects (Van Dalftsen and Aarninkhof, 2009). Since 1990 the Dutch government decided on a different policy. This policy resulted in a spatial turn and was called dynamic preservation ('apply soft coastal defence where it is possible and hard defence when there is no escape' (Mulder et al. 2011). This gave room to the new approach for coastal management "BwN" started in 2008 (Meulen, 2014). A foundation that performs the public-private innovation program BwN in the Netherlands is Ecoshape (Ecoshape, 2018¹). EcoShape (2018¹) states that they build knowledge through pilot projects. The focus of these projects is on restoring natural and lively waterfronts that are resilient and adaptive instead of the urbanized hard-engineered waterfronts of today, maintaining the water safety. Ecoshape (2018¹) determines different measures to achieve the mentioned goals. Pilot projects concerning these measures are already executed in Rotterdam and Dordrecht.

Spatial quality and BwN in the city

Whilst there is a relative paucity on studies investigating the impact of BwN on the spatial quality, it has been found that Room for the River measures have a positive impact on the spatial quality, while dike reinforcements tend to have a negative impact on the spatial quality (Nillessen & Kok, 2015). Room for the River is a similar concept to BwN (Rijkswaterstaat, 2019). This paper researches the effects of the measures mentioned earlier on the spatial quality. The definition of spatial quality varies in the literature and is a normative term that is defined differently by different disciplines and over time (Hooimeijer et al., 2001). Since this paper is concerned with planning, the term will be defined based on urban planners and designers, whose terminology concerns spatial quality of live-work milieus (Smit, 2012). The spatial quality of the live-work milieus is determined by for example restaurants and parks for leisure activities (Smit, 2012). This spatial quality is usually judged by visual inspection of residents or users, resulting in the experienced spatial quality of a space. The experienced spatial

quality based on the perceived image strongly depends on the observed scene as well as the viewing and the observer conditions (Borra-Serrano et al., 2015). This visual quality increases when architecture, green, and water give their own distinctive visual character to the environment (Smit, 2012). The experienced spatial quality is considered good or high when the measures or changes are valued by those who have to make use of the space for decades (Verbart, 2004). Albeit, while Smit (2012) states that green and water enhance the visual or spatial quality and the BwN measures thus could enhance the spatial quality, Van der Valk (2002) argues that the spatial quality is linked to a well-maintained physical environment. Since the measures are natural, these aren't well-maintained but are run wild. However, these measures are able to give their own distinctive visual character to the environment (Smit, 2012).

A strong relationship exists between flood risk management measures and spatial quality (Klijn et al., 2013; Nillesen & Kok, 2015). Klijn et al. state that new flood defence infrastructure can have a significant impact on spatial quality. In urbanised deltas with historic built environments, such as the Netherlands, this impact is even greater (Klijn et al., 2013; Nillesen & Kok, 2015). In recent years there is a growing appreciation of this relationship. An integrated approach where spatial quality is increasingly incorporated in the objectives to be achieved in the development of flood risk management strategies is gaining popularity (Nillesen & Kok, 2015). This can be seen in the concept Room for the river (Demon & Alberts, 2005) and the concept BwN (Korbee et al., 2014). In the room for the river approach, first an inventory of possible measures was made and assessed, using multiple criteria that include spatial quality (Klijn et al. 2013). This example endorses the growing appreciation suggested by Nillesen & Kok (2015). The measures are able to add value in terms of spatial quality because of the new green spaces and a park, high visual quality with a distinctive ecological character and contact with the water for leisure (Ecoshape, 2018; Smit, 2012). However, the expected impact on the experienced spatial quality has to be assessed by participants, as demonstrated in the paper of Nillessen & Kok (2015).

The measures

Whilst a fair amount of research has been carried out on BwN measures as the sand-engine, few studies have attempted to investigate the use of this concept for (minor) measures within the city. However, some research has been carried out on the measures. Ecoshape (2018) describes the measures as follows:

1. Keeping dikes lower with willows: from a monotonous dike embankment to a wooded landscape with appealing ecological features.
2. Natural breakwaters: living mussel beds and oyster reefs reduce sand erosion on river banks.
3. Tidal park: tidal parks make high and low tides visible again in the city: the water flows onto and back off the land.

Ecoshape (2018) states about the measure ‘keeping dikes lower with willows’ that “Willows break wind waves, which are one of the factors that determine dike height. Breaking the waves makes it possible to keep dikes lower, and so to improve the view. This approach also provides a habitat for fauna in the area”. Previous research confirms that foreshores create additional safety against flooding, as they are able to reduce incoming wave energy and withstand erosive forces (Möller et al., 2014; Smolders et al., 2015; Penning et al., 2016). As Penning et al. (2016) point out, upgrading dike systems can be done with traditional often costly methods so new methods as newly constructed vegetated foreshores should be considered. The choice of willows as the specific foreshore vegetation is based on multiple factors. Penning et al. (2016) and Borsje et al. (2011) argue that willow vegetation acts as a windbreaker and reduce wave impacts on the dike and therefore allow for a considerably lower dike height while maintaining the required safety levels, reducing the construction costs, limiting maintenance time and costs, increasing landscape attractiveness and complying with the historical landscape in river areas. In addition, willow vegetation allows smaller plants to establish themselves, increasing the biodiversity and low scale habitat diversity of the site (Penning et al., 2016; Borsje et al., 2011).

Commenting on the measure ‘natural breakwaters’, Ecoshape (2018) argues: “The mussel fields or oyster reefs on the fore bank break the waves. That reduces the wave impact and erosion affecting the soft riverbank behind, allowing for the development of a natural bank area. In addition, the mussel fields and oyster reefs also serve as a habitat for fauna”. Similarly, Borsje et al. (2011) state that mussel beds and oyster beds are known to damp waves and stabilize the bed. Additionally, mussel beds and oyster beds can enhance biodiversity by providing shelter and nesting area for fish and lobsters (Coen et al., 2007).

On the final measure debated in this paper, the tidal parks, Ecoshape (2018) argues that “As we move inwards from the coast, there is a shift from salt to brackish and then to fresh water. There are also areas that are only submerged during spring tides. Tidal nature can get a foothold, with areas of reeds, rushes and/or willows, but also with mud flats and salt marshes”.

This measure focusses on the spatial quality of the area, especially the ecological values. The restoration of Delta Nature with reeds, rushes and willows that comes with these tidal parks comply with the historical landscape in river areas (Borsje et al., 2011). These foreshores and tidal parks create additional safety against flooding. This is because of the ability to reduce incoming wave energy and withstand erosive forces (Möller et al., 2014; Smolders et al., 2015; Penning et al., 2016).

Groningen

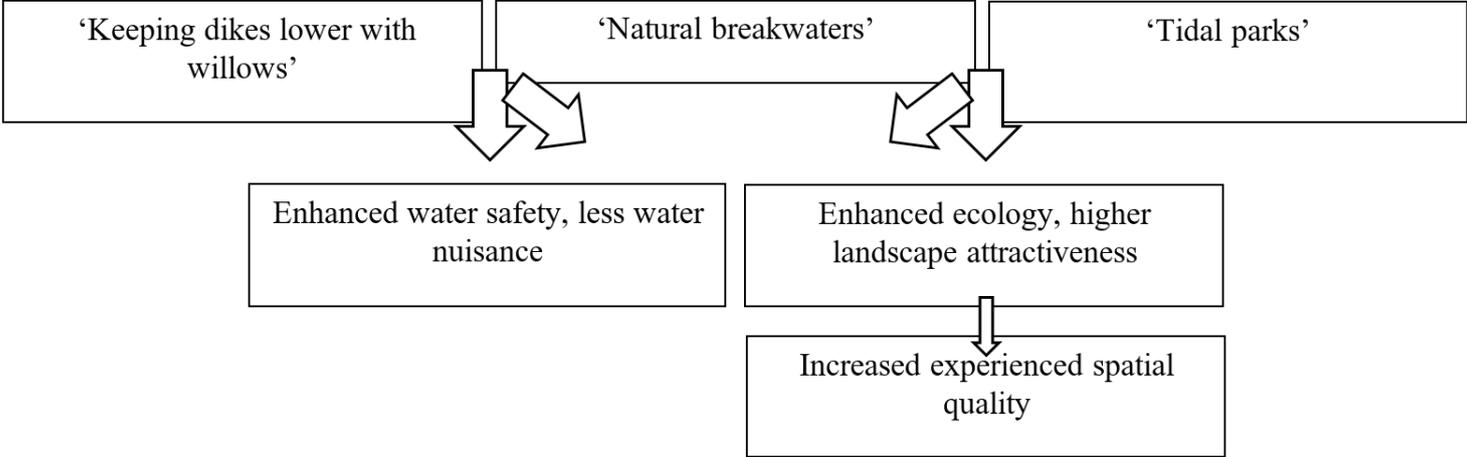
Groningen is situated at the Eemskanaal, which is not a river but a constructed canal (Rijkswaterstaat, 2018) and the Reitdiep, which is the channelled lower course of the river Hunze (Het Groninger Landschap, 2018). Both canals are surrounded by dikes that have to be maintained (Het Groninger Landschap, 2018; Noorderzijlvest, 2017). The Eemskanaal is connected to the river Eems and the depth of the canal fluctuates from 5,20 to 5,80 metres. The Eemskanaal is not influenced by astronomic tides, as the canal is connected to the Eems, but ends at the sluices just before the Eems (Provincie Groningen, 2018). Since the Eemskanaal is not influenced by tides, the implementation of the measures is only possible making use of a different approach, or not possible at all. However, the “bosom” level of the Eemskanaal fluctuates, since the canal temporarily stores the emptied polder water before this water is drained (Provincie Groningen, 2009). The fluctuation of the water level through fluctuation in the “bosom” and differences in precipitation, could act for tidal changes. This fluctuation differs however a lot from astronomic tides since the water level does not always differ during the day (Rijkswaterstaat, 2018¹). The water level of the Reitdiep is maintained by sluices, but the canal is used for drain purposes (Boetze, 2001).

In the watervision ‘Koersen op water’ of 2017 the municipality of Groningen mentions the importance of the visibility of the water, quality and availability of the space next to the water and the relation with the water in Groningen and present measures to achieve this. The safety measures exist of raising the quay or dikes. This implies the measures of BwN in the city would be suited in Groningen, since the lower dikes and multifunctionality of the measures increases the relation of the residents with the water, in contrast to the measures in the water vision that exist of raising dikes or quays (Ecoshape, 2018; Gemeente Groningen, 2017) .

In Figure 1 the conceptual model is shown. This research tries to establish if there could be an effect on the experienced spatial quality when the BwN measures would be implemented. This increase could be caused by the enhanced ecology and higher landscape attractiveness. It

is known that the measures tend to have a positive effect on the water safety and water nuisance, what isn't known is if this effect can be established in Groningen.

FIGURE 1. Conceptual model BwN in the city



Methods

The method used for this paper is a qualitative research method, making use of six in-depth interviews. The benefit of this approach is that it allows a deeper insight into professional opinions on the topic and the desires of the target audience (Clifford et al., 2016). This is a useful method for the exploration of the possibilities of this concept in Groningen and uncover the meanings people attribute to spatial quality (Clifford et al., 2016). The in-depth interviews were conducted with two experts on BwN in the city (Victor Beumer, Landscape ecologist and former employee of Deltares & Pieter de Greef, Spatial planner at the municipality of Rotterdam) two residents of Groningen that live within 500 metres of the Eemskanaal or Reitdiep and two experts on Groningen (Jan Pieter Koppert, Policy officer urban development at the municipality of Groningen & Kees de Jong, Strategic advisor at the water board Noorderzijlvest). This set of respondents covers most of the stakeholders. Another stakeholder is for example Rijkswaterstaat. Rijkswaterstaat owns and manages the Eemskanaal (Rijkswaterstaat, 2018). This specific stakeholder not included since this stakeholder is no expert on both the Eemskanaal and Reitdiep, as the water board Noorderzijlvest is.

FIGURE 2. Residential location respondents: residents living within 500 metres of the Reitdiep or Eemskanaal



The respondents were approached via e-mail and phone calls. The residents living nearby the Eemskanaal and the Reitdiep were recruited via acquaintances. Data were collected using semi-structured interviews. For the experts on BwN in the city, the residents and the experts on Groningen different interview guides were designed, where the first focussed on applicability of the measures, the second on the effect on the spatial quality of the measures and the latter on the possibilities in Groningen. The interview guides are included in Appendix 1. The interviews were conducted in Dutch as Dutch is the native language of all respondents. This is to ensure all the respondents could speak as freely as possible. The used data was translated into English, which could lead to interpretation and translation mistakes. Therefore, the translation and interpretation have been handled carefully. The original Dutch quotes are included in the appendices as well (appendix 3). The residents remain anonymous since their name does not contribute to the findings and data quality, as the names of the other experts do contribute to the findings and data quality. The interviewees have been informed of the careful handling of the data. All interviews were transcribed so there was no loss of nuance or changes in meaning. Transcripts were coded using qualitative data analysis software, (Atlas.ti), applying thematic analysis. For this analysis an mostly inductive method was used, making use of open and axial coding. This method allows for theory to emerge from the content of the raw data (Clifford et al., 2016). This method is chosen because this research is explorative and therefore no pre-conceived hypothesis will be tested (Clifford et al., 2016). In appendix 2 the relevance of the codes is explained in a codebook and code tree.

Results

In this chapter the results are discussed. The present study was designed to explore the possibilities for BwN in the city of Groningen and the possible effect on the spatial quality in the city of Groningen. The research question is therefore: How can BwN in the city contribute to the water safety and spatial quality in Groningen? This chapter analyses the results of interviews and is divided in three sections. In every section a different secondary question is discussed. Unexpected is that the results are more concerned with the importance of the process than with specific possibilities in Groningen. A possible explanation for this might be that the scope of this study was too limited in terms of respondents and timespan. As this is a qualitative study, these results therefore need to be interpreted with caution.

Section 1: Applicability

In this section the results for the following secondary question are discussed: Are the 'BwN in the city' measures applicable in a safe and cost-effective way in a city that is situated at canals or channelled rivers instead of natural rivers? To answer this question interviews were conducted with Victor Beumer (Landscape ecologist, former employee of Deltares) and Pieter de Greef (Spatial planner, municipality of Rotterdam). Both are experts on measures of BwN in the city. Data of other respondents is used as well. The most important identified codes for this section are setting goals, linking goals and argumentation.

In reviewing the literature, little data was found on the applicability of BwN measures at canals or channelled rivers instead of rivers. The results show that before finding if the measures are applicable, it is important to establish the problem the measure will solve. As Victor Beumer explains:

First you have to make an inventory, what problem or which need am I trying to solve? And, is it about liveability or about water quality, or is it about water safety? [...] When you have a look at those things, then you can start to think about what you can apply here. What is most suited? And often these steps are skipped.

For the applicability of these measures it is important that the measures have a function. This could be an aesthetic function as well. The most important is that goals are set before implementing BwN measures at a location. This is illustrated by Pieter de Greef:

In my opinion, it is possible to apply the principle of BwN in other situations as well. It just needs another form. I think that just the principle, for example what we

were just talking about, nature-friendly banks, at locations where you can argue that these contribute to your goals, it is possible to realize natural banks in your canals or rivers without tides.

Only minor changes are needed, according to Victor Beumer, to implement the measures at canals instead of rivers. One has to take into account the absence of tides and the fresh water instead of brackish water. The form of the measures depends most on the set goals. BwN measures often do not serve just one function, but serve several goals, which makes it relatively easy to gain support. This was described by Kees de Jong (Strategic advisor, water board Noorderzijlvest), who also mentions the difficulties.

The advantage of BwN measures is often that one can realize water safety goals, but other types of goals at the same time. And, there is interest in that, but, according to us, if we have to apply this from a water safety point of view, then we are willing to contribute the money. And the money to reach the other goals, well, we have to find someone who's responsible and thinks it's important enough to contribute that money. And that is a negotiation process.

Kees de Jong mentions that he believes the water safety can be maintained with BwN measures. The measures are proven to be safe and achieving the safety standards is possible. However, the calculations are more difficult than with hard engineering solutions as dikes. The integration of multiple goals in one BwN solution is assessed as a strength by Kees de Jong. De Vriend et al. (2015) state that this collaboration with other disciplines is crucial to come to solutions. Pieter de Greef endorses this as follows:

I think I said this before, but, I just think concepts as BwN have to be linked with other objectives of the city. If you just want a BwN concept somewhere, I think it's the trick to link it with, as you mentioned as well, an attractive, liveable city and other great urgencies..

The concept isn't just stronger when linked with other objectives, it's also easier to fund when other goals of for example the municipality or companies are pursued. This results in the measures being cost-effective. The results suggest that making an inventory of problems and goals is of great importance before implementing a BwN project. It's crucial that the contribution of the BwN project to your goals is well argued. If this argumentation is in order and multi-disciplined goals can be linked to your project, enough support can be gained and

will make it possible to apply the BwN project in a cost-effective way. However, as Victor Beumer mentioned, minor changes are needed. Problems for canals as the Eemskanaal with professional shipping are for example the lack of space. According to Victor Beumer, this is a difficulty for all the measures, since the Willows and the Oyster banks take up space in the fairway. For the tidal park it's a problem as well when one has to work in the water instead of inlands due to not being allowed to touch the dikes, for example when the water board Noorderzijlvest or Rijkswaterstaat won't cooperate. When it's possible to (re)move the dikes, this doesn't have to be a problem for this measure. This goes for the Reitdiep as well, however, the fairway is less of an issue there. Victor Beumer adds, for the Oyster banks specific, that a freshwater mussel or oyster species has to be used. The Eemskanaal and Reitdiep consist of freshwater instead of brackish water as is the case with deltas. When these minor changes or problems are taken into account, the argumentation is in order and multi-disciplined goals can be linked to the project, enough support can be gained and will make it possible to apply the BwN project.

Section 2: Spatial quality

In this section the results for the following secondary question are discussed: How can these measures improve the experienced spatial quality? To answer this question interviews were conducted with Groningen residents Resident 1 and Resident 2, since the spatial quality of a place only can be considered as good or high when the measures or changes are valued by those who have to make use of the space for decades (Verbart, 2004). Both residents live within 500 metres from Reitdiep or Eemskanaal. Data of other respondents is used as well. The most important identified codes for this section are improved atmosphere, adding green, recreation, and bottom up.

There is a relative paucity of studies investigating the relation between BwN and the experienced spatial quality. As mentioned in the literature review, the experienced spatial quality based on the perceived image strongly depends on the observed scene as well as the viewing and the observer conditions (Borra-Serrano et al., 2015) and increases when architecture, green, and water give their own distinctive visual character to the environment (Smit, 2012). The most obvious finding to emerge from the analysis is that all respondents other than residents expect residents to experience the measures as a positive change. Pieter de Greef mentions measuring if the residents of Rotterdam experience increased spatial quality after implementing BwN measures isn't done yet, but a bottom up approach is used.

We've been on markets, a few years ago, and we asked the residents: we are standing along the river, what do you think has to change? And the people said, they didn't study for this [as we did], and they just said: there just have to be good routes, more nature, you have to have access to the water and there must be something to do, something to experience. So actually, as far as we are concerned, those are the principles.

The residents of Groningen that participated in this research are predominantly positive. In accordance with the statement of Smit (2012), the respondents rate green and water as an attractive environment. Resident 1 indicates: 'that [more green] results in a little better atmosphere in the city.' However, when questioning the residents on the measures that are included in this research, the opinions vary. For resident 1, it is difficult to visualise the explained measures: 'I'm not really familiar with this, so maybe that's why it sounds a bit strange to me.' For resident 2, some measures did not appeal at all: 'I actually don't have an opinion about that.' However, these regard the aesthetic value of specific measures. As mentioned before, the respondents were positive on adding green to the watersides in Groningen. The measures, or adding green in general, boosts the ecology and biodiversity. For resident 1, this in particular adds value to a space: 'For me, that [enhanced ecology] is a big addition, yes. You have something to look at, a duck that swims by, or a goose walking by.' In addition, recreation is an important aspect for the respondents. Resident 2 illustrates this as follows:

Yes, I do live near the Eemskanaal, but there's nothing to do there, so I'm not really doing anything with that. When you talk about those natural banks with a park or something, that does appeal to me. Maybe I will make use of the space around the water then.

This corresponds to the opinion which Rotterdam residents expressed towards Pieter de Greef and is endorsed by Smit (2012) as well. Smit states that the spatial quality of the live-work milieus is determined by parks for leisure activities. The results suggest that adding green to the water spaces in Groningen increases the spatial quality for both respondents. Some of the measures don't appeal that much, but as long green is added, the ecology is boosted and recreation possibilities are expanded, the respondents do feel a measure increases the spatial quality. In contradiction, dike reinforcements are assessed as measures that result in a decrease or stagnation of the spatial quality.

Section 3: Measure and location assessment

In this section the results for the following secondary question are discussed: Where and how could the ‘BwN in the city’ measures be implemented in the city of Groningen? To answer this question interviews were conducted with Jan Pieter Koppert (Policy officer urban development, municipality of Groningen) and Kees de Jong (Strategic advisor, water board Noorderzijlvest). Data of other respondents is used as well. The most important identified codes for this section are setting goals, linking goals, contact with water, water safety and space.

As discussed earlier, if, where and how the measures should be implemented in Groningen depends on the different goals linked to the measures. This research focuses on the Eemskanaal and the Reitdiep. The results suggest that the goals linked to the measures are more important than the measure itself. This goes for the location as well. Possibilities can be found at every location. In the water vision ‘Koersen op water’ (2017) the municipality of Groningen expresses the desire to increase the contact with the water for the residents. Jan Pieter Koppert explains what ambitions they have included in the water vision: ‘In there [the water vision], different ambitions are written down, as, [...] we want to improve the quay, we want more spaces along the water where people can sit down, and experience more’. To increase the contact with the water, the municipality aspires to create more space. However, the water vision includes safety measures as raising quays. There is a paucity of studies investigating how contact with water can be increased, however, the interviewed residents stated that the height of the quay or dike influences the contact with the water, as is explained by resident 1.

I think it [a lower dike] does [increase the contact with the water], since your closer by, so you feel like you can jump in the water, and out of the water again. I would never do that, but you obviously have this feeling.

This increases the possibilities for all measures included in this research. However, not all of the aspects of the measures increase the contact with the water. Both residents didn’t feel the Oyster banks added to contact with water by being able to eat them or by showing the fluctuations of the water by being not being visible all the time, especially in Groningen that is not influenced by tides. For the Tidal park, the increased awareness of high water is valued a little more by both residents. Kees de Jong, who indicates that the bosom level of the Eemskanaal and Reitdiep does not fluctuate that much, sees possibilities for the Tidal park.

I think it's already done, this idea, for example with ponds, these have as function storing extra rainwater, and are larger at really wet times. In itself, it is a smart way of doing that. [...] When you can link this to other goals, I think it's worth it.

In contradiction, Jan Pieter Koppert argues it's not really suited for Groningen. He states that high water levels occur rarely due to the designated storage areas. Kees de Jong agrees it's a rare event, but nevertheless he thinks it is worth it, as long as other goals are linked to the project. Interviewee Victor Beumer reported difficulties for BwN with water boards:

The thing is, with dikes, you have the difficulty you aren't allowed to touch the dikes, the water board gets overstrained. So, with those dikes you have to work water inward, and you'll have much less space.

In contradiction, Kees de Jong (Noorderzijlvest) mentions the BwN projects the water board is already involved in. He is convinced of the possibilities for BwN in the city of Groningen. Space however, is a concern. There is no consensus on what location is most suited for BwN. At the Eemskanaal there's a shortage of space due to shipping and habitation. Kees de Jong states that for Reitdiep there's more possibilities because of new construction projects. Especially for the Tidal parks, one has to work inland. With new building projects it's possible to reserve space for these Tidal parks, or one of the other measures. Conflicting with the lack of space, found is that it's expected for urban areas to have greater demand for BwN projects than outlying areas. Kees de Jong explains:

I think that in urban areas eventually the need to think more about multifunctional solutions, where BwN often contributes to as well, that the need over there is raised sooner, and that there are more possibilities, easier possibilities than outside of the city.

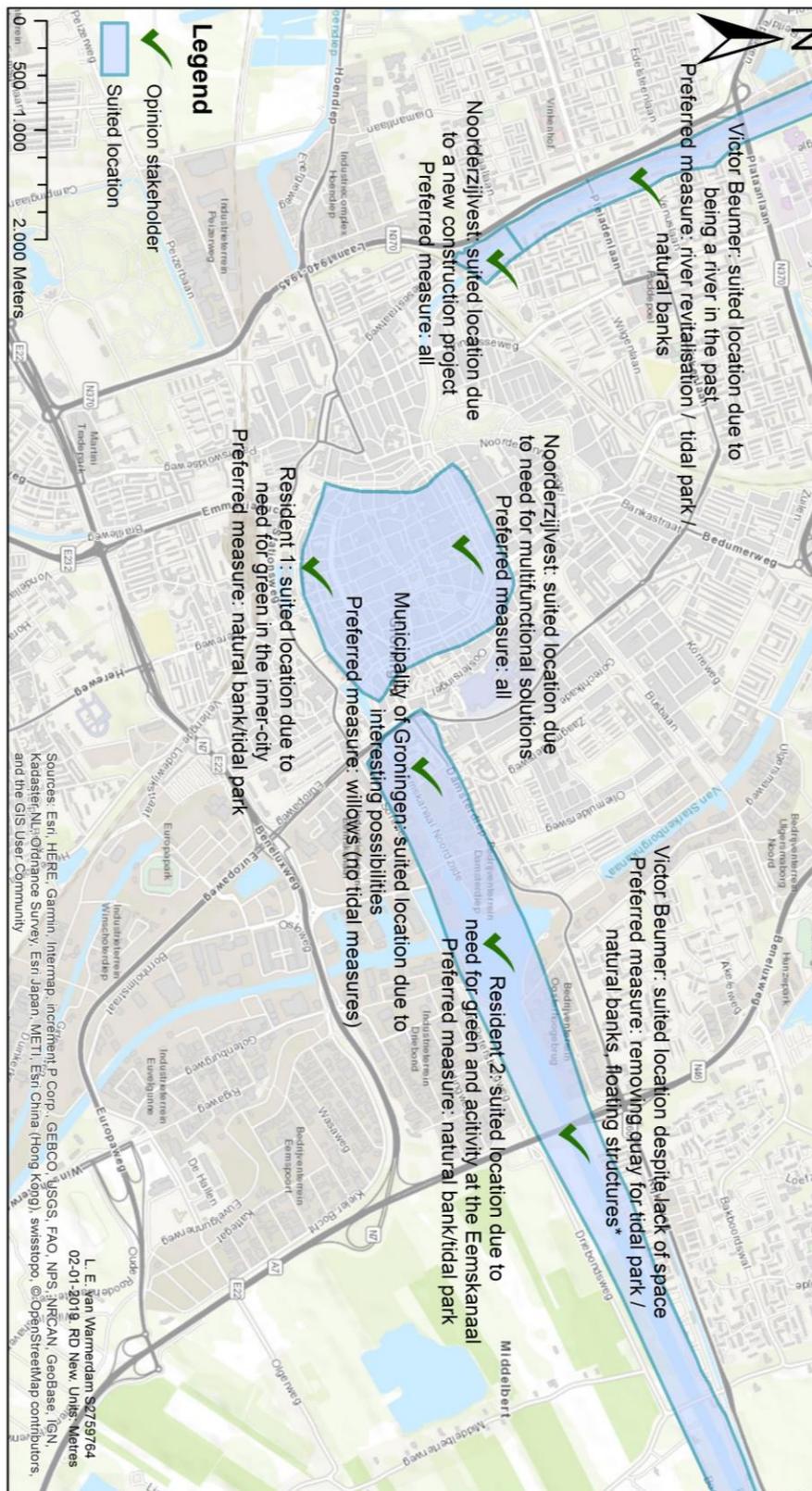
Despite the space issue, the multidisciplinary character of BwN could result in easier possibilities for the urban area. In addition, resident 1 states that he would prefer the measures to be implemented in an urban area. Albeit, Jan Pieter Koppert stresses the space issue in the inner city:

So, to get a broader bank, I know they're looking into this in Rotterdam, but we actually don't have the space. No, so I don't think we have looked into this here, only very globally maybe. Because those broad spaces, especially in the inner city we don't have that, you'd have to take space from the asphalt.

This is contrary to the statement of Kees de Jong mentioned above. Jan Pieter Koppert mentions that the dikes at Reitdiep are part of valuable historical structures as old dikes and sluices, which creates difficulties for especially the measure 'Tidal park' with natural banks. He argues that the Eemskanaal would be more suited, despite the limitations. For the measure 'Keeping dikes lower with willows', Victor Beumer argues no inner city is spacious enough, since the Willows take in a large amount of space.

The results suggest that the residents feel the measures 'Tidal park' and 'Keeping dikes lower with willows' increase the contact with the water because of lower dikes or removal of the dikes. It is also found that for the residents eating oysters from Oyster banks or being made aware of fluctuations of the water by a 'Tidal' park doesn't increase the contact with the water, or only a little. The Oyster banks therefore have the least possibilities in Groningen. The municipality and the water board have different perceptions on the possibilities for both locations. The results suggest that the water board stresses the possibilities for multi-functionality, urban areas and new construction projects while the municipality stresses the possibilities for more spacious areas, while its interests lies at the Eemskanaal. The municipality stresses that in this exploration, the limitations aren't that important. However, at the Reitdiep there are more possibilities in terms of space, multi-functionality and urban development, but historical dikes and other structures are a limitation for this location. All the preferences and thoughts of the municipality, the water board and the other stakeholders included on the location are presented in figure 3. The locations in figure 3 are found to be suited by one or more stakeholder. However, other stakeholders may not agree with this location.

FIGURE 3. Preferences and thoughts on the location



* Victor Beumer advised this measure

Conclusions and discussion

The central research question for this research is as follows: How can Building with Nature in the city contribute to the water safety and spatial quality in Groningen? The study presented here attempted to explore the possibilities for BwN in the city of Groningen and tried to establish if the experienced spatial quality could increase by BwN measures. The possibilities were explored using a qualitative research method. Six semi-structured interviews were conducted with different stakeholders. The results suggest that when one wants to apply BwN measures, making an inventory of problems and goals is of great importance. It's crucial that the contribution of the BwN project to your goals is well argued. If this argumentation is in order and multi-disciplined goals can be linked to your project, enough support can be gained. As De Vriend et al. (2015) state, the collaboration with other disciplines, is crucial to come to BwN solutions. In order to applicate the measures in Groningen, changes are needed. Problems for canals are the freshwater instead of brackish water (need for freshwater mussels) or the lack of tides (make use of the bossom level). When these minor changes or problems are taken into account, it will be possible to apply the BwN project in a cost-effective way. This study lays the groundwork for future research into using BwN at channelled rivers or canals.

The results of this paper suggest that adding green to the water spaces in Groningen increases the spatial quality for both respondents. Some of the measures don't appeal that much, but as long green is added, the ecology is boosted and recreation possibilities are expanded, the respondents do feel a measure could increase the spatial quality. If the users that have to use the space for decades value the changes, the spatial quality is considered high (Verbart, 2014). This is in line with the findings of Smit (2012), who states that the spatial quality of the live-work milieus is determined by e.g. restaurants and parks for leisure activities and that green increases the visual quality of an environment. In contradiction, van der Valk (2002) argues that the spatial quality is linked to a well-maintained physical environment. However, the unmaintained natural banks were valued by the residents. As for Room with the River studies, the results of this study suggest that dike reinforcements tend to have a negative impact on the spatial quality (Nillessen & Kok, 2015)

Finally, it was found that the residents feel the measures could increase the contact with the water because of lower dikes or removal of the dikes. It is also found that for the residents eating oysters from Oyster banks or being made aware of fluctuations of the water by a 'Tidal' park doesn't increase the contact with the water, or only a little. There is no existing literature found on this, but the last results do contradict the expectations. The Tidal park without tides

and the Willows thus have the most opportunities in Groningen. The municipality and the water board have different perceptions of which locations have the most possibilities. The results suggest that the water board stresses the possibilities for multi-functionality, urban areas and new construction projects while the municipality stresses the possibilities for more spacious areas, while its interests lie at the Eemskanaal. The municipality stresses that in this exploration, the limitations aren't that important. However, at the Reitdiep there are more possibilities in terms of space, multi-functionality and urban development, but historical dikes and other structures are a limitation for this location. Unexpected is that the results are not as specific for the possibilities in Groningen. A possible explanation for this might be that the scope of this study was too limited in terms of respondents and timespan. However, the results of this study indicate that there are many possibilities for BwN in the city of Groningen and that BwN measures in Groningen probably have a positive impact on the experienced spatial quality.

This research is a qualitative research and therefore no relations were proven. Limitations of this study and its findings are the limited amount of stakeholders and in particular residents included in the research, as well as the translation of the data. Possible interpretation and translation mistakes result in the data being less valuable. One source of weakness in this study which could have affected the results was interviewing unprepared stakeholders. Further research might explore the effect of the BwN measures on the experienced spatial quality more closely by using opinions of a larger amount of residents.

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Appendix 1: Interview guides

Interview Guide 1: Building with nature in the city: Victor Beumer and Pieter de Greef

1. Could you please tell me what you think the concept building with nature in the city stands for?
 - What are the goals?
 - What is the power of this concept?

2. Could you please elaborate on the benefits of the measures of building with nature in the city?
 - What are the limitations?

3. The measures seem to be designed for cities that are situated at a river. What is your opinion on the applicability of the measures of the program at cities that are situated at channeled river and canals, or even applying the measures at a lake?
 - Which measures do you think would be fit for these situations?
 - In which ways would these measures need to be redesigned?

4. I'm investigating if the following measures could be implemented in a way in Groningen at the Eemskanaal or Reitdiep: keeping dikes lower with willows; natural breakwaters; tidal parks. I've chosen these measures because I think these measures can have a positive effect on the spatial quality in Groningen as well as on the water safety in Groningen. The Eemskanaal and Reitdiep are not influenced by tides. However, the water levels fluctuates because of precipitation and the function as "bosom". The canals are enclosed with dikes. What is your opinion on the chances of success for these measures in Groningen?
 - Especially the tidal park needs adjusting before this could be implemented. Since the Eemskanaal and Reitdiep are not influenced by tides, the park needs another interpretation. Do you see possibilities? (e.g. water square)
 - Could you please elaborate on why these measure would or wouldn't work out in Groningen? Which of the other measures of the concept would fit better in the situation of Groningen Eemskanaal/Reitdiep? What are the arguments for this?

5. Do you know how the residents of Rotterdam and Dordrecht have experienced the measures so far? Are these opinions researched?
 - If yes, what were the (largest) positives?
 - What were the (largest) negatives?

Interview Guide 2: Gemeente Groningen: Jan Pieter Koppert

1. Could you please tell me what you think the vision of 'Koersen op water' stands for?
 - What is the power of this idea?
 - How does this work in practice?
2. Could you please elaborate on the benefits of the measures of koersen op water?
 - What are the limitations?
3. In what ways do you strive to enhance the relations with the water?
 - What is the focus of this endeavor? Do you emphasize on the relations of the residents with the water? E.g. recreation and nature.
4. In the vision 'koersen op water' the importance of the visibility of the water, quality and availability of the space next to the water and the relation with the water in Groningen is mentioned. Safety measures exist of raising the quay or dikes. Have you thought about including measures that are based on nature and make raising the quay or dikes unnecessary? Are you familiar with these measures?
 - Are you familiar with the concept building with nature in the city?

Building with nature in the city is a concept where the aim is to make cities that are situated at rivers or water safer in a cost effective way, making use of the nature. Within this concept. Different measure have been designed. The purpose of these designs is to enable e.g. water boards to keep dikes lower, so the water will be more visible, enhance the ecology and landscape and make the historical landscapes, tides and other characteristics and benefits of the water more visible, to enhance the relation of the citizens with the water.

5. I am investigating if some of these measures could be adjusted to be implemented in Groningen. The measures I've chosen are 'keeping dikes lower with willows', natural breakwaters and tidal parks. The first measure consists of placing willows in front of a dike to create a vegetated foreshores. These willows act as breakwaters and therefore the dikes do not have to be as high as without these vegetated foreshores. This can result in the water being more visible and the landscape more attractive. The second measure has the same function. Oyster and mussel beds act as breakwaters. Residents can eat the

oysters and mussels from the water. The last measure are the tidal parks. When situated in rivers, these parks make the tides visible for the residents. The parks can enhance the landscape and create recreation possibilities. Since waters around Groningen are not influenced by tides, the parks would have a different purpose. Could you please tell me if you know a place in Groningen where you think implementing these measures would be of any value?

- Do you see possibilities for another interpretation of the tidal park?
 - In my research I focus on implementing these measures at the Eemskanaalzone and Reitdiep. Do you think Reitdiep or Eemskanaalzone are suited?
 - Do you see any possible problems for the implementation of these measures in Groningen? What about the safety, spatial attractiveness, costs?
6. If the water board Noorderzijlvest wanted to implement the ‘building with nature in the city’ measures, would you welcome this idea with open arms?
- Why / why not?
7. Could you please elaborate on why you think this concept and the chosen measures (don’t) fit in the vision on water ‘koersen op water’?
- Do you think other measures of the concept have a better fit for Groningen?
8. How do you think these measures will be perceived by the residents of Groningen?
- What are the expected positives / negatives?

Interview Guide 3: Noorderzijlvest: Kees de Jong

1. Could you please elaborate on the requirements that are needed for the measures on water safety implemented in Groningen (at the Reitdiep, Eemskanaal)?
2. Next to hard engineering as raising the quay or dike, do you implement soft engineering to enhance the water safety in the city of Groningen?
 - What do you know about the concept of building with nature?
 - And about the measures of this concept designed for the city?
 - Are there any existing plans for implementing measures of this kind to enhance the water safety in Groningen city?

Building with nature in the city is a concept where the aim is to make cities that are situated at rivers or water safer in a cost effective way, making use of the nature. Within this concept. Different measure have been designed. The purpose of these designs is to enable e.g. water boards to keep dikes lower, so the water will be more visible, enhance the ecology and landscape and make the historical landscapes, tides and other characteristics and benefits of the water more visible, to enhance the relation of the citizens with the water.

3. I am investigating if some of the measures of ‘building with nature in the city’ could be adjusted to be implemented in Groningen. The measures I’ve chosen are ‘keeping dikes lower with willows’, natural breakwaters and tidal parks. The first measure consists of placing willows in front of a dike to create a vegetated foreshores. These willows act as breakwaters and therefore the dikes do not have to be as high as without these vegetated foreshores. The willows also break the waves of ships, which results in less wear and tear of the dike. This can also result in the water being more visible and the landscape more attractive. The second measure has the same function. Oyster and mussel beds act as breakwaters. Residents can eat the oysters and mussels from the water. The last measure are the tidal parks. When situated in rivers, these parks make the tides visible for the residents. The parks can enhance the landscape and create recreation possibilities. Since waters around Groningen are not influenced by tides, the parks would have a

different purpose. Could you please tell me if you know a place in Groningen where you think implementing these measures would be of any value?

- Do you see possibilities for another interpretation of the tidal park?
 - In my research I focus on implementing these measures at the Eemskanaalzone and Reitdiep. Do you think Reitdiep or Eemskanaalzone are suited?
 - Do you see any possible problems for the implementation of these measures in Groningen? What about the safety, spatial attractiveness, costs?
4. If the municipality of Groningen wanted to implement the 'building with nature in the city' measures, would you welcome this idea with open arms?
- Why / why not?
5. How do you think these measures will be perceived by the residents of Groningen?
- What are the expected positives / negatives?

Interview Guide 4: Residents of Groningen

1. Do you spend time at the Eemskanaal and/or the Reitdiep?
 - What do you like the most about these places?
 - What do you dislike?

2. How do you value landscape with dikes and quays?
 - What is your opinion on contact with the water in a landscape?
 - What is your opinion on contact with the water in a urban space?

3. How do you value parks?
 - What is your opinion on the amount of parks in Groningen?

4. How do you value greening?
 - What is your opinion on the amount of green in Groningen?

5. How do you value spaces with water?
 - What is your opinion on the amount of spaces with water in Groningen?
 - Do you prefer natural/green water spaces as rivers and lakes or urban water spaces as canals with quays or dikes and channels?

6. How would you rate vegetated and green shore?
 - How do vegetated shores compare to quays or dikes in terms of attractiveness?

Building with nature in the city is a concept where the aim is to keep cities that are situated at rivers or water safe in a cost effective way, making use of the nature and enhancing the spatial quality in various ways. Within this concept different measures have been designed. The purpose of these designs is to enable e.g. water boards to keep dikes lower, so the water will be more visible, enhance the ecology and landscape and make the historical landscapes, tides and other characteristics and benefits of the water more visible, to enhance the relation of the citizens with the water.'

7. I am investigating if some of these measures could be adjusted to be implemented in Groningen. One measure consists of placing willows in front of a dike to create a

vegetated foreshores. These willows act as breakwaters and therefore the dikes do not have to be as high as without these vegetated foreshores. This can result in the water being more visible and the landscape more attractive.

- How would you rate willows in front of a dike?
- Why?
- In the case of Eemskanaal and Reitdiep, would you prefer a lower dike with willows or a dike as they are at this moment?
- What is your opinion on the effect of lower dikes on the contact with the water?

8. Another measure has the same function as the willows. Oyster and mussel beds act as breakwaters and therefore the dikes do not have to be as high as without these beds. This can result in the water being more visible and the landscape more attractive. Residents can eat the oysters and mussels from the water.

- How would you rate banks of oysters and mussels or other kinds in front of a dike?
- Why?
- Does the fact that these banks only can be seen in summer during low water levels change this?
- In the case of Eemskanaal and Reitdiep, would you prefer a lower dike with oyster and mussel banks or a dike as they are at this moment?
- What is your opinion on the effect of being able to eat the mussels and other kinds during summer on the contact with the water?

9. Another measure are the tidal parks. When situated in rivers, these parks make the tides visible for the residents. The parks can enhance the landscape, ecology and create recreation possibilities. Since waters around Groningen are not influenced by tides, the parks would have a different purpose.

- How would you rate a park on the water side, incorporated with the water and the fluctuating water levels caused by rain etc.?
- Why?
- Would you like to make use of such a park?
- In the case of Eemskanaal and Reitdiep, would you prefer a vegetated shore in the form of a tidal park or a quay or dike as they are at this moment?

10. Another measure are floating structures and rafts of plants that enhance the ecology and improve the water quality.

- How would you rate these floating structures?
- Why?
- What is your opinion on the effect of enhanced ecology on the valuation of a water space?

11. Are there any spaces in Groningen that you can think of that are suited for the measures we discussed?

- Are there spaces in Groningen where you think vegetated foreshores are not suited?

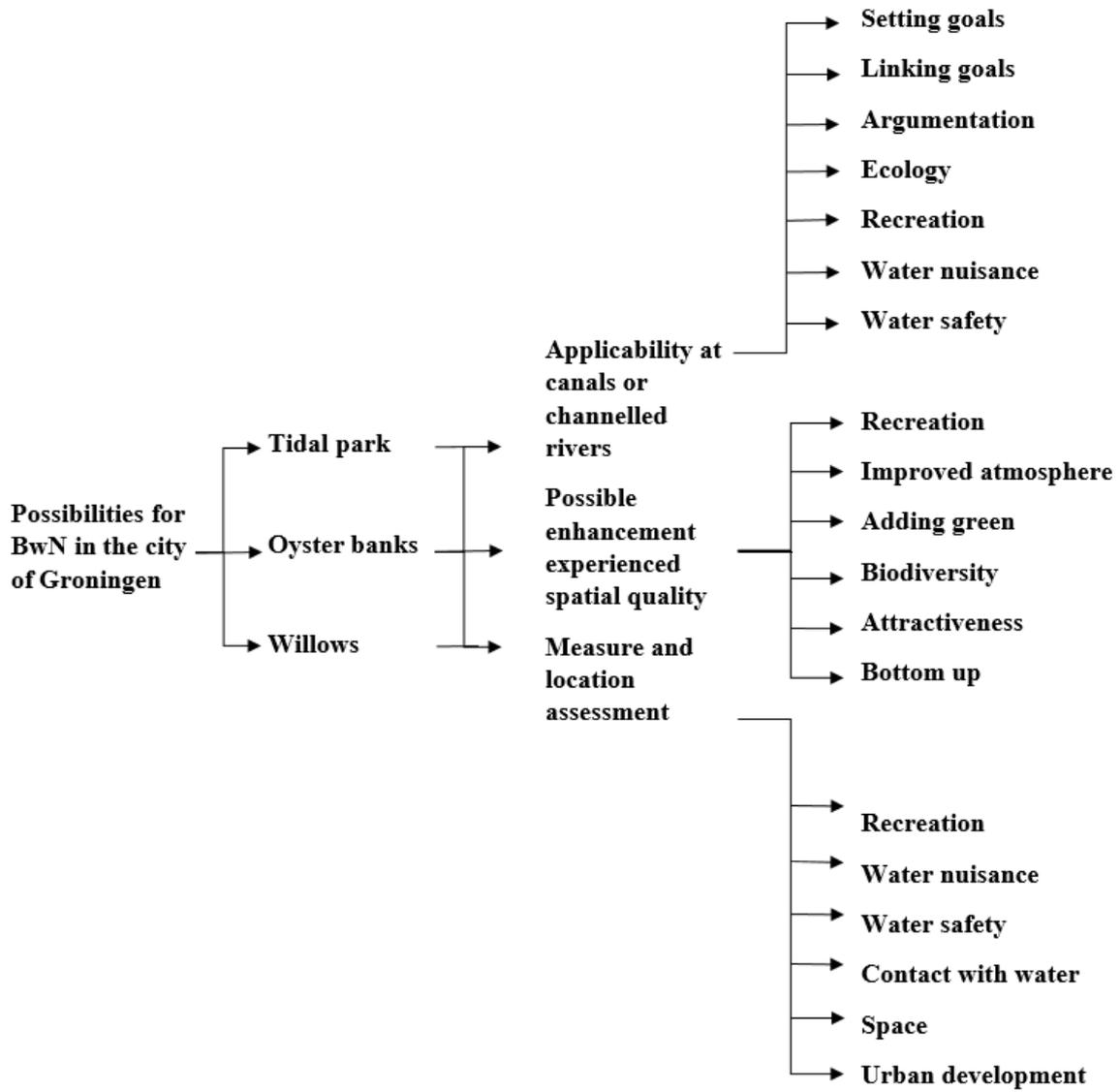
Appendix 2: Codebook and code tree

Codebook

Themes	Inductive / deductive	Relevance
Applicability (1)	Inductive	Secondary question 1
Spatial quality (2)	Inductive	Secondary question 2
Measure and location assessment (3)	Inductive	Secondary question 3
Codes	Inductive / deductive	Relevance
Setting goals (1, 3)	Inductive	Setting goals is important, since this makes implementing BwN in the city possible
Linking goals (1, 3)	Inductive	Linking goals is important, since this makes implementing BwN in the city possible and affordable by gaining support and financing with multiple resources
Argumentation (1)	Inductive	The argumentation is important for gaining support for implementing BwN measures
Ecology (1)	Inductive	The ecology is enhanced by the measures and is part of the argumentation
Recreation (1, 2, 3)	Inductive	Recreation possibilities are created by the BwN measures and this is part of the argumentation for the implementation, enhanced experienced spatial quality and location
Water nuisance (1, 3)	Inductive	Water nuisance can be solved by the BwN measures and this is part of the argumentation for the implementation and location
Water safety (1, 3)	Inductive	Water safety has to be maintained with the BwN measures and this is part of the argumentation for the implementation and location
Tidal park (1, 2, 3)	Deductive	The tidal park is one of the measures included in this research

Oyster banks (1, 2, 3)	Deductive	The oyster banks are one of the measures included in this research
Willows (1, 2, 3)	Deductive	The willows are one of the measures included in this research
Improved atmosphere (2)	Inductive	The BwN measures can improve the atmosphere, which has an effect on the experienced spatial quality
Adding green (2)	Inductive	The BwN measures include adding green, which has an effect on the experienced spatial quality
Biodiversity (2)	Inductive	The BwN measures enhance the biodiversity, which has an effect on the experienced spatial quality
Attractiveness (2)	Inductive	The BwN measures can increase the attractiveness of a space, which has an effect on the experienced spatial quality
Bottom up (2)	Inductive	BwN measures at other locations were assessed by inhabitants using a bottom up strategy, which has an effect on the experienced spatial quality
Contact with water (3)	Inductive	Lower dikes and being aware of water level fluctuations increases the contact with the water, which creates possibilities for the BwN measures in Groningen
Space (3)	Inductive	Space is a challenge for implementing the BwN measures in Groningen
Urban development (3)	Inductive	Urban development is an opportunity for implementing the BwN measures in Groningen

Code tree



Appendix 3: Original data

Victor Beumer

“Eerst je moet goed inventariseren, welk probleem, of welke behoefte wil ik nou eigenlijk oplossen. En, gaat het om leefbaarheid of gaat het om waterkwaliteit, of gaat het om waterveiligheid, en eigenlijk praten we dan over wateroverlast. Als je dat soort dingen op een rijtje hebt, dan kun je pas gaan bedenken: wat kan ik hier nou gaan toepassen? Wat is nou het meest geschikt? En vaak worden die stappen overgeslagen.”

“Ja. Het punt is natuurlijk he bij dijken, kom je natuurlijk in een moeilijkheid dat je die dijken niet mag aanraken, dan wordt het waterschap wordt dan een beetje overspannen. En ehm, bij die dijken moet je vaak water inwaarts gaan werken, en dan heb je natuurlijk veel minder ruimte.”

“Even kijken, je had het over wilgen, ja kijk wilgenbossen dat is natuurlijk dat ze het probleem dat ze teveel ruimte in nemen, dus eh, ik kan niet precies de situatie voorstellen maar als je een stukje hoog stedelijk zit is dat eigenlijk al een no go natuurlijk, kom je iets meer buiten stedelijk terecht dan is dat wel, of rietkragen of dat soort dingen, kan je wel echt aan gaan denken.”

Pieter de Greef

“Volgens mij kun je het principe van Building with Nature kun je natuurlijk ook in andere situaties toepassen. Alleen hoort er een andere vorm bij. Ik denk dat gewoon het principe, bijvoorbeeld waar we het net over hadden, natuurvriendelijke oevers, op plekken waar je dat, beargumenteerd, een bijdrage vindt vormen aan je doelstellingen, kun je ook heel goed natuurlijke oevers in je kanalen of rivieren zonder getijden realiseren.”

“Ja, volgens mij heb ik dat al gezegd, ik denk gewoon dat concepten als building with nature, is dat je het echt moet koppelen aan andere doelstellingen die de stad heeft. Want ehm, als je alleen maar, eh ja wij van building with nature willen, willen ergens een building with nature concept, volgens mij is het echt de truc dat je het moet koppelen aan, aan ja wat jullie ook noemden, aan een aantrekkelijke, leefbare stad, en die grootste urgenties. Bijvoorbeeld voor Rotterdam, is die grootste urgentie we moeten woningen bouwen. Dus als je daar, ehm, je concept aan kunt koppelen, ehm, dan heb je gewoon een veel sterker verhaal. Eh, dusja, dat is natuurlijk in iedere stad anders, dus eh, dat moet je natuurlijk ook een beetje vanuit je eigen kwaliteitsopgaves over nadenken.

“Wij hebben ook op markten gestaan, een paar jaar geleden en dan vroegen we aan de bewoners joh eh, we staan hier langs de rivier, eh, wat vindt u dat er nou moet gebeuren, nou de mensen zeiden ja, die hadden er niet voor gestudeerd, en die zeiden gewoon van ja er moet gewoon een goeie routes, meer natuur, je moet bij het water kunnen komen, en er moet wat te doen zijn! Dus eigenlijk zijn dat ook een beetje wat ons betreft de principes.”

Resident 1

“Dat vind ik wel een grote toevoeging ja.” “Ja, dan heb je wat om naar te kijken, een eend die voorbij zwemt, of een gans die voorbij loopt.”

“Ik ben er niet zo bekend mee, ik ken het niet echt, dus daarom misschien ook dat het een beetje gek mij in de oren klinkt”

“Dat denk ik wel, want je bent ook dichterbij, dus je hebt sneller dat je er bijvoorbeeld in kan springen, en weer uit. Dat zou ik nooit doen, maar dat gevoel heb je natuurlijk wel.”

“Nou, dat [meer groen] geeft wel een beetje sfeer in een stad denk ik”

Resident 2

“Ehm, ja, ik woon wel bij het Eemskanaal, maar daar is nu niet echt iets te beleven, dus daar doe ik ook niks mee. Dus eh, zo’n groene oever met een park ofzoiets, ehm, dat spreekt me op zich wel aan. Misschien maak ik dan, nog, nog eens gebruik van de omgeving bij het water.”

“Ik heb daar eigenlijk niet echt een mening over.”

Kees de Jong

“Voordeel van Building with Nature maatregelen is vaak van, omdat je niet alleen waterveiligheidsdoelstellingen maar ook ander type doelstellingen dat je die tegelijkertijd kunt eh, realiseren. En, en daar is wel belangstelling voor, maar dat is ook zo van, ja, dat wat ons betreft, als we dat uit waterveiligheidsoogpunt moeten gaan toepassen, dan hebben we daar het geld voor over. En eh, het geld om dan die andere doelstelling te bereiken, ja, daar moeten we dan ook een verantwoordelijke bij zoeken die daar dan zo belangrijk vindt dat ie daar dan aan mee moet betalen. Nou, en dat is een heel onderhandelingsproces.”

“Nee, maar volgens mij wordt dat wel gedaan hoor, met dat idee, van vijvers bijvoorbeeld, die hebben, die hebben ook een functie om extra regenwater op te vangen, enne, die soms zijn die ook groter wanneer het heel erg nat is. Op zich is dat wel een slimme manier. En ehm, ja, je

moet natuurlijk de begaanbaarheid, daar moet je iets op zien te vinden, in een periode dat het heel erg nat is, dat mensen dat ook heel goed kunnen zien, en dat ze zicht niet in rare situaties begeven, dat het water niet daar komt waar je het niet wilt hebben. Maar dat valt opzich, valt dat wel te voorzien. Als je daar verschillende doelstellingen aan kunt verbinden, dan is het denk ik de moeite waard.”

“Ik denk trouwens dat in stedelijk gebied, dat ehm, de noodzaak uiteindelijk om, wat meer in multifunctionele oplossingen te denken, waar building with nature vaak ook aan bijdraagt. Dat die noodzaak, dat die eh daar ook wel eerder omhoog steekt, dat er meer mogelijkheden, makkelijkere mogelijkheden liggen, dan in eh, ja dan in, in buitengebieden.”

Jan Pieter Koppert

“Dus om, om een bredere oever te, te krijgen, ik weet dat ze in Rotterdam dat ook heel erg onderzoeken. Maar, eigenlijk hebben wij die ruimte niet. Nee. Dus ik denk ook niet dat dat hier onderzocht is, of misschien heel globaal. Want die brede ruimtes, zeker hier in de binnenstad hebben we dat niet, dan zou je dus van het asfalt ruimte moeten nemen. En ook buiten de binnenstad, met water, daar zou misschien wel wat meer kansen zijn, af en toe leggen we ook wel natuurlijke oevers aan, maar niet op grote schaal.”

“Ik denk alleen niet, dat je echt de combinatie met waterveiligheid, die... daar heb ik ook geen zicht op, maar ik denk dat dat ook niet echt aan de orde is hier. Ja, je zou het wel ook bij het Eemskanaal kunnen voorstellen maar ik weet dat er, de provincie is dan de beheerder van het Eemskanaal, die, ja die gaat gewoon voor veiligheid en die zegt nou, die dijk moet zo hoog zijn klaar”

“Nouja, in praktijk dan stel je zo'n visie vast, daarin staan allemaal ambities, van we willen woonboten, kwaliteit van woonboten willen we verbeteren, we willen de kade verbeteren, we willen meer plekken aan het water waar eh, mensen aan het water kunnen zitten, dus meer beleven, eh, dat zijn de ambities”

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