

# Strengthening spatial quality in regional flood risk management in the Netherlands

A comparative case study of best practices the  
Wheredijk and the Voorweg

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Master thesis Environmental and infrastructure planning

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## Colophon

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## Abstract

Currently, water management is shifting from a traditional approach towards a more integrated approach. This trend is known as the 'spatial turn'. Boundaries between land and water, as well as between disciplines, are blurring. As a result of the spatial turn, spatial quality has gained more attention in flood risk management. National Dutch programs such as Room for the River have successfully integrated spatial quality in flood risk management. However, current practices show that incorporating spatial quality in flood risk management is still not mainstream. Practitioners struggle to develop reachable goals and structurally use appropriate methods and tools to achieve spatial quality. Moreover, much research is focused on primary flood defenses, but little is known about how spatial quality is negotiated in regional flood risk management. Therefore, this study aims to gain insights into how spatial quality is considered in regional flood risk management and how policy instruments can be applied to strengthen spatial quality. To gain these insights, a comparative case study approach was executed. The cases of the Wheredijk and The Voorweg were analyzed, which were appointed as best practices by practitioners. The applied policy instruments were analyzed and compared in the results. Additionally, several boundaries and opportunities were found for enhancing spatial quality in flood risk management. The outcome of this study is that the combination of policy instruments was able to enhance spatial quality in both cases. Eventually, recommendations for waterboards have been formulated to enhance spatial quality in regional flood risk management. First, adopt a more integral and area-based approach. Second, clearly define spatial quality in projects. Third, consider spatial quality measures on program level. Forth, institutionalize existing soft policy on spatial quality. Last, acquire financing and secure spatial quality via financial (treasure) instruments.

Keywords: Integrated flood risk management, spatial quality, policy instruments, NATO-typology, regional flood risk management

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## List of abbreviations

EDF	European Flood Directive
DO	Final design ( <i>definitief ontwerp</i> )
HHNK	Hoogheemraadschap Hollands Noorderkwartier
HWBP	Hoogwaterbeschermingsprogramma
IPO	Interprovinciaal Overleg
ORK	Ontwikkelingsprogramma Regionale Waterkeringen
RftR	Room for the River ( <i>Ruimte voor de rivier</i> )
Rijnland	Hoogheemraadschap van Rijnland
SO	Sketch design ( <i>schets ontwerp</i> )
UO	Implementation design ( <i>uitvoerings ontwerp</i> )
VKA	Preferred alternative ( <i>voorkeursalternatief</i> )
VO	Preliminary design ( <i>voorlopig ontwerp</i> )

# Chapter 1 Introduction

## 1.1 Background

Globally, floods risk is increasing in deltas due to factors such as subsidence, climate change, population growth, and economic development (Nillesen & Kok, 2015). Therefore, suitable flood risk management strategies are needed to cope with this increased risk. Traditionally, flood risk management was a sectoral- and technical sector (Nillesen & Kok, 2015). There was a one-sided focus on defending the land against the water and using hard, technical measures to do so (Verweij et al., 2021). This resulted in a strong boundary between land and water (Busscher et al., 2019). The traditional approach has not always been successful in keeping the water out. Since mid- 1980s many countries experienced high-impact flood events (Löschner & Nordbeck, 2020). Next to that, the traditional approach had many negative effects on spatial quality, as the flood risk management strategy was leading and the role of spatial design was solely focused on fitting in flood protection measures (Nillesen & Kok, 2015). Interventions necessary to meet the protection standards were facing growing opposition, because they influenced spatial quality and the newly appreciated cultural and environmental values negatively (Klijn et al., 2013; Van der Brugge et al., 2005).

After recognizing the flaws of traditional flood risk management in the 1990s, a policy shift is taking place in the water sectors of Europe (Löschner, 2018). The focus is not solely on keeping the water out, but it has partly shifted towards living with water and giving water more space (Ritzema & Van Loon-Steensma, 2018). With this shift, more holistic and integrated flood risk management strategies have emerged (Ibid.). These management strategies integrate multiple sectors, such as spatial planning and flood risk management. Consequently, *“both the physical boundary between land and water as well as the boundaries between different disciplines, policy objectives, and values (such as water safety, spatial quality, and economic development) are blurring”* (van den Brink et al., 2019, p13.). More parties and interests are involved in flood risk management, as it now crosses through multiple institutions and disciplines. When the integrated approach is applied appropriately it creates benefits, as flood control measures are better connected with other land use functions and spatial quality of the area is taken into account (Scott, 2013). Within this integrated approach spatial quality is seen as an important factor for the solution of socio-economic problems (Nillesen, 2019). However, defining spatial quality is difficult as there is not one true definition (Moulaert et al., 2013). Until recently little attention was paid to the concept of spatial quality, but its importance is being recognized and Dutch national programs such as Room for the River (Rftr) are prioritizing spatial quality.

In the Netherlands, a distinction is made between primary- and regional flood defenses. Primary flood defenses protect against high water from the North Sea, the Wadden Sea, the IJsselmeer and Markermeer, and the biggest rivers of the Netherlands (Rijkswaterstaat, n.d.). Regional flood defenses are the flood defenses that are not defined as primary and are governed on a regional level (Rijkswaterstaat, n.d.). There are three different types. First, the flood defenses that retain water from the primary waterways, but are not defined as primary. For example *zomerkades* (summer quays). Second, the flood defenses that retain other non-primary water, such as flood defenses along regional rivers, canals and lakes. Third, dry flood defenses that serve as secondary dikes in case the primary dikes flood (Heuer et al., 2009). Until recently, most attention was geared towards primary flood defenses. Regional flood defenses gained more attention after a shock event occurred in 2003. During a heatwave the dike in Wilnis dried out and breached. The village of Wilnis flooded and 1500 inhabitants had to be evacuated. This was a wake-up call for all regional governments and waterboards to pay more attention to the regional flood defenses. Subsequently, the *Ontwikkelingsprogramma*

*Regionale Waterkeringen* (ORK) was established in 2005 to create a uniform way of testing and strengthening regional flood defenses.

The current vision of the *Interprovinciaal Overleg* and the Union of Waterboards on regional flood defenses describes the current narrative and the upcoming challenges. Inspiration was drawn from the Delta Program and other successful national programs (STOWA, 2016). In this vision, it is stated that the focus should shift from a sectoral view towards a more integral view (STOWA, 2016). Furthermore, attention is paid to multiple uses and functionalities in which ecological values, recreation values, and landscapes values are important. However, explicitly how this is going to be achieved or what policy instruments are necessary in the planning process is not mentioned.

## **1.2 Problem definition and research aim**

Regional flood management, and their policies, take inspiration from the Delta Program and other successful national programs (STOWA, 2016). An example of a national program where an integrated approach was successfully applied to flood risk management is the Room for the River (RftR) program. RftR prioritized two objectives: water safety and spatial quality (Rijke et al., 2012). The program was successful and is often presented as best practice. However, current developments show that integrating spatial quality in flood risk management is still far from mainstream (Busscher et al., 2019). A successive program from RftR is the Hoogwaterbeschermingsprogramma (HWBP), which entails the largest dike improvements since the Delta Works. The program started with a sectoral focus, but it was soon recognized that spatial quality should be incorporated. The waterboards are responsible for translating spatial quality objectives into practice, but this translation has proven difficult (HWBP, 2021). The monitoring program of HWBP shows that water managers' main problems are developing reachable goals, structurally using appropriate methods, and structurally using tools to achieve spatial quality (HWBP, 2021).

Although steps have been made regarding integrating spatial quality in flood risk management there are still many challenges. When spatial quality is not being prioritized, as done with the dual objective of RftR, there is a big chance the focus of the planning process will return to the primary objective of flood protection (Busscher et al., 2019). Furthermore, in policies and programs the aim is to adopt an integral perspective and to improve spatial quality, but the implementation in the planning process is difficult. Often when pressure on time schedules and budgets increases, there is a tendency to return to old monofunctional routines (Verweij et al., 2017a). Additionally, there is a lack of knowledge on how and what type of policy instruments should be applied in the planning process, especially the implementation phase, to strengthen spatial quality in flood risk management (Verweij et al., 2021). Policy instruments can be seen as tools that governments can use to translate abstract policy objectives, such as strengthening spatial quality, to a concrete implementation in practice (Acciai & Capano, 2018; Ali, 2012). Gaining insights in what type of policy instruments are favorable for safeguarding spatial quality can help in reaching spatial quality objectives.

Against this background, the aim of this study is to identify how spatial quality can be achieved in the regional flood risk management projects and what types of policy instruments can be applied to strengthen spatial quality. This study will explore the current practices of regional flood risk management and spatial quality. Eventually, this study will formulate recommendations, based on best practices, on how to spatial quality can be safeguarded in regional flood defense projects.

### 1.3 Research questions

The above mentioned problem definition and research aim leads to the following central research question: How can policy instruments enable the strengthening of spatial quality in regional flood risk management?

In order to answer the main question, the following sub-questions are formulated:

1. How can spatial quality be defined in the context of flood risk management?
2. What policy instruments can be distinguished in flood risk management and how can they help to strengthen spatial quality in flood risk management projects?
3. Which policy instruments for strengthening spatial quality have been applied in regional best practices and what lessons can be drawn?
4. How is spatial quality being considered in regional flood risk management, and what are barriers/opportunities for strengthening spatial quality in regional flood risk management?

### 1.4 Theoretical approach

To position spatial quality within flood risk management, the spatial turn is discussed in Chapter 2. This development refers to the shift from keeping the water out to living with water and giving water more space (Ritzema & Van Loon-Steensma, 2018). The development underlines the increased importance of an integrated approach and spatial quality. Second, spatial quality is discussed and defined. Spatial quality can be seen as a contested notion (Moulaert et al., 2013). Despite the concept's fuzzy nature, some widely used definitions exist. This research uses the Vitruvius triplet, consisting of three dimensions: *Utilitas* (utility), *Venustas* (beauty), and *Firmitas* (Firmness). These dimensions are translated to the flood risk management context using, among others, the definition of spatial quality in the RftR program (see Klijn et al., 2013). Third, Chapter 2 elaborates on policy instruments. The different types of policy instruments are explored. To structure the various policy instruments used to safeguard spatial quality in flood risk management, the NATO-typology of Hood (2007) is adopted. This typology categorizes policy instruments on the resources of the governments, consisting of nodality, authority, treasure, and organization. At last, instruments for strengthening spatial quality in flood risk management are identified and operationalized for the NATO-typology. This results in an overview of instruments that can be used in the empirical part of this research.

### 1.5 Research design

This research employed a comparative case study method to gain in-depth knowledge of how spatial quality is strengthened in regional flood risk management. Two best practice cases were identified using an expert-based survey. After applying the selection criteria the Wheredijk case and the Voorweg case were selected. The Wheredijk is located in Purmerend, and falls under the responsibility of the waterboard Hoogheemraadschap Hollands Noorderkwartier (HHNK). The Voorweg is located in Zoetermeer and is part of the management area of the waterboard Hoogheemraadschap Rijnland (Rijnland). In both cases, spatial quality was strengthened during the water safety project. To acquire data, three different methods were adopted. First, a document analysis was conducted by reviewing documents connected to the project and policy documents on spatial quality. Second, ten semi-structured interviews were conducted with project team members of the cases. Third, a focus group discussion was held to explore the perspectives and attitudes of experts on spatial quality in regional flood defenses.



## 1.6 Scientific and societal relevance

The shift from a traditional approach to a more integrated approach has resulted in increased attention for spatial quality in flood risk management projects, as it was recognized that flood defense infrastructure has a significant impact on its environment (Klijn et al., 2013). Much research has been done on institutional- and governance arrangements for integrated flood management (e.g. Hartmann & Driessen, 2017; Jaspers, 2003). However, little is published about *how* exactly spatial quality can be achieved in the planning process (Busscher et al., 2019; Nillisen, 2019).

Governments can use policy instruments as concrete tools to translate (policy) goals, such as strengthening spatial quality, into implementation in practice. Much research has been done on public policy instruments (e.g. Hood, 1983; Howlett, 2004). This is mainly because they help understand why and how modes of governance change and how actors use or do not use certain policy instruments (Acciai & Capano, 2018). However, the focus on policy instruments in spatial quality is underdeveloped and conceptual thinking about policy instruments is limited (Stead, 2021). This is surprising given how frequently they are employed.

This research will address these knowledge gaps and contribute to scientific literature by focusing on how spatial quality can be strengthened in flood risk management using policy instruments. Gaining insights into what type of policy instruments are favorable for spatial quality can help to reach spatial quality objectives. The focus will be on regional flood defenses, because currently research on integrated management or spatial quality in flood risk management is mainly geared at primary flood defenses (see Busscher et al., 2019; Klijn et al., 2013; Verweij et al., 2021). Little is known about how spatial quality is handled in regional flood risk management.

Next to scientific relevance, this research is also has a societal relevance. By taking a more integrated approach in flood risk management co-benefits can be created (Zevenbergen et al., 2015). An important driver for integrating spatial quality (and thus spatial planning) in the planning process of flood risk management is the idea that this will improve the local and regional spatial environment (Nillesen & Kok, 2015). Therefore, it is relevant for practitioners to gain knowledge on how to integrate spatial quality in regional flood risk management. In this way, society benefits from improved local and spatial qualities while simultaneously making the environment safer.

## 1.7 Readers guide

Thus far, Chapter 1 introduced this research and the foundation on which it is built. In the second chapter, the theoretical debate of the concepts of this research are discussed. Chapter 3 will elaborate on the methodology, which includes the data collection and data analysis along with the selection criteria of the best practice cases. After that, Chapter 4 and 5 will provide the results of the empirical research on best practices in regional flood management. The conclusion and recommendations for further research are formulated in Chapter 6.

## Chapter 2 Policy instruments for improving spatial quality in flood risk management

In this chapter the theoretical basis of this research is formed. This chapter aims to answer the research questions: ‘How can spatial quality be defined in the context of flood risk management?’ and ‘What policy instruments can be distinguished in flood risk management and how can they help to strengthen spatial quality in flood risk management projects?’ First, Sections 2.1 and 2.2 will elaborate on the spatial turn. After that, spatial quality will be defined in 2.3. In Section 2.4 policy instruments will be discussed, and will be operationalized to the context of flood risk management in Section 2.5. Lastly, in Section 2.6 the relationship between spatial quality and policy instruments will be visualized.

### 2.1 A shift in flood risk management – The spatial turn

Traditionally, flood risk management was a rather technical sector, as stated in Chapter 1. The global trend in flood risk management was to ‘fight against the water’ and defend the land against floods (Löschner & Nordbeck, 2020). This approach was rooted in a strong belief that water experts could control rivers with engineering solutions. These technical measures consisted mostly of building barriers, raising dikes, and enlarging drainage capacity (Woltjer & Al, 2007). Since the mid-1980s numerous high-impact flood events around the world resulted in the first cracks in beliefs of the traditional approach. They showed that even with the best technology, floods could not be prevented (Löschner & Nordbeck, 2020). More insights followed that undermined the basic principles of the traditional approach. First, there were problems in the governance arrangements in flood risk management all over the world (Pahl-Wostl et al., 2011). Examples are fragmented administrated structures with a divide in policy and operational responsibilities, narrow sectoral decision-making systems, and a disconnection between the vertical governance levels of countries (Kidd & Shaw, 2007). Second, there were increasing uncertainties on the predictability of the standards and maximum capacity the water system should hold due to climate change (Pahl-Wostl et al., 2011). Furthermore, there was an increasing awareness that the water system needed to be more sustainable, as the environment was largely ignored in traditional management. Last, the traditional approach was criticized for being reactive instead of pro-active in response to floods (Löschner & Nordbeck, 2020). Through these insights, the world view on flood risk management started to change. Another approach was desired.

The problems mentioned above stimulated a shift from flood control policies to a more integrated flood risk management approach (Löschner, 2018). On a global level, this started with partnerships and programs. In 2002 the World Meteorological Organization and the Global Water Partnership established a program on flood management to develop the concept of Integrated Flood Management. The European Union followed by publishing the EU Flood Directive (EFD) in 2007, in which flood risk management was introduced. Flood risk can be defined as *“the product of probability and consequences of flooding”* (Nillesen, 2019, p.17). Flood risk management thus entails the process of managing this flood risk. According to Hall et al. (2003, p. 126) it is: *“the process of data and information gathering, risk assessment, appraisal of options, and making, implementing, and reviewing decisions to reduce, control, accept, or redistribute risks of flooding.”* The EFD focused on the reduction of this risk. It promoted using hard measures, such as building dikes, in combination with softer spatial measures, such as water retention. Risk assessment and management plans needed to be made (Löschner, 2018). Additionally, the focus of the EFD was on a more holistic approach of flood risk management including prevention, protection, and preparedness. Thus, not only keeping the water out but also preparing for when a flood occurs (Douka, 2020). Furthermore, the EU mandated a river-basin approach. This encourages water managers to look beyond local actions to the effects of

measures on the total river basin (van Ruiten & Hartmann, 2016). Lastly, it stimulated higher involvement of other policy sectors and stakeholders (Douka, 2020).

The characteristics of flood risk management, promoted in European countries by the EFD, indicate a 'spatial turn'. This spatial turn refers to the growing importance of land and space in flood policy (Löschner, 2018). According to Van Ruiten and Hartmann (2016) three characteristics indicate a spatial turn (see Figure 1). The first characteristic is providing more space for rivers. This means letting go of the traditional line of defense and allowing rivers to flow more naturally. Consequently, water managers face more complexity, since more space land inward is required. This often results in conflicts with other land uses. Therefore, it requires close collaboration between spatial planners and water managers (Van Ruiten & Hartmann, 2016). The second characteristic is using an integrated approach. This entails cooperation on three different aspects. First, cooperation across physical boundaries, meaning the dike does not function as a physical barrier between institutions and land-use functions anymore. Second, cooperation across catchments, water managers need to take the whole catchment into account. And last, cooperation between different sectors, especially between flood risk management and spatial planning (Van Ruiten & Hartmann, 2016). The final characteristic is using techniques beyond structural measures. Next to technical measures (structural measures), other non-technical measures (non-structural measures) such as precautionary- and spatial measures are used to reduce vulnerability of the flood plain (Van Ruiten & Hartmann, 2016).

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<b>1: Space for rivers</b>
Retreat flood defense lines
Increase natural flood risk management
<b>2: Integrated approach</b>
Across physical boundaries (beyond dikes)
Across catchments (upstream and downstream)
Across sectors
<b>3: Beyond structural measures</b>
Spatial flood management
Precautionary measures

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Figure 1: Characteristics of the spatial turn in flood risk management (Van Ruiten & Hartmann, 2016)

## 2.2 The spatial turn in the Netherlands

The above-mentioned spatial turn has changed flood risk management in the Netherlands. Similar to other European countries, the Netherlands experienced (near) flood events in 1993 and 1995. Thousands of people were evacuated (van der Brugge et al., 2005). These events created momentum for other perspectives to develop in flood risk management. The EFD, created by the EU, was developed based on a Dutch proposal. The Netherlands had a prominent role in putting it on the political agenda and were considered frontrunners of flood risk management (van Ruiten & Hartmann, 2016). They published the policy note (*beleidsnota*) 'Ruimte voor Water' already in 2000 (Wiering & Immink, 2006). The EFD policy of 2007, which promoted an integrated approach, had to be translated to the Dutch policy. Even more policy documents started to appear, calling for more dynamic coastal management and water storage plans (Woltjer & Al, 2007). The national program Room for the River (RftR) started in 2006. This program successfully incorporated the characteristics of the spatial turn, by creating more space for rivers using an integrated approach. The program had a dual objective, water safety and spatial quality (Rijke et al., 2012). The line of defense was moved and more room was created by floodplain or shore lowering, creating bypasses and the removal of summer quays (van Ruiten & Hartmann, 2016). The projects were carried out in an integrated way, taking into account the areas beyond the dikes, the catchment, and including other sectors to create added value. RftR was

also one of the first successful programs that adopted new governance approaches, as the program used collaborative governance strategies on a decentral level, and delivered integration of objectives across spatial and temporal scales (Zevenbergen et al., 2015).

Standing out is the growing attention for space and spatial quality in flood risk management. According to Meyer (2006) there is a strong relationship between flood risk management measures and local and regional spatial quality. The trend of integrated flood risk management and of giving rivers more space has resulted in an interconnection between the water sector and the sector of spatial planning (Nillesen, 2019). An advantage of this interconnection is that more attention is paid to spatial policy objectives in flood risk management, which ultimately improves local and regional spatial quality (Busscher et al., 2019). In researching how spatial quality can be achieved in the planning process, it is necessary to understand how spatial quality is defined and what this concept entails. Therefore, this concept will be elaborated in the following section.

## **2.3 Spatial quality**

### **2.3.1 The intersubjective nature of spatial quality**

The concept of spatial quality can be found predominantly in Dutch and Flemish journal articles (e.g. Hartman et al., 2016; Hooimeijer et al., 2001; Moulaert et al., 2013). This does not mean that on an international scale the planning sector does not consider spatial quality. Other definitions and aspects related to spatial quality are used (Janssen-Jansen et al., 2009). An example is landscape quality, which is often used as a concept to express the visual aesthetics and patterns of a landscape (Janssen-Jansen et al., 2009). Moreover, more social concepts related to spatial quality exist, such as social- and cultural diversity or quality of life. Environmental quality is another example that is geared more towards nature, ecology, and sustainability (Cropper & Griffiths, 1994). These concepts are all different aspects of spatial quality, emphasizing the multiplicity of spatial quality.

Spatial quality is generally a contested notion (Moulaert et al., 2013). There is often an agreement that spatial quality is positive and that it should be strived for. However, the definition of spatial quality, and what this means in practice, often remains unclear as it contains both subjective and objective elements (Hooimeijer et al., 2001). Lothian (1999) makes a distinction between the objective paradigm and the subjective paradigm. The objective paradigm views spatial quality as a characteristic of the physical landscape, which is assumed to be an intrinsic attribute of the landscape. Evaluation of spatial quality is based on applying criteria to the physical landscape that can be observed and valued. This relates to functional and aesthetic characteristics of the landscape, such as landform, water, vegetation and land-use elements. In contrast, the subjective paradigm assumes that spatial quality is a human construct, solely based on interpretations and perceived through associations and memories (Lothian, 1999). Assessing the landscape is seen as a psychophysical process. Therefore, to concretize spatial quality, conversations with people about their preferences are essential. In this way, preferences can be derived and understood, providing understanding of spatial quality for a particular area. Accordingly, participation with stakeholders and citizens is an important aspect of this paradigm.

The two described paradigms are extremes and each other's opposite. Janssen-Jansen et al. (2009) bring these two opposing views together by defining spatial quality as an intersubjective concept, meaning that it contains both objective and subjective features (see Figure 2). On the one hand, Janssen-Jansen et al. (2009) note that how we value space is subjective and thus related to personal preferences, culture, and time. Therefore, spatial quality is viewed differently by people from different sectors, as they have different backgrounds and normative frameworks from which they reason

(Moulaert et al., 2013). Other parties can prioritize different characteristics of spatial quality. For instance, a forester values ecological values more than an infrastructure developer. On the other hand, spatial quality is made objective by formulating objectives, norms, and criteria that can be enforced to keep a certain degree of spatial quality (Janssen-Jansen et al., 2009). According to Hartman et al. (2016) the ambition to improve spatial quality calls for agreement on what the spatial quality entails. In creating this agreement, along with objectives, norms and criteria, an interactive process is favoured. This stimulates the involvement of different perspectives and opinions of people from different backgrounds (Healey, 2003).

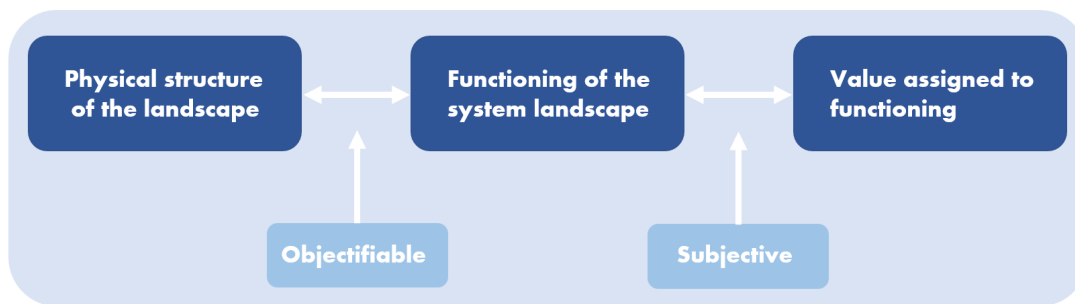


Figure 2: Subjective and objective components of spatial quality (Janssen-Jansen et al., 2009)

### 2.3.2 Defining spatial quality

Despite difficulties of the concept, there are some widely used ways to define spatial quality (Rapoport, 1970). The concept's origins can be traced back to 60 years before Christ. Vitruvius, an architect in the Roman Empire, used the terms *Utilitas* (utility), *Venustas* (beauty), and *Firmitas* (Firmness) to describe well-designed buildings. The Vitruvius Triad further evolved and is used by many scholars as the basis for the definition of spatial quality (see Hooimeijer et al., 2001 & Klijn et al., 2013). This research will also use this as starting point to define spatial quality.

*Utilitas* translates to user value, which means “the usability, effectiveness and, efficiency of a physical structure and its surrounding space” (Hooimeijer et al., 2001 cited in Busscher et al., 2019, p.4). This refers mostly to the functionality of the development and the area. Thus, looking at how people can use the area and how functionalities can be integrated. Highly valued in this are for instance different functions of usage (multi-purpose) and high accessibility of the area (Hooimeijer et al., 2001). In the context of flood risk management, this also relates to water safety, as that is generally the main function of flood defenses. Therefore, the relationship between the hydraulic effectiveness and other functionalities of the site (e.g. housing, agriculture) is important (Klijn et al., 2013).

*Venustas* translates to experiential value, which relates to identity, culture, diversity, and aesthetics (Hooimeijer et al., 2001). It is about how people perceive and experience the area. Important in this are cultural values, landscape qualities, and the relationship to neighboring areas (Ibid.). Additionally, social safety plays an important role (Ibid.). Related to flood risk management, it is important for developments to take into account the characteristics of the site (culture, history, landscape qualities) when developing and designing flood defenses and try to strengthen these qualities (Klijn et al., 2013).

*Firmitas* translates to future value, which refers to the possibility the area will retain its qualities in the future (Hooimeijer et al., 2001). It is about the robustness, flexibility, and durability of the structure and the area (Busscher et al., 2019). Robustness means that the structure and area should be able to withstand adverse conditions (Mens et al., 2011), at the same time it should be adaptable to changing conditions. Moreover, the development should be manageable, attention needs to be paid to the ease



and sustainability of maintenance (AT Osborne, 2021). Another element of future value is sustainability. For the flood defenses to be sustainable, design should incorporate and build on the natural processes of the area, involving for example ecological processes. Building on these natural processes and limiting disruption makes the structure more durable and futureproof (Klijn et al., 2013). A related concept in flood risk management is nature-based solutions, these are solution that are *“inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience”* (European Commission, 2021, p.4). Thus, utilizing and favoring natural materials and dynamics such as sediments, vegetation and currents for risk reduction and adaptation, over hard technical measures.

Although the domains of the Vitruvius Triad can complement each other, they can also contradict each other in some situations. For instance, the user value can conflict with the future value. From a future value perspective, it can be beneficial to create more room for the water and for example create soft natural barriers. This requires space, which is often scarce as areas are often intensively used in the Netherlands (Ritzema & Van Loon-Steensma, 2018). Another example is the tension between maintaining the landscape with its historical and cultural aspects (experiential value), or changing the landscape by for instance creating new sustainable or robust elements to the landscape (future value). A tension between maintaining the landscape or transforming the landscape is then present. In these conflicts, it depends on the context of the case, and the interest of the stakeholders, which interest will be prioritized.

The view on spatial quality in regional flood risk management and the possible preferences of certain domains of spatial quality are not yet known. Therefore, this research will explore this, by using the definition and domains defined above as a frame, which are summarized in Table 1.

*Table 1: Defined dimensions of spatial quality and their aspects (author)*

Spatial quality dimensions	Different aspects of the dimension	Sources
<b>User value</b>	Usability	Hooimeijer et al. (2001); Busscher et al. (2019); Klijn et al. (2013)
	Mixed functions	
	Accessibility	
	Hydraulic effectiveness	
<b>Experiential value</b>	Landscape qualities (landform, water vegetation)	Hooimeijer et al. (2001); Klijn et al. (2013)
	Social safety	
	Culture/Identity	
	History	
<b>Future value</b>	Robustness/flexibility	Busscher et al. (2019); AT Osborne, (2021); Klijn et al. (2013); European Commission (2021)
	Maintenance (as little as possible, sustainable)	
	Sustainability	
	Building with nature	

### 2.3.3 Barriers of improving spatial quality

Spatial quality is increasingly gaining attention in flood risk management. However, spatial quality is not self-evident. Ensuring spatial quality requires active management in, for instance, policy design and in the planning process. There are several barriers that prevent the integration of spatial quality and water safety.

First, spatial quality is often not prioritized because of a lack of time and money (AT Osborne, 2021), which is a common issue in project management. The interactions between time, money, and scope are called the trippel constraint (Van Wyngaard et al., 2012). Generally, spatial quality is not included in the financial resources and time waterboards have to execute water safety projects (AT Osborne, 2021). Therefore, the scope of the projects is limited to the water safety tasks, making it more challenging to improve spatial quality.

Second, spatial quality objectives are often eliminated in the implementation phase (Busscher et al., 2019). When pressure on time schedules and budgets increases, there is a tendency to return to old monofunctional routines (Verweij et al., 2017a). Additionally, projects are executed by contractors which makes them responsible for the implementation. It depends partly on the contractor (Klijn et al., 2013), and on the type of contract (Verweij et al., 2021), whether the contractor will actually realize the spatial quality objectives in the implementation phase.

Third, a barrier regarding spatial quality is ownership. Unlike flood defenses, spatial quality does not have a clear owner. Thus, no one can be held accountable for improving spatial quality. The benefits of spatial quality are not financial of nature and do not flow directly back to the financer (AT Osborne, 2021). Consequently, it is unclear who should strengthen and thus pay for spatial quality. Usually, waterboards solely receive financing for water safety tasks, which leaves little financial room for improving spatial quality.

Finally, improving spatial quality can be challenging when there is little consensus on what spatial quality is (Hartman et al., 2016). As discussed in Section 2.3.1, spatial quality is an intersubjective concept to which people assign different meanings and values. Furthermore, spatial quality cannot be measured quantitatively in a satisfactory way (Klijn et al., 2013). The concept often remains undefined in projects, which makes it difficult to take concrete measures to strengthen spatial quality (AT Osborne, 2021). There is a need for consensus and guidelines for creating spatial quality (Ibid.).

Given these barriers, it can be argued that strengthening spatial quality is mainly a governance challenge. Governance is a broad notion. Covering all definitions and aspects of governance is beyond the scope of this research. In this study, the focus is on the public policy aspect of governance, as we aim to understand what goals are made regarding spatial quality and how they are achieved in practice. Policy instruments are tools that can be utilized to reach policy goals. In this study, they are tools that can safeguard spatial quality in the planning process. The next section will elaborate on policy instruments and their application.

## **2.4 Governing for spatial quality: the importance of policy instruments**

### **2.4.1 Defining policy instruments**

Policy instruments can be defined as *“the way through which governments do their job to steer policies and try to change the performance of existing policies”* (Acciai & Capano, 2018, p3.). They can be viewed as tools with which policy goals can be translated from abstract goals to implementation in practice (Ali, 2012). Policy instruments have been widely studied in the policy studies domain (e.g. Hood, 1983; Howlett, 2000; Salamon, 2002). In spatial planning, conceptual thinking about policy tools is limited, which is surprising given how frequently they are employed (Stead, 2021). The study of policy instruments and their classification allows for a better understanding and analysis of the reasons to use different instruments (Stead, 2021).

The first generation of policy instrument literature focused on studying individual instruments (Capano & Howlett, 2020). That is, researchers focused on the performance of one individual instrument without considering other instruments or the environment in which it operated. However, policy instruments rarely operate in isolation. They are often combined with other instruments (Ibid.). Therefore, current policy studies are geared more towards instrument mixes, referring to combinations of different policy instruments *“of which the exact configurations changes from location to location”* (Rayner et al., 2017, p. 473). When researching policy instruments it is thus important to acknowledge that these different types of policy instruments, and the environment in which they operate, influence their performance (Lieu et al., 2018).

#### **2.4.2 Types of policy instruments**

Policy instruments come in many forms. In policy studies numerous categorizations of policy instruments have been made (Hood, 1983; Howlett, 2000 & Salamon, 2002). Categorizing policy instruments can be relevant for multiple reasons: it helps to understand and analyse the use of the instrument, it provides insights on factors driving the policy process, and it facilitates the comparison of policy approaches between administrations (Howlett, 2000). A well-known categorization, based on the resources that the government possesses, is that of sticks (regulatory), carrots (economic), and sermons (informative) (Vedung, 1998). In this research the NATO-typology of Hood (1983) is used, consisting of nodality, authority, treasure, and organization. Hood adds the organizational resources of the government to the typology of Vedung, which refers to the (human) stock of the government (Ibid.). Organization instruments are important in this study, as hiring expertise can be beneficial in strengthening spatial quality (Verweij et al., 2017b). A brief description of the different categories is given in the section below.

Nodality is derived from the concept node, which means being in the middle of an information or social network (Verweij et al., 2021). Governments generally have a central position in information networks, which allows them to strategically provide and gather information to change beliefs and perceptions of public and private actors (Macintosh et al., 2015; Verweij et al., 2021). Furthermore, there are instruments based on authority, referring to legal power or official power to *“demand, forbid, guarantee, adjutate”* (Hood, 1983, p.6). The instruments differ in degree of restriction. For instance, certificates and approvals are not highly restrictive, whereas constraints are highly restrictive (Vught & Boer, 2015). Through these type of instruments, the government prescribes what is expected of actors (Verweij et al., 2021). Treasure is the next type of instruments. These instruments are based on financial resources governments spend to achieve policy goals. Treasure instruments come in many forms, such as rewards, salary, and materials (Hood, 1983). Examples are contracts, grants, loans, and subsidies. Lastly, there are instruments based on organization, referring to the government’s internal stock of land, buildings, equipment, and the collection of individuals with their capital, skills and knowledge (Hood, 1983). Stead (2021) notes that the collection of individuals is important in spatial planning, especially the public officials involved in designing, implementing, and enforcing spatial planning policy. This human stock has decreased in the last years, through developments as ‘hollowing out’ the state (Ibid.). As a result, governments are required to hire such expertise.

When using the NATO typology, it is important to consider that sometimes multiple resources are necessary to utilize a policy instrument (Acciai & Capano, 2021). For instance, a company could use certain subsidies to employ a professional (needing treasure to use an organizational instrument).

## 2.5 Policy instruments for strengthening spatial quality in flood risk management

In this section, the NATO typology of Hood (1983) is operationalized to the context of spatial quality in flood risk management. This research used a combination of academic papers and grey literature to make an overview of the possible instruments used for this purpose. Multiple policy instruments for enhancing spatial quality have been identified using literature concerning the Room for the River program (Busscher et al., 2019; Klijn et al., 2013; Nillesen, 2019; Verweij et al., 2021). These are landscape architects, a broad scope, spatial quality advise, design ateliers, spatial quality framework, administrative agreements, tender documents, and contract-type. Additionally, policy instruments have been identified using flood risk management literature and policy instruments literature (Edelenbos et al., 2017; Freiberg, 2018; Steenblik, 2018). These include citizen participation, internal policy, and subsidies. The remaining policy instruments were identified using grey literature (Conijn & Bijman-Van den Dungen, 2021; Restemeyer, 2021; Restemeyer, 2022), including engineering/consultancy firms and co-financing. Additionally, grey literature was used to supplement the scientific literature mentioned above (At Osborne, 2021; RWS-ontwerpt, 2020). Below, instruments based on organization, nodality, authority, and treasure will be elaborated. The NATO-Rose below (Figure 3) shows the different categories and operationalised instruments and will help to analyse the different instrument mixes utilized in the cases.

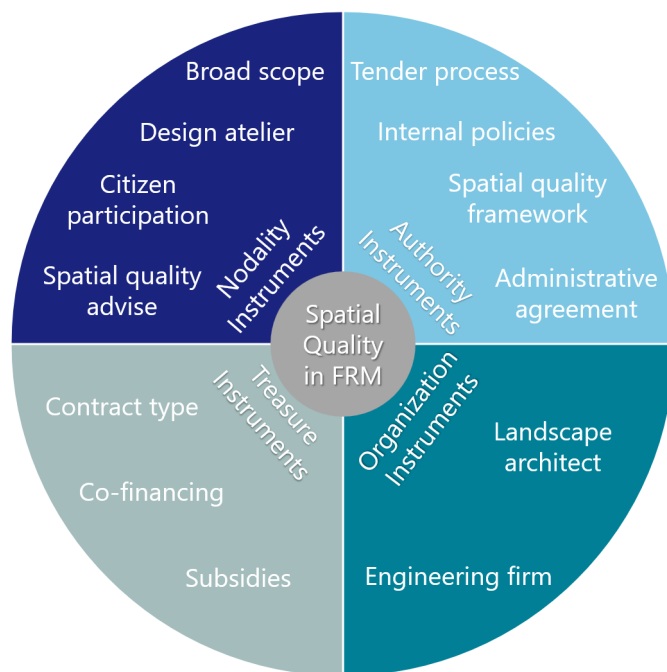


Figure 3: Instrument rose containing policy instruments operationalized for flood risk management and spatial quality (author)

### 2.5.1 Organization

Organizational instruments are based on resources of land, buildings, equipment, and the collection of individuals with their skills (Hood, 1983). Stead (2021) states that employing actors with specific skills can also be categorized as an organization instrument. In light of flood risk management, this refers to utilizing these resources and employing skilled actors to enhance spatial quality. In this section, the focus is on the act of employing professionals and internal policy of waterboards. The employment of professionals is currently relevant as waterboards are given more responsibilities in enhancing spatial quality. However, they do not always possess the skills to create it themselves (Van den Brink & Restemeyer, 2021).

Recently a more holistic approach has been used in flood risk management, which implies considering a broader area with more (conflicting) interests. Boundary spanners can help in bridging the interest between different sectors and organizations. They are “*skilled networkers, who have the ability to recognize and exploit opportunities to develop inter-organizational relationships*” (Edelenbos & Van Meerkerk, 2015, p.27). Furthermore, boundary spanners can understand actors’ needs, build trust between the actors, and help improve the coordination between decision-making and implementation (Van den Brink et al., 2019). They can connect spatial objectives with water safety objectives in flood risk management. This role is often reserved for landscape architects or spatial designers (Roe, 2011; Van den Brink et al., 2019), and consultancy/engineering firms (Conijn & Bijman-Van den Dungen, 2021; Restemeyer, 2022). These will be elaborated below.

An important organizational instrument is the employment of a *landscape architect* (Busscher et al., 2019; Verweij et al., 2021; Van den Brink et al., 2019). A landscape architect can contribute to the content by creating high-quality designs and spatial quality plans. They also contribute to the process by enabling joint conceptualization and visioning, and improving collaboration and networking (Busscher et al., 2017; Van den Brink et al., 2019). Designers are able to create and invent alternative futures of landscapes (Nassauer, 2012), which can be made visible and communicated via maps and drawings. Hence, design can help in starting discussions about complex matters. Thus, landscape architects are increasingly involved as process managers in participatory design workshops, using design as an instrument for bringing together spatial functions and stakeholders (Kempenaar & Van den Brink, 2018). For a successful result, the designer should be included from the beginning of the process, ideally as a full member of the project team (Van den Brink et al., 2019).

*Employing a consultancy or engineering firm* can also be categorized as an instrument for preserving spatial planning (Restemeyer, 2022). Conijn and Bijman-Van den Dungen (2021) argue that consultancy/engineering firms can play a valuable role in integrating spatial quality in the planning phases of water safety projects. These firms are able to apply an integrated approach and find relationships between the different spatial developments in an area. Proactively combining spatial developments can add to the user, experimental, and future value of the project’s area (Ibid.). Moreover, engineering firms often play a significant role in the selection criteria of the preferred alternative design (voorkeursalternatief), in which they can actively underline the importance of spatial quality (Ibid.). For consultancy/engineering firms to play such a role, it is favorable to employ them early in the planning process when there are still opportunities to find linkages between spatial developments (Ibid.).

### **2.5.2 Nodality**

Nodality refers to the provision and collection of information (Macintosh et al., 2015), which makes it possible to influence the behavior of agents to reach specific policy goals (Kuehnhanss, 2018). In the context of flood risk management, specifically spatial quality, it refers to the collection and provision of information or knowledge regarding the creation of spatial quality. Different instruments can be applied.

First, according to Klijn et al. (2013), considering *a broad scope* at the start of projects can be beneficial for strengthening spatial quality. Considering a broad scope and creating synergies align with a more integrated way of working that has become more dominant in flood risk management (as explained in Section 2.1). It requires collecting information on the project area and the desired hydraulic effect (Ibid.). Additionally, information on the broader area can be collected, along with the ambitions and desires of stakeholders. Area-specific knowledge can be gained through researching landscape



characteristics, such as analyzing cultural heritage and nature. Additionally, the interest of stakeholders can be explored through a network analysis or stakeholder meetings (AT Osborne, 2021). By doing this, possible synergies can be identified and connected to the water safety project (Klijn et al., 2013). By combining several spatial developments, more value can be created for the project area, which could lead to an improved spatial quality (Conijn & Bijman-Van den Dungen, 2021).

Second, receiving *spatial quality advice* can help achieve spatial quality (Klijn et al., 2013). This refers to advice that can be requested, but can also be given unasked and unrestrained (Ibid.). The advice can either be from an expert group, or an experienced individual inside or outside the organization. An example of an expert group is the spatial quality team used in the RftR program. A spatial quality team (Q-team) was appointed to formulate recommendations on enhancing spatial quality (Ibid.). Three visits were made to the project teams, and several designs and plans were reviewed. In the end, this helped project groups integrate spatial quality into their project. Advice can also come from other organizations that are separate from the program. An example is that waterboards can receive advice from the municipality or the National Office of cultural heritage (RCE, n.d.). By acquiring advice in this way, insights can be gained on how spatial quality can explicitly be enhanced within the context of the project.

Third, Busscher et al. (2019) identified *design ateliers* as a policy instrument for increasing spatial quality. Research has shown that design ateliers have an important role in designing landscapes (Hulsbergen & Strouten, 2011; Prominski et al., 2012). In design ateliers different stakeholders and multidisciplinary experts come together to create an integrated design (Prominski et al., 2012). The process involves collecting, sharing, and creating knowledge. In this way, different insights are shared and knowledge gaps are identified (Nillesen, 2019). Design ateliers stimulate thinking beyond disciplines and taking into account interaction between different spatial developments in the area. This way of working stimulates creating a design with multiple benefits for the environment (RWS-Ontwerpt, 2020), which often enhances spatial quality.

Fourth, *citizen participation* can be used to collect information specific to the area. The importance of participation in flood risk management has increasingly been recognized. The EFD promotes citizen participation as part of a more integrated approach to ensure citizen involvement in flood risk management (Newig et al., 2014). Having citizens participate in the process allows for acquisition of local knowledge, which can improve decision-making (Edelenbos et al., 2017). Additionally, it can increase support for flood risk management projects and establish more trust between citizens and flood risk management agencies (Edelenbos et al., 2017). With regard to spatial quality, this means that information on how citizens view spatial quality and how they value the area can be acquired. This information could help in creating a supported design. A precondition for citizen participation is that citizens can actively participate. There should be room for them to share their insights (Al-Kodmany, 2001).

### 2.5.3 Authority

Authority-based instruments rely on the ability of the government to command a specific behavior through making rules, regulations, and legislation (Hood, 1983). They are the structures that clarify what is expected of actors. In light of flood risk management, authority instruments can be the rules, regulations, and legislations related to spatial quality, along with frameworks that state what is expected of actors.

First, a *spatial quality framework* can stimulate spatial quality in flood risk management (Klijn et al., 2013). In such a framework, the project area is analyzed on different elements, such as landscape values and history. Strengths and weaknesses of the area are explored, and concrete guidelines are formulated to strengthen aspects of the projects' area (see the example for HWBP project Grebbedijk, Flux (2019)). Klijn et al. (2013) believe that the process of making a project-specific frameworks is valuable, as they state: '*such activities can be considered as crucial stages in a joint investigation of the precise spatial setting of a project, with due attention for the larger spatial context ... They contributed strongly to the level of knowledge of the project teams*' (Klijn et al., 2013, p. 291). Currently, spatial quality is often not explicitly defined, making it difficult to strengthen spatial quality in practice (AT Osborne, 2021). Developing a spatial quality framework could help in overcoming this barrier by providing concrete guidelines on how to improve spatial quality in flood risk management projects.

Second, according to Busscher et al. (2019) the concretization of spatial quality in *administrative agreements* can help to improve spatial quality. An administrative agreement outlines the division of tasks, terms, and conditions between two or multiple parties (Busscher et al., 2019). Spatial quality can be secured in such an agreement, which makes parties formally obliged to realize it. These agreements are expected to be more successful when spatial quality is specified beyond the general notion (Busscher et al., 2019). Instruments like this help to overcome the barrier of ownership of spatial quality, as it is often unclear who is responsible for its creation (AT Osborne, 2021). The RftR program used this instrument successfully: for each project an administrative agreement was made, in which the tasks, terms, and responsibilities were described (Collignon-Havinga et al., 2009). According to Collignon-Havinga et al. (2009) this was an important instrument for securing spatial quality in the RftR program.

Third, Verweij et al. (2021) argue that the inclusion of spatial quality in *tender documents* can be favorable for improving spatial quality. The tender process precedes the contracting phase. In the tender process, an assignment is presented to the market to which companies can apply. Tender documents generally contain the design and specifications of what a client wants to build (Laryea, 2011). This also requires selection criteria on which the client judges the companies that apply. Verweij et al. (2021) argue that the inclusion of spatial quality as a project requirement is important. The extent to which spatial quality is specified matters for the interpretation of the contractors (Ibid.). For example, by defining spatial quality extensively, the contractor is given specific requirements. The formulation of spatial quality could thus influence the way spatial quality is realized in the implementation phase.

Fifth, *internal policy, strategies, and visions* of waterboards can play a role in enhancing spatial quality. As mentioned, authority instruments refers to commanding certain behavior through steering and regulation (Freiberg, 2018). Internal policy can guide and steer practitioners in enhancing spatial quality in flood risk projects. In that way, practitioners know what is expected of them. An example is the policy of waterboard Drents Overijsselse Delta (2019), where spatial quality is defined, objectives are formulated, different levels of integration of spatial quality are established, and possible measures are explained. In this way, the government (waterboard) provides clear objectives and concrete methods to reach them. Additionally, this provides practitioners the opportunity to internally justify the significance of spatial quality in their water management project.

#### 2.5.4 Treasure

Instruments categorized as treasure typically rely on financial resources to bring about policy outcomes (Hood, 1983). Treasure instruments direct actors by the use of economic means. In this study, this relates to financial resources that are applied to strengthen spatial quality. Creating financial resources is one of the main barriers to strengthening spatial quality as discussed in Section 2.3. Financial instruments can be applied to overcome this barrier. Below, these instruments are elaborated.

First, financial resources for spatial quality can be attained through *securing co-financing* (Restemeyer, 2021). As mentioned, using a more integrative approach and a broader scope creates opportunities to tackle multiple issues and create multiple benefits simultaneously (RWS-Ontwerpt, 2020). Likewise, this creates opportunities for co-financing. Public or private enterprises might be willing to financially support a project if it also creates benefits for them. For example, a waterboard and a municipality can join financial resources to reinforce a dike along with sidewalks located next to the dike. By joining forces, higher quality can be achieved with lower costs (Riemslog & Van der Linde, 2021).

Second, *subsidies* can contribute to improving spatial quality (Restemeyer, 2021). Subsidies are financial contributions made by the government granting benefits to the recipient (Steenblik, 2018). They can be seen as a classic treasure instrument (Ibid.). Project teams can, if available, apply for subsidies. Acquiring subsidies could be difficult since there are often strict application rules (Ibid.). Nevertheless, they still provide significant financial benefits. There are quite some subsidies that involve spatial quality. An example is the subsidy of the province of Groningen. The province grants subsidies to provide support in exploring possibilities for spatial quality and the deployment of designers or planners (Provincie Groningen, n.d.).

Third, according to Verweij et al. (2021) the *contract type* could play a role in enhancing spatial quality. After the tender process, contracts with the contractor are established. According to Verweij et al. (2021, p. 206), these contracts can be seen as “*a way in which the private sector’s capacities can be harnessed to achieve effective policy implementation.*” In contracts, conditions on spatial quality can be specified that the contractor must adhere to. There are several types of contracts that differ in terms of inclusiveness. In more inclusive contract types, the contractor is responsible for multiple phases, which generally are the exploration phase, plan elaboration phase, and implementation phase (Lenferink et al., 2013). The idea behind inclusive contracts (e.g. Design and Construct and Plan, Design and Construct) is that they incentivize the contractor to coordinate the multiple phases, resulting in a more efficient process with potentially higher spatial quality (Verweij et al., 2021). This could also bridge the gap that is currently present between the exploration phase and the implementation phase.

#### 2.5.2 Reflection

This section presented several policy instruments that can be applied to safeguard spatial quality. Multiple instruments can be used simultaneously. It could be that different instruments are used in different planning phases. For example, an area analysis is generally executed in the exploration phase, whereas subsidies could be attained in the plan elaboration phase. It is important to recognize that there is no one-size-fits-all approach to improve spatial quality. According to Verweij et al. (2021), there is no single instrument that in itself is responsible for the creation of spatial quality. Thus, different combinations of instruments in different planning phases can be responsible for improving spatial quality.

## 2.6 Conceptual model

The aim of this research is twofold, namely: to analyse how spatial quality is currently integrated in regional flood risk management projects and how different policy instrument are applied to strengthen spatial quality. The two main concepts, spatial quality and policy instruments, have been explored in this chapter and are synthesized in the conceptual model below (see Figure 4). The conceptual model, together with the operationalization of the main concepts (see Table 1 & Figure 3), serve as the backbone of this research. They help to structure and analyse the empirical findings.

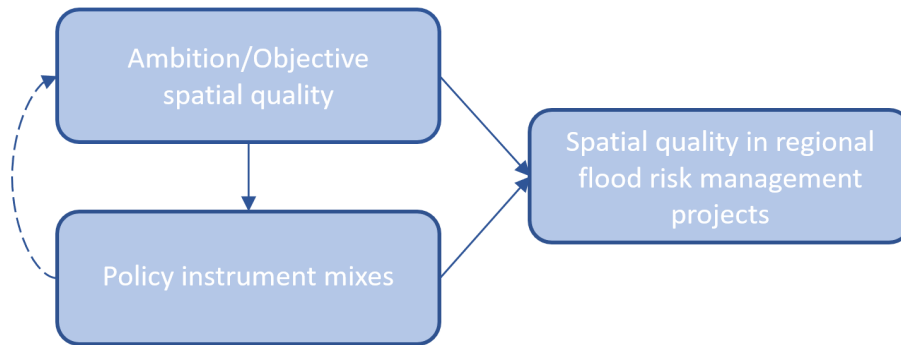


Figure 4: Conceptual model (author)

In the conceptual model the relationships between the main concepts are visualized. First, the ambitions and objectives made regarding spatial quality can influence how and what types of policy instruments are utilized, and how spatial quality is integrated in projects in practice. As mentioned, spatial quality has an intersubjective nature, meaning there are different perspectives on understanding spatial quality. Nevertheless, the ambition to strengthen spatial quality calls for an agreement on what spatial quality entails (Hartman et al., 2016). In addition, this concretization also substantiates decisions about these ambitions and ensures that spatial quality can be prioritized in development processes (Ibid.). The way policymakers and actors in flood risk management interpret and prioritize certain elements of spatial quality thus impacts the ambitions and objectives they formulate, which in turn impacts the way spatial quality is delivered in practice.

The ambitions and objectives formulated can influence the use of policy instruments. Policy instruments are in essence instruments that help to achieve the policy goals. Therefore, the use of policy instruments is partly dependent on the goals formulated or the problems faced (Bemelmans-Videc et al., 2011). Furthermore, analyzing the use of policy instruments can also give insights in how practitioners concretize this ambition to create spatial quality in practice. In other words, it gives insight in what concrete actions are taken to create spatial quality. The policy instrument mixes could also influence the ambition/objectives of spatial quality to some extent. Some instruments are used to specify or give meaning to spatial quality. For example, a landscape architect can create a spatial quality framework in which spatial quality is worked out in more detail. In that way, the ambition for spatial quality can change slightly, or get more focus.

The two elements, the ambitions and policy instruments, in their turn influence the way in which spatial quality is ultimately strengthened in projects. The relationships explained above will be analyzed in the cases in the empirical part of this research.

## Chapter 3 Methodology

This chapter focusses on the research methods applied in this study. First, the research design is discussed. Hereafter, the literature review of Chapter 2 is described. Subsequently, the comparative case study and case selection are discussed. Lastly, the three qualitative methods of data collection used in the case study are described, consisting of a document analysis, semi-structured interviews, and a focus group discussion.

### 3.1 Research design

This research consists of four main methods. The first is a literature review, which summarizes and evaluates a body of writings on a specific topic (Knopf, 2006). This helped to establish which theories are currently out there, how they relate, and to what degree they have been researched (Fink, 2019). Next to that, the literature review provides room to position this research within the academic literature (Van Wee & Banister, 2015). Chapter 2 has provided an overview of the most prominent concepts of this research, along with the conceptualization and operationalization of these concepts (see Figure 3 & Table 1). These, in combination with the conceptual model, created the theoretical foundation that was put to the test in practice. This method was mainly used to answer the first two research questions.

The empirical part of this research consists of a comparative case study. Case study research is a method that *“investigates a contemporary phenomenon in depth and within its real-life contexts”* (Yin, 2014, p. 48). The purpose of the case study was to explore how spatial quality was negotiated in flood risk management sector and which policy instruments the practitioners used to reach spatial quality. The conduction of expert interviews helped to answer these questions. Additionally, a document analysis was executed. The documents included are connected to the case and provide specific information on the projects or are policy documents regarding spatial quality. Furthermore, a focus group discussion was conducted to explore the perspectives and attitudes of experts on spatial quality in regional flood defenses. These methods used provided answers to the last two research questions. The overall research design is visualized in Figure 5.

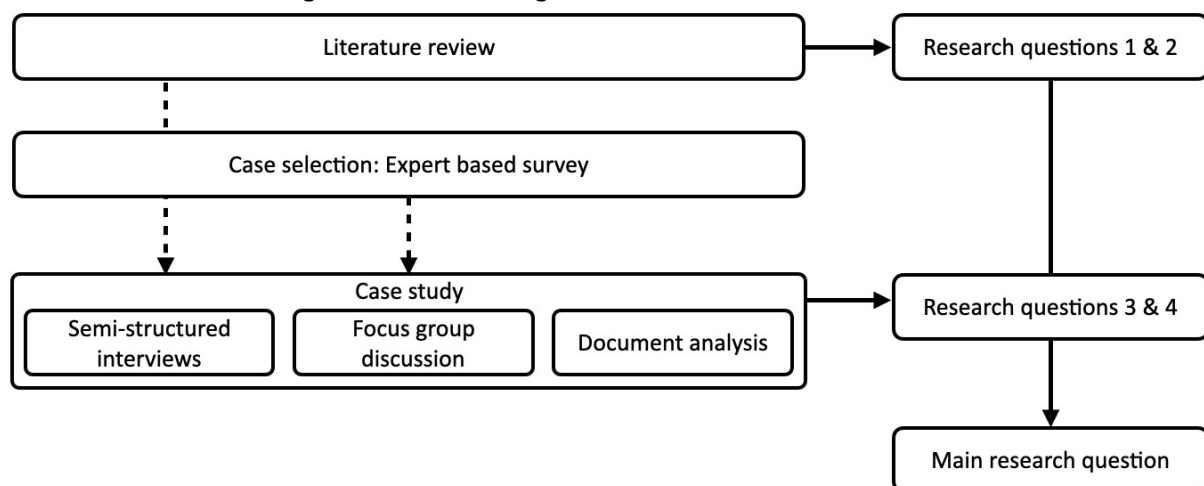


Figure 5: Research design (author)

### 3.2 Literature review

The previous chapter consists of a theoretical framework. To come to this theoretical framework, a literature review was conducted. The purpose of this literature review was to gain insight on recent developments on the main concepts of this study in scientific literature and to answer the first two



research questions: *How can spatial quality be defined in the context of flood risk management?* and *What policy instruments can be distinguished in flood risk management and how can they help to strengthen spatial quality in flood risk management projects?* Different search engines were used to find academic sources, namely: Google Scholar, Scopus, and SmartCat. Most literature was acquired using the search terms like: 'flood risk management', 'integrated flood risk management', 'spatial turn', 'spatial quality', 'landscape value', 'policy instruments', 'policy instrument mixes', 'NATO-typology' and 'policy instruments for increasing spatial quality'. The principle of snowballing, using the reference list of papers to identify additional papers, helped to attain more literature (Wohlin, 2014). Additionally, grey literature (e.g. AT Osborne, 2021; Conijn & Bijman-Van den Dungen, 2021; RWS Ontwerpt, 2020) was studied to operationalize policy instruments to the flood risk management sector.

### **3.3 Case study and case selection**

#### **3.3.1 The characteristics of a case study**

There are several reasons why a qualitative case study is used in this research. A qualitative case study is a robust research method to explore and understand a complex phenomenon in real life (Zainal, 2007). According to Yin (2014) a case study is the preferred method when: (a) the focus of the study is to answer 'how' and 'why' questions; (b) The researcher has little or no control over the participants and their environment; (c) contextual conditions are relevant for the phenomenon under study; (d) the study is focused on a contemporary phenomenon. All conditions are in line with this study. The main research question is a 'how' question, aiming to answer how spatial quality is seen in flood risk management and how policy instruments are used for that purpose. The question has a descriptive nature but is also explorative since little research has been conducted on this topic. Next to that, in social sciences phenomena are primarily studied in 'real life', as it is impossible to study the subject of study in isolation (Mohajan, 2018). In light of spatial quality, the context is essential as it gives meaning to how spatial quality is seen. Lastly, this study aims to analyse a contemporary phenomenon.

It is important to note that a case study is not intended to be representative of a population. The purpose of the case study is to analyse whether theoretical concepts occur in practice (Starman, 2013). In this case, practical knowledge about how spatial quality is created in regional flood risk management is desired. In qualitative case studies *analytic* generalizations can be formulated about how the cases could resemble general constructs (Curtis et al., 2000). This means that no *statistical* generalizations can be made. However, the analytic generalizations in qualitative research can provide 'guidelines' (Ibid.). Accordingly, lessons learned from the cases could serve as an example or provide guidelines for other regional flood defense projects.

Within the case study method, there are several types of case studies. This research adopts a multiple case study method. Overall the evidence created from this method is considered reliable and robust (Baxter & Jack, 2008). Furthermore, compared to a single case study, not only comparison within the cases is possible, but also between different cases (Yin, 2003). Comparative research helps in deciphering similarities and differences between cases and experiences, which facilitates learning between similar cases (Van Assche et al., 2020). In this study, this provides room to make recommendations to waterboards on how spatial quality can be strengthened in other regional flood defense projects.

A characteristic of a case study is that they rely on multiple sources of evidence (Yin, 2014). Clifford et al. (2016) argue that triangulation ensures a higher validity of the research outcomes. For that reason,

this study adopts multiple data collection methods, namely: a document analysis, semi-structured interviews and a focus group discussion.

### **3.3.2 Case selection through an expert based survey**

An important aspect of the case study method is the case selection. Flyvbjerg (2006) notes that strategic selection of cases can increase the generalizability of the case study. Therefore, an information-oriented selection approach was adopted, meaning cases are chosen based on expectations about their informational content (Ibid.). The main focus of this study is best practices, which refers to regional flood defense projects that have successfully enhanced spatial quality alongside the primary objective of water safety. Little information on regional flood risk projects was provided online. An expert-based survey was executed to select best practices.

In the expert-based survey, experts were asked to identify different projects that, in their opinion, could be classified as best practices. Subsequently, follow-up questions were asked regarding the argumentation on why they viewed it as best practice, what stakeholders were involved in the project, and how extra information could be accessed. The survey was made with Qualtrics XM software. Mail addresses of experts were acquired via persons participating in the research program 'Spatial quality in water safety management' (*Ruimtelijke kwaliteit in waterveiligheidsbeheer*). More experts were reached through the principle of 'snowballing', meaning participants of the assessment could contact other experts that could participate (Valentine, 2013). In total 30 projects were identified.

Consequently, a most similar case comparison design was adopted. In this design, cases are selected based on presenting similar characteristics on the most notable variables (Ruffa, 2020). This method was chosen because it focuses on how and why specific outcomes have occurred (Yin, 2014). In this study, the main feature of similarity is the successful creation of spatial quality. A practical consideration was that the cases needed to have finished the implementation phase. This was essential, as it allowed for comparison between spatial quality objectives in the exploration and plan development phase and spatial quality created in the implementation phase. Additionally, the environment in which the projects were developed needed to be similar to ease comparison between cases. In this study, an (semi)urban environment was preferred because generally it has more stakeholders than rural environments (Basedow et al., 2017). Multiple stakeholders often require more consensus-seeking and possibilities for synergies. In most similar design, the studied phenomenon is partly different in the case studies (Anckar, 2008). In this research, these were the policy instruments used in the projects. Cases that had used multiple (different) instruments were favored. Moreover, cases from different waterboards were preferred, as they might have different approach to improve spatial quality. After applying these criteria, four suitable cases remained. Eventually, practical reasons such as availability of information and available contacts led to the choice of the cases of Wheredijk and Voorweg.

#### **Case Wheredijk**

The Wheredijk is a regional quay located in Purmerend. The waterboard Hoogheemraadschap Hollands Noorderkwartier (HHNK) is responsible for the Wheredijk. A periodic inspection in 2016 detected that the regional quay did not meet the safety standard. The project team of the Wheredijk approached the regional flood defense project in an integrated way, thereby adding to multiple aspects of spatial quality.

### Case Voorweg

The regional quay is located along the Voorweg and Wilsveen. This regional quay crosses two municipalities: Leidschendam-Voorbrug and Zoetermeer. The waterboard Hoogheemraadschap Rijnland (Rijnland) is responsible for the Voorweg. A periodic inspection detected that the regional quay did not meet the safety standard. The project team of the Voorweg paid much attention to spatial quality by taking into account the landscape's history and qualities at an early stage.

### 3.4 Document analysis

In order to understand how spatial quality was integrated in projects or policy of waterboards a document analysis was executed. A document analysis is a research method in which documents are systematically collected, reviewed and evaluated (O'Leary, 2014). Reviewing documents helps to gain understanding, extract meaning and develop empirical knowledge of the research topic (Bowen, 2009). A document analysis fulfills multiple functions. Firstly, the documents can serve as data about the context in which the participants of the cases operate. So, the document provide insights and can contextualize the collected data of interviews (Ibid.). Secondly, it can provide additional research data, as documents can provide information that is not acquired in interviews (Ibid.). Thirdly, it can verify or substantiate findings from other sources (Ibid.). In the documents the primary focus was on spatial quality. The documents were analyzed on the following points: how is spatial quality defined, what type of objectives are formulated, how are the designs assessed, and what type of instruments were employed. While doing this, it was interesting to analyse whether or not this corresponds with what participants say about these topics. The documents selected are mainly documents relating to the projects or to the policy of the waterboards. Below the documents that are studies are presented in Table 2.

Table 2: List of documents

Author	Year	Name (translated in English)
STOWA	2009	Guidelines Design and Improvement of regional quays
HHNK	2020	Project plan Wheredijk
HHNK	2021	Timeline and process Wheredijk
HHNK	n.d.	Evaluation Wheredijk
HHNK	n.d.	Assessment framework design Wheredijk
Arcadis	2019	Participation plan Wheredijk
Rijnland	2020	Project plan phase 1 Voorweg
Rijnland	2020	Project plan phase 2 Voorweg
Bosch Slabbers	2019	Spatial Quality framework Voorweg
Rijnland	2021	Factsheet Spatial quality Rijnland
RAAP	2019	Cultural-historical desk research Voorweg/Wilsveen

### 3.5 Semi-structured interviews

A substantial part of the empirical research is collected through interviews. Interviews are an important way of collecting empirical data in case studies (Tellis, 1997). They help in attaining detailed practical information from experts (Rabionet, 2011), and in analyzing complex processes (Clifford et al., 2016). In this research semi-structured interviews were conducted. In these interviews, predefined questions are formulated to structure the interview, providing guidelines to answer the research questions. However, this form is also flexible. Room is provided for follow-up questions and for participants to explore issues they feel are important (Longhurst, 2010). This flexibility is essential, as

it is necessary to understand the reasons for the interviewees' opinions, decisions, and views to answer the research questions. This structure allows the interviewer to ask follow-up questions on particular opinions, decisions, and views.

The interviewees were selected based on their function related to the projects. The goal was to speak with persons who had been involved in improving spatial quality in the projects, within the project team (e.g. project manager/stakeholder manager) and outside of the project team (e.g. landscape architect), to get broader picture. The interviewees were contacted via e-mail, which were attained via the expert-based survey. By means of 'snowballing' more respondents were contacted and invited for an interview. In total ten interviews were conducted. An overview of the interviewees and their functions is provided in Table 3. The interviews were structured with the interview guide (see Appendix 1), which contained questions formed using the theoretical framework from Chapter 2.

All interviews were recorded and transcribed afterwards. To analyse the interviews in a structural way the transcripts were coded using Atlas.ti. software. Coding refers to the assignment of interpretative tags to the transcripts based on themes or categories relevant to the research (Cope, 2010). Labeling the text into categories provides an overview of the data and helps to identify patterns (Cope, 2010). Coding is done using a codebook, which is a collection of codes and definitions that provide structure in the analysis of the data (DeCuir-Gunby et al., 2011). In this research, deductive codes were created before the data analysis using the theoretical framework, and inductive codes were created while going through the data. The codebook created can be found in Appendix 2.

*Table 3: List of interviewees*

Date	Identifier	Case	Function	Organization
11/05/22	R1	Wheredijk	Project manager	HHNK
17/05/22	R2	Wheredijk	Water safety advisor	HHNK
27/05/22	R3	Wheredijk	Technical manager	Aveco de Bondt
30/06/22	R4	Wheredijk	Stakeholder manager	Aveco de Bondt
07/06/22	R5	Wheredijk	Contractor	AW Infra
18/05/22	R6	Voorweg	Contractor	Van Rijn Service
19/05/22	R7	Voorweg	Landscape architect	Bosch Slabbers
25/05/22	R8	Voorweg	Project manager	Waterboard Rijnland
01/06/22	R9	Voorweg	Stakeholder manager	Flux Partners
17/06/22	R10	Rijnland	Process leader area development	Waterboard Rijnland

### 3.6 Focus group discussion

To gain knowledge on how spatial quality is considered in regional flood risk management in general, a focus group discussion was held in the form of a workshop. A focus group discussion is a type of qualitative research; it involves a focus on a certain topic with a predetermined group of people that participate in an interactive discussion (Hennink, 2013). The goal is to gain insights on personal experiences, beliefs, and attitudes of the participants (O.Nyumba et al., 2018). This discussion took place on June 2<sup>nd</sup>, during the Regional flood defense day (organized by STOWA). On this day, regional flood risk experts gathered to share knowledge. During a workshop given by the researcher, this focus group discussion was incorporated. In total 24 regional flood defense experts participated. The workshop began with an introduction to the research, then information on a topic (three topic blocks in total) was provided, followed by questions. The questions were presented using Poll Everywhere, to which participants could answer on their phones. After the question, extensive discussions were held on the question and the answers.

All answers to the questions were registered by Poll Everywhere (See Appendix 5). The discussions were recorded. However, the recording failed. Therefore, a report was made on the discussions. This report can be requested from the researcher. In the results, the Poll Everywhere data and the report are referred to as the Focus group discussion data.

### **3.7 Ethical considerations**

According to Longhurst (2010), important ethical issues are confidentiality and anonymity. Therefore, all participants signed a form of consent. In this form, the rights of the participants was explained. Participants could withdraw from the interview at any time and could revisit the transcripts. Privacy was ensured by anonymizing names, along with managing and storing the transcripts carefully (Longhurst, 2010). The transcripts were only used for this study.

Another ethical consideration of case studies is the bias towards verifications of the researcher. This bias entails the tendency to confirm preconceived assumptions (Flyvbjerg, 2006). It derives from the room that qualitative research provides for subjective interpretations of the findings (Ibid.). It should be mentioned that the researcher was associated with STOWA (Stichting Toegepast Onderzoek Waterbeheer) in the form of an internship. STOWA is an independent knowledge center for waterboards and provinces regarding regional flood risk management. This internship provided the researcher access to documents, knowledge on the topic, and relevant contacts. To counter the bias towards verifications, multiple data sources have been used (Bowen, 2009). Next to that, the interviews were coded using the codebook. Lastly, to avoid misinterpretations of the quotes due to translation from Dutch to English, the original quotes are provided (see Appendix 3).

## Chapter 4 Spatial quality in the cases Wheredijk & Voorweg

In this chapter in-depth knowledge of the cases of the Wheredijk and the Voorweg is discussed. The required knowledge was gathered by analyzing the conducted data from semi-structured interviews, a focus group and policy documents. First, the cases are introduced. After this, the meaning-making process and the achieved spatial quality are described for both cases. Subsequently, the different policy instruments used in the cases are described and compared. Together, these results provide an answer to the third sub-question: ‘Which policy instruments for strengthening spatial quality have been applied in regional best practices and what lessons can be drawn?’

### 4.1 Introduction to the cases

#### 4.1.1 The Wheredijk case

The Wheredijk is part of the regional quays (*boezemkades*)<sup>1</sup> surrounding the polder Zeevang. It is located in the municipality of Purmerend on the north side of the canal ‘De Where’. The waterboard HHNK is responsible for the Wheredijk. A periodic inspection in 2016 detected that the regional quay did not meet the safety standards for regional flood defenses as established by the Interprovinciaal Overleg (IPO), as the inner side of the dike was not stable enough (HHNK, 2020). Accordingly, a trajectory of 1.35 kilometers of the Wheredijk was added to the program ‘Improvements Regional Quays of HHNK’. The project was divided into two trajectories (see Figure 6): the west side of the Wheredijk, which runs from the railway-line Amstelhoorn until the Churchilllaan, and the east side of the Wheredijk, which runs from the Churchilllaan to the Hannie Schaftstraat. The project finished at the beginning of 2022.

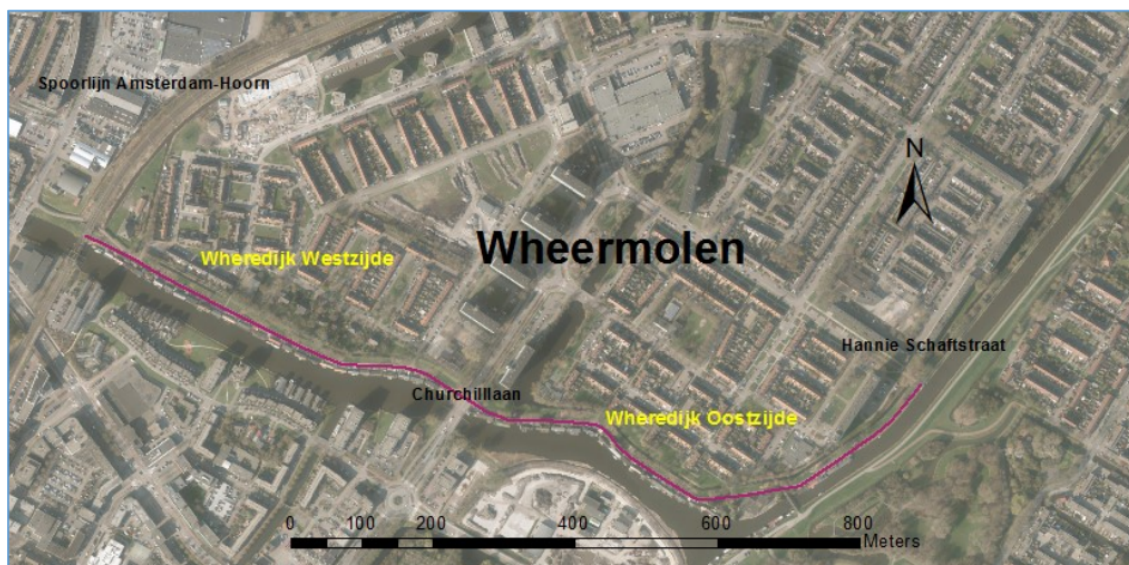


Figure 6: Map of the trajectories of the Wheredijk (HHNK 2020)

#### The characteristics of the area

Although the technical aspects of the project were not difficult, the context in which the project took place was complex. First, the project was highly urgent as one of the heat pipes near the dike was leaking. Therefore, HHNK cooperated with the local heat company Stadsverwarming Purmerend, who was responsible for the heating system. Due to this urgency, the project had a very tight schedule.

<sup>1</sup> Regional quays (*boezemkades*) is a term used for regional flood defenses. They are small dikes that prevent water from flowing from the reservoir (*boezem*) to the lower laying polders (Deltares, n.d.).



Second, the project took place in an urban environment. The zoning plan (*bestemmingsplan*) assigned many functions to the Wheredijk (*dubbelbestemmingen*). On the crest of the dike a bike lane was located, together with gardens of the inhabitants that live in the houseboats located along the Where (see Figure 7). Additionally, cables ran along the dike to provide the houseboats inhabitants with water, gas, and electricity. HHNK had ownership of the land of the quay, the regional flood defense, and the bike lane. The proximity of these functions in the limited space created a challenge for the project team. Third, the 51 houseboats that were located along the Wheredijk had no legal authorization to be there. The legalization process of the houseboats was done in parallel to this water safety project, which caused some resistance from the inhabitants.



Figure 7: Wheredijk before the project (HHNK, 2020)

### The phases of the project

The project was structured into different phases. However, as interviewees confirmed, the phases of regional flood defense projects are not as straightforward and rigid as the project phases of primary flood defense projects. This is because most regional flood defense projects are not obligated to apply for as many permits and subsidies as primary flood defense projects. For example, projects regarding regional quays are generally not obliged to execute an Environmental Impact Assessment (*milieueffectrapportage*) (STOWA, 2009). The process consisted of an exploration phase, plan elaboration phase, preparation phase, and an implementation phase (HHNK, 2021a; HHNK, n.d. a). The phases were not strictly linear executed and had to be completed rapidly due to the time pressure. In the exploration phase, the main goals were to gather the stakeholders' wishes and get an overview of the policies applicable to the area. Different solutions were created and considered in the plan elaboration phase. A selection of promising alternatives was made, after which the preferred alternative was chosen (see Appendix 3). In the preparation phase, a building team (*bouwteam*) was set up, which consisted of HHNK and the contractor. This team created the final design (*definitief ontwerp (DO)*) and the implementation design (*uitvoerings ontwerp UO*). In Figure 8 the phases are presented schematically.

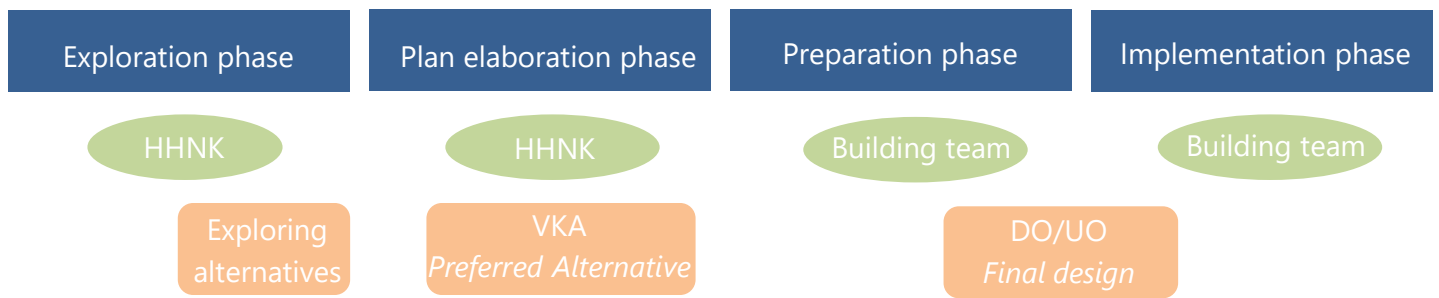


Figure 8: The phases of the Wheredijk project, the responsible party, and the official design milestones (author)

#### 4.1.2 The Voorweg case

The regional quay along the Voorweg and Wilsveen protects the area against the water from the Molenvaart and the Voorwegwetering. This regional quay is around five kilometers long and crosses two municipalities: Leidschendam-Voorbrug and Zoetermeer. The waterboard Rijnland is responsible for the Voorweg. A periodic inspection detected that the entire length of the regional flood defense did not meet the safety standard established by the Interprovinciaal Overleg (IPO), as the height of the dike was insufficient. Accordingly, the project was established to raise the whole length of the quay. The project was divided into two trajectories (see Figure 9). The westside is the first phase and runs from the outskirts of Zoetermeer to the railway. From the railway until Vlamingsstraat 2 is the second phase of the project. The project was finished at the end of 2021.



Figure 9: Map of the trajectories of the Voorweg (Rijnland, 2020a)

#### The characteristics of the area

Similar to the Wheredijk case, the technical aspects of the project were not difficult, but the context was complex. First, a large part of the quay is located in a densely built environment containing many stakeholders, such as the inhabitants, local companies, and recreational organizations. Particularly challenging was the fact that the quay was located in the backyard of many inhabitants. Second, the zoning plan assigned many double functions (*dubbelbestemmingen*) to the dike. The functions contained living, agriculture with landscape values (with culture-historical and archeological values), firms, and the protected cityscape (*beschermd stadsgezicht*). All these functions needed to be considered in the project. Third, the protected cityscape and the cultural-historical and archeological



objects implied stricter rules to the environmental permit (omgevingsvergunning). Therefore, the municipality had more influence on the project compared to other regional flood defense projects.

### The phases of the project

The process of the Voorweg/Wilsveen project consisted of the same phases as the Wheredijk, namely: an exploration phase, a plan elaboration phase, a preparation phase, and an implementation phase. In the exploration phase research was conducted on multiple aspects of the area, the spatial quality framework was developed including design guidelines and multiple design choices per location, and a sketch design was created (*schets ontwerp (SO)*). In the plan elaboration phase, inhabitants actively participated, and the preliminary design (*voorlopig ontwerp (VO)*) and the final design (DO) were created. In the preparation phase, the specifications (*bestek*) for the contractor were made and the tender process was carried out. In the implementation phase, the project plans were executed by the contractor. In Figure 10 the phases are presented schematically.

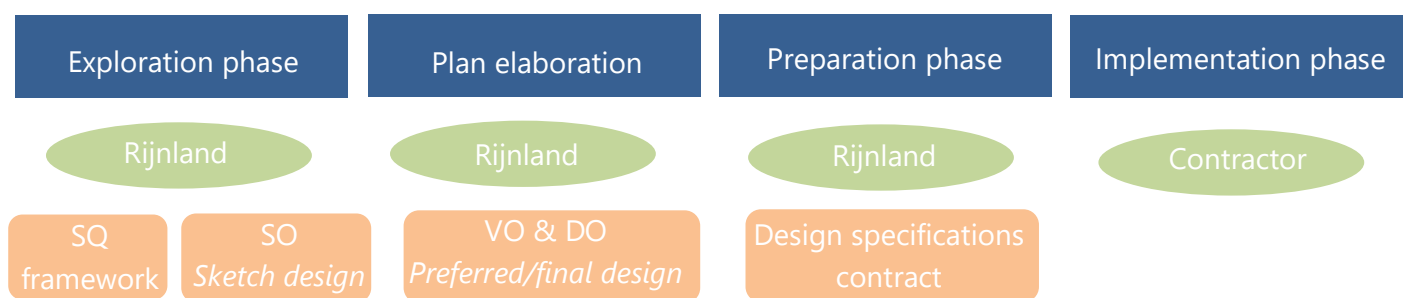


Figure 10: The phases of the Voorweg project, the responsible party, and the official design milestones (author)

## 4.2 Making sense of spatial quality

### 4.2.1 Spatial quality in the Wheredijk case

#### No initial objectives for spatial quality

Originally, no predefined objectives were formulated for spatial quality in the Wheredijk case. The water safety adviser mentioned they had ‘zero objectives’ for spatial quality (R2). The two main objectives were to increase water safety and to replace the leaking heating pipes. During the project spatial quality became more present. More attention was paid to integrating the project in its environment, and other objectives such as road safety, social safety, and ecology became important.

#### Interpreting spatial quality along the way

At the beginning of the project spatial quality was not clearly defined. The project leader (R1) mentioned that spatial quality was more clearly defined as the project progressed because later on it became apparent what aspects of the area were of importance.

Spatial quality did play a role in the assessment framework of the different alternative designs. These designs were assessed on the water safety, user value, and the experimental value (HHNK, n.d. b). First, the safety element was defined as the water safety of the design, as it had to withstand all fail mechanisms. Robustness, meaning the design had to take into account future developments and uncertainties, was also incorporated in water safety (HHNK, n.d. b). Second, the user-value was defined as the integration of multiple functions into the design, in which five functions needed to be integrated: traffic above ground (bicycle lane), utility services underground, use of the side of the dike as gardens, the living function of the houseboats next to the dike, and the use of open space of the dike as recreation. Third, the experimental value was defined as the area’s LNC-values; the landscape

characteristics, nature, and cultural-historical elements. These assessment points overlap partly with the Vitruvius Triad as defined in Section 2.3.2. The hydraulic effectiveness (water safety) and functionality correspond with the user value. Next to that, the elements of the experiential value of HHNK resonate with the experimental value as defined in Section 2.3.2. Furthermore, the robustness of the flood defense, which HHNK linked to water safety, corresponds with elements of the future value as defined in Section 2.3.2.

The assessment elaborated on above was made by HHNK, but RPS (a hired engineering firm) was officially responsible for creating and registering the alternative designs. When comparing the HHNK (n.d. b) assessment framework with the official documents of RPS (2020a; 2020b), it is noticeable that the experimental value was not explicitly mentioned in HHNK's assessment. Water safety (along with robustness) and the user value did have a prominent role in the assessment.

Multiple interviewees stated that involved stakeholders sometimes had different opinions on the spatial quality or the area's design (R2, R3, R4). Especially, the municipality of Purmerend and HHNK had opposing views. For example, the municipality wanted to broaden the cycle lane along with the green stroke, and keep large trees on the dike. The technical manager explained: *"Given the available space it was impossible to broaden both the green stroke and the bicycle path. Everybody reasoned from their own personal needs and desires, which made it hard to show that not everything is possible and that consensus is required to keep the project going"* (R3). Furthermore, she stated: *"what is considered spatial quality for the waterboard, might not be spatial quality for the inhabitants"* (R3). However, all interviewees were satisfied with the end result, especially considering the difficult context in which the project took place (R1, R2, R3, R4). The technical manager mentioned: *"In my opinion, the end result is the option that suited all wishes and requirements best. Then again, that does not mean that from every stakeholders' perspective this was the highest achieved result, but it does mean it was the highest achievable for the wishes combined"* (R3).

#### How the Wheredijk strengthened spatial quality

Combining several functions and creating synergies were crucial in the Wheredijk case for achieving the desired spatial quality. In the project, the following synergies have been identified and created (HHNK, 2020; RPS, 2020c):

1. The broadening of the bike lane and the creation of a sidewalk
2. Improving the traffic safety of the bike lane
3. Improving street lighting near the bike lane
4. Enriching the green stroke along the dike
5. Enabling the replacement of the heat pipes and utility cables

These different aspects of the area have been upgraded. The area has become more accessible with a better and safer bicycle lane. Furthermore, the social safety and liveability of the area have improved. The project leader explained: *"It used to be a desolated pathway that you would avoid at night. Now it is a broad, open, and safe place"* (R1). Next to that, there was an emphasis on ecology and planting. Large trees had to be cut down according to HHNK policy. This was compensated by placing other lower planting and a flowery grass mixture to attract different insects. From the wood of the cut-down trees, benches were made along the Wheredijk to enjoy the view. In this way, HHNK has made good use of the opportunity to execute multiple tasks simultaneously to increase the spatial quality of the area.

#### 4.2.2 Spatial quality in the Voorweg case

##### Spatial quality as key objective

In contrast to the Wheredijk, spatial quality was of importance from the beginning of the project in the Voorweg case. This was due to many cultural-historical objects and the protected cityscape (R8). The quality of these cultural-historical elements and the cityscape could not be lowered during the project, which created a motive to prioritize spatial quality. The objective was to integrate the water safety project into the current environment and to strengthen the spatial quality of the area where possible (BoschSlabbers, 2019). However, clear criteria on how the spatial quality could be tested were not present.

##### Defining spatial quality

At the start of the project, the meaning of spatial quality in the context of the Voorweg was unclear. HHNK hired landscape architecture firm at the beginning of the project to help define spatial quality and to creating a spatial quality framework (R8, R9). The project manager explained: *“We [Rijnland] did not define spatial quality as a client. When this project started we said: spatial quality is important. Then we called our contact at BoschSlabbers, he also asked what we thought it was. I replied; I have no clue, but we know it is important here; what do you think it entails? Then they started to create the spatial quality framework, which we adopted in our project”* (R8). The spatial quality framework helped in defining spatial quality for the Voorweg context in a clear and concrete manner. The landscape architect explained that establishing the spatial quality framework was partly a reciprocal process. Sometimes after the preferred alternative is made, the spatial quality framework is revisited and adjusted. The guidelines of the spatial quality framework were prominent in the design session and were also communicated clearly to the contractor and the stakeholder manager (R6, R9). According to the landscape architect (R8) the guidelines provided a mixture of the Vitruvius Triad (user/experiential/future) values. In this case, the user value referred to strengthening the multiple uses of the quay, along with the connection between the rural area and the city. The experimental value referred to the guidelines of increasing the authentic feeling of the quay by for bringing back the quay’s history. The future value, in this case, was primarily geared towards strengthening ecological features and planting greenery.

In contrast to the Wheredijk case, the main stakeholders largely agreed on the meaning of spatial quality in the process (D6, D7, D8). The spatial quality framework and the involvement of stakeholders in an early stage were helpful. Stakeholders were free to share their thoughts and opinions (R9), which would be considered in the designing process (R7). This led to a well-supported final design.

##### How the Voorweg strengthened spatial quality

The spatial quality framework first pointed out several qualities of the area. They include (BoschSlabbers, 2019):

- *The rural and informal ambiance:* although the area is partly located in a densely populated area, the ambiance throughout the whole quay is rural and informal.
- *The colorful string of breads (kleurrijke kralensnoer):* the area has different (historical) functions, and a natural line of the waterway.
- *The distinction between the rural and urban side:* the character of the city part is more closed and the rural part has an open polder landscape.
- *Recreational connection between the rural and the urban:* the Voorweg serves as a recreational connection between the center of Zoetermeer and the outskirts. It forms an attractive and green cycling and walking route with many recreational functions.

- *The asymmetrical profile of the quay*: the north side of the quay is asymmetric and has differences in hard and soft boundaries.

The strengths of the area, as presented above, were translated into concrete guidelines (BoschSlabbers, 2019; Rijnland, 2020a). By prioritizing the main guidelines during the project, different characteristics of the area were preserved or strengthened. Next to that, historical objects were restored. The washing stoops (*wasstoepjes*) that were used in the past to wash clothes in the waterway had disappeared under the water. They were dug up, restored and placed back on the quay. The efforts to safeguard the cultural-historical elements along with the greenery and plants was much appreciated by the stakeholders (R6).

What is striking, is the number of tailor made designs that were created in this project. For every plot a different design was made. This was done by analysing the plot, subsequently assessing which guidelines of the spatial quality framework were applicable to the plot, and then assessing how they could be translated to the specific situation (R8). In this way, the unique features of every plot were preserved, while also adding to the main qualities of the waterway. As the contractor stated: *“through paying attention to these details the authentic ambiance of the Voorweg could be preserved”* (R5).

#### **4.2.3 Reflection and comparison**

The interpretation of spatial quality was different in the two cases. In the Wheredijk case no initial objectives were formed. Spatial quality became more important as the project progressed. Opportunities to create synergies led to more attention for spatial quality. Spatial quality was defined during the project. On the contrary, in the Voorweg case spatial quality had a prominent place from the start of the project, due to the protected cityscape status and the cultural-historical objects. Defining spatial quality was done at the start of the project by creating a spatial quality framework, and was revisited multiple times during the project.

In the end, elements of all values of the Vitruvius Triad (see Section 2.3.2) were strengthened in the Wheredijk case. However, the most prominent value was the user value. One of the most crucial factors was how all functions could be integrated and coordinated. Just as the Wheredijk case, the Voorweg contributed to different elements of the Vitruvius Triad. One of the most prominent objectives was to safeguard the cultural-historical authentic ambiance, which can be defined as the experiential value. Hence, the two cases emphasised different values of spatial quality.

## 4.3 The applied policy instruments

This section elaborates on the different instruments that have been applied in the two cases. The instruments used in the cases of the Wheredijk and the Voorweg will be structured following the NATO-typology as explained in Section 2.4. After each typology a reflection is provided comparing the two cases.

### 4.3.1 Organizational instruments

In this section, the organizational instruments utilized in the two cases are discussed. As explained in Chapter 2, organization instruments are based on the government's resources. With regard to flood risk management, this refers to employing skilled actors that could help to increase spatial quality. In both cases a landscape architect and multiple engineering or consultancy firms were hired. The Voorweg also had an 'integral thinker' in their project team.

#### The Wheredijk case

##### Landscape architect

At the end of the project, in the implementation phase, the contractor recommended a landscape architect. He was hired by HHNK. His task was to help with the furnishment of the dike, in particular the green plan (*groenplan*). The green plan was a design to replant the area of the dike of which trees had to be cut down. This was necessary because policy of HHNK stated that no large trees are allowed on flood defenses, as this could lead to instability of the dike (HHNK, 2012). The municipality of Purmerend was against cutting down the trees. As the stakeholder manager said: *"We had asked the architect for a vision of the greenery of the environment to have a good basis on which we could have the difficult conversation with the municipality... with that image we could steer towards a common vision"* (R4).

The landscape architect led the design sessions with the different stakeholders to gather everyone's wishes for the green design. In the sessions, the independence of the landscape architect was valued. The stakeholder manager explained: *"The idea was that we would hire an external independent third party that could create a design, so that it would not be our story [HHNK], but the story of the landscape architect"* (R4). Unfortunately, the collaboration between HHNK and the landscape architect did not run smoothly. There was a conflict between the landscape architect, the municipality, and HHNK. The landscape architecture's way of working did not align with that of HHNK. Therefore, the cooperation was ended, and HHNK finished the green plan themselves. A consensus was made between the municipality and HHNK: a limited number of trees were cut down, which were replaced by a flowery grass mixture and less impactful vegetation. Although this did not exactly go as planned, interviewees did acknowledge the benefit of hiring a landscape architect in flood defense projects (R3, R4).

##### Engineering or consultancy firms

In all phases of the project different engineering firms have been consulted. However, not all firms were hired to add to the spatial quality of the project. In this subsection, only the engineering firms that directly added to spatial quality, or indirectly by facilitating the instruments for spatial quality, are discussed. First, HHNK hired Arcadis in the exploration phase to create a participation strategy. This strategy stated the different stakeholders and their interests, guidelines for participation, and the level of participation. Arcadis thus helped to develop an instrument, citizen participation, that could safeguard spatial quality. Second, HHNK hired DTV Advies in the preparation and implementation phase. The firm helped to design the bicycle lane and the sidewalk and ensured that the road safety requirements were met. The water safety advisor stated: *"DTV consultants actually found out that the*

*project met all requirements of the subsidy Verkeersregio Amsterdam” (R2). Thus, the engineering firm indirectly contributed to the neighborhood’s social- and traffic safety. This adds to both user value by making improving flow of traffic, and to the experiential value by improving the social safety of the area.*

#### Integral thinker

The project team of the Wheredijk also contained an integral thinker. The project manager explained: *“We had an integral thinker in our team. He was someone who thought about things no one else thought about. He was a senior policy advisor at HNKK who had worked at different organizations, like ‘Het Waterschapshuis’ and ‘Stichting toegepast onderzoek waterbeheer’ (STOWA). He brought up different things that we could combine with the water safety objective, and also thought about spatial quality” (R1).*

The integral thinker was the water safety advisor (R2). When asked about his role, he stated that he was broadly educated and had a background in road design. This allowed him to look further than the water safety objective. The experience at ‘Het Waterschapshuis’ allowed him to take into account many different policy documents and networks, such as bicycle and recreational routes, and nature networks. He stated: *“The Wheredijk was not a livable area, so I started to reason from the perspective of livability: what do you need then to design the area?” (R2).* Furthermore, he embraced broad, integral thinking: *“We [HNKK] are afraid that looking too broadly will cost us a lot of money. However, the opposite is true ... If you do not optimize the project, you will have to keep coming back. Because we were the first to come here, we had the opportunity to paint our perfect picture and improve the area” (R2).* In this way, he helped the project team to look more broadly and consider the area and its different functions.

### **The Voorweg case**

#### Landscape architect

The employment of a landscape architecture firm was also a crucial instrument for safeguarding spatial quality in the Voorweg. In contrast to the Wheredijk, a landscape architecture firm (BoschSlabbers) was employed from the exploration phase until the implementation phase. Multiple landscape architects worked on the case, of which R7 was the point of contact. He went to the meetings and worked on location. His colleagues worked on the content from the BoschSlabbers office. The landscape architects' spatial quality framework was used as a starting point for the technical design. The intensive involvement of the landscape architects in every phase of the project was seen as unique in regional flood risk management (R7, R8). This approach was used for two reasons. First, the zoning plan showed that the project area contained multiple elements of cultural-historical and archaeological value, and a protected cityscape (*beschermde stadsgezicht*) (Rijnland, 2020a, 2020b). Second, the project area contained many stakeholders, and the regional quay ran through numerous private gardens (R8).

In the different phases, the landscape architect had various tasks. The main task in the exploration phase was to create a spatial quality framework to explore the landscape of the project area and to form concrete design guidelines that would fit the landscape qualities of the area. In the plan elaboration phase, the landscape architect (R7) was part of the internal design team and was involved in the design sessions of the VO and DO. Furthermore, the landscape architect (R7) occasionally attended meetings with the municipalities. Additionally, the landscape architect (R7) was involved in citizen participation, including information evenings and design sessions with citizens and stakeholders. In the preparation phase, the landscape architect (R7) provided the final advice and

finishing touches. In the implementation phase, the landscape architect was less involved. Overall, the landscape architects were not only involved in the creation of designs but also contributed to other aspects of the project.

The project manager noted that employing a landscape architect is one of the most important instruments for increasing spatial quality. He stated: *“Personally, I think that a landscape architect provides more broadness to a project, and provides more clear design choices. Landscape architects view things integral, instead of only looking at technology”* (R8). The landscape architect has the ability to function as a bridge between the environment with its stakeholders and the technical engineers (R7, R10). The landscape architect of Rijnland explained: *“The advantage of a landscape architect is that he has a feeling of what the environment means for people, but also understands the technical assignment. Moreover, landscape architects can visualize things, and can therefore translate between the technical engineers’ language and the language of the people of whom the backyard is being teared up”* (R10).

The interviewees mentioned different success factors. First, it is beneficial to have a project team that has the intrinsic motivation to create and prioritize spatial quality (R7, R10). Second, involve the landscape architect early in the process (R8, R7). Third, involve the landscape architect in the design team of the waterboard (R7).

#### Engineering or consultancy firms

Next to the landscape architect, Rijnland hired two firms that directly or indirectly added to the spatial quality of the project. First, HHNK employed Fluxpartners in the plan elaboration phase to gather the wishes and possible risks of the landowners of the quay. Their employment was essential in safeguarding spatial quality from the inhabitants’ perspective. Second, Rijnland hired KP to create 3D visualizations of the design for specific places of the project. This improved communication of the design to stakeholder, and helped the landscape architect improve some designs.

#### **Reflection and comparison**

The organization instruments used in the two cases are partly similar but also contain differences. These differences and similarities are discussed below.

First, a landscape architect was employed in both cases to strengthen spatial quality in the projects. However, the role of the landscape architect was different in the cases (see Section 2.5.1). In the Wheredijk case, the landscape architect was employed via the contactor in the implementation phase. By employing the architect late in the process, the focus was specifically on the design of the green plan and thus on delivering a specific design product (R4). The architect had a traditional content-oriented role. In contrast, in the Voorweg case, the landscape architect was involved from the beginning of the process until the implementation phase. The landscape architect’s role was both content-oriented and process-oriented. The content-oriented role consisted of making sketches, designs, and a spatial quality framework. In the process-oriented role, the landscape architect was present at various stakeholder meetings, citizen participation activities, and design ateliers, bringing together opinions, values, and interests by using design. The landscape architect thus functioned as a member of the integral design team and played an important role in the planning process. In both cases, the landscape architect functioned as a boundary spanner (See Section 2.5.1). In the Wheredijk the landscape architect had a more traditional role, meaning the landscape architect was primarily focussed on spanning physical and mental boundaries while focussing on designing for landscape change (Van den Brink et al., 2022). In comparison, the landscape architect of the Voorweg had both

a traditional and a more process-based role. The landscape architect was more involved with the process of design and facilitated an inclusive design process (Van den Brink et al., 2022). The findings of both cases confirm the pivotal role of the landscape architect as a guardian of spatial quality and as boundary spanner between the different interests and policy sectors involved in flood risk management, as found by Busscher et al. (2019) and Van den Brink et al. (2019). Furthermore, professionals confirmed the pivotal role of the landscape architect in the focus group discussion, as it was appointed as one of the most important instruments for strengthening spatial quality (Focus group data, see Appendix 2).

Second, the Wheredijk had an integral thinker in their project team, unlike the Voorweg. As mentioned, he was broadly educated and thus had an integral perspective. In this way, the integral thinker could also be seen as a boundary spanner. He considered different aspects of the area, connected and integrated different policy sectors, and connected HHNK with different organizations.

Third, both cases employed engineering or consultancy firms. In regional flood risk projects expertise is often hired. This is in line with Stead (2021), who notes that governments are required to hire more expertise through developments as privatization. The hired expertise discussed in the sections above did directly or indirectly contribute to strengthening of spatial quality in the project. However, not all collaborations with engineering firms were successful. The water safety advisor of the Wheredijk states that the engineering firm hired for the project plan *“were very technical, they were constantly calculating technical aspects but did not consider the environment. My colleague and I had rewrite their work”* (R2). He stated that some engineering firms are not experienced in integral plan development. Next to that, interviewees of both cases pointed out that the waterboard had framework agreements with certain firms, in which they are obliged to hire them (R2, R8). Although these agreements provides financial and collaboration benefits, they can also be a hindrance. Deviating from these agreements is difficult, which to some extent makes it harder to hire project-specific knowledge (R2, R8).

#### **4.3.2 Nodality instruments**

In this section, the nodality instruments that were used in the two cases are discussed. As explained in Chapter 2, nodality refers to the provision and collection of information. In the Wheredijk case, a broad scope was adopted, multiple forms of participation were used, and design sessions were organized. In the Voorweg case, a broad scope was adopted, multiple forms of participation were used, design sessions were held, 3d visualizations were made, and spatial quality advice was received.

##### **The Wheredijk case**

###### Broad scope

The Wheredijk had a broad scope from the beginning of the project. The project became urgent due to a leaking heat pipe. That incident created an opportunity to bundle multiple tasks into one project. According to the stakeholder manager (R4), HHNK deliberately chose to take this opportunity. In the exploration phase the project’s scope was explored, and a stakeholder analysis was executed. HHNK met with different parties to see if collaborations were possible. Stadsverwarming Purmerend was involved from the beginning. The utility companies joined later in the exploration phase as they saw the opportunity to install their internet cables during the construction of this project. Next to that, HHNK used a GIS tool in which all relevant policy documents were visualized on a map, for example the zoning plan, natura 2000 areas, and public management plans. The water safety advisor stated: *“We gather all plans that public governments have published, then we stack them and that becomes the basic map. Then the stakeholder manager can go outside with the forms, and he can put that in*



*GIS. Then we have a complete picture of all tests, policy, and other matters” (R2).* According to the water safety advisor (R2) this helps to get a complete picture.

The technical manager stated that the broad scope also had implications for the design: *“We have considered the whole story integral from the beginning, and therefore the whole design of the dike has been adjusted to the multiple uses of the area ... So actually, basing your design on the qualities and the functions of the area, and not adjusting the qualities and functions to the design, which is normally the case” (R3).* HHNK (n.d. c) confirmed this in the evaluation of the project; a lesson was to make integral long-term maintenance plans and reserve budget for this.

Multiple interviewees mentioned that considering a broader scope had advantages. According to the stakeholder manager (R4) the project was executed faster and with less nuisance for the inhabitants. Accordingly, it saved money, as resources could be shared (R3). Next to that, it was beneficial for the environment. The water safety and multiple aspects of the area have been upgraded, adding to the quality and livability of the area (R1).

There were also difficulties in considering a broad scope. First, the technical manager (R3) pointed out that the organization structures of the waterboards, and other public organizations do not always line up. For example, the organizations have different financial systems, and all have their own planning for the execution of projects. When the planning of projects does not align it becomes difficult to execute projects simultaneously. Second, collaboration is essential when taking a broad scope. Often, more parties with different interests are involved. In the Wheredijk case, the cooperation with the municipality and the utility parties was difficult. R3 stated that for good collaboration trust is essential, along with the ability to address each other when agreements are not being met. Third, water safety is the main focus of the waterboard. Taking a broad scope and working more integral means working more area-oriented (*gebiedsgericht*). So, not only looking at the dike but also considering the area and its stakeholders (R3, R4). Working more area-oriented was at times difficult, since it is not yet mainstream at HHNK.

A possible solution for the problems, as explained by the water safety advisor (R2), is more transparency, so sharing different visions and project plannings in an early stage. The water safety advisor noted that when the municipality sees that the waterboard has a water safety project planned, then they can align for example their sewerage project to it. In that way, more collaboration is possible.

#### Citizen participation

Different forms of participation were utilized during the project. In the exploration phase a participation strategy was developed by Arcadis, stating how the inhabitants could be included and what level of participation was required. The project started just before the corona pandemic (March, 2020). The pandemic had an extensive impact on the participation process. The participation entailed different forms: newsletters with videos, public information evenings (*bewonersavonden*), and one-on-one talks. With the newsletters, HHNK wanted to keep the inhabitants up-to-date on the developments of the projects. The newsletter became critical in the corona period, since that was one of the few activities that could continue. The public information meetings were impossible due to the corona measures. Therefore, HHNK created an alternative by organizing digital open hours where inhabitants could ask their questions about the project. The stakeholder manager R4 indicated that despite the efforts, inhabitants did not show up: *“finding people was hard in COVID times, but when we were visible with the construction shed people started to find us again. The questions they had still came through in the end” (R4).* When the corona restrictions were less strict all 60 inhabitants had one-

on-one conversations with HHNK, in which they asked different questions. This was part of the legalization process that was executed parallel to the water safety project. These conversations took place in the implementation phase.

Multiple interviewees, and experts involved in the focus group discussion, saw citizen participation as an essential instrument (R1, R3, R4). It was important for the support of the project and for collecting wishes and local information about the area. The project manager stated: *"You are constantly trying to keep the conversation going, to gather wishes, answer questions, to decrease frustration, and to bring the inhabitants back on board" (R1).*

An implication of participation is that management and maintenance of the area can become more expensive. In this case the maintenance of the dike became more expensive. The project manager explained: *"Participation entails that the interests, wishes, or requirements you agree to, that you will have to arrange the finances for that for several years. Thus, you have to arrange your finances differently, if you want to achieve long-term success ... that jar of money is not there yet" (R1).*

The participation in this project also faced challenges. The project area was complex, because the houseboats and gardens have been there for years but were never legalized. As mentioned, this project ran parallel with the water safety project. The technical manager (R3) pointed out that this legalization process was inevitably going to lead to negative reactions, because the inhabitants were going to pay for things they did not have to pay before. The interviewees mentioned that this affected the attitude of the inhabitants (R3,R1). Secondly, the board of the houseboats (*het Arkbestuur*) represented the inhabitants. The project team used this board as a sounding board. They consulted them and had conversations about the project. However, the interests of the inhabitants were not fully represented. The stakeholder manager explained: *"We thought we had a nice sounding board (klankbord). However, people came into these sessions with collective interests and individual interests. Moreover, not every inhabitant was well connected with the Arkbestuur. So you can have consensus with their board, but that does not mean every inhabitant agrees. We started to hear different opinions from the inhabitants. We could not cannot escape one-on-one talks them" (R4).* Because the time pressure was high, and because of the restrictions regarding the corona pandemic, the one-on-one talks happened in the implementation phase. This was a little late, which resulted in conversations about details instead of the bigger picture of the dike (R4).

The interviewees mentioned different factors that were important for successful participation. The stakeholder manager noted: *"the trick is always to carefully register and make notes of sessions and provide feedback on what you did with their suggestions. Even if things are impossible, you can start a conversation and explain: what you ask is impossible, but we researched it so and so (R4)".* The feedback is essential in creating understanding and a feeling of being heard. The technical manager (R3) adds that registering your participation and results is also important for your organization. When inhabitants are dissatisfied you can start a conversation and show that decisions were made in consultation. Lastly, building trust is essential. If that is not present everything you do will be questioned (R4).

#### Design sessions (green commission)

During the implementation phase, HHNK arranged design sessions to create the green plan for the dike. The green plan was part of the dike furnishment and added to the experience and biodiversity of the dike. The design sessions took place at the same time as the construction of the water safety part of the project. Due to corona restrictions the sessions were held online. Different parties participated,

namely inhabitants of the area, the municipality of Purmerend, employees of HHNK (within project team and managers of maintenance), and the landscape architect. The technical manager stated that participants *“could share their thoughts about the design and think about, for example, what trees could remain, what trees could be planted back, what type of grass was suitable”* (R3). HHNK still had the final decision on the design, since they were responsible for maintaining the dike. As the design sessions were organized in an advanced stage of the project, the results were mainly focused on details, like discussing one tree or bench. Not a lot of new surprising insights were shared (R4). However, worries could be taken away, and stakeholders felt included.

The stakeholder manager valued the design sessions highly as an instrument for improving spatial quality and gaining stakeholders' support. Ideally, design sessions take place early in the project. In that way, the bigger picture can be explored (R4). Furthermore, more attention could be paid to the history of an area and the water/soil systems early in the process. Additionally, it is beneficial for stakeholders to come together, and for the landscape architect to make sketches to make visions or designs visual for stakeholders (R4). Allowing the landscape architect to lead these sessions is favourable, as stakeholders will feel the plans are their own, rather than the plan or design of a particular organization (R4). The stakeholder manager also stated that due to the complexity and the political-administrative context, and due to COVID, not all of this was possible. He mentioned: *“We made the most of the time period and the political-administrative context we were in”* (R4).

## **The Voorweg case**

### Broad scope

From the beginning of the exploration phase Rijnland considered a broad scope. The water safety project was not bundled with other projects, but extensive research was conducted on different aspects of the area. Furthermore, the project team was very aware of the landscape in which the project took place. What is striking is the extensive research on the archaeological and historical-cultural aspects of the area (see RAAP, 2019). The reason for this research was the high number of assigned double functions (*dubbelbestemmingen*), with many archaeological and historical-cultural zones, combined with many inhabitants (R8). The findings of this research served input for the spatial quality framework. Next to that, HHNK identified the stakeholders and involved them early in the project.

This broad view and extensive analyses of the area have multiple benefits. It provided a basis of knowledge which justified design choices and the creation of guidelines for spatial quality (RAAP, 2019). Furthermore, it contributed to the support of the plan (R9). As the stakeholder manager stated: *“I believe that if you approach a project broadly and seriously, people are more supporting of the project ... It shows inhabitants that Rijnland is not just here to raise the dike as quickly as possible, but they notice that attention is being paid to their living environment”* (R9).

An extensive exploration phase requires time and money. However, several interviewees explained, this is regained later in the process (R7, R8). The project manager stated that the rest of the project ran smoothly without significant setbacks. In such a complex project, a broad view and extensive research is beneficial. If this is not considered, the project will most likely face resistance: *“before you know it you will have rooms full of angry citizen or several judicial appeals. That will cost huge amounts of money and time”* (R8).

### Citizen participation

Citizen participation was an important instrument in the project of the Voorweg. Since the exploration phase the inhabitants were involved. During the plan elaboration phase participation was intensified. In the implementation phase the participation was less intensive again. Multiple methods of participation were used, namely: newsletters, public information meetings, kitchen table conversations (*keukentafel gesprekken*), and online videos and information. Throughout all phases of the project, the newsletter informed the inhabitants on the project. Additionally, the public information meetings also provided information and citizens could comment on the plans. Rijnland held the first meeting at the beginning of the project. In the following meetings, the designs were presented and discussed. However, the COVID pandemic occurred and the following public information meetings had to be held online.

More intensive participation was organized in the plan elaboration phase, before the COVID pandemic. Kitchen table conversations were held with all inhabitants (and other stakeholders) that lived on the quay. The conversations took place in the inhabitants' homes. In these conversations wishes of the inhabitants regarding the design of the project were collected. In the conversations 30 questions were asked in a structured way. The inhabitants' wishes were documented and printed on the spot to ensure that the inhabitants and Rijnland had a clear picture of the conversations. This personal attention, in combination with the personalized and tailor-made designs for each parcel, resulted in successful participation. According to the stakeholder manager, the inhabitants became more open and trusting once they realized that: *"they could choose more than just the paint of a fence, they realized we actually listened to what they wanted"* (R9). Next to that, the inhabitants realized the importance of the project for the water safety of the area. This gave a feeling of responsibility and willingness to participate (R9). A critical note of the project manager (R8) was that it took much time to follow-up on all these conversations and that some questions were unnecessary.

When the COVID pandemic hit, more participation was done online. Videos were made with the updates on the project and designs were presented online. The design could be viewed in a GIS viewer. This GIS viewer showed the situation now, and the situation with the new designs. This instrument helped in communicating the technical designs in a more visual way (R7, R8, R9).

Overall, the participation was highly valued. Participation allowed citizens to add to the spatial quality of the project. There were multiple factors of success. First, giving feedback to inhabitants was important, to explain which wishes were (not) granted and why (R8,9). Second, the registering the conversations or wishes was important, as it could be revisited when misunderstanding arises (R9). Third, listening carefully to the participants and getting to the core of their feelings was essential to understand them and gain trust (R9). In this case, there was room for tailor-made designs and financial room to include the participants' wishes. Participation requires time and money, but this is won back in the implementation phase as this runs more smoothly (R8, R9). Inhabitants will be more supportive of the project and willing to help. Eventually, the participation helped to strengthen spatial quality and to create a positive image for Rijnland (R9).

### Design sessions

In the plan elaboration phase, design sessions were held on five locations on the quay. These were locations on which the wishes of Rijnland and the inhabitants clashed, or where the water safety objects were difficult to realize. The design sessions were accompanied by the landscape architect, stakeholder manager, technical designer from Rijnland, project manager and inhabitants. The project manager explained: *"we did the design session by putting a white paper on the table, with the designer*

*and the landscape architect ... and then we started designing together with the inhabitants, and asking things like how high does the quay need to be, how do you think it should look like?"* (R8). On the initiative of the landscape architect the sessions were held on-site, which made it easier to visualize and show inhabitants the effects of design choices.

The project manager and the stakeholder manager stated that the design sessions were an essential instrument for strengthening spatial quality. The project manager stated: *"Overall, we got a more supported design and some creative solutions we did not think of in advance"* (R8). He added that it is important to include the inhabitants in the decision-making process, even when the design will come out the same. The inhabitants can see why certain things were (not) possible, which creates understanding and increases support (R8). Next to that, getting together inhabitants with their neighbors helped in creating more coherent designs that were in line with the spatial quality framework. The stakeholder manager explained: *"the willingness to take into account each other's needs and create consensus grows if you bring the inhabitants together"* (R9). Altogether, these factors created successful design sessions.

#### Spatial quality advice

During the project exploration and plan elaboration phases, the commission spatial quality of the municipality Zoetermeer advised Rijnland. This was obligatory due to the environmental permits that Rijnland required, since the area was part of the protected cityscape (*beschermde stadsgezicht*). Rijnland included wishes and recommendations of the commission of spatial quality from the start of the project. The project manager mentioned that instead of looking at it as a barrier, Rijnland regarded it as an opportunity to use their expertise to make the plan better (R8).

The municipality of Zoetermeer already had a vision for the Voorweg. The landscape architect stated: *"They had a broad and integral perspective on spatial quality. They suggested less on the appearance of buildings and more on the use of the public space, ecological elements, and cultural-historical elements"* (R7). He also mentioned that the municipality of Zoetermeer was on top of it, as they attached much value to the protected cityscape. The value they attached to the design, in combination with their advice, helped to give spatial quality a prominent place in the planning process (R7, R8). Within Rijnland this also made it easier to require resources, as the municipality had to grant Rijnland the necessary permits (R8).

#### 3D visualizations

In the plan elaboration phase KP made three-dimensional (3D) visualizations of characteristic sites of the project. These were 3D pictures in which the projects' design was implemented. Inhabitants could view these designs of the situation before and after on the website. Interviewees mentioned that this helped greatly in communicating the design to the stakeholders (R7, R8, R9), as normally the only reference is a technical picture, which is hard to read for stakeholders. On the website, the inhabitants could click on these 3D visualizations and ask questions.

The 3D visualizations were not only helpful in communicating the design to stakeholders, but also in improving the designs. The landscape architect explained: *"You saw it in 3D for the first time. Certain things are not visible from the technical maps. ... Visualizations are not just pretty pictures, they are actually an instrument to improve your design"* (R7). The visualizations were valued highly. Multiple interviewees stated they would use it again (R7, R8, R9).

## Reflection and comparison

The use of the nodality instruments in the two cases is partly similar but also contains differences. These are discussed below.

First, both cases used a broad approach to facilitate spatial quality, this resonates with the article of Klijn et al. (2013). In the Wheredijk case, multiple projects were bundled into an integral project. The leaking pipeline could be considered as a window of opportunity to approaching the project broadly. Multiple synergies were created. The use of a broad scope facilitated the improvement of the spatial quality, as both the water safety and the liveability of the area have been upgraded. Furthermore, considering this broad scope meant that the uses of the area were leading in the design instead of solely the technical measures. Compared to the Wheredijk, the Voorweg case had less opportunities to link their projects to other developments in the area. Fewer synergies were found. Instead, extensive research was executed on the area. This background information on the history, archeology, different landscape elements and ecology, all contributed to the spatial quality framework. It led to informed design principles and support of stakeholders.

Second, the participation of both cases was rather similar, as they both used newsletters, public meetings, and one-on-one talks. However, there were also some differences. The Wheredijk case was more affected by the corona pandemic, as more of the participation activities had to take place online. Additionally, their participation and one-on-one talks were situated later in the project, meaning the design was mostly completed. In the Voorweg, the wishes of the stakeholders were collected earlier in the process, and there was more room for tailor-made designs. In that way, the wishes of the participants were taken into account in the designs. Overall, participation was highly valued as it considers spatial quality for the inhabitants and created support for the project.

Third, both cases deployed design sessions. In the Wheredijk case, these sessions were held online due to the COVID pandemic. This made the design sessions more difficult since drawing and sketching are central to these sessions (R4). Furthermore, the design sessions were held in the implementation phase. This meant that the design was mostly completed. In addition, the design sessions were solely on the green furnishment of the dike. In the Voorweg case, the design sessions were held in the plan elaboration phase. The sessions were held in an interdisciplinary team on location. There was room for the inhabitants to speak their minds and adjust designs to their liking. Overall, the design sessions were highly valued for improving spatial quality in both cases. The sessions helped in gathering information, finding consensus and creative solutions, and in creating support.

Fourth, spatial quality advice from the municipality and 3d visualizations were instruments that were only applied in the Voorweg case. Of these instruments especially the 3D visualizations were highly valued, as they contributed to the improvement of the design and communication the design to stakeholders. This resonated with the article of Metze (2020), in which is stated that visualization can play a positive role in the perception of problems, public participation, and knowledge co-creation.

### 4.3.3 Authority instruments

In this section, the authority instruments that were used in the cases are discussed. As explained in Chapter 2, authority refers to regulative and steering measures to clarify the expected behavior of actors. In the Wheredijk case, no authority instruments were used. In the Voorweg case, a spatial quality framework was created and a factsheet on spatial quality (internal policy) was used.

## The Voorweg case

### Spatial quality framework

In the exploration phase, the landscape architects of BoschSlabbers created a spatial quality framework (BoschSlabbers, 2019). The spatial quality framework was made in collaboration with the internal team of HHNK (technicians, designers, maintenance managers), the landscape experts of the municipalities, and the inhabitants. Extensive research on the archaeological and historical-cultural aspects of the area was done (see RAAP, 2019), which formed the basis of the spatial quality framework. The goal of the spatial quality framework was to analyse and value the current spatial quality and indicate how the spatial quality could be maintained and strengthened in the plan elaboration and the implementation phase (BoschSlabbers, 2019). In the framework, the characteristics of the area were explored and threats and opportunities were formulated, which were translated into design guidelines (BoschSlabbers, 2019). The design principles were concrete and detailed, which made them easy to apply to specific situations. The spatial quality framework ensured that the water safety measures would blend into the area and strengthen the existing historical landscape ribbon.

According to the landscape architect of BoschSlabbers and process leader area development of Rijnland, a spatial quality framework is an important instrument (R7, R10). Developing this in an early stage is beneficial to gain insight on different spatial assignments and possible synergies (R7, R10). The landscape architect (R7) mentioned that making a spatial framework *“forces you to think about the area early in the process and avoids that the technical solution becomes leading. Instead, the best solution is found by looking at the landscape integrally”*. Moreover, it helps in creating a vision with clear design guidelines (R8). Such a tool counteracts fragmentation in the landscape and helps the stakeholder manager to present a clear story to the stakeholders. Furthermore, this story made it easier to explain design choices to inhabitants (R9).

Three factors of success were mentioned by the interviewees. First, it is beneficial if the spatial quality framework is developed early in the planning process, as it provides better insights into the landscape characteristics and current developments (R7, R10). Additionally, it helps to define spatial quality at the start which makes it easier to strengthen and prioritize it. Second, include stakeholders wishes in the creation of the spatial quality framework. In this way, the project will be supported from the beginning (R7). Third, ensure that the spatial quality framework will be prioritized and used throughout the process. The process leader area development of Rijnland stated: *“The technical firms have to be given the assignment [from the waterboard], to take into account the spatial quality framework”* (R10). The same applies to the contractor (R8). These success factors were all applied in the Voorweg case.

### Internal policy (factsheet)

Rijnland created a factsheet on spatial quality that helps project teams to safeguard spatial quality in projects (see most updated version: Rijnland, 2021). The process leader area development (R10) who has a landscape architecture background, made the factsheet. One of his tasks is to raise awareness of spatial quality within Rijnland. He was not directly part of the Voorweg case, but he is the point of contact for project teams that require advice on spatial quality. The factsheet provides information on the different elements of spatial quality (user value, experiential value, and future value). Additionally, the factsheet explains in which situation spatial quality is essential to take into account, and when project teams should hire a landscape architect. Moreover, the way spatial quality can be considered in the different project phases is explained. Lastly, it provides a checklist for spatial quality and possible synergies within the projects (Rijnland, 2021).

The author of the factsheet stated that the checklist is preferably used at the beginning of a project, when the scope is set. He explained that when research and analysis of the area are being executed, the checklist can help in considering whether spatial quality is an essential part of the project (R10). Considering spatial quality at the beginning of projects and making an informed decision on whether or not it is prioritized in a project is crucial (R10). Spatial quality is not yet part of Rijnland's water management program (Rijnland, 2022). Therefore, this factsheet or checklist is not obligatory or binding.

## Reflection

The authority instruments mentioned above were only applied in the Voorweg case. They had different functions in safeguarding spatial quality.

First, the spatial quality framework was seen as a crucial instrument for enhancing spatial quality in flood defense projects (R7, R8, R10). Often, spatial quality is difficult to define in a concrete and location-specific manner (see Hartman et al., 2016). The spatial quality framework helped to overcome this difficulty. At the beginning of the project, the current spatial quality was established along with concrete ways to strengthen the area's qualities. Defining spatial quality specifically for this area helped to create clear guidelines for the design. The spatial quality framework thus facilitated the prioritization and measurability of spatial quality in the project. Furthermore, it helped to develop a narrative that would ease communication and understanding with stakeholders. Nevertheless, the process leader area development (R10) mentioned that this instrument is essential in complex projects but is not always necessary in simple flood defenses with fewer historical/cultural value.

Second, the internal factsheet on spatial quality helped to spread awareness on the importance of spatial quality within the organization and within water safety projects. It mainly informs project members when spatial quality is important and when expertise regarding spatial quality should be hired. Thus, it is a tool for putting spatial quality on the agenda of water professionals. However, it is merely providing information, as the factsheet or the use of it is not obligatory.

### 4.3.4 Treasure instruments

In this section, the treasure instruments that were used in the two cases are discussed. As explained in Chapter 2, treasure refers to the use of economic means to achieve policy goals. In the Wheredijk case a building team was created and a subsidy was granted. In the Voorweg case the contract played crucial a role in safeguarding spatial quality.

#### The Wheredijk case

##### Building team

The complexity of the Wheredijk project, in combination with the time pressure, required a different approach than usual. Therefore, the project team decided to create a building team in the preparation phase. A building team is a client-contractor collaboration in which the contractor is also involved in the project's design process. The contract contained the building team and the implementation. The building team consisted of both HNNK and AW group (contractor) employees and was arranged according to the IPM roles (project manager, project control, stakeholder manager, technical manager, and contract manager). The project manager explained the choice for a building team construction: *"we opted for a building team so that we could include the knowledge of construction into our design. Not only what we were going to build, but how we were going to build it was just as important ... How we would do this, with all these parties, and with the least nuisance for the inhabitants, that was one of the biggest challenges concerning the construction"* (R1). This approach is uncommon for regional



flood defense projects, the project manager has fought hard within the organization to implement it (R5).

Generally, a building team construction has multiple advantages. The contractor (R5) pointed out that it bundles the expertise of the client and the contractor. Moreover, the process is more efficient in terms of money and time (R5). Less coordination is necessary in the construction phase because the design is altered to the construction. This makes the transition between the plan elaboration and the implementation phase smoother. The technical manager (R3) also noted that working in a building team required collaborative decision-making. This was beneficial because it was more clear how a decision of one sector/person influenced another sector/person.

Although there were many advantages, there were also some challenges, especially since this was one of the first times such a construction was used for regional flood defenses. The collaboration was difficult sometimes because it was the first building team with this contractor. The contractor stated that to have all benefits a building team should be utilized more than once. In that way, the relationship with the client improves, as you learn to trust each other, and become more aware of each other's stakes and expertise (R5).

Nevertheless, the instrument was seen as valuable for improving spatial quality. The stakeholder manager explained that in this way, the client has more influence on the actual design and the spatial quality in the design (R4).

#### Subsidies

In the implementation phase, DTV consultants discovered that the improvement of the bicycle lane and the sidewalk met the requirements for the subsidy of Vervoerregio Amsterdam. The subsidy was granted, the costs of the bike lane were partly compensated (R2). This created opportunities, as more money was available. Overall, the subsidy was viewed as positive for strengthening spatial quality.

The subsidy was not requested earlier in the process because it was unknown to the project team that there was a subsidy. It would be beneficial to look into subsidies earlier and on a higher level (e.g. program level), so it is not explored separately in every project (R3, R4).

#### **The Voorweg case**

##### Contract

The contract type that Rijnland used was a UAV contract (*Uniforme administratieve voorwaarden*). In this contract type, the contractor is only responsible for the execution of the project. For the specifications a RAW Bestek was used, meaning that the client responsible for the description of the 'what', 'where', and 'under which terms', and that the contractor is responsible for the 'how' and the 'with which' (CROW, 2020). This contract type and specifications are common for regional flood defense projects (R6, R8). Spatial quality was not per se stimulated by the contract type. However, it was safeguarded in the set of requirements. The contractor stated that there was *"a hard set of requirements. This is how we want it to look like. That was described very clear; there were no loose ends"* (R6).

The contractor noted that the number of cross-sections (*dwarsdoorsnedes*) they received was very high and with great detail: *"normally we receive 10 or 20 cross-sections, in this project we received 197. That showed the detail in which they considered personal situations"* (R6). However, it was not all strict. Rijnland provided room and financial freedom to fix unforeseen situation, also related to spatial quality

(R6). Next to that, the contractor also noted that to safeguard spatial quality, the client should emphasize it in the assessment, and make the contractor eager to add it (R6).

The project manager (R8) explained that there is a difference between primary and regional flood defenses. With primary flood defenses contractors are large companies that can hire all types of expertise. Often their contract type requires more than constructing (e.g. design, finance, maintain). With regional flood defenses, these contractors are a lot smaller. They are used to only constructing a project and do not have the capability to hire extra expertise. The stakeholder manager explains: *“If you deliver an incomplete design to regional contractors, you should not expect them to finish your design or to add spatial quality. They are solely responsible for the construction”* (R8). Thus, defining spatial quality and delivering these clearly in the designs to contractors is essential to safeguard it in the implementation.

### **Reflection and comparison**

In the cases of the Wheredijk and the Voorweg different treasure instruments have been utilized.

First, a building team was established in the Wheredijk case. The contract with the contractor entailed both the building team and the implementation. Thus, the contractor was partly responsible for the design (together with HHNK) and was entirely responsible for the construction. In this way, the gap between the plan elaboration phase and the implementations phase was reduced. This is because the project team had more influence on what was included in the final design, including elements of spatial quality. Moreover, the contractor could use their practical knowledge to make a feasible design. In that way, spatial quality objectives that are often cut in the implementation due to pressure on time and money (Busscher et al., 2019) could be safeguarded in the implementation.

Compared to the more innovative contract type of the Wheredijk, the Voorweg case used a more traditional contract in which the contractor was solely responsible for the construction. Nevertheless, spatial quality was still incorporated in the implementation. Rijnland did this by making highly detailed specifications. The designs were accurate to the centimeter (R6, R8). Rijnland delivered a design for every plot. In that way, the assignment was made explicit to the contractor. Still, room was left for the contractor to handle unforeseen circumstances. The contractor stated it was a good mix of rigid specifications and room to handle uncertainties (R6). What is striking is that literature often emphasizes that spatial quality is more likely to be created in more innovative contract types (see Verweij et al., 2021; Lenferink et al., 2013). In this case study, that is not the case. Spatial quality was extensively safeguarded using a traditional contract.

Second, a subsidy was granted in the Wheredijk case. The subsidy helped to finance measures that enhanced spatial quality in the project. Internally, this helped to create support for the project. According to multiple interviewees (R2, R3, R4), it would be beneficial to explore subsidies on project level to stimulate the use of such subsidies, and to prevent that every project has to look into these subsidies on their own.

#### 4.4 The applied policy instrument mixes

In the sections above the different instrument mixes utilized in the Wheredijk case and the Voorweg case have been discussed. In Figures 11 & 12 below, these instrument mixes are presented schematically.

The instruments mix of the Wheredijk can be seen as an 'Ad hoc - along the way'. Due to the urgency of the project, the instruments were not chosen before the project. Choices on instruments and objectives on spatial quality were made during different phases of the project. An example is the subsidy that was applied for when the project was already in the implementation phase. This approach did allow HHNK to be innovative. An example is the building team, this was an integrative contract that is not often applied in regional flood risk management.

The instruments mix of the Voorweg can be seen as 'All the way - from the beginning'. At the start of the project it was clear that spatial quality would play a big role. It was decided early in the project that a landscape architect, a spatial quality framework, and citizen participation would be important instruments. Next to that, the amount of instruments they carefully applied is extensive.

##### Instrument mix of the Wheredijk

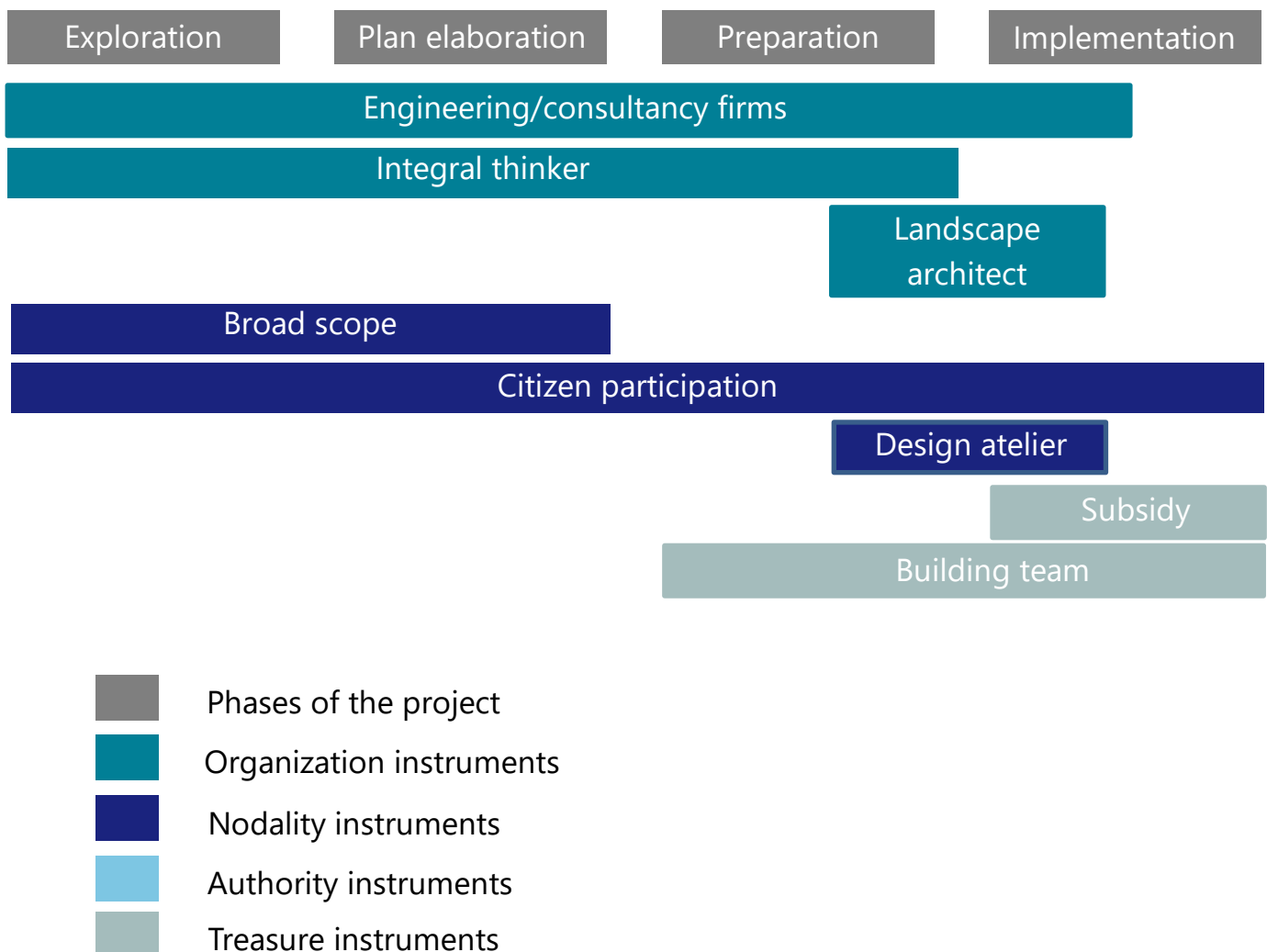


Figure 11: The instrument mixes of the Wheredijk case (author)

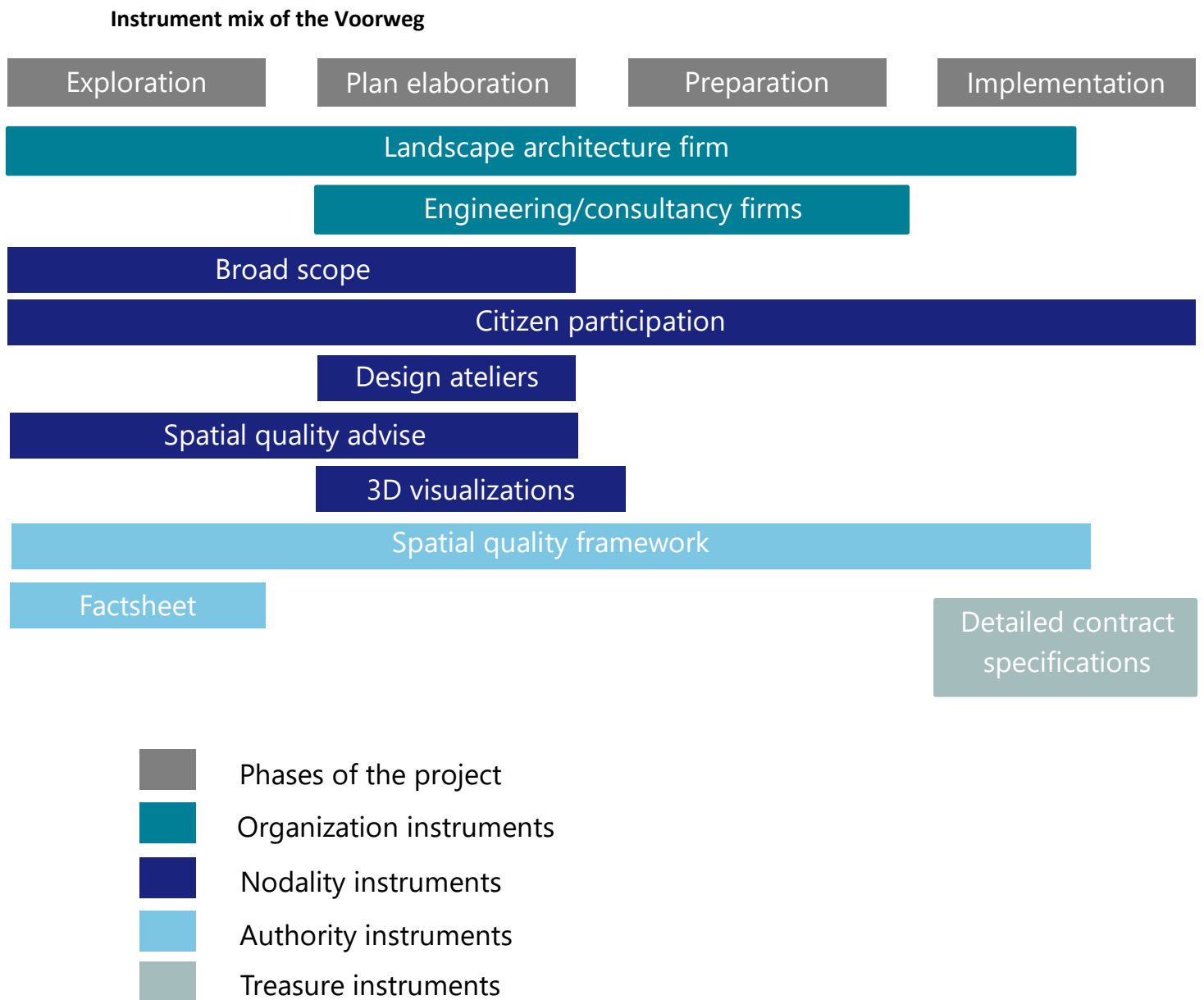


Figure 12: The instrument mixes of the Voorweg case (author)

## Chapter 5 Regional flood risk management and spatial quality

In this chapter an overview is given on how regional flood risk management is currently being governed, and what the main differences are compared with primary flood defenses. Additionally, the role of spatial quality in regional flood risk management is discussed, along with the barriers and opportunities for strengthening spatial quality in regional water safety projects. The data of this chapter is retrieved from the interviews and especially the focus group discussion (Focus group data, see Appendix 2). Together, these results provide an answer to the fourth sub-question: How is spatial quality being considered in regional flood risk management, and what are barriers and opportunities for strengthening spatial quality in regional flood risk management?

### 5.1 The context of regional flood defenses and spatial quality

The provinces are primarily responsible for developing safety norms for regional flood defenses in close collaboration with the waterboards (IPO & Unie van Waterschappen, 2005). In turn, the waterboards and regional departments of Rijkswaterstaat are legally obliged to ensure that regional flood defenses meet the safety requirements and that the management and maintenance is carried out (IPO & Unie van Waterschappen, 2005). Regional flood defenses are inspected periodically. When regional flood defenses do not meet the safety norm, waterboards add them to their program for improving regional flood defenses. Furthermore, regional water safety projects are somewhat different from primary flood defenses. Below the main differences are discussed.

First, the phases and safety norms of the regional water safety projects are rather flexible (R3, R7, R8). In regional flood defenses the boundaries are not as rigid as compared to primary flood defenses. There is no established way for the project's phases, it can differ per waterboard (R3). This is mainly because fewer permits and subsidy procedures are required. Moreover, the technical requirements and standards are less strict since the damage is much lower when a dike breaches as compared to a primary flood defense. The stakeholder manager of the Voorweg mentioned: *"you are not as strictly bound to the safety norms. This also makes that you can have discussions with your technicians, and say: maybe this is not completely according to the norm, but in light of spatial quality, we can be a bit more flexible on the safety norms on this location"* (R8).

Second, the finances are arranged differently. Primary flood defenses often receive subsidies or funding from the government. For example, the government covers 50% of the projects' cost in the Hoogwaterbeschermingsprogramma. In contrast, waterboards have to fund regional flood defenses. The technical manager of the Wheredijk stated: *"you only have the budget for your primary task, which is water safety"* (R3). For other objectives, such as spatial quality, waterboards need to find co-financing and thus collaborate with other parties.

Third, regional flood defenses are less visible in the landscape (R3). The function of the primary flood defense is much more visible. Furthermore, regional flood defenses often contain multiple assigned functions in the zoning plan, and citizens live closer to or on the flood defense (R3, R8). The technical manager of the Voorweg indicated that less visibility and multiple functions make it harder for stakeholders to understand the urgency of flood defense projects. Next to that, she stated: *"it is strange that, if you look at how many functions and inhabitants regional flood defenses sometimes have, that we participate and collaborate less with citizens in regional flood defenses projects (as compared to primary flood defenses)"* (R3).

## 5.2 The role of spatial quality in regional flood risk management projects

When asked how much spatial quality plays a role in regional flood defense projects on a scale of one to ten most experts answered with a six (Focus group data, see Appendix 5). According to the interviewees and water experts, there are multiple reasons why spatial quality is, or is not, prioritized in regional water safety projects. The three most mentioned reasons are elaborated below.

First, the prioritization of spatial quality depends on the persons involved in the project team (R3, R4, R5, R8, R10). The process leader area development of waterboard Rijnland noted: *“whether spatial quality is prioritized is partly dependent on the stakeholder managers and project manager involved. It depends on the affinity and knowledge of the people involved on spatial quality, as it is not an obligatory part of projects”* (R10). Hence, it matters how the project team values spatial quality. The contractor mentioned that when the project team is very technical, everything will be subordinate to the water safety function. However, he also mentioned that there are teams that do consider the area in which the project takes place (R5). In other words, there has to be an intrinsic motivation to safeguard spatial quality (R7).

Second, the waterboard plays a significant role. The stakeholder manager of the Wheredijk, who worked with various waterboards, stated that it differs per organization how much attention is paid to spatial quality (R4). The landscape architect confirmed this: *“there are differences between waterboards, some are more traditional and pay less attention to spatial quality, and other waterboards do prioritize it more and have experience with considering spatial quality in an integral way”* (R7).

Third, it depends on the characteristics of the regional flood defense project. The project manager of the Voorweg explained that when there are many historical/archeological objects in the zoning plan or protected cityscape, spatial quality is more likely to be prioritized (R8). From the project teams' perspective, it is easier to require the necessary resources for improving spatial quality, as there is a valid reason to use them (R8). The stakeholder manager agrees: *“I often see that there has to be a clear reason to prioritize spatial quality, otherwise it is not always considered”* (R4). Furthermore, spatial quality is considered more often, if the project has more stakeholders and a high impact on the environment (R7, R8).

## 5.3 Barriers for strengthening spatial quality

Although spatial quality is getting more attention in flood risk management, some barriers prevent the strengthening of spatial quality in practice. Many barriers correspond with the theoretical barriers discussed in Section 2.3. The most prominent barriers mentioned during the focus group discussion and the interviews are a lack of money and time, a sectoral mindset or organizational structure, a lack of ownership, limited collaboration with other governments, and a lack of policy and a vision.

One of the most mentioned barriers is the interplay between money, time, and the prioritization of spatial quality (Focus group data, see Appendix 5). The technical manager of the Voorweg stated that HHNK would want to strengthen spatial quality, but: *“we do not act upon it yet. This is mainly due to how streams of money are directed internally”* (R3). She explained: *“financing is essential in getting things done. If you want to create spatial quality, but there is no money, it will become difficult to create it”* (R3). It is currently not a priority in regional water safety projects. Therefore, when the pressure on time or budget increases, the focus is redirected to the water safety objective. Moreover, waterboards fear that if they pay more attention to the area and include spatial quality, more time and money is

required (R7). However, interviewees state (R2, R7, R8, R10) that costs made for research on the project area, participation with stakeholders, and raising the quality of the area, were won back in the implementation phase, as the project will have more support and thus face less resistance.

Next, professionals frequently referred to the sectoral structure of the organisation and the sectoral mindset that is sometimes present in the water sector. In the focus group discussion, experts mentioned *“a limited view in the organisation”* and *“change is difficult”* as barriers for creating spatial quality. The main task of water safety always has priority and technical aspects are often still leading (R3, R4, R5, R8). The technical manager explained that waterboards wish to look broader and more integral, but: *“that is not what many water practitioners do, they just look at the technique ... the technique is leading and spatial quality is seen a bonus”* (R3). Therefore, the area and its qualities are not always considered. However, there is an ambition to approach water safety project more holistic and integral, but currently the right instruments and organizational structure are not there yet (R3).

Furthermore, a lack of ownership of spatial quality can be identified in practice. Provinces, municipalities, and waterboards all have their responsibilities. None of these governments is directly responsible for spatial quality, which makes it difficult to hold someone accountable for it. The water safety advisor noted: *“we are a functional government organization and our primary responsibility is water safety, spatial quality is not our primary task”* (R2). Often these responsibilities are not completely clear. The contractor of the Wheredijk (R5) mentioned that a barrier in practice is that governments do not know exactly who is responsible for which area or function and thus who will pay for it.

Moreover, there is a lack of policy and general vision on spatial quality. Both HHNK (2021b) and Rijnland (2022) do not explicitly mention spatial quality in their general water policy. Still, progress is being made because climate adaptation, sustainability, and biodiversity are mentioned in both programs, which links to spatial quality. Moreover, some waterboards, such as Brabantse delta, do explicitly mention spatial quality along with three reasons (historical, organizational and juridical) why waterboards do have a responsibility in strengthening spatial quality (R10). Nevertheless, waterboards still lack general policy and *“miss an umbrella for spatial quality”* (R4).

The last barrier is the lack of collaboration among governments. This barrier links with the ownership and the lack of vision. Collaboration between governments is essential in safeguarding spatial quality, because looking more integrally often means the involvement of multiple sectors. Currently, not all collaboration between the governments run smoothly (R6). Governmental organizations have their own way of working, as they have different organizational structures and different financial systems. An example is the policy of the municipality to preserve trees, while the waterboards generally want no trees on their flood defenses. These differences can make it difficult to cooperate (R3).

## **5.4 Opportunities for strengthening spatial quality**

In practice there are also opportunities to increase spatial quality. Interviewees and the participants in the focus group discussion mentioned multiple conditions that could help to enhance spatial quality in water safety projects. Furthermore, successes were found in the best practices that other water professionals could apply to safeguard spatial quality. The opportunities most mentioned are taking an integral perspective, developing a clear framework, better collaboration with governments, creating more awareness, and creating support via participation. These are discussed below.

Multiple interviewees mentioned the importance of a more integral and area-based perspective (R2, R3, R4) on a higher level (e.g. program-level or organisation-level). The technical manager of the Wheredijk noted: *“We should look more at spatial planning (ruimtelijke ordening), infrastructure, and water of an area. What multi-annual assignments are present in that area, and how do they overlap? If you look at that more holistically on a program level, you could start working smarter in your projects”* (R3). Moreover, the importance of a vision is emphasized, as the stakeholder manager of the Wheredijk explained: *“currently, all waterboards want to do something with biodiversity or nature, but they consider it separately in different projects. That does not work: it is a network, not a stamp, you have to make a vision”* (R4). A vision or general guidelines would be beneficial for spatial quality, as it helps in requiring focus. Then project teams do not have to reinvent the wheel every time (R4).

Furthermore, it was argued that a clear framework for spatial quality would be beneficial (R3, R4, R10). Currently, spatial quality is not structurally considered at the start of regional water safety projects. Moreover, what spatial quality means in a project is often unclear to project teams. Therefore, there is a need for a clear framework that can be considered at the beginning of projects. The stakeholder manager of the Wheredijk stated: *“It would help if there was some sort of standard on spatial quality with the different elements that project teams could use”* (R4). The process leader area development (R10) mentioned that spatial quality should be an obligatory part of the decision-making at the beginning of the project, to ensure that informed decisions can be made on whether spatial quality should or should not be prioritized in the project.

Moreover, better collaboration and communication with governments are essential (R2, R3, R4). Collaboration and communication are essential in finding synergies and in sharing ownership of spatial quality. The water safety advisor of the Wheredijk noted: *“The idea of governments is that, together you have to have a conversation with each other on how spatial quality can be realized”* (R2). It would help if governments shared their future spatial assignments or projects with each other. In that way, governments could collaborate (R2). Furthermore, agreements could be made on who is responsible for safeguarding spatial quality in specific situations.

Next, creating awareness on spatial quality within waterboards is important (R8, R10). By creating awareness, water professionals are more conscious of the importance of spatial quality and learn how it can be safeguarded in projects. An example is the process leader area development (R10), who is responsible for creating awareness for spatial quality within Rijnland. As stated above, he created a factsheet on spatial quality. Additionally, informative sessions with all stakeholder managers were held in which the factsheet and best practice examples were discussed. According to the process leader area development (R10) the stakeholder manager has a crucial role: *“Within the project team the stakeholder manager has an important role. They are the spiders in the web. They assess the situation of the area and can assess whether tailored designs are necessary, or whether the area is listed as valuable in the zoning plan”*. Therefore, project member must keep spatial quality in mind, as it has to become part of the project’s scope (R10).

The last opportunity entails participation with stakeholders and inhabitants of the area (R8, R9). Participation was one of the most mentioned opportunities for improving spatial quality (Focus group data, see Appendix 2). By participating, regional interest can be incorporated, which adds to the spatial quality of the project. Moreover, involving stakeholders early while truly considering their suggestions, increases support for the project (R8, R9). The project manager of the Voorweg stated: *“By paying serious attention to the interest of stakeholders, you will create support and a positive vibe. That also generates money, both in the process and preparation. It also enhances the image of Rijnland”* (R8).



Nevertheless, participation is primarily beneficial in complex projects with many stakeholders. Simple straightforward projects require less participation (R8, R10).

## **5.5 Conclusion**

In conclusion, this chapter discussed regional flood risk management and spatial quality. Several differences between primary and regional flood defenses were found. Regional flood defenses are less bound to the safety norms, receive less budget for objectives other than water safety, and are less visible in the landscape. Furthermore, the role spatial quality plays in regional flood risk management is specified. The findings show that the composition of the project team, the waterboard in which the project takes place, and the characters of the project influence whether spatial quality is prioritized. Moreover, several barriers and opportunities were found for improving spatial quality in regional flood risk management. The next chapter will discuss how these findings relate to the research questions of this thesis.

## Chapter 6 Conclusion

The aim of this research was twofold, namely: to analyse how spatial quality is currently integrated in regional flood risk management projects and to analyse how different policy instrument are applied to strengthen spatial quality. The first step in this research was to conceptualize spatial quality and to identify and operationalize what type of policy instruments could be applied to increase spatial quality in the flood risk management. This was done through a literature research. Subsequently, the empirical part of this research consisted of a comparative case study. Two regional flood risk management projects that were considered to be best practices by partitioners were selected: The Wheredijk case and the Voorweg case. The data of this case study was collected through semi-structured interviews, a document analysis, and a focus group discussion. In this chapter, the final link will be made between all research questions. First, the research sub-questions will be answered, after which an answer is provided to the main research question. This results in recommendations for other regional flood risk management projects. Subsequently, a reflection is provided on the theoretical approach and methodology used in this research. Finally, suggestions for further research are formulated.

### 6.1 Answering the research questions

In this section, answers will be provided to the sub-questions. Ultimately, the answers to the sub-questions provide an answer to the main research question.

#### *1. How can spatial quality be defined in the context of flood risk management?*

As explained in Section 2.3, spatial quality is hard to define as it has objective and subjective elements (Hooimeijer et al., 2001). Still, there are common ways to define it. Vitruvius laid out the foundation for defining spatial quality with the Vitruvius Triad, containing *Utilitas* (utility), *Venustas* (beauty), and *Firmitas* (Firmness). Several scholars (e.g. Hooimeijer et al., 2001) translated these dimensions into user value, experimental value, and future value. This research used these dimensions as the main pillars of spatial quality and based its further conceptualizations on a combination of scholars (AT Osborne, 2021; Busscher et al., 2019; Hooimeijer et al., 2001; Klijn et al., 2013). These dimensions of spatial quality could be recognized in the qualitative findings. Both cases prioritized different dimensions in their projects. In the Wheredijk case, no initial objectives or definitions on spatial quality were formulated. The findings indicate that spatial quality became more important as the project progressed. All dimensions (user-, experiential-, future value) were strengthened. However, the most prominent dimension was the user value, as one of the most crucial factors was how all functions could be integrated. In the Voorweg case, spatial quality was prioritized and defined at the beginning of the project. Similar to the Wheredijk case, the Voorweg case contributed to all elements of spatial quality. The most notable dimension was the experimental value, as their primary objective was to safeguard the cultural-historical authentic ambiance of the area.

#### *2. What policy instruments can be distinguished in flood risk management and how can they help to strengthen spatial quality in flood risk management projects?*

Policy instruments were defined as tools to translate abstract policy goals to implementation in practice. In flood risk management, instruments can be used to improve spatial quality (Verweij et al., 2021). Therefore, this research operationalized and identified policy instruments that could strengthen spatial quality in flood risk management. To structure them, Hood's (1983) NATO typology was adopted, consisting of nodality, authority, treasure, and organization. Multiple policy instruments for strengthening spatial quality in flood risk management were already identified in different scientific papers. Additionally, this research identified new policy instruments using grey literature. The instrument rose in Figure 13 illustrates the operationalized instrument. The policy instruments that

were found in scientific literature are presented in white. The policy instruments added by this research using grey literature are presented in orange, and the policy instruments added by the empirical part of this research are presented in green.

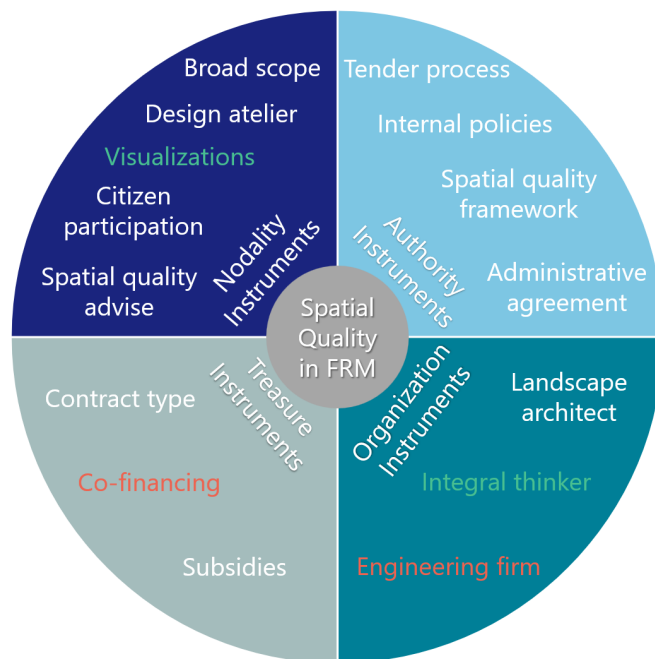


Figure 13: The instrument rose with additions (author)

### 3. Which policy instruments for strengthening spatial quality have been applied in regional best practices, and what lessons can be drawn?

In the cases of the Wheredijk and the Voorweg, many policy instruments were used that contributed to spatial quality (see Figures 11 & 12). Concluding remarks are made on the use of the policy instruments in the context of both cases, following the NATO structure.

#### Organization: more than landscape architects as boundary spanners

In this study, organization instruments were defined as hiring expertise with regard to spatial quality, with the hypothesis that both landscape architects and engineering firms could function as ‘boundary spanners’ (see Section 2.5.4). While both instruments were applied in both cases, they differed to which extent they functioned as boundary spanners. The boundary-spanning role of landscape architects described in literature (see Roe, 2011; Van den Brink et al., 2019) was confirmed in both cases. In the Wheredijk case, the landscape architect had a more traditional role, spanning physical and mental boundaries while focusing on the project’s design. In the Voorweg case, the landscape architect also had a process-oriented role in which the landscape architect was involved in facilitating an inclusive design process. The landscape architect functioned as a bridge between the technical aspects and the area with its stakeholders. In contrast to what grey literature implied (see Conijn & Bijman-Van den Dungen, 2021), engineering firms did not fulfill a boundary-spanning role. Hired engineering firms contributed to spatial quality in both cases. However, their contribution to spatial quality was often indirect by supporting or facilitating other policy instruments. For example, in the Wheredijk case where DTV Advies discovered that HHNK could apply for a subsidy. Another notable finding was the integral thinker in the Wheredijk case. This person supported the project team in taking a more integral and broad perspective, as he brought up different objectives that could be combined

with the water safety objective. In that way, the integral thinker could be seen as a boundary spanner. Therefore, this thesis suggests that, next to the landscape architect, other players can play a boundary-spanning role concerning spatial quality in flood risk management projects.

#### Nodality: broad scope, participation, and visualizations as success factors

The findings show that considering a broad scope was an essential instrument in both cases. Considering a broad scope was beneficial as it helped project teams of the Wheredijk and the Voorweg to look further than the water safety objective, consider the project's environment, and explore synergies. For example, in the Wheredijk case, a broad scope helped in seizing windows of opportunities to connect the water safety project with other developments. Furthermore, in both cases citizen participation was highly valued as an instrument for safeguarding spatial quality. It was a tool for collecting local perspectives on the project's area and spatial quality. Especially in the Voorweg case, the extensive attention to individual wishes and input improved the project's design and increased support for the project. Another remarkable finding in the case of the Voorweg was the success of the visualization instrument. Visualizing the design helped to improve the design, because it showed aspects of the design that were not visible on technical maps. Moreover, the visualizations allowed for better communication of the design to the inhabitants. This aligns with Metze (2020), who stated that visualization positively affects the perception of problems and public participation. This instrument was not identified in the theoretical framework and could be added to the instrument rose.

#### Authority: the need for general policy guidelines and constantly revisable project frames

As mentioned in Chapter 2, to strengthen spatial quality there must be an ambition to strengthen spatial quality, and an agreement on what spatial quality entails (Hartman et al., 2016). This study found that waterboards often do not have policy guidelines for improving spatial quality in regional flood risk management. Additionally, it is often unclear for project groups how to handle or define spatial quality in their projects. In the case of the Voorweg, two instruments were found that helped to overcome these problems. On organization level, a factsheet on spatial quality served as a tool for dissimilating knowledge on incorporating spatial quality into flood defense projects at the start of water safety projects. Although the document was not binding, it did provide guidance on how spatial quality can be safeguarded. On project level, the landscape architect created a spatial quality framework to define spatial quality in the project's context. By establishing clear guidelines, the spatial quality framework created a narrative that eased communication with stakeholders. For this instrument to be successful, the framework was constantly revisited and prioritized.

#### Treasure: building teams and traditional contracts as promising instruments

In this research, treasure instrument were defined as the use of economic means. In the cases, the contract type was the most prominent treasure instrument. An interesting finding is that spatial quality was safeguarded with both an innovative and a traditional contract type. In the Wheredijk case, a building team was set up in which the contractor and HHNK worked together toward a final design. This innovative contract type helped realize (implicit) spatial quality objectives formed in previous planning phases in the implementation phase. Thus, the Wheredijk case overcame the earlier mentioned problem of objectives other than water safety being eliminated in the implementation phase (Busscher et al., 2019). In contrast, the Voorweg case employed a traditional contract. To safeguard spatial quality, Rijnland created highly detailed specifications for the contractor. A cross-section design was made and delivered to the contractor for every plot. In this way, the contractor had to execute the spatial quality objectives. This finding contradicts the statements of Verweij et al. (2021) and Lenferink et al. (2013), who expected that spatial quality is more likely to be created in more

inclusive contract types. It shows that traditional contracts can also safeguard spatial quality by delivering clear and extensive specifications.

*4. How is spatial quality being considered in regional flood risk management, and what are barriers/opportunities for strengthening spatial quality in regional flood risk management?*

In this thesis, multiple factors were found that influence whether spatial quality is considered in flood risk management projects (see Section 5.1.2). First, it depends on the knowledge and intrinsic motivation of the project team to improve spatial quality. Second, the type of waterboard executing the project is important, as there are more traditional and progressive waterboards. Third, it depends on the characteristics of the project. For example, cultural-historical values in an area often raise the importance of strengthening spatial quality. Furthermore, multiple barriers and opportunities were found for strengthening spatial quality in flood risk management (see Sections 5.3 & 5.4). These are summarized in Table 4. The barriers found overlap with the barriers identified in Section 2.3.3 (see AT Osborne, 2021; Busscher et al., 2019; Klijn et al., 2013; Verweij et al., 2021).

*Table 4: Summary of barriers and opportunities for strengthening spatial quality*

<b>Barriers (source of confirming literature)</b>	<b>Opportunities for waterboards</b>
1. A lack of time and money	1. Use a more integral and area based approach
2. Sectoral structure of the waterboard and sectoral mindsets of practitioners	2. Create awareness of spatial quality within or between waterboards
3. A lack of ownership of spatial quality	3. Collaborate and communicate with other governments to find synergies and share ownership
4. Little general policy on spatial quality and a lack of general vision	4. Create and use a clear framework for spatial quality at the start of the project
5. Lack of collaboration between governments	5. Participate with stakeholders and inhabitants to include regional and local interests/perspectives

***Main research question: How can policy instruments enable the strengthening of spatial quality in regional flood risk management?***

This research found that policy instruments can improve spatial quality in regional flood risk management. In the best practice cases, both waterboards applied multiple policy instruments to increase spatial quality. Section 4.3 showed how waterboards applied policy instruments and how these instruments contributed to spatial quality. Just like Verweij et al. (2021) stated, there was no single policy instrument that in itself was sufficient or responsible for increasing spatial quality. Eventually, the combination of instruments and the context in which they were utilized were important in safeguarding spatial quality. The Wheredijk case had a more ‘ad hoc – along the way’ strategy, where spatial quality objectives and policy instruments were formed along the way. In contrast, the Voorweg case had an ‘all in – from the beginning’ approach, as they had clear spatial quality objectives from the beginning and applied many instruments.

Instruments valued greatly in the Wheredijk case and the Voorweg case which contributed directly to spatial quality were employing a landscape architect (or another boundary spanner), citizen participation, considering a broad scope, making visualizations, creating a spatial quality framework, and the contract type. During the case study, two new policy instruments were found that supplement the policy instrument rose created in the theoretical framework. These are the 3d visualizations and an integral thinker (See Figure 13, the orange instruments).

Generally, flood risk management professionals expressed that spatial quality is important and should receive attention. However, the context of the water sector and the project-specific context in which the policy instruments are applied are not always conducive to improving spatial quality (see the barriers in Table 4). In Section 6.2, recommendations are formulated on how spatial quality can be strengthened in regional flood risk management and how waterboards can create a more stimulating environment where policy instruments can be used to their full potential.

## **6.2 Recommendations for spatial quality in regional flood risk management**

Based on the conclusions above and the barriers and opportunities (see Table 4), this section proposes recommendations to safeguard spatial quality in regional flood risk management projects, and to improve the context in which policy instruments are employed. These recommendations are geared towards the Dutch waterboards on regional flood risk management. The following recommendations are proposed:

- *Adopt a more integrated and area-based approach*

For spatial quality to become more prominent it is advised to approach the water safety projects more integral and area-based. This means not only focusing on the technical side of the project, but also considering the area and its developments. A policy instrument waterboards can use to adapt a more integrated and area-based approach is considering a broad scope at the beginning of projects. In that way, possible synergies can arise, and developments or projects in the area can be bundled. This does require more collaboration and communication with local and regional governments and stakeholders. Another policy instrument that can be used for this purpose is employing a landscape architect or 'integral thinker'. Having a project team member with a broad background can help in looking beyond water safety objectives. In that way, the water safety objective can be reached while simultaneously improving the projects' area.

- *Consider spatial quality on program level*

Currently, spatial quality is usually considered on project level. However, considering spatial quality on program level would be more beneficial. The primary flood defense projects are already part of such a program (HWBP), in which financing, visions, and objectives on spatial quality are mostly arranged on program level. Rijkswaterstaat and the 21 waterboards could form a similar program for regional flood defenses. In that way, spatial quality objectives could be made on a larger scale, and policy instruments for strengthening spatial quality could be explored and advised. Creating such a program will prevent project teams from reinventing the wheel every time. Furthermore, many water professionals are still struggling to include spatial quality in regional flood risk projects. The program could help to disseminate knowledge on how to successfully strengthen spatial quality, by for example, sharing best practices, creating factsheets and guidelines, and giving workshops. This would allow waterboards to learn from each other and share information on how to improve spatial quality.

- *Define or concretize spatial quality in projects*

Currently, spatial quality is often not concretized in projects. It is difficult to achieve or strengthen spatial quality when it is not explicitly defined. Therefore, spatial quality should be made concrete to the context of regional flood risk projects, so that concrete actions can be taken to strengthen spatial quality. A policy instrument that can help achieve this is the spatial quality framework. In the case of the Voorweg, a spatial quality framework was made in which the area's qualities were explored, and concrete guidelines were provided to strengthen these qualities. In concretizing spatial quality an

interactive process is favored. By including stakeholders and inhabitants their perspectives and wishes regarding the area can be incorporated. This could lead to more supported designs.

- *Institutionalize (soft) policy regarding spatial quality*

Currently, spatial quality is not included in the general policy of most waterboards. Therefore, strengthening spatial quality is not considered a standard practice in regional flood risk management projects. It is mainly seen as a bonus. However, some waterboards do have soft policies on spatial quality (e.g. the factsheet on spatial quality from Rijnland). It is recommended to institutionalize soft policy on spatial quality and to include spatial quality in the waterboards' general policy to strengthen the position of spatial quality. Waterboards can do this by giving spatial quality a place in the water management plan (*waterbeheerprogramma*). This will give practitioners a reason to pay more attention to spatial quality.

- *Acquire financing and assure spatial quality via treasure instruments*

An frequently mentioned barrier was the lack of financing. To acquire sufficient financing, waterboards could collaborate with other governments or stakeholders to acquire co-financing. Collaborations with other parties are crucial in this. By taking a broader perspective, as advised above, multiple projects or developments could be bundled and costs can be shared. Additionally, provinces or other organizations often have subsidies available that contribute to aspects of spatial quality. Furthermore, waterboards can also utilize the contract type to safeguard spatial quality. Both cases were successful in this by either using a more traditional contract with extensive specifications on spatial quality, or by using a more integrative contract in which the waterboard safeguarded the spatial quality by collaborating with the contractor.

### **6.3 Theoretical reflection and contributions to literature**

In this research, I mainly used literature regarding spatial flood risk management (Van der Brugge et al., 2005; Van Ruiten & Hartmann, 2016), spatial quality (Hooimeijer et al., 2001; Klijn et al., 2013), and policy instruments (Hood, 1983; Howlet, 2000). Spatial flood risk management was discussed to show the developments within flood risk management and to position the increasing attention for spatial quality in the water sector. Theories on spatial quality were explored to understand the fuzziness of the concept, and to operationalize the concept for flood risk management. Operationalizing the Vitruvius triad (user, experimental and future value) was very helpful, as it eased the categorization of the different spatial quality elements in the case studies. Next, policy instrument studies helped to define policy instruments and to categorize the instruments using the Hood's (1983) NATO typology. On that foundation, different policy instruments for strengthening spatial quality in flood risk management were operationalized. Using the NATO typology had many advantages, it enabled the categorization of policy instruments based on governments resources. It also allowed for comparison between the two best practice cases. However, a difficulty of using the NATO typology is that the boundaries between the categories are not rigid. Therefore, some policy instruments could be located in different categories, depending on the argumentation. An example is the building team, which could be seen as a contract type, categorized under treasure, as well as a formal collaboration between HHNK and the contractor, categorized under authority instrument.

This study contributed to planning theory in multiple aspects. First, a contribution was made to literature on regional Dutch flood risk management. Until now, research was mostly aimed at primary flood defenses (e.g. Rijke et al., 2012; Van Herk et al., 2015). This study showed the current practices of regional Dutch flood risk management. Second, this thesis contributed to planning theory by

exploring how spatial quality can be achieved in the planning process of flood risk management, as research has been largely ignorant of that (Busscher et al., 2019; Nillisen, 2019). Knowledge is acquired on how policy instruments can be utilized in the planning process to increase spatial quality. Third, little research is geared explicitly towards spatial quality and policy instruments in flood risk management (apart from Busscher et al., 2019; Verweij et al., 2021). This study added to this field by operationalizing policy instruments that could be applied to strengthen spatial quality in flood risk management (Figure 3). Additionally, new instruments were found that could be added to literature, such as creating visualizations, and employing an integral thinker. Fourth, this research contributed to the boundary spanning literature in flood risk management (see Roe, 2011; Van den Brink et al., 2019; Van den Brink et al., 2022), as this study found that boundary spanning activities could possibly also be executed by persons other than the landscape architect.

#### **6.4 Methodological reflection**

In this comparative case study, possible cases were filtered using the selection criteria presented in Section 3.2.2. The expert-based survey was used as a tool to select best practices. An advantage of this expert-based survey was that inside information of experts could be required, as little information on regional flood risk projects was provided. However, a disadvantage was that the researcher had to rely solely on this expert knowledge. It could be that experts that filled in the form were biased, as they could fill in projects that they executed. Another point to reflect upon is the generalizability of the results. A comparative case study was used to acquire in-depth knowledge of how spatial quality was considered and organized within the project context. A disadvantage is that it is difficult to make generalizations based on two cases. No statistical generalizations can be made from this study (Taber, 2000). However, the analytic generalizations in qualitative research can provide 'guidelines' (Curtis et al., 2000). By choosing two cases, comparisons could be made between cases. Next to that, experts from different waterboards participated in the focus group discussion, giving insights into their organizations. Therefore, this study can give recommendations on how spatial quality can be strengthened in other regional flood risk management projects for waterboards.

Overall, the data collection went well. The semi-structured interviews provided enough room for the interviewees to add knowledge on topics that were discussed in the questions. Furthermore, it provided the freedom to adapt the interview to the function of the interviewees. The focus group discussion provided a more general view, as it helped to gather insights from different water experts who were active in different organizations. The only drawback was that the recording equipment failed during the interview with respondent five and the focus group discussion. To compensate, a report was made of both data collection moments. Moreover, data was available from the Poll Everywhere that was conducted during the focus group discussion (see Appendix 5). Therefore, this drawback did not significantly impact the data collection. In total, ten interviews were conducted. In the last few interviews there was a repetition of content. Hence, one could speak of data saturation.

#### **6.5 Suggestions for further research**

The first suggestion for further research is to look into other types of regional flood defense projects. In this research two best practices were analyzed, in which it was clear that the projects improved spatial quality. However, little research is conducted on how spatial quality is considered in regular and average regional Dutch flood risk projects. By researching this, more insights can be attained that can be generalized to regional flood risk management.



Second, more research can be conducted on the difference between how spatial quality is considered in regional flood risk management and primary flood risk management. In primary flood risk management, there are already some pretty good examples in which spatial quality is actively being pursued. Insights into differences between regional and primary flood defense projects could help translate good practices and useful instruments to strengthen spatial quality to the regional context.

Last, additional research could be done on the role of boundary spanners in increasing spatial quality in flood defense projects. The landscape architect and the integral thinker were identified in this research as boundary spanners. Both had much influence on how spatial quality was considered in the cases. Currently, research focuses on the role of the landscape architect. This research showed that people with other backgrounds could also carry out this role. Further research could investigate which people could function as boundary spanners within flood risk management projects.

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## Appendix 1: Interview Guide

Start	<ul style="list-style-type: none"> <li>- Kleine intro van mijzelf en het onderzoek</li> <li>- Vragen toestemming opnemen interview (toestemmingsformulier)</li> </ul>
Inleiding	<ul style="list-style-type: none"> <li>- Kunt u kort wat vertellen over uw achtergrond en uw relatie met het thema ruimtelijke kwaliteit bij regionale keringen?</li> <li>- Wat is uw functie in de organisatie en wat was uw rol in het project?</li> </ul>
Themablok A: Ruimtelijke kwaliteit	<ul style="list-style-type: none"> <li>- Wat is volgens u ruimtelijke kwaliteit? (los van het project)</li> <li>- In hoeverre wordt er bij regionale keringen op ruimtelijke kwaliteit aangestuurd? (door wie, hoe?)</li> <li>- Waarvan is het afhankelijk of ruimtelijke kwaliteit bij een regionale keringsproject geprioriteerd wordt?</li> </ul> <p><i>Project specifiek</i></p> <ul style="list-style-type: none"> <li>- Wat maakt dit project een <i>best practice</i>?</li> <li>- Hoe werd ruimtelijke kwaliteit gedefinieerd in het project?</li> <li>- Was er veel confrontatie / overeenstemming tussen actoren over de invulling van ruimtelijke kwaliteit in dit project?</li> </ul>
Themablok B: Beleidsinstrument	<p><i>Laat lijst met instrumenten zien (tabel vertalen en uitbreiden)</i></p> <ul style="list-style-type: none"> <li>- Wat voor instrumenten zijn er gebruikt in het project om ruimtelijke kwaliteit te verhogen? En in welke fase zijn ze ingezet?</li> <li>- Wat hield het instrument precies in en hoe zorgde de instrumenten ervoor dat ruimtelijke kwaliteit versterkt werd?</li> <li>- Waarom was dit instrument gekozen?</li> <li>- Wie waren hierbij betrokken?</li> <li>- Hoe hadden de instrumenten invloed op elkaar? (losstaand, versterken, tegenwerken).</li> </ul>
Themablok C: Evaluatie instrumenten en ruimtelijke kwaliteit	<p>Instrumenten</p> <ul style="list-style-type: none"> <li>- Hoe heeft u de instrumenten ervaren?</li> <li>- Hoe hebben ze bijgedragen aan het versterken van de ruimtelijke kwaliteit?</li> <li>- Wat waren de succesfactoren of barrières (failures) van de genoemde instrumenten?</li> </ul> <p>RK</p> <ul style="list-style-type: none"> <li>- Bent u tevreden met de invulling van ruimtelijke kwaliteit in dit project?</li> <li>- Zijn de ambities rondom ruimtelijke kwaliteit die gesteld zijn in de verkenning en planuitwerking ook uitgevoerd?</li> <li>- Zou u de volgende keer het creëren van ruimtelijke kwaliteit weer hetzelfde aanpakken of zou u de aanpak/instrumenten veranderen?</li> </ul>
Reflectie en afsluiting	<ul style="list-style-type: none"> <li>- Wat zijn nu de grootste kansen en dilemma's voor het integreren van ruimtelijke kwaliteit bij regionale keringen en welke veranderingen zou u graag zien om ruimtelijke kwaliteit bij regionale keringsprojecten in de toekomst beter te kunnen integreren?</li> <li>- Bedankt voor het beantwoorden van alle vragen. Heeft u zelf ook nog vragen of toevoegingen?</li> </ul>
<i>Snowballing</i>	<ul style="list-style-type: none"> <li>- Met wie zou ik volgens u nog meer moeten praten over dit project om meer te weten te komen hoe ruimtelijke kwaliteit bereikt is in dit project?</li> </ul>

## Appendix 2: Interview code book

Code groep	Deductief/ Inductief
Context	Regionale keringen (projecten)
Integral approach	Integrale aanpak Gebiedsgericht Systeem benadering
General – spatial quality	Ruimtelijke kwaliteit
User value - spatial quality	Bruikbaarheid Gemixte functie Bereikbaarheid Waterveiligheid Technische oplossing Verkeersveiligheid
Experiential value – spatial quality	Landschapswaarde Cultuur Identiteit Historische waarde Archeologische waarde Sociale veiligheid Recreatie Leefbaarheid
Future value – spatial quality	Robuustheid/flexibiliteit Beheer en onderhoud Duurzaamheid Ecologie/bouwen met de natuur
Nodality – policy instruments	Brede scope Participatie (inspraak, bewonersavonden, keukentafel gesprekken) Ontwerp ateliers Ruimtelijk advies
Authority – policy instruments	Administratieve overeenkomst Ruimtelijke kwaliteitskader
Treasure – policy instruments	Aanbesteding proces Contract type Cofinanciering Subsidie
Organization – policy instruments	Landschapsarchitect Engineersbureau Intern beleid Integrale denker/dwarsdenker
Barrières	Budget, geld Tijd Financieel system Sectorale houding Verantwoordelijkheid
Kansen	Kans Inspiratie

### Appendix 3: Translated Quotes

Quotes	Engels	Nederlands
<b>H4.2</b>		
R3	<p><i>'Given the available space it was impossible to broaden both the green stroke and the bicycle path. Everybody reasoned from their own personal needs and desires, which made it hard to show that not everything is possible and that consensus is required to keep the project going' (R3).</i></p> <p><i>'what is considered spatial quality for the waterboard, might not be spatial quality for the inhabitants' (R3).</i></p>	<p>Als je kijkt naar de beschikbare ruimte was het niet mogelijk het beide te verbreden. Iedereen kijkt vooral vanuit zijn eigen behoeftes en wens, en dan is het soms moeilijk om te laten zien dat niet alles kan en dat je tot een consensus moet komen om door te gaan.</p> <p>Dus het kan ook best zijn dat wat voor het waterschap voor de ruimtelijke kwaliteit is, voor de bewoner helemaal niet zo is.</p>
R3	<i>'In my opinion, the end result is the option that suited all wishes and requirements best. Then again, that does not mean that from every stakeholders perspective this was the highest achieved result, but it does mean it was the highest achievable for the wishes combined (R3)'.</i>	Volgens mij is het gene wat we hebben gemaakt het gene wat voor alle eisen en wensen die iedereen had, het beste inpasbaar was. Maar dat houdt dus wederom in, niet voor iedereen zijn perspectief is dus het hoogst gewenste resultaat gehaald. Maar wel voor alle wensen samen.
R1	<i>'It used to be a desolated pathway that you would avoid at night. Now it is a broad, open, and safe place' (R1).</i>	En dat was eigenlijk gewoon een beetje een verlaten paadje waar je 's nachts niet hoefde te lopen. Nu is het gewoon breed, open, en veilige plek
R8	<i>'we [Rijnland] did not define spatial quality as a client. When this project started we said: spatial quality is important. Then we called our contact at BoschSlabbers, he also asked what we thought it was. I replied: I have no clue, but we know it is important here, what do you think it entails? Then they started to create the spatial quality framework, which we adopted in our project. (R8)'</i>	Wij hebben niet van te voren gedefinieerd van dit is ruimtelijke kwaliteit vanuit opdrachtgever (Rijnland) gezien. Toen we dit project begonnen zeiden we: ruimtelijke kwaliteit is belangrijk. Toen hebben we gewoon eigenlijk heel simpel ons contact opgebeld van het bureau Bosch Slabbers..Toen vroeg hij hetzelfde. Ik zeg: nou ja ik heb geen idee. Het is gewoon belangrijk en wat denk jij dat het is. Dus toen is hij dat ruimtelijke kwaliteitskader gaan schrijven en dat hebben we gewoon overgenomen.
R6	<i>'Trough paying attention to this details the authentic ambiance of the Voorweg could be preserved (R5)'.</i>	Door die kleine details hebben ze kunnen bijdragen aan het authentiekere beeld van die weg [De Voorweg]
<b>H4.3</b>		
R4	<i>'We had asked the architect for a vision of the greenery of the environment to have a good basis on which we could have the difficult conversation with the municipality... with that image we could steer towards a common vision' (R4).</i>	We hadden een landschapsarchitect gevraagd om daar een visie op te zetten. Zodat we ook gewoon een mooie onderlegger hebben, zodat we ook het gesprek, dat moeizame gesprek zo met de gemeente bijvoorbeeld op tafel konden brengen, zodat je met mekaar het gesprek krijgt: van wat is nou hier de ruimtelijke kwaliteit? En kan je dat dan in beeld brengen aan de hand van een visie voor het gebied, zodat we daar ook met elkaar op kunnen sturen.
R4	<i>'The idea was that we would hire an external independent third party that could create a design, so that it would not be our story [HHNK], but the story of the landscape architect'</i>	het idee was wel dat we dus een externe en een-derde, bewust om een soort onafhankelijke partij te creëren. Niet wij als waterschap die eigen ontwerp maken, maar dat ik een-derde vraag om er een visie op te zetten, zodat het niet mijn verhaal is, maar het verhaal van de landschapsarchitect.
R2	<i>'DTV consultants actually found out that the project met all requirements of the subsidy Verkeersregio Amsterdam' (R2)</i>	Daar hielp het dat we DTV consultants aan boord hadden en dat zij eigenlijk ondervonden van dit project voldoet aan alle eisen van de subsidies van Vervoersregio Amsterdam
R1	<i>'We had an integral thinker in our team. It was someone that thought about things no one else thought about. He worked at different organizations, like 'Het waterschapshuis' and</i>	We hadden een dwarsdenker in ons team. Iemand die alle dingen waar een ander niet aan denkt op tafel legt. Een senior beleidsadviseur binnen HHNK, die ook veel bij het waterschapshuis heeft gewerkt, en ook veel met STOWA heeft

	<i>'Stichting toegepast onderzoek waterbeheer' (STOWA). He brought different things up that we could combine with the water safety objective, and also thought about spatial quality' (R1).</i>	opgetrokken. En omdat hij vaak hele andere dingen binnenbracht, kon je dat vaak mooi combineren met waterveiligheid. Hij was ook bezig met de ruimtelijke kwaliteit.
R2	<i>The Wheredijk was not a livable area, so I started to reason from the perspective of livability: what do you need then to design the area? (R2).</i>	De dijk was niet leefbaar. Ik ben vaak vanuit de functie leefbaarheid gaan redeneren. Wat heb je dan nodig om dat gebied in te richten.
R2	<i>'We [HHNK] are afraid that looking too broadly will cost us a lot of money. However, the opposite is true ... If you do not optimize the project, you will have to keep coming back. Because we were the first to come here, we had the opportunity to paint our perfect picture and improve the area' (R2).</i>	Waar we heel erg bang voor zijn is dat dat een hele boel geld kost, maar het tegenovergestelde is waar. Stel je maakt een kering die je niet helemaal optimaliseert, dan moet je steeds weer terug. Ik denk op het moment dat je daar toch als eerste langskomt, schets eerst het ideale plaatje dat voor jou als waterschap, en maak de omgeving beter in plaats van dat je het aan andere overlaat.
R8	<i>'Personally, I think that a landscape architect provides more broadness to a project, and provides more clear design choices. Landscape architects view things integral, instead of only looking at technology' (R8)</i>	Ik vind zelf dat het inschakelen van een landschap deskundige zorgt voor wat meer breedte in het project en ook duidelijkere ontwerpkeuzes. Ze kijken ook meer integraal, in plaats van als je alleen en uitsluitend naar techniek kijkt.
R10	<i>'The advantage of a landscape architect is that he has a feeling of what the environment means for people, but also understands the technical assignment. Moreover, landscape architects can visualize things, and can therefore translate between the technical engineers' language and the language of the people of whom the backyard is being teared up (R10)'.</i>	En het leuke van een landschapsarchitect is dat die natuurlijk gevoel heeft voor wat de omgeving voor mensen betekent, maar snapt ook de technische opgave en die landschapsarchitect kan ook dingen goed verbeelden, en kan daardoor dus eigenlijk heel goed vertalen tussen zeg maar onze technuten taal en de taal voor nou degene wiens achtertuin overhoop gaat.
R2	<i>'were very technical, they were constantly calculating technical aspects but did not consider the environment. My colleague and I had rewrite their work' (R2).</i>	dat waren echte technici die continue bij dijken aan het rekenen waren en plannen aan het schrijven waren, maar niet op de omgeving zaten. Dus R3 en ik hebben de stukken gelezen voor het project plan en echt her geschreven zodat alles klopte.
R2	<i>'We gather all the plans that public governments have published, then we stack them and that becomes the basic map. Then the stakeholder manager can go outside with the forms, and he can also put that it GIS. Then we have a complete picture of all tests, policy, and other matters' (R2).</i>	We halen al die plannen binnen, die iedereen heeft gepubliceerd, die stappelen we. Dat is voor ons een basis kaart. Dan gaat de omgevingsmanager met de formulieren naar buiten toe, en stopt het ook in GIS. Die voegt het daaraan toe, en dan hebben we een compleet beeld van alle toetsingen en andere zaken
R3	<i>'We have considered the whole story integral from the beginning, and therefore the whole design of the dike has been adjusted to take the multiple uses of the area into account ... So actually, basing your design on the qualities and the functions of the area, and not adjusting the qualities and functions to the design, which is normally the case'</i>	Omdat we werkelijk het hele verhaal integraal hebben beschouwd, vanaf de start eigenlijk, dus het hele dijk ontwerp heeft rekening gehouden met medegebruik ... Dus echt het ontwerp baseren op de kwaliteiten en functies van de ruimte en niet de kwaliteiten en functies ondergeschikt maken aan het design, wat normaal het geval is.
R4	<i>'finding people was hard in COVID times, but when we were visible with the construction shed people started to find us again. The questions they had still came through in the end (R4).</i>	Het lukte gewoon niet om daar mensen te vinden (tijdens COVID). Toen bouwde we stond, en dat dus wat makkelijker werd om elkaar buiten ook te vinden, gewoon op de dijk. Toen zag je ook dat ineens die vragen als nog op tafel kwamen op het eind.
R1	<i>'You are constantly trying to keep the conversation going, to gather wishes, answer questions, to decrease frustration and to bring the inhabitants back on board' (R1).</i>	je probeert continu met de bewoners, die er aan en achter wonen, om in gesprek te komen en blijven, wensen mee te nemen, vragen te beantwoorden, frustratie weg te halen en ze weer binnenboord te halen (R1)

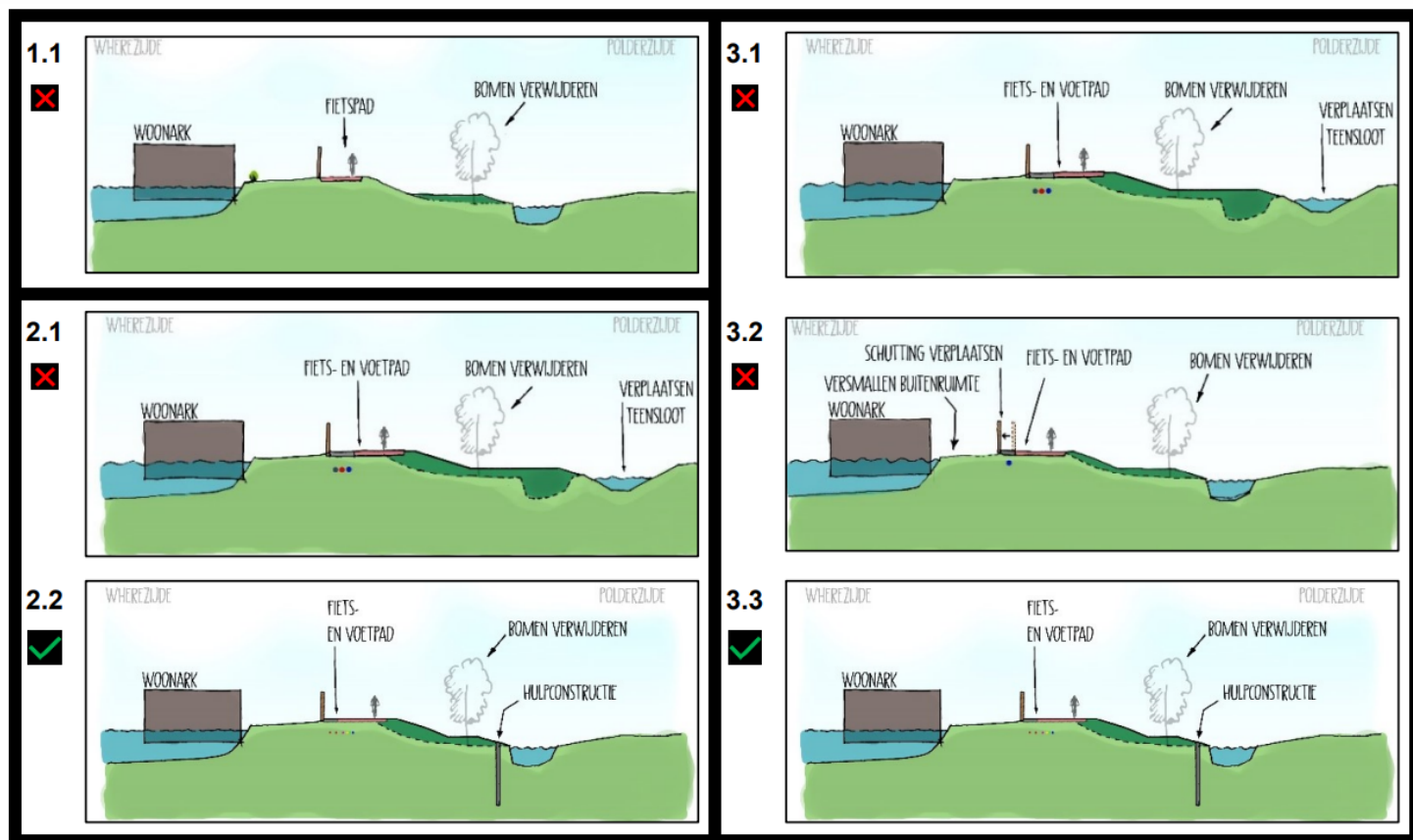
R1	<i>'Participation entails that the interests, wishes, or requirements that you agree to, that you will have to arrange the finances for that for several years. Thus, you have to arrange your finances differently, if you want to achieve long-term success ... that jar of money is not there yet' (R1).</i>	Participeren houdt ook in dat je op de dingen waarin je zegt: ja, dat gaan we doen. Dus de belangen die je toekent, de wensen of eisen die je honoreert zul je ook direct de financiën meerjarig voor moeten gaan regelen. De financiën moet je anders neerzetten wil je lange termijn succes krijgen. En dat potje geld is er nog niet.
R4	<i>We thought we had a nice sounding board (klankbord). However, people came into these session with collective interests and individual interests. Moreover, not every inhabitant was as well connected with the Arkbestuur. So you can have consensus with their board, but that does not mean every inhabitant agrees. We started to hear different opinions from the inhabitant. We could not cannot escape one-on-one talks with the inhabitants' (R4).</i>	Je zag ook dat je dan denkt een mooi klankbord te hebben. Maar inwoners die zitten daar dan met een persoonlijk belang en een collectief belang. En niet iedereen was even goed aangesloten bij het woonark bestuur. Dus uiteindelijk zie je dat niet helemaal verder door druppelt naar de andere bewoners. En dan kan je wel consensus hebben of iets bespreken met een woonhuis bestuur. Maar als je verschillende geluiden terughoort... Dus uiteindelijk ont kwam je er niet aan om ook gewoon de individuele gesprekken alsnog op dat moment te doen.
R4	<i>'the trick is always to carefully register session and provide feedback on what you did with their suggestions. Even if things are impossible, you can start a conversation and explain: what you ask is impossible, but we researched it so and so (R4)'.</i>	Dus het is altijd de kunst dat je dingen goed vastlegt dat je dat helder terugkoppelt, en dat je laat zien wat je met hun stem gedaan hebt. Ook als dingen niet kunnen, dat je ook het gesprek aan gaat, wat u vraagt, we hebben gekeken, maar op deze en deze manier hebben we niet mee kunnen nemen.
R3	<i>.. could share their thoughts about the design and think along on, for example, what trees could remain, what trees could be planted back, what type of grass was suitable'</i>	.. meedenken hoe gaan we het groen inrichten, kunnen de bomen blijven staan? Als er bomen terugkomen? Wat voor bomen zouden dan terug? Wat voor een type gras wil je?
R4	<i>'We made the most of the time period and the political-administrative context we were in'</i>	daar hebben we denk ik, het maximale gehaald uit het moment en de fase waar we zaten, ook in de bestuurlijke context waar we zaten
R9	<i>'I believe that if you approach a project broadly and seriously, people are more supporting of the project ... It shows inhabitants that Rijnland is not just here to raise the dike as quickly as possible, but they notice that attention is being paid to their living environment' (R9).</i>	Ik geloof er wel in dat als je het breed oppakt en serieus oppakt, dat mensen sowieso meer willend staan tegenover een project.. Het laat zien jullie komen hier niet alleen om zo snel mogelijk weer een paar kilometer dijk verbetering te doen, maar nee, d'r is aandacht voor onze leefomgeving.
R8	<i>before you know it you will have rooms full of agree citizen, or several judicial appeals. That will cost huge amounts of money and time (R8)'</i>	Voor dat je weet dat je in heel hele lange processen in zaaltjes met boze mensen of bezwaren en beroepen. En ja, dat kost helemaal de wereld aan geld en tijd.
R9	<i>they could choose more than just the paint of a fence, they realized we actually listened to what they wanted. (R9)'</i>	Ze konden niet alleen de kleur van hekwerk kiezen, maar er wordt geluisterd naar de inwoner en die kan echt bepalen van ik wil dit hebben.
R8	<i>'we did the design session by putting a white paper on the table, with the designer and the landscape architect ... and then we started designing together with the inhabitants, and asking things like how high does the quay need to be, how do you think it should look like?' (R8).</i>	Dat hebben we gedaan door gewoon echt een wit vel op tafel te leggen met de tekenaar erbij en de landschapsarchitect ... En dan met elkaar ontwerpen met de samen met de bewoners: zo hoog moeten dijken worden, hoe moet het eruit zien?
R8	<i>'Overall, we got a more supported design and some creative solutions we did not think of in advance' (R8).</i>	Over het algemeen krijg je een meer gedragen ontwerp. Ook wel creatieve oplossingen dat je denkt daar hadden we nog niet aan gedacht.
R9	<i>'the willingness to take into account each other's needs and create consensus, grows if you bring the inhabitants together' (R9).</i>	Dus de bereidwilligheid om tegemoet te komen aan elkaar of zorgen van anderen, wordt groter als je mensen bij elkaar brengt
R7	<i>'They had a broad and integral perspective on spatial quality. They suggested less on the appearance of buildings and more on the use of</i>	Zij kijken wat integraler, die wat bredere blik van ruimtelijke kwaliteit. Zij suggereren veel minder over de verschijning van gebouwen en meer over de openbare ruimte, ook het gebruik ervan, ook ecologische aspecten, cultuur historische aspecten.

	<i>the public space, ecological elements, and cultural-historical elements' (R7).</i>	
R7	<i>'You saw it in 3D for the first time. Certain things are not visible from the technical maps. ... Visualizations are not just making pretty pictures, it is actually an instrument to improve your design' (R7).</i>	Je zag het in een keer in 3D, want bepaalde dingen kan je niet helemaal in plattegrond. Een visualisatie is niet alleen leuke plaatjes maken, maar is ook een hulpmiddel om het ontwerp beter te krijgen.
R7	<i>'forces you to think about the area early in the process, and avoids that the technical solution becomes leading. Instead, the best solution is found by looking at the landscape integrally'</i>	waar je ook vroegtijdig al aan het denken werd gezet en niet de automatische technische oplossing leidend werd. In plaats daarvan wordt er integraal landschappelijk gekeken naar wat is hier de beste oplossingen.
R10	<i>'The technical firms be given the assignment [from the waterboard], to take into account the spatial quality framework'</i>	Het technische bureau moet opdracht krijgen, zich wat aan te trekken van het ruimtelijke kwaliteitskader.
R1	<i>'we opted for a building team so that we could include the knowledge of construction into our design. Not only what we were going to build, but how we were going to build it was just as important ... How we would do this, with all these parties, and with the least for the inhabitants, that was one of the biggest challenges concerning the construction' (R1)</i>	Daarvoor hebben we ook een bouwteam-contract gekozen, zodat we, al de uitvoeringskennis in onze ontwerpen mee konden nemen. Niet alleen wat gaan we bouwen, maar hoe krijgen we het gebouwd was net zo belangrijk ... Hoe gaan we dit in de tijd doen met al deze partij en de overlast zo beperkt mogelijk maken voor alle aanwonenden en omwonenden, dat was wel de grootste uitdaging die we hadden ten aanzien van de realisatie.
R6	<i>'a hard set of requirements: this is how we want it to look like visually. That was described clearly, there were no loose ends (R6).'</i>	Een hard eisen pakket, dit is hoe het visueel eruit moet zien. Daarin was het goed uitgeschreven, er waren geen losse eindjes aan.
R6	<i>'Normally we receive 10 or 20 cross-sections, in this project we received 197. That showed the detail in which they considered personal situations' (R6).</i>	Waar we normaal 10 of 20 van die dingen hebben lagen er hier 197. Dat geef tal aan hoe gedetailleerd ze hebben gekeken naar de persoonlijke situaties.
R8	<i>'If you deliver an incomplete design to regional contractors, you should not expect them to finish your design or to add spatial quality. They are solely responsible for the construction'</i>	dan dan moet je er niet van uitgaan dat als je een halve tekening aanlevert dat zij dan wel afmaken en daarbij verzinnen dat het heel belangrijk is dat ruimtelijke kwaliteit wordt meegenomen. Ze zijn er voor de uitvoering.
<b>Chapter 5</b>		
R8	<i>you are not as strictly bound to the safety norms. This also makes that you can have discussions with your technicians, and say: maybe this is not completely according to the norm, but in light of spatial quality we can be a bit more flexible on the safety norms on this location' (R8).</i>	Je zit niet knetter vast aan die hele harde grote normen. Waardoor je soms wel wat meer discussie kan hebben met de technici van: Goh, ja, weet je, misschien is technisch niet helemaal dicht te rekenen, maar goed kunnen we niet in het belang van de ruimtelijke kwaliteit hier even wat soepelere tegen de technische regels aankijken
R3	<i>you only have the budget for your primary task, which is water safety' (R3).</i>	je hebt een budget voor het werk waarvoor je bent: voor je kerntaak (waterveiligheid) en niet voor alle andere dingen.
R3	<i>it is strange that, if you look at how many functions and inhabitants regional flood defenses sometimes have, that we participate and collaborate less with citizens in regional flood defenses projects (compared to primary flood defenses)' (R3).</i>	Dus als je de bestemmingsplannen ziet en je kijkt naar een regionale en hoeveel dubbelbestemming en er op zit. En dat is dan raar, daartoe we eigenlijk veel minder aan participeren en samenwerken
R10	<i>'Whether spatial quality is prioritized is partly dependent on the stakeholder managers and project manager involved in the project. It depends on the affinity and knowledge of the people involved on spatial quality, as it is not an obligatory part of projects' (R10).</i>	Dat is deels afhankelijk van welke omgevingsmanagers of projectleider er op zitten. Het hangt wel een beetje af van de affiniteit en de kennis van de mensen die daarbij betrokken zijn. Want het is geen vastgesteld beleid
R7	<i>'There are differences between waterboards, some are more traditional and pay less attention</i>	Daar zit ook wel weer verschil in. Tussen de waterschappen. Je hebt toch gewoon nog een beetje de traditionele

	<i>to spatial quality, and other waterboards do prioritize it more and have experience with taking spatial quality into account in an integral way' (R7).</i>	waterschappen ... Soms is dat traditioneler, dan krijgt ruimtelijke kwaliteit minder aandacht. Sommige waterschappen, bijvoorbeeld bij het waterschap Rivierenland, heeft wel de ervaring om ruimtelijk kwaliteit integraal mee te nemen.
R4	<i>'I often see that there has to be a clear reason to prioritize spatial quality, otherwise it is not always considered' (R4).</i>	Ik zie wel, er moet een aanleiding zijn om het te doen. Anders gebeurt het niet.
R3	<i>'we do not act upon it yet. This is mainly due to how streams of money are directed internally' (R3) ... 'financing is essential in getting things done. If you want to create spatial quality, but there is no money, it will become difficult to create it.</i>	Het handelen is er nog niet altijd. Dat ik komt voor een deel voort uit hoe de potjes geld lopen. De geldstromen dicteren voor een deel ook het handel op de werkvloer. ... hoe je het financiert is wel één van de kerndingen om iets gedaan te krijgen. Als je iets wil, maar er is geen financiën voor heel moeilijk om dat wel te doen.
R3	<i>'that is not what many water practitioners do, they just look at the technique ... the technique is leading and spatial quality is seen a bonus' (R3)</i>	Maar dat is niet wat heel veel waterschappers doen. Die kijken alleen naar techniek ... Er wordt vaak op techniek gekozen en dan is ruimtelijke kwaliteit een extraatje.
R2	<i>'we are a functional government organization and our primary responsibility is water safety, spatial quality is not our primary task' (R2)</i>	Wij zijn een functionele overheidsorganisatie, onze primaire opgave is waterveiligheid. Ruimtelijke kwaliteit zit niet primair in onze opgave.
R4	<i>'they miss a umbrella for spatial quality'.</i>	ze misten dus een kapstok of een paraplu op het gebied van ruimtelijk kwaliteit.
R3	<i>'We should look more at spatial planning (ruimtelijke ordening), infrastructure, and water of an area. What multi-annual assignments are present in that area, and how do they overlap? If you look at that more holistically on a program level, you could start working smarter in your projects' (R3)</i>	Ja, en vanuit het gebied moeten kijken wat vanuit de ruimtelijke ordening, infra en water. Wat voor meerjarige opgaves hebben we liggen en hoe overlappen die elkaar? En als je die pakt en daarvan voor allemaal je programmering op programmaniveau neerzet dan kun je slimmer gaan werken in je projecten, maar dat is een stapje hoger.
R4	<i>'currently, all waterboards want to do something with biodiversity or nature, but they view and analyse it separately in different projects. That does not work: it is a network, not a stamp, you have to make a vision'</i>	Op dit moment worden roepen alle waterschappen wij willen iets met biodiversiteit en natuur, maar wat er gedaan wordt is dat er nu per traject gekeken wordt, oh kunnen we iets met natuur. Maar dat werkt niet: het is een netwerk, dus dat wil niet op een postzegel, je moet een visie maken.
R4	<i>'It would help if there was some sort of standard on spatial quality with the different elements that project team could use' (R4).</i>	Het zou denk ik helpen als dat er een soort standaard is en dat bekend is wat voor standaard project teams kunnen gebruiken en wat voor elementen daarin horen.
R2	<i>'The idea of governments is that, together you have to have conversation with on how this spatial quality can be realized' (R2).</i>	Volgens mij is het idee van de overheid, dat je juist het gesprek met elkaar hebt, en dat je juist met elkaar gaat passen hoe je die ruimtelijke kwaliteit kan maken.
R10	<i>'Within the project team the stakeholder manager has an important role. They are the spiders in the web. They assess the situation of the area and can assess whether tailored designs are necessary, or whether the area is listed as valuable in the zoning plan'.</i>	Nou toen bleek inderdaad dat binnen zo'n projecten hebben de omgevingsmanagers een cruciale rol, die zijn het spin in het web, zeg maar ook naar buiten toe. Ja, en zij signaleerde de situatie en kijken van zijn er maat oplossingen nodig of het staat in een bestemmingsplan als landschappelijk waardevol, of kwaliteitseisen.
R8	<i>By paying serious attention to the interest of stakeholders, you will create support and a positive vibe. That also generates money, both in the process and preparation. It also enhances the image of Rijnland' (R8)</i>	Door serieuze aandacht te geven aan gewoon de belangen die mensen hebben en hun en betrokkenheid bij die leefomgeving, creëren je gewoon ook draagvlak en een positief gevoel. Dat levert ook geld op, in de zin van, zowel in proces en voorbereiding, als in imago voor Rijnland.

## Appendix 4: Alternative designs and the preferred alternative of the Wheredijk

Most promising alternatives (RPS, 2020c, p. 4)



The preferred alternative (RPS, 2020c, p. 2)





## Appendix 5: Data Poll Everywhere focus group discussion

Participant info			
	Activity count	11	
	Participant count	24	
	Average responses	28	
Bij welk waterschap (of andere organisatie) bent u werkzaam?	Activity type	Open ended	
	Total responses	29	
	Unique participants	21	
	Responses		
	kijkopdedijk		
	Noorderzijlvest		
	Hunze en Aas		
	vallei en veluwe		
	Amstel gooi en vecht		
	HHSK		
	Groningen		
	HHNK		
	Amstel gooi en vecht		
	Noorderzijlvest		
	HHNK		
	STOWA		
	Provincie		
	Rijksdienst voor het Cultureel Erfgoed		
	Waterschap Rivierenland		
	kijkopdedijk		
	Provincie Groningen		
	Aa en Maas		
	Hhmk		
	Provincie		
	Provincie Noord-Brabant		

	Rijnland		
	Iv infra		
	Hunze en Aa's		
	Waternet		
	Aveco de Bondt		
	Waterschap Rivierenland		
	Sweco		
Wat is uw functie binnen het waterschap (of andere organisatie)?	Activity type	Open ended	
	Total responses	22	
	Unique participants	21	
	Responses		
	Adviseur Erfgoed en Klimaat		
	Geotechniek		
	Beleidsadviseur waterveiligheid		
	Beleid in breedste zin van woord		
	Adviseur waterveiligheid		
	Beleidsmedewerker		
	Beleidsmedewerker waterveiligheid		
	Beleidsadviseur		
	Adviseur		
	Beleidsmedewerker Waterveiligheid		
	Projectleider /adviseur waterveiligheid		
	Planvormer waterkeringen		
	Programma Manager Waterveiligheid		
	Specialist waterkeringen		

	Adviseur Waterkeringen		
	Projectleider		
	Kering specialist		
	dijkadviseur		
	Toetsen RWK		
	Adviseur waterveiligheid		
	Beleid waterkeringen		
	Specialist waterkeringen		
Op een schaal van 1-10 hoeveel aandacht voor ruimtelijke kwaliteit is er binnen uw waterschap/organisatie? (denk aan: beleid)	workshops	kennisdeling)	Activity type
	Total responses	19	
	Unique participants	19	
	Response options	Count	Percent
	1	0	0.0
	2	0	0.0
	3	1	5.26
	4	2	10.53
	5	2	10.53
	6	7	36.84
	7	4	21.05
	8	3	15.79
	9	0	0.0
	10	0	0.0
Op een schaal van 1-10 hoeveel aandacht voor ruimtelijke kwaliteit is er bij regionale keringsprojecten?	Activity type	Multiple choice	
	Total responses	19	

	Unique participants	19	
	Response options	Count	Percent
	1	0	0.0
	2	0	0.0
	3	1	5.26
	4	3	15.79
	5	2	10.53
	6	6	31.58
	7	4	21.05
	8	3	15.79
	9	0	0.0
	10	0	0.0
Wat komt er bij u op als u denkt aan ruimtelijke kwaliteit bij regionale keringsprojecten?	Activity type	Open ended	
	Total responses	31	
	Unique participants	20	
	Responses		
	Ruimtelijke plannen en functies met dubbelgebruik		
	Cultuur versterken of behouden		
	Toegankelijkheid		
	Landschap		
	Durven het anders te doen		
	Belangen		
	fietspad op kruin		
	Kering als een zone ipv harde lijn		
	Aandacht voor cultuurhistorie		
	Landschappelijke inpassing		
	Landschap, mooi, waarde gebied		

	Sociale veiligheid		
	Inpassing en waar mogelijk versterking natuur, erfgoed, landschap		
	Leefklimaat		
	Natuur en landschap behoud of versterking		
	Verkeersveiligheid		
	Groen		
	Kwaliteit voor de gehele leefomgeving		
	Leefomgeving		
	Leesbaarheid van de historie behouden		
	Omgeving		
	Landschappelijke inpassing		
	Integratie van belangen		
	Biodiversiteit		
	oever verflauwing		
	LCA borgen		
	Omgeving		
	Biodiversiteit		
	Inpassing		
	Omgeving		
	Medegebruik		
Welke dimensie van ruimtelijke kwaliteit krijgt volgens u het meest aandacht bij regionale keringsprojecten?	Activity type	Ranking	
	Total responses	19	
	Unique participants	19	
	Response options	Rank	

	Gebruikswaarde (usability, mixed functions, accessibility, hydraulic effectiveness)	1	
	Belevingswaarde (Landscape qualities, landform, water vegetation, historical/cultural values)	3	
	Toekomstwaarde (Robustness/flexibility/maintenance/sustainability/ecology)	2	
Is het volgens u vanuit het waterschap nodig om ruimtelijke kwaliteit te creëren bij regionale keringsprojecten?	Activity type	Multiple choice	
	Total responses	22	
	Unique participants	22	
	Response options	Count	Percent
	Ja, bij elk project zou er oog moeten zijn voor ruimtelijke kwaliteit.	16	72.73
	Ja, maar alleen als het project zich er voor leent	6	27.27
	Nee, veel projecten lenen zich daar niet voor	0	0.0
	Nee, het waterschap is alleen verantwoordelijk voor het borgen van de waterveiligheid	0	0.0
Welke instrumenten worden volgens u het meest gebruikt in regionale keringsopgave?	Activity type	Multiple choice	
	Total responses	55	
	Unique participants	21	

	Response options	Count	Percent
	Omgevingsscan	12	21.82
	Bewonersparticipatie	11	20.0
	Ontwerpateliers	6	10.91
	Ruimtelijk advies (intern of van een commissie)	1	1.82
	Samenwerkingsovereenkomsten	3	5.45
	Kaders voor ruimtelijke kwaliteit	3	5.45
	Tenders	3	5.45
	Contractvorm/voorwaardes	5	9.09
	Subsidies	3	5.45
	Co-financiering	2	3.64
	Inschakelen landschapsarchitect of ruimtelijk ontwerper	2	3.64
	Inschakelen engineersbureaus (voor meer dan technische ontwerpen)	4	7.27
Welke van deze instrumenten zijn volgens u het belangrijkste voor het versterken van ruimtelijke kwaliteit bij regionale keringsprojecten?	Activity type	Multiple choice	
	Total responses	51	
	Unique participants	19	
	Response options	Count	Percent
	Omgevingsscan	7	13.73
	Bewonersparticipatie	6	11.76
	Ontwerpateliers	5	9.8
	Ruimtelijk advies (intern of van een commissie)	8	15.69
	Samenwerkingsovereenkomsten	1	1.96

	Kaders voor ruimtelijke kwaliteit	5	9.8
	Tenders	2	3.92
	Contractvorm/voorwaardes	2	3.92
	Subsidies	4	7.84
	Co-financiering	3	5.88
	Inschakelen landschapsarchitect of ruimtelijk ontwerper	7	13.73
	Inschakelen engineersbureaus (voor meer dan technische ontwerpen)	1	1.96
Wat zijn de grootste dilemma's of struikelblokken bij het versterken van ruimtelijke kwaliteit bij regionale keringsprojecten?	Activity type	Open ended	
	Total responses	20	
	Unique participants	14	
	Responses		
	Grondeigendom		
	Te druk		
	Verandering is vervelend en moeilijk		
	Verandering maar moeilijk en ingewikkeld vinden		
	Geld, omgeving, Planvorming staat al vast		
	Geld		
	Samenwerken div belanghebbenden		
	Geld		
	Commitment		
	Beheer en onderhoud		



	Geld		
	Geld		
	Wie betaalt wat? (Geld)		
	Beperkt Beeld bij eigen organisatie		
	Gebrek aan beleid		
	Organisatie structuur		
	Politiek/bestuur		
	Geld		
	Beloftes die niet waargemaakt kunnen worden		
	Geld		
Wat zijn de succesfactoren bij het versterken van ruimtelijke kwaliteit bij regionale keringsprojecten?	Activity type	Open ended	
	Total responses	17	
	Unique participants	14	
	Responses		
	Besluitvorming goed vastleggen		
	Dijkinspiratieteams/participatie		
	omwonenden kennen belang en functies		
	Omgevingsparticipatie		
	Inspraak omgeving		
	Omdenken		
	Meekoppelkansen benutten		
	Initiatief tot overleg met omgeving		
	Nuchter blijven		
	Meer inzetten op duurzaam aanbesteden		

	Omgevingssessies		
	Veel regionaal passen al goed in het landschap		
	Inbreng burger		
	Veiligheid voorop		
	Doorzetters		
	Bewonersgesprekken		
	Pragmatisch		