At The Edge

OF THE LAND - OF THE OCEAN - OF CHANGE

by Marit Noest

The Report

At The Edge

of the land – of the ocean – of change

Research, Film and Design on the Coastal Landscape of New Jersey after Superstorm Sandy

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Preface

Three years ago, I watched Sandy make landfall on Dutch television. It was immediately clear that it would become a long-lasting rebuilding process for many towns along the North Atlantic shores. I instantly knew that I wanted to spend the time and effort in my master's thesis on contributing to the recovery. After the media coverage had died out, I put every assignment in the curriculum towards building my body of knowledge on Sandy and coastal management in the USA. After a year I was inspired by the documentary Framing the Other, that Ilja Kok and Willem Timmers graduated with in Tourism Studies. Their amazing documentary made me see the value of film in research. With an attitude of "let's see how far this idea will develop", I started integrating film in the set-up of the thesis. Not long after that I found Anouk through a mutual friend on Facebook and we were ready to start executing all of our ambitious ideas.

With the research, design and the film, the project quickly grew larger than expected. Luckily there were many people who supported me throughout the entire project. First of all, of course, Anouk Saint Martin. Thank you for daring to join me on this adventure, even though we didn't really know each other before we went on the six week field trip! I think we both learned a lot from each other's fields and I am looking forward to future projects to work with you again. Next I would like to thank my official and unofficial supervisors for their time and being open to the experiment with film in landscape architecture: Ingrid Duchhart, Cees van der Veeken, Adri van den Brink, Kevin Raaphorst, Ilja Kok, Margriet Goris and Angela Pachuau. Setting up a network in New Jersey was hard but in the end we were able to meet so many helpful and kind people thanks to Anne Kelliher, Bob Yaro, Jason Hellendrung, Frederick Steiner, Billy Fleming and Donna Fabyonic. Of course the documentary would be nothing without everyone who was so kind to be interviewed and filmed for this project: Jaap van der Salm, Inge Kersten, John Weber, Joe Woerner, Micheal Schwebel, John Williamson, Donna Marie Williamson, Kathy Barisciano, Shaun McGrath, Marilyn Gargiulo, JD LaCarrubba, Zack Rosenthal and all the 85 participants of the community outreach days. Special thanks to the people at the Asbury Park Press for allowing us to use so much of their amazing footage and pictures surrounding the storm: Brian Johnston, Jim Connolly, Jean Mikle, Tom Bates, Ken Serrano. Last but certainly not least: Jenneke Kruisbrink, Andre Noest, Peter Veldman, Nathaly Agusto Filion, Ben Kalina, the Bierbaum family, H+N+S, the City of Asbury Park, Surfrider Foundation, Summertime Surf, NH Bos and EFL Stichting.

Summary

All over the world, flood resilient coastlines are desperately needed. Unfortunately, the edges between land and ocean also attracts a lot of urbanization. Superstorm Sandy hit land in October 2012 and once again emphasized the paradox of the attractiveness and danger of living on the oceanfront. Quickly after Sandy, ideas arose to rebuild stronger and better shores to face the next storm. In spite of these goals, many parts of New Jersey were being build back the same as they were before the storm.

This thesis researches with a human-centered focus why the repetitive cycle of storm and rebuild persists in New Jersey, USA. Through academic filmmaking, this norm is challenged by encouraging awareness and discussions about the future of the Jersey Shore. Design aims to show an alternative that links a regional and long-term perspective with local and short-term benefits, for Asbury Park, NJ, using a case study.

The landscape analysis shows the vulnerability towards floods on many levels. On natural level, the shore has only a fragile strip of dunes to protect the low-laying land behind it. On top of that, urbanization has clear effects on the protective qualities of the coastal landscape. On socio-political level, the landscape is fragmented by the many small towns that all have their own say on their piece of shoreline.

After Sandy, the Rebuild By Design organization combined expertise from many countries to propose a long-term, regional approach to deal with the flood risks. Unfortunately, the plans now struggle at the link between their approach and the American context. Conservative politics influences the way rebuilding money is spend, so building back the same was often the only realistic option. Together with many political, economic, cultural and emotional arguments, the repetitive cycle of storm and rebuild is maintained by a complex web of reasons.

The documentary focusses on the topic of climate adaptation of the Jersey Shore and shows various perspectives and stakeholders surrounding it. Through film, all these views are presented as valid perspectives and audiences are asked to follow these reasonings for a while. The documentary lets the contrasting perspectives co-exist, enables viewers to understand the complexity of the situation and encourages reflective discussions on how things are done.

Academic filmmaking is also used as a method to extract design guidelines through a discourse analysis on the filmed interviews. The different perspectives are summarized through analytical sketches, to find common grounds. These common grounds form the basis for design choices.

Second, the outreach quality of the documentary is tested through community outreach posters. These posters presented different flood protection options that participants could vote on. Half of the participants saw a video clip where long-term strategies and short-term choices were explained. After seeing the video, people voted more on long-term options that required larger investments and also voted less divided.

All the preferences, demands and priorities on local level are important evidence on which design choices are based. In the design, the regional vision is adapted to the local identity and wishes of the case study area of Asbury Park. The design attempts to inspire towns to see the benefits of a multifunctional dune landscape and tries to move from the small edge to a larger landscape zone. Local priorities like a boardwalk, ocean view and the fun character of Asbury Park are all integrated into a protective dune landscape. This way, the design links small-scale (economic) benefits to the larger goal of the paradigm shift towards a sustainable way of coastal management.

Guide to the reader

This thesis consists of a report and a documentary. They can be read/watched without the other, though the combination will bring out new dimensions in both. Because of the American topic, the report is printed on letter-sized paper and written in American English. Measurements and distances are noted in the metric system.

The report is made up out of three parts: Research, Film and Design. To introduce the topic, chapter 1 discusses the global and local relevance and introduces the reader shortly to what happened during Superstorm Sandy.

Part I Research deals with the research outline, analyzes the landscape of New Jersey and the issue of coastal management in the USA. This part entails:

Chapter 2 describes the research design by with the thesis is conducted. It explains theories surrounding leading concepts, the focus that thesis has and by which questions and methodology that is aimed to achieve.

Chapter 3 specifically focusses on academic filmmaking in landscape architecture and how that method was applied in this thesis.

Chapter 4 describes the landscape dynamics of New Jersey by looking at natural, human and social factors.

Chapter 5 specifically focusses on how this dynamic reacted after Superstorm Sandy by looking at the rebuilding strategies that were present during the rebuilding process.

At this point I would advise to watch the documentary (Chapter 6). The reader will now have a informed view on the rebuilding issues after Sandy, so the content of the film can be placed well into its context.

Part II Film deals with the analyses that were made through academic filmmaking. Here the step is made from the landscape and the rebuilding problems towards design guidelines and common grounds that later can be built on. This part includes:

Chapter 7, which describes the first way of applying film as a method in this thesis: film as data collection tool. The filmed interviews are analyzed to come to common grounds for design.

Chapter 8 tests the second way of applying film in research: film as discussion tool. Multiple flood

protective and building options are collected. These options are evaluated through a community outreach process.

Part III Design translates all the research outcomes to designs of local interventions that fit within a larger strategy. This is done in the following chapters:

Chapter 9 searches for the best location to focus the design on; a location that has high risk and high urgency and will work as an incentive for regional change.

Chapter 10 makes the link from regional vision towards the scale of s single town. This is done by developing models that explore ways of applying that vision onto the case study area.

Chapter 11 explains how the regional vision is applied and detailed into a design for Asbury Park. It focusses on local interventions and how they contribute to larger goals for the location and the region.

Chapter 12 then links the interventions back to form an adaptive regional strategy.

To end, chapter 13 reflects on the whole research and its methods to come to points of discussion and conclusion.

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Introduction

Let us begin this study with Ian McHarg: the writer of one of the most influencial books in landscape architecture. In the first chapter of his book 'Design with Nature', McHarg speaks with envy about the Dutch shorelines and how their configuration and character would have benefited the New Jersey shores in their fight against floods, specifically after the storm of 1962. (McHarg, 1966) "Sadly", he writes "in New Jersey no such planning principles have been developed."

"While all the principles are familiar to botanists and ecologists, this has no effect whatsoever upon the form of development. Houses are built upon dunes, grasses destroyed, dunes breached for beach access and housing; groundwater is withdrawn, bayshore is filled and urbanized. Ignorance is compounding with anarchy and greed to make the raddled face of the Jersey Shore." (McHarg, 1992, p. 16)

His essays were first published in 1966 and here we are -50 years later- still dealing with the same issue. But why? As McHarg mentions in the qoute, the reasons why do not have a technical character. 'Botanists' and 'ecologists' know that the current way of coastal management along the Jersey Shore is unsustainable and unable to protect them against a storms surge, but the problems keep repeating after every storm. In this thesis, the answers are searched for in the societal realm to challenge norms, stimulate awareness and reflect on each other's and own perspectives.

Globally, some things did change over the past 50 years, for example how the world views the issues of climate change and climate adaptation. World leaders, ranging from Obama to the Pope, have clearly expressed their concerns about the future of our climate. (Roberts, 2015; Jackson, 2015) On December 2015, fifty five countries presented a global agreement on climate change in Paris, that specifically mentions risk reduction surrounding extreme weather events.
In contrast to that, the Dutch coastal management has also taken a turn that same December. Minister Schultz van Haegen of the Ministry of Infrastructure and Environment lifted the ordinance that prohibits development in the coastal zone. The world's example of good coastal management and flood control, now feels safe enough to experiment with building on the Dutch shores. This decision sparked much public and political protest, but conclusions are yet to come this February. What would McHarg think of this?

This recent debate in Dutch legislation suddenly added a new audience to this thesis. Not only am I pleading for a shift towards sustainable coastal management in the US, but also for the Dutch society not to forget what makes our shores so great, our water clean, our nature divers and our feet dry.

1 | From Global to Local

In this chapter, the larger relevance of research on hurricane-prone coastal areas is elaborated on. The relevance zooms in from global need for resilient coastlines, to the risk of urbanization of coastal zones and the discussions about the consequences of this trend. Last, the case of hurricane Sandy in New Jersey is introduced.

Global need for resilient coastlines

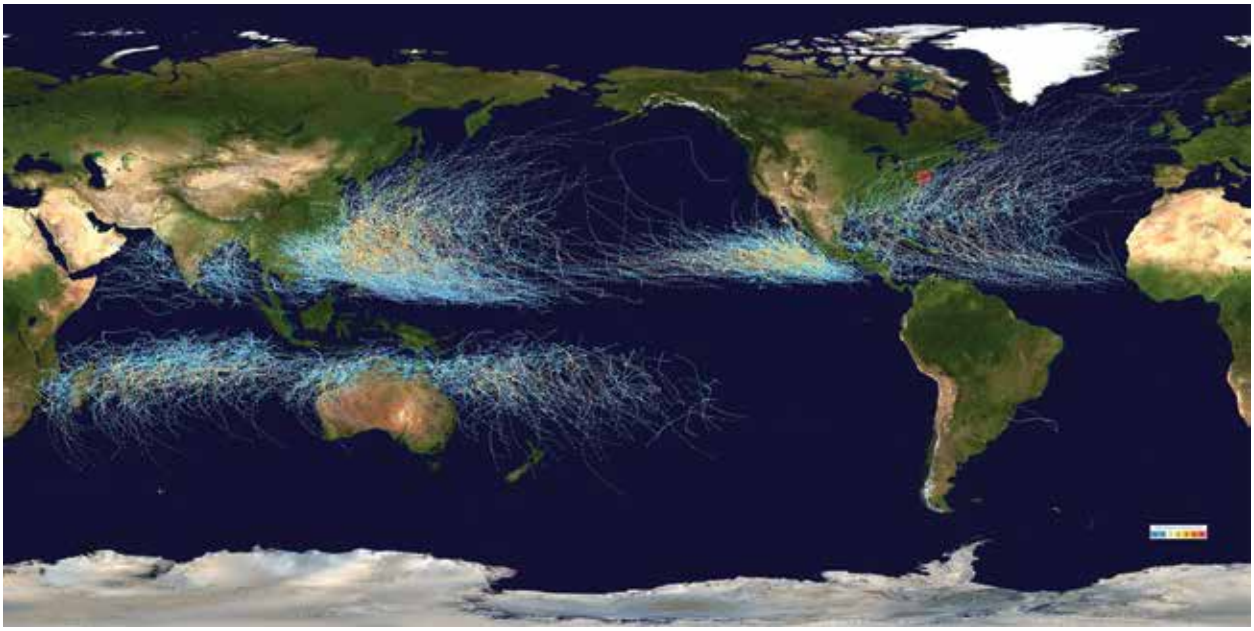

Figure 1.1 Patterns of Hurricane Movement between 1985 – 2005 (EarthLabs Carlton College n.d.)

Stronger and more resilient coastlines have a high priority all over the world (Fig 1.1). Just the past year, we have seen large floods from England and France, to North American and Asia. The recently constructed Paris Climate Agreement even specifically states the intent of all involved parties to "recognize the importance of averting, minimizing and addressing loss and damage associated with (..) extreme weather events (...) and the role of sustainable development in reducing the risk". (United Nations 2015, p.26) But still, cities in delta areas are expanding mostly towards low lying areas. About half of the world population live in those areas, and that number is rapidly growing. (Molenaar et al. 2013) Mitigation towards coastal areas is increasing with 35% in comparison to 1995. This exposes 2,75 billion people to coastal hazards like tropical storms, sea level rise and tsunami's. (Goudarzi 2006) In the coastal areas of North America, the main problem will lay at coastal floods due to the combination of seal level rise (expected 30-50 cm in NJ until 2050) and heightened frequency and intensity of storms (Jacob 2011). New Jersey is even seen as a hotspot for sea level rise, as the level here increases more than the global average (Georgetown Climate Center & Rutgers University Climate Institute 2014)

Regional storm hazards

Coastal hazards are not new to the Mid-Atlantic states of the US. A hurricane with a direct hit like Sandy has an expected 1 in 200 year frequency. Flooding of the barrier islands can occur every 10 years. (Savadove & Buchholtz 1997) Looking at the past sixty years, there are many storms that made a significant impact on the state of New Jersey. The tracks of the storms with the largest impact are depicted in fig 1.2.

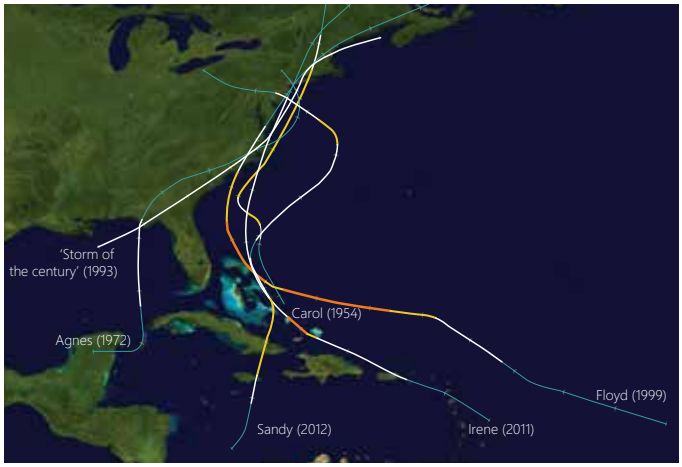

Figure 1.2 Storm tracks of highest impact storms in the area since 1950. Colour of line indicates storms' intensity (Based on National Hurricane Center 2015)

Comparing the major storms that made landfall in the area since 1950, we can see that the impact of the storms exponentially increases. (fig 1.3) This can be attributed to many factors like and evacuation measures, growing investments in flood areas or sea level rise. Looking at these factors individually for each storm (death toll, damage costs and storm surge), the first two factors don't show a clear line of growth. (fig 1.4) The costs of the damage on the other hand, does show this growth. These growing costs can be linked to rapidly increasing urban developments and property values in the coastal area. Higher investments in vulnerable areas mean greater monetary losses during a storm.

Urbanization of the coastline

The state of New Jersey is part of the metropolitan area of New York. (fig 1.5) It is the home of 8,9 million people. (US Census 2010) Residents of New Jersey are mostly concentrated around the big cities and the coast. Residents living by the Jersey Shore are mostly elderly people, adults working in the tourism sector or commuters to New York. Because of the many commuters, the infrastructure and public transport towards New York and Philadelphia is highly developed and used.

Figure 1.5 Topography overview NJ

New Jersey is well known for its Jersey Shore. This is where a lot of people live or take a vacation. The coast is responsible for 70% of the States' tourism

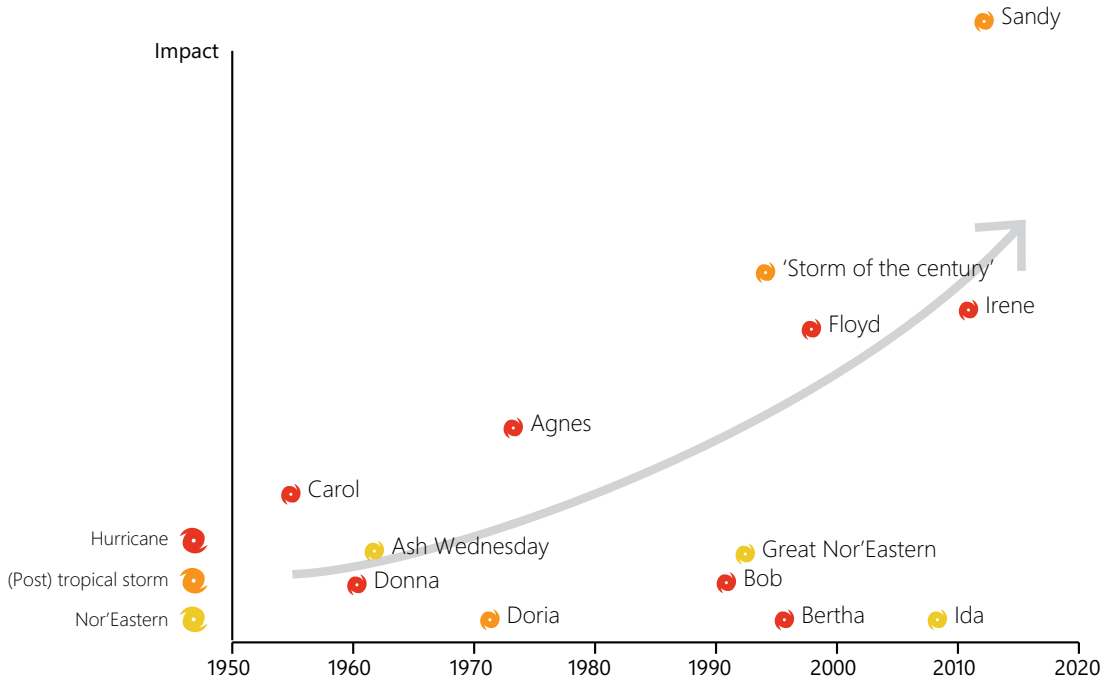

Figure 1.3 High impact storms with landfall in Mid-Atlantic states since 1950. (Based on National Hurricane Center 2015)

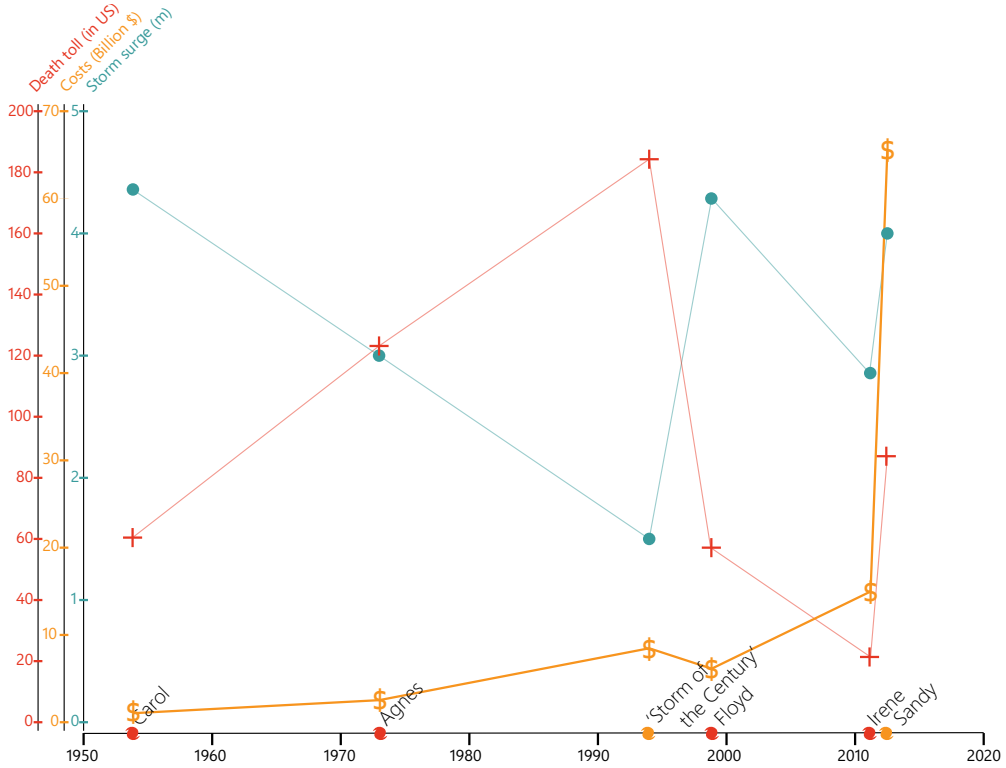

Figure 1.4 Death toll, costs and height of storm surge for six highest impact storms in Mid-Atlantic states (Based on National Hurricane Center 2015; NOAA 2015)

(Georgetown Climate Center & Rutgers University Climate Institute 2014). In 2014, the tourism sector expanded with 3.8% and is now worth $42 billion. Major attractions are the casinos in Atlantic City and the many seaside towns along the Shore. (Tourism Economics 2014)
Urban development in the coastal area of New Jersey is very popular. Especially in the 90's, with the growing access to the internet, good oil prices and economic reforms under the Clinton administration, the American economy was booming. Comparing to 1995, urban development in these areas will have increased with 40% in 2020, mostly taking space from forests, agricultural land and wetlands (Conway 2005). (fig. 1.6) There are even TV-shows dedicated to the housing search that many American go through

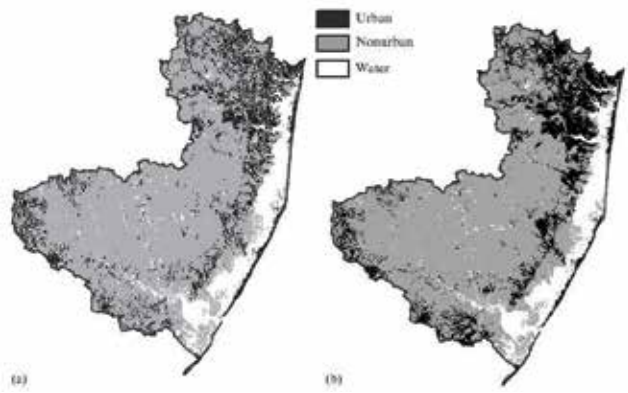

Figure 1.6 Urban area (black) in Ocean County, NJ in 1995 (left) and 2020 (right) (Conway 2005, p.888)

Figure 1.7 The Water's Edge House on Buying the Beach (Destination America 2014 minute 0.12)

to find their oceanfront dream house. 'Buying the Beach' (Destination America) and 'Beachfront Bargain Hunt' (HGTV) show American families, often from the inlands of the country, that want to move to or buy a second home on the coast. The closer to the ocean, the better. Homes on the side of the ocean usually cost a multitude of what a home on the bayside will cost. Fig 1.7 shows a house for sale that is literally on the edge of the ocean. (Destination America 2014) From the Golf Coast to Alaska, homes can be found that are on the water's edge or extremely close to it.

Sandy: Hurricane? Post-Tropical cyclone? Superstorm?

October 29th 2012, a storm hit the coast of New Jersey, USA. The storm is now known as one of the most devastating storms in the history: 'Frankenstorm' Sandy. With an estimated 65 billion dollar in damage, Sandy turned out to be the second costliest hurricane in US history, after hurricane Katrina (Blake et al. 2013). The storm resulted into major floods along the coast, heavy snowfall in West-Virginia to surfing on heightened waves in Chicago.
Despite the size and heavy impacts of the storm, Sandy was not a hurricane at landfall. (Table 1.1) Large storms like Sandy form over warm parts of the ocean. Where the Atlantic Ocean is warmer than 27˚C, these tropical cyclones can gain power. If the right climatic conditions persist, the storm can grow by collecting

and producing clouds, water vapor and wind. The wind streams of the storm push water up and therefore collect a large amount of ocean water that later will form the storm surge. If the wind speeds increase over 120 km/h, the storm can be called a hurricane. Sandy did have that notation over Cuba and the Atlantic Ocean, and those strong winds also reached the New Jersey coast. But, just before landfall, the storm decreased in power and the wind speeds were not high enough for a hurricane notation. (NOAA 2014; NASA 2015). Because of the heavy impacts, the name of 'Superstorm Sandy' was soon invented by the media covering the storm.

Characteristics Superstorm Sandy

General		
Lifespan	10 days	
Highest notation	Category 1 Hurricane	
Notation at landfall USA	Post tropical cyclone	
Diameter	1512 km	
Highest measured impact	**USA**	**NJ**
Wind speed	185 km/h	130 km/h
Rain fall	320 mm	300 mm
Storm surge	3.4 m	2.6 m
Storm tide (Storm surge +tidal level)	3.85 m	3.2 m
Inundation	2.9 m	2.7 m
Casualties	117	12
Costs	$65 billion	$30 billion
Properties damaged	650.000	347.000
People losing power	8.5 million	2.4 million

Table 1.1 Characteristics of Sandy (Based on Blake et al. 2013)

Impact

Sandy set up over the Atlantic Ocean, with the Caribbean as first in its path. Normally a storm like this would then turn east towards the ocean, but due to a low-pressure area over the ocean, it set straight towards New York and New Jersey. Another factor that made the impact so great, was the full moon increasing the water level 20% higher than normal and amplifying the waves of Sandy (Sharp 2012). The funnel-shaped bays between New York and New Jersey, steered these waves towards the metropolitan area. This resulted into major impacts on the coastal landscape of multiple states. Flooding of power stations led to broad loss of electricity and communication, hospitals losing power and people were not able to contact emergency services. The storm's winds, rain and floods damaged three states and was felt in over 24 states. The worst impact of Sandy were the 117 people who died direct or indirect from the storm (Diakakis et al. 2015).
New Jersey was one of the states that was hit the hardest by Sandy, partly because of its low-laying land. "285 square miles [738 km^2] of land lie less than 5 feet [1,5 m] above the high tide line in New Jersey. This land is home for 295,000 residents, (...) $112 billion in property value (...) and 45 public schools. These numbers grow by more than half when assessed at 9 feet [2,75 m] above the high tide line – Sandy's peak flood elevation as measured at the Battery in New York City" (Strauss et al. 2014, p.8) Sandy made landfall in Brigantine, just North of Atlantic City. In figure 1.8 is shown where the main impacts were measured on the build environment.

Sandy was a wake-up call for the US government. Many -mostly democratic- government officials took the event to re-start discussions on climate change and environmental policy changes. (Jakuboski 2012; Dunlap & McCright 2008) Besides a Sandy relief fund for the victims, President Obama installed the Rebuild by

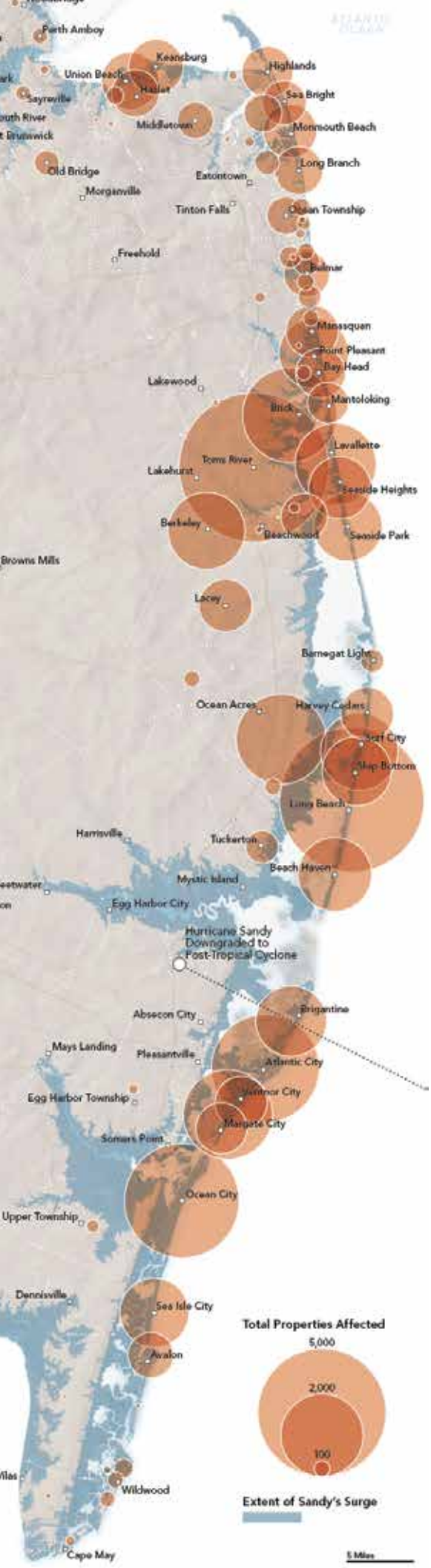

Figure 1.8 Map of Sandy's destruction along the Jersey Shore (Kirkham & Rudolf 2012)

Design organization. This organisation held a design competition where companies from all over the world could propose spatial solutions for the area. Rebuild by Design organized participatory workshops to involve local communities in the climate adaptation changes that need to be done. Unfortunately, they mainly involved the public in a passive way: document study of the winning design proposals shows that communities were mainly used as input or conformation for designs, but that they did not receive much education on long-term climate adaptation. (Appendix I) In the community outreach chapters of the proposals, phrases like 'aligned with our design concepts' were used a lot, implying that the experts had already formed concepts that were only confirmed by the public. Often the architects took a strong lead in presenting their findings and ideas and left the public as audience in Q&A's instead of giving them the stage or the marker. In addition, plans and researches are often in big reports or are written for an academic or architectural audience.

A proposal that stands out in their efforts of actively involving communities and also taking on a role as educators, was the BIG 'U'. This team gave the public a role in many of the design steps and decisions and even translated all the workshop material into Spanish and Mandarin so many subgroups could be included. "The Big U's public outreach work focused on cultivating understanding and generating excitement"(BIG Team 2014, p.73)

Despite these governmental efforts, 71% of New Jersey Sandy-survivors feel forgotten by the recovery efforts. Sixty to seventy percent of survivors found it difficult to get recovery information from their government (Murray & Tracey 2014) As a reaction, many local efforts arose like distributing food, supporting survivors and rebuilding homes and boardwalks. This recovery often came from family, friends, neighbors and community organizations. (Murray & Tracey 2014) The efforts were mainly focused on rebuilding back what was, but have a much smaller role in the long-term adaptability of the area. This is a problem because the local organizations will get most of the rebuilding funding, not the long-term climate adaptation plans of Rebuild by Design. If all this money is spend on only short-term recovery, it is likely that the areas will not be better prepared for the next storm.

For example the boardwalk of Asbury Park that was destroyed by the storm. This boardwalk was rebuild in the same way as it was before Sandy, while they could also have heightened it to function as a flood defense.

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PART I RESEARCH

2 | Research Design

Where the previous chapter introduced the thesis topic, this chapter focus on the thesis research design. The main goal of this chapter is to show the choices, theories and method that narrow the topic down to a specific thesis assignment. First of all, a theoretical framework will clarify and specify some of the concepts and theories that the thesis will deal with. This specification will give a first aim to the thesis assignment. The aim is also formed by the personal lens and knowledge claim of the researcher, which will be elaborated after. The design thesis is specified even more by where a gap in current knowledge is, the problem statement and the research questions. Afterwards, the methodology of the design thesis is shown.

2.1 | THEORETICAL FRAMEWORK

In the 60's, the famous landscape architect Ian McHarg already warned about the flood risks at the Jersey Shore. He made the link to the Dutch coasts as a place that forms a good example of how New Jersey should deal with its Shore. He speaks with envy about the high Dutch dunes, their 'human surrogate', dikes and the overall place that water management has in the Dutch society. (McHarg 1992, p.7) McHargs' analysis of the land dynamics after storms was an almost exact prediction of the flood areas during Sandy. (McHarg 1992, p.16) Despite his plead for a better coastal landscape, sixty years later the same risks exist. But what exactly made these areas so risky when it comes to floods?
Risk of flooding is usually defined as the hazard (probability of occurrence) x exposure (people/property etc.

2.1.1 Flood risk

present in the area) x vulnerability (sensitivity of the system). (Kron 2005) (Fig 2.1) As I am not claiming to solve climate change itself and therefore reduce the occurrence of storms, and I am not claiming that moving everyone out of this area is a sustainable solution, I will focus on reducing the vulnerability. Coastal vulnerability is defined by the Intergovernmental Panel for Climate Change as "the extent to which climate change may damage or harm a system; it depends not only on system sensitivity but also the ability to adapt to new climatic conditions" (Pethick & Crooks 2000, p.359) Meaning, it is more than just the vulnerability of the system itself, but also the ability of the system to respond to climate change in a resilient way. In addition: "The concept of vulnerability includes the susceptibility of a coastal area to the physical changes produced by climatic change, but more importantly the impact that these changes may have on socio-economic and ecological systems." (Harvey et al. 1999, p.50) This means that adapting to climate change can not only be seen in physical interventions, but also in improving the strength and resilience of coastal communities on a social level.

Figure 2.1 Risk triangle including vulnerability, hazard and exposure. Based on Kron 2005

2.1.2 Social resilience

Resilience is often seen as the ability to bounce back from a disturbance. It is about "learning from past disasters for better future protection and to improve risk reduction measures" (Heijmans 2013, p.6). This applies to both natural systems and social structures, the latter of which we will focus on here. A study by Van Kessel et al (2014) showed that the main component of this social resilience was the ability for people

to "get on with rebuilding" (van Kessel et al. 2014, p.5). The authors found this need present in all scale levels of Bronfenbrenner's model on the ecological disaster resilience process. This model describes the levels used to analyze the effect that the environment has on people. Figure 2.2 shows this model adapted to post-Sandy situation.

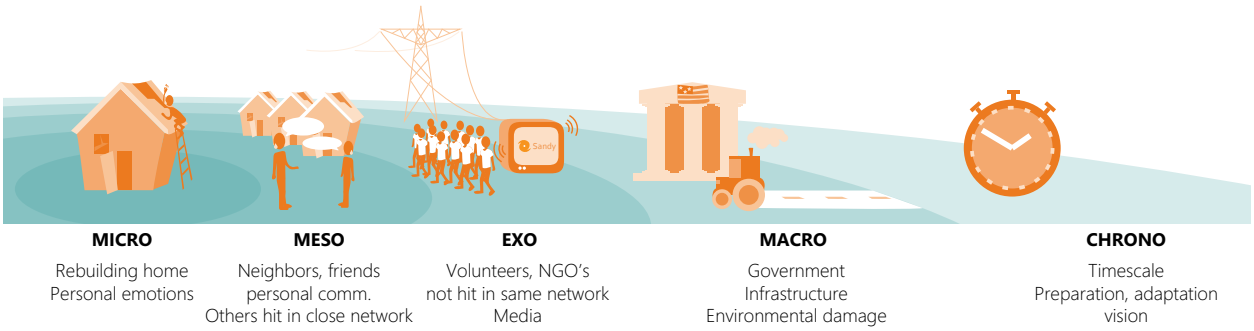

Figure 2.2 The resilience model adapted to the post-Sandy situation. Based on Bronfenbrenner in Van Kessel (2014)

After two and a half years, we see that the social resilience is still quite limited to the micro and meso scale. In the exo scale, there are still volunteers and NGO's present, but -just like the amount of media- the attention towards it is dying out. Multiple things happened on macro scale, but took a very long time until they reached other layers. Placing the situation after Sandy in the model, we can see where the missing link is (fig 2.3). On the left side, we can place local and community efforts to rebuild what was there before the storm. They do this work with rebuilding funds, mostly on private areas and have a short-term and small scale character. On the other side of the model, we can place the more regional, long-term plans of Rebuild by Design and the State and National government. Property rights and assignment of funds are slowing down many of these interventions. The problem finds itself between these players. Study of the Rebuild by Design proposals showed that community outreach was mostly a one-way street, while education, information and an active role in the design process could have helped communities to take on a more holistic, future-oriented attitude.

Even though all these layers concern the social landscape, bridging between layers can be done with physical interventions "through the deliberate and careful planning of community layout and architectural structures." (Daniel & Meyer 2015, p.262) Meaning that, as a landscape architect, I am able to improve this social resilience by carefully planned interventions that improve the links between the layers.

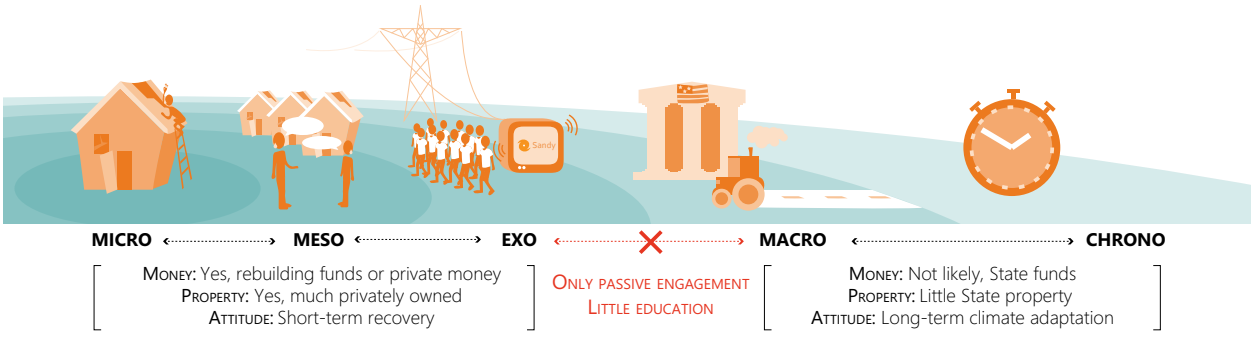

Figure 2.3 Missing link in the social resilience scheme. Based on Bronfenbrenner in Van Kessel (2014)

2.1.3 Community-based disaster management (CBDM)

The field of community-based disaster management researches how these links between societal layers can be improved in disaster recovery processes , by taking the community as starting point and working its way up to the other layers. The impact of natural hazards on people has increased more than the economic and population growth. Sustainable disaster recovery is therefore increasingly important but often fails. The reason for this is based in the short-term focus and absence of sustainability. (Murphy 2007; Pandey & Okazaki 2005) Short-term efforts help as immediate response, but over time lose their strength. They are only a way of recovering from a situation, not a way to rebuild in a new manner that will mitigate risks. To make sure that recovery efforts sustain, a crucial element is involvement of local knowledge and people, because "they are the first ones to become vulnerable to the effects of such hazardous events [and] they have the most to gain if they can reduce the impact of disasters on their community." (Pandey & Okazaki 2005, pp.2–3) Knowledge on the hazards, taking part in the discussions concerning the future and pride in local efforts is therefore very important in the continuous process of disaster preparedness and recovery. CMDB contributes to this process by "raising awareness on hazard exposure and its consequences and the appropriate preparedness and mitigation measures to undertake, [but also] gaining consensus, building interest and commitment to the actual community risk reduction assessment" (Victoria 2002, p.279) This way attention not only goes towards immediate recovery, but also to lasting rebuilding activities through a process of general rethinking of the landscape.

2.1.4 Grounded theory

To get from recovery to rethinking, this research takes a human-centered focus and looks for interventions that work from the ground up to larger scales. When applying this focus in research, one often associated with grounded theory. Grounded theory emerged from sociology and focusses on society and the individual and concerns "theory that is grounded in the words and actions of those individuals under study." (Goulding 2005, p.296) Grounded theory is therefore not based on deductive reasoning but inductive reasoning. (Corbin & Strauss 1990) It entails study of concepts grounded in the data and aims to explain social processes by looking at participant's experiences surrounding an issue. (Starks & Trinidad 2007) To do that, participants need to make the researcher "see their world and their actions within them" (Charmaz 2006, p.21). Visiting the site and interacting with the people surrounding the studied phenomena or process is crucial to achieve that.

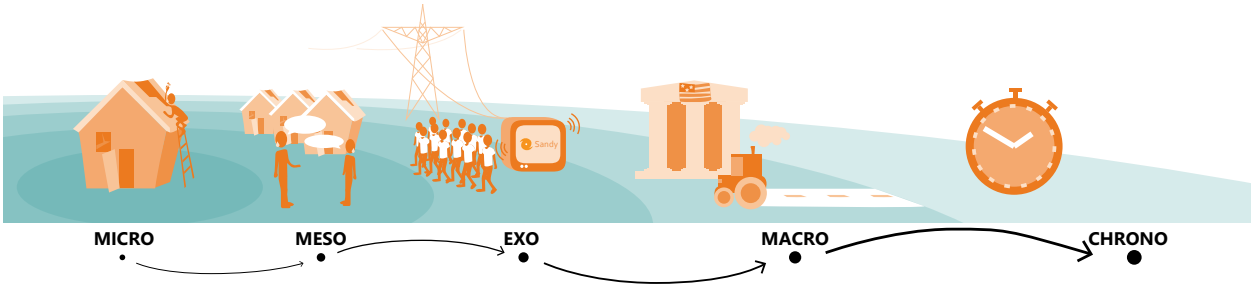

Figure 2.4 Small scale layer working its way up to larger scales. Based on Bronfenbrenner in Van Kessel (2014)

2.2 | LENS AND CLAIM

Landscapes are a system in motion, they are always in "the state of becoming" (McHarg 1992, p.29) The development and movement never stops, especially in coastal landscapes; the reason for my personal fascination of them. Every second of every day, the natural dynamic shifts sand, water and air to a different place. Sometimes, this dynamic comes to an extreme and collides with the dynamic of man. It is the task of the landscape architect to know both systems and carefully place interventions in this very complex dynamic, so a balance can be restored. Sometimes, these interventions might limit nature, which was the Dutch coastal defence strategy in the past and sometimes it will regulate or steer human dynamics. Today, we look for the balance in both systems, that can also be a fruitful ground for both systems to flourish.
In this particular design thesis, the research will be conducted through a worldview on the sliding scale between constructivist and transformative.(Lenzholzer et al. 2013; Creswell 2014) Or, as I would like to call it: change-oriented constructivism. The social constructivist claim is represented by the open perspective towards meanings and multiple truths held by different people. (Groat & Wang 2002; Creswell 2014; Lenzholzer et al. 2013) Perceptions of people in their own setting can sometimes even be more 'true' then scientific articles. Because what is truth without the perception of it? I will "seek to understand the context or setting of the participants through visiting this context and gathering information personally" (Creswell 2014, p.8) The change-oriented character finds its roots in the transformative worldview, which "provides a voice for these participants, raising their consciousness or advancing an agenda for change to improve their lives." (Creswell 2014, p. 10) This last step is done through experimenting with academic filmmaking in landscape architecture.

2.2.1 Academic filmmaking

Filmmaking can be seen as simply a different way of reporting and communicating research findings to an audience, but besides that it can also function as a research method. Hadfield and Haw researched video-based methods and their implementations in social science research. They found five modalities where the use of film in research can be ordered. (Table 2.1)

Modality	Explanation
Extractive	Video is used to record a certain event or interaction so it can later be studied in more detail by the researcher. For example: the use of video in tennis games, where the eagle eye is able to extract information on whether the ball was in or out that could not be extracted easily by bystanders.
Reflective	This modality is mainly based on the ability the rewind film, to look back at earlier actions or words of participants. The act of observing oneself, looking back, creates a mirror that both the participants and the researcher can learn from, draw conclusions from or even change their behavior based on it.
Projective and provocative	This way of using film is about showing and challenging social norms. It is in that sense an extension of the reflective modality. Video is used here as a discussion point and should trigger arguments about 'what is normal' and 'how things are done'.
Participative	Here video is used as a way to "encourage the co-construction of knowledge" (Hadfield & Haw 2012, p.318). Participants can be involved in the production process or be given the camera at some point, to literally observe the object from his or her perspective.
Articulation	In this modality, video is used to give participants a platform where they can be heard. Their existence and opinions, that otherwise might have been marginalized, are voiced through the medium of film.

Table 2.1 Modalities of academic filmmaking in research. (Based on Hadfield & Haw 2012)

This overview shows that there are variations in the objectivity just like any other research method. Some will be seen as valid methods in natural science, some in social science or both. In the last modality of Articulation, the objectivity is even openly discarded to be able to voice certain subgroups or taboos. For the filmmaking in this thesis, the modality 'Projective and Provocative' links well to the transformative aspects of the research. The purpose of the documentary is to show and question how different parties view the rebuilding process after Sandy. There is so much knowledge and experience about climate adaptation, so why isn't it applied yet? Challenging this complex societal and landscape-based issue from many different viewpoints and representing those views in the shape of a film, can make participants and other audiences reflect on their own perceptions of how it is done right now, and how it could or should be done. In the research and the film, my personal opinion in the matter will be unimportant. Both participants with a long-term view and participants with a short-term view will be treated as equally valuable to understand the complexity of the issue. The design phase will represent my opinion on the discussion and interventions that I would recommend.
Because the method of film is relatively new in the field of landscape architecture, chapter 3 will go more in depth on the use of academic filmmaking and how this method was applied in the thesis.

2.2.2 Research, design and the role of the landscape architect

Because the chance of actual implementation of a thesis is very small, I have the luxury of making mine more of a discussion point; a plea for climate adaptation with a starting point at the perspectives of a local community. Research and design form the pillars on which the case is build, "whereby design is not the aggregation of objectively-derived facts, but a dialect between pre-conceived solutions and observed facts" (Millburn et al., 2003) (Fig. 2.5)

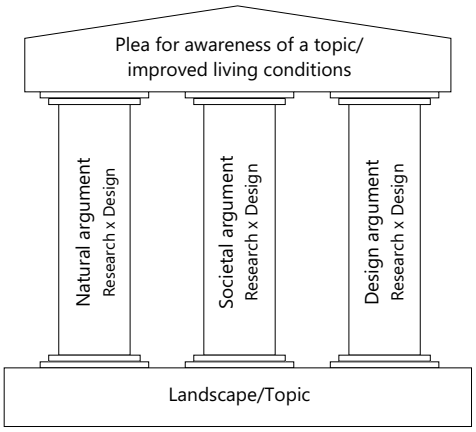

Figure 2.5 Thesis as discussion with supportive arguments

As a landscape architect, I am trained to create links between the physical interventions and the societal basis which the interventions need to match. I can develop smart solutions that fit the opportunities and restrictions of a certain landscape. I can add aesthetics in the shape of beauty, but also experience of embodiment, place, the senses, the self, the past and the future and emotions to the solutions or designs. (Roncken, 2014; Etteger, 2014) I see a landscape architect as a translator and discussion leader between different sciences and disciplines. Creativity is the mean used to translate natural and social sciences, research and design and the languages of different disciplines into comparable entities, so they can be brought together. The common factor is spatial configuration. In relation to the design thesis, this means that during the process, I will research both natural and social sciences and define what they spatially mean for each other, or facilitate between different parties.

2.3 | FOCUS AND ASSIGNMENT

Over the past three years since Sandy, a lot of knowledge has been generated. In table 2.2, the available knowledge is summarized.

Type	Deals with..	Examples
Plans from Rebuild By Design	Long term regional designs Focus on New York	(Rebuild by Design 2015) (BIG Team 2014) (Sasaki/Rutgers/Arup 2014) (PennDesign/OLIN Team 2014)(MITCAU et al. 2014)(SCAPE Team 2014) (Interboro Team 2014)(OMA Team 2014)(HRA & IP Team 2014)
Case Studies	Assessments environmental vulnerability	(Wu et al. 2002), (Titus et al. 1991)
Scientific articles	Impact on environment, mental health, vulnerable sub-groups	(Drexel University 2013), (The American Littoral Society 2012), (Dennison et al. 2012), (Neria & Schultz 2012), (Lane et al. 2013), (Rettner 2013)
Government/ Newspapers	Impact build environment	(Entreprise 2013), (Sagara 2012), (FEMA 2013)

Table 2.2 Overview of available literature and documents on the rebuilding process after Sandy

Scientific articles only assess the current situation, impacts and urbanization and do not adress what should be done about it. The design reports of Rebuild by Design have this focus on the future, but researches on New Jersey are few. A quick counting of the resources of Rebuild by Design, shows that most reports are about the whole tristate area (50 reports), then about New York (21 reports), about New Jersey (4 reports) and Connecticut (1 report). In the winning proposals there is not a single plan that deals with the Jersey Shore, even though this is where the storm made landfall. Another gap in knowledge shows in the perspective of local communities on their coast and climate adaptation. Rebuild by Design used participatory processes, but only as passive input for the designs and the results are not very well documented or analyzed.

Concluding from this gap, this research will focus on producing holistic and normative knowledge on climate adaptation in New Jersey. A design with a human-centered focus will generate knowledge on how local parties view their coast after Sandy and how they can be triggered to create more long-term and large scale climate adaptation measures.

2.3.1 Problem statement

In the current day and age, we have the knowledge, experience and resources to limit the vulnerability towards storm like Sandy. But, it turned out to be not a technical but a social issue, where short-term rebuilding strategies have the most influence. To adress this, awareness, priorities and link to local communities are crucial for success. The shift towards a more sustainable way of thinking about coastal management is already in motion. The existence of Rebuild By Design, with its large scale and long-term

plans, is proof of this shift. With this thesis, the aim is to keep adding to this shift, be it in a small way. The opportunity to create a new way of coastal development in this area lies within valuable discussion and cooperation between societal layers. The future of the Shore can be the reason for different layers of government and society to come together, like the Dutch governing body practically started by Water Boards that were forced to work together to insure a safe and productive future for the Dutch landscape.

2.3.2 Research focus

The process of specifying the research assignment is done through a couple of steps. (fig 2.6) The knowledge gap showed that researches and designs of New Jersey were few. Within that State, the idea of 'keeping it simple' lead me to focus on the Northern Headlands, where the ocean generally only comes from one side. The network I was able to expand lead me towards Asbury Park. This network is shown in fig 2.7. Concerning the topic, personal learning goals and the theoretical framework steered towards the social aspect of resilience, of which the main issue lays in a societal shift towards resilient coastal management. My personal fascination, combined with the goal of this thesis, was the basis on which I chose to do a combination between research, design and film.

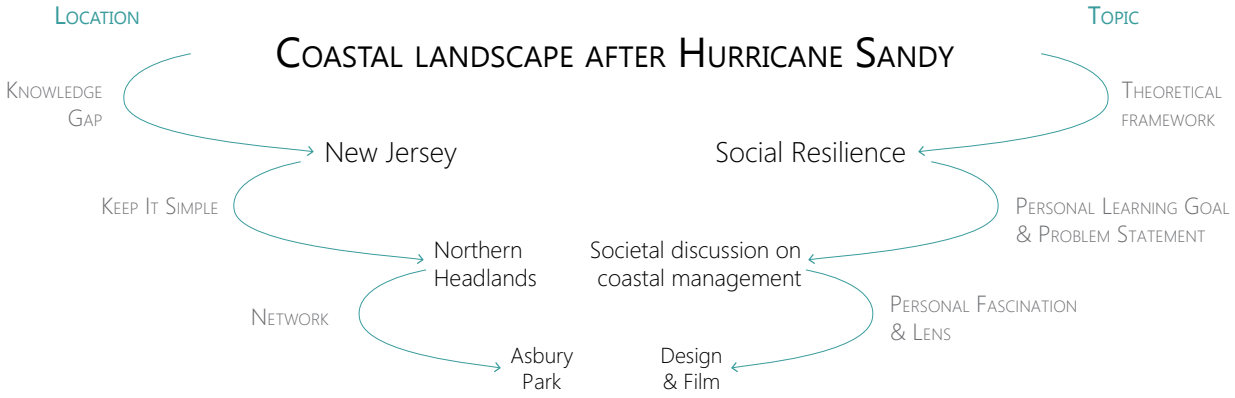

Figure 2.6 Specification process of the research focus

2.3.3 Design Assignment

In the Netherlands, the regional threat of coastal safety is very similar to that of the US east coast. An important difference is, though, that the flood of 1953 functioned as our eye-opener. After that event, the national government took on an attitude of 'never again', resulting in the formation of The Delta commission and large infrastructural interventions like the Oosterscheldekering. To this day, the National Board of Water and Infrastructure (Rijkswaterstaat) keeps water safety out of the hands of the citizens. A top-down handling of these similar regional problems in New Jersey seems unrealistic in the current American society. Due to its individualistic nature, they hold a very different relationship towards the government. Americans want to create their own success in life and do not trust their government to be a part of that in the way that Dutch people do.
An important part of the design assignment is therefore to find local solutions for this regional problem.

The fact that large interventions would not gain much ground amongst American citizens, does not mean they do not care about their surrounding neighborhoods. They just want to know who they are helping, instead of helping a collective. For them to care about this regional problem, it has to be made understandable on small scale and for individual people. Second, a balance needs to be found between the wish to live on this edge between land and water and the amount of risk that comes with it. Large scale urbanization of the coastal area is not an uncommon demand. Through the history of settlement, people were always attracted to edge landscapes. These are the places of tension and excitement. To dance on a volcano appears to be a human instinct. The challenge is to make environments that accommodate this desire in a safe way, or at least with an acceptable risk.

Figure 2.7 Contact network

2.3.4 Research and Design Questions

From the previous chapters and paragraphs, the following questions are formed:

Research Question (RQ)	Sub Questions (SQ)
In what way can the vulnerability towards storm-induced floods be reduced along the coast of New Jersey, USA, using a change-oriented constructivist approach?	**SQ 1 RESEARCH – vulnerability towards storm-induced floods** Which landscape and societal factors are currently causing the vulnerability towards storm-induced floods in the study area?
	SQ 2 FILM – change-oriented constructivist approach How can academic filmmaking play a role in change-oriented landscape architecture?
Design Question (DQ)	**Case**
How can the regional vulnerability towards storm-induced floods be addressed with local solutions?	**SQ3 DESIGN – regional problem local solution** How can Asbury Park be designed with local climate adaptation measures that fit into a regional strategy?

Table 2.3 Research and design questions leading this thesis

The aim is then to, first, get a grip on the current repetitive cycle of storm and rebuild, with all the factors that influence the further development and what the future will probably be according to projection of the current influences. Second, the film will aim to challenge the norm of repetitiveness and encourage people to think about what needs to happen to ensure a safe future for this coastal landscape. Last, the step of design is then to develop a future alternative that reduces the vulnerability towards storm-induced flood along the coast of New Jersey, USA, by proposing local solutions that fit in a regional strategy.

2.4 METHODOLOGY

Traditionally, the Wageningen approach is based on the triplex models of Kerkstra and Vrijlandt (fig 2.8). In this model, relations between biotic and abiotic layers form the patterns that make up the landscape. Though these authors support the notion that a landscape is always in changing (Duchhart 2007), it does not show in the triplex model very well. Also, their starting point is more focussed on the actual visual landscape, while some social interactions and processes might not be visual but still very influential for how the landscape is formed. Therefore, for this thesis, a different model is used. In Duchhart (2007) the triplex model is combined with the socio-physical organization model of Kleefmann (fig 2.9). Where previously, "landscape architects tend to approach these relations much more from an ecological and spatial perspective, while Kleefmann explicitly includes a social point of view."(Duchhart 2007, p.18). Intertwining these two models combines the systematic approach to a complex landscape of Kerkstra and Vrijlandt with the focus on processes with a social starting point of Kleefmann. This combination makes the model very applicable to the lens of this design thesis.

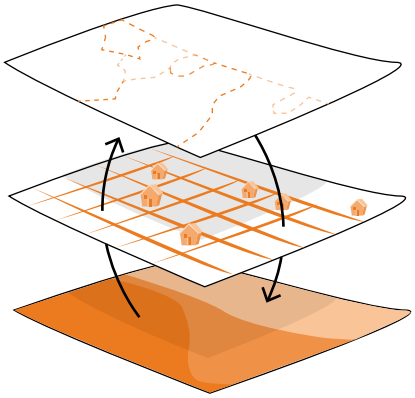

Figure 2.8 Traditional triplex model of Kerstra and Vrijlandt

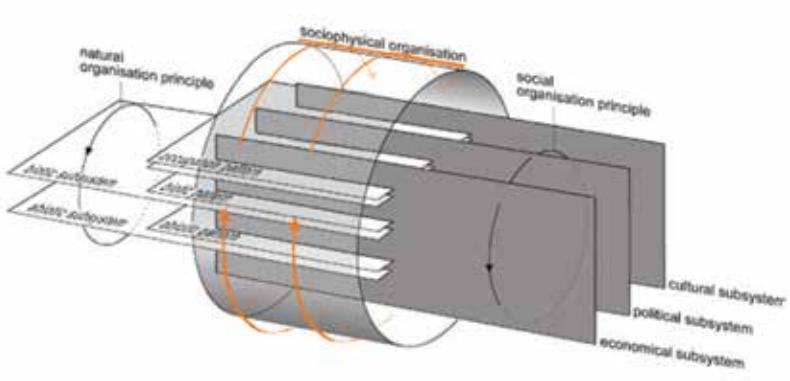

Figure 2.9 Socio-physical organization model of Kleefmann (Duchhart 2007)

2.4.1 METHODS

Table 2.4 shows the methods used in the thesis per sub questions. Multiple methods are used to get to the sub goals of the specific research question. Multiple subgoals form the basis for the research outcome. The output is then 1) a research on the factors that are currently making up the vulnerability towards flood, 2) research on how film can be used to address that issue, 3) a documentary showing the different perspectives on the future of the Jersey Shore and 4) a design for Asbury Park that links local solutions to a regional strategy.

In fig 2.10, this process is depicted in a flowchart, starting with the base of knowledge and experience that I carried when starting this project. This background helped me form the aim and outline for the research. The research itself is split up in three segments that correspond with the three parts of the design thesis: Research, film and design. In grey are the main methods or research activities that are a key input of that part of the research. In light blue dashed lines is the output of that research activity. Part one concerns the

first research question about the factors that are currently causing the lasting vulnerability towards floods. Analyses of the landscape, literature and studies on site aim to find out what is causing the repetitive cycle of storms and rebuilding processes in the area. A focus is put on the human layer of the landscape, because of the constructivist approach of the thesis. Through designing, the collected data can be analyzed and synthesized to form new insights on what the problem in the rebuilding process really is and why it does not come to more long term interventions. Part two focusses on the use of academic filmmaking. Literature study will provide more insights on the relationship between landscape and film and how to apply the method in a way that is useful for design research. Video footage of the location and interviews with different parties surrounding the issue form basis for the ethnographic film. Discourse analysis of the filmed interviews and analytical sketches will extract design guidelines that can later be used in the design. Also the use of community outreach posters helps build guidelines and preferences for design. In part three, the thesis focusses on the design. Main input for the design process are the design guidelines that come out of the film analysis and the posters. Together with the knowledge on the processes of the landscape, these guidelines can be applied to the Jersey Shore. After the regional design, focus zooms in on the specific study area of Asbury Park. Through the use of models is explored what the regional strategy can mean for this location. The local design will be based on interventions that function on a small scale but also have a place in the larger improvement of regional flood protection and coastal management.

SQ	Method	Sub Goal	Output
SQ 1	Literature study	Theoretical context	Factors that currently make up the vulnerability
	Landscape analysis	Landscape dynamics	
	Designing as way to map different sources of information		
	Site visit		
	Document study	Post-Sandy Dynamics	
	Comparative photo study		
SQ 2	Literature study	Theoretical context	How film can play a role in addressing the issue
	Video interviews	Design guidelines: strategy	
	Discourse analysis		
	Designing as way to summarize and analyze local stories and perspectives		
	Community outreach posters	Design guidelines: techniques	
		Test film as discussion	
	Editing process		Documentary
SQ 3	Design guidelines	Regional Design	Local solutions in a regional strategy in case study area of Asbury Park
	Landscape analysis	Local Dynamics	
	Design Models		
	Designing to find local solutions in regional strategy	Local Design	
	Designing as way to generate new search questions	Detailing and material	

Table 2.4 Methods organized per sub question and the goal that they serve in the design thesis

The implementation strategy will try to link the designs to the research outcome of why long-term change has not been successful up to now. All throughout the design research process, concluding and reflecting on choices is present. In the final stage, though, there will be more emphasis on these activities. Finally, the discussion with local parties is continued with the help of the film, to keep contributing to the change towards a regional and long term flood protection.

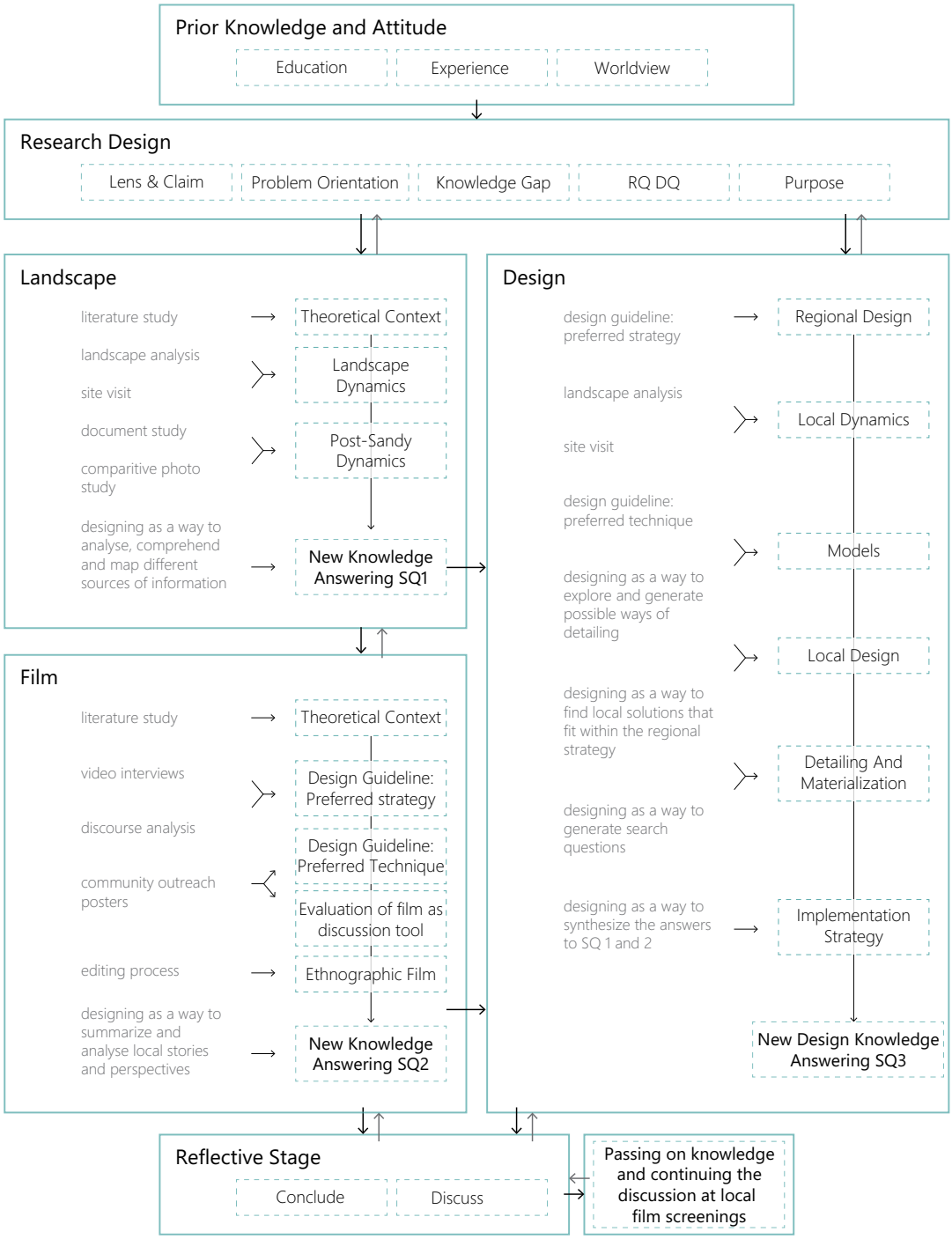

Table 2.10 Methods and the goal that they serve represented in a flowchart that depicts the work strategy

2.4.2. Researcher <-> participant

Different methods entail different relations between the researcher and the participant. In fig 2.11, this changing relationship is shown. In all three sub-questions, desk study of literature, documents or maps is present. This is placed solely at the researcher and will provide a base of knowledge from other academic researches or give insights from for example Rebuild by Design documents or newspapers. In the landscape analysis different layers of the landscape will be studied, providing again the base for the rest of the research. This will not only consist of desk study, but also analyses on site and local participants become a valuable source to help uncover the complex reasons behind the problem statement. During interviews participants also provide input, but more importantly discuss their view on the issues. The method of filming is used an a experimental data collection method in landscape architecture and as a reflective tool for local parties to think about their actions and perspective in relation to climate adaption of their shore. During the making of the film, the researcher and participant are put on equal levels: Participants can collect footage, contribute to the project and reflect on the discussion through watching the film. This last step is used during the community outreach posters, where participants are asked to evaluate possible intervention techniques after watching a short video. During the landscape design the constructivist view is present more, resulting in the different relationship between researcher and participant. The goal of the end results, a written report, documentary and landscape design, is to enable discussions between the researcher, participant and within the different groups.

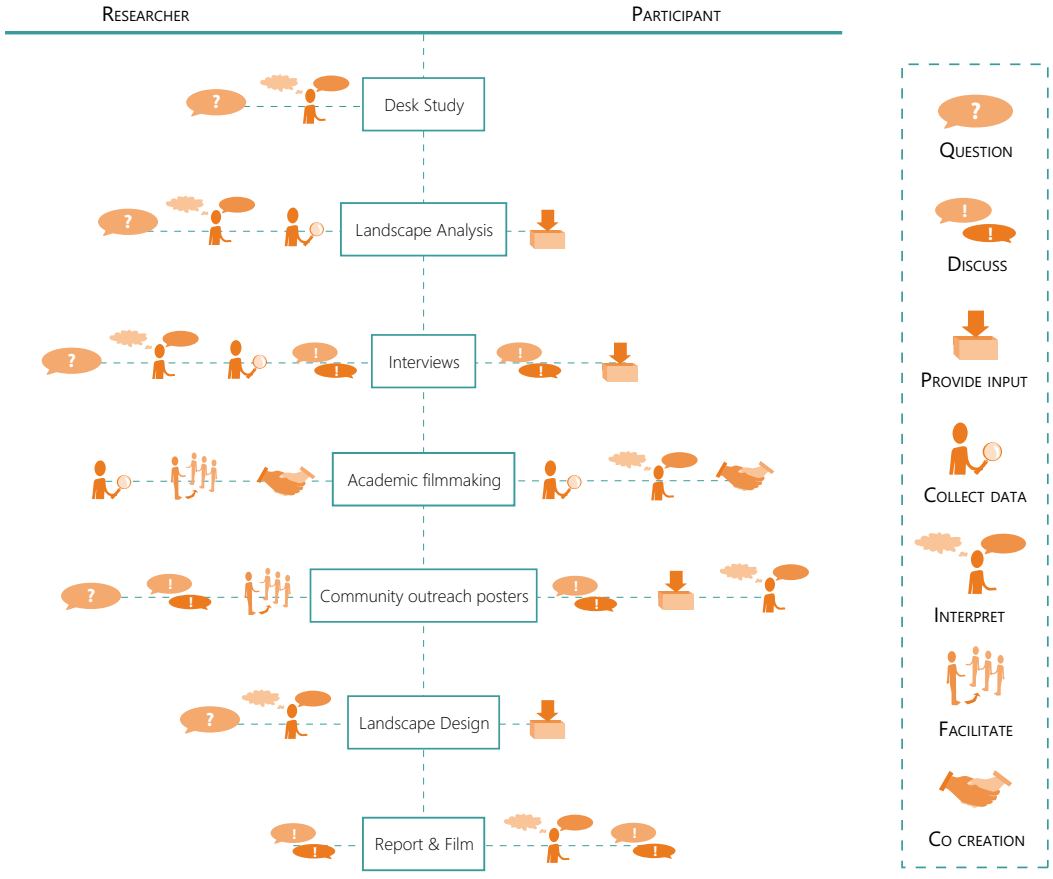

Figure 2.11 Changing relationship between the researcher and the participant

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3 | Academic filmmaking in landscape architecture

Every day, landscape researchers go on field observations, analyzing and reporting what they see with photo cameras. "The very heart of geography – the search for our sense of place and self in the world – is constituted by the practice of looking and is, in effect, a study of images." (Aitken and Zonn in Kindon 2003, p.142) But using film in their researches –even though the availability of movie cameras has increased extremely over the past decades- has yet to become a common method in landscape architecture. In this chapter, the link between film and landscape will be discussed. In the Research Design, the aim of using film as research method was already explained as one of the modalities of Hadfield and Haw (2012). Here, the modality of "Projective and Provocative" deemed most applicable for this thesis. Also the modality of "Extractive" will be explored to use video as way to collect data. (Table 3.1)

Modality	Explanation
Extractive	Video is used to record a certain event or interaction so it can later be studied in more detail by the researcher. For example: the use of video in tennis games, where the eagle eye is able to extract information on whether the ball was in or out that could not be extracted easily by bystanders.
Projective and provocative	This way of using film is about showing and challenging social norms. It is in that sense an extension of the reflective modality. Video is used here as a discussion point and should trigger arguments about 'what is normal' and 'how things are done'.

Table 3.1 Visual modalities that will be used in this thesis (Based on Hadfield and Haw 2012)

By using film with a norm-challenging character, this thesis aims to contribute to the paradigm shift that needs to take place to reinterpret fundamental values that currently stand in the way of a flood resilient landscape. Through video as data collection tool, local views are extracted that will form the base for guidelines for design. But first, because academic filmmaking is still in an experimental phase in the field of landscape architecture, this chapter aims to give more theoretical and practical insights of what filmmaking and landscape architecture can offer each other.

3.1 | VISUAL CULTURE AND LANDSCAPE

Even though we do not see it directly, landscapes around us are influenced by the production of images. "Like the plow forever changed the physical landscape, so photographers and the images they produced changed its personality and perception." (Jongerius 2015, p.10)

Film has the power to transport us to unknown places. Even if you never physically traveled to Japan, Alaska or the mountains of Tibet, you have an image of it after seeing Memoires of a Geisha, Into the Wild or Seven Years in Tibet. Seeing these movies creates an image in our head about what this place looks like. (Carl 2004) This image is created based on what is shown in the movie, but can be distorted by the makers. In Seven years in Tibet, for example, film locations were based in not only Tibet, but in Austria, Canada and Argentina. (Orueta & Valdés 2007) "[V]isual images manipulate reality and we are fooled into thinking that seeing is believing." (Carl 2004, p.29) Our images may not always be accurate, but they leave a mark on our visual culture; our expectancies of what something should look like. (Orueta &Valdés 2007) Landscapes are designed according to this expectation. (Jongerius 2015)

A good example is Lord of the Rings. This very popular film trilogy shows the adventurous quest that leads through various types of mystical landscapes. Shown all over the world, the movies created an enormous flow of tourists towards New Zealand, where the films were shot. The tourist industry now provides tours along the LOTR landscapes including a visit to real hobbit houses. Is this a landscape, film set or theme park? (Fig 3.1)

These types of changed visual expectations through the influence of movies can be found all over the world. Examples from the USA, are the role of cowboy movies on the visual expectation of prairie landscapes and the typical Lucky Luke cactus. (Fig 3.2 and 3.3)These type of cacti are originally found in Mexico, but, due to the representations in visual culture, "have become an icon of the Southwest". (Jongerius 2015, p.171) The expectations of what a landscape should look like can grow so strong that environmental consequences are of secondary importance. Jongerius (2015) describes how the image of an oasis-like landscape in Los Angeles, has grown more important than the serious droughts that are caused by the irrigation needs.

Figure 3.1 Hobbit houses, Hobbiton, New Zealand Source: (Meinhold 2010)

Figure 3.2 The landscape of Lucky Luke source: (ComicVine 2013)

Figure 3.3 Screenshot from Once upon a time in the West (Leone 1968)

3.2 | WHY USE FILM AS A METHOD IN LANDSCAPE ARCHITECTURE?

There are much more similarities between the fields of landscape architecture and film than one might think. Filmmakers are visual thinkers, dreamers, people who have a critical view of the world around them and can put everything up for discussion. Just like landscape architects, they are painters, writers and musicians at the same time. (Spielberg 1988)

3.2.1 Landscape setting

When a filmmaker makes a documentary about a landscape, he asks himself the same questions as a landscape architect on a field trip: what makes this landscape, this landscape? In that process of characterizing the landscape, the filmmaker searches for the same elements a landscape architect would in his landscape analysis. First the elements that make it recognizable, linking to Lynch's paths, nodes, edges, districts and landmarks.(Lynch 1960) No landscape architect or filmmaker, would make a plan or documentary about Paris without mentioning the Eifel tower, about New York without showing Manhattan or, in this case, Asbury park without its boardwalk. These settings immediately show the location and part of its identity. Using video can even add dimensions to report this first physical landscape, because it can capture change. Landscapes are a systems in motion (McHarg 1992) and film is a medium that can actually show this dynamic.

> *„A movie may be regarded as an intention to register something that is fleeting- elements of a process, (...) a response to prevailing conditions or to reveal something that is otherwise invisible - drifts of a wind, the relationships that impart structure to an environment." (Laurel 2003)*

3.2.2 Stories and persona's

A second thing both disciplines search for, are stories. Adding this human element gives life to the plan or documentary. Film as research method initially came from anthropology and ethnography, mostly because it enabled researchers to show a phenomena or story in its own surroundings (Pink 2007). By letting people tell their story, they remember, reflect and share the experiences that are embedded in that landscape. Video is able to bring up this otherwise tacit knowledge or practices. People are as much part of their landscape as the landscape is part of them, so, when capturing stories in their matching locations the surroundings will tell as much as the actual words in the story. Using the method of film will register both at the same time. Giving the participant a camera will even enable the researcher to collect data and stories from a first-hand perspective.

A limited amount of people can form the main characters in a documentary. They are chosen as having different perspectives on the filming subject. They have a relatable profile and carry a perspective that is representable for many others in their subgroup. (Martin & Hanington 2012) These people form personas, a method commonly used in landscape architecture. A difference is that in landscape architecture, these would be fictitious characters that are an average or typical representation of a subgroup. In film, it is an actual person who might vary from the typical representation. (Raijmakers et al. 2006)

3.2.2 Multisensory data collection

The view that the landscape is more than just the visible, is a growing issue in the field of landscape architecture. Film can benefit design research by a way of data collection and communication that speaks to multiple senses. The visual will still be a dominant sense, but the addition of sound adds a whole new dimension. (Rakić & Chambers 2010; Vroom 2014) Not only will interviewees be able to express themselves and in their own voice, but the sounds of the landscape are also linked to their visual image. Wind blowing, birds singing, waves crashing, cars or trains driving by, if you think of it, what is a landscape without sound? Unfortunately smell and touch are yet to be part of the medium of video. But, film can add a perception of time – slowed down, real time or speed up-, movement including velocity, atmosphere of a place and empathy for the people or events depicted. (Pink, 2007)

3.2.3 Subject, approach and purpose

Another aspect that film and in landscape architecture have in common, is the purpose it can have. A landscape architect never just describes the landscape and stops there. Instead -directly or indirectly- he wants to expose a problem, bring attention to an issue or in a different way press his views and values onto the landscape. This is one of many purposes a design can have, just like a documentary can have this purpose. (Raijmakers et al. 2006) A documentary can showcase a subject and implicitly or explicitly ask the viewer to form an opinion or even adopt the opinion of the maker. (Bordwell & Thompson 2008) Both a landscape architect and a filmmaker can start at a problem, approach this problem from their own values, shed light on the subject by showing different aspects surrounding it to make their case and can pose solutions that in their worldview would help solve the issue. Whether this project is communicated through a design or a documentary, is irrelevant for the stated purpose.
In this thesis, the aim is to both bring attention to an issue and advocate change from a bottom-up perspective. The choice of visualization is then important to support this aim. The appropriate type of visualization can then be crucial for the public involvement, by for example translating the complexity of the issue in a common visual language. "Visualization provides a focus for a community's discussion of design ideas; it guides community members through the design process, it raises their design awareness and facilitates better communication."(Al-Kodmany 1999, p.38) The use of video can support those aims by shaping the subject into a discussion point that is understandable for everyone and where participating and viewing audiences can reflect upon.

3.3 | ACADEMIC FILMING METHODS

The method of filming was studied and applied within the research in multiple ways. The result is an intertwined written report and documentary: research shaped the way the film was set-up and made, while the film also influenced the research results. This chapter describes the choices and actions in the process towards making the documentary.

3.3.1 Approach

Table 3.4 Intertwined relationship between film and research: Research on, for and through film

The relation between research and film changed over the course of the project from research on filming, to research for filming, to research through filming (fig 3.4). First, the method of filming was studied by looking at theory and other documentaries. Looking at these examples gave insights on the large amount of choices that influence the type of film result, for example whether the researcher is present in the film or not. In this project, we decide to not be present in image or sound. The film is about the location, the people in the landscape and the discussions about the future, not about me. The only exception is made at the community outreach posters, because the research is then actively interacting with the participants. At that point, my presence and voice is included in the film.
Second, research created knowledge that informed the video report. For example, the storyline and choice of characters were based on research prior to making the film. Last, filming functions as an active part of the research. Filming was a way of exploring the surroundings, understanding the personas from their own perspective, documenting their tacit knowledge and practice and involvement in the project.

The visual methodology that will be used in this thesis, relates to the ethnographical representation of the stakeholders surrounding the thesis topic. The film focusses on a single topic (Climate adaptation of the Jersey Shore after hurricane Sandy) and highlights the complexity of multi-stakeholders surrounding the issue. (Fig 3.5) An characteristic of documentaries is that they can "accommodate the opposites, paradoxes and ambiguities that are part of everyday life and to explore them rather then to resolve them" (Raijmakers et al. 2006) The documentary lets the various perspectives that these parties might have on the same topic

co-exist and enables viewers to understand the complex setting in which rebuilding decisions are made. (Raijmakers et al. 2006) The fact that viewers see every stakeholder reason from his own perspective increases empathy, engagement and understanding of that person's worldview through the simulation of actually talking to that person. Besides creating understanding, it also encourages learning through reflection on own and other perspectives how things are done now and how they could or should be done. (Witteveen et al. 2010)

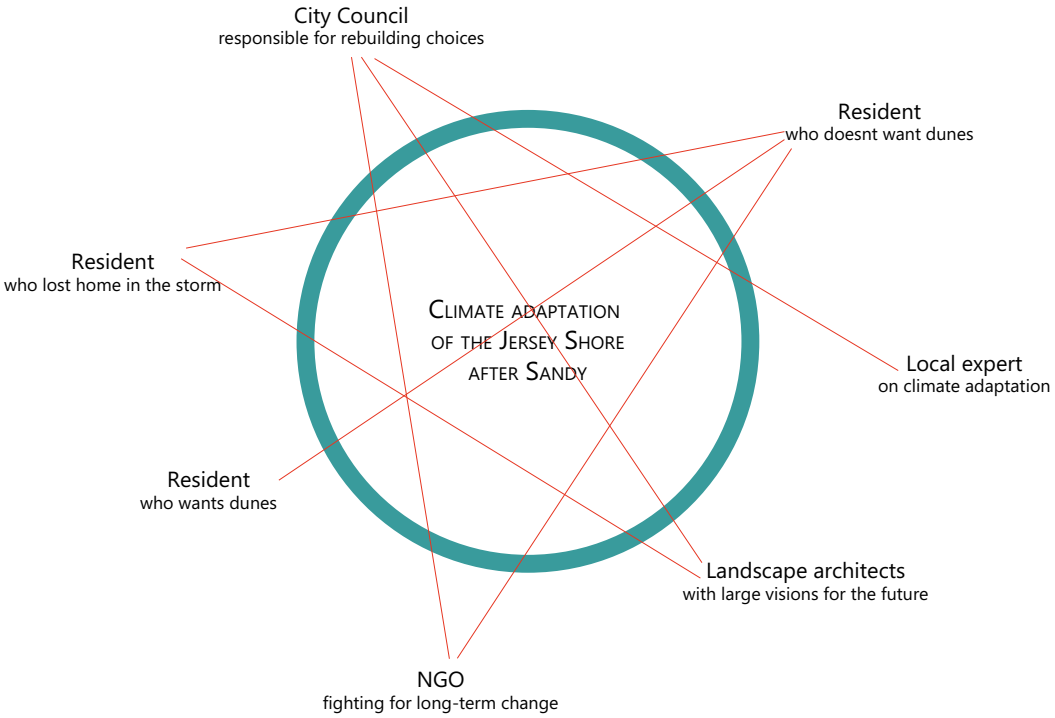

Figure 3.5 Visual Methodology: Different perspectives surrounding a single topic

3.3.2 Application of the method

In this design thesis, the method of academic filmmaking will be applied in two ways: As data collection tool and as educational discussion tool. In the following paragraphs these ways of applying are discussed and the added values for research is underlined.

Data collection tool

"As researchers, much of our work revolves around data collection. The filmmaker is a data collector too." (Goodman 2004, p.331) In this thesis, the main focus of the data collection will be on the filmed interviews. Having a video recorded interview adds much value over an interview with only sound recordings or written notes. "[A] research documentary allows us to hear the voices of the participants directly in a way that allows us to capture the nuances of gesture, facial expression and vocal intonation and emphasis." (Petrarca & Hughes 2014, p.579) In addition, video as data collection method is able to bring out knowledge and

actions that otherwise would have stayed tacit. (Pink 2013) Film in research is therefore discussed to be not just a different way of recording, but an innovation in research data collection itself, because it changes "how we approached and considered data collection, analysis, and mobilization, and improvement of data interpretation and mobilization." (Petrarca & Hughes 2014)

Discussion tool

Documentaries have always, and in many forms, been a way of sheading light on a societal issue with the purpose of creating change through informed discussion. For example how 'Bowling For Columbine' (Moore 2002) asks its viewers to reflect on gun laws in the US, or how Al Gore gave a large push to the climate change debates through 'An Inconvenient Truth'(Guggenheim 2006). Film has the power to awaken or stimulate these types of societal discussions. In science, a documentary can add value to its audience by increasing "empathy", "provide a sense of particularity that abstractions cannot render", "generate insight" and stimulate an "attention to complexity" (Petrarca & Hughes 2014). In addition, not only the knowledge that is transferred to the audience increases, but also the audience itself becomes larger by expanding beyond the academic community. (Pink 2013; Petrarca & Hughes 2014)

3.3.3 Techniques

Making the documentary would not have been possible without the help of Anouk Saint Martin, who is a Film Science graduate and responsible for the camera work and editing process. Over the course of the entire project, she was an important source of practical knowledge and experience in film production and filming. We discussed many reference documentaries and did practice rounds at the beach of Scheveningen to test the material and get some experience in filmed interviewing.

Preparation

Together with Anouk, every minute of what we imaged the film to become was discussed, based on the research and contacts at that moment. The script functions as a sketch of the overall story: the set-up of the film, the message, order of the interviews and what functions the interviews would have in the whole project. (Appendix II). Of course there were many assumptions and uncertainties because we didn't visit the locations yet and hadn't done the interviews. Even though, it provided a helpful guideline during the filming period because we had a sketched view of what our goal was.

Capturing location and people

The first days on location were about exploring future film locations that would represent the town well or locations that could later be used as background for interviews. It is important to capture the seaside town as diverse as it is: Many of the footage focusses on the shore, as this is the heart of the town and the research. We made sure that we had this location in the early morning, in the afternoon and at night during the 4th of July celebration when people come together to see the fireworks over the ocean.
Filming these places, activities and people enabled us to capture things that otherwise would be lost. Small things that are normal for people there can be left out in regular data collection methods, because

it is so normal to them. Video captures these tacit practices. The method of film is perfect to show the change in one location, but also to show the change between different locations. An action camera on a bike, for exmaple, allows us to show the change in neighborhoods and the growing amount of traffic when getting closer to the coast. (Fig 3.6) Recording from the back of the car, gave us the opportunity to make filmed cross sections of different towns to show the change landscape towards the coast and what flood protective interventions were used along this cross section.

Fig 3.6: All the materials we brought with us on a film day (from top to bottom, from left to right): Action cam mounting kit, action cam, detailed sound recorder, laptop, tripod, release forms, camera, pen, script, extra batteries, headphones, microphone, present for the interviewee, hard drive, camera cleaning set

We used first hand footage of locals to create an even stronger link between the images and the location. A lot of footage was provided by the local newspaper, the Asbury Park Press. They shared press pictures and video material that their reporters made in the days surrounding the storm. Also, we gave the camera to a surf instructor, who filmed his surfing experience during one of his classes. Last, we always asked during interviews if people had video or photos of the events they mentioned in their stories. With this visual addition to the stories, we were able to illustrate their stories better than only words can.

Filmed interviews

Regular interviews for research purposes can be challenging, but with a topic that can be very emotional for some and adding a camera to the setting, adds even more aspects to consider in its execution.
Setting up the interviews, we aimed to be clear about the research context, goal of the meeting and the presence of a camera during the interview. We didn't want to surprise someone by showing up at the interview with a camera. This communication with the interviewee beforehand, gives them the chance to think about the subjects and enables them to give clear and concise answers that are easier to edit into the film.
During background research on the interviewee, the goal was to already know the topics that the interviewee would want to talk about and the opinion they would probably take on in that discussion. This steered the formation of the right questions and tone of the interview, depending on if our goal was to let the interviewee talk freely about their own experiences or evoke an critical discussion about certain choices that were made. This background research also helped to form a feasible script with our expectations of what the interviews would bring us.
Most of the times, the interviewee chose the location of the interview. In the half an hour before, we would set up the equipment in such a way that the background image would suit the interviewee or the topic. Also, things like wind direction, distracting activity or noise shaped our choices of the setting. (fig 3.7)
The introduction towards the interviewee was positive and relaxed, to limit the persons' feelings of being nervous about the presence of a camera.

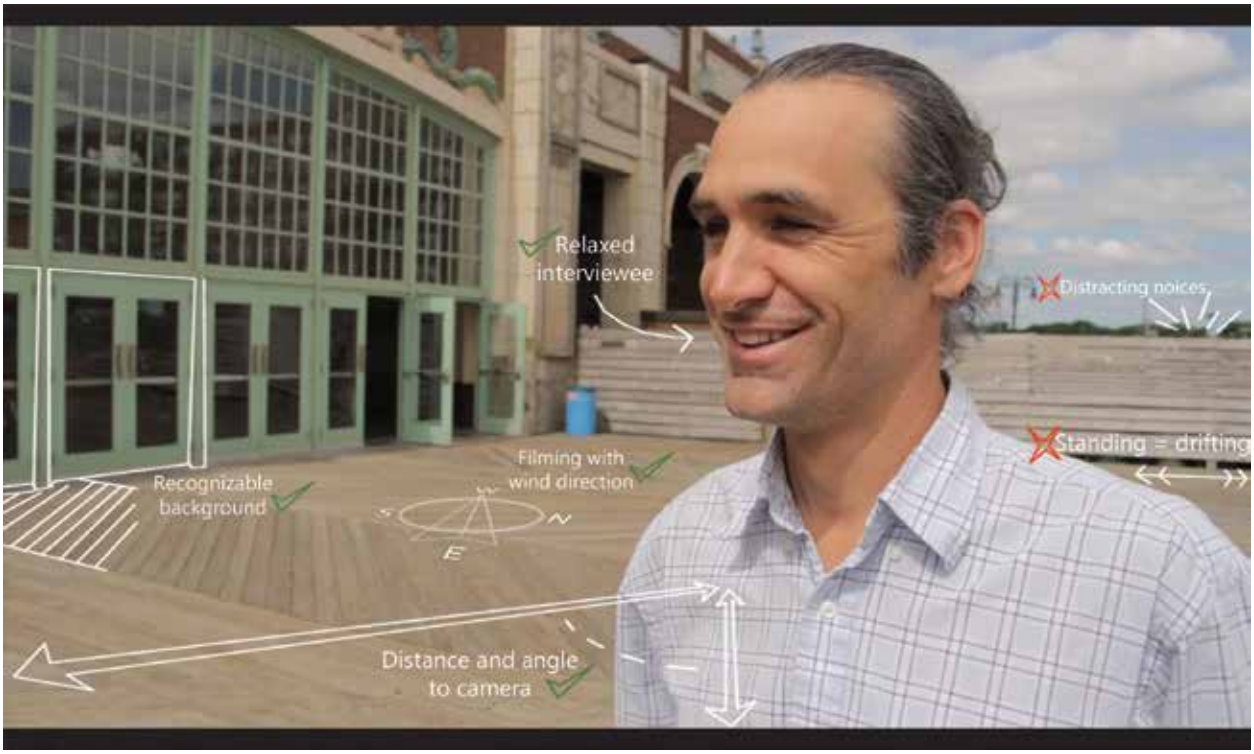

Figure 3.7: All the choices and decisions that are present in each frame of the footage

The set-up of the questions is also designed to make the interviewee feel more comfortable in front of a camera. (fig 3.8, appendix III) The first 3-5 questions have a sole purpose of letting the interviewee get used to answering in front of a camera, so the real questions will be answered in a normal and relaxed way. Some people did not need these calming introductory questions, while others needed more time to overcome their nervous feelings. The core of the interview was done in a semi-structured way with open questions based on the background research, the script and research interests.

Explaining
Calming
Reminding
First try

My questions will be cut from the documentary, so I will be silent for a few moments between the answers and questions to create a gap were we can later make the cut. And because my question will be cut, I would like to ask you to answer in whole sentences. Other than that it will be a normal conversation and you can just look at me during the interview.
The interview will take about XX minutes. First I will ask you some introducing questions about XX, after that we will talk about XX, XX and some ending questions. If you want to pause the interview at any time, let us know.
Could you state your name and the date, so we can test the sound?

Figure 3.8: Concious set-up of interview questions to limit influence of the camera on participants behaviour

At this point, the camera is turned off and the interviewee has to sign a personal release form that allows us to use their image, likeness and voice in the documentary (appendix IV). On this form it also asks whether they would like to receive updates on the development of the project and future film screenings. If so, they will be kept posted through the projects' website (www.creatingattheedge.wordpress.com) or the Facebook Page (www.facebook.com/creatingattheedge). Blogs on the research activities are placed on these websites. A week after returning from the site visit, the website has had a total of 290 individual visitors, responsible for 824 views, of which 556 from the Netherlands and 213 from the USA. The Facebook page had 68 likes and a highest total reach of 383 people per blog post.

Editing process

Processing the raw footage of one interview took about 2 days. In this time, the interview of 30-90 minutes is reduced to 3-9 minutes of film. There are a couple of steps to be taken to get to this 90% reduction without losing the argument of the interviewee.
After an interview, we leave all the new information alone for a day. All interviews, but especially the more emotional interviews with Sandy survivors, can be very exhausting. Our memories in the time away after an interview are the first way of filtering the raw data. The next day, I went back to the interview to write down quotes that were important in the story or a clear answers to the asked questions. Traditionally, an interview would be transcribed fully and coded for analysis. In this case is chosen otherwise, first of all because the step of transcribing would be translating the footage to text again, and in this experiment we want to explore the values of video data and try to move away from only having written data. Second, the transcription of all the hours of footage would not be practical in the timeframe of this project. Back to the footage, a longlist of quotes from the interview is created, with the time and summary of that quote. After the whole interview is processed this way, a shortlist of quotes is made. Quotes are chosen that together represent a summary of the larger argument of the interviewee. This representation has to be done in a ethically sound manner, to not represent the interviewees in a different way than they were in real life.
The short list of quotes goes to Anouk, who cuts the footage to match that list. She might alter or add

some quotes with the purpose of creating a film story that a viewer is able to follow, understand and find interesting, after which multiple feedback rounds on the result follow. This process is repeated for all interviews, with a documentary of about 25 minutes as result.

Additions

Animations helped clarify phenomena or words used by interviewees. In the documentary, they are put to use to introduce the location and twice to explain phenomena mentioned by a local expert.
Because of intellectual property rights, we are not able to use music from others in the documentary. Therefore, Lennart Meijvogel made our own film music. As inspiration we showed him footage of the location, talked about our experiences at the location, its history and referred to artists that we thought suited the feel of the place. With this in mind, he was able to provide us with five tracks of music that we would describe as beachy with a hint of rock-and-roll, just like Asbury Park.

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4 | Laying out the Landscape

Now that the context and set-up of the thesis is clear, the focus moves to the landscape that forms the stage of the research topics. To know what factors keep the repetitive cycle of storms and rebuilding in place, a landscape analysis is conducted. Combined with the site visit and supporting literature, the landscape analysis aims to give insights on the workings of the landscape dynamics present in New Jersey. The analysis is organized into three parts: 1) the natural landscape, with its geological base and processes that shaped the land, 2) the anthropogenic landscape, concerning urban growth and infrastructure that man has added to the natural landscape, and 3) the social/political landscape, where the influence of borders and property ownership in this landscape is discussed.
In the next chapter, the analysis is elaborated towards the specific dynamics after Superstorm Sandy. The research methods and outcomes combined answer the first sub research question.

4.1 | BARRIER ISLANDS AND THE NORTHERN HEADLANDS

New Jersey has many different landscape types within one state (fig 4.1) In the North, the Highlands are part of the Appalachian Mountains. Along the New Jersey coast, the land is low and the soils mostly consisting of silt, sand and gravel (Muessig 2011). This coastal geology is the basis for many pine forests and sand and gravel groves. Along the shore, a long strip of barrier islands is formed through sandy deposits from the sea, separated by tidal inlets of the ocean.
Behind these barrier islands there are many wetlands. The ocean and rivers, coming from the heightened mid-section of the peninsula, fill the bays between the main land and the barrier islands with brackish water. Some of these waters have been cut off from the ocean, forming the many coastal lakes in this area.
Along the east coast of the US all the way down to Florida, the shore is formed by barrier islands. They form a small strip of land a few kilometers from the mainland. In the northern part of the Jersey Shore, this sandy strip collides with the mainland, known as the Northern Headlands (CRC Stockton University 2015).
The Barrier islands along this shore are geologically very young; between seven and three thousand years old. They are able to form only when the right conditions of waves, wind, sea level change and sediment availability are present. These conditions make sedimentation along the shore possible. Then, due to sea level changes and

Figure 4.1 Map showing the natural landscape types of the New Jersey. Adapted to Geological map of New Jersey (Muessig 2011)

subsidence of the land behind the sandy deposits, the barrier islands detach from the mainland. This step of detachment did not happen in the northern part of the Jersey shore, where the sandy deposits are still connected to the mainland. (Johnson 2007)

Whether this small strip of land is attached to the mainland or not, has a lot of consequences for the risk of flooding. The presence of a barrier island creates a first line of defense against storms and floods. The bay behind it functions as a buffer function for large amounts of water. At the Northern Headlands, there is only a small strip of protective dunes directly in front of the mainland and no buffer function. Though the Northern Headlands sounds worse protected than when there are barrier islands in front, there are also less edges exposed to flood risk. Besides flood risks, is also creates a variety of landscape types. (Fig 4.2)

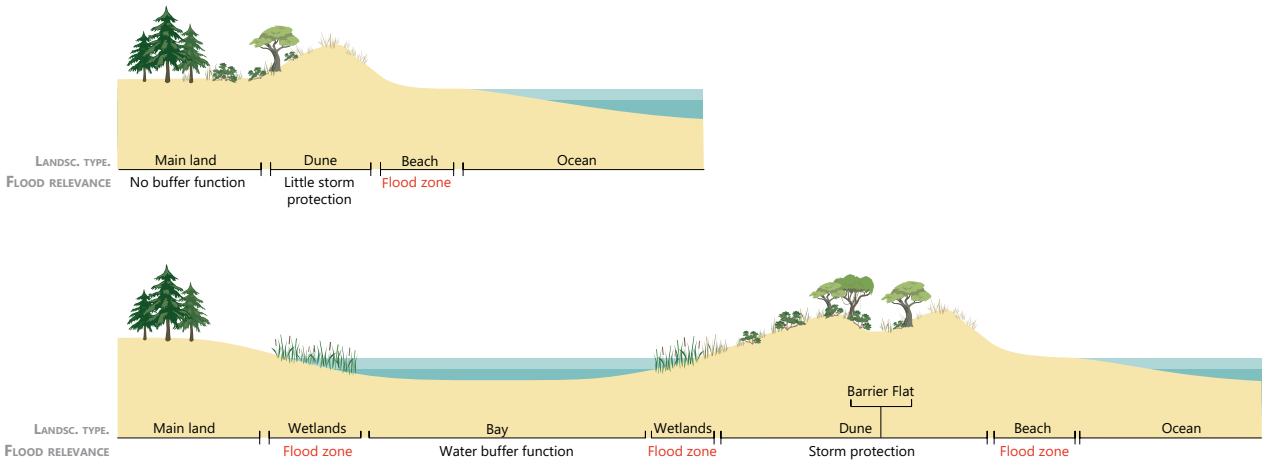

Figure 4.2: Cross sections of the natural landscape, Northern Headlands (top) and Barrier Islands (bottom)

Every landscape type is connected to the others by the natural processes that are at play in a coastal landscape. Wind, waves, in- and outflow of sand, water, nutrients, they all contribute to the formation of the specific landscapes present in the area. So all of the types also play an important role in the flood management of the area.

Main Land – Low flood risk

The main land largely consists of higher, sandy grounds. It is vegetated with large trees, especially in the Pinelands, in the center of New Jersey. This area is known for its variety of large and rare pine trees. Due to its higher grounds, it the main land not as much exposed to flood risks.

Figure 4.3 Landscape type: Main Land

Wetlands – High flood risk

Wetlands form a large part of the landscape surrounding the bays. The large areas of low laying land and brackish vegetation form an important stepping stone for plant species and north-south bird migration. As edge landscape between the main land and the bay, the wetlands often have to deal with rising flood water.

Bay and coastal lakes – Water buffer

Along large parts of the Jersey shore are bays or coastal lakes. These brackish water bodies can function as water buffers for the area. The bays are often still in contact with the ocean, the coastal lakes usually are not. The water quality of the lakes is therefore significantly lower, because of the lack of in- and outflow of clean water.

Dunes – Medium flood risk

The dunes along the Jersey Shore are relatively small and less vegetated compared to the dunes known in the Netherlands. Though they are higher than the surrounding area, they are often exposed to floods. Specifically the dunes of the barrier islands can flood 1 in 10 years.

Beach – High flood risk

The oceanbed along the Jersey Shoreis relatively low on sand. Due to this low natural influx of sand from the ocean, the beaches of the Jersey shore are naturally exposed to erosion. They are small and in need of regular beach replenishment to keep them wide enough. The general flow direction of the ocean is to the north, so beaches in the north of New Jersey are often wider than in the South.

Figure 4.4 Landscape types: Wetlands, Bay and coastal lakes, Dunes, Beach

4.2 | IMPACT OF ANTHROPOGENIC GROWTH

The urban focus on the very edge of the land has been there as long as there has been settlement (fig 4.5). In 1901, the villages in this area were all connected directly to the ocean. Interesting is that even at the start of the urbanization trend, there are very little dunes or other protective area between the villages and the sea. In 1943, a large urban expansion has taken place. The smaller villages have grown to become one large urban ocean edge, sometimes even with an arm in the ocean. This growth continues over the following decades, closing the gaps between the separate cities and spreading inland. Acknowledging the extreme urbanization, an accurate representation of the cross section of the coast, should therefore be more like figure 4.6.

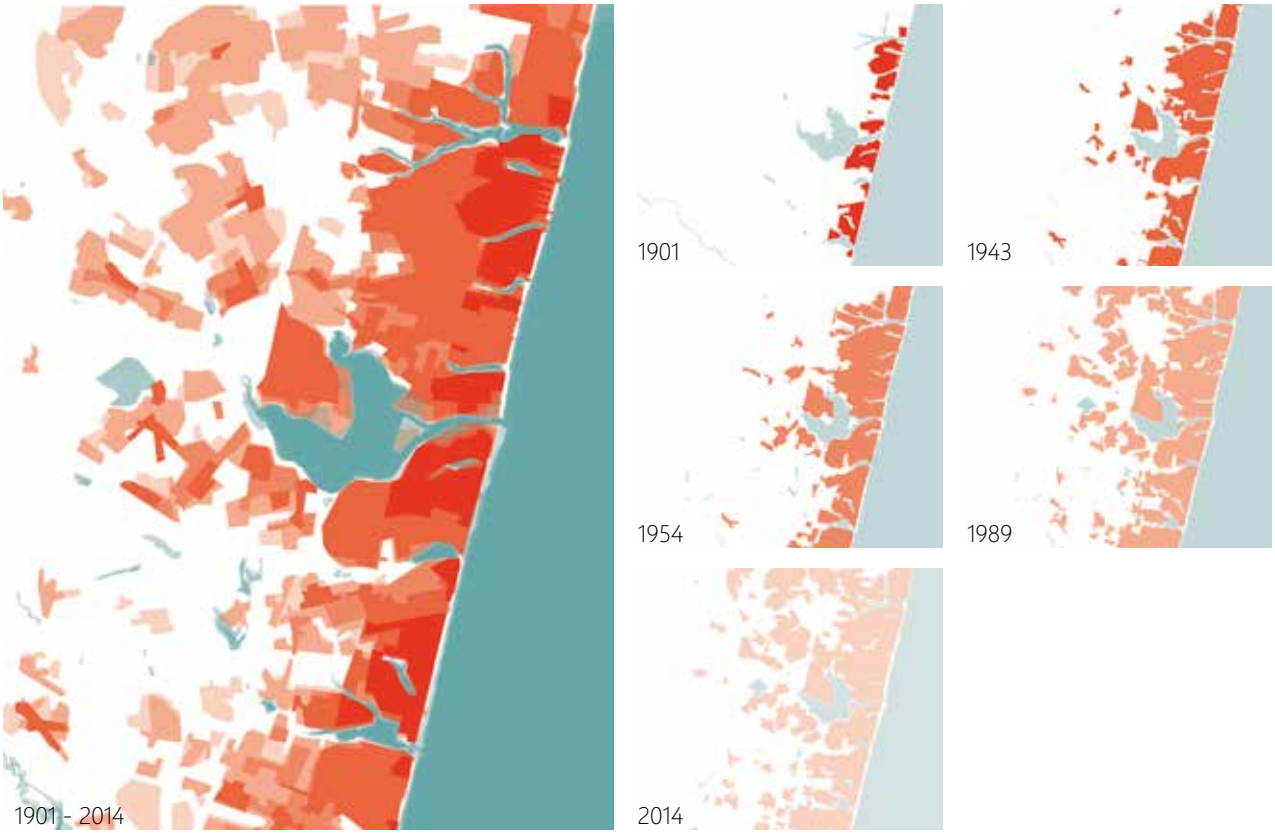

Figure 4.5 Urbanization layers showing the urban growth over time

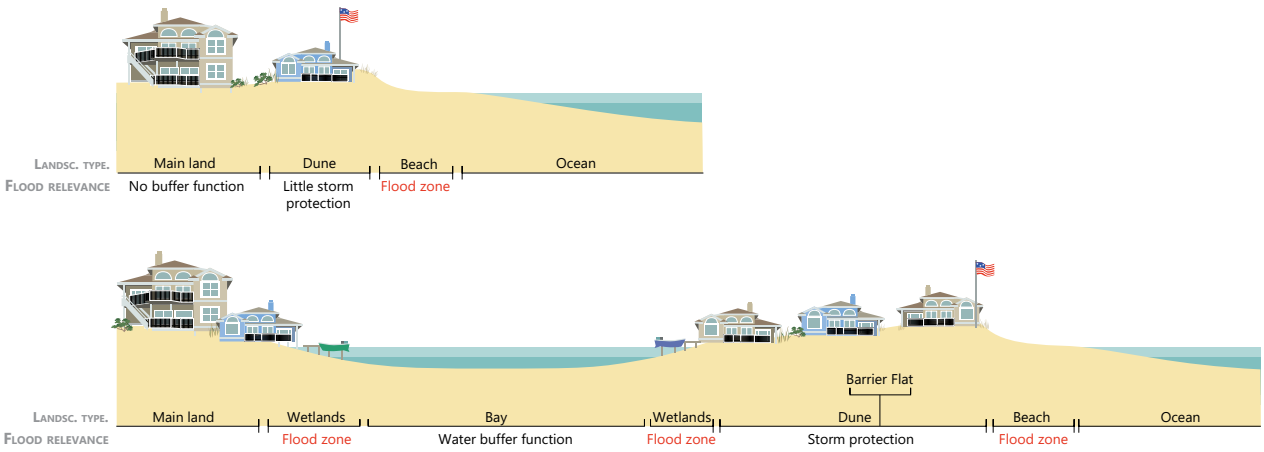

Fig 4.6 Cross sections of the built landscape, Northern Headlands (top) and Barrier Islands (bottom)

In both the Northern Headlands and the Barrier Islands, there is a lot of urbanization in landscape types that usually play an important role in flood safety. This results in large amounts of impervious pavements and exposure of lives, buildings and infrastructure to flood risk. Next, is a description of the urbanization per landscape type.

Main Land – Low flood risk

The hinterland of New Jersey is, despite its good flood safety, less occupied than the coastal part of the state. This landscape type is more used for agricultural and natural areas and less urbanized. The towns and highways in this area are placed in forested surrounding.

Wetlands – High flood risk

In spite of the wetland's critical function in flood control, the areas are often urbanized. The calm waters of the bay are suitable for recreational uses like boating and fishing, so in many places the wetlands are build with docks or housing.

Bay and coastal lakes – Water buffer

The coastal lakes are located along the highly urbanized shore of the Northern Headlands. The lakes often form the border between two towns. Most of the lake shores are hardened to limit erosion towards the housing and infrastructure.

The bays that are present along the barrier island shores, experience the same high pressure of urbanization on their edges.

Figure 4.7 Build landscape types: Main Land, Wetlands, Bay and coastal lakes

Dunes – Medium flood risk
In many places, the already relatively low dunes are urbanized. On touristic parts of the shore, the urbanization takes the form of boardwalks, restaurants and other touristic facilities. In more residential parts, it concerns big oceanfront homes, sometimes with terraces on the dunes.

Beach – High flood risk
Most types of urbanization stay away from the actual beach. Though building a private house on the beach occurs in some places, it was not seen during the site visit on the Jersey Shore. Buildings that do occur on the beach are piers and touristic facilities. For example in Asbury Park, the convention center and casino stick out right towards the ocean. Also the beaches are strengthened by many jetties along the shoreline.

Figure 4.8 Build landscape types: Dunes and Beach

Urban Grid

At a regional level, New York and Philadelphia are the main knots in the web of infrastructure. The large amounts of commuters and tourists demand a well-developed network of roads. Along the coast, there is one main route heading south, with crossways towards coastal towns or main attractions like Atlantic City. Along the Headlands, a train connection offers travel possibilities between the Jersey Shore and New York, commuters going north and seaside visitors going south (fig 4.9).

On a smaller scale, this network of roads expands all the way to the coastline. The typical US street blocks, that were present in the earliest years of the shores' urbanization, orient along and at right angles with the shore and almost reach towards the ocean's waterline. It would go over the edge, if it physically could.

"Within the city, the grid accommodated free development, movement and change. The city did not require a stable center, particularly in the absence of any monumental core in the European manner. (...) The grid enables the possibility of infinite interchangeability, extension and realization." (Jongerius 2015, p.36) The absence of a naturally grown city center, leaves the ocean as the main focus point of the grids' orientation. This orientation provides long views towards the ocean and quick access to the waterfront. Housing prices increase exponentially towards the first block and the first house on the oceanfront.

On the scale of a single town, the grid forms the structuring factor for parks and neighborhoods. The coastal lakes are the only elements that do not follow the grid shape (fig 4.10). Even though, over the years the smaller lakes have often been pushed into the guiding structure. The coastal lakes often form the natural borders between different towns.

Cutting through the city, are the train tracks. They are the central axis of the business districts and the down town area that developed alongside the tracks. The train tracks cut through the grid and create a very clear distinction between who can afford to live in an oceanfront neighborhood and who does not.

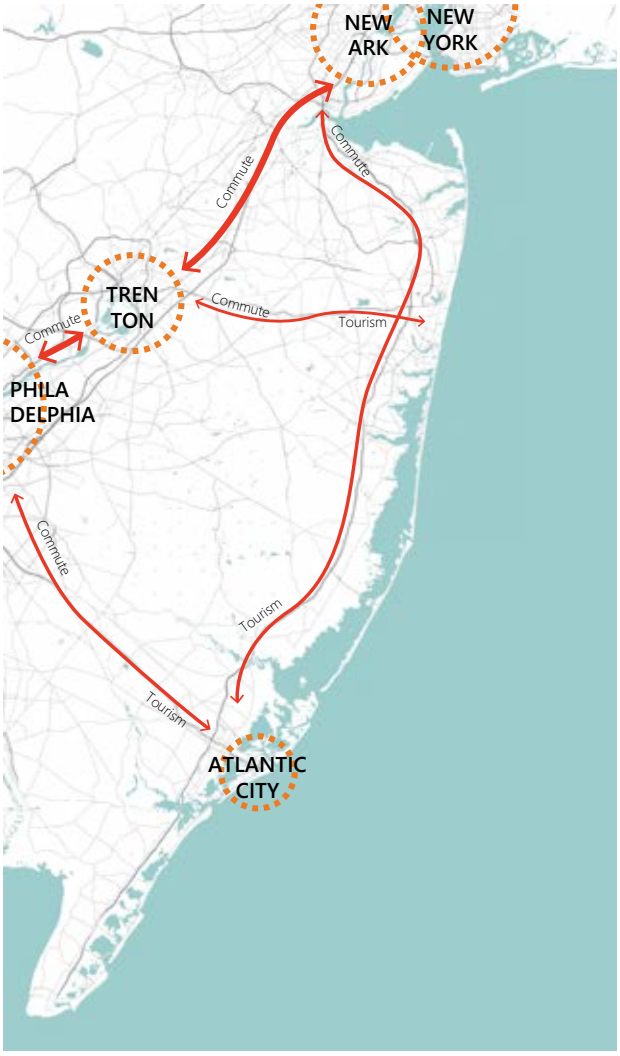

Figure 4.9 Infrastructural network and knots of New Jersey

Figure 4.10 The urban grid stretching all the way to the shoreline

4.3 | BORDERS OF THE SOCIO-POLITICAL LANDSCAPE

In the US are many different levels of government: National (USA), State (NJ), County (Monmouth county) and Townships, Boroughs or Cities. Around the Northern Headlands, there are already more than 30 of this last type of local governments present just on the ocean front. Governmental decisions are taken on the lowest possible level of government, to ensure that any change is at least close to the needs and desires of individual people. This phenomena is called Home Rule and gives municipalities as small as a couple of blocks, their own mayor and own say on their landscape.
As result of this attitude, regional plans or strategies are hard to implement. Efforts to recover from Sandy were done in many places, but an overarching plan of interventions seems hard to achieve. Towns started to build steels walls for example, that stop at the border of another township. A small city would construct a jetty to stimulate natural sedimentation on its shore, but the next village would have to deal with the backlash behind the structure (fig 4.11).

North Carolina, the state south of New Jersey, has an coastal commission that over sees all the plans of the individual coastal municipalities. Any plans concerning development in the coast zone, is approved by the North Carolina Coastal Resource Commission. This commission has members in the fields of coastal engineering, marine life to business development and local government, and has the power to evaluate plans and give out permits.
In New Jersey though, a commission like that is not present. Every town can choose for themselves what type of flood protective strategy they wanted to implement.

Figure 4.11 Effect of fragmented coastal plan

4.3.1 Up- and downsides of Home Rule

Too see what the power of Home Rule means for the shore profile, a photo study is conducted. Along the Shore, ten point are chosen in which the characteristics of the shore cross section are shown. Fig 4.12 shows the most divers different profiles along the shore, ranging from dunes and boardwalks to five meter high stone walls or no flood protective intervention at all. The rest of the photos can be found in appendix V. As the highlighted parts show, Home Rule resulted into a large and mismatching diversity of shore profiles just minutes away from each other.


Homes, path, road, bushes, path, steel flood wall, ocean- Atlantic Highlands


Homes, bushes, path, road, path, rock wall , beach, ocean - Monmouth Beach


Restaurants, boardwalk, beach, jetty, ocean - Asbury Park


Street, fences, christmas trees, beach, ocean - Ocean Grove


Homes, boardwalk, dunes, beach, ocean - Lavalette

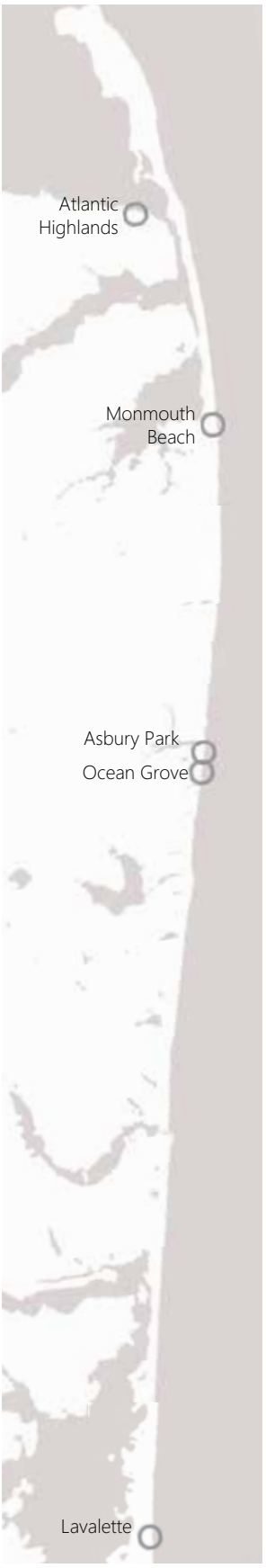

Figure 4.12 Photo study showing the diversity in coastal cross sections and protection measures along the Jersey Shore

Though this fragmentation is a negative effect of Hole Rule, there is also a positive side for the landscape. The second series of images (fig 4.13) shows the character differences that have developed in all the little towns. Some have a natural or small-scale touristic character, while others profile themselves by a highly commercial boardwalk. Over the years, Home Rule has enabled these shore towns to remain a rich diversity of identities along the shore.


Nature and Recreation - Sandy Hook


Old Glory boardwalk - Asbury Park


Gingerbread Houses - Ocean Grove


Amusement pier - Seaside Heights

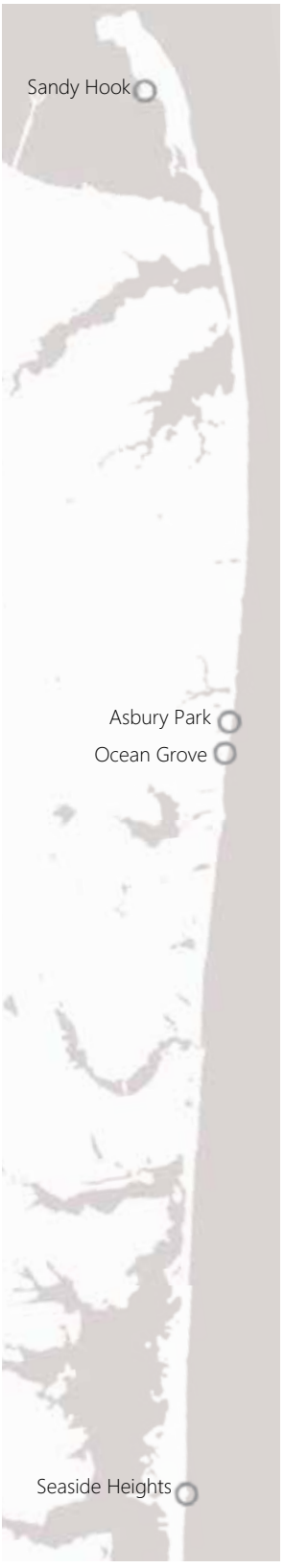

Figure 4.13 Photo study showing the quality that the diversity along the Jersey Shore provides

4.3.2 Property ownership

Another factor that fragments the shore, is the amount of private property and the effect that it has on the possibilities of climate adaptation.

Figure 4.14 and table 4.1 show who owns the plots in the 10 km around Asbury Park. The amount of public plots are few (10) but make up 47,5% of the surface area. There are also privately owned plots that are still open to the public, for example beach clubs or shops along the boulevard. These spaces feel public, but if a government would want to plan climate adaptation measures, they still needs consent of the owners. The majority of the plots (71.6%) are private property. They include 36.5% of the oceanfront surface area. So in this 10 km stretch, the government does not own 52,5% of the shoreline surface.

Figure 4.14 Public and privately owned oceanfront property in 10km surrounding case study area.

	Plots (#)	Plots (%)	Surface (ha)	Surface (%)
Publicly owned	10	11,4%	49,04	47,5%
Private owned/ Public access	7	8.0%	16,47	16,0%
Private owned/ Private access	63	71.6%	37,64	36,5%
No data	8	9.1%		
Total	88	100%	103,15	100%

Table 4.1 Type of property ownership and the number and surface area of the plots along 10 strip of coast. Based on (State of New Jersey 2015)

The privatization of the coastline forms an extra hurdle to make the shore more flood proof. Due to the large amount of private property along the shore, a plan to build dunes cannot start without consent of the homeowners. The State is now asking these beachfront residents for an easement that would provide the State with the rights to use a part of their land to build coastal defence. From almost 3000 easements, about 300 are still to be signed. (Asbury Park Press 2014) Property rights carry high importance in the American culture, making this a heated discussion for many oceanfront home owners. Most of them refuse to sign an easement because it means forever signing a part of your land to the state, are afraid of losing their view of the ocean or that the government will later decide to use the space to build other things. (Asbury Park Press 2014) Another reason could be that the ones living on the oceanfront usually are rich, so their dependence on State efforts to mitigate climate risks is relatively small: they are able to rebuild their homes easily or pay for their own adaptation measures. In the area behind this first row of big beach homes are usually less fortunate people who are stuck with the flood risks because of the few unsigned easements.

4.4 | SYNTHESIS – FRAGMENTATION AS BOTTLE-NECK IN FLOOD PROTECTION

Trying to answer the critical question of why New Jersey does not have regional flood protection despite the repetitive storms, shows to have its roots on multiple levels.

On a natural level, the coastal landscape has a very small and fragile dune strip. The land is low-lying and water comes from all sides; Not just from the ocean, but from the bays, coastal lakes and streams. On top of that is an extreme urbanization that has clear effects on the protective qualities that would have been present in the natural landscape. The urban grid stretches all the way to the ocean's edge, putting a large strain on the coastal strip. On the political level, the many local governments and private home owners all have its say on their own strip of the shore.

When putting all the layers together, the fragmentation and vulnerability of the region shows very well. (fig 4.15) Low lying areas are covered in urbanized space because of the attractiveness of the ocean. The landscape is cut into pieces by varying landscape types, varying shore identities and the strict municipal borders. This political fragmentation has direct effects on the fragmentation of the coastal landscape. On a smaller scale, the large amount of privately owned beachfront cuts everything in even smaller pieces. Finding a regional solution in this chopped-up coast seems very hard.

Another aspect that stands in the way of finding a sustainable solution in this region sooner, is in the American culture. The values of individual freedom and property rights are signs of an attitude that would not be open to the regional solution that this area needs to fight the regional problem of coastal safety. To solve this problem, a paradigm change needs to take place in which coastal safety for the collective will be more important than the needs of the individual. The next chapter will go more in depth on these cultural values that are behind the choices that were made in the rebuilding process after Sandy.

Figure 4.15 Landscape unity map synthesizing the gained knowledge and information of the past chapter.

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5 | Rebuilding strategies after Sandy

After Sandy hit, the Rebuild By Design organization invited many international parties to look for ways to rebuild in a smarter way. The Dutch, with their elaborate knowledge and experience with water management, had a lot of success in the competition with the Dutch Approach. (Van Gils 2015) But, how to reduce the flood risks téchnically, does not seem like the main problem. How this Dutch approach of regionalism and future-orientation will fit into an American context is the main issue. From the landscape analysis was concluded that the factors that make up the flood risks of the study area, were in natural, anthropogenic and social/political layers. But also was concluded that most of the factors that make the area vulnerable to flooding have a base in values of the American culture. This chapter takes a closer look at the governmental choices and culture that the issue is embedded in.

The societal and political factors that influence how the study area deals with flood risks is analyzed by looking at how different levels of the American government reacted after Sandy in their coastal zone management. (fig 5.1) Afterwards, a photo study comparing pictures of before, right after, and two and a half years after the storm, will check what has physically happened in those years. Last, the links between how governments reacted after Sandy and basic values within the American culture are discussed.

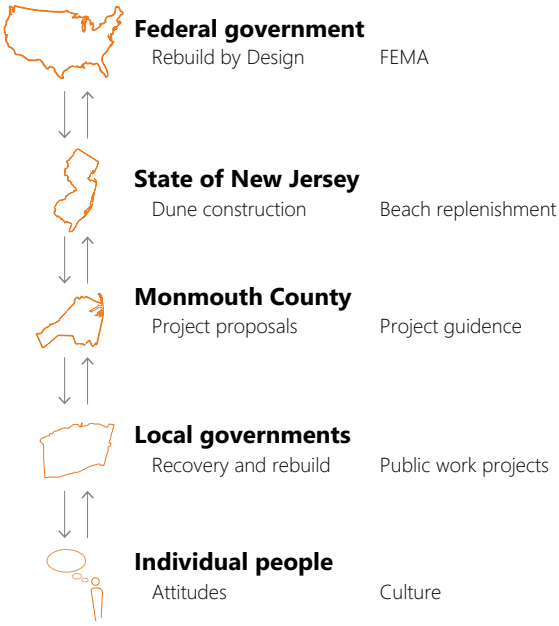

Figure 5.1 Socio-political levels and how they play a part in the rebuilding process

5.1 | GOVERNMENTAL LAYERS

5.1.1 Federal rebuilding strategies

On a federal level, the Coastal Zone Management Act from 1972 has been a leading document concerning the coastal management in the USA. Supported by federal research and management agencies, the act provides national policies, objectives, financial support and minimum standards for interventions. Is does not entail a federal framework for actions or national program, this responsibility lays at the State level. Also, State participation is voluntary. (Huggett 1998; Lowry et al. 1993)

These characteristics combined, form the base of most of the critique towards the CMZ Act: first of all "[t]his means responsibilities remain fragmented and dispersed at the federal level often resulting in agencies working at cross-purposes". (Huggett 1998) Second, because of the lack of an overarching national framework, the state plans vary highly in quality and are usually vulnerable to local political changes. (Huggett 1998)

Despite the large increase of coastal (hazard mitigation) plans and policies since the '70, a comprehensive overarching national plan currently does not exist. The lack of such a plan is considered to be obstructed

by two main issues at play in the US: "privatism, whereby owners are entitled to use their land largely as they wish, and localism, whereby planning and management of coastal resources is considered within local government purview" (Nordstorm & Jackson 1995). These issues match the main reasons of fragmentation that can be concluded from the previous landscape analysis.

So, with the questionable influence of the general federal government on this matter, we will continue with two specific federal players that did show a significant influence on how the shores of the USA were rebuild after Sandy: the Federal Emergency Management Agency (FEMA) and the Rebuild By Design organization (RBD). FEMA is a federal organization responsible for the management of recovery efforts after large (natural) disasters. This organization divides rebuilding funds over everyone affected by Sandy. Rebuild By Design is an organization that held a global design competition to find the best way to plan the future of the metropolitan area after Sandy.

5.1.2 Federal Emergency Management Agency (FEMA)

This organization is responsible for dividing the 65 billion dollar of federal money over the states, towns, organizations and people that were hit. After Hurricane Katrina in New Orleans, there was a lot of critique on FEMA because parts of the money disappeared at State level and because some people used the money to do other things than rebuild their homes. For the recovery after Sandy, the application was made stricter to ensure righteous spending. The results were first of all a very long time before an application for FEMA money was granted. And second, FEMA regulations prescribed that money would only go to plans that focused on rebuilding back what was there before the storm and nothing more. What this meant was that towns whose boardwalks were hit, could only apply for FEMA money if they would rebuild them back as they were before, not for an elevation or dune expansion. Money-wise, communities' only option was to build back what was there before, even though this situation has proven itself to have bad flood protective qualities.

FEMA was also responsible for updated flood risk maps of the entire area. These maps define the zone in which there is a significant flood risk and therefore prescribe which homes should have flood insurance are obligated to raise their homes from the ground. (fig 5.2) Due to conservative politics, FEMA was not allowed to base these maps on sea level predictions. "In accordance with the current Code of Federal Regulations, FEMA does not map flood hazards based on anticipated future sea levels or climate change." (FEMA 2015) The flood maps were therefore outdated on the day of their publication.

Figure 5.2 Example of raising homes in Atlantic Highlands, NJ

5.1.3 Rebuild By Design (RBD)

Rebuild By Design is an organization "dedicated to creating innovative community- and policy-based solutions" and aims to "connect the world's most talented researchers and designers with businesses, policymakers and local groups in the Sandy-affected area in order to better understand how to redevelop their communities in ways that are environmentally and economically healthier and better prepared." (Urban Institute & The Rockefeller Foundation 2014, p.2)

Even though, the winning proposals from Rebuild By Design did not include a proposal focusing on the Jersey Shore. Therefore, this thesis will address the proposal for New Jersey that made it to the finalists: 'Resilience + The Beach' by Sasaki/Rutgers/ARUP. In their plan, the team opted for a diversity of multifunctional interventions that meet the needs of more than one goal (fig 5.3). For example, they introduce ecotourism, combining ecological and economical purposes; They find a way to combine the identity of Asbury Park's boardwalk with flood protective dunes (fig 5.4); And the team designs wetlands and overall greening of pavements for their buffer function, ecological values and for beautiful residential areas.

Figure 5.3 Multifuncionality and landscape-based character of interventions in Resilience + The Beach by Sasaki (2014)

Also taking into account the other nine finalists, it clearly shows that Rebuild By Design promoted a landscape-oriented approach. They show strategies on a regional scale and detail those into interventions at the size of a town. The interventions always try to serve multiple goals. The designers see the devastation of Sandy as the moment to rethink and redesign the shores and flood defenses in a new, sustainable way. These values link to the Dutch Approach on water management and flood safety. This strategic, technical way of dealing

Fig 5.4 Smart combinations of sustainable coastal management with beneftis on local scale (Sasaki 2014)

with flood risks searches for ways to combine different goals in one intervention. It is often seen as one of the largest export products of the Netherlands, towards flood prone developing countries or in the Dutch Dialogues after hurricane Katrina.
Unfortunately, RBD struggles at making a well thought-out plan to implement this Dutch approach into an American context. The Army Corps of Engineers (somewhat similar organization to the Dutch Rijkswaterstaat) could not work with the plans and the money to finance the ideas was just not there. Up to now, the designs did not develop into more than inspirational ideas.

5.1.4 New Jersey State and county plans

The State of New Jersey and the Army Corps of Engineers are supporting dune construction and beach replenishments along the entire 200 km Jersey Shore. Unfortunately, the way that they are planning this is experiencing push-back from the communities. Though the administration of Governor Christie is claiming the planning of dunes in newspapers and official state announcements, the Army corps of engineers does not have any actual plans of making dunes. (State of New Jersey 2013; Army Corps of Engineers 2014) The administration only supports it, but they do not have any legally binding plans or guidelines on the dimensions of the dunes, the placement, sediment, environmental assessment studies or any other guiding structures that could force municipalities to implement them. In reality, the choice of implementing dunes is therefore the responsibility of the individual municipalities.
New Jersey State has a map (fig 5.5) describing the construction agenda of these municipalities. But, without general guidelines, municipalities can do whatever they want within this agenda. For example, the promising green strip in the north of the map, is where the site visit took place. Not any significant dune is present in this town, but it does have a green mark saying the work here is done (fig 5.6). Towns can choose not to implement any flood protective strategy, but apparently get a green mark anyway.
Some towns do have dunes. If a town decides to implement dunes, the Department of Environmental

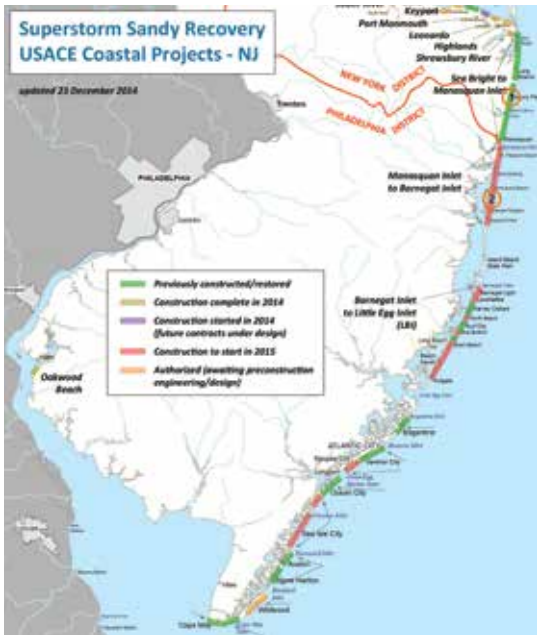

Figure 5.5 State map of current coastal projects (USACE 2014)


Figure 5.6 State's project location with green label


Figure 5.7 State's project location with red label

protection will pay for 75% of the costs. (NJDEP 2010) Also, the county of Monmouth has documents to help municipalities build dunes. Even though, none of these governmental layers provide minimal demands or an overview to come to a functional or coherent dune system. The type of dunes looked often like fig 5.7, very small and not likely to protect against a hurricane's surge.

Concerning the shore's cross section, the way that the beach replenishments are currently done underlines a short-term perspective towards shore protection. New Jersey struggles finding suitable sand for beach replenishments. Studies to find sand resources are being done but until they approve retrieving this sand, the state of New Jersey allows near-short sand mining. (Hedrick 2000; Waldner 2004)

Figure 5.8 Example of short term perspective in the shore's cross section

So in the current strategy, the sand is retrieved close to the shore and spread mainly over the beach. The only goal that is aimed for is to make a wider beach for tourists, but compromises on ecological values and flood safety. The steep slope that is created when only the beach is heightened, is very sensitive for wave action (fig 5.8). The beach easily erodes to a state of natural balance; meaning a gentle slope.(Waldner 2004) Retrieving the sand so close to the beach, also has negative effects for the wildlife present in the shallow waters. In addition, the underwater relief that surfers benefit from, is usually damaged in this strategy of beach replenishment (fig 5.9).

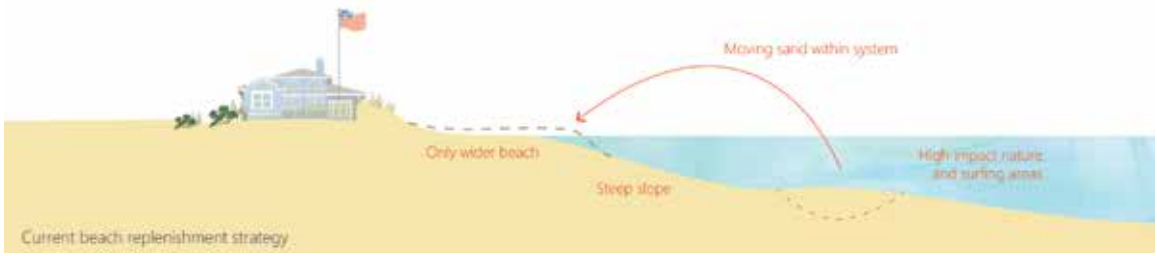

Figure 5.9 Current strategy for the coastal cross section of the Jersey Shore

5.1.5 Local rebuilding strategies

On local level, small governments had to deal with a lot after the storm. The small municipal boards had to function between higher governmental institutes on the one hand, and a badly hurt community on the other hand. Often, board members were dealing with their own rebuilding process too. For them, the main first goal was to get everything back to normal. As a lot of seaside towns live on the touristic summer season, the failed summer after Sandy meant another big financial blow for local businesses. Many of the towns aimed to rebuild their boardwalks before the summer of 2014. For the local communities, this was the only option to restore peoples' livelihood.

As was shown in the landscape analysis, many of the municipalities are very small and fragmented along

shore. The boards of these cities and boroughs are often volunteers who try to do the best they can in a very difficult situation. They do not necessarily have the resources or experience with climate adaptive coastal planning and flood protection. (Huggett 1998) The large plans of Rebuild By Design were an inspiration, but usually too large and complex to give more priority over everything else that needed to happen. Especially when these boards have to deal with a community that is often divided on the influence of climate change and the frequency of storms. These conditions make it very difficult for local governments to take on a long-term vision, and therefore usually managed the recovery within their local and short-term focus.

Though it is very understandable that these local governments' and communities' first priority is to get everything back to normal, there is also a risk that comes with it. If everything is back to normal, it is very easy to forget the necessity of redesigning the coastal zone. Research after hurricane Katrina showed a large decrease of the perception of the risk of a hurricane impact, after just two years and even for people who lost their home in the storm. The optimistic bias –the feeling that bad things can happen to others, but not to yourself- grew over those same two years. (Trumbo et al. 2014) Experiences with similar events and the length of residence in a hurricane-prone area effect the risk perception even negatively (Trumbo et al. 2014; Baker 1991). This was exactly the case during Sandy. A part of the residents that were asked to evacuate, stayed in their homes because they had been fine during hurricane Irene in 2011. Getting back to normal decreases peoples fear of hurricanes, which is essential for people to get on with their daily life but also lowers the priority they give to preparing for the next storm.

5.2 | 2015: Two and a half years after Sandy

In all the complexity of the situation, what happened in the ground? To analyze what local governments were able to rebuild in the years since the storm, a comparative photo analysis is conducted. The goal of this analysis is to find out if towns were able to rebuild and in what way they decided to rebuild. Photos from before Sandy were found mostly through panoramio.com, which shows a geographical location with every crowd-sourced photo. During the storm, residents, press and governmental parties made a lot of photographs to show the impact of the storm. All the after-shots were made by myself during the site visit two and a half years after the storm. In total the analysis concerns fifteen locations (appendix VI), of which four examples are discussed here.

A. Street – River street and Ocean, Sea Bright

Oct 2007 (Google Streetview 2007)

Oct 2012 (Lindren, 2012)

July 2015

In this line of pictures, we see a street in Sea Bright, located on a barrier island in the North of the shore. The 'during' picture shows the extensive flooding that took place in this area. In the recent picture, the damage is still very visible. The homes on the right are boarded up and vacant. On the left, a wall and trees are gone. A new building has also risen. None of the buildings show signs of being redesigned to mitigate flood impact.

B. Lake – Lake Takannassee, Long Branch

Oct 2006 (Wolfe 2006)

Oct 2012 (Eidman 2012)

July 2015

July 2015

On these pictures, we see the ecological consequences of Sandy. The vegetated banks of Lake Takannassee were severely damaged in the storm. In the recent picture, the banks are fairly recovered to their old state. More interesting though, is that close by at the inlet towards the ocean, large rebuilding efforts were in process. Big blocks of concrete and steel walls indicate that they are implementing hard structures to deal with future flood risks.

C. Boardwalk – Sea Girt Boardwalk

April 2011 (Seagirter 2011)

Nov 2012 (Strimpler 2012)

July 2015

This is the boardwalk of Sea Girt, badly destroyed by the storm and covered in sand. Comparing the pictures, we can see that the boardwalk is cleaned up and restored to its old state. An addition though, is the planting and height of the dunes in front of the boardwalk.

D. Shoreline – Bay Head

Dec 2007 (Panoramio 2007)

Nov 2012 (Irish, 2012)

July 2015

July 2012

The people of Bay Head were surprised to see an 18th century wall under the sand that was washed away by the storm. Old or not, it protected most of the homes behind it from destruction. Two years later, the wall is buried under the sand again, planted with new dune grasses and with new fences showing the borders of the private properties. Besides everything going back to normal, new homes are being built on the same place as they were before, but raised on poles.

Seeing these before – during – after photo sequences, a couple of things stand out. They show that most of the time, the only goal that was achieved is building back what was there before the storm. Boardwalks are rebuild, dune are replanted, banks are remade. It looks as if the storm didn't change anything in how people build their landscape. Even homes, that have been totally destroyed only two years ago, are being built back on the same location, as if nothing happened.

This can be mainly attributed to how the rebuilding funding was regulated. The fact that FEMA did not pay for other strategies that the one present before the storm, made building back what was the only paid option.

But, in some locations, measures were taken anyway. In Lake Takannassee, hard structures are added to ensure less impact of floods. In Sea Girt, the existing dune structures were expanded, maybe inspired by the proposals of Rebuild By Design. So, some towns did make a change. But overall the fifteen locations visited, every town did its rebuilding differently. This shows again how the fragmentation on governmental level has caused a fragmentation of interventions on landscape level. The regional approach shown in Rebuild By Design did not survive the fragmented bureaucracy of the Jersey Shore.

5.3 | ATTITUDES BEHIND SHORT-TERM REBUILDING

To explain these choices after Sandy and the general attitude towards flood protection, one has to look deeper into the American culture. It has a very different character than that of the Netherlands.

The American Dream is a set of values that can be directly linked to the way people deal with flood risks and landscape in the US. The values promote freedom of the individual and the possibility to make your own success in life. These values originate from the settlement in North America and still represent an important part of the American culture.

A large part of the US population finds its roots in either settlers of centuries ago or modern immigrants, both looking at North America as the land of endless possibilities. They were freed from the European hierarchical ways and would all be equally responsible for their own success in life. This new world provided "opportunities for European urban civilization to expand, explore, exploit and colonize; to found new settlements in a vast unknown domain, a truly New World."(Pimlott in Jongerius 2015, p.21) These earliest settlers were explorers, not afraid of the wilderness, explored the New World in their pursuit of individual freedom and happiness. Their relationship to nature was very different from how the Native Americans treated their environment. The Natives lived with nature, formed a part of nature's cycles. They were pushed out by the colonists who cultivated the wild landscapes of the New World. This desire to cultivate wild nature is in a sense similar to building a house on the edge of the ocean. Here the untamable ocean in placed in a position of a garden. The rough sea as backyard, the ultimate cultivation of nature.

The responsibility for your own success has created a very individual character of the country. In general, the individual is chosen over the collective. Especially politics are very sensitive to this. In the Netherlands, we happily pay large percentages of taxes to support our collective health, education and water safety. In the USA, that system would easily be seen as pure socialism. People are responsible for their own success, education, health and safety and work very hard to achieve this. Even tough, this does not mean that people don't care for each other. The USA is, for example, one of countries that continuingly scores well on who spend the most on charity per capita (CAF 2011). Americans contribute a lot, but want to know where their money goes to and usually also want their name mentioned as a sign of the success they created themselves and that they are now selflessly sharing.

All the short-term interventions that we saw before are also a lot different then what Dutch towns and governments would probably do. The reasons behind this attitude can be seen as similar to how these countries deal with, for example, money. The Dutch are known for living modestly and saving their money for the future, while Americans have a culture of living of credit cards. (To compare: 55% of Dutch people have a credit card of which 89% has only one. In America, more than 70% of citizens have a credit card with an average of almost four per person (Kosse 2009; Holmes 2014)) They rather spend now and have a quick fix for their needs of that moment, then to save for an uncertain future. The same goes for the

rebuilding attitude; they rather rebuild their homes and boardwalks now, than to adapt their behaviour for an uncertain climatic future.

This attitude shows direct links to the order of rebuilding efforts after a storm. A study of Nordstrom and Jackson (1995) shows that "[s]peed of reconstruction efforts may be a function of the economic importance and size of the market area for tourists", meaning that touristic towns generally get rebuild faster and than non-touristic towns. (Nordstorm & Jackson 1995, p.59) An example of a rebuilding timeline in an urbanized and touristic part of the Shore is given in fig 5.10. On locations that have less economic importance, it can take years or even decades for the basis rebuilding activities to take place. The large focus on solely economic value of the coastal zone management is also seen as one of the main reasons behind the continuing extreme urbanization of the shorelines: "Arguments to prevent coastal development or convert developed areas to natural environments because of economic or social costs hold little weight because of the enormous value of shorefront property" (Nordstorm & Jackson 1995, p.60)

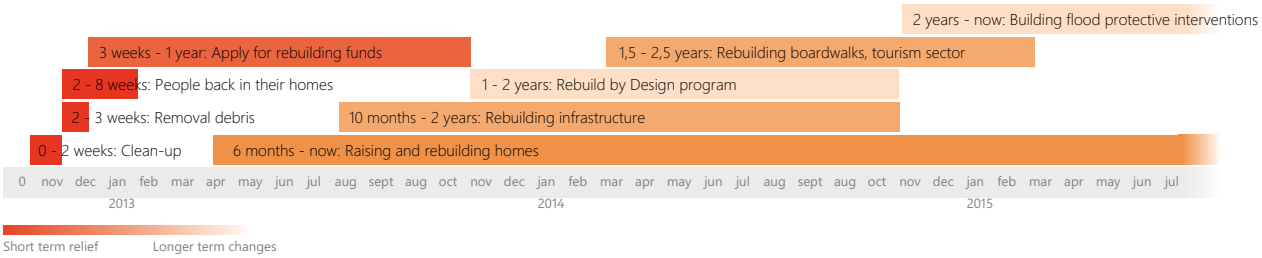

Figure 5.10 Rebuilding timeline after Superstorm Sandy

5.4 | SYNTHESIS: MISMATCHING REBUILDING STRATEGIES

From the photo analysis shows that the governmental layers are mismatching even more than was concluded from the landscape analysis (fig 5.11). A mismatch that stands out is the completely different views that are present within the Federal layer itself. On the one hand, through RBD it promotes rethinking the landscape followed by long-term, innovative and landscape-based interventions. On the other hand, FEMA has a very conservative character where future scenarios are not taken into account and building exactly like it was is the only paid option. In addition, state and county levels don't have much governing power or legal force in this issue, so the responsibility lays at the local governments.

These policies and power relations have deep roots in the American culture and is of a very different character compared to the strategy that Rebuild by Design is promoting. The fact that these short-term attitudes are in a way engrained in the American culture, makes them even harder to change. To make this happen, the current norms need to be challenged. The fact that Rebuild By Design is a large organization with governmental support and at the same time has a sustainable and long-term character can be seen as a first sign of a change towards a more long-term attitude.

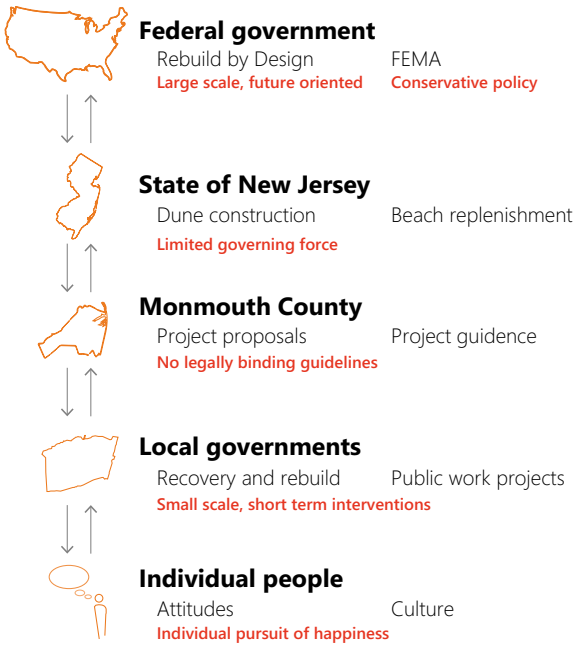

Figure 5.11 Mismatching rebuilding views in the socio-political levels

Unfortunately, due to the lack of feasible implementation of the RBD plans, the policies of FEMA controlled largely what happened on the ground. Local governments were dealing with very hard situations immediately after the storm, where building everything back to normal was the only option with the resources and experience that they had. It is very understandable that in these situations, a small government has so many other things on it's mind that keeping their eyes on the horizon is very hard. Over time the immediate response came to an end and larger projects like public works and boardwalks were restored to get the economy back up and running. Now, two and a half years later, we can see that some towns have gotten around to implementing or strengthening their flood protection and others have not. Now seems like the right time to discuss how to deal with coastal hazards along the shore, before everything really is 'back to normal'.

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Conclusion Part I: Vulnerability Tree

One of the first personal fascinations in this project was why this area does not take flood protective measures on a long-term and large scale, even after yet another big storm. Why hasn't the American government done something to prevent all this harm to their people? The Dutch did it in their own country after the flood of 1953, so why can't it be done somewhere else? A lot of attention is going towards the Rebuild By Design program, experts from all over the world are being involved and still, it seems a real sustainable future able to mitigate flood risks is very far from realization. But why?
Study of various landscape layers, governmental layers and seeing how different parties reacted after Sandy, shows the complex reasons behind the consistent vulnerability towards storms. (fig I.1)
The landscape analysis shows a vulnerable and exposed coastal landscape due to extreme urbanization.

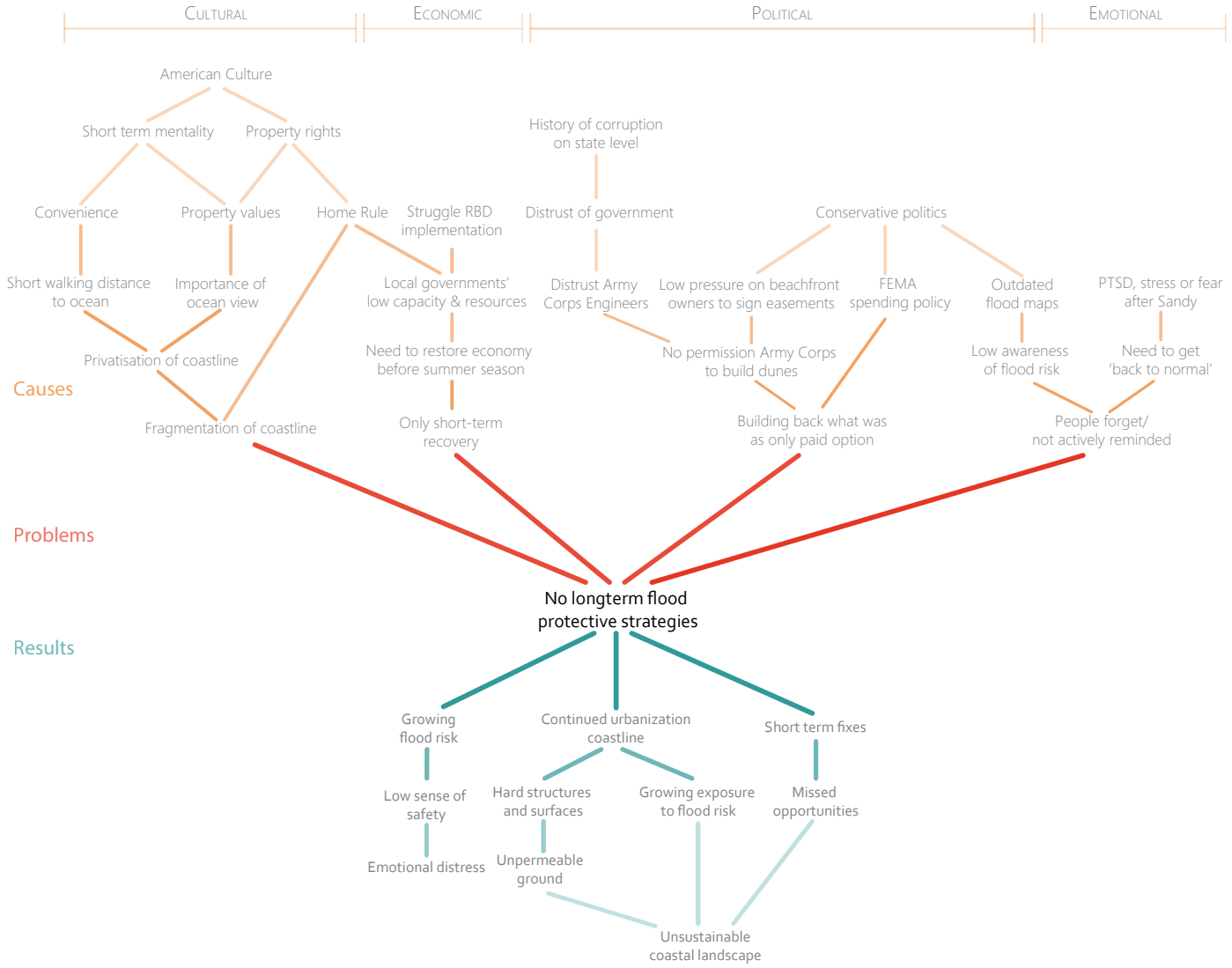


Figure I.1 Vulnerability tree depicting the answer to the first research question: the reasons why there is a persisting vulnerability towards floods and why long-term and large-scale plans are hard to implement in New Jersey

Everything in this landscape surrounds the very edge of the land. The view on the ocean is such a powerful attraction that people rather rebuild their dream home close to the beach over and over again, than to compromise on the location. Local governments and communities try their best to get everything back to normal, and can you blame them? With the resources, experience, time, money and tools that these people have, a future-oriented view just does not survive between all the things that need attention right now. Aspects of American culture, like Home Rule, private property and the lack of trust in the government, fragment the shore and leave a gap where the Dutch had an overarching powerful government that ensured a flood protected future after '53.

Despite all the reasons why this area has not been able to come to a shared coastal plan for the future, it does not mean the Shore is a lost case. (fig I.2) The common threat of flood risks can function as a force to stimulate collaboration between governmental layers, between towns, between residents. Just like the Dutch Water Boards were created out of necessity of regional water management and safety.
The analyses also show that now is a crucial time in the rebuilding process after Sandy. The immediate response is over, people are back in their homes and are starting to get back to normal. But, is it smart to go 'back to normal', if this is a situation where so many lost everything they had? I don't think so. Now is the time to have valuable discussions on the future of the Shore and get to work on the paradigm change that is needed to create a flood free new normal.

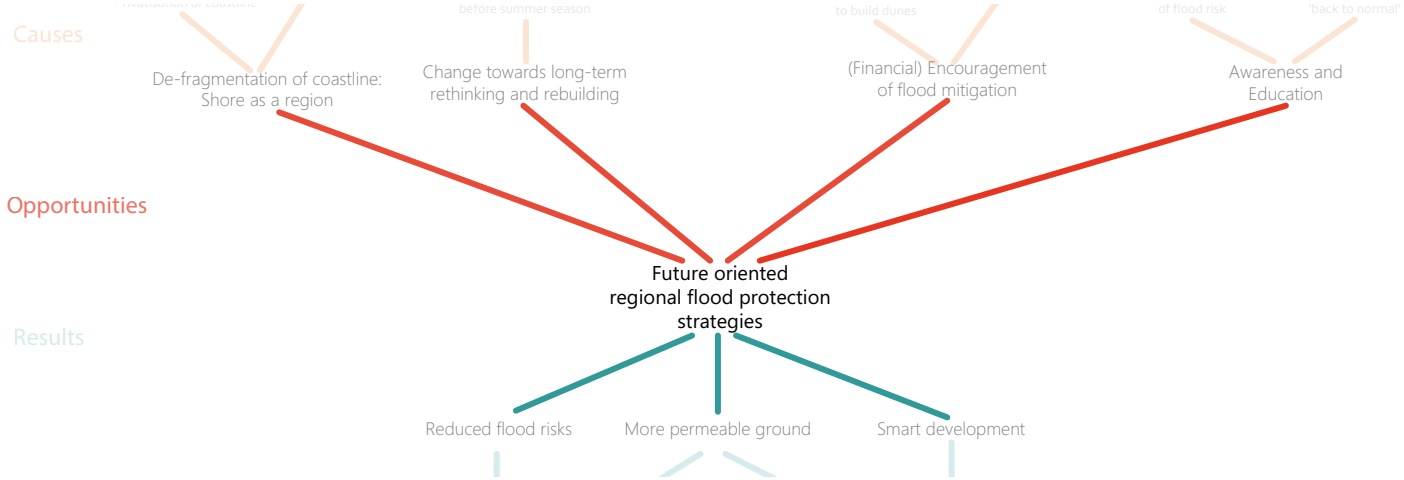


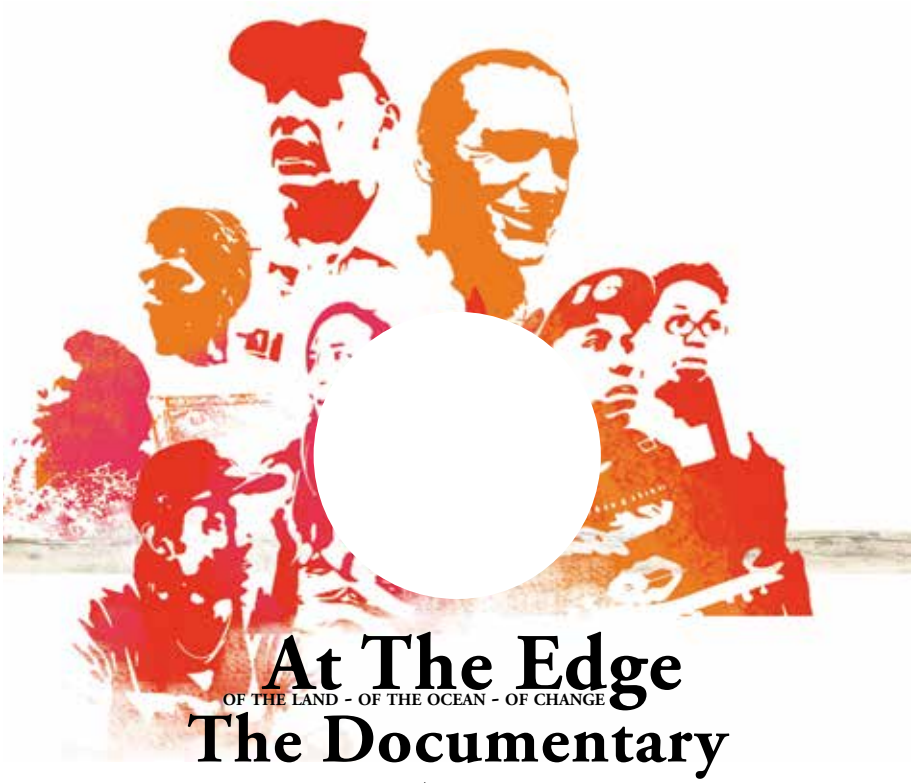
Figure I.2 The main problems from the vulnerability tree are inverted to come to an opportunity tree

PART II FILM

6 | At The Edge - The Documentary

The first part of the research focusses on the dynamics of New Jersey after hurricane Sandy. Findings mainly consist of reasons why long-term change has been difficult to achieve in the given social and political context. This second part moves away from the reasons why change seems impossible, and turns towards different perspectives on a new future. The focus will be on film as data collection tool and discussions tool and how common grounds and design guidelines can be derived from that.

At this point, the reader is encouraged to watch the At The Edge – The Documentary. In this documentary, the various views on the future of the Jersey Shore are presented. All perspectives are equally valuable and co-exist within the documentary.
At The Edge – The Documentary first shows the arrival of Sandy on the Jersey Shore, after which experts set the scene of the difficult rebuilding process. Special attention is given to the paradox between the oceanfront home owners and their love of the ocean view and the residents who want more protection against floods. Also, the discussion between long-term and short-term interventions is highlighted by a conversation between landscape architects and a local city councilman. Finally, local residents and visitors of Asbury Park take the stage and discuss different options for the future of the Shore.



Director/Production – Marit Noest
Camera/Sound/Editing – Anouk Saint Martin
Music - Lennart Meijvogel

7 | Research through filming

Film functions both as a result of research, and as data on which continuing research and design steps are based. (fig 7.1) In chapter three was described how the research influences the film. In this part, the step from film to further design research is made by changing scale from the regional analysis, to individual stories and truths. This data will later be used to induct design guidelines from. (fig 7.2)

Figure 7.1 Film as medium to get from research to design

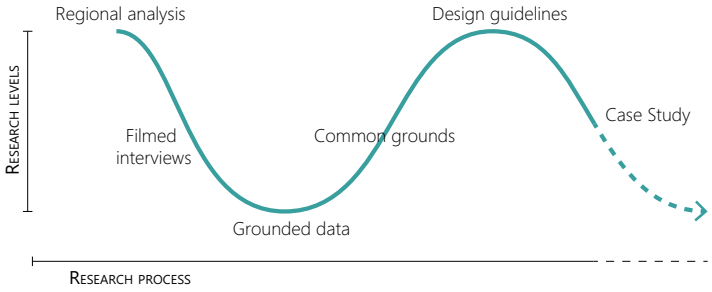


Figure 7.2 Change in scale from regional analysis, to individual truths, that will be inducted to form design guidelines.

The main source of data from the method of film, is footage of the filmed interviews.
First, they are seen as data from video as data collection tool (fig 7.3). A discourse analysis is conducted on the video data. The analysis is accompanied by analytical sketches that summarize the outcome per interviewee. These sketches are compared to find common grounds that can function as design guidelines. This way, we move from the arguments standing in the way of change, to common grounds that will form important input for design.
Second line from the filmed interviews to design, is through video as educational discussion tool. In this line, the footage is gone through the editing process to form representations of the interviews in the shape of a documentary. A direct outcome of that is the documentary that aims to contribute to the larger paradigm shift that is going on. In a second branch, two of the edited interviews (City Councilman and landscape architects of H+N+S), were shown as discussion starter at the community outreach posters. Half of the participants were shown the short clip before voting on their preferred coastal interventions. This method provides insights on both the norm-challenging influence of film as well as the preferred techniques that will be direct input for design choices.
In the following chapters is elaborated how the analyses of the film translate to guidelines or preferences that will directly influence the design.

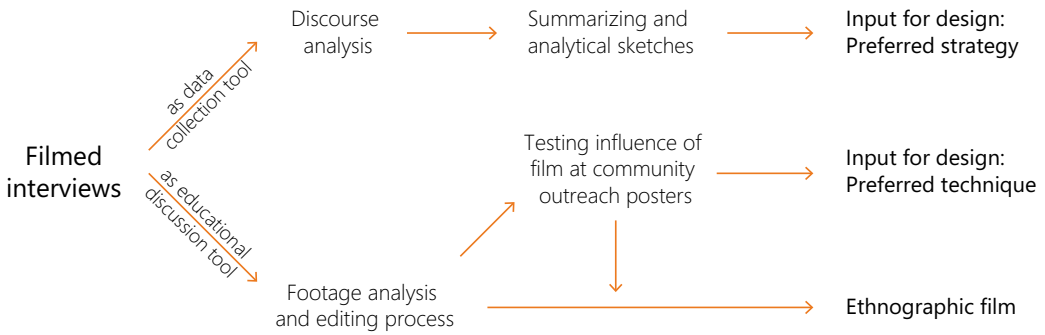


Figure 7.3 Different ways how footage of the interviews was used in the research

7.1 | TOWARDS COMMON GROUNDS: ANALYSIS OF THE INTERVIEW FOOTAGE

In this part, the filmed interviews will be analyzed through a discourse analysis. (fig 7.4) A discourse analysis not only studies the content of what is said, but also the larger context of the message. It analyses the language used -the choice of words and expressed body language for example- to construct meaning from the holistic setting of the interview instead of just the content of the words. (Gee 2010) The goal of the discourse analysis of two pairs of the personas seen in the film, is to extract their perspectives on how to (re)develop their shore and translate those into what it would mean as a design guideline. For this analysis are chosen: Shaun and Marilyn (Sandy survivors) , which will be compared to John and Donna Marie (oceanfront property owners), and the perspective of John Weber (NGO), which will be compared to that of Joe Woerner (City Council). First, the perspectives are shown in contrast to each other, after which the comparison looks at what they have in common.

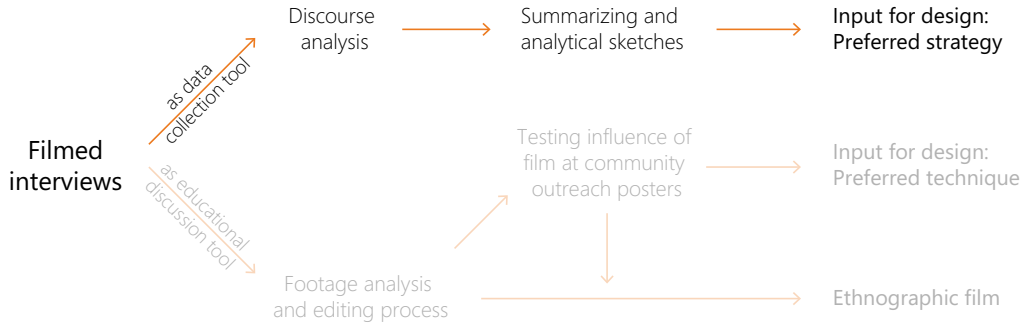


Figure 7.4 Application of film as data collection tool

The main data for this are the filmed interviews as seen in At the Edge – The Documentary. But, because the documentary has a time limit for the sake of a watchable film, quotes of spatial preferences or interventions from the full interviews are sometimes used as an addition, for the purpose of developing well-rounded design guidelines per interviewee. From the interviews, quotes were highlighted that related to spatial preferences or spatial interventions. These quotes are analyzed on the content and way that the content is brought, to create an in-depth understanding of the different points of view and how the participants look at their landscape and its future. The findings are summarized in analytical sketches to make a first step towards spatial configuration.

The transcriptions are based on the transcription conventions of Heath, Hindmarch and Luff. (Heath et al. 2010), in which:

CAPS = louder
°grades° = softer
(.) = short pause
underlined = emphasis
colon:: = prolonged word
((brackets)) = action or hard to describe sound.

7.1.1 Shaun and Marilyn - Surfer couple

Shaun is one of the owners of a chain of surf schools along the Jersey Shore. His fiancé, Marilyn, also works at the surf school and as a teacher in the off-season. They welcome us in Marilyn's home, that is built in the backyard of her parents' home. Shaun lives a few blocks away in an oceanfront apartment. Together they live a true surfing lifestyle where everything revolves around the ocean. Their tanned and fit appearance is the first sign of this active lifestyle.

Figure 7.5 Screenshots of Shaun talking about living on the shore as a religion

Shaun and Marylin have a very special relation to the ocean, Shaun talks about it like it really is his religion in a sense (fig 7.5). This shows how intimate and sacred their relation to the ocean really is. He would never live anywhere other than right by the beach.

During Sandy, they both stayed at Shaun's house. They boarded up the windows but left a space open to be able to see nature's show. Their movements and facial expressions repeat this excitement for nature's power during the storm. But during the evening, their feelings changed. They saw waves like they never saw them before. Taking about this, their facial expressions change from excitement to worry and fear. The next morning, they found that Marilyn's home was flooded. Even tough, their strong relationship to the ocean was never damaged.

For Shaun and Marilyn the storm was not the bad experience, it was the weeks after. They describe the weeks as a 'never ending hell' where they felt as in a war zone. Talking about this phase, you can see Shaun making waving gestures and rubbing his head to fortify the confused state that he was in at that point. Marylin looks blank into the distance (fig 7.6). During all that stress, Marilyn's home remained flooded for a very long period. They can still show us the remains of that period by the standing water line that they drew on the door and the dirt in the basement.

Shaun: The basement lasted for week. The standing water of like (.) up to here ((gestures the water level)) in the in the rooms was here for (.) few days. But the water:: like this is all dirty right? Like how is this dirt here? ((rubs the dirt of the basement wall) This is because (.) the water was up

((gestures the water level)) and then as it receded (.) the dirt like you know (.) the dirt kind of got on here ((Gestures the sedimentation on the walls)) like this is Sandy dirt.
(Noest 2015 Time 3.46)

Figure 7.6 Explicit body language during bad memories of the storm

Shaun was all of a sudden very aware of what were the lowest points in the area where all the water kept going to. They are currently renting their homes, but are looking ahead with these lessons of nature in mind. If they would buy a home, they will make sure that it is safely above sea level, because they never want to go through the process of recovery and rebuild again. After the storm, they were shocked to see the amount of debris from all the destroyed homes and the boardwalk. To them all of this debris were opportunities to build new things. For example the boardwalk pieces that Shaun shows in the documentary, were perfectly fine to rebuild with, but were not recycled.
Shaun and Marilyn were shocked to see their town being rebuild in exactly the same way. They were aware that building it up differently would have taking a longer time, but they think it would have definitively been worth it. They saw this as a very sadly missed opportunity, where not even the lowest hanging fruit was considered in the rebuilding process.

Marilyn: We're starting from scratch now, you know let's make it the best we can so that (.) you know whatever's best for the town (.) in case something like this happens again and so-
Shaun: Or not even if something happens again, people have wanted a bike lane! Because you can't bike (.) on the boardwalk and there are a lot of people who like to bike (…) at minimum it was an opportunity to install like a bike (.) lane on Ocean Ave, that was like the lowest hanging fruit (McGrath and Gargiulo, July 2015: 1:04:43)

Both Marilyn and Shaun talk with shock about this attitude during the rebuilding process; there were so many things that could have been improved but everything just went back to the same as before. Even the tents on the beach that were put there temporarily are being replaced by expensive pavilions.
Their love for the ocean makes them want to be close to it, but their respect of it's nature makes them open to compromises. To them, lots of investments on flood prone ground doesn't seem smart.

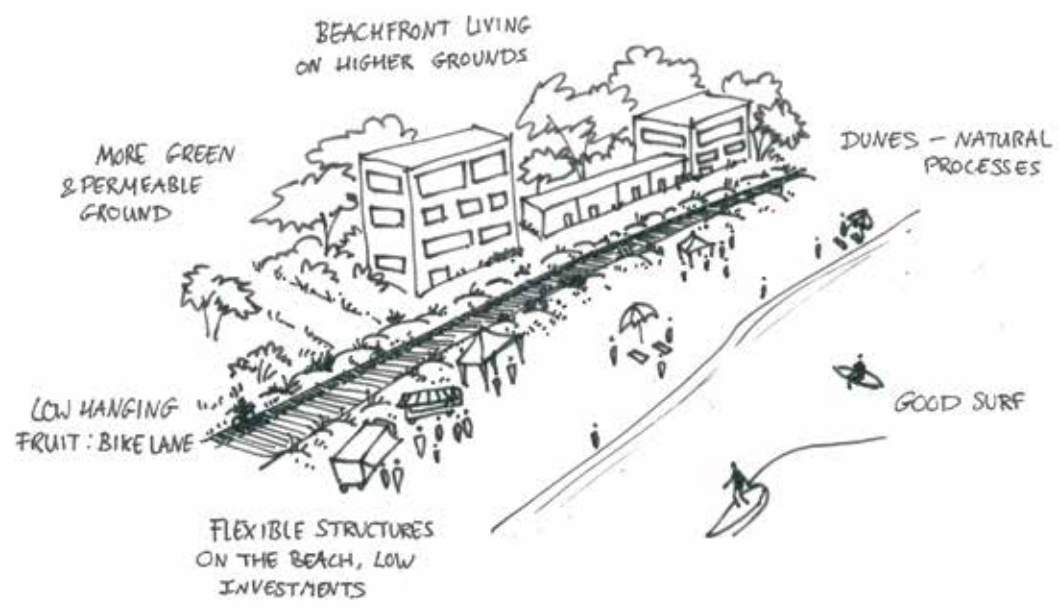


Figure 7.7 Summarizing sketch of the analysis of Shaun and Marylin's interview

7.1.2 John and Donna Marie – Oceanfront home owners

The home of John and Donna Marie was the fourth house from the ocean. This house in their second home, that John was able to afford with his job as a layer. At arrival, John showed us around the house and in every room he would pull back the curtains and show very proudly the view of the ocean from that room.

> *John: We built this house uh my wife wanted a house at the beach and uh (.) I said well that fine (.) I only have one qualification (.) I have to be able to see the ocean from the house(.) otherwise, why should we pay money to be at the ocean?*
> *(Noest 2015 Time 12.28)*


Figure 7.8 Body language showing enjoyment of the view but fear of heights

The view of the ocean is very important to them. They built the home as high as they could to get the best view, even though John mentioned he was

afraid of heights and didn't like standing so close to the edge of the balcony. This fear is visible in how he keeps grabbing the railings during the interview (fig 7.8). The view is what made them build like that, it is the main factor in their property value and the main reasons they mentioned for staying there. When the neighbors build their home bigger, they were shortly 'deprived' of their beloved view.
After the interview, they mentioned that they don't go to the beach. They weren't very fond of it and Donna had trouble crossing the dunes. Their love for the ocean is mainly based on the view. Losing that view, would make homeowners in their street very worried.

John: *As long as I can still see over them [dunes] ((laughs)) But if you uhh (.) you know (.) did that and and raised it up over so these guys ((gestures to the neighbors)) couldn't see the ocean from their top floor, they'd go <u>berserk</u>*

Donna Marie: I think any house that was built here (.) from the sixties on (.) it was almost a given that you have a upside down house with the uh (.) living space on the second- or main floor (Williamsons July, 2015: 20:17)

Having a view on the ocean has large impacts on the relation they have to their surroundings. The beach home is their second home, so they have less emotional connection to it then to their first home. Talking about the risk of losing their home also didn't spark a same emotional reaction as talking about losing their ocean view.

Donna Marie: If something happened to it and we lost it [the house] all together (.) well then:: ((shrugs her shoulders)) it would be sad but we'd get <u>over</u> it, you know. (Noest 2015 Time 13:24)

Losing their home is something that they would get over, but losing their view would make them go 'berserk'. Donna still talks with some emotion about losing the house, but John is immediately thinking about the quality and value of his property. For him, the property is really what is at stake: the home is

Figure 7.9 Screenshots of John and Donna Marie explaining how their faith calms them in the idea of losing their home

replaceable and as long as the sand is not washed away and the ocean is visible, they would build again. This attitude also showed in how they talked about the house, mostly in monetary terms or property value. Another important factor that shapes the way they look at flood risks and what they might lose, is their faith. Their faith calms them in the materialistic things they might lose and helps them deal with the risks that nature brings them. Donna Marie even takes on a praying-type of position when she talks about this (fig 7.9).

Figure 7.10 Summarizing sketch of the analysis of John and Donna Marie's interview

7.1.3. John Weber - NGO

John Weber is the mid-Atlantic regional manager of an NGO called the Surfrider Foundation. The way he talks is mostly in a serious manner and with full sentences, like he is used to speaking in public for the position he has (fig 4.11).
His organization is one of the few NGO's in the area that does not focus on the immediate recovery, but promotes long term rethinking of the coastal zone, more coherent and natural ways of developing the shore and the policies that link to that.

Figure 7.11 Static posture shows John Weber's experience with speaking in front of a camera

Weber: The Jersey Shore chapter of the Surfrider Foundation uhm they started this website this idea of rethinking the Jersey Shore. Uhm there was a lot of (.) re happening after Sandy there was you know this called rebuild and restore the shore::! And all this re and we thought well maybe we should rethink some of this. Maybe we shouldn't build

everything exactly the way it was or build it better or smarter or maybe not rebuild certain thing at all. (Noest 2015 Time 9:49)

The NGO does this by promoting critical reflection on the amount of man-made structures in coastal areas (fig 7.11). His view of what the coastal landscapes should look like is very focused on nature and the natural processes that shape the coast. Man-made structures are in the way of this dynamic and therefore should be planned with caution and respect to the natural processes. This includes man-made flood prevention strategies in the ocean but also urban development on land.

Figure 7.12 John Weber explaining his view on the rebuilding process after Sandy

To John Weber, the natural character of the shore is its main attraction. Tourists will keep coming as long as there is a beach, an ocean and supportive facilities like parking. Everything that is extra should be subject to critical rethinking of its need to be located so close to the ocean when in the process of rebuilding.
The location of the interview also supports this perspective. We met at the North End beach of Asbury Park, where the Surfrider Foundation had successfully stopped a planned development of oceanfront townhomes. John is opposed to building these new homes but unfortunately, there are already a lot of homes on the oceanfront build over the years.

Weber: We're all here now uhm I mean that's why this is a difficult problem (.) uhm it would be nice to (.) you know (.) stop the bleeding so to speak and make it so people couldn't build new homes right in the coastal zone. But for the ones that are here now:: we have to like I said we have to uhm (.) make sure that they're baring the costs for their decisions to build you know uh a giant home right on the oceanfront in harm's way.
(Noest 2015 Time 12.00)

John pleads for an extra check if a development plan is necessary and responsible towards the future. He looks at the example of the coastal commission in California and thinks that if New Jersey would have that, the development in the coastal zone would be much more sensible. A commission overviewing all the development plans would be a great addition in his view, but he also underlines the role that communities can have in the smart development of the coast.

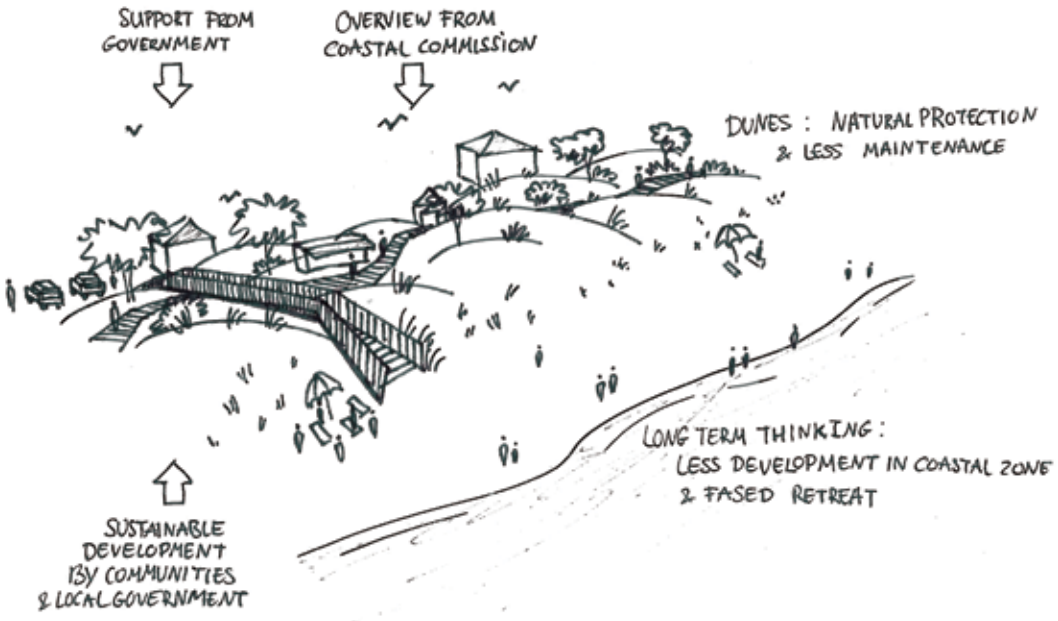


Figure 7.13 Summarizing sketch of the analysis of John Weber's interview

7.1.4 Joe Woerner - Local government

Joe Woerner is currently in the city council of Asbury Park and was part of some of the rebuilding choices that were made in the years after Sandy. His background lays at the Surfrider Foundation. At the beginning of the interview he asked whether he should answer as a council person or as a member of the Surfriders. This double function made the interview interesting because personally he is very much in favor of long-term strategic changes but as a council person he has to deal with the reality of local politics and has to also speak for parts of the community that have a different view.

Joe was partly responsible for short-term solutions in Asbury Park like rebuilding the boardwalk exactly like it was before the storm. to explain this, he mentions the divided views on climate change in the town and how as a councilman you have a hundred other things that need attention now, so it is very understandable that longer-term issues get less attention then they might deserve. His internal discussion between vision and reality was very interesting to notice during the interview and showed at many of the interview topics, for example about the relation between long-term strategies and short-term interventions. Another good example of this internal paradox is the development of the oceanfront townhomes that was also discussed with John Weber and the topic of dunes:

> *Woerner: You can see that area [North End beach] (.) was hit hard. Uh and you can see if you had town homes (.) right there, it's like the worst place you can possibly build them. So what what we need is not town homes but what we need is a dune:: system to protect that area which is the most vulnerable area in town.*
> *(Woerner July, 2015: 9:43)*

Figure 7.14 Second qoute of Joe Woerner speaking about dunes

In the first quote, he agrees with the Surfriders' arguments of building dunes instead of town homes. In the second quote (fig 7.14), you can see that he is aware of the arguments that make realization of dunes very hard in the town. He experienced a lot of push-back from other parts of the community that don't want dunes because of the ocean view. As a councilman he has to represent both of those groups. A compromise is found in developing dunes in a small way so people can get used to it and if so, widen and extend them towards more central parts of the boardwalk.
How he deals with the issue shows both his background at Surfrider and that he takes other perspectives in his town seriously. He tries to find common grounds, collaborations and comprises so the town can be both safe and attractive to tourists. But, if it comes down to it, he is also not afraid to make decisions that can contradict opinions that are present in the town.

> *Woerner: I don't think you can have your cake and eat it too. I don't think you can say I want my views and I want protection? I think at some point there has to be a decision made by the municipalities what has a higher value (.) protection against storms (.) or uhm our traditional boardwalks (.) which, which we all love, but traditional boardwalks with dunes in front of them are absolutely beautiful as well.*
> *(Woerner July, 2015: 28:30)*

In this last quote he is not afraid to go against the traditional view of the boardwalk culture. He is open to change because he believes it to be necessary to ensure a safer future for the people of Asbury Park. He also takes up the discussion with the traditional sacredness of Home Rule, that gives the local governments a large say in how they deal with their coastal zone. On the one hand, he admits to seeing the advantages of an overarching commission that can coordinate with the towns to

Figure 7.15 Joe Woerner smiling at the thought of removing Home Rule

implement regional plans and increase collaborations between towns. But on the other hand, he sees the importance of Home Rule in the American culture. He laughs when asked critical questions about it, like it will never be any different. (fig 7.15)

> *Woerner: After Sandy Home Rule came up directly after but there's not a lot of discussion (.) it's very very:: sacred amongst municipalities.((grins)) Home Rule will be fought for.*
> *(Noest 2015 Time 17.20)*

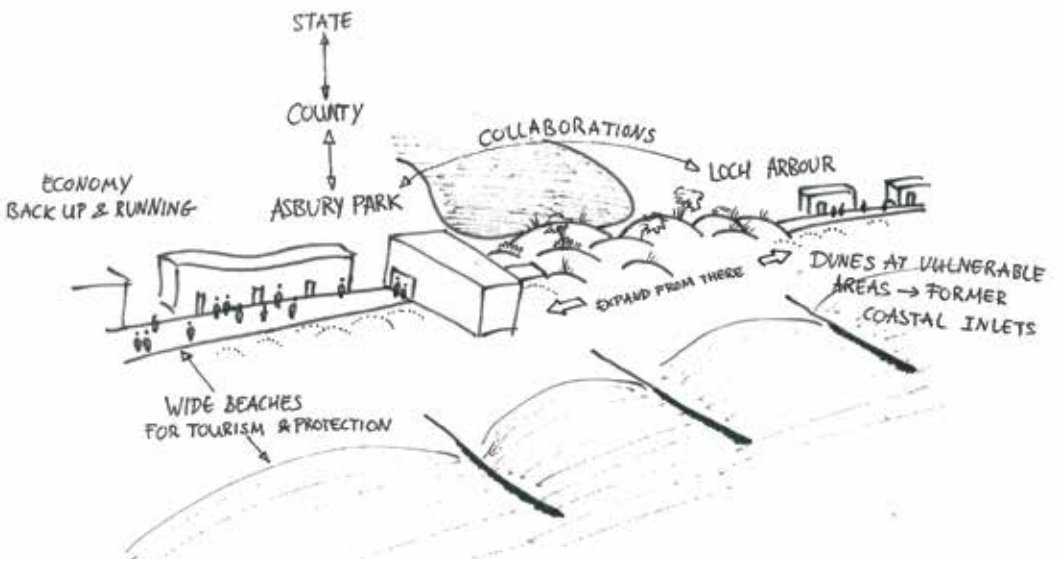


Figure 7.16 Summarizing sketch of the analysis of Joe Woerner's interview

7.2 | COMPARISON OF PERSPECTIVES

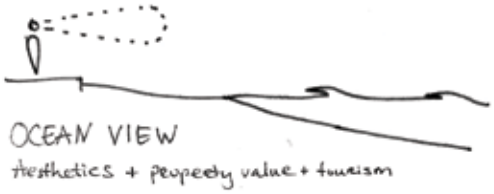
The first two, Shaun and Marilyn and John and Donna Marie, talk mostly from a residential perspective, which is obvious because they are both oceanfront residents. However, the views they have on their surroundings are completely different. Shaun and Marilyn, the surfers that they are, have a very close and multi-faceted relationship to the ocean. John and Donna Marie mostly mentioned the relationship between the property and the ocean view.

A comparison between Joe Weber and Joe Woerner brings out very interesting points because they have a similar background. The fact that Joe Woerner is now a City Councilman means that he now has to compromise between ideas, deal with practical and financial arguments and represent all the different opinions in his town. Joe Weber, representing only his NGO, can dream big about a more natural coastline with low maintenance and respect for nature's ways.

Coastal safety

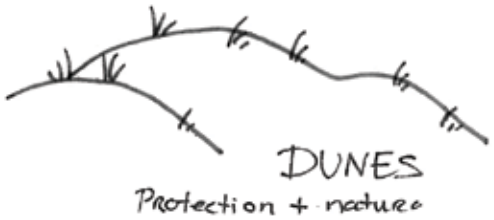
Though they all have very different interpretations, all the interviews in favor of some type of coastal safety. They all acknowledge the risks that are present and see that as a threat. For some, this is the threat of losing their physical property, for some it is losing their home and the memories that are embedded in that. As a councilman, Joe Woerner sees the threat for almost all the livelihoods of his town's residents and the economic blow that these storms mean for his town. Weber also mentions the homes and lives that are at risk and adds the natural and ecological impact that these storms have. Part of his NGO's goal is to improve the risk awareness and link that to action and change.

Ocean view



Shaun describes living by the ocean as a religion. Having a view on the ocean has a calming effect on his brain and he would never go without it. John and Donna Marie also share this love for an ocean view, but in a very different way. Their desire to have a good view on the ocean is mainly based on the property value of their home. The way that John talks about the view is with much more emotion than at the thought of losing his home to a storm. Joe Woerner also sees the benefits of ocean view for his town. People visit the town for the traditional boardwalk with the ocean in the back. Losing that view could mean loss of income for much of the tourism sector. John Weber, on the other hand, is very willing to compromise on the ocean view. His principle is: If you can see the ocean, the ocean can see you too.

Dunes

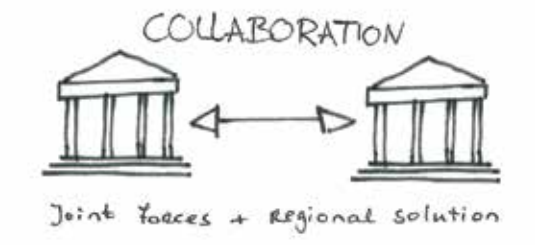


Overall, everyone was open to having dunes. Though for some, this was in a more functional way, like John and Donna Marie who prefer the low strenghtened dunes that are present now. The summarizing sketch of their interview shows a functional dune with the single purpose of providing protection to the houses in the back. Others, like John Weber, see dunes as a natural system that fulfils many functions and should have a higher priority over man-made structures. Also the sketch of Shaun and Marilyn's interview is much more based on the natural processes of the land and the ocean. Joe Woerner knows the divided opinions about dunes in his town. His compromise is to start small at a less intensively used part of the boardwalk and expand the dunes from there. This first, small dune strip is seen as an experiment to let people get used to it and gradually expand from there.

Multifunctional

Everyone saw the shore as a multifunctional place: there were always combinations made between protection and residential, or nature, or tourism. No one thought the shore should be only for nature or only for residential.
The area where they saw this multifunctionality varied. The residents were mostly focused on what happens between their house and the ocean. The public figures on the other hand had a focus on the shore as larger landscape. In the sketch of John Weber's interview, the shore is really seen as a wider landscape zone.

Collaboration



Besides that Joe sees the shore as a larger landscape, he also pleads for governments and organizations working together. A coastal commission will have the overview on the region. Collaborations between communities, government and a coastal commission should be the base for sustainable development of the coastal zone.
Joe Woerner is also not afraid to look beyond the borders of his town and look for collaborations towards a more cohesive strategy. He sees potential in better collaborations with other layers of government, and stresses how he is working together with the neighboring town to tackle the flood risks on their border.

Sources

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8 | Community outreach posters

In this chapter, the second branch of the film analysis will be discussed (fig 8.1)

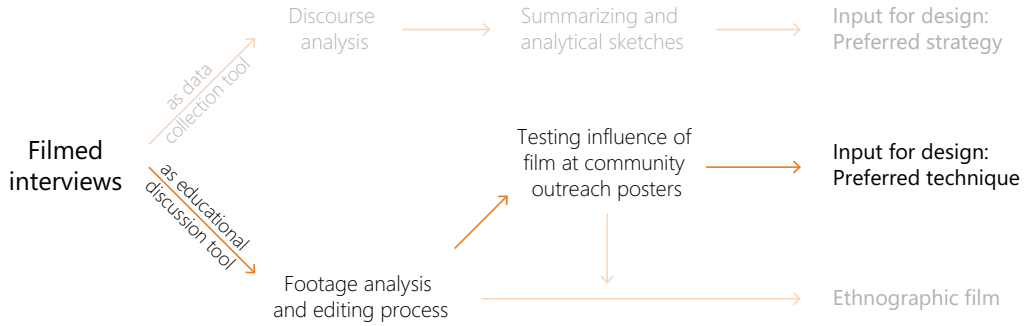


Figure 8.1 Application of film as discussion tool

In the following chapter, possible coastal management strategies and techniques will be inventoried and discussed. First are ways of flood protection and second are ways of building on the beach. These options will be based on references from the New York metropolitan area and the Netherlands (fig 8.2). The options that are taken into account are physical landscape interventions that could apply to the landscape types present in New Jersey. They will be evaluated by a local New Jersey community through community outreach posters. This method will be explained further on, but first the flood protection and building options are described.

Figure 8.2 Reference locations for the interventions options (Based on Imgur 2014)

8.1 | FLOOD PROTECTION OPTIONS

First options that are explored are for flood protection. All the different ways of coastal protection are accompanied by explanatory pictures. A small map and cross section provide a general view of the intervention and information on the way of functioning. The pictures give an idea of the spatial consequences of the intervention and what the reference looks like.

8.1.1 New York Metropolitan area

Rock wall inside dune – 18th century seawall, Bay Head, New Jersey

After Sandy, the people of Bay Head were pleasantly surprised to see that a 18th century rock wall had protected their homes from the storm. No one knew that the wall was still there. Now, the property owners of Bay Head refuse to let the government build dunes on their land. They are building their own rock wall with their own money.

The basalt rocks in the center of the dune strengthen the structure. Waves crash against the sturdy wall first, before they get a chance to erode the land. For this reason they are a commonly used hard material in coastal defense.

Figure 8.3 Cross section, map and reference images of the intervention (Mills, 2015) (Bay Head Oceanfront, 2012) (Singlefinglide 2012)

Bio-based sand catchers – Christmas trees on the beach on NY, CA, FL

In the hurricane-prone states of North Carolina and Florida, the idea of using old Christmas trees as sand catchers is very common. After December, the retired Christmas trees of local residents and not-sold ones from large suppliers are placed on the beach. The shape and texture of the trees is extremely efficient as sand catcher, they are biologically degradable and produce a nice smell.

The trees are placed in patterns that create the most wind shelter. Sand settles in these lee areas, so primairy dunes can start to form. Over time, the small dunes grow and the trees start to degrade. This way, natural dune formation is stimulated which can protect against flooding. When the trees are gone, development of the small dunes depends on the natural influx of sand and how well sand can settle onto the primairy dune.

Figure 8.4 Cross section, map and reference images of the intervention (Higgs 2014) (Higgs 2014) (Chase, 2014)

Double dune structure – Ian McHarg's Design With Nature

In the sixties, the famous American landscape architect Ian McHarg already argued how the coast of New Jersey should be adapted towards a double dune structure. Here, coastal protection is done in the shape of a landscape region, instead of a single line of defense.

A double dune system includes a beach, primary dunes as and a region of secondary dunes. Primary dunes are steep dunes partly overgrown by pioneer vegetation. They form the first line of coastal defense. Secondary dunes are less steep, well overgrown by larger vegetation like bushes and trees and often include dune valleys. All the elements of the dunes, hills, valleys, flora and fauna, form a living landscape system. The dune system finds its protective qualities in width and working with natural processes.

Figure 8.5 Cross section, map and reference images of the intervention (Amelanderparadijs 2012) (ZUS 2011) (Staatbosbeheer 2012)

8.1.2 The Netherlands

Beach nourishments – Sand motor, North sea coast, NL

Coastal landscapes are always dynamic. Sand erodes and sediments along the coast. Beach nourishments add sand to this natural balance; it increases the influx of sand. There are many ways to get the extra sand on the beach, one of which is through 'rain bowing'. Here a dredging boat takes sand from off shore

to the coastline and sprays it close to the beach. Natural processes will spread the sand surplus over the coastline and widen the beach. Eventually, when the sand has reached the dunes, they will form higher and wider dunes that will protect the homes behind it from floods. This principle was used in the Zandmotor experiment where a large surplus of sand was placed near the shore that spread out through only natural processes.

Figure 8.6 Cross section, map and reference images of the intervention (Zandmotor 20110) (Van Houdt, 2011) (RWS 2012)

Guardian, sleeper, dreamer – Dike system, North Holland, NL

This is one of the oldest dike systems in the Netherlands. The risk of flooding is spread out through three dikes structures at various distances to the shore. First is the Guardian, the first line of defense. The second is the Sleeper, but awakes when the water passes the first line. The last, the Dreamer, is de final line of defense, only needed if the first two structures have failed. The further from the shore, the better the structure is integrated in the landscape. For example, roads, homes and other infrastructure are placed on top of it.

Figure 8.7 Cross section, map and reference images of the intervention (Percussion, 2006) (Centurion, 2006) (Lola 2014)

Dike in Dune – Noordwijk, NL

The Dike in Dune in Noordwijk combines the hard structure of a dike with the ecological and recreational possibilities of a dune. The core of the dune is made of hard materials like a dike and inside is room for parking. On top is a dune park landscape with vegetation, beach facilities and paths. In other cases it is also combined with boulevard-like facilities overlooking the sea. On top of the hard structure are dunes , vegetation and walkways. This hybrid structure creates multifunctional space for both privatized commerce and public goods like flood safety and natural values

Figure 8.8 Cross section, map and reference images of the intervention (RHDHV 2015) (OKRA 2015) (DP6 2007)

8.2 | LIVING ON THE BEACH

Second are the options for the ways of building on the Shore. Again, the options are supported by a map, cross section and reference images. The next options will show that the Netherlands and the USA have different perspectives against the topic, maybe even more than the previous exploration.

8.2.1 New York Metropolitan Area

Permanent beach homes – Many places along NY metropolitan shores

Along large parts of the American shorelines, permanent housing is allowed very close to the ocean. In some areas even literally on the beach itself. The ocean view and beach life attracts many people into buying a (second) home on the shore. The homes are permanent constructions that can be lived in year-round. They often have a beautiful view over the ocean and direct access to the beach. Flood insurance is a large cost for these homeowners. Flood risks and possibly rebuilding after a storm are apparent threats. Having permanent homes close to the ocean can limit sand drift and therefore limit dune growth. Accessibility of the beach to the public often feels more limited in areas with a lot of private housing.

Figure 8.9 Cross section, map and reference images of the intervention (Gabela, 2014) (Bookthejerseyshore, 2014) (Beachrealtync, 2015)

Integrated in flood protection – Big U, New York

In the Rebuild By Design competition, one of the solutions in the BIG U was buildings with integrated flood protection. As can be seen in the reference images (fig 8.10), shops are organized in linear structures. When a storm sets up, the storm walls can close off the buildings so they function as a flood barrier.
Applied to the Jersey Shore, this concept could be the following: People should be allowed to live close to the shore, but homes in these areas should also be able to function as flood protection. The homes can be integrated with flood protective constructions that can be put in place when a storm is coming. Combined with flood protection with soft materials, building could also be part of dune.

Figure 8.10 Cross section, map and reference images of the intervention (Amie 2014) (BIG 2013) (BIG 2013)

Homes on Poles - FEMA

After Sandy, FEMA asked many homeowners to raise their homes. An example of how this can be done is through raising the house on poles. When a home is placed on the beach, water, wand and sand can flow under the house. This way the natural processes of the shore are less limited than when a home is permanently on the ground. More inland, the space between the homes is often used as garage or storage basement. Living spaces are then on higher floors. Raising a home, the risk of water damage is decreased, while still maintaining ocean view .

Figure 8.11 Cross section, map and reference images of the intervention (NY Rising, 2008) (Cook, 2003) (Norlin, 2012)

Homes on heightened dunes - FEMA

The obligated raising of homes, can also be done by first heightening the ground and then building the house on top of it. In this option, people should be able to live close to the ocean but first have to raise the ground on which they build. This way, every home in a flood zone does its part in flood protection of their

own home as well as for protection of homes more inland. When the majority of the homes in a flood zone raises their ground, the individual interventions can lead to a large flood protective zone.

Figure 8.12 Cross section, map and reference images of the intervention (Hunnoval, 2015) (Cofman, 2015) (Visitnc, 2015)

8.2.2 The Netherlands

No beach homes – Many places along Dutch shores

Along the majority of the Dutch coast, there are no beach homes allowed. As the flood protective qualities and natural values of the coastal landscape carry high importance, not many things that limit these aspects are allowed. The absence of constructions on the beach is important for sustaining the sand flows and other natural processes that shape the Dutch dune landscape. Following that perspective, this option does not allow any buildings directly on the shore. Beach homes can be built behind a steady row of dunes, dike or other type of flood protection.

Figure 8.13 Cross section, map and reference images of the intervention (Metz, 2014) (Smith, 2015) (Recreatief, 2012)

Temporary beach homes – Zandvoort, NL

Along Dutch shores with high recreational use, some temporary structures are allowed. In summer, residents and tourists can enjoy staying in a small beach home. After the summer season, the homes are taken apart and stored. In these low season months, the beaches are empty so the natural processes are not limited. This temporary construction of beach homes combines the need for recreational facilities in summer with the space for natural processes on the shore in the off-season.

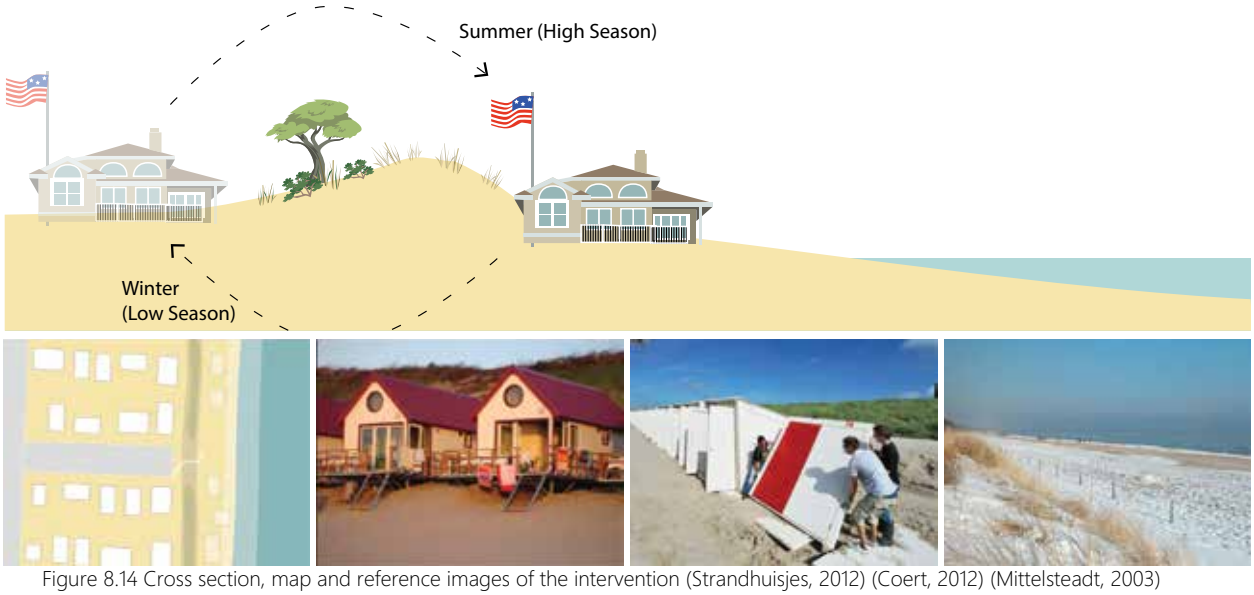


Figure 8.14 Cross section, map and reference images of the intervention (Strandhuisjes, 2012) (Coert, 2012) (Mittelsteadt, 2003)

8.3 | EVALUATION BY THE COMMUNITY

The flood protection and building options are evaluated by the NJ community through community outreach posters. This method is described as the 'graffiti wall' method by Martin and Hanington (2012). "Graffiti walls provide an open canvas on which participants can freely offer their written or visual comments about an environment or system, directly in the context of use." (Martin & Hanington 2012, p.217) The method includes large posters that casually provide the opportunity for participants to leave a comment related to a guiding question. This method was chosen because of the difficulties of attracting a focus group that was able to find the time in the busy summer season. The posters form a time-efficient method that can executed with simple materials. (Martin & Hanington 2012)
The goal of the evaluation is first, to find out what options a New Jersey coastal community prefers and second, how discussion through film may trigger different voting behaviour. To achieve this goal, the evaluation was done in two ways (table 8.1).

8.3.1 Method

The first group of participants was shown a map of the area and a detailed map of the place of the inquiry. They were asked to choose their favorite location along the Jersey Shore. The goal of this step is to get the participants to start thinking about their environment and how they feel about it. In the second step, participants were given post-its to vote for their flood protection strategy of their choice. The same was applied to a poster with option on how to build on the shore. Pens were provided so participants could write down comments on their post-its. In group B, the first step is replaced by a three minute video showing the discussion between long-term rebuilding strategies and short-term recovery.

	Group A	Group B
Introduction: Encourage thinking about environment	**Poster 1:** What is your favorite place along the Jersey Shore?	**Video clip:** Discussion between long-term and short-term strategy
Evaluation 1: Voting through post-its	**Poster 2:** Flood protection options	**Poster 2:** Flood protection options
Evaluation 2: Voting through post-its	**Poster 3:** Building options	**Poster 3:** Building options

Table 8.1 Set-up of the poster method

The location of the inquiry was kept consistent: all days of applying this method were done on the North End of the Asbury Park boardwalk. This location was quiet enough to have people calmly do the assignments and it was busy enough to attract a lot of participants. Local residents were given a post-it in the shape of a yellow star, non-local visitors were given a pink heart. The outreach posters were carried out on Thursday and Friday, because of the number of people on the boardwalk and the mix between local and visitors, which can be distorted in the weekends. The inquiry of group A was performed on one day from 10:30 to 15:30. Group B was acquired over two days, Because the video clip and the discussion took longer than the introduction poster of group A.

Posters

The layout of the posters was done in such a way that all the options were represented equally (8.15). All the options were given the same type of information in graphically the same way: a similar cross section, three pictures showing what it physically looks like, a short text explaining the concept and indicators of the costs of construction (`$-$$$`), costs of maintenance (`$-$$$`), flood protective quality (sad-happy smiley) and sustainability (sad-happy smiley).

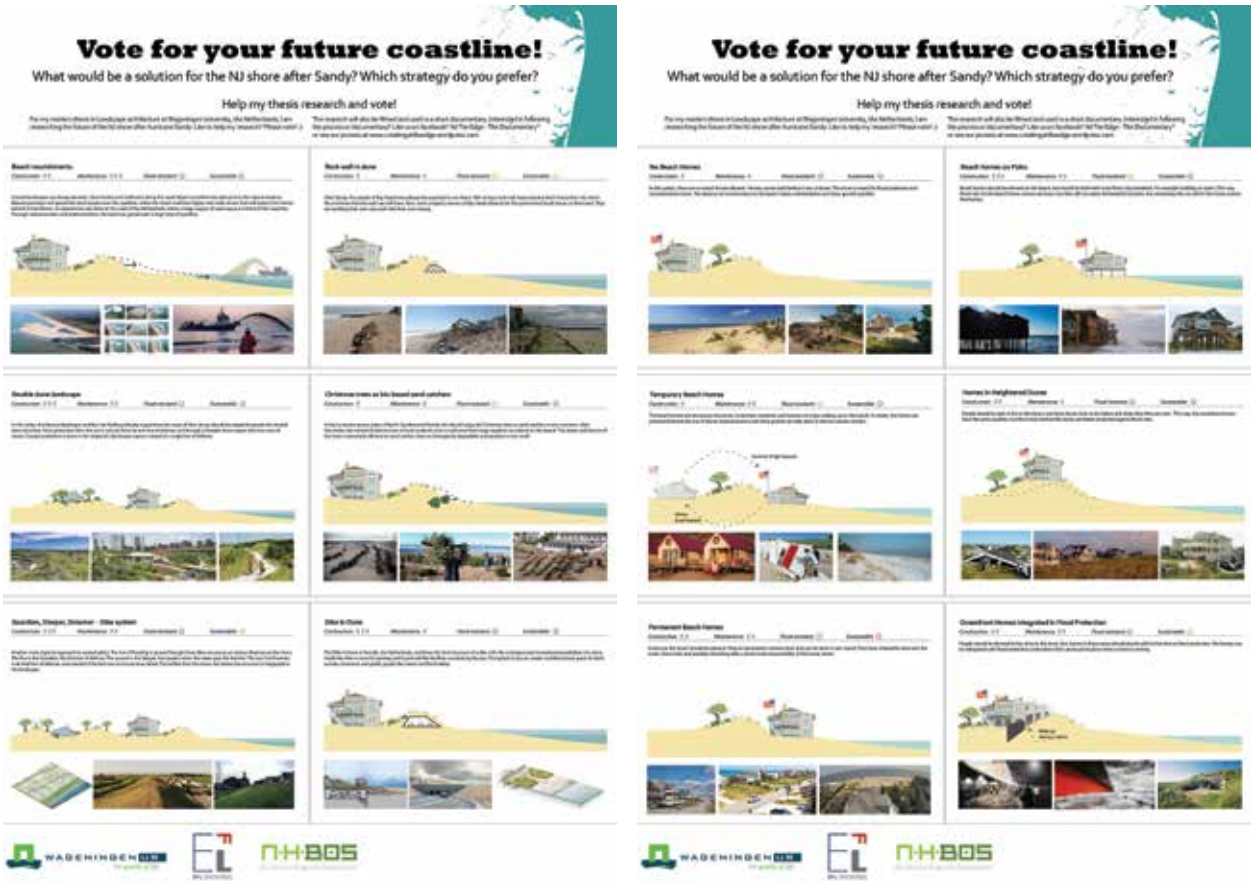


Figure 8.15 Set-up of the posters for the community outreach method

Video

In group B, a three minute video was shown where the pros and cons of both a long-term strategy and a short-term fix for the coast were discussed (Appendix VII). The point was not to steer participants in a certain direction, but to encourage discussion and reflection. Both sides of the story had similar amounts of time in the video. The long-term strategy was explained by landscape architects of HNS, who made a winning proposal in the Rebuild by Design program. The short-term choices were explained by the city councilman of Asbury Park. They both talked about their perspective on rebuilding and specifically discussed two examples of how they look at dunes and beach replenishment. After the video, participants were asked what they had seen and where they would place themselves in that discussion.

8.3.2 Poster Results

All collected data from the community outreach posters can be found in appendix VIII.

Results - Group A (Without video)

Figure 8.16 Posters 1, 2 and 3 of Group A

Poster 1: Introduction poster

Some of the comments of poster 1, from left to right: "The boardwalk" (with drawing of the boardwalk and beach); "Living on the shore!"; "My home" (drawing of a heart); "The sand" (drawing of sea and parasol); "Can't wait for it to get developed"; "My soul comes alive at the shore"; "Soy Papillo, Asbury Park gets better"; "Where I went as a child"

Figure 8.17 Some of the comments from poster 1 group A

Poster 2: Flood protection

Beach nourishments 9 ; Rock wall 9; Double dune 13; Christmas trees 11; Dike system 1 ; Dike in dune 2.
Some comments from Double dune option, from left to right: "Appearance and sustains wildlife"; "Have to have dunes, sensible"; "More protection".
Some comments from Christmas trees option, from left to right: "Decorate the trees!"; "Used trees put to 2nd use"; "Fresh scent"

Figure 8.18 Some of the comments from poster 2 group A

Poster 3: Building on the shore

No beach homes 16;On poles 8; Temporary 5; Heightened dunes 10; Permanent 3; Integrated 3 votes.
Some comments from No beach homes option, from left to right: "This is right!"; "Prevents flooding and unnecessary building"; "No homes – not smart".
Some comments from Heightened dunes option, from left to right: "Maintains the view but protects from future storms if rebuilding needed"; "Sustainable, not bad for the environment"; "Still allows people to live on the shore with low risk"

Figure 8.19 Some of the comments from poster 3 group A

Results – Group B (with video)

Poster 2 (Day 1 and 2)

Figure 8.20 Poster 2 from group B and some comments

Poster 2: Flood protection

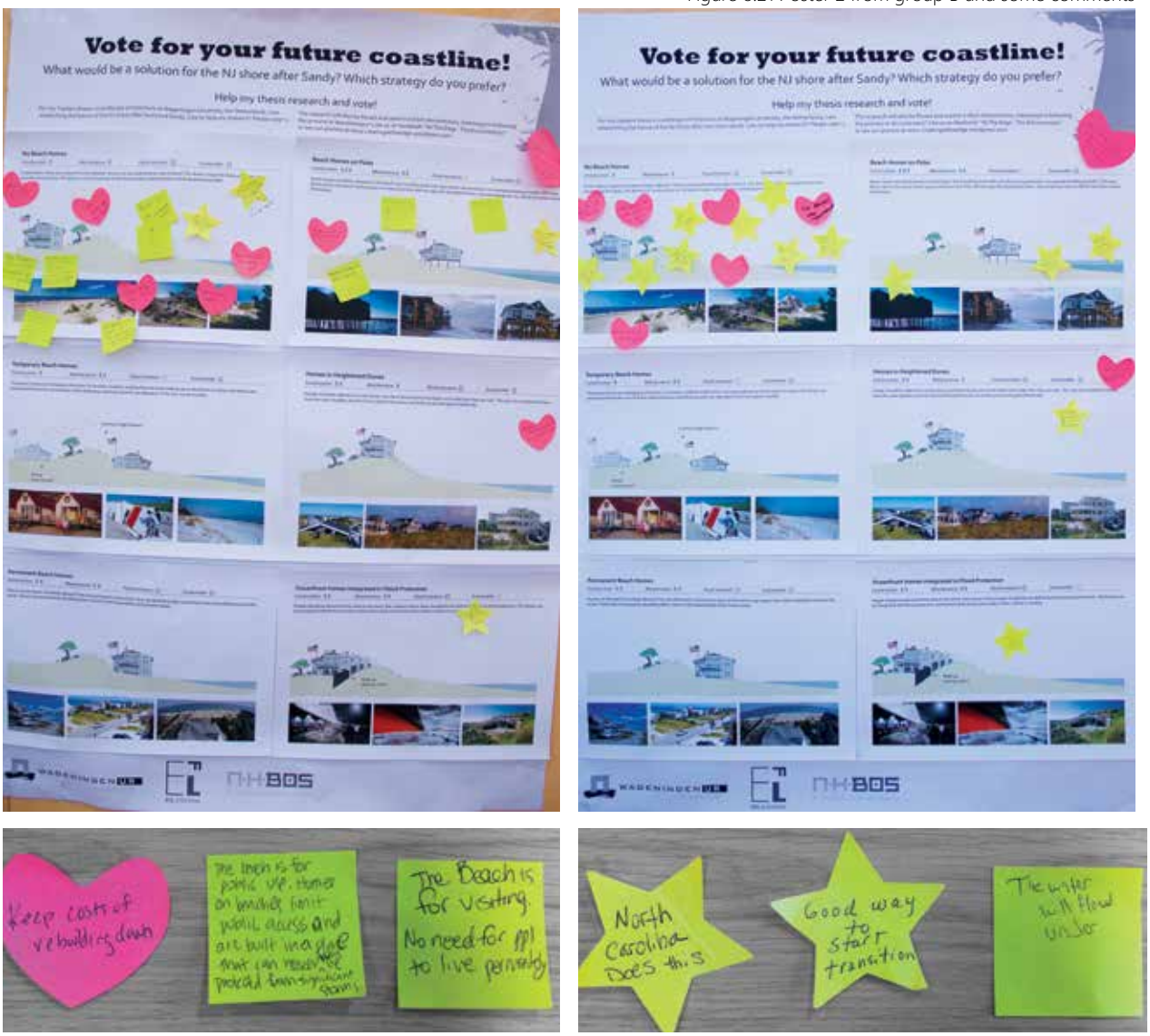
Beach nourishments 9 ; Rock wall 3; Double dune 12; Christmas trees 3; Dike system 0 ; Dike in dune 13.

Some comments from Double dune option, from left to right: "Natural looking"; "Beach protection – walk to beach for views"; "Benefits development – protects environment".

Some comments from Dike in Dune option, from left to right: "Works well in other countries"; "Innovative, considers multiple problems, still aesthetically pleasing"; "More tourists = more $ + protection"

Poster 3 (Day 1 and 2)

Figure 8.21 Poster 2 from group B and some comments



Poster 3: Building on the shore

No beach homes 27;On poles 8; Temporary 0; Heightened dunes 3; Permanent 0; Integrated 2 votes.
Some comments from No beach homes option, from left to right: "Keep costs of rebuilding down"; "The beach is for public use, homes on beaches limit public access and are built in a place that can never be protected from significant storms"; "The beach is for visiting, no need for people to live permanently".
Some comments from On Poles option, from left to right: "North Carolina does this"; "Good way to start transition"; "The water will flow under"

8.3.3 Counting the votes

Tables 8.2 and 8.3 show the votes per poster option and per type of participant. A total of 85 people participated in the inquiry, of which 45 did the introduction poster and 40 saw the introduction video.

Flood Protection options

In group A, the flood protection option with the most votes was the Double Dune landscape (13 votes). People commented on its natural appearance, protective qualities and how it can benefit wildlife. Participants also liked the option to put Christmas trees on the beach, they responded positive to the idea of reusing material and it being a cheap solution that they can take part in themselves. This last option was most appealing to local residents. Visitors mostly opted for strategies that resulted into a wider beach area.

Flood Protection options	Group A			Group B		
	Local	Visitor	**Total**	Local	Visitor	**Total**
Double Dune Landscape	7	6	**13**	5	7	**12**
Dike in Dune	1	1	**2**	9	4	**13**
Beach Nourishments	3	6	**9**	7	2	**9**
Rock Wall in Dune	8	1	**9**	3	0	**3**
Christmas trees	9	2	**11**	2	1	**3**
Dike System	0	1	**1**	0	0	**0**
Total votes	**28**	**17**	**45**	**26**	**14**	**40**

Table 8.2 Votes of Poster 1 of both group A and B

Group B showed the option of the Dike in Dune (13 votes) and the Double Dune landscape (12 votes) as main winners. Local residents mostly voted for the Dike in Dune option, of which they saw great potential in the innovative idea and how it combined functions. Visitors liked the Double Dune landscape the best and commented on the natural look and protection of the environment.

Living on the Beach options

Group A voted the No Beach Homes option as the best (16 votes). Participants commented on it being ethically 'right' not to build on the beach and called it 'unnecessary'. A large majority of locals voted for this option. Runner-up was the option of building on Heightened dunes (10 votes), which was mostly voted on by visitors. People commented on how it combined the wish to live close to the beach but still have low flood risks.

Building options	Group A			Group B		
	Local	Visitor	**Total**	Local	Visitor	**Total**
No Beach Homes	11	5	**16**	16	11	**27**
Temporary	4	1	**5**	0	0	**0**
On Heightened Dunes	4	6	**10**	1	2	**3**
Integrated	2	1	**3**	2	0	**2**
On Poles	4	4	**8**	7	1	**8**
Permanent	2	1	**3**	0	0	**0**
Total votes	**27**	**18**	**45**	**26**	**14**	**40**

Table 8.3 Votes of Poster 2 of both group A and B

In group B, votes from both visitors ad locals were concentrated towards the option of No Beach Homes (27 votes), they commented on the importance of a public beach and unsustainability of building in risky areas. The option of building on poles received 8 votes. Local residents saw it as a good compromise on the transition towards retreat.

Influence of the video clip

In some cases, Group A and B had significantly different winning options. Where the Dike in Dune option only got two votes in group A, it was the winning option with 13 votes in group B (table 8.4). The type of options that got votes also changed after watching the video. At the flood protection poster, the Dike in Dune option stole votes from the Christmas trees and the Rock Wall option. This shows that the participants were voting more towards larger and long term investments, instead of smaller projects.

In the poster about building strategies on the beach, the votes of group B were less divided than those of group A. After the video, the option of No Beach Homes got almost all the votes, were in group A they were divided over multiple options (table 8.5). Almost all the other options, that did have beach homes in a certain way, lost votes. This also shows that people voted for more long-term solutions, and are willing to compromise on their desire to live near the ocean.

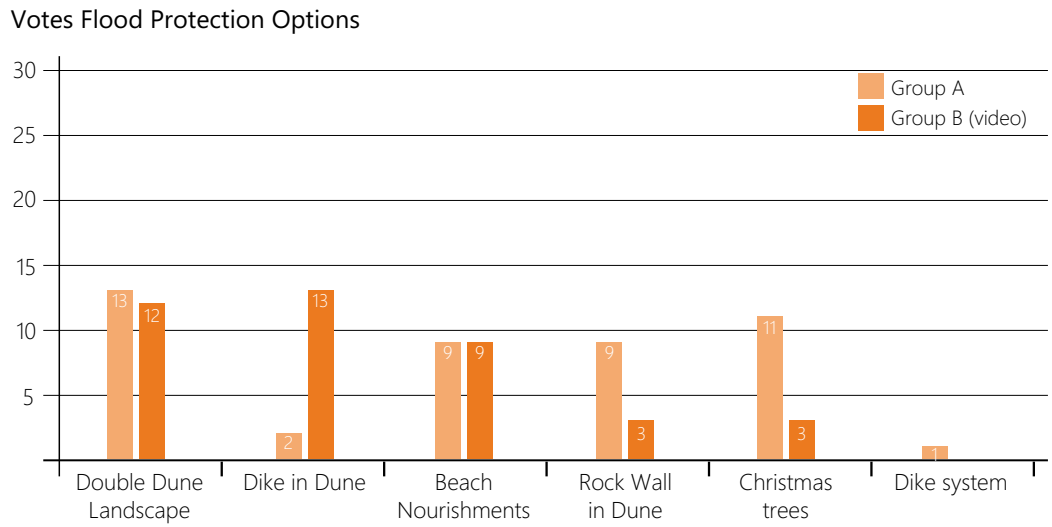


Table 8.4 Comparing votes of Poster 2 between group A and B

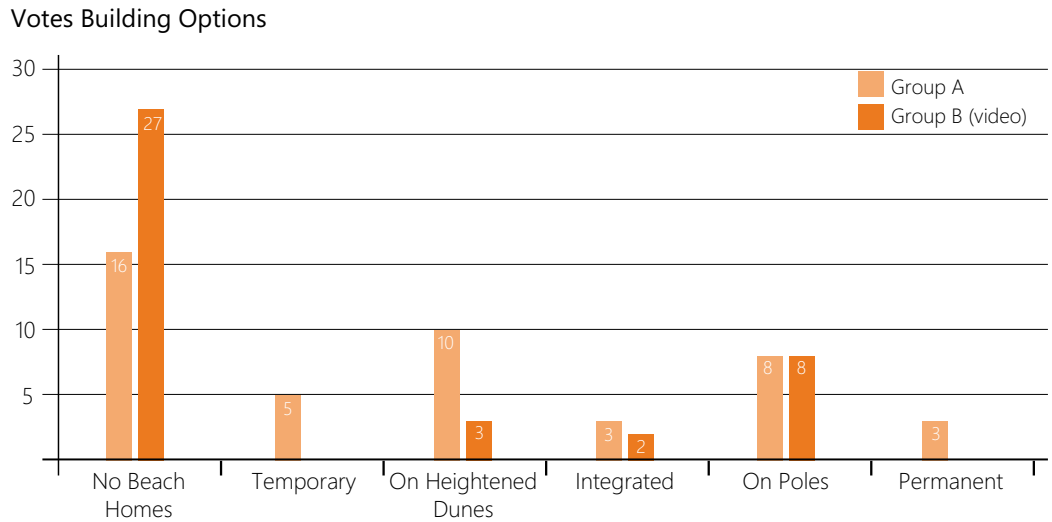


Table 8.5 Comparing votes of Poster 2 between group A and B

8.3.4 Significance

With the estimated 16.000 residents in Asbury Park and possible doubling in summer weekends, the sample group of 85 people is small. Accepting this limitation, the significance calculation focusses on the research outcomes that I was able to collect.

An outside expert conducted statistical tests on the data to compare the voting results to a random drawing of votes. The test shows that the chance (p) of the voting results coming from sampling errors are $p<0.4\%$ for poster two and $p<0.7\%$ for poster three. So, the preferences that arose from the research results have a small chance of occurring just from coincidence.

Second, to calculate whether participants significantly voted for longer-term options after seeing the video, the Mann-Whitney Permutation Test is applied. (Field 2013) For this, the options of poster two and three have to be ranked from long-term strategy to short-term solution (appendix IX. Their order is from high to low: Double dune structure, Dike in Dune, Beach nourishments, Rock wall inside dune, Bio-based Sand catchers, and Guardian Sleeper Dreamer. The options of poster three are ranked, according to the same criteria, as follows from high to low: No beach homes, Temporary Beach homes, On heightened dunes, Integrated in flood protection, On poles, Permanent Beach homes.

The statistical test aims to find out whether votes from group B are more than generally higher in the ranking than the votes from group A. This would mean that the film has a significant effect on the increased amount of votes on long-term options. For poster two, the test shows that the chance (p) of this difference coming from a random coincidence is smaller than 0.8%. For poster three, $p<1.2\%$. So, it is credible that the video has had significant impact on the increase of votes on longer-term options.

Also the influence of the film shows to have a significant impact on reducing the dividedness of the votes. The amount of order (Shannon-entropy (H)) (Field 2013) increases at group B for poster two with 0.17 bits (6.5%). At poster three, the amount of order increases even with 0.99 bits (38.4%). So, both posters show an increase of order in the votes after being shown the video.

8.3.5 Conclusions

Overall, the Double dune landscape was very popular. People liked the natural look and how it could be combined with other functions. The option of putting Christmas trees on the beach got a lot of votes because of its recycling and participatory character, but after seeing the video the number of votes decreased and more long-term or large scale interventions like the Dike in Dune, won votes.

In both Group A and B the general opinion was to not have homes close to the beach. This can be linked to the fact that there are no homes on the beach at the location of inquiry at this moment. If there would be plans to build homes, people feel like they should be built on poles or on heightened ground.

The influence of the video shows in multiple ways. Even though the video showed the pros and cons of both long-term strategies and of short-term responses, the discussion made people vote more often for larger investments and more multifunctional strategies. The video also got more people behind similar ideas; the division between options was less spread out. Statistical tests support these conclusions.

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Conclusion Part II: Reflections on the film

Academic filmmaking adds value to the research in multiple ways. The medium can show the location, people, customs and actions as holistic representations. (Laurel 2003; Rakić & Chambers 2010; Raijmakers et al. 2006) It creates a stage for the people in the film to explain their perspective on the topic and their future. It enables viewers to experience the world through their eyes with more empathy and understanding than any other medium is able to. (Pink 2013; Witteveen et al. 2010) In addition, academic filmmaking encourages critical reflection on own behavior and larger social norms. (Witteveen et al. 2010; Hadfield & Haw 2012) Film in research might be in an experimental phase in the field of landscape architecture, but in many other fields it is (growingly) accepted as a research method. (Pink 2013) It is seen as an innovation in research, because of the new dimension it can add to research data and how it asks for a new approach to its analysis. (Petrarca & Hughes 2014; Rakić & Chambers 2010; Pink 2013)

Stimulating understanding and discussion is an important value of film in this thesis. Showing the video clip during the community outreach posters aimed to trigger discussion and reflection on what is currently normal coastal management. With many efforts to keep a fair balance between both the short-term and long-term in the clip, the goal was not to steer people to one specific perspective but to make participant think and reflect. After seeing the video, people voted significantly more on longer-term options that required larger investments. Also the votes were less spread out; people agreed with each other more often. These conclusions are consistent with the theories of Hadfield and Haw (2012) concerning the use of filmmaking as a reflective and norm-challenging method. The video clip was a small experiment where the influence of film on the coastal management norms were tested. After seeing the video, people voted differently than what is currently the norm.

Concerning the whole documentary, the reflective function of film adds a lot to the goal of the project. The documentary asks viewers to see the issues from the perspective of the survivor, the city council, the fortunate homeowner etc. That perspective immediately reflects on your own values and opinions. "Our reading of a film, and our feelings about it, are at every moment the result of how we experience the complex fields this orchestration creates- partly dependent again upon who we are and what we bring to the film." (MacDougall in Pink 2013) People who watch the film will have instant reactions to what they see and hear. People react differently and those reactions say as much about the film as about the viewer themselves. (Pink 2013) Their own values are reflected on how they react. Even though an audience might not agree, they are still asked to follow the argument for a while. This internal discussion can be a valuable step in the reflective field of landscape design research.

Using film in research helped to move away from all the hurdles and towards common grounds. The conclusions that are derived from the filmed analyses are mainly insights on spatial preferences or design guidelines. These conclusions form a direct link from the participants towards the design.

Design guidelines derived from filmed interviews:

- *Coastal safety* – Though interpreted in various ways, all the interviewees attributed value to a level of coastal safety. They all acknowledged the flood risks and saw that as a threat for either their livelihood, property, landscape or town.
- *Ocean view* – Another shared value was the possibility to see the ocean. Again with varying argument like tourism, property value or as an almost religious aesthetical experience, but still a very strong shared desire to maintain an ocean view.
- *Dunes* – From small and strengthened with hard material to a large and natural dune system, all of the interviewees supported the idea of dunes in one way or another.
- *Multifunctional* – Another perspective that all the interviewees shared was the multi-functionality of a coastal zone. No one pleaded for a single type of use, there were always options mentioned where things like tourism, residential area and nature would be combined.
- *Collaboration* – Most of the interviewees also mentioned collaborations between governments or local communities as something to better protect a coastal zone. Either by adding a coastal commission or looking beyond town borders with the current institutions, most of the time a change on governmental level was mentioned.

Design guidelines derived from community outreach posters:

- *Double dune landscape* – Both with and without seeing the video, the option of the double dune landscape as described by Ian McHarg in Design with Nature, received many votes. People liked the natural look and how it could be combined with other functions.
- *Christmas trees* - The option of putting Christmas trees on the beach as sand catchers also received many votes. Participants liked the idea of recycling material and the participative character of it. After seeing the video, the vote count went down.
- *Dike in dune* – This option received less votes, but grew in popularity at the group who saw the video. Participants mentioned the smart combination of functions within one element.
- *No beach homes* – Both with and without video, the option to not have any form of residential possibilities on the beach was very popular. Comments included that it was more natural and even ethically right to limit the development of homes on the beach.
- *Heightened beach homes* – From the votes that accepted some form of homes on the beach can be concluded that they had to be heightened. Either on poles or heightened ground, the constructions should react on their vulnerable position on the beach.

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PART III DESIGN

9 | Towards design

In the previous two parts, the research deals with the paradoxes that make up the problem of persistent unsustainable coastal management: The attractiveness ánd danger of living on the oceanfront, the priority of ocean view in ánd the need of flood protection, the fight between long-term strategies and short-term interventions. In order to move away from the unsolvable paradoxes, the first step is start seeing opportunities in all the hurdles. We take the values of the opportunity tree that was concluded from part I as a starting point in forming a regional vision.

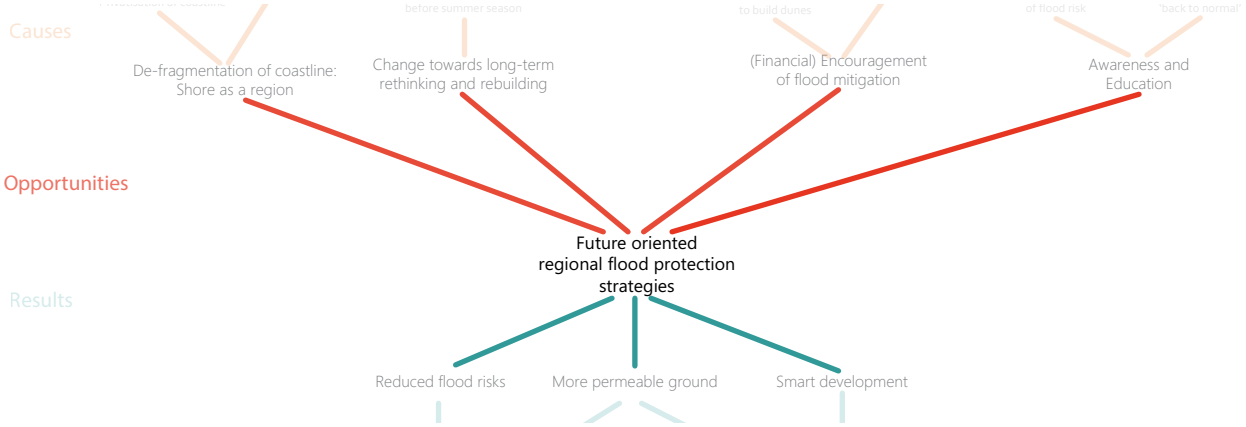


Figure 9.1 The opportunity tree now forms the main direction for the regional vision

9.1 | REGIONAL FOCUS

The problem of a regional vision is that it does not match the way that coastal management is done in the USA. The deciding powers are located on local level, at local governments and communities. A plan is needed that works according to those local principles and at the same time functions on a larger scale. To achieve this, we need to look for the right location to invest in, that will be an incentive for the development of the entire region. A location that, when developed right, will act like an oil spill and spread the change towards a sustainable coastal management over a large area.

To find this location, a risk map of the area is made (fig 9.2). The maps shows the vulnerable areas – fragmented areas and low lying flood zones- and the exposure -urban development and infrastructure-. The Jersey Shore can then be divided in areas with various levels of risk. The southern part of the Northern Headlands shows a high risk level: It is a highly developed area in which urban, economic and infrastructure developments are done in flood prone areas. On top of that, is an extreme fragmentation of small towns that make climate adaptation very hard to implement consistently.

Not only the risk is important to take into account, but also where rebuilding efforts have the most urgency. Risk maps are mostly static information in a rebuilding process, but urgency also emphasizes the processes that can be disrupted by a flood. For example whether there is an urgent need for rebuilding an agricultural

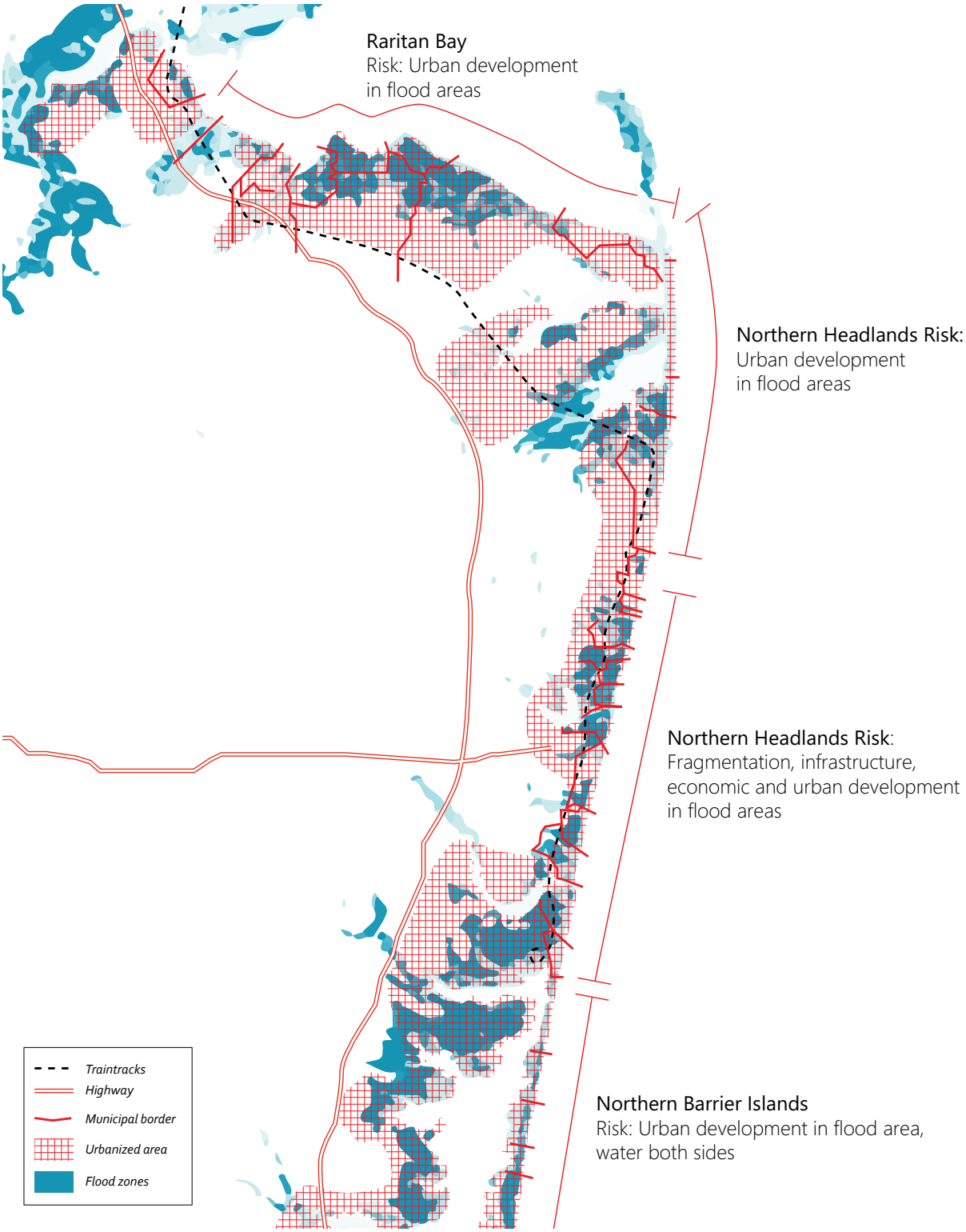


Figure 9.2 The landscape unity map transformed to the landscape risk map

area for the harvest season or a natural area to be restored in time for mating season. Taking into account these cycles can contribute to more efficient rebuilding strategies.

Along the Jersey Shore, the economic cycle is very influential. Rebuilding efforts were focussed a lot on getting the tourist economy on its feet. Every summer that passes before rebuilding is done, means a great strain on the people's livelihood and possibly a downwards spiral for the whole town. This cycle links to the economy and tourist attractiveness of many other towns. Investing in these influencial areas can also have a positive effect on the economic cycle in one town and quickly spread over other parts of the Jersey Shore.

Asbury Park is one of the towns that is present in this high risk and high urgency zone (fig 9.3). The town represents a typical seaside town on the Jersey Shore and lays near the transition to another zone, so there is a high possibility of interventions and benefits spreading to many other towns and shore zones. The town deals with many issues that are also present elsewhere along the shore, which is probably why Asbury Park is also seen by the State and County as suitable pilot location.

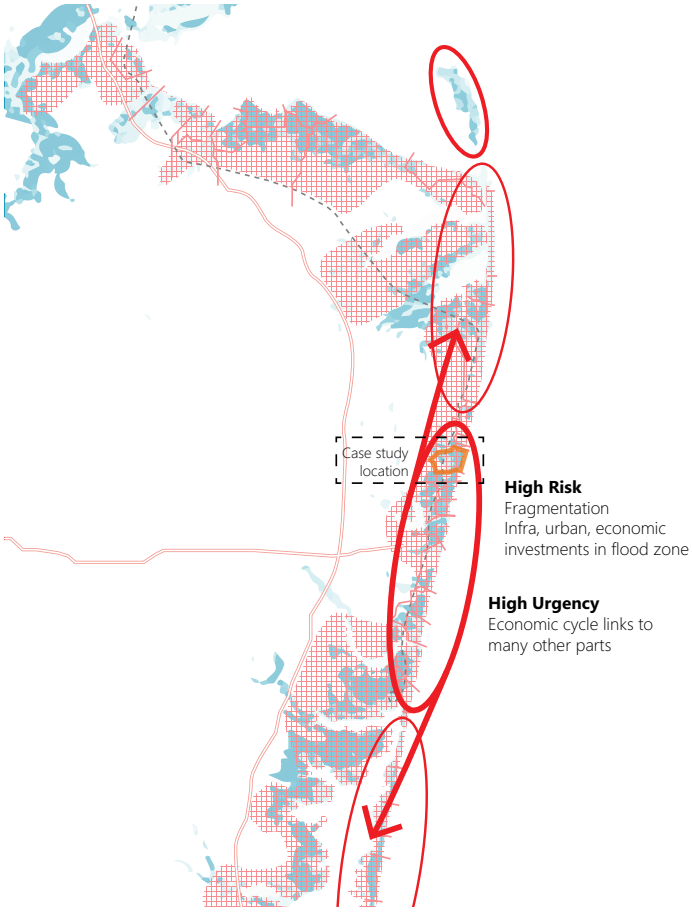


Figure 9.3 Adding urgency to the risk map shows a location that can function as an incentive for larger changes along the Jersey Shore

9.2 | ZOOM IN: ASBURY PARK

The city of Asbury Park is a seaside town within Monmounth County, New Jersey. It has about 16.000 residents and the largest income sector is tourism.(U.S Census, 2014) Asbury Park lays on low sandy soils, divided by coastal lakes and with the higher laying pine lands in the back. It is surrounded by the many other Jersey Shore towns of the Northern Headlands and has quick connections to larger cities like Toms River, Trenton, Philadelphia and New York City. (fig 9.4)

Figure 9.4 Location map for Asbury Park: close connection to both New York and Philadelphia. Reference size: North-Holland and Texel

9.2.1 Development of Asbury Park

Asbury Park is one of the many seaside towns along the Jersey Shore. Where surrounding towns have many large private homes on the oceanfront, Asbury Park was always designed as a business. (Wolff, 2006) The boardwalk, restaurants, shops, arcade and theater form the edge, but also the heart of the city. The typical wooden deck of the boardwalk is originally for letting the sand of people's feet fall through the planks before reaching the hotels.

The town has known great times as a seaside amusement resort. In the roaring twenties and thirties, the city was booming (fig 9.5). Its geographical position made the town attractive for visitors from both New York and Philadelphia. In the west, behind the train tracks, the workers and African American community lived in harsh contrast to the glamorous world of the oceanfront. (fig 9.6)

Figure 9.5 Boardwalk Casino build in 1929 and designed by same architects as Grand Central Station (Montone, 2010)

Figure 9.6 Map of the districts, boundaries and landmarks of Asbury Park

Because of growing competition from the casinos in Atlantic City, Asbury Park started losing its glory. The tourist numbers dropped as travelling large distances and going overseas got easier. Some of the old glory is still visible in the art deco skeleton of the casino and memories of the good old days. (fig 9.7)
This loss of clients meant a great fall for the seaside town. Jobs were lost and racial riots started to occur. Hotels and facilities just behind the boardwalk were torn down, leaving many blocks along the oceanfront vacant.

Figure 9.7 Boardwalk Casino now vacant

In the seventies, Asbury Park was launched into a new identity. When Bruce Springsteen released his debut album "Greetings from Asbury Park, N.J." (fig 9.8) in 1973, the music world looked at the city as the new Mekka of the music genre. To this day, people visit Asbury Park

for musical festivals or concerts. The main venue is the famous "The Stone Pony" club, seen as the starting point for Springsteen, Jon Bon Jovi and many others.
While the music image of Asbury Park is still alive, a new wave of tourists is setting up. Slowly, the gay community moves to Asbury Park and turns this sleepy old-glory seaside town around. During the site visit, the Supreme Court voted for legal gay marriage in the entire US, resulting in rainbow flags at homes and businesses for weeks.

With this newly found potential, Asbury Park is trying to remove itself from the dark period of the 60's and 70's.

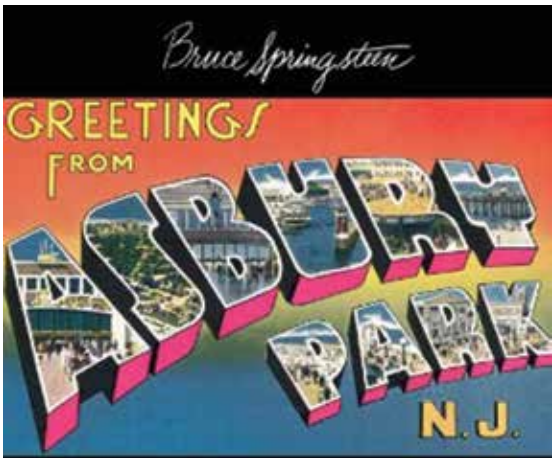


Figure 9.8 Cover of Bruce Springsteen's album Greetings from Asbury Park (Springsteen, 1973)

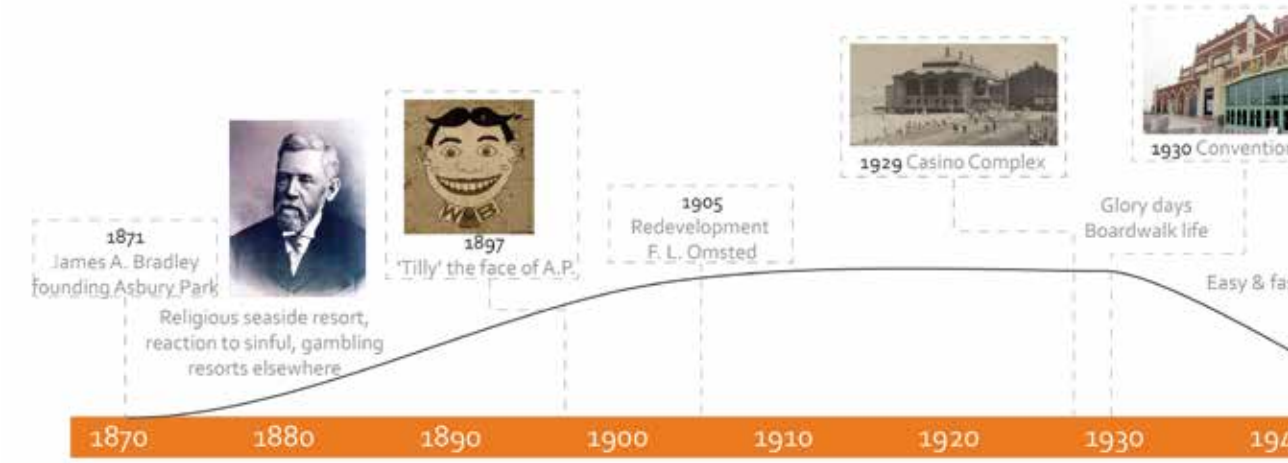
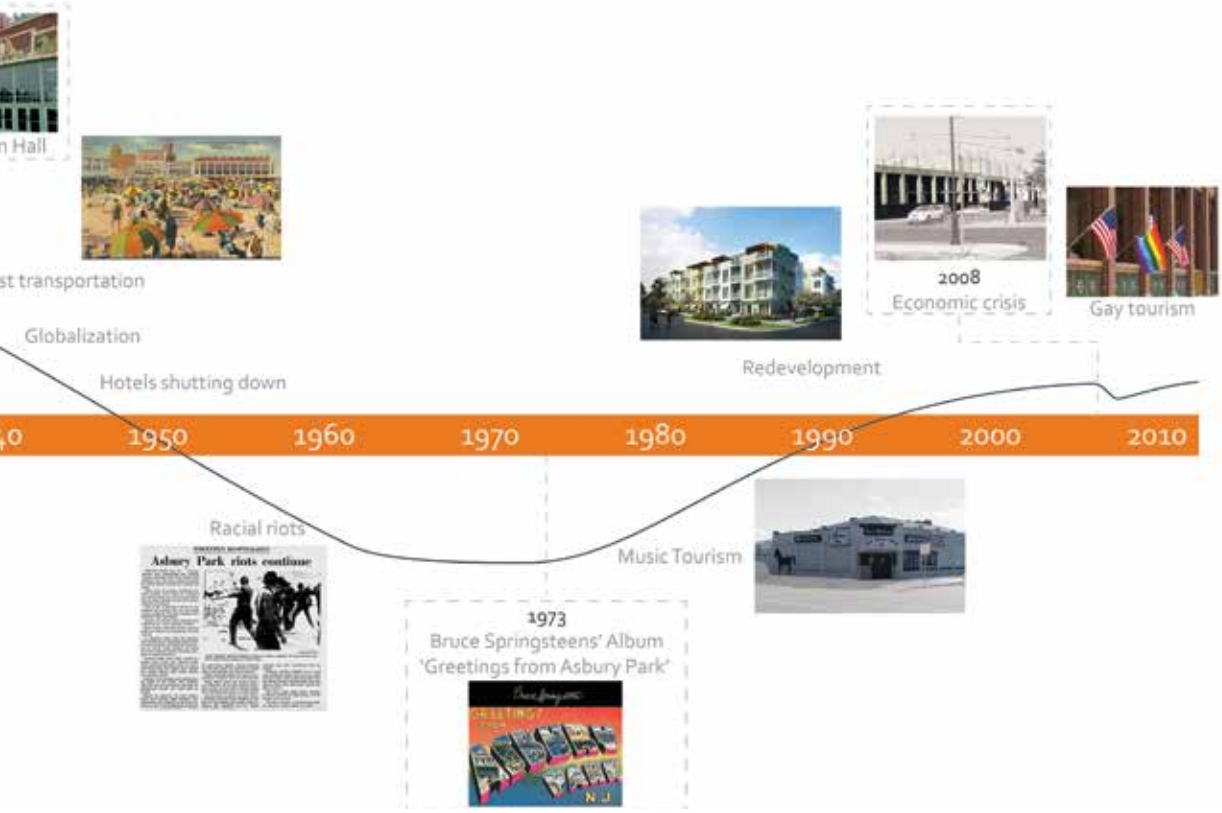


Figure 9.10 Timeline of Asbury Park's rich history

Slowly but surely, crime rates are going down and new development projects are taken on.
Unfortunately, the growing economy of the town had to face some difficult times already. The economic crisis (2008), Hurricane Irene (2011) and Sandy (2012) were three hard blows to the fragile recovery. During Sandy, the beloved boardwalk, situated in the heart and history of Asbury Park, was partly destroyed and adjacent buildings were damaged. Some homes and streets were flooded, from the ocean side and in the west from the lakeside. Since then, everything was mostly build back to normal again. The boardwalk was restored to its former state before the summer of 2014.

Figure 9.9 New development projects in the oceanfront zone (iStar 2013)



9.2.2 To the boardwalk

Along the way to the beach, some of the historic changes are visible. The following filmed cross-sections show different parts of the route from the west side of Asbury Park towards the boardwalk.

A - Asbury Park West

Asbury Park West – Behind the train tracks is where the working class and mostly African American community used to live. The plot size and type of housing still shows this history. The street has a lot of trees, able to grow because of the large distance to the ocean, and provide shade for the cars and habitat for birds and insects.

B - Train Tracks

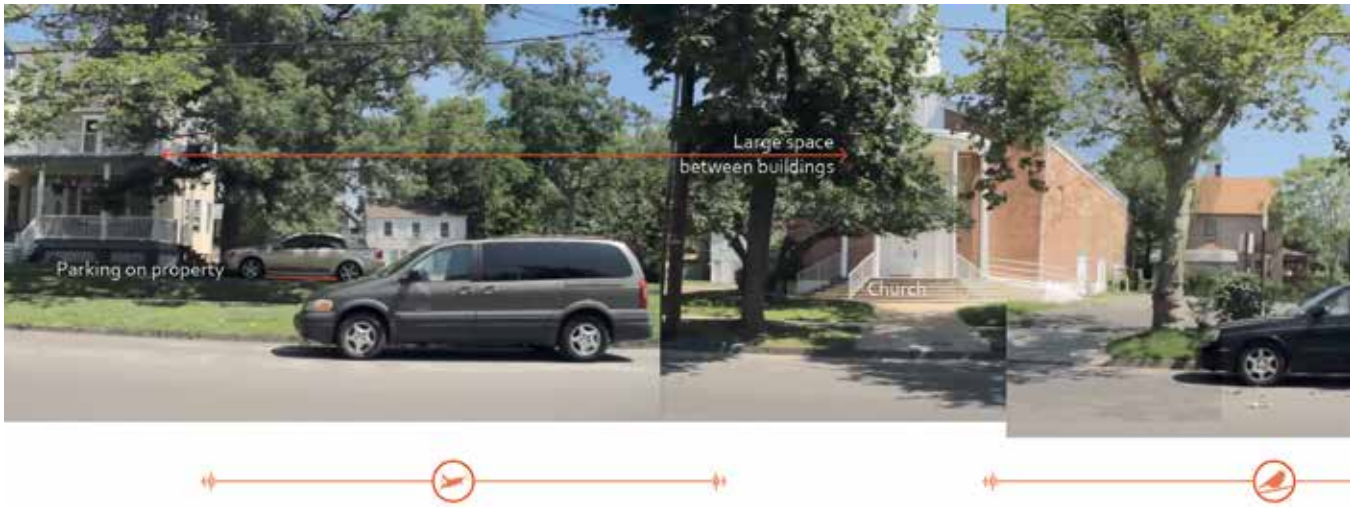
Train tracks – The area around the train tracks are mostly large warehouses and businesses. The facades and walkways are continuing, resulting in a large amount of hard surfaces. Sounds are mostly associated with cars, people working in the warehouses and the train.

A - AP West
B - Train tracks
C - AP East
D - Oceanfront

Sounds

Birds
Cricket
Wind
Cars
Music

C- Asbury Park East



Asbury Park East – The neighborhood on the 'good' side of the tracks has wider plots and larger houses. Parking can often be done on private property, leaving the streets with less cars. The sounds in this area are a mix of cars and natural sounds.

D - Oceanfront

Oceanfront –Leading up to the edge of the land, there are mostly construction sites and vacant buildings to be seen, as a result of the economic crisis and other low-tourism years. The road along the ocean is characterized by parking lots and backsides of buildings. Though not visible, the sound of the wind indicates that the ocean is near.


Large plots


Parking lots
Backside of buildings
Parking lots

In the area directly behind the boardwalk, the historic changes of Asbury Park are visible. Where there used to be hotels and bars to support the tourist economy of the boardwalk, now there are mostly vacant lots, parking and construction sites that failed in the economic crisis. (fig 9.11)

Figure 9.11 Vacant plots and failed construction sites in the oceanfront zone due to the economic crisis.

The boardwalk itself, is the key axis of Asbury Park. It fulfils the position of city centre, mall, tourist attraction and linear park all in one. From the Fourth of July weekend until September, the boardwalk and beach attracts tourists from upstate New Jersey, New York and Philadelphia. For the locals, the boardwalk functions like a third space, a public living room for everyone from Asbury Park and beyond. Restaurants, bars and shops are mostly found alongside the boardwalk or in the convention centre stretching into the ocean. In between those are event spaces where small concerts or bonfires are organized and a diversity of food stands in container-like structures. (fig 9.12) These are also used for the sale of beach badges and public bathrooms. In addition there is a midget golf track, grass fields and a kids pool.

Figure 9.12 Photo study of the type of buildings along the boardwalk of Asbury Park

9.2.3 Developing Urban Waterfront

Asbury Park is a seaside city with a lot of character. To this day, the art deco buildings tell the stories of the good times, and the bad times are told by the struggling redevelopment behind the boardwalk. It has a rich history with the ups and downs that are characteristic for an evolving touristic town. The discussions on how to develop with these dynamics in mind are therefore also relevant to many other seaside towns.
The filmed cross sections show that the area where you feel close to the shore is very narrow. The residential area, with its common architecture and vegetation, could also be located miles more inland. Even the oceanfront area looks more like a construction site than a warm welcome to the beach. Dune vegetation species are present, but often little amount and behind a row of cars. The feeling of being on the shore, really only starts on the very edge of the land: the boardwalk.
Now that the tourism buzz is returning to Asbury Park, there is a risk that the empty plots in the oceanfront will all be developed into hotels again as soon as the economy allows it. Before this happens, thinking about how these empty spaces should be developed seems like a crucial thing to do. Discussions on the type of coastal landscape that would fit in this town and would be sustainable in a future with flood risks can save Asbury Park from losing investments to the next storm.

From this analysis, the following design guidelines can be derived:

- *Adding to the growth* - Considering the lift in Asbury Park's popularity and local economy in the recent years, it is important to keep adding to this positive flow and to take into account what this growth will mean for future needs of residents. The need for business and residential developments is expected to increase. A design that responds to these developments can make sure that they happen within a sustainable coastal zone.

- *Fun character* - Throughout the entire history of Asbury Park, a large part of its character has always been entertainment. Still today, Asbury Park remains a fun town where people can enjoy the boardwalk life. The remnants like the former casino and carrousel ask for a reinterpretation of the old glory days that takes the identity of Asbury Park to the 21st century.

- *Expansion of beach feel* - From the filmed cross sections was concluded that the feeling of being on the coast is very narrow. The type of vegetation, sounds and character don't match a shore landscape until actually supported by a visible ocean. The zone just before arriving at the ocean, is filled with parking lots and construction sites. Expanding the feeling of being on the shore more towards the back can add a lot of value here and might even make people have this beach-feel without necessarily having direct ocean view.

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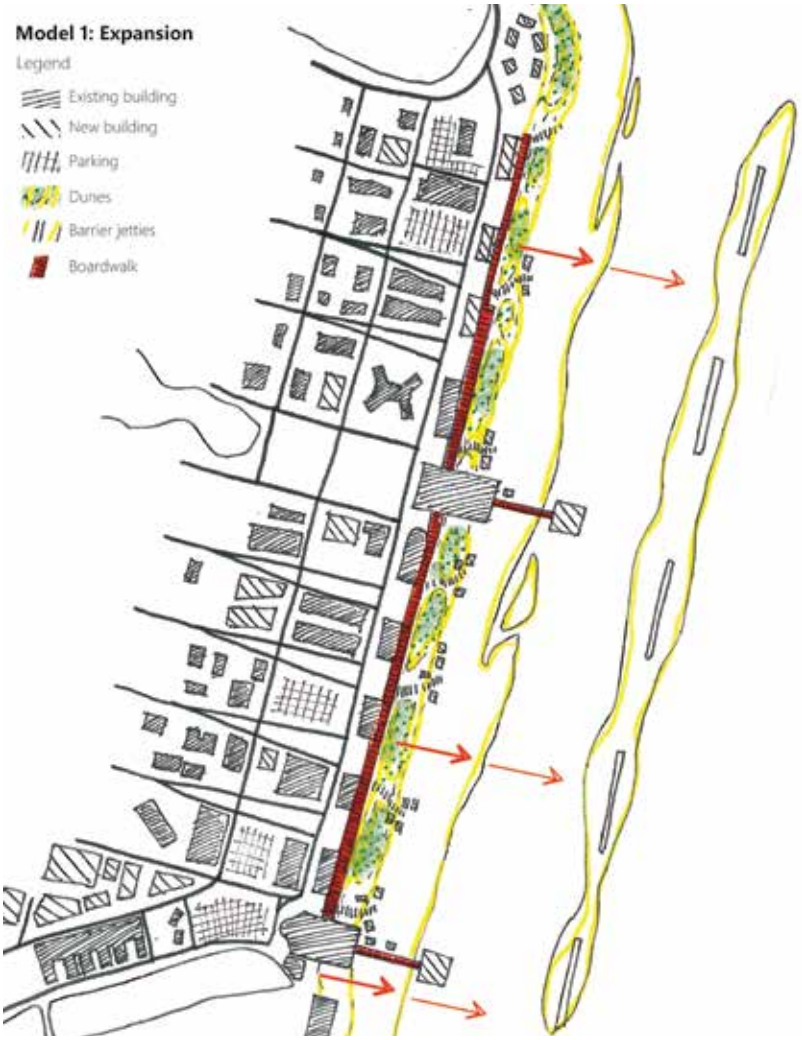
10 | Exploring design models

How to detail the regional values onto Asbury Park, can still be done in multiple ways. Three models have been developed to explore each one's possibilities and pitfalls. The models are Expansion (1), Seasonal (2) and Retreat (3). In the following sub-chapters, the character of these models will be discussed and summarized what the pros and cons would be for the city of Asbury Park. Afterwards, the models are evaluated on flood safety and oher socio-economic and natural values.

10.1 | MODEL 1 EXPANSION

Description:

In the model 'Expansion' flood prevention is provided by making new land. A strip of barrier jetties parallel to the shoreline creates a lagoon in front of the shore with calmer water where more sedimentation can take place. The beach will expand through natural processes. On this wider beach and with the increased sedimentation of sand, dunes can be established. The shops on the boardwalk expand alongside the new land on piers and next to the beach accesses. This development of buildings in front of the dunes is done in a way that doesn't limit dune growth. The boardwalk itself is elevated so flood safety and ocean view can be provided to residents and tourists. The renewed attractiveness of the beach area creates opportunities for development of new homes and businesses on the shore. The blocks behind the boardwalk are developed with new hotels, homes and shops. The empty lots are filled and give life to the coastal zone surrounding the boardwalk.



Pro:

- Heightened boardwalk with dunes combine flood safety, ocean view, tourism and nature.
- Use of natural sedimentation processes and hard structures to create safety .
- Wide beach, room for dunes and tourism .
- More exploitable land, more income for the town.
- Development of the abandoned blocks behind the boardwalk create lively zone around the boardwalk.
- Lagoon and dunes provide habitat for flora and fauna.

Con:

- Chance of flood water going around the heightened boardwalk.
- Chance that the new barriers will be developed in the future and flood exposure is increased again.
- Loss of view on the ocean from behind the boardwalk .
- Difficult technical feasibility due to low sand influx.
- Expensive option due to the low availability of sand off shore and large interventions.
- Increase of hard structures close to the ocean.

Reference images:

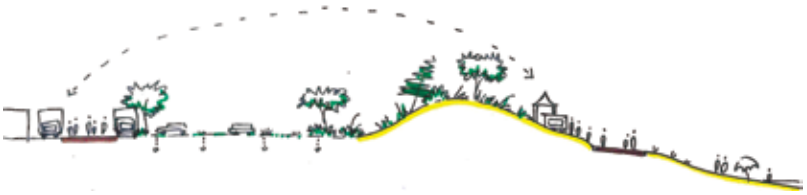
Pompano Beach (Dunes and boardwalk combinations) - Lagoon Island Venice (buffering function lagoon islands) - Hondsbossche Zeewering (combination hard/soft structures and lagoon)

Figure 10.1 Reference images: Pompano Beach (EDSA, 2009), Venice lagoon (Spicosa, 2007), Hondsbossche Zeewering, (RWS 2013)

10.2 | MODEL 2 SEASONAL

Description:

In this model, the coastal zone is designed the follow the dynamics of coastal nature and the dynamics of the seasonal use. The jetties are removed to have a shoreline that is able to move with the natural processes. If the beach becomes too narrow, beach nourishments add sand to the system again. Behind the boardwalk, dunes are established. The boardwalk shops are replaced by movable structures like containers and trucks, so they can also move according to the seasonal demand. Also the zone behind the boardwalk is put to multiple uses dependent on the season. In summer, the focus is on the ocean. The movable shops are placed in a dune landscape and view the ocean. The wide beach provides space for the many tourists that visit. Visitors can park close to the beach in a green zone behind the boardwalk. This zone creates beautiful residential areas and a welcoming entrance to the shore. In winter, the shops move from the dunes towards a parallel street to the west that connects to the city center. The economic focus is pulled back from the ocean. Natural processes like erosion of the beach and sedimentation of the dunes can take place again. The empty parking lots and green zone behind the boardwalk function as a buffer zone for flood water by increasing the percentage of permeable ground.



Pro:

- Touristic in high season, flood protective in hurricane season: Exposure to flood risks decreased only when needed.
- Adaptive design in changing landscape and time.
- Ocean view maintained in high season.
- Increased livability of the abandoned blocks behind the boardwalk.
- Better connection boardwalk and city center in off season
- Creation of buffer zone through vegetation and permeable ground.
- Technically feasible.

Con:

- Relatively small protective strip of dunes.
- Increased frequency of beach nourishments.
- Removal of permanent buildings along the boardwalk.
- Costs of moving everything back and forth.
- Increased percentage of permeable ground means less space for permanent buildings and asphalt.

Reference images:

Fort Worth Texas (Permeable parking lot) —Almere Duin (Greening and permeable ground in residential area) — Miami Food Festival (Removable beach shops)

Figure 10.2 Reference images: Texas parking lot (Fortworthtexas, 2015), Almere Duin (ZUS, 2011), festival (Sobefest, 2014)

10.3 | MODEL 3 RETREAT

Description:

In model 'Retreat' a more defensive strategy is chosen. The empty plots behind the boardwalk are used to build a wide dune system. It protects the town behind it from floods and increases the amount of permeable ground to soak up flood water. The boardwalk and buildings linked to it are abandoned and left as ruins of the former boardwalk life. Other buildings close to the beach have a phased retreat strategy: When they are significantly damaged in a storm, they can't be rebuild again. A program like Blue Acres will buy these plots so they can be put to use for flood protection. Parking and other supporting functions are placed more to the west and towards the city center. Also the new boardwalk is developed more inland. From the boardwalk, the beach is reached by crossing the dunes and ruins. The amount of jetties is decreased and connections are made between the ocean and the coastal lakes to improve water quality and provide a buffer for storm water.

Pro:

- Wide dune system with lot of flood protective qualities.
- Decrease of exposure: less buildings in harm's way
- Empty lots behind boardwalk put to use in flood protection.
- Better connection to the city center.
- Increase water quality and buffer function of coastal lakes.
- Increase of permeable ground close to the ocean.
- Increase habitat of dune flora and fauna.

Con:

- Loss of ocean view
- Current boardwalk and connected buildings not in use
- Loss of residential area on the shore
- Increased distance between parking, boardwalk and beach

Reference images:

Blue Acres (Buyout program) - Noordwijk aan Zee (wide dunes with lower buildings inside) — Atlantikwall France (Ruins of former coastal use)

Figure 10.3 Reference images : Buy-out program (Blue Acres, 2016) Builld dunes (Holland, 2015), Atlantic wall France (Buijsman, 2003)

10.4 | CHOOSING MODELS

All three models have specific up- and downsides. Flood protection and ocean view are aspects that are a give and take in all the models. Retreat is an option that no one wants to think about but could form an inevitable strategy in some areas along the Shore. Let us first look at the flood safety that the models present. (table 10.1) The model 'Expansion' creates flood safety on newly made land. Unfortunately, in the case of the Jersey Shore the option to expand further into the ocean would be very hard due to the limited amounts of suitable sand resources. Also the expansion of build environment that comes with it, would put more people and businesses in harm's way. Model 'Seasonal' does contribute to lowering the amount of people exposed to flood risk. The temporary character of this model moves with the natural and touristic dynamics of the town. The green and permeable soils help prevent standing flood water by soaking it into the ground. A downside is that this option has the smallest flood protective strip of all models. The last model, 'Retreat' has the widest dune landscape of all the models. The phased retreat ensures few homes and businesses in harm's way and a lot of room for water to permeate into the ground.

Flood Safety	Decreased exposure to flood risks	Prevention of flood impact	Less vulnerability during flood
Model 1 *Expansion*	● No, more development close to the ocean	● Yes, heightened boardwalk, dunes and barrier islands	● No, inland is very impervious, water can't get out behind the heightened boardwalk
Model 2 *Seasonal*	● Yes, low exposure during storm season	● No, only small dune strip	● Yes, water can easily get into the ground, little investments close to the shore
Model 3 *Retreat*	● Yes, permanently decreased exposure	● Yes, very wide protective dunes	● Yes, large permeablility close to the shore

Table 10.1 Evaluation of the models based on flood protective qualities

Due to the practical arguments and the fact that model 'Expansion' will create more homes and businesses in harm's way without lowering the vulnerability during a flood, this model will be dropped from further evaluation. This model does have a lot of interesting possibilities for the tourism sector, but because safety comes first, this aspect will be prioritized over other social economic arguments. Model 3 might have scored perfectly on flood safety, but on more socio-economic factors it scores very poor (table 10.2). The wide dune limits ocean view and pushes the touristic boardwalk further away from the shore. The former boardwalk features are left behind and also the beach is narrow, providing limited space for seaside visitors. Model 'Semi-Permanent' does have this wide beach and the ocean view during the high season. But, does not provide a lot natural values for flora and fauna along the shore.

Socio-Economic	Ocean View	Adaptable to touristic demands	Natural values
Model 2 *Seasonal*	● Yes, in high season	● Yes, meets the temporal needs during tourist season	● No, not significantly more habitat
Model 3 *Retreat*	● No, not from the boardwalk	● Loss of old boardwalk features, larger distance to small beach	● Yes, a wide dune landscape with variety of habitats

Table 10.2 Evaluation of the models based on socio-economic values

Based on the evaluation, a choice is made for a hybrid version of model 2 and model 3 . Though model 3 had a perfect score on its flood protective qualities, the model did not score well on socio-economic and natural aspects. Model 2 on the other hand scored sufficient in both categories. A hybrid version between the two will combine the flood protection of model 3 and the suitability with the tourism economy of model 2 (fig 10.4). The hybrid model will provide an adaptive shore landscape that is first of all protective against floods. Second, it should be adaptive towards seasonal and future changes and at the same time not increase the amount of people and businesses that are exposed to flood risks. It should fit within the city of Asbury Park, but also be translatable and adaptive towards implementation in other towns.

The hybrid concept is based on two main components (fig 10.5). First, a dune zone is proposed behind the boardwalk. This zone will be the main protective element and integrated all the functions and facilities needed. Second is a boardwalk as coastal cord, connecting the highlights of the location. These focus points form a link between the shore route and the landscape in the back. This way, people are invited to come to the shore by the perpendicular connections, and encouraged to move along the shore by the parallel connection.

Figure 10.4 Sketch Design based on the integration of model 2 and 3 Figure 10.5 Concept within the sketch design

Figure 11.1 Sandy Shores : Landscape plan for Asbury Park

11 | Sandy Shores

For the design of Asbury Park, the strengths of both models from the previous chapter are combined into one model that represents an adaptive shore landscape (fig 11.1). Also the guidelines and priorities that were collected over the landscape analysis, filmed interviews, community outreach posters, regional design and the analysis of Asbury Park are combined. (fig 11.2) Interesting to see is that most guidelines are supported by more than one research method. The principles of ocean view, multifunctionality, dunes, natural look and interventions that fit within the dynamics of the surroundings can be concluded from multiple methods. These principles will guide the design choices and shape the regional values to match the scale of Asbury Park. Next to each sub-chapter is a short list of which guidelines are used in the decision making process for that intervention.

Landscape Analysis

- **Defragmentation** of the coast, shore as a region
- **Change** towards long-term rethinking and rebuilding
- **Stimulation** of flood mitigation
- **Awareness** and education about flood risks

Filmed interviews

- **Coastal Safety:** shared acknowledgement of coastal threat
- **Ocean View:** shared love of the ability to see the ocean
- **Dunes:** shared support of dune construction as defense
- **Multifunctional:** Shared views of coastal zone as place with multiple uses and functions
- **Collaboration:** Between government and community, crossing borders

Community Outreach Posters

- **Multifunctionality** and **natural look** of Double Dune Landscape by Ian McHarg
- **Recycling material** and **participatory character** of Christmas tree option
- **Multifunctionality** and **innovative** character of Dike in Dune
- **Natural look** and **ethically 'right'** option of No Beach Homes
- Construction that **reacts to its surroundings** of Heightened beach Homes

Regional vision

- **Dunes as landscape type** that looks beyond human borders
- **Adaptive design** to tailor for local surroundings: support local identity of towns
- **Multifunctionality:** combining multiple goals in one intervention
- **Touristic Headlands:** economic benefits and increase of permeable ground

Analysis Asbury Park

- **Adding to the Growth:** Responding to growing future developments
- **Fun Character:** Adding to and reinterpreting fun identity of AP
- **Expansion of the Beach Feel:** Expanding sense of being on the shore towards the west

Models

Model Semi-permanent:
- Decreased exposure to flood risks
- Increased permeability of soil
- Ocean View
- Seasonal needs of tourism sector

Model Retreat
- Decreased exposure to flood risks
- Wide protective dunes
- Increased permeability of soil
- Variety of habitats created

Figure 11.2 All the guidelines that were collected over the previous research methods

The design process is generally based on evidence–based design that takes the previous findings as guidelines. In that process is room for research-through-designing. Constant changing of design levels was a very important aspect of that. As the context demands a focus on small scale, the local design level was the main starting point. The Wageningen approach usually has an emphasis on large-to-small scale changes, but this context demands an emphasis on the local level. Designing through different levels was crucial to keep developing the link towards regional values as well.
In addition, the design process also included many jumps within one level. The proposed interventions that take place in the same design level were held parallel to each other to make sure that they interact with each other as well as with other design levels. An example of this is a viewport study between the proposed dunes and other interventions. Designing these parallel at a certain point will make sure the interventions match each other well.
In the following paragraphs, the design for Asbury Park is elaborated. This will start with the elements in the Dune Zone and secondly the highlights along the Coastal Cord, as seen in the concept sketch in the previous chapter.

11.1 | DUNE LANDSCAPE

Guidelines
Coastal safety
Ocean view
Dunes
Natural look
Reacting to surroundings
Adding to growth
Expansion beach feel

In Sandy Shores, the main structure is a wide dune system inspired by the double dune landscape of Ian McHarg (McHarg 1992). Empty lots, green space and large amount of parking space close to the ocean is seen as an opportunity to create a welcoming and sustainable coastal zone. All these spaces together form the base of the dune structure. (fig 11.3)

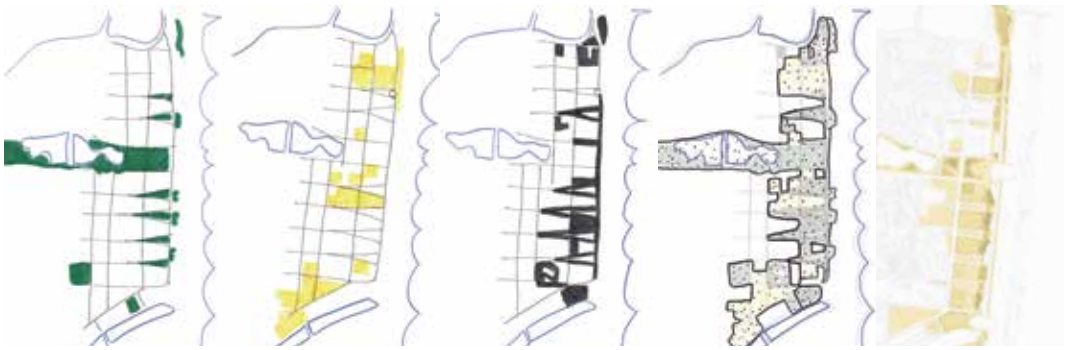


Figure 11.3 Green space, empty lots and parking space in the oceanfront zone make up the outline of the dune zone

Heightening the empty plots now, before they will be developed to hotels or apartments again, will save these buildings from flooding in the future and provide a wide buffer for floodwater. Previous to being developed, the plots provide area where water can permeate the ground and strengthen the sense of being close to the ocean. The overall dune landscape will widen the coastal feel to a zone instead of noticing that you are near the beach only on the boardwalk. Expansion of the coastal landscape to the west will give more people a sense of living on the shore, will increase natural values in the area and manage flood waters in a sustainable way.

An important factor from the analyses is the ocean view. Because of the insisted importance of the ocean view from all corners of the community, the design finds a way to combine the view with flood safety. The dune system is shaped with the aim to remain some form of ocean view and as little as possible compromise on flood safety. This is done, from the hinterland to the ocean, as followed (fig 11.4):

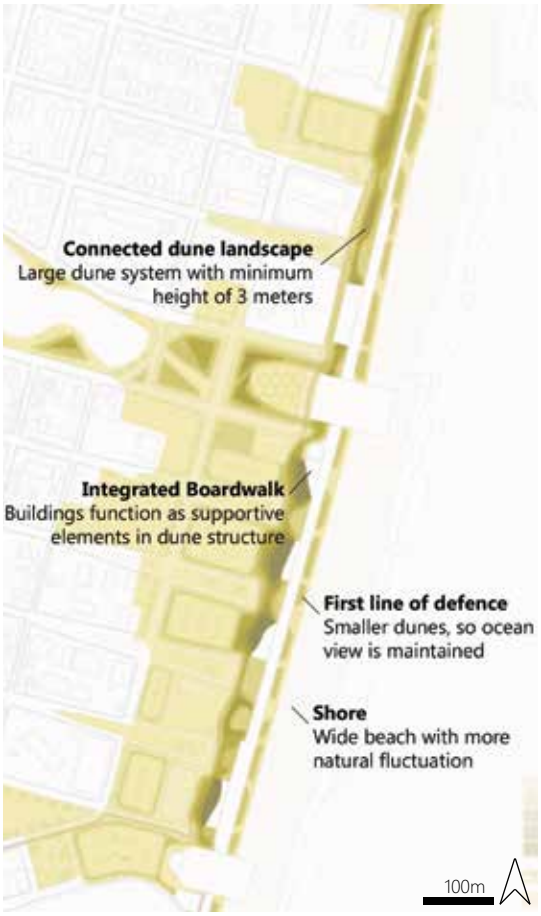


Figure 11.4 Elements within the dune zone

Connected Dune Landscape

West of the boardwalk, a larg dune system with a minimum height of three meters is constructed to lower the vulnerability towards flood for the rest of the city. Minimum height of the dunes is based on the water level during Sandy. To resist a storm like Sandy, flood protection has to be more than the 2.6m water height that was noted during the storm on this location. The dune zone forms a connecting line of flood defense in which the boardwalk shops are integrated. This line of defense stretches to the neighboring towns to form a cohesive and protective coastal landscape.

Integrated Boardwalk

Ocean view is maintained only from the boardwalk. Blocking the view here would have such large impacts on the tourism and economic sectors, that it would not support the new growth and development of the city. Keeping this view, means accepting a certain level of flood risk for the boardwalk and adjacent buildings. The buildings that are connected to the boardwalk can stay, but have to do their part in protecting the town behind them. The buildings are now also seen as hard structures that strengthen the dunes. (fig 11.5) At a location where there is no building, the dune structure continues and is integrated with paths and spaces where events can be hosted.

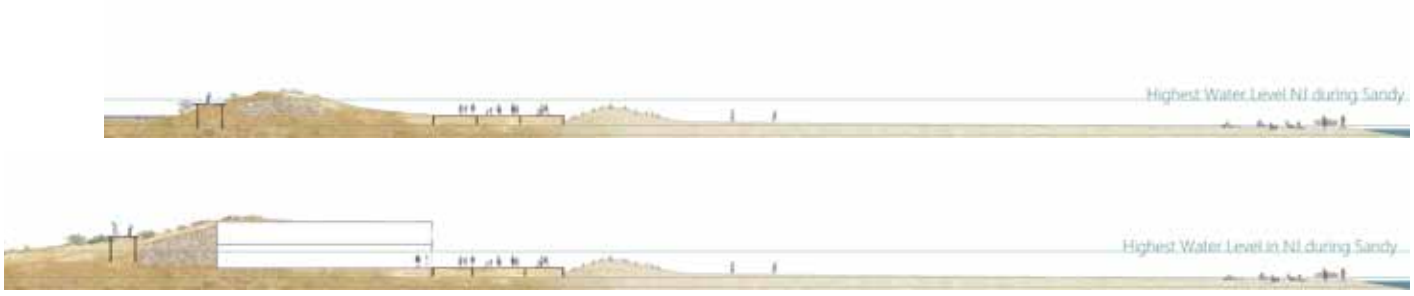


Figure 11.5 Cross sections of the integrated boardwalk where there are buildings (bottom) and no buildings (top)

First Line of Defense

East of the Boardwalk, small dunes are established. The formation of these dunes uses the naturally occurring processes of sand-drift. By adding a wooden element, sand will start to settle and form small dunes (fig 11.6). The optimal form for this element is a zig-zag beach fence, like a dune harmonica, that is able to move with the formation of the dune. If the dune is large enough to cover the dune fence, a new one can be placed in front. Gradually, the dunes will get wider and higher, and therefore stronger. In fall, when storm season sets up, some erosion of the dunes might take place. The wooden dune skeletons will be visible and the dune formation will start its life cycle again.

The boardwalk is currently about one meter higher than the beach, so small dunes of max. 2.25 meters can be formed without losing ocean view for the boardwalk visitors. With only small dunes on the beach, the boardwalk and the buildings that are connected to it are still subject to storm water, be it in a lesser way. This is a compromise that has to be made when ocean view from the boardwalk is such an important requirement.

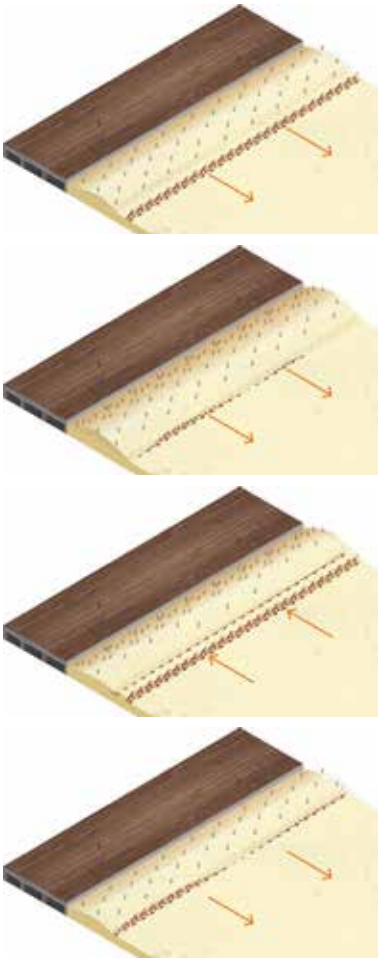


Figure 11.6 Principle of growing dunes by placing wooden elements

The Shore

In the current situation, the beach is about 60 meters wide to provide as much space for seaside visitors as possible. Jetties secure the beach, but also have negative effects on the surf habitats and amount of natural processes that are able to take place between the ocean and the land. In the new design, a combination is found between the more flexible shorelines that were present in the models Semi-permanent and Retreat: Jetties are removed in the less-touristic northern part of the boardwalk. In the southern touristic part, the jetties remain to secure the wide beach. Also the Convention center and Casino, that both stick out into the ocean, take up some function of a jetty.

On a larger scale, the dune landscape ignores borders as much as possible, just like natural processes do. Also a focus is put on interventions that are easily translatable to other towns. For example the integrated boardwalk, which is often the only element that is able to cross town borders without interruption. The principles that are applied there can be copied to the next boardwalk, though the execution of it will be adapted to the possibilities and identity of that specific town. Also, the dune harmonica could be an element that easily is applied elsewhere.

Figure 11.7 Bird eye of the Asbury Park boardwalk in the proposed design

Design with Natural vegetation

Developing a dune zone with vegetation that is common to North American shores will stimulation this sense of place. Taking into account the sense of place supports people's identification and orientation within the landscape. "To gain en existential foothold, man has to be able to orientate himself; he has to know where he is" (Norberg-Schultz 1980, p.19) The well-known Kevin Lynch has studied what structures people need to successfully build an environmental image that helps them know where they are. (Lynch 1960) "Often these systems of orientation are based on or derived from a given natural structure. Where the system is weak, the image-making becomes difficult, and man feels "lost"" (Norberg-Schultz 1980, p.19) According to Norberg-Schultz, strengthening the natural structures can be done by visualizing, complementing and symbolizing: Visualizing the understanding of the natural landscape, complementing what is currently lacking and symbolizing the natural system into properties of the new man-made landscape "makes the environment become a unified whole" (Norberg-Schultz 1980, p.18) Bringing back elements from the coastal landscape that lays under all the urbanization, is a way that this design tries to support the link between the natural system and human existence in it.

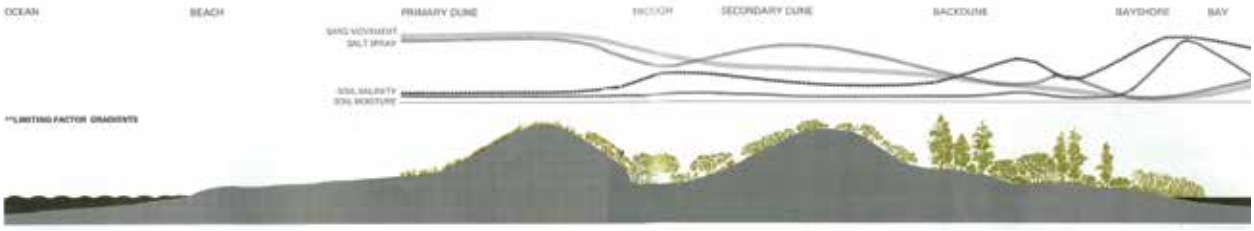


Figure 11.8 Cross section of the double dune landscape (McHarg, 1992)

Choice of the specific vegetation is based on McHarg's description of the double dune landscape for New Jersey. (McHarg 1992)
In fig 11.8, it shows how the type of vegetation changes over different parts of the dune landscape – primary and secondary dunes, backdune and the bay. Over these parts, the impact of sand movement, salt spray, salinity and moisture changes, which influences the ability of certain plants to grow. In the study area, the dune zones as described by McHarg are identified and applied to the design in fiure 11.9.
The vegetation of the design is kept consistent with the zones and their matching species (table 11.1). Close to the beach, mostly small grasses can grow. Planting dune grasses benefits the stability of the primary dunes by holding the sand with their root system. On the secondary dunes, larger grasses and bushes are able to grow. These types of larger vegetation also improve the stability of the dune

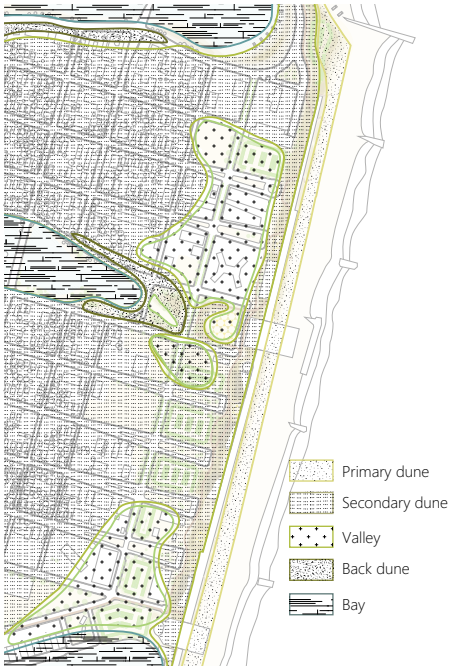


Figure 11.9 Zones of the double dune landscape identified and applied to Asbury Park

structure and can function as elements of the design. On the back dune, larger bushes and trees grow. The local planning board of Asbury Park, found that trees start to grow from the second block from the ocean, be it somewhat affected by the salt spray.(Asbury Park Planning Board 2002) In this design, this information is taken as a guideline for the location to start planning large shrubs and trees.

The coastal lakes match the vegetation of the bay habitat, which can have additional benefits for the water quality of the coastal lakes. Deal lake, in the north of Asbury Park, and the other coastal lakes present are currently undergoing measures to improve the water quality. Also, study showed that only 1% of the residential area surrounding the Deal Lake is able to buffer enough water during a storm to help a slow release of storm water towards the lake. (Deal Lake Commission 2013) With the right types of wetland vegetation, the lake shores can function as a sponge that stores and slowly releases storm water and at the same time act as a filter that takes up pollutants present in the water.

Landscape type	American Name	Latin Name
Back dunes Based on Pine Barrens in hinterland	Pitch Pine	Pinus rigida
	Shortleaf Pine	Pinus echinata
	Virginia Pine	Pinus virginiana
	Atlantic White Cedar	Chamaecyparis thyoides
	Black-Jack Oak	Quercus marilandica
	Red Cedar	Juniperus virginiana
Secondary dunes and valleys Based on McHarg(1992) and typical North American secondary dune vegetation	Northern Bayberry	Myrica pennsylvanica
	Black Huckleberry	Gaylussacia baccata
	Ink Berry	Ilex glabra
	Shad Bush	Amelanchier arborea
	Sheep Laurel	Kalmia angustifolia
	Beach Plum	Prunus maritima
	Shore Juniper	Juniperus conferta
Primairy dunes Based on North American primairy dune vegetation	Switch Grass	Panicum virgatum
	Pennsylvania Sedge	Carex pennsylvanica
	American Beachgrass	Ammophila breviligulata
	Atlantic Coastal Panicgrass	Panicum amarum
	Atlantic Goldenrod	Solidago tarda
	Sea Oats	Uniola paniculata
	Beach Heather	Juniperus conferta
	Virginia Creeper	Parthenocissus quinquefolia
Lake Shores Based on native wetland vegetation in the area	Pondweeds	Potamogeton spp.
	Smooth Cordgrass	Spartina alterniflora
	Cattails	Typha spp.
	Swamp Azalea	Rhododendron viscosum
	Buttonbush	Cephalanthus occidentalis
	Common Reed	Phragmites australis

Tabel 11.1 Overview of the vegetation species native for the Jersey shore organized per landscape unit

Primary Dunes | Secondary Dunes | Back Dunes | Bay

11.2 | PARKING AS URBAN FLOOD PLAINS

Guidelines

Multifunctional

Natural look

Innovative character

Reacts to surroundings

Adding to growth

Expansion beach feel

Decreased exposure

Permeability

From the analysis of Asbury Park was concluded that the amount of parking lots present in the waterfront zone do not add any spatial quality or sense of being on the shore. Previous to reaching the boardwalk, seaside visitors have to cross a zone of traffic nightmare, lots of hard materials and blazing hot cars parked along the streets. To provide an alternative for this challenging zone close to the ocean, guidelines from the analyses are combined.

Figure 11.10 Current look of the oceanfront parking lots

The parking has to take place in the demanding waterfront zone: Economic and touristic needs of development have to be combined without exposing more people and construction to possible floods (fig 11.11). The function of parking in this zone is therefore not bad, people want to park close to the beach and parking lots are relatively low investments in a flood risk area. In the design, a new type of parking lot is explored that is adaptable to the seasonal demands of tourists and that is able to function like an urban flood plain.

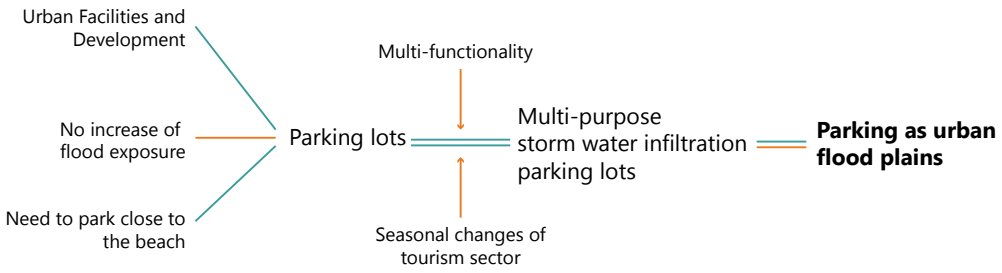


Figure 11.11 Line of thought leading to designing the parking lots as an urban flood plain

In the design, the scattered parking is removed from the streets that lead to the ocean. Instead is chosen to focus the parking area into the first row of blocks behind the boardwalk. The same amount of parking spots is guaranteed (around 1900 spots) but they are developed in a more natural and flood proof manner. (fig 11.12)

The infrastructure is designed for the many cars that are looking for a parking spot and increasing traffic safety close to the boardwalk. The street closest to the ocean is removed, but the perpendicular roads remain. Through the perpendicular streets, trucks can still reach shops and restaurants on the boardwalk and it can function as a kiss-and-ride spot. On the corners of the parallel street, signs that count the number of open parking spaces are placed to help guide the visitor looking for a parking spot.

In summer, these blocks provide parking space close to the beach. The parking lots are integrated into the dune landscape with matching materials and vegetation. (fig 11.13) When the parking lots are not filled to

their maximum, some of the plots can be used as market place, food festivals or arts and crafts markets. During the fall and winter, when the parking lots are not as much used and the storm season sets in, the pervious material lets rain or floodwater infiltrate the ground instead of flooding the streets. Small bio swales between the rows of parking support this infiltration function.

On a larger scale, having this row of parking lots that can soak up large amount of water, can have a significant effect during a storm. Along the shore are many oceanfront parking lots and, more importantly, they are all in the hands of the government. Applying the technique of permeable pavement all along this strip, can creates on a larger scale multi-functional urban flood plains all along the Jersey Shore and therefore contribute to sustainable water management for the entire region.

Figure 11.12 Plan of a parking lot with permeable materials, designed as urban flood plain

References: Dune Parking in Cape Cod (Goldsmith, 2011) - Storm water bio swale, Portland (JB+A Architects, 2015) - Permeable parking lot, Fort Worth Nature Center and Wildlife Refuge, Texas (Fortworthtexas, 2015)

Figure 11.13 Multifunctional aspect of the parking lots: Parking close to beach in summer, Event space outside peak hours and water buffer during storms

Permeable Pavement

To make sure that the parking lot can be used for many purposes including infiltration of storm water, specific materials need to be used. In an innovative way of paving, gravel is a main component in waterproof roads and parking lots.
New Jersey soils generally have a lot of gravel in them. The ocean floor consists of a lot of gravel and the hinterland has always known the gravel mining as one of the largest industries. (Bell et al. 1991) Just ten kilometers from Asbury Park are three gravel mines (fig 11.14). It seems logical to put the material that is present in the area to use for flood control. At the same time, using local gravel mines supports the local economy and as the mine pits grow, the amount of surface water that can buffer storm water in the area grows as well.

Figure 11.14 Map of active gravel mines in the area

In this innovative way of pavement, the base of the pavement is a stone aggregate with 40% void between the stones. (fig 11.15) This empty space between the gravel can hold a large amount of storm water that can evenly infiltrate into the ground or storm water drains. On top of that is a coarse grade aggregate to secure the gravel underneath and a top layer of self-binding gravel or porous asphalt. This porous asphalt has an average permeability of 600 liters of water per m2 per minute without losing driving quality. (Tarmac 2015)

The current storm water drains are from the 1930's and in need of replacement. (Asbury Park Planning Board 2002) When these streets are broken up for their replacement, the pervious roads and parking lots can also be constructed. Combining the smart paving techniques with new storm water drains, will ensure that the ground can soak up flood or rain water as fast as possible.

Streets: Permeable asphalt
Parking: Coltswood 10-15 mm gravel Sidewalks and
Borders: Concrete tile

Figure 11.15 Cross section of the innovative technique and matierals that ensure large amount of water can be soaked into the ground

11.3 | EVENT VALLEYS

Guidelines
Dunes
Multifunctional
Natural look
Reacting to surroundings
Adding to growth
Fun character
Seasonal needs
Permeability

Along the boardwalk, event spaces provide room for all the activities that are organized in Asbury Park. The spaces can be used for many purposes, are directly connected to the boardwalk and are shaped like small valleys in the dune zone. These event spaces can be the setting for bands playing or food trucks. In the off-season, these activities will be removed so the exposure to storms is kept low. Near the convention hall, the dunes are shaped like an outside theater. (fig 11.17) In the summer evenings, movies can be projected on the walls of the old paramount theater. (fig 11.16) The slopes of the vegetated dunes provide space were the viewers can watch the film. Wooden structures provide more steady seating area and secure the flowing landform, similar to the seating elements in Keast Park, Australia (fig 11.18)

In the case of Asbury Park, the dune valleys are adapted to integrate the local fun identity into the protective dune zone. In other towns, this principle can be adapted to meet the needs that are specifically present on that location. For example small neighborhood parks in residential areas or more ecological values in the nature areas along the Jersey Shore.

Figure 11.16 Dune structure integrated with the fun character of Asbury Park



References: Wooden seating in dune landscape in Keast park, Australia. (Gollings et al. 2011) - Public tribune integrated in landscape structures at Tennisclub Ijburg MVRDV (MVRDV 2013) and Floriade Venlo)

Figure 11.17 Map of the large event valley near the old theater and the boardwalk

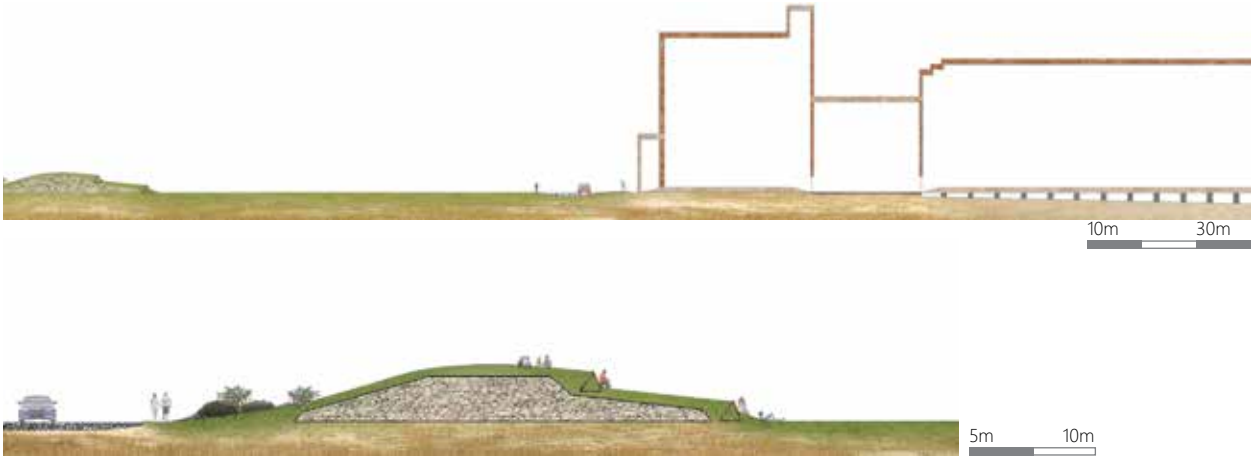


Figure 11.18 Cross sections showing how the dune structure is integrated with seating elements to form an outside stage

11.4 | BOARDWALK BIKE RIDES

Guidelines

Ocean View

Multifunctional

Reacting to surroundings

Fun character

Recycling

Asbury Park is a fun seaside town, so this character had to be integrated in the dune landscape. In the early days, this fun character was present in the rides and attractions along the boardwalk. Unfortunately, these rides have disappeared and also on the boardwalk bikes and skateboards are currently not allowed during the day. Integrating these memories with a dune landscape asks for a reinterpretation of the old glory fun as the fun people have when biking up and down the dune hills. In the Netherlands, people usually have fun memories of vacations on the coast including bike rides up and down the dunes.

Combining the dunes with the memories of the rides on the Shore, a wide bike path is placed between the dunes. Visitors and residents can rent bikes, skateboards or other type of wheels in the old casino on the boardwalk and have a fun time biking through the dunes and between the boardwalk, city center and famous Asbury Park landmarks like the Stone Pony, the Empress hotel and the convention center.

Figure 11.19 Reinterpretation of the old-glory fun of the boardwalk rides to new fun rides in the dune landscape. (Salvini, 2005) (VVVTerschelling, 2015)

The initial design of the bike path was largely based on the relief of the dune structure. This design was held subject to a study of the viewports and how they related to the main attractions of Asbury Park. (fig 11.20)

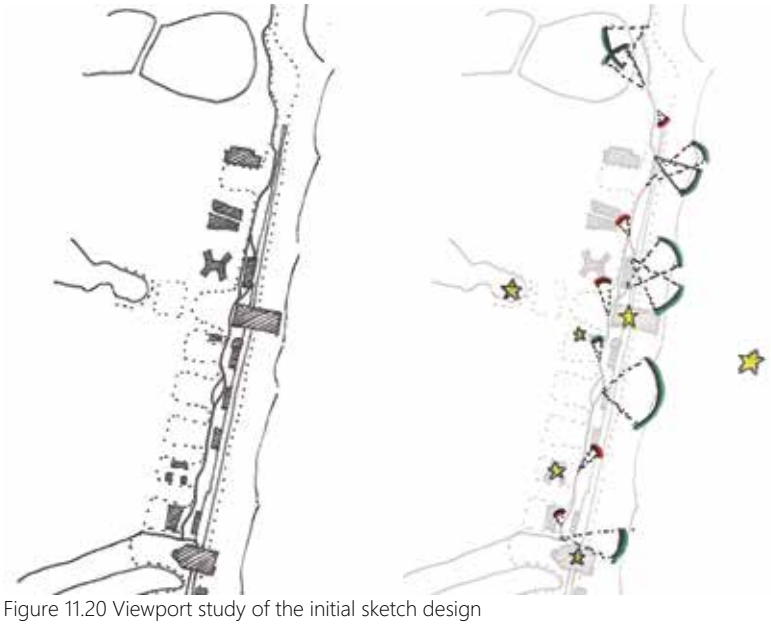


Figure 11.20 Viewport study of the initial sketch design

The viewport study shows that the design does not highlight all the attractions. Also, small viewports remain that sometimes have an a view on less attractive buildings. Adapting both the bike path and dune relief to enhance the quality of the route, creates more complex views to many of the attractions of Asbury Park. (Fig 11.21 and 11.22)

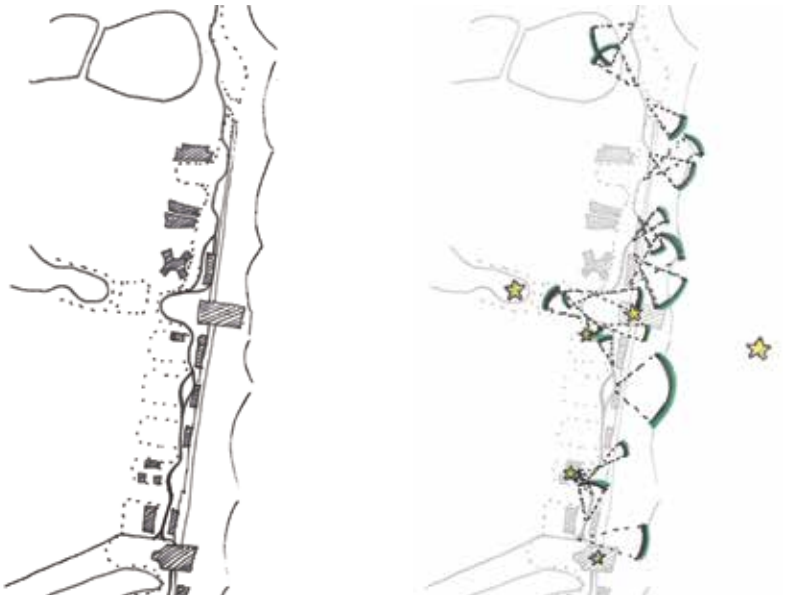


Figure 11.21 New sketch design based on the quality and amount of viewports that are created

The highest point, 6 meters high, is on top of the Arcade and Silver ball museum on the boardwalk. People can stop to take a look at the beautiful ocean view and rush down the path again. (Fig 11.23) In the North, the path makes another climb into the northern building on the boardwalk. This building is currently being used for some storage only, but in the high times of Asbury Park there was another boardwalk on the second floor. This former second floor boardwalk is opened again so that bikes can go through. This area forms a stopping spot where the bikers and skateboarders can enjoy the boardwalk life and the ocean view. After a well-deserved stop, the bike path will take them to neighboring towns like Loch Arbor and Ocean Grove, or towards the city center of Asbury Park.

Figure 11.22 Height map of the biking boardwalk

In the cross-sections of fig 11.24, the height differences of the bike path are visualized. For the less adventurous visitors, a lower lying path is also available at every large climb. The route with many peaks, uses the dune structure and the building that are embedded in it as places to exploit the ocean view as much as possible. Views from the roof of the Arcade, from the second floor boardwalk and over dune peaks are unique viewing point that are incomparable in the Jersey Shore area.

The design for the bike path itself is based on the wooded pattern of the current boardwalk. The pattern is adapted to meet faster traffic instead of only pedestrians. The supporting beams have a similar shape to the distinctive street forms present in Asbury Park. Viewed from the side, the beams are kept as slim as possible to limit disruption of the ocean view when crossing the dunes under the path. (fig 11.25)

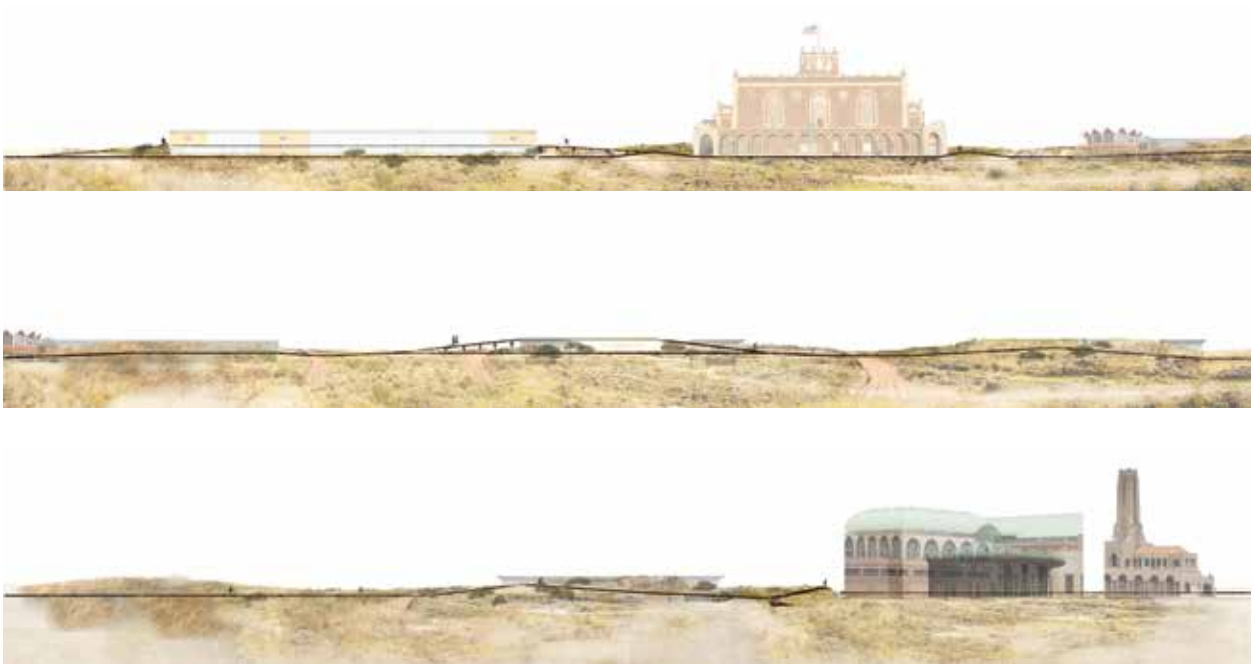


Figure 11.24 Side views of the biking boardwalk along the shore of Asbury Park

Figure 11.23 visual of the high viewpoints that are created along the biking boardwalk

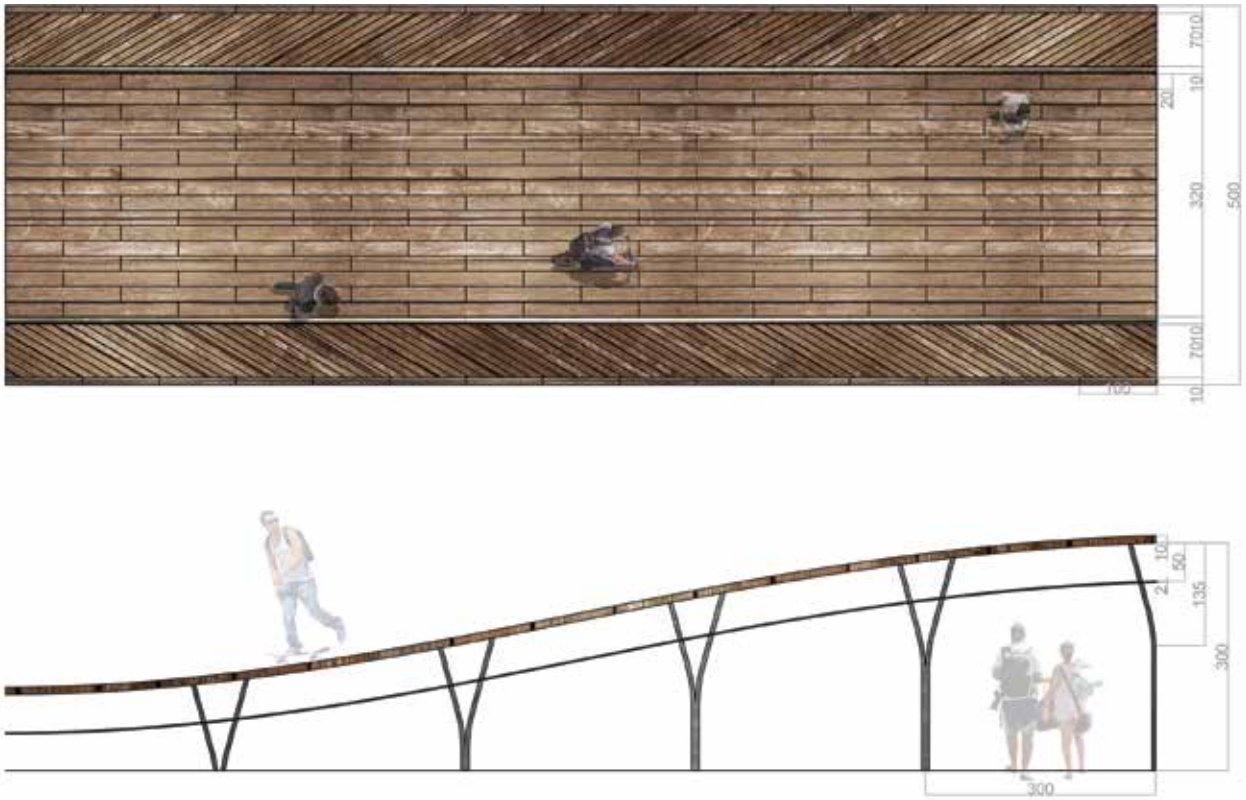


Figure 11.25 Technical detailing of the biking boardwalk that fits with the main boardwalk (measurements in centimeters)

11.5 | SEASONAL SHORE DWELLINGS

Guidelines

Ocean view

Collaboration

Multifunctional

Innovative character

Reacting to surroundings

Adding to growth

Exposure to flood risk

A couple of years ago, there were plans of developing fifteen townhomes on the North End of Asbury Park. In 2014, this plan was stopped after a lot of protest. In fix 11.26, the main concerns are listed that stopped the development. (Surfrider Foundation 2015) The concerns are real and sound arguments, but the demand for living with ocean view will still exist. It is easy to say that these people should just not be able to live on the shore, but that will not reduce the demand. Therefore, I would still like to explore how building on the shore could be done in a sustainable way.

Figure 11.26 Line of thought that lead to exploring the possibility of building near the shore

How these dwellings should be developed is based on Dutch research on how to build in coastal areas without disturbing natural sand-drift towards the dunes. Normally, even buildings that are only seasonally present can have a significant negative effect on the amount of sand drift. (Hoonhout & Thiel de Vries 2013) This flow of sand is crucial for a naturally sustaining dune system. Too many buildings on the beach or buildings too close to each other, can limit sand flow from the beach to the dunes.
Building on poles and guidelines for the dimensions of the dwellings can create conditions where sand can drift underneath and not collect around the building itself. (Rijkswaterstaat 2015) With these principles in mind, beach homes can be developed in a sustainable way that doesn't limit natural dune growth. In fig 11.27, these principles are shown in an example situation with a common sized temporary beach dwelling.

In the design, fifteen dwellings are placed at the North End of the boardwalk (fig 11.28). They are semi-permanent beach homes that can be occupied in summertime, when there is a demand to live near the shore. The location is close to a good surf spot, so the main target group will be surfers who like to have a summer on the water in Asbury Park. They can stay in the cabins and walk directly into the ocean to surf or along the coastal lake. In wintertime, when the tourist demand has diminished, the homes are taken away so sand can move naturally. The dwellings are put to their second use, as supporting structure of the coastal protection behind the dunes.

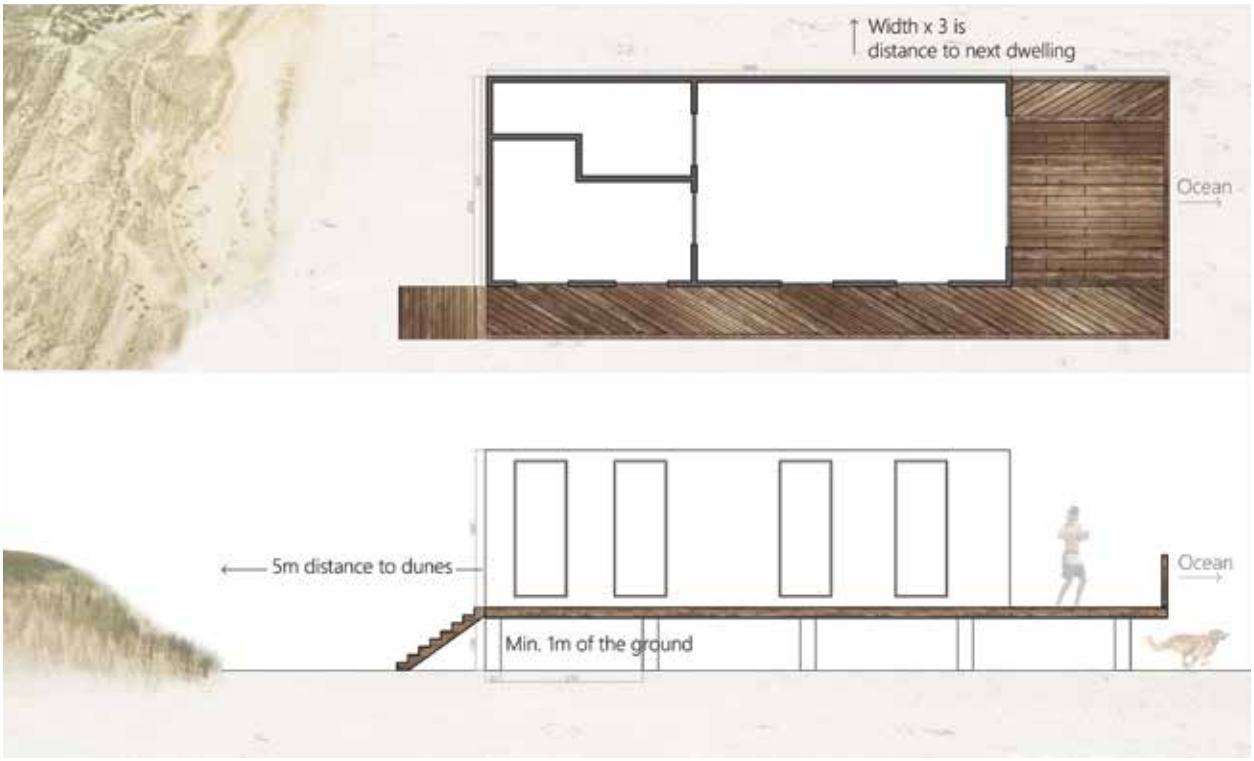


Figure 11.27 Principles and measurements of a beach dwelling that does not limit sand drift and dune formation

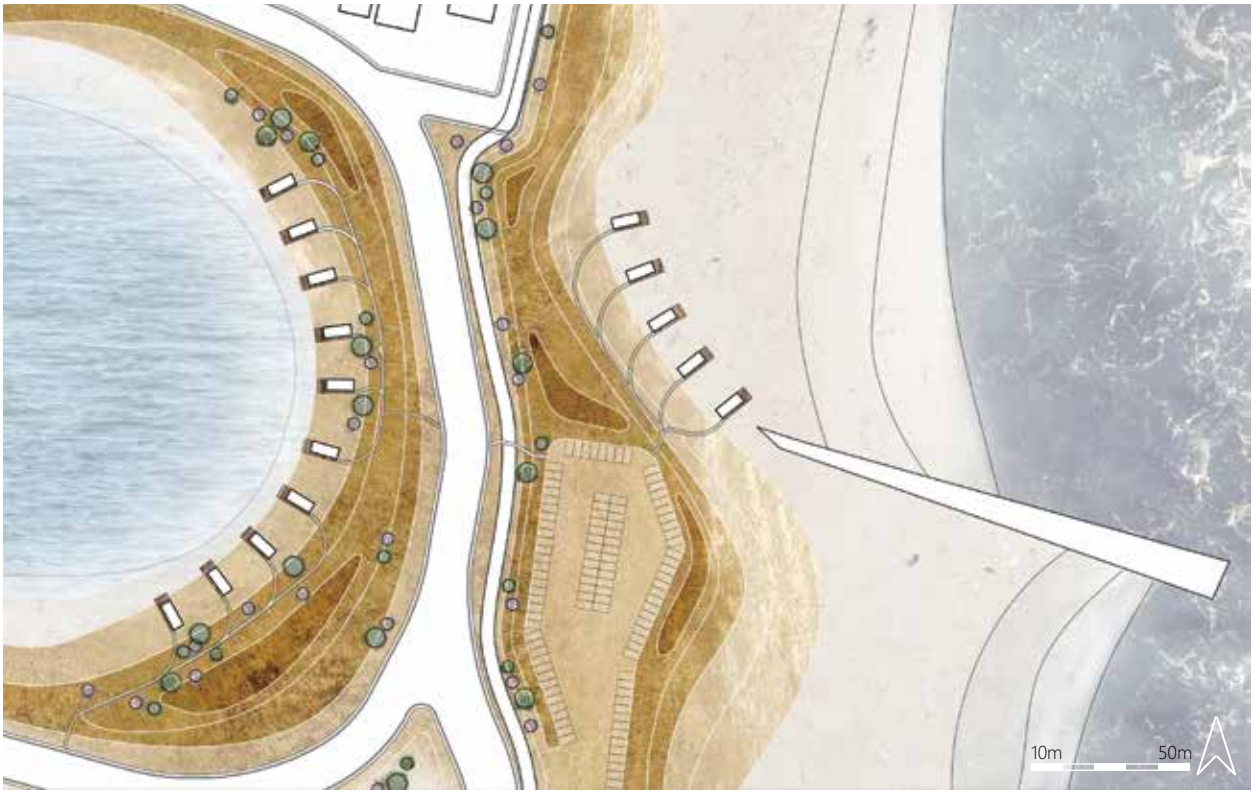
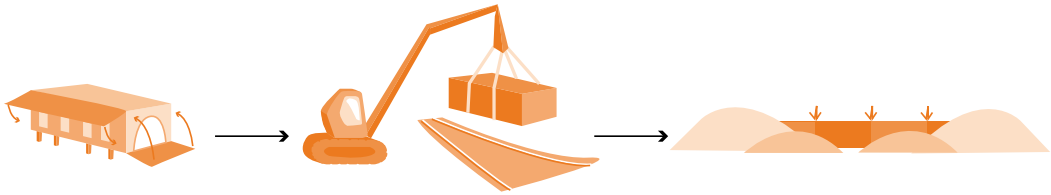


Figure 11.28 Placement of the dwellings along a surfing beach and on the side of the coastal lake

A main conclusion from the landscape analysis was that the fragmentation by municipal borders is a large obstruction in the way to a coherent coastal protective strategy. Adding a flexible element like mobile protection elements can be used to strengthen the weak spots at the borders of two municipalities.

The dwellings can close their walls and lock into each other to form a sturdy element that works as a supportive flood wall (fig 11.29). Movement of the dwellings to either the north or south border can be done by placing them on rails on the bike path. After each summer, the cabins are put on the rails and can move to where more support is needed in storm season. This way, a boardwalk structure - often the only element that continues over municipal borders- is used as the base for a growing collaborative coastal protection. (fig 11.30)



Summer
Temporary beach cabins
Do not limit sand flows

Fall
Cabins close their walls
Crane puts the cabins on rails

Storm
Cabins lock into eachother as
supportive flood wall where needed

Figure 11.29 Principle of the transformation of the beach dwellings into supporting elements for flood safety

Figure 11.30 Visual of the transformation in action

References: The rolling masterplan (Milton, 2010) - False bay writers cabin (Olson Architects, 2011) - Rolling huts (Olson Architects, 2011)

11.6 | AWARENESS THROUGH INVOLVEMENT

Guidelines
Coastal safety
Dunes
Multifunctional
Collaboration
Recyling
Participatiry
Reacts to surroundings

As was derived from the research, a very important aspect to break the repetitive cycle of storm and rebuild, is awareness. Currently, after every storm, the strategy is to get everything back to normal. The risk is that when everything is back to normal, people will forget the urgency of protecting against the next storm. People have to be able to remember what happened, so they will want to make sure that similar impacts don't occur again. Re-using debris from Sandy can contribute to that mental change. Since the storm, various efforts arose to give Sandy debris a second use as remembrance art. Fig 11.31 and 11.32 show two examples of that: Situ Studio's Heartwalk, a travelling structure made from former pieces of boardwalk, and Roddy Wildemans' Startburst art pieces, where he marks the pieces of debris with the location where he found them.

Figure 11.31 Heartwalk (Situ Studio, 2013)

Figure 11.32 Starburst by Roddy Wildeman (2013), using debris to create art

With more than 6,5 million cubic meters of debris, including fallen trees, destroyed homes, boats, vehicles and boardwalks, there is plenty of material to work with. (FEMA 2013) The storm's debris could therefore function very well as the main material for most of the proposed elements in the design like the bike path, seating elements and dune crossings (fig 11.33 and 11.34).

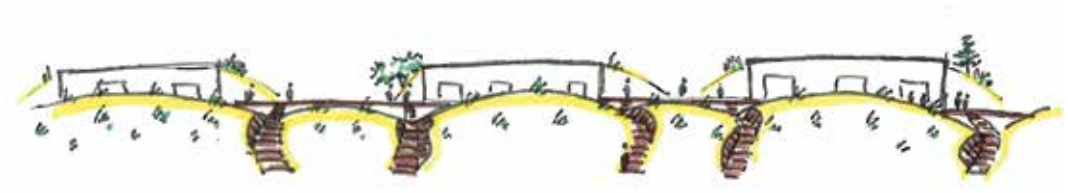


Figure 11.33 Principle sketch of wooden dune structures that function as dune crossings and support dune formation

The dune crossings are made from this recycled material. The paths are given side flanks to support the dune growth and limit people entering the dunes at the same time. Seating space is provided in the wooden structures for people who want to change their shoes or get the sand of their feet at return.

Figure 11.34 Cross section (top) and side view (bottom) of wooden beach access that supports dune formation

References: Keast Park, Australia (Gollings et al. 2011) - The Line Condominium Sales Gallery, Bangkok (Shma Company Limited, 2015) - Luchtsingel, Rotterdam (ZUS, picture by Rosanne Schrijver)

Important is though, that reminding all visitors at all times of flood history is not desirable. Seaside visitors should be able to just go to the beach without having to pass something that reminds them of possibly very bad moments of their life. Therefore, at the north end of the boardwalk only one of the dune crossings will be notably made from Sandy debris. (fig 11.35 and 11.36) How to involve the community in the construction of this memorial, will be similar to the making of the Luchtsingel in Rotterdam. A large urban bridge was constructed totally through crowd funding of involved residents and companies. With every donation, the name of the giving party was put on a plank. For the Sandy memorial, local residents can hand in debris that they still have or contribute a message or name that will be put on a plank. All these contributions will make this memorial a reflection of the hurt communities.

The crossing can become unique spot for remembrance and reflection on the storms that past the Jersey Shore. The construction can be attractive as a tourist site and a memorial that keeps the discussions on coastal protection alive. On a larger scale, it encourages awareness and asks for people to start learning from every storm, which is the first step towards a larger sustainable vision on coastal management.

Figure 11.35 Top view of the commemorative dune crossing at the north end of the boardwalk

Figure 11.36 Visualization of the commemorative dune crossing with dunes surrounding it

11.7 | IMPLEMENTATION

The design itself is organized from a larger dune zone, to small and detailed elements. For the implementation, the small elements form the begin point. (fig 11.37) After a storm, the recovery process will still be the main issue in the first few years after (fig 11.38). People need to get back in their homes and have a sense of safety before they can start thinking about real change. When a couple of years have passed, it is important that individual people do not forget about the storm. If they forget, they will take crucial systems of the landscape for granted and the chance of making the same mistakes is higher. The construction of a dune crossing with messages from Sandy survivors is a small way that could help people to stay aware of the ongoing battle against flood risk. The fact that people can contribute to the construction through donating planks or crowd-funding, makes the involvement that much greater. Second step would be the transition towards a multifunctional landscape. Combinations like the bike path and beach homes, combine economic benefits, tourism, ocean views and entertainment with the coastal landscape. These interventions support the growth that Asbury Park is currently in and can add new experiences to the visiting public as well as local residents. The overall development of the waterfront can improve tthe livelihood by increased tourist numbers and practical issues like the rental of bikes and the beach homes.

Development of the bike path has to come with the larger development of the dune landscape. This landscape is the connecting factor of all the proposed interventions and links them to water safety. Through all the different combinations of functions and people involved, the development can appeal to a variety of sectors. Funding of large investments can therefore come from both public and private parties. When a town like Asbury Park would alter its landscape to fit a more resilient and multi-functional coastal zone, the benefits for the people, landscape and economy could inspire many other towns. The development of a multi-faceted dune landscape could therefore spread over neighboring towns and evolve into a regionally shared perspective in how to develop an urbanized coastal zone.
This shared perspective does not mean that is should be implemented the same way on every location. Adaptation to local demands and identity is encouraged to make a good link between the regional vision and the local intervention. When more and more towns join, the step can be made towards a coastal commission and overseeing policies that are needed to guarantee a regional safety. This way, the change towards a long-term and large-scale coastal zone is found with the involvement of individual people and interventions, that one by one inspire others to achieve great things together.

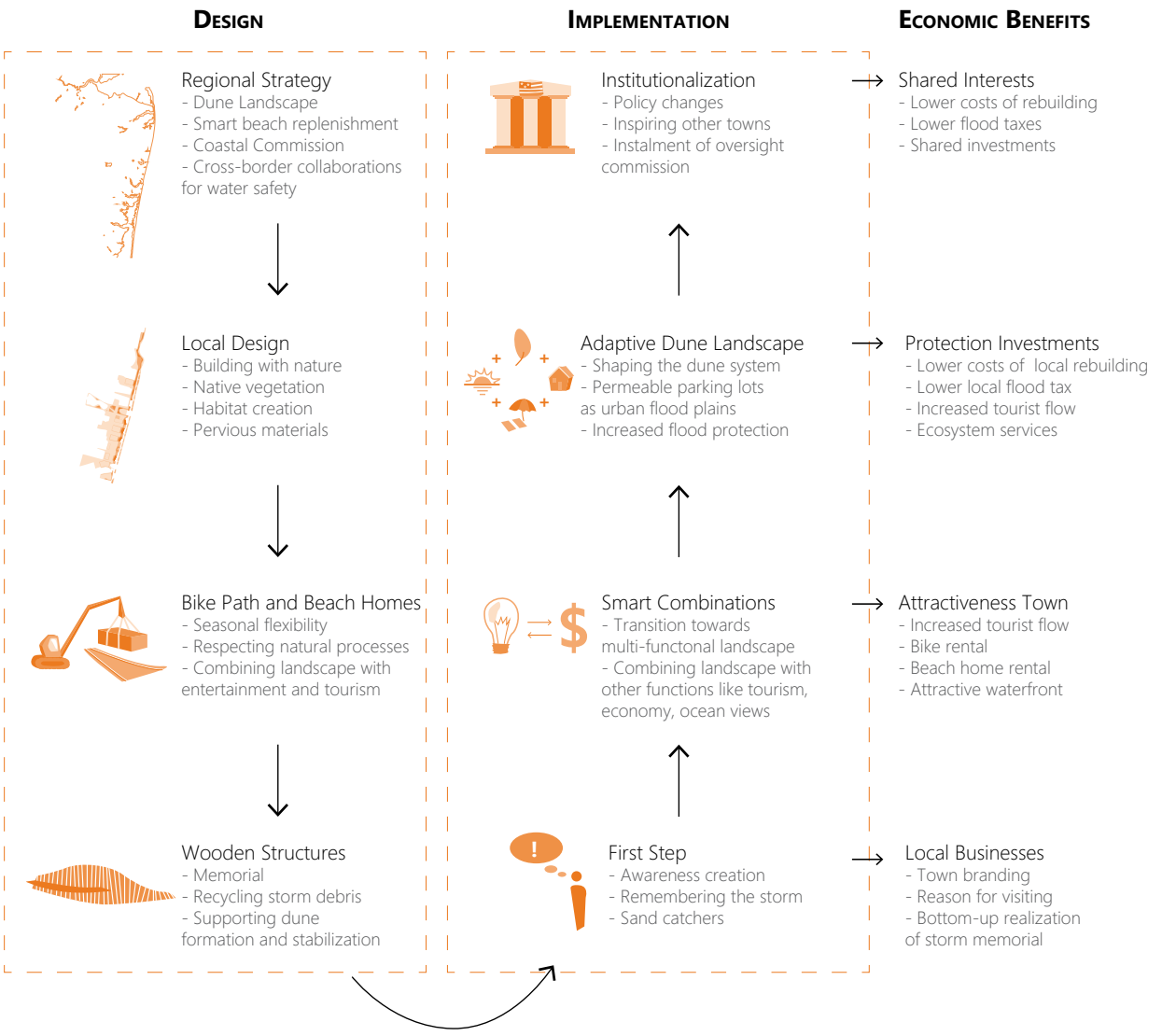


Figure 11.37 Small scale as starting point in the implementation strategy

Figure 11.38 Timeline from recovering to rethinking the landscape

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12 | Adaptive shore landscape as regional strategy

The previous chapter detailed the concept model onto the location of Asbury Park. In this chapter, we zoom out again to the regional vision the design is part of. (fig 12.1) First the vision for the region and cross section is explained. Second is discussed how the regional vision can be adapted to different landscapes of the Jersey shore.

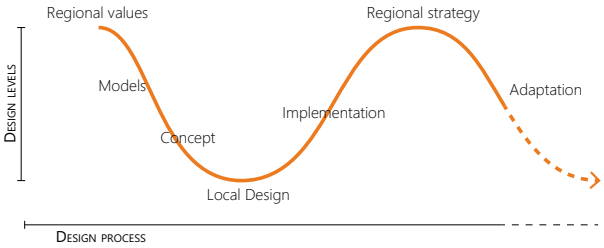


Figure 12.1 Zooming in and out throughout the design process

12.1 | ADAPTIVE SHORE LANDSCAPE

In an adaptive shore landscape, the shore is seen as a landscape zone and should be treated as such. It functions as flood protection, as well as that it adds value to ecological, touristic and residential areas. Currently, 'the shore' is a tight edge of the land, where all the demands and priorities are projected on. In a wide shore landscape, this pressure is spread over a larger zone. This way, all the tight paradoxes of the landscape are given more breathing room. The shore zone includes many different functions, dependent on demands of the specific location. Combinations are made that contribute to multiple goals and development of many different sectors. The power of a shore landscape lays in the adaptability to local surroundings, which, if done right, can form the solution to any problem that communities are now raising. It can be adapted to the character of the different municipalities, to a more urbanized, natural or touristic dune landscape while never compromising on flood safety. The shared love and dependency of the ocean, will be the connecting factor that will bring the municipalities together.

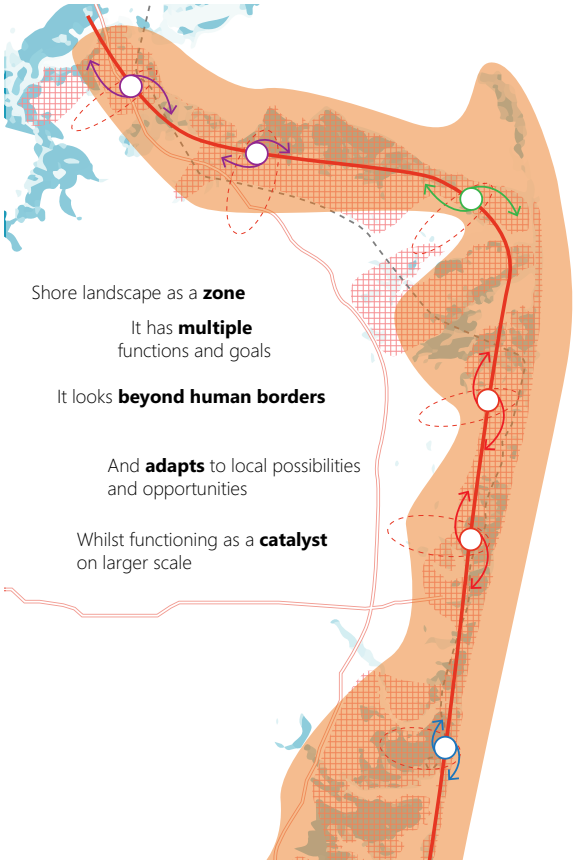


Figure 12.2 Concept of the Dune Zone and Coastal Cord on regional level

At the same time, the interventions also contribute to the development and sustainable coastal management on regional scale. Specific knots are developed that function as catalyst for the development of adjacent towns, communities and economies. The investments in high risk and highly urgent locations is done in such a way that they trigger a larger development along the shoreline. To achieve this, the state and municipalities need to work together. A coastal commission, like other states with similar threats already have, will keep the overview of the coastal development. They will keep an eye on the long-term

goals during the implementation of solutions that work and are understandable on the short-term. The Army Corps of Engineers has to make legally binding minimal demands for the protection of its land and people. They should help municipalities realize a coherent coastal zone and focuss on the regional issue. One by one, the tows will benefit from the development of the region and one day, the coastal cord can be complete.

Figure 12.3 Weak links program along Dutch Shores (RWS, 2014)

An example of this idea is the Weak Links program (fig 12.3). Rijkswaterstaat keeps Dutch national standards for coastal protection to make sure that the country is prepared for future storms and sea level rise. Every twelve years, they evaluated the whole coast and found that ten spots along the shores were not up to the legal standards. (HWBP 2014) Those ten locations formed the Weak Links that were redeveloped together with provinces, water boards and municipalities. In 2016, all the ten projects will be realized. (RWS 2014) Their mutual goal in those projects is combining flood protection measures with nature, recreation and economic benefits.

An example of one of those projects is Kustwerk Katwijk (fig 12.4). In this project, the involved parties combined the need for a strengthened coast with the development of parking space. This is done by adding a dune structure where underneath is a wide dike and a parking lot. This addition gives the plans economic benefits for the town, provides tourists with a parking spot close to the beach and minimizes car traffic in the city center. The dunes provide a pleasant walk to the beach while maintaining the view of the sea and space for beach pavilions. The wide dune zone with diverse slopes provides habitat for the flora and fauna found along the Dutch coast. (OKRA 2012; Arcadis 2012)

Figure 12.4 Before and after pictures of the coastline near Katwijk (NederlandinBeeld, 2006), (KustwerkKatwijk, 2015)

Regionally, governmental organizations also need to work on the overall cross section of the Jersey Shore. In the proposed strategy for the cross section, the sand is retrieved further of the coast than currently being done. (fig 12.5) By doing this, sand will actually be added to the shore's system, instead of just moving it around. The sand comes from deeper waters that are ecologically less valuable and the sand is spread over a wider area of ocean bed. (STOWA 2001) Spreading the sand out over a gentle slope will increase its flood

protective qualities, because it has space to slow down the wave power over a larger area than a steep slope is able to. (MDE 2008; RWS 2013)

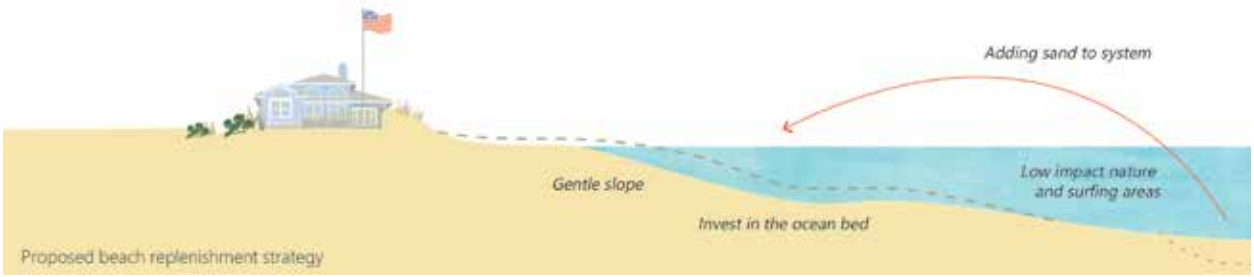


Figure 12.5 Proposed coastal management strategy for the cross section of New Jersey based on the reference study

An example of what such a strategy for the shore's cross-section can offer, can be found at the Hondsbossche Zeewering: also one of the Weak Links projects. The last Dutch sea dike did not meet the national flood protective standards. Heightening the dike would mean a six meter increase in height and fourty meters in width. Such a large intervention would have a lot of negative effects on the spatial quality of the surrounding towns, so Rijkswaterstaat looked at a solution with natural materials. (RWS 2013) Dutch dredging companies won the competition to build the sandy protection in front of the old dike (fig 12.6). A total of 36 million cubic meters of sand is used. For this enormous project, the dredging companies retrieved the sand from far of the shore. At least at twenty meters deep to really add sand to the local shore system and not only move it around within the system.(RWS 2013) All this sediment is used to strengthen the ocean bed close to the coast. The wishes of the local surfing community are taking into account in this process by ensuring the right barriers to keep quality surfing areas. Above water, a 300 meter wide dune landscape is constructed. (Loffler 2014) Within this zone, there is a lagoon to create both natural habitats and places for young children to play in the sea. (RWS 2013)

Figure 12.6 Before picture and visualization of the end result of the Hondsbossche Zeewering development (Beeldbank RWS 1993) (RWS 2013)

Again in this project, soft solutions are combined with many different functions, spatial quality and benefits for local towns. The projects fits within the national strategy and meet the national standards. Through collaborations and investments throughout the governmental layers, the larger flood protective standards are linked to local wishes and economic benefits. The hard structure of the dike is a relic of the former strategy to fight water. Soft landscapes are the sign of a new, multifunctional strategy that works with nature, instead of fighting it.

12.2 | ADAPTIBILITY

A crucial part of the regional vision is its adaptability to local surroundings. A combination between the landscape unity map and the urgency map shows four different landscape types (fig 12.7). The regional vision should be adapted to meet the local character and priorities of these landscapes, resulting in different application of the regional values. Another scale level more detailed, these adapted visions are again adapted to meet the character of a single town for example.
Below, the adaptive shore landscape is adapted to the four landscape types.

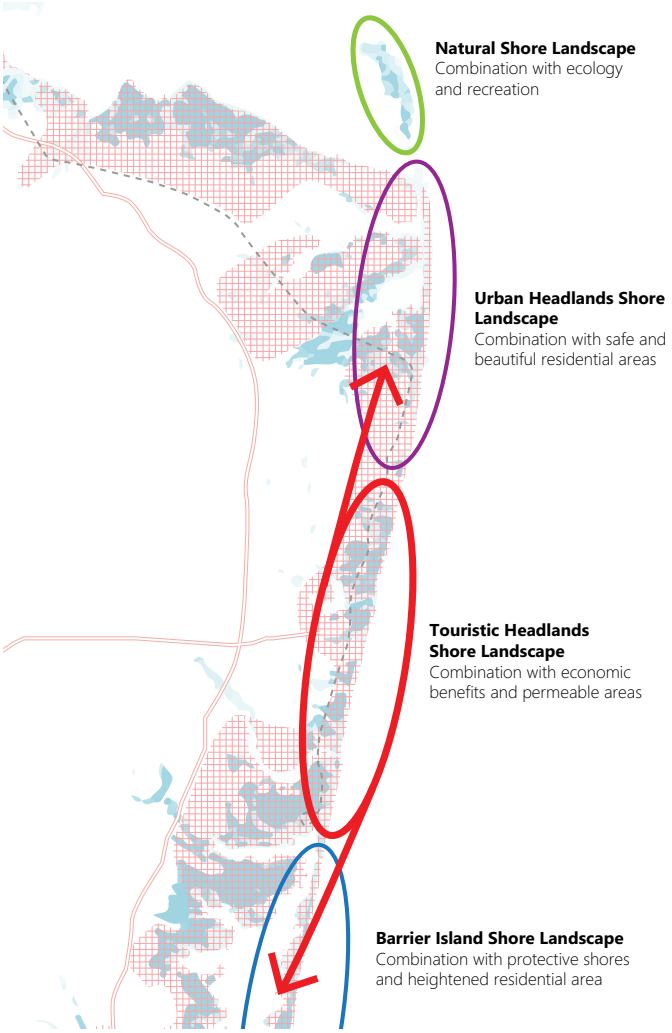
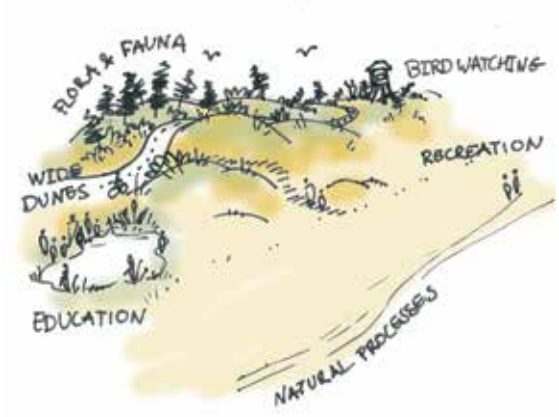


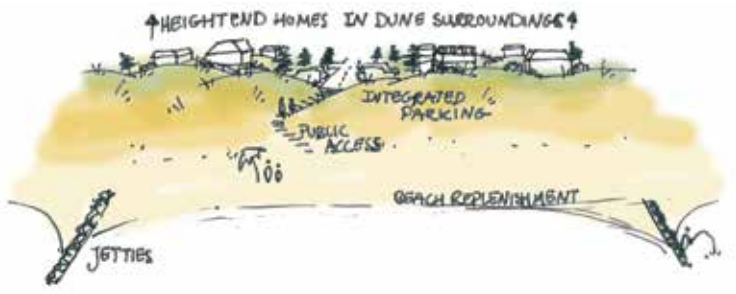
Figure 12.7 Adapting the regional strategy towards the landscape, risk and urgency that is present on location

Natural Dune Landscape

This landscape vision type within the adaptive dune landscape is meant for nature areas along the Jersey Shore. Sandy Hook, the peninsula on the top north of the shore, is especially applicable to this. The natural dune system type enjoys the rich vegetation and animal species that profit from a double dune. It accepts natural processes of the coast, which creates a diverse landscape with accents on natural values. Combinations make the nature accessible



and profitable for many audiences. The landscape type can be combined with education, like field trips and guided tours, but also calm recreative use like walking, fishing, biking and birdwatching.

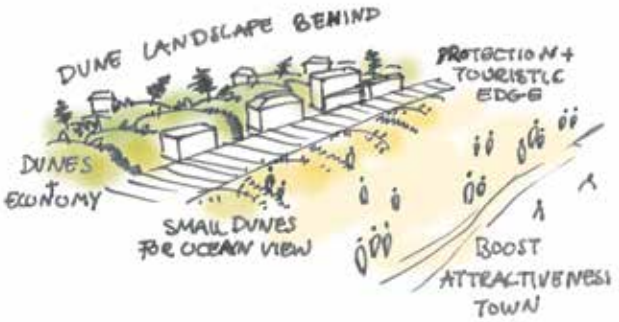


Urban Headlands Dune Landscape

This regional vision type is applicable for the residential parts of the Northern Headlands. Here, natural erosion is less accepted because of the many lives and homes that are at stake. The accent is therefore more and safety, but combined with benefits for the quality of the town. Integrating the residential area in a dune surroundings can create attractive living environments. Homes can be heightened on dunes if they are damaged by a storm, so a multifunctional dune landscape arises gradually. The heightened homes increase flood safety and exploit ocean view.

Touristic Headlands Dune Landscape

The touristic parts of the Jersey shore demand an own adaptation of the regional vision. Here the dune landscape is placed more in the back of the land, so a touristic seaside edge can remain. The edge integrates flood safety with economic benefits and adds to the attractiveness of the town for both visitors and locals. The accent here is on supporting the local identity that makes the town attractive to tourists and integrating that with a dune landscape.



Barrier Island Dune Landscape

The barrier islands are a completely different landscape type and therefore require a different adaptation of the regional vision. As the water comes from both sides, the focus is on flood protection on both the inner and outer edge of the land. The outer side of the barrier is a dune landscape with similar characteristics as the urban dune landscape. On the inner side, wetlands restauration combines water buffering function, ecology, recreation and an attractive living environment. Homes will be put on poles or integrated into the dune strip.

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Conclusion Part III: Breaking the cycle

Sandy Shores is meant as a illustrative design to widen people's view on what is possible despite all the contrasting perspectives. It is not a blue-print plan or something that should just be copied to other towns. It is an example of how the regional vision, which hold many values for the long-term and large scale, can be adapted to meet the need and priorities on local level. If the same rergional principles would be detailed on another town, the design will look different to meet the needs that are present in that specific location.

In the design, a large emphasis is on the larger impacts of small interventions. This is done through a constant changing of scales during the design process. even the smallest interventions have a purpose in achieving local goals ánd contributing to a regional vision. Wooden structures support the local dune system and add to the awareness that is needed on the larger scale. The seasonal housing, event spaces and bike path are ways to create economic benefits for local businesses, while simultaneously showing the added value of a multifunctional dune landscape adapted to local identities. Permeable parking lots meet local needs of the large tourist numbers and can create a large strip of urban flood plains if applied on regional scale. The dunes link all the smaller interventions and create a protected and attractive oceanfront. On a larger scale, the concept of the Dune Zone and the Coastal Cord is repeated. The multifunctional and adaptive shore landscape is achieved through focused interventions on critical locations that can work as a catalyst for more than the location itself. By repeated and smart development of incentives along the shore, a sustainable coastal management can be achieved.

Until that final moment, all the towns will still have some level of flood risk, because the regional protection is dependent on the actions of each single town. In the current mindset and with the current relation between local and larger governments, that is an inevitable outcome. But, doing nothing would be even worse and also local changes can already contribute to larger things. The Coastal Cord is like a zipper; when every town is on board the whole zipper can close, but until then it is best to keep adding small links that contribute to the larger line of defense.

Finding a way in the American norms of coastal management asked for a different approach than designs in the Netherlands. The Wageningen approach includes scale changes, but the general direction of design is mostly from large to small. In this specific context, the general direction of the design process was turned around. Designing included many scale jumps but much more were from small to large, to fit the American way of doing and thinking in coastal management. This inversed approach could be important for Dutch landscape architects who have the task of planning a sustainable coastal zone for the shores of the US.

13 | Concluding and reflective remarks

This thesis starts and ends with Ian McHarg's plead for an improved coastal landscape along the Jersey Shore. Fifty years ago he addressed the persistent vulnerability towards floods and this thesis continues his plead for sustainable coastal management. In this final chapter, we look back on the research, film and design and discuss the main conclusions that can be derived from the design thesis as a whole.

13.1 | DISCUSSION

In this part, the research itself will be subject to critical reflection concerning its character, theories, methods and execution. The discussion points are organized in the three parts of the thesis; research, film and design. As film is still seen as an experiment in landscape architecture, most attention will go to the critical reflection and ethical considerations of that method.

13.1.1 Research

Theory

The human-centered focus of this thesis shaped the goals, methods and outcome of the design research. Even though, remarks have to be made when critically reflecting on underlying theories. The approach of individual people and observations as basis for inductive reasoning towards larger generalizations experiences critique. For example the interaction between participant and researcher that it is founded on. "Your grounded theory journey relies on interaction (...) To interact at all, we make sense of our situations, appraise what occurs in them, and draw on language and culture to create meanings and frame actions. In short, interaction is interpretive." (Charmaz 2006, p.179) The relatively large presence of the researcher and room for interpretation, can decrease the validity and reproducibility of the research.
Thede effects were tried to limit by taking a step back after the site visit, so I would not reason as a friend of a Sandy survivor, but as the landscape architect I am trained to be. Triangulation of methods aimed to validate findings and decrease the level of personal interpretation. Last, openness concerning the methods and execution of them, is done to support the reproducibility and transparency of the research.

Researcher

So with the relatively large room for interpretation, it is important to be open about the background of the researcher that influenced this interpretation. I approach the thesis topic from a clear Dutch perspective: I consider the values of the Dutch approach to landscape architecture as a smart and sustainable way of managing coastal zones, I used -amongst other- Dutch examples on the community outreach posters and as references for the regional vision and design. During the project, this belief in the Dutch approach was challenged and changed. The site visit and interactions with local people and organizations changed my perspectives towards a grown understanding and nuanced view with more room for how things are done in the US. My initial perspective might have influenced the way I interviewed, but their arguments have definitively changed mine.
The most important ethical consideration in the research was not to execute this research as a disaster tourist, where I traveled to the location to hear about people's tragedy and troubles for my own graduation without giving anything back. During the project I tried to limit this as much as possible through good

communication with the participants during my stay and after. With the approachable medium of film, I hope to share our results online or coming summer at my return to Asbury Park.

Methods

As mentioned in the method section in the research design, multiple methods were generally used to answer a sub-research question. Even though, more methods could have been applied to also triangulate the function of film. Currently, this is based on theoretical underpinnings and a test of the influence of the video clip. Further research could support the findings that resulted from these two sources. Furthermore, visiting the case study location multiple times over a longer period could have added valuable insights in the dynamics of the rebuilding process and make the research a more longitudinal study of the processes instead of an analysis mostly based on the situation two and a half years after the storm. Unfortunately due to the time frame of this thesis that was not possible.

13.1.2 Film

Academic filmmaking as research method

Film as method

The use of film in research also experiences some critique from the academic community. For example Barabantseva and Lawrence (2015) discuss that film in research is not a new or better way of doing research. They see a camera and microphone just as tools that can become a method when in the hands of a researcher, which does not necessarily represent an innovative approach to research. The authors also stress "role of the researcher/filmmaker in navigating this research process. The films are heavily reliant on interviews, which are guided and directed by the researcher/director with the intention of leading to answers to specific questions around their research agenda." (Barabantseva & Lawrence 2015, p.915)
The traditional form of video use is also seen as passive in an educational settings. Film would lack in interaction between the sender and audience, while "current views of learning emphasize the need for active participation." (Moore 1993, p.172) Film should therefore not be a sole form of presenting a research, but in combination with other media it can be used effectively. (Moore 1993)
In the thesis documentary, active participation of the audience is encouraged, for example by the text and questions in between the film parts. It is also advised to see the documentary in its research context of the larger report.

Reactions on the documentary

From preliminary screenings of the documentary, a strong indication arises that the educational goals of the film are achieved. A questionnaire was handed out before and after a screening of the film to an audience of 22 first year master students in landscape architecture. After short introduction to the topic, students had to identified the reasons behind the lacking long-term perspective in the rebuilding process. The students often thought it was mainly based on financial shortcomings, or that people are just used to dealing with storms that way. The answers were fairly short and straight forward. They already included a lot of good answers, more than a group of non-landscape architects would probably get. After the

screening, students wrote down much more and longer answers, with more nuance and understanding than they were able to produce before seeing the documentary. Though this was a small test without much significance or structural execution, it indicates a validation of the literature that supports film as educational tool. More research can be done to verify this quick test.
During the screenings, the reactions of the audience indicate that the reflective goals of the film may also be achieved. People who watch the film have instant reactions to what they see and hear. Some react at the mentioning of God as an influence in this discussion, some react at the reasoning of the teenagers at the community outreach posters, or at the sight of someone's home washed away. People's own values are reflected on how they react. Even though you might not believe in God, you are still asked to follow their reasoning for a little while. The reflectivity that the film evokes, is a valuable step in the reflective field of landscape design research.

Film analysis

Interviews

Because of the complexity of arguments and perspectives surrounding the topic, a larger amount of interviews could have shown this even better. At the time of filming was tried to arrange interviews with more organizations and people, but due to practical reasons or time limits these did not take place or did not make it to the final cut.
For now, the choice of interviewees was based on the main paradox that the thesis focusses on (long-term strategy or short-term intervention) and highlights that discussion from the perspective of organizations (local government-NGO) and residents (dunes-no dunes). Other interviews were added for more explanatory purposes. The interviews that were chosen for analysis represented this paradox and were large interviews that provided lots of input for analysis.

Community outreach posters

Concerning the community outreach posters, a number of things could have influenced the voting results. First of all, previous votes were not removed when a new participant came. Their voting behavior could therefore have been influenced by the post-its that were already present. In practice also showed that more people were attracted by the posters if there were already a lot of colorful post-its on there. So, presence of the previous votes could have influenced voting behavior, but also increase the amount of participants.
Second factor was the video clip. We have reflected extensively on whether the video clip is not biased to steer people in a certain direction, but rather showing participants both sides of the story equally. We tried to do this by giving similar amounts of time to both the long-term and the short-term side, both were presented by characters with some authority and they both talked about the same topics. The video clip can be found in appendix VI.
Last factor that could have influenced the voting outcome was the location and time the method was conducted. The location was rather close to a retirement home, so there is a chance that a larger percentage of older people participated than represented in the town. Also a different time, could have changed participating group and therefore the outcome.

Ethics in academic filmmaking

"A depiction is never just an illustration" (Fyfe and Law in Rose 2001, p.10) Just like all methods, there are ethical considerations that need to be taken into account when applying it into responsible academic research.

Presence of the camera and the audience

First of all, ethical questions raise about the presence of a camera. Recording with a video camera is often seen as a more obtrusive method of recording. (Timmers 2012) For example, seaside visitors might not all like the presence of a camera while they are in their bathing suits. Also, the knowledge of being recorded, influences often how people act or what they say. Participants become self-aware of their words and actions. This can tempt them to apply self-censorship or adopt different or more extreme opinions. "'flat actors are for hard drives,' i.e., tedious performances do not make it to the final cut."(Shrum et al. 2005, pp.12–13) During the recording days of the documentary, this effect was tried to limit by for example the set-up of the interviews and good communication with the participants.

When using visual methods in research (static or moving), another important player is the audience. "Images exert their own power and agency and (...) meanings are thus constructed in negotiation between image and viewer." (Pink 2003) It is the filmmakers' job to not only think about the meaning of the images, but also the meaning the audience will assign to them. (Pink 2007) By the larger variety of triggers that film provides, the role of the audience can be greater, resulting in more and diverse meanings that will be assigned to it. (Rose 2001)

Validity and the editing process

Besides that people start editing themselves, the academic filmmaker has to edit them too. Due to the timeframe and goal of the documentary, only important quotes are cut from the initial hours of raw film. This also means that there is a risk of removing the context from certain quotes. Editing can be in that sense similar to writing, a way that is partially representing facts and partially interpreting them. (Rakic & Chambers 2009) It is the task of the editor to make responsible choices concerning the editing process, and to cut and rearrange film data in such a way that the initial message stays the same. In the editing process of the documentary, Anouk and I have tried to keep a critical view during reviews of draft edits to make sure that the representations in the film match the overall argument of the interviewee.

The partial interpretation that comes with the editing process, raises ethical considerations on objectivity or subjectivity of the presented data. This is not only a relevant question in filmmaking, but also at all the traditional research methods. The presentation of results may include raw data in some sciences, but what is derived from them will be in some way depend on the researcher. A researcher cannot reach conclusions without rearranging data into patterns or sequences that show the conclusions. There has to be a step of subjectivity -in some sciences larger than others- to arrive at a conclusion or summary of raw data. The same goes for an editor rearranging his raw film material into an understandable and time-limited representation of the results. (Rakic & Chambers 2009; Rose 2001)

In landscape architecture, the issue of subjectivity is especially relevant when making overly happy or sunny visuals. Using film raises the same question, because the viewer only sees what the filmmaker wants to show. The gaze of the camera might take up a broader range of input, but relevant contexts can still be left out.

Although Anouk and I had a good communication during the entire course of the project, a part of the documentary is the result of choices and decisions that Anouk made. Anouk's role in this project was supportive in the first stage, where she helped me gain (practical) knowledge on filmmaking. During the site visit, here role was greater. She was the one carrying the camera and therefore directly responsible for the footage that was created. So, though I was with her and am responsible for the project as a whole, I did not have all the influence in the specific choices of the camera's gaze.

The same goes for the editing process. I have seen all the footage, made long-lists and short-lists of the quotes that had to be edited into the documentary and reviewed multiple edits of the film, but concerning specific editing choices, Anouk had more influence than I did.

Anonymity and ownership

In traditional research, a participant or interviewee might be referred to as 'Person X' or 'Interviewee nr. 10". In filmmaking this anonymity disappears when participants are shown, often with their (full) name and face. An ethical question is then, who owns the images? The person in the film or the filmmaker? To prevent disagreements along the way, it is common to sign a release form after every appearance or interview. This transfers the image rights of the person depicted away from that person and towards the filmmaker. Meaning that this person is no longer the owner of the images of himself.

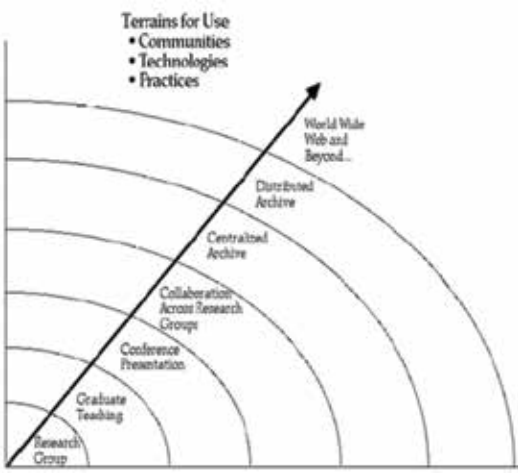

Figure 13.1 showing how the anonimity and ownership reduces when showing the documentary in different settings (Derry et al. 2010)

If the film is shown for a broader audience or put on the internet, the distance between the researcher and where the film is able to travel can become too large to ensure this limited access. Figure 13.1 shows the increasing distance between the maker and the recordings when shown in different contexts. (Derry et al. 2010, p.38)

Legally, all the interviews have been approved by the interviewees for use and broadcast through release forms. None of the interviewees declined to sign the form after giving the interview, nor have they contacted us with second thoughts afterwards. The release forms of Inge Kersten and Jaap van der Salm from H+N+S were signed under the condition of reviewing the edited version of their interview. This review was done and accepted by Inge.

The participants of the community outreach days however, did not sign a release forms. For research purposes, it seemed unpractical to break the informal and approachable setting of the poster set-up with legal papers for everyone who stood in front of our camera for a couple of minutes. Instead of that, was

asked up front if participants minded that we turned on the camera to film them. People have declined to that question and if so, we did not film them. We believe that we have been fair and clear in stating the purposes of our activities that day. If a participant that made it to the documentary cut does not agree with this, we happily invite them to contact us.

13.1.3 Design

Location

Designing climate adaptation measures for the case study of Asbury Park also raises critical questions. First of all, Asbury Park was not amongst the worst hit towns along the Shore. The case study was chosen anyway because of its urgency, practical reasons like the contact network that made it a feasible case study and because it is often subject to pilot studies of the State of New Jersey.
Next important value was to fit the interventions in the American context and local identity. Extensive research has been done to understand the workings of the American way of coastal management so they can be integrated into the design. But, I could never have reached the understanding of its workings better than someone who grew up in them. Looking back, it could have been interesting to work with an American landscape architecture student to validate some of the design choices.

Recently I came across a plan of a large project developer that owns much of the oceanfront in Asbury Park. In this plan, the oceanfront plots that currently are underdeveloped due to the economic crisis, are completely filled with apartment buildings and shops (fig 13.2). In Sandy Shores, I propose a dune zone here with permeable parking lots that will function as a type of flood plains. As an idealistic young landscape architect, I would strongly advise the open and permeable space in this zone. The reason why Asbury Park was not hurt that much during Sandy, can very well be because much of the oceanfront was underdeveloped. In my opinion, adding so much urban development and hard materials means asking for trouble.

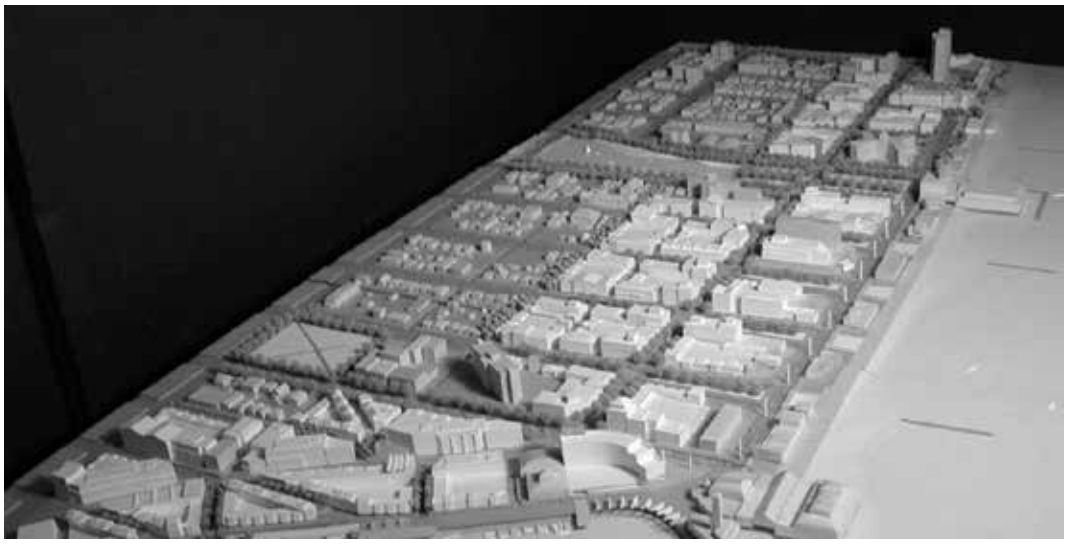

Figure 13.2 Maquette of the planned oceanfront developments in Asbury Park (Asbury Park Planning Board 2002)

However, development is hard to slow down when the economy is strong again. In that case, heightening the empty lots now is even more crucial. The techniques for permeable hard surfaces will have to be a key point in the plan and housing should be developed in a flood-conscious way that limits the exposure to flood risk. As the design emphasizes, a flood protective landscape can go together with many things, also housing development. But, to do that, conscious choices and investments have to be made to turn this plan into a sustainable multifunctional shore zone.

Implementation

Unfortunately, the large dune system will probably not be able to be implemented consistently over the entire Jersey Shore. Also, as there is no overarching governmental body that can enforce a regional vision, some towns might develop a better flood protection than other towns. This will result in remaining flood risk, also for the towns with protection, because water will always flow where it can. (fig 13.3) Scientific models would have to calculate the effect of a fragmented protection on the water flows during a flood.

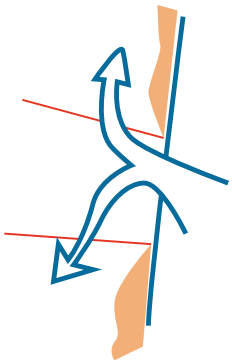

Figure 13.3

Acknowledging this limitation, I still think that investments in sustainable flood protection are valuable for this area. The regional vision aims for the locations that will function as an incentive for the whole shore to develop. That process will take time and will even include one by one development in the hope of one day being able to connect all the pieces. Until then, the design concept also emphasizes perpendicular connections. These perpendicular connections can create compartments, so the water is at least comparted into a smaller area during a flood (fig 13.4). In the design, these perpendicular connection were for example the Deal lake in the north and Sunset Park in the center of Asbury Park. Here the buffer function of the coastal lakes is improved, so during a storm they might be able to limit further flooding of urban area by being able to take up a lot of water.

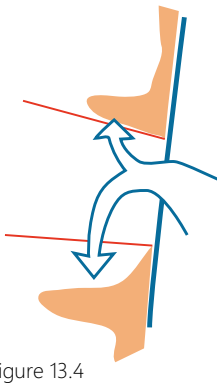

Figure 13.4

Goal

When comparing New Jersey after Sandy with the Netherlands after the flood of 1953, it is easy to say that there weren't any long-term changes done after three years here as well. So can I claim that the short-term interventions along the Jersey Shore are a problem, when it just might take 50 years for them to develop their interpretation of a Delta plan? The important difference is, that New Jersey also had these devastating storms 50 years ago, Ian McHarg wrote his strong advices in 'Design with Nature', academics and engineers had the knowledge on what was needed to prevent another storm damage and still nothing has really changed since. This thesis links that repetitiveness to the consistent unsustainable norms and paradigm that is present along the Jersey Shores.

In the Netherlands, there was a strong government that promised such a major flood would never happen again, and delivered a multitude of large interventions and strategies in the fifty years after. In the situation

of New Jersey, the governmental system and culture is so different, that a solution from a large governing body will just not be realistic. Therefore, this thesis aims to contribute to the changes on local scale, that can lead to a larger shift towards flood resilient coastal management.

Will this thesis be able to really make a change towards that new paradigm? Not alone. As said before, I see the paradigm shift already being in motion by the work of much larger institutions and organizations. The change that is already present, can for example be seen how the town of Belmar dealt with Blizzard Jonas in Januari 2016 (fig 13.5). The near-Sandy water levels flooded much of the Jersey Shore, yet again. Belmar, home to surfers Shaun and Marylin that participated in the thesis documentary, constructed dunes after Sandy and were now able to keep their residents safe. A tweet from the mayor of Belmar shows his pride in this achievement. This thesis aims to contribute to this change even in the smallest way possible, by stimulating understanding, awareness and reflective discussions.

Figure 13.5 Mayor of Belmar, NJ, proud of the flood preparations at work during Blizzard Jonas. (Doherty, 2016)

13.2 | CONCLUSIONS

Notwithstanding the limitations and considerations mentioned in the discussion, the following conclusions can be derived. These conconclusions are again divided over the three parts, after which an overall conclusion is given.

Research

The aim of the first part of this thesis was to get a grip on the dynamics of the New Jersey landscape and how it has reacted after a natural disruption like Superstorm Sandy. The landscape analysis and post-Sandy analysis showed many reasons why the storms and rebuilding are a repetitive cycle in this area. Much natural protection is not present along the Jersey Shore and large amounts of private property make governmental plans hard to implement. This fragmentation is made more obstructive by the local governments themselves: the principle of Home Rule cuts the shore in even more pieces and collaborative plans are difficult to develop and implement. Federal and state governments often deal with conservative politics and the limitation of their legislative power.
On a more abstract level, all the constraints have a base in unresolved paradoxes: the risk of living by the ocean and the attractiveness of it. The addictive power of seeing the ocean, which also means that the ocean can see you too. The long-term and large scale strategies that are needed to resolve the flood risk are located in a culture of short-term solutions and small scale thinking.

Between all the hurdles that are in the way of achieving a sustainable coastal development strategy, none of the reasons are technical. The knowledge and experience is present, either in the US or supported by international parties and the rebuilding funds were packed with 65 billion dollars. All these right circumstances are in place, but do not result in climate adaptation strategies that will reduce the risk of flooding at the next storm. As the concluding problem tree of Part I shows; cultural, economic, political and emotional arguments are in the way of achieving that goal. To change thése issues, a large societal change needs to happen. Ian McHarg was already an example of someone challenging the current way of thinking and many large organizationa like Rebuild by Design and also smaller initiatives are constantly adding to his work. This thesis also tries to add to the larger paradigm shift that is needed, even in the smallest way possible.

Film

This design thesis uses film as a way to challenge those societal attitudes. Using academic filmmaking has added much value to the research, for example by creating a stage for the people in the film to share their perspectives on the issue of climate adaptation of the Jersey Shore. Showing these people and the location as holistic representations makes it possible for an audience to experience their worldview through their eyes with more empathy and understanding. The reflectivity that this encourages, stimulates critial thinking on a viewer's own behavior and larger social norms. This reflective step can be a great addition to the reflective field of landscape architecture.
Film was used as a research method in the extractive and reflective ways of Hadfield and Haw. Footage

of the interviews was the data on which a discourse analysis was conducted. From this analysis, specific meanings have been extracted that formed the basis for the common grounds on which design guidelines were developed.
In the community outreach posters, the video clip showed to have significant effects on the way that people voted. The most interesting conclusion was that the dividedness of the voting behavior decreased. Using film to bring many of the divided views on the topic together, could be a very important way of moving forward in this discussion.

Film had an important role in the overall process of research and design: it changed the focus from the obstruction-focused research to the opportunity-focused design. In the research, I ask what the driving forces are that make these towns to build back everything just like before the storm. The conclusion shows a problem tree of all the cultural, political and socio-economic reasons that explain the phenomena. It answers the initial question. In the film part, the research moves away from the hurdles and makes a step to shared values, common grounds and preferences that are a base for future decisions. With deeper understanding of local reasoning that the combined media of writings, pictures and film brought, I am richer as a researcher and designer. It enabled interpretation of the design assignment though the eyes of all the people that were shown in the film and makes my interpretation more well-rounded and considerate. It enabled design decisions that were based on all their perspectives as well as my own, which makes the design more founded and valuable.

Design

All the local perspectives and priorities are represented in the design for Asbury Park. Sandy Shores is an example of how the regional strategy can be linked to local benefits and local identity. Goals of a single intervention resonate through to the goals of the regional vision, parking lot design can contribute to regional safety in the shape of urban flood plains and the larger dune landscape is tailor-made for the needs and priorities of the local scale. The design forms an illustration of what is possible in an adaptive multifunctional shore landscape and aims to broaden the views on what kind of solutions exist and can address the current flood risks.
The design process that led to the design also needed adaptation to the local circumstances. The traditional scale changes of the Wageningen approach needed tailoring to match the American way of coastal zone management and also the implementation looks at the smallest scale as the starting point for big changes.

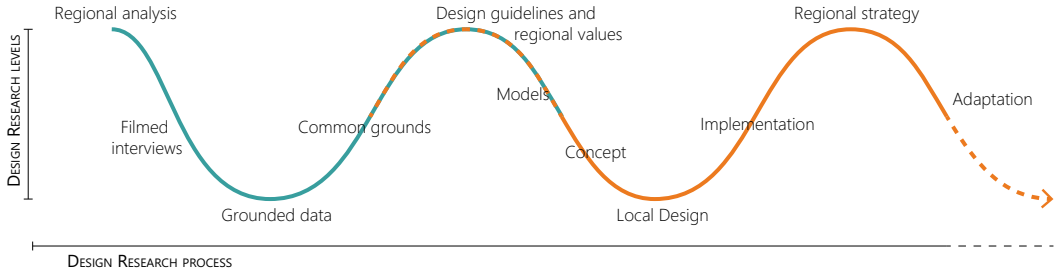

Figure 13.6 Constant scale changes in the design research process to deal with the long-term short-term paradox

Adapting the content of a design to match local surroundings is a common value in landscape architecture. Also adapting the design process itself to match the world that you are designing for, can be an aspect that could use more attention.

Overall Design thesis

At the start, the research focused on reducing the vulnerability part of flood risk. Looking at the entire project, reducing the risk cannot be done by solely addressing vulnerability. Vulnerability, exposure and hazard are such entangled concepts, that risk reduction will only work if they are all addressed. The design shows way in which the sensitivity of the current coastal zone can be altered. But at the same time it also integrates options to decrease the exposure, for example by proposing seasonal housing that challenges current plans of building permanent oceanfront homes or introduces parking lots that together form urban flood plains. Linking interventions that address vulnerability and exposure make a plan smart, efficient and multifunctional. To also address the hazard, the plan will have to be resonate through to even global levels of limiting the growth of climate change itself.

An aspect that also cannot be seen apart from risk, is urgency. Only consulting flood risk maps will give an incomplete and somewhat static image of where interventions are needed. In this thesis, the focus is on the processes that form the landscape. An indication of the urgency can add the element of time and shows the landscape into the cycles that are distorted during a storm. This process-centered view of risk reduction can add crucial information when prioritizing the rebuilding efforts.

Growing urgencies have a direct link towards the timeline of the rebuilding process. (fig 13.7) In the research is concluded that the first couple years are needed for people to restore their sense of safety and normalcy. This needs to happen before any other larger goals can get the attention they need. After these 2-3 years, governments and communities need to convert their focus onto larger rethinking of the landscape to prepare for the next storm. Shifts in the urgency can strongly effect whether this timeline is feasible.

Last year, the first winter hurricane of century was noted and in the end of January this year, New Jersey experiences near-Sandy water levels during Blizzard Jonas. If the hurricane season extends and there are

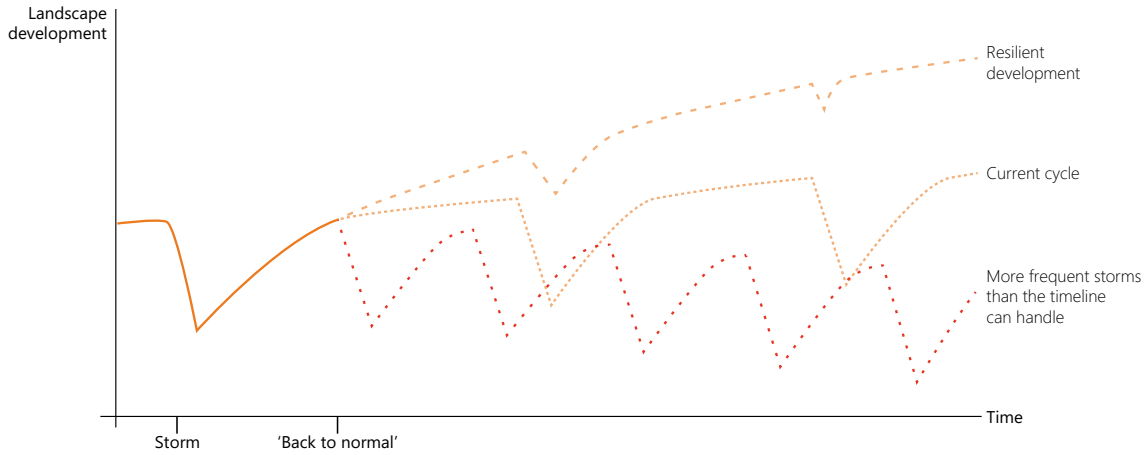

Fig 13.7 Breaking the cycle of storm and rebuild through resilient development

more storm in the winter as well, it is likely that the current timeline cannot be managed. It will be more common that people and towns who are still in the rebuilding process of one storm, will already be hit again in the next. If these event start piling up, it will become harder and harder to address these larger goals and people will constantly be in a state of rebuilding.

Unfortunately, a large hurdle that will still remain is fragmentation of the shoreline. Towns will have to start thinking and working across administrative borders to tackle this regional problem. In addition, the obstructive role of private oceanfront property has to be addressed. Up to now, private property rights have been a large problem for towns that want to develop flood protective dunes. Some of the easements to allow for dune construction on private grounds, are still to be signed. Recently, procedures for eminent domain have been set into motion to retrieve these grounds for public safety. The expropriation of some of the oceanfront property will become long ongoing trials between the property owners and the State of New Jersey. The result of the first trial is yet to come, but will have a very large impact on the course of the dune developments. If the owners will get a large financial compensation, all the property owners will see the benefit of going to trial for years. If the first trial ends in a small compensation, the entire process will probably be speeded up immensely.
In contrast to that, the organization Urgenda has recently won a trial against the Dutch government for not doing enough to address climate change. This victory turned into an international example of how small organization can force their government to deal with the effects of climate change. If the repetitive storm cycle will continue, it could also happen that US governments will be sued for not doing enough to protect their people and force them to take on a more sustainable approach to coastal zone management.

Initially, this project started with the question of why the towns on the Jersey Shore did not show any intent to rebuild smarter after Sandy's destruction. It is easy to have a quick judgement of what the problem is and what should be done about it. But, instead of teaching them that this behavior is unsustainable, the film recordings and future film screening enables us to discussed together, experience the location and people and how they relate to each other and empathize for each other. These shared lessons and discussions are extremely valuable for, on the one hand, the paradigm shift needed to get to a society in which more regional and long-term strategies are accepted, and on the other hand for designers to know how to fit their design in the human coastal landscape of New Jersey.

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Figure 13.1 showing how the anonimity and ownership reduces when showing the documentary in different settings (Derry et al. 2010)
Derry, S.J. et al., 2010. Conducting Video Research in the Learning Sciences: Guidance on Selection, Analysis, Technology, and Ethics. Journal of the Learning Sciences, 19(1), pp.3–53.

Figure 13.2 Maquette of the planned oceanfront developments in Asbury Park (Asbury Park Planning Board 2002)
Asbury Park Planning Board, 2002. Asbury Park Waterfront Redevelopment Plan, Asbury Park.

Figure 13.5 Mayor of Belmar, NJ, proud of the flood preparations at work during Blizzard Jonas. (Doherty, 2016)
Doherty, M., 2016. Belmar 1.3 mile dune at 8am from a drone. Performed great with 1 breach but no flooding. Our preparation paid off. Available at: https://twitter.com/mattdohertynj

APPENDICES

Appendices

I Rebuild By Design analysis

II At The Edge - The script

III Interview Questions

IV Release Forms

V Photo study shore profiles

VI Photo study Before and After Pictures

VII Video Appendices

VIII Community Outreach Results

IX Significance Calculation

	"Gaining"		"Giving"	
Teams	Input/Information	Confirmation	Education, awareness	Active involvement throughout process
BIG team	The team took participants' input to heart and used it to refine design options that were presented and discussed in Round II. (p.73)		The Big U's public outreach work focused on cultivating understanding and generating excitement about the possibilities for flood protection and civic infrastructure on the Lower East Side. (p.73) In Round I, the team used interactive models to demonstrate potential flood protection options and generate discussion among workshop participants. Everyone participated in designing their own waterfronts, with integrated protection schemes and program options. (p.73)	the community was actively involved in the design of these projects, the projects tell the story of what the community finds important. (p. 10) At the first workshops, the community debated the merits of various approaches, using the BIG Team's models of different prototypical solutions. In the second series of workshops, the results of these discussions were incorporated in two possible integral design solutions for each compartment. Once again these designs were discussed at length by community groups. Many people from the community attended these workshops as well as the party at the end of the process.(p.10) Participants discussed the options in small groups at tables before beginning to work on designing their own waterfront schemes. (p.77)
HRA IP team	we focused on gathering information about Sandy's impacts on individual businesses and specific communities. (p.57)	introduce our preliminary framework; gauge reactions and concerns(p.58) we concluded that many of the NYRCR Planning Committee's principles and priority projects aligned	we provided education about behavioral and physical strategies that could be implemented by business and building owners. (p.57)	

		with our design concepts (p.59) The group was responsive to our focus on a funding strategy (p.59)	
Interboro team	Presented Stage 2 plan and Stage 3 progress; received feedback (p.28) For Community Meetings I and II, we distributed the following surveys (p.40)	Presented Living with the Bay; answered questions; council voted affirmatively to support the plan (p.35)	discussed the threats of surge, sea level rise, and stormwater; discussed strategies for combating the threats(p.29)
MITCAU team	Input was vocal and passionate. (p.71) The pilot areas were confirmed and many requests for follow-up conversations were made Because the process of RBD was nearing completion, some of these conversations will continue in the next phase. (p.71).	the RBD leadership introduced its process. The MIT team then introduced the contours of the proposal, followed by a Q+A session with the participants. (p.69) The participants articulated the three pilot areas as key ones for the team. This coincided with the team's own analysis. (p.69) This event was very well attended and the proposals were positively received (p.71) This provided for an important confirmation that these areas would be broadly supported as priorities. (p.75)	
OMA team	The team spent long days and nights presenting, listening (p.11) Presented proposal and fielded questions		Our goal was to educate the community and ourselves on the costs and benefits of protecting Hoboken and living with water. (p.11)

	from the community at an evening drinks reception as part of outreach roadshow. (p.12)		teaching resilience through the lens of politics 101 (p.11)	
Penn team	called upon their expertise (p.33)	These early conversations were crucial to ensuring that the team had accurately gauged the range of stakeholder (p.32)		An experienced artist and videographer, Sahar Coston, worked with the teens to direct their inquiry, edit the film, and help ensure that the content was accessible to a broad audience. The young people succeeding in capturing a range of perspectives, including how their peers think about the future of their community, about climate, and the sustainability of cities. (p.35)
Sasaki team	data provision analysis to critiques of ideas (p.16) A key recommendation that came out of conversations (p.16) They were also a way to identify key stakeholders for involvement (p.30)	The Ocean County planning director, David McKeon, has been enthusiastic and supportive of the project ideas (p.17)	an online game-like interface, helps communities achieve better public participation and understanding of trade-offs. (p.13)	
Scape team	Our team benefitted from diverse input from a range of stakeholders(p.90) A series of community meetings in Mt. Loretto crafted our approach and helped us determine the physical extents of our proposed pilot.(p.90)			we have met with community members and stakeholders to collectively brainstorm… community will continue to shape the design process. (p.76)
Unabridged team	get input from leaders, stakeholder and residents to formulate a strong, well-		increase public awareness of risk, resilience, and Rebuild by Design (p.76)	The group was divided into three tables with local design professionals and

	integrated Rebuild by Design proposal; (p.76) The design team did a brief presentation. Most of the time was spent on obtaining input from state and regional agencies. (p.80) The workshop presented Rebuild By Design in general and summarized the Bridgeport project. (p.77)	educate leaders, professionals and the public about resilient design strategies. (p.76) This was followed by a design workshop in which the teens learned how to make sectional drawings, and used their newly-learned skills to develop designs for the river, taking into account the programming, land uses, and hydrological issues discussed earlier during the bike ride. (p.85)	Rebuild By Design team members helping to facilitate and visualize the ideas of residents. (p.78) Two-and-a-half days to share, learn, draw, revise, and discuss Rebuild by Design proposals, with invited designers and planners joining stakeholders ranging from federal, state, and local government officials to Bridgeport residents at the table. (p.83)
WXY west 8	science and engineering experts to give presentations on research relevant to the project (p.144) garner as much input and dialogue from them in order to design effectively and with confidence and for the public good (p.144)		

II At The Edge - The script

At The Edge – Script
Video Report on Asbury Park, NJ and surroundings 2,5 years after Hurricane Sandy.
June 26 – August 4th 2015

What kept the residents here, how are they connected to their place? How have different parties reacted in the 2,5 years after Sandy and how do inhabitants feel about these reactions. Should we move towards a more long term flood prevention plan and when is the time for this?
Main characters:

- The resident: Shaun McGrath and Marylin Gargiulo, Belmar NJ
- The City Councilman: Joe Woerner, City Council in rebuilding period of AP, Asbury Park NJ
- The Expert: Dr. Micheal Schwebel, community resilience and climate adaptation specialist at Monmouth University and Sea Grant
- The Landscape Architects: Inge Kersten and Jaap van der Salm, H+N+S, Amersfoort, NL
- The NGO: John Weber, head of NJ chapter of Surfrider Foundation
- The oceanfront property owner : John and Donna Marie Williamson, Avalon, NJ

1. Introduction

Introduction to the storm, experiences of the storm
--Black screen—
Sounds: ocean, water against the rocks, wind, lightning, waves.
Music: Intro theme music Lennart
--Fade in—
Image: News stories of 29th October 2012, APP, CNN, reporters in the storm, amateur storm videos, residents own pictures/videos.
Clips show the damage and intensity of the storm. Introduce the event and the severeness of it.
Should have a map showing our location (possibly anomation)
Date(/time) and source of video must show.

•Interview: Residents tell about their experiences of the storm, emotions, memories. What they saw during and after the storm, the destruction in their neighbourhood. Emotions of fear, excitement, chaos.
Image: show pieces of the boardwalk, line of water height, pictures of what they found after the storm.

•Interview and storm images can be mixed: Couple of good qoutes for the residents mixed with images of the storm.

•Last shot: Strong, clear image of the storm and the damage it had on people and their landscape. Image should be felt and remembered by all viewers

--black screen-

2. Two and a half years later

Why no one left the area, how people, the city and the ocean are linked. Introducing the landscape layer and the urbanized layer. Feeling of the shore.

--Fade in—

Image: Sandy Hook, dunes, beach, ocean, natural landscape layer

Sounds: natural sounds, birds, ocean, nature is calm again.

Music: Lennart sfeer 1/2/3

•Voice over Mike Schwebel about the landscape of NJ.

Interview Mike on diversity of the landscape and how many of it is now urbanized.

--Fade out/in—

•Sounds: people talking, boardwalk sounds, restaurants

Music: Lennart sfeer 1/2/3

Image: Daily life on the boardwalk, how people and the ocean are connected through economy, recreation, tourism, view, all different activities between people and shore. Why people don't leave after a big storm.

- Time: shots organized from morning, to afternoon, to night (4th of July)
- Surfers, on beach, in the sea, catching a wave. Surfer video of JD
- Boardwalk life: restaurants, bikes, skaters, beachgoers, visitors
- Beach activities: sunbathing, eating, chilling, playing, sports, swimming, kites
- Multisensory shots: sand between toes, ocean waves, cola bottle (can experiment with slow-motion)

•Before-after shot of the boardwalk. Picture of broken boardwalk turns into live image of boardwalk back to normal.

•Interview Zack: how the boardwalk recovered from Sandy. Everything back to normal for the summer season.

•Interview /voice over at the shore footage, residents talk about their favorite place, the joy of living along the shore, why they would never live anywhere else. Favorite activities on the shore.

Possibly graffiti wall people telling about their favorite place along the shore

Interviews can be mixed with images of the shore feeling/link people-shore

•--fade out--

3. Rebuilding problems

How did people rebuild and what factors are in the way of making long term change?

--fade in--

Image: Everyone rebuilt in a different way.

Quick view of many different way of shoreline in different towns

- Showing diversity of shoreline, not connected, everyone has different way of dealing with flood risk. No overarching group.
- Images of stone wall, steel wall, christmas trees, dunes, boardwalks, private beach etc.. with location/how far apart they are.

Cross section of different towns looking back to normal.

- Allenhurst Allen street, as example of perfect rich neighborhood with private shore
- Asbury Park 3rd street, as example of middle class neighborhood with commercial shore
- Monmouth beach, as example of rich neighborhood rebuilding with stone flood wall.
- If only time for 1 cross section, I would say the Monmouth beach shows the rebuilding the best and crazy flood protection.
- Show location of cross section

Sounds: background sounds, car, birds, surroundings

•Voice-over Mike Schwebel about rebuilding process and risk awareness. Difficulties of fragmented municipalities, bath tub effect, bureaucratic process, importance of home rule

Possibly animations to explain

•Interview John Weber talks about the problems statement, why did everyone rebuild back like it was before and what makes long term change so hard to implement? Critical tone. Rebuild by design, long term vs short term, risk of building everything back to normal, what he thinks needs to be done.

- Take enough time to make the problem clear

Bridge to private property owners

--fade out/in--

Interview: John and Donna Marie about why they live so close to the shore, about their home and ocean view, what they would do if a storm comes.

Image: private ocean front homes, fences/signs on the beach, hidden public beach access, ocean view

- Kathy interview? Waar doen we die?

--fade out--

4. Short-term long-term

Putting the short term recovery and long term vision in contrast to each other. Conversation between city council and landscape architects. Both perspectives equally understandable and correct. No preference at this point.

--fade in--

Image: Interviews with Joe Woerner and HNS mixed with each other so they have a 'conversation' where they defend themselves against the opponents point of view. Pro and con organized per topic, for example

- short-long term,
- dunes and ocean view
- beach replenishments and marine life/surfers
- smart investments vs immediate recovery
- ...

Images of the projects or locations used as explanation of what they are both talking about. If possible moving images, otherwise pictures.

•Interview HNS: Pro's of long term flood protective strategy. Multifunctional, large scale, integrated, landscape based interventions. Landscape architecture jargon.
Examples from the Netherlands with matching images.

- Sand engine
- Dike in dune (katwijk en noordwijk)
- Sasaki plans
- HNS plans
- Beach replenishments

•Interview Joe Woerner: Why building back as it was before the storm, summer season, down sides of dunes and beach replenishments, home rule. Not only negative and short term, in his heart he wants long term change. Should show his own struggle of wanting real change but in practice not feasible.
Examples from New Jersey of short term fixes with matching images

- Flood wall monmouth beach
- Steel wall from Martys' appartment
- Stone wall bay head
- Christmas trees
- Poster options

--Fade out—

5. Participatory Poster/video

Posters on the boardwalk, participatory part of the research. What do people think is the best solution? People get to see a summary of the discussion between Joe and HNS and have to choose themselves what they think is the best option for the coast.

--fade in--

Image: Poster video days

- Set up of the posters on the wall, empty posters
- Marit explains the assignment and hands people the ipad.
- People looking at the video and the posters, maybe already reacting a little bit on what they see or think.
- People describe what they saw in the film
- People in front of the posters, telling about how they are making their choices
- People putting their post its on the wall and explaining their choice
- Fully packed posters at the end of the day, some zoom-ins on the options with the stickers on them.

•This part can be very positive and fun, different peoples reactions mixed and cut in short parts. Weird reactions of people show people like to participating

--fade out--

6. Ending

Closing the discussion with end quotes from everyone. Future oriented, what now? Whats next?

--fade in--

Image: Back on the shore, calm daily life. Everything back to normal on the boardwalk.

Music: Lennart theme outtro

Voice over: Resident talking about the future of this shore. Will they stay here or move away? Will Sandy really change anything?

Ending qoutes of Mike Schwebel, Joe woerner and John Weber about how they see the future.

•Tention rising, when will the next storm hit? Will everyone be ready for the next storm?

•Inception ending (?)

--Black screen--

thank you's etc.

III Interview questions

Shaun McGrath and family - bewoner Belmar- 29 july 17:00

My questions will be cut from the documentary, so I will be silent for a few moments between the answers and questions to create a gap were we can later make the cut. And because my question will be cut, I would like to ask you to answer in whole sentences. Other than that it will be a normal conversation and you can just look at me during the interview. First I will ask you some introducing questions about your life on the Jersey shore, after that we will talk about your experiences of the storm, the future and some ending questions. If you want to pause the interview at any time, let us know. Could you state your name and the date, so we can test the sound?

Binding aan de plek
How long have you lived along the Jersey Shore?
Why did you move here?/ What kept you here all this time?
In what ways do you enjoy living on the shore?
Do you have a favorite place along the shore?
Would you ever consider moving elsewhere?

Ervaring van storm
Were you here during Sandy?
Can you tell me about the days leading op to the storm?
How did you prepare?
Can you walk us through the day of the storm?
How did you experience that day?
What did you see when you returned after the storm?
Can you tell me about the damage on your home?
Can you walk us through the process after the storm? Who helped you rebuild?

Toekomst
Are you afraid that another storm will hit?
Why did you choose to rebuild and not move away?
Did you change anything about your home when you rebuild?
Do you think that Sandy was just another storm or did it really change anything?
What do you think the future of the Jersey Shore is going to be like in regards to flood safety?

Ending
Did we forget to ask you anything you would like to highlight?
Do you have pictures of what you found here when you came back after the storm or the damage to your home?

HNS interview – 1 juni 16:30 – Amersfoort, HNS – Inge Kersten, Jaap van der Salm

My questions will be cut from the documentary, so I will be silent for a few moments between the answers and questions to create a gap were we can later make the cut. And because my question will be cut, I would like you to answer in whole sentences. Other than that it will be a normal conversation and you can just look at me during the interview.
First I will ask you some introducing questions about the landscape of New Jersey and Sandy, after that I will move on to the climate adaptation in the area, Rebuild by Design, your entry in that and the regional problem with a local solution.
Could you state your name and the data, so we can test the sound?

Introduction
Have you both visited the east coast often now?
How would you describe this coastal landscape? How would you characterize the different landscape types?
Would you say that this landscape was prepared to face large storms? How does it deal with the constant risk of storms?

Climate adaptation
Two years after, how is the landscape designed to deal with the risk of storms at this moment? Did anything change?
Do you think Sandy was just another storm for the people there, of did it change anything about their view on the landscape?
Who would you say is responsible for the climate adaptation of the area? Is it the state, local governments or local communities, someone else? How are they dealing with their responsibility?
What role do you think the local communities should have in the climate adaptation of this landscape?
A lot of organizations focused on the immediate recovery like rebuilding homes. Is there as much attention for longer-term or more large scale projects that try to make this coast better prepared for the next storm?
Do you think that this coast will be well adapted with just the short term solutions? What else would they need?
The climate threat is a regional issue, but it seems like a regional solution wouldn't be accepted in the US. Why not? How else can it be solved?
Climate adaptation is not new, the knowledge and expertise exists and the money is there. Why isn't it implemented yet?

Rebuild by Design
Could you explain what Rebuild by Design is, why it was organized and what was the goal of the design contest?
Could you elaborate on the process you went through in Rebuild by Design, so did you visit the area much, what did you see and hear there, what parties where involved in your design process?
How did the collaboration with local communities go and what role did you take in this as a landscape architect?
Did you notice a difference in how American people view their coast in comparison to how Dutch people would? Did they have other priorities or react different to certain interventions?
What were some of the main concerns and qualities that were mentioned by the local communities?
Did you mostly gain information from participants or was it also about educating them on climate adaptation?
What main problem did your entry address? Could you outline your proposed solutions?
You mention the concept of 'grassroot regionalism'. Could you explain what that means and what it can offer to the

coastal landscapes after Sandy?
Living with the Bay proposes quite a holistic and landscape-based interventions, why did you choose for this approach?
All the interventions facilitated multi-functional use. Can you tell us a about those interventions and why you chose for that type of interventions?
The interventions you proposed are very Dutch in a way. We have the sand engine, dikes, dunes, bio swales, flood plains.. What is it about the Dutch landscape that makes it important to implement in the US? What were some of your references?
What makes your plan American? Or is that not necessary?
Parts of the coast are private property, how did this influence your design assignment and solutions?
Were there any conflicts between local parties and certain climate adaptation measures you planned? For example local residents who didn't want beach nourishments or dikes in front of their homes, marches where people usually go boating?

Ending
What would happen to this coast if nothing was done?
What would say is the main assignment for the coast after Sandy that is still present?
Now that the winning proposals are known, what is next for you?
Is there anything you would like to highlight about the topics we discussed, that we forgot to ask?
thank you for your time!
This form allows us to use your appearance in our documentary, so if you would like sign below?
Can we use some images of Living with the Bay in our documentary?

Kathy Barisciano - Ortley beach resident - Ortley Beach

My questions will be cut from the documentary, so I will be silent for a few moments between the answers and questions to create a gap were we can later make the cut. And because my question will be cut, I would like to ask you to answer in whole sentences. Other than that it will be a normal conversation and you can just look at me during the interview.
First I will ask you some introducing questions about the landscape of New Jersey after Sandy, after that we will talk the rebuilding process in the area, the future of this shore and some ending questions. If you want to pause the interview at any time, let us know. Could you state your name and the date, so we can test the sound?

Introduction
How long have you lived along the Jersey Shore?
Why did you move here/what has kept you here all this time?
Do you have a favorite spot along the Shore?
Wuold you ever consider moving elsewhere?

Experience storm

Were you here during Sandy?
Can you walk us through the day of the storm?
What did you see when you returned after the storm?
Are you afraid that another storm will hit?
Can you walk us throught the process of rebuilding your home after the storm? Who helped you rebuild?

Rebuilding
How did FEMA play a role in the rebuilding process in this area? Did a lot of people get funding from them?
Is there a general opinion on how FEMA responded after Sandy?
How do you think this town should be protected against the next strom?
Can you tell me about the discussion that arose on how the town should rebuild their shore? There was a rally not long ago that was connected to that issue.
Who decides in the end what would happen, how the town is going to be rebuild?
Were people involved in the rebuilding process of the town?
What role do private beachfront owners have in the rebuilding process?
The state of NJ has recently stated to start an eminent domain process towards the property woners to build dunes. What do you think about that?
How do you feel about people saying that in a place like Mantoloking/Ortley Beach that was hit so badly, people shouldn't be able to rebuild anymore?

Future
How should this area be rebuild if it was up to you?
thank you for your time!
Did we forget to ask you anything you would like to highlight?
Do you have any tips on who else we should approach to talk about this topic?
Name and title correctly? Would you mind signing this form so we can use the material of this interview?

Mike Schwebel - Monmouth University - July 7th 2015 9:30 - Sandy Hook

My questions will be cut from the documentary, so I will be silent for a few moments between the answers and questions to create a gap were we can later make the cut. And because my question will be cut, I would like to ask you to answer in whole sentences. Other than that it will be a normal conversation and you can just look at me during the interview.
First I will ask you some introducing questions about the landscape of New Jersey after Sandy, after that we will talk the rebuilding process in the area, the future of this shore and some ending questions. If you want to pause the interview at any time, let us know. Could you state your name and the date, so we can test the sound?

Introduction
How long have you lived along the Jersey shore?

What are some of your favorite places along the shore?
Can you tell us about the types of landscapes that can be found here?
The shore is very urbanized, what pulls all these people to the Jersey shore?
How has human impact effected those landscapes you mentioned?
Is there something you would change about the current state of the Jersey shore?

Sandy
Storms are not new to the area, can you tell us something about the history that New Jersey has with storm and flood risks?
Do you think people are aware of the risk or how do they act on knowing that risk?
Why do people choose to live here even though there is a history of storms and floods?
Then Sandy hit, can you tell me about how you experienced Sandy? Can you tell about the impact that the storm had on people and the landscape?
Do you still notice the fact that Sandy damaged the area? How or where?
Do you think that Sandy was just another storm for the people here, or did it change anything about their view on their surroundings or future?

Rebuilding
Who would you say is responsible for the rebuild of the New Jersey shore?
Why did so few plans of RbD focus on the Jersey Shore?
Have you seen the plan that was made by Rebuild by Design? What did you think of it?
In your work you focus specifically on community resilience in climate adaptation is that correct? What role did communities have in the rebuilding after Sandy?
Is that the role that they should have? Or do you think the rebuilding process could have gone better?
Can you tell us about what these communities have had to go through after Sandy?
Would you say that everything is back to normal now? Is that a good thing?
A lot of organizations focussed on the immediate recovery like rebuilding homes. Is there as much attention for longer-term projects that try to make this coast better prepared for the next storm?
Do you think communities and governments see the importance of a longer-term prevention of storm impact? How do they act on it?
Can you name some examples of projects that towns did as flood prevention measures?
Were those measures mostly community initiatives or did they come from the government?
What do you think about the measures that are being taken by towns up to now? Are they good solutions? Do they serve the goal of reducing risks?
What do you think is the best way to move towards a lowered flood risk?
Climate adaptation is not new, the knowledge and expertise exists. Why isn't it implemented yet on a large scale?
Climate change is a regional issue, but it seems like a regional solution wouldn't be accepted here. It seems like its every town for themselves. What factors would you say are in the way of finding a larger scale solution?

Future

What would happen if nothing in the landscape changed, if everyone just kept going, developing and thinking like they always have before?

What do you think needs to happen for that situation to be prevented?

If it was up to you, what would the future of this coast look like?

Ending

Did we forget to ask you anything you would like to highlight?

Do you have any tips on who else we should approach to talk about this topic?

Name and title correctly? Would you mind signing this form so we can use the material of this interview?

John Weber - Surfriders Foundation NJ Chapter - July 2nd 2015 10:00 - North end beach

My questions will be cut from the documentary, so I will be silent for a few moments between the answers and questions to create a gap were we can later make the cut. And because my question will be cut, I would like to ask you to answer in whole sentences. Other than that it will be a normal conversation and you can just look at me during the interview.
First I will ask you some introducing questions about the Surfriders foundation and New Jersey after Sandy, after that we will talk about the rebuilding and rethinking process in the area and some of the problems that it might be facing, the future of this shore and some ending questions. If you want to pause the interview at any time, let us know. Could you state your name and the date, so we can test the sound?

Introduction

Can you tell me about your position at the Surfriders foundation and in short what the Surfriders stand for?

In what way are you active in this particular area and what problems make it necessary for you to be here?

The majority of NGO's focussed on the immediate recovery after Sandy like rebuilding homes or providing basic needs. Is there as much attention for longer-term projects that try to make this coast better prepared for the next storm?

What is the essential difference between recovery and rebuilding after Sandy? Why do the Surfriders choose not to focus on this recovery but on more long term change?

Rebuilding

The Surfriders foundation is linked to the Rethink the Jersey Shore campaign. Why is rethinking, something that needs to be promoted? Are people are not doing enough now or do you have examples of where it when wrong?

Who do you think should do the rethinking?

What attitude do they have now, that needs the rethinking? What should change about their attitude towards the shore?

In what way has rethinking the landscape been necessary at this North End beach that you chose as our location today?

There was a plan to build in the area we are now. Why did the Surfriders appose those plans?

What about the people that might have loved to live in this spot, it's a beautiful area, right near the water, beautiful view.. What would you say to those people?

In our email contact, you mentioned that "we can come up with the greatest most resilient plan for Asbury Park but there is nothing to compel the State to accept such a plan". What are exactly the factors that keep plans like that hard to be accepted and implemented?
(What role do private property owner in the acceptance of these plans?)
Climate change is a regional issue, but it seems like a regional solution wouldn't be accepted. Why not?

Future
Do you think that Sandy was just another storm for the people here, or did it change anything about their view on their surroundings or future?
What would happen if no one rethinks their landscape and they just keep going like they always have before?
What needs to happen for that situation to be prevented?
If it was up to you, what would the future of this coast look like?

Ending
Did we forget to ask you anything you would like to highlight?
Do you have any tips on who else we should approach to talk about this topic?
Name ant title correctly? Would you mind signing this form so we can use the material of this interview?

Joe Woerner - Asbury Park City Council- July 10th 2015 10:00 - Convention Hall/boardwalk

My questions will be cut from the documentary, so I will be silent for a few moments between the answers and questions to create a gap were we can later make the cut. And because my question will be cut, I would like to ask you to answer in whole sentences. Other than that it will be a normal conversation and you can just look at me during the interview.
First I will ask you some introducing questions about New Jersey before, during and after Sandy, after that we will talk your role in the rebuilding process and how Asbury Park and other towns chose to deal with the risk of flooding, the future of this shore and some ending questions. If you want to pause the interview at any time, let us know. Could you state your name and the date, so we can test the sound?

Introduction
How long have you lived along the Jersey shore?
You weren't in the city council during Sandy, correct? Were you here during hurricane Sandy?
Can you tell me about your experiences during Sandy?
What made you decide to get in a governing position in Asbury Park?
Before this you were part of the Surfrider foundation, did you take the goals and ideals that they have with you when you became part of the city council? In what way can we see it back?

Before during after Sandy
Can you walk us through the process of preparing Asbury Park for the storm?

And during the storm, what happened here? Did many people stay here?
At what point did you maybe walk around to assess the damage? What did you find?
How did Sandy influence the policies or priorities of your local government?

Rebuilding process
What were some of the first things that needed to be done after the storm?
Why was this immediate recovery necessary?
Can you tell us about the local initiatives in the area that worked on the recovery and rebuild after Sandy? How did the local government support them?
Asbury Park rebuild its boardwalk quite fast after the storm. Is it build back in the same way as before? Why was it build back like it was before?
Other towns along the shore put up sea walls made of steel or rock, what do you think about that solution? Would you consider building sea walls in Asbury Park?
We spoke to some landscape architects that were part of a winning proposal of Rebuild by Design. They don't agree with some of these interventions made by local governments here, because they think they are based on short term thinking. Do you think that this immediate response of for example rebuilding back the boardwalk as it was, was still the best solution at the time? Why?
Another critique that they had was that the interventions are often only within a single town. For example a sea wall or dunes that end at the border of the next town, or a jetty that is placed on a town border so the next town has to deal with the erosion side. Do you think it's a good thing that all these towns have this Home rule, and can decide for themselves how they want to deal with flood risks?
Immediately after the storm, were there also thoughts on a long term vision for reducing flood risks? (why not?)
How about now, is there a long term plan for flood risks?
Would you say that most of the flood risk projects that have been implemented up to now deal with long term flood adaptation or were they more short term solutions? Why is that?

Future
Do you think that Sandy was just another storm for the NJ residents, or did it change anything about their view on their surroundings of future?
Did Sandy change your views on this area or its future? How?
With what level of priority do you feel this coastal area should be adapted to face more storms like Sandy?
Who should be responsible for for the planning of that?
If it was up to you, what would the future of this coast look like?
What would you say is the main assignment for the coast after Sandy at this point?

Ending
Did we forget to ask you anything you would like to highlight?
Do you have any tips on who else we should approach to talk about this topic?
Name and title correctly? Would you mind signing this form so we can use the material of this interview?

IV Release Forms

Personal information is blacked out due to privacy reasons

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: Donna Marie Williamson Date of birth: 6-23-56

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location:

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

whereas, I understand that:

a) my likeness and voice will be recorded on a video, audio, photographic, digital, electronic or any other medium ("the Recordings");
b) my name will be used in connection with these Recordings.

I hereby authorize the producers, its subsidiaries, licensees, successors and assigns or anyone authorized by the producer , to use, publish, and reproduce the Recordings in the above documentary (or parts thereof) and in all media including, without limitation, cable and broadcast television and the internet, and for exhibition, distribution, promotion, advertising, sale, press conferences, meetings, hearings, educational conferences and in brochures and other print media worldwide.

The Producer will have the unrestrained right to use edit or alter (including non-use or deletion) the Recordings or parts thereof, in any manner the producer may see fit.

I hereby waive the right to receive any payment for signing this release and waive the right to receive any payment for producer's use of any of the material described above for any of the purposes authorized by this release.

I am of full legal age and capacity and fully understand the rights I am assigning or waiving. I am freely and voluntarily entering into this agreement, and have read and understood each and every provision, as set forth herein. In entering into this agreement, I have not relied on any statements by the producer or anyone else regarding the nature of the film, its content or how I will ultimately be depicted.

Signature of Person Appearing: Donna Marie Williamson

Address [redacted] City, State, Zip: [redacted]

Date: 7-9-15 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? YES/NO

Email: [redacted]

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Production Date(s): June 26th – August 4th 2015

Production Title (Working Title): The Oceans' Edge

*Participant's Name: Inge Kersten

Producer/Production Entity: Marit Noest/Anouk Saint Martin

Production Location: Amersfoort, NVS

I hereby authorize the producers to record and edit into the documentary and related materials my name, likeness, image, voice and participation in and performance on film, tape or otherwise for use in the above documentary or parts thereof (the "Recordings"). I agree that the documentary may be edited and otherwise altered at the sole discretion of the Producer and used in whole or in part for any and all broadcasting, non-broadcasting, audio/visual, and/or exhibition purposes in any manner or media, in perpetuity, throughout the world. The producer agrees to retain the integrity of the interviewee's image and voice, neither misrepresenting the interviewee's words nor taking them out of context.

The Producer may use and authorize others to use all or parts of the Recordings. Producer, its successors and assigns shall own all right, title and interest, including copyright, in and to the documentary, including the Recordings, to be used and disposed of without limitation as Producer shall in its sole discretion determine.

I am of full legal age and capacity and fully understand the rights I am assigning or waiving. I am freely and voluntarily entering into this agreement, and have read and understood each and every provision, as set forth herein. In entering into this agreement, I have not relied on any statements by the Producer or anyone else regarding the nature of the film, its content or how I will ultimately be depicted.

*Signature of Person Appearing: [signature]

*Date: 01-06-2015 Phone: [redacted]

Address: [redacted] City/State/ZIP:

*Email: [redacted]

Would you like to receive updates on the development and screenings of the documentary? (YES)/NO

* required field

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Production Date(s): June 26th – August 4th 2015

Production Title (Working Title): The Oceans' Edge

*Participant's Name: JAAP VAN DER SALM

Producer/Production Entity: Marit Noest/Anouk Saint Martin

Production Location: Ameland, HNS

I hereby authorize the producers to record and edit into the documentary and related materials my name, likeness, image, voice and participation in and performance on film, tape or otherwise for use in the above documentary or parts thereof (the "Recordings"). I agree that the documentary may be edited and otherwise altered at the sole discretion of the Producer and used in whole or in part for any and all broadcasting, non-broadcasting, audio/visual, and/or exhibition purposes in any manner or media, in perpetuity, throughout the world. The producer agrees to retain the integrity of the interviewee's image and voice, neither misrepresenting the interviewee's words nor taking them out of context.

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*Signature of Person Appearing: Jaap van der Salm

*Date: 01/06/2015 Phone: [redacted]

Address: _____ City/State/ZIP: _____

*Email: [redacted]

Would you like to receive updates on the development and screenings of the documentary? YES/NO

* required field

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: Joe Weiner Date of birth: 7-28-1975

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location: Convention Centre

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

whereas, I understand that:

a) my likeness and voice will be recorded on a video, audio, photographic, digital, electronic or any other medium ("the Recordings");
b) my name will be used in connection with these Recordings.

I hereby authorize the producers, its subsidiaries, licensees, successors and assigns or anyone authorized by the producer , to use, publish, and reproduce the Recordings in the above documentary (or parts thereof) and in all media including, without limitation, cable and broadcast television and the internet, and for exhibition, distribution, promotion, advertising, sale, press conferences, meetings, hearings, educational conferences and in brochures and other print media worldwide.

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Signature of Person Appearing: [redacted]

Address: [redacted] City, State, Zip: [redacted]

Date: 7-10-2015 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? YES/NO

Email: [redacted]

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: John Weber Date of birth:

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location: North end Beach

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

whereas, I understand that:

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Signature of Person Appearing: John Weber

Address: [redacted] City, State, Zip: [redacted]

Date: 7-2-15 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? YES/NO

Email: [redacted]

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: John Williamson. Date of birth:

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location: Avalon

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

whereas, I understand that:

a) my likeness and voice will be recorded on a video, audio, photographic, digital, electronic or any other medium ("the Recordings");
b) my name will be used in connection with these Recordings.

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Signature of Person Appearing: _____

Address [redacted] City, State, Zip: [redacted]

Date: 7-9-15 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? YES/NO

Email: [redacted]

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: KATHY BORISCIANO Date of birth: 7/8/57

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location:

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

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Signature of Person Appearing: [redacted]

Address: [redacted] City, State, Zip: [redacted]

Date: 8/1/15 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? YES/NO

Email: [redacted]

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: Marilyn Gargiulo Date of birth: 02/03/81

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location: Belmar NJ

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

whereas, I understand that:

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Signature of Person Appearing: Marilyn Gargiulo

Address: [redacted] City, State, Zip: [redacted]

Date: July 29, 2015 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? YES/NO

Email: [redacted]

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: Michael B. Schwebel Date of birth: July 1, 1982

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location: Fort Hancock, Sandy Hook, NJ

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

whereas, I understand that:

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Signature of Person Appearing: _____

Address: [redacted] City, State, Zip: [redacted]

Date: 7/7/15 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? (YES)/NO

Email: [redacted]

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: Shaun McGrath Date of birth: 01/27/83

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location: BELMAR

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

whereas, I understand that:

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Signature of Person Appearing: _____

Address: [redacted] City, State, Zip: [redacted]

Date: 7/29/2015 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? YES/NO

Email: [redacted]

PERSONAL APPEARANCE RELEASE

Documentary part of Masters Thesis in Chairgroup Landscape Architecture at Wageningen University

Participant's Full Name: Zack Rosenthal Date of birth: 12/12/94

Producer/Production Entity: Marit Noest (WUR) and Anouk Saint Martin

Production Location: Pop's Garage

Whereas, the producer is going to make a documentary about the New Jersey coast after Sandy, and

whereas, I, the undersigned, have agreed to appear in the documentary and,

whereas, I understand that:

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Signature of Person Appearing: [redacted]

Address: [redacted] City, State, Zip: [redacted]

Date: 7/6/15 Phone: [redacted]

Would you like to receive updates on the development and screenings of the documentary? (YES)/NO

Email: [redacted]

V Photo study shore profiles

Diversity Shore profiles

Homes, path, road, bushes, path, steel flood wall, ocean- Atlantic Highlands

Homes, bushes, path, road, path, rock wall , beach, ocean - Monmouth Beach

Appartments, road, boardwalk, steel flood wall, boulders, beach, ocean - LONG BRANCH

Restaurants, boardwalk, beach, jetty, ocean - Asbury Park

Street, fences, christmas trees, beach, ocean - Ocean Grove

Diversity Shore profiles

homes, road, parking, bushes, boardwalk, dunes, beach, jetty, ocean - Ocean Grove

Homes, road, parking, boardwalk, beach, dunes, beach, ocean - Sea Girt

homes, private beach, public beach, ocean - Bay Head

Road, bushes, trees, home, private dunes, beach, ocean - Mantoloking

Diversity Shore character

Nature and Recreation - Sandy Hook

Hills and forrest - Atlantic highlands

Rebuilding Mansions - Monmouth Beach

Rebuilding Surf Beach - Loch Arbour

Diversity Shore character

Old Glory boardwalk - Asbury Park

Gingerbread Houses - Ocean Grove

Hidden oceanfront mansions - Montoloking

Wetland and wildlife reserves - Barnegat Bay

Amusement pier - Seaside Heights

VI Photo study before and after pictures

Asbury park boardwalk



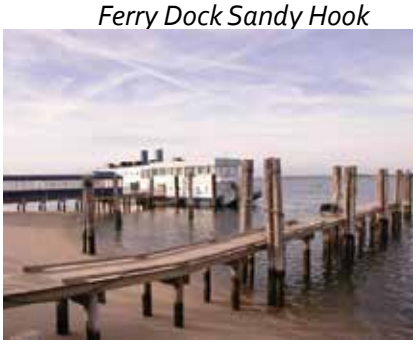
Bay Head



Edgemont Drive



Ferry Dock Sandy Hook



Heating Plant



Lake Como



Lake Takannassee



Ocean Grove



Pier Village



Sea Bright



Sea Girt



Seaside Heights

Shark River inlet



Stony Pony



Twilight Lake



VII Video Appendices

The video that was shown during the community outreach poster method can be found at

https://vimeo.com/152961612

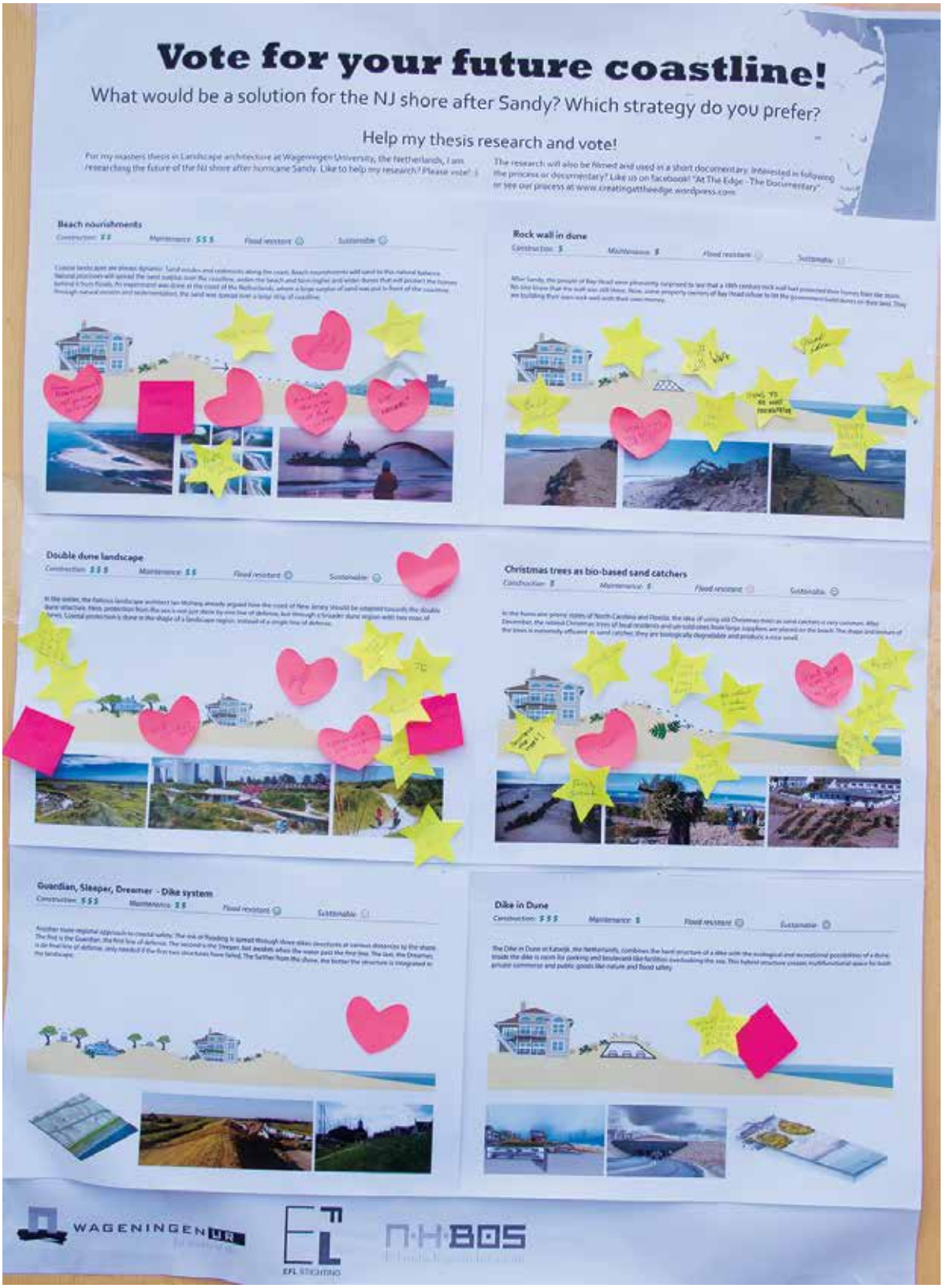
The trailer of the documentary can be found at

https://vimeo.com/151434131

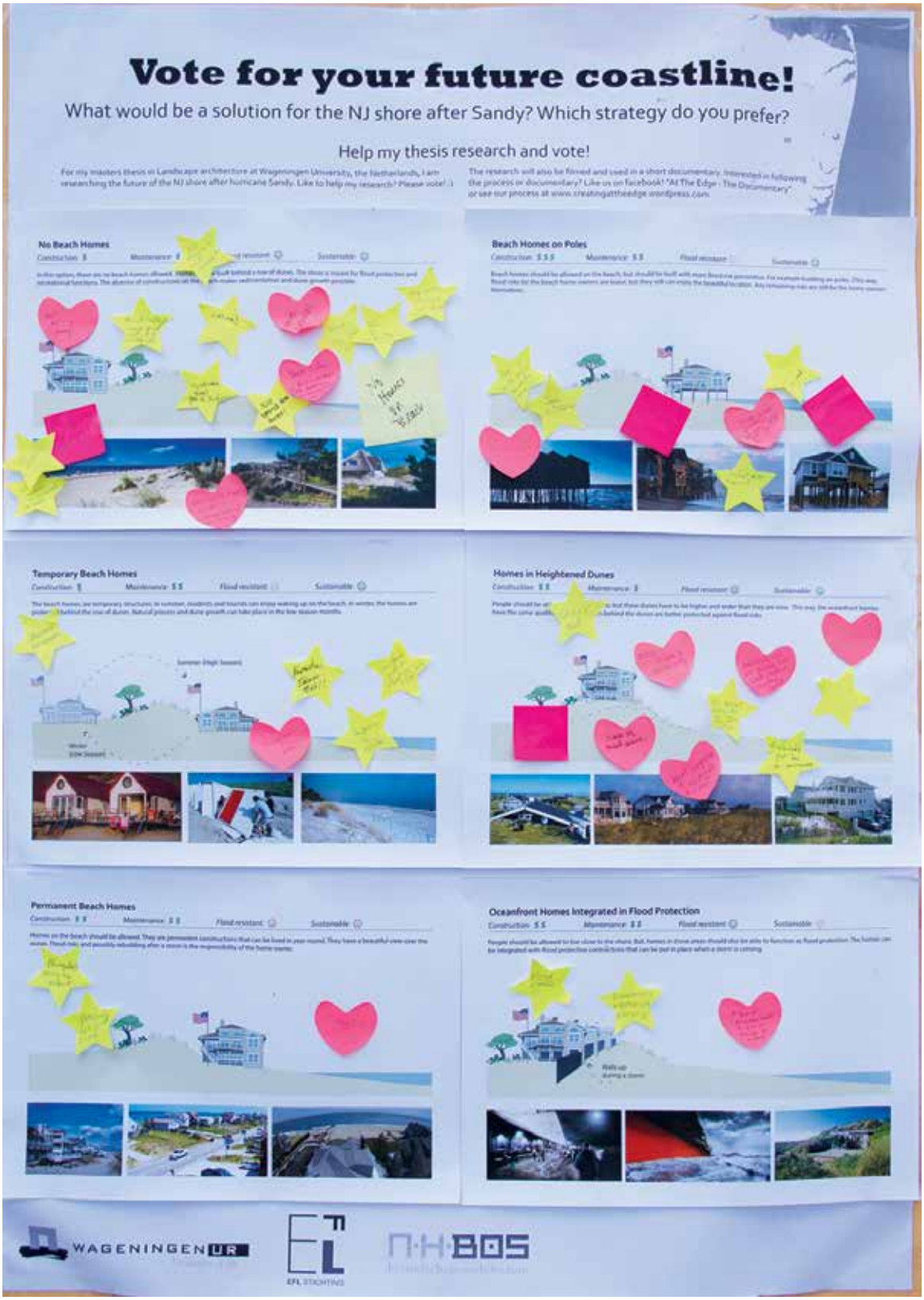
VIII Community Outreach Results

Poster 1, 23 juli 2015

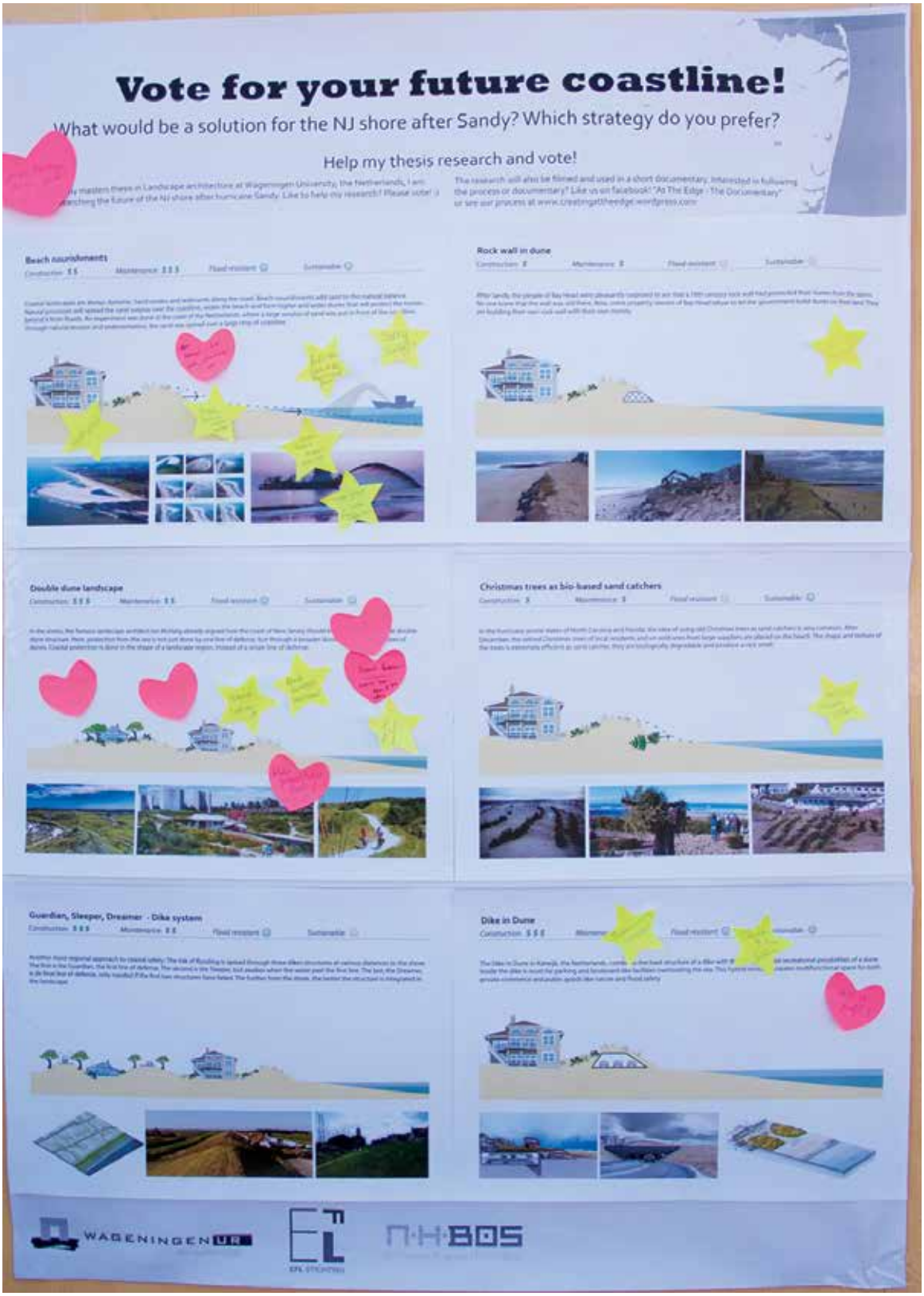
Poster 2, 23 juli 2015



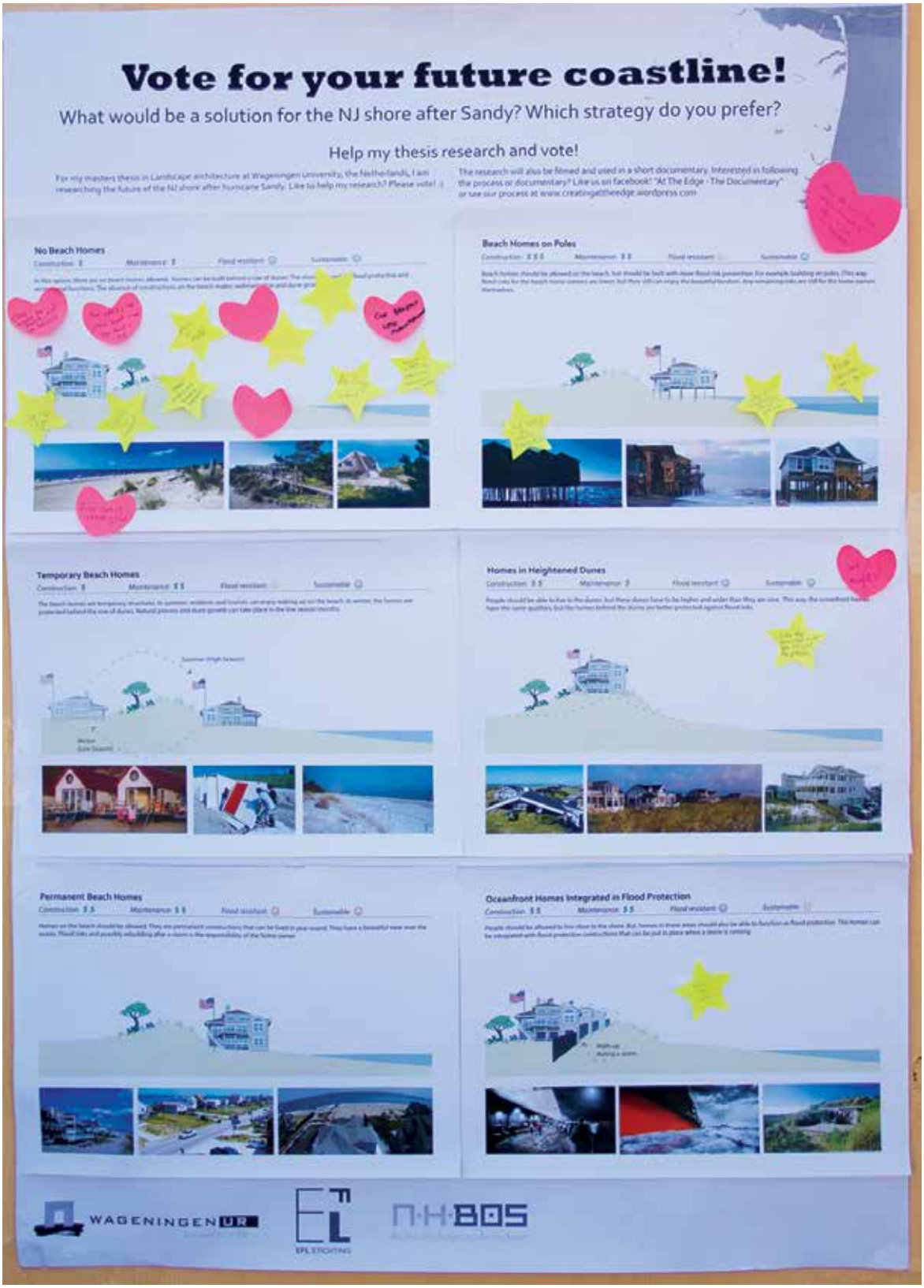
Poster 3, 23 juli 2015



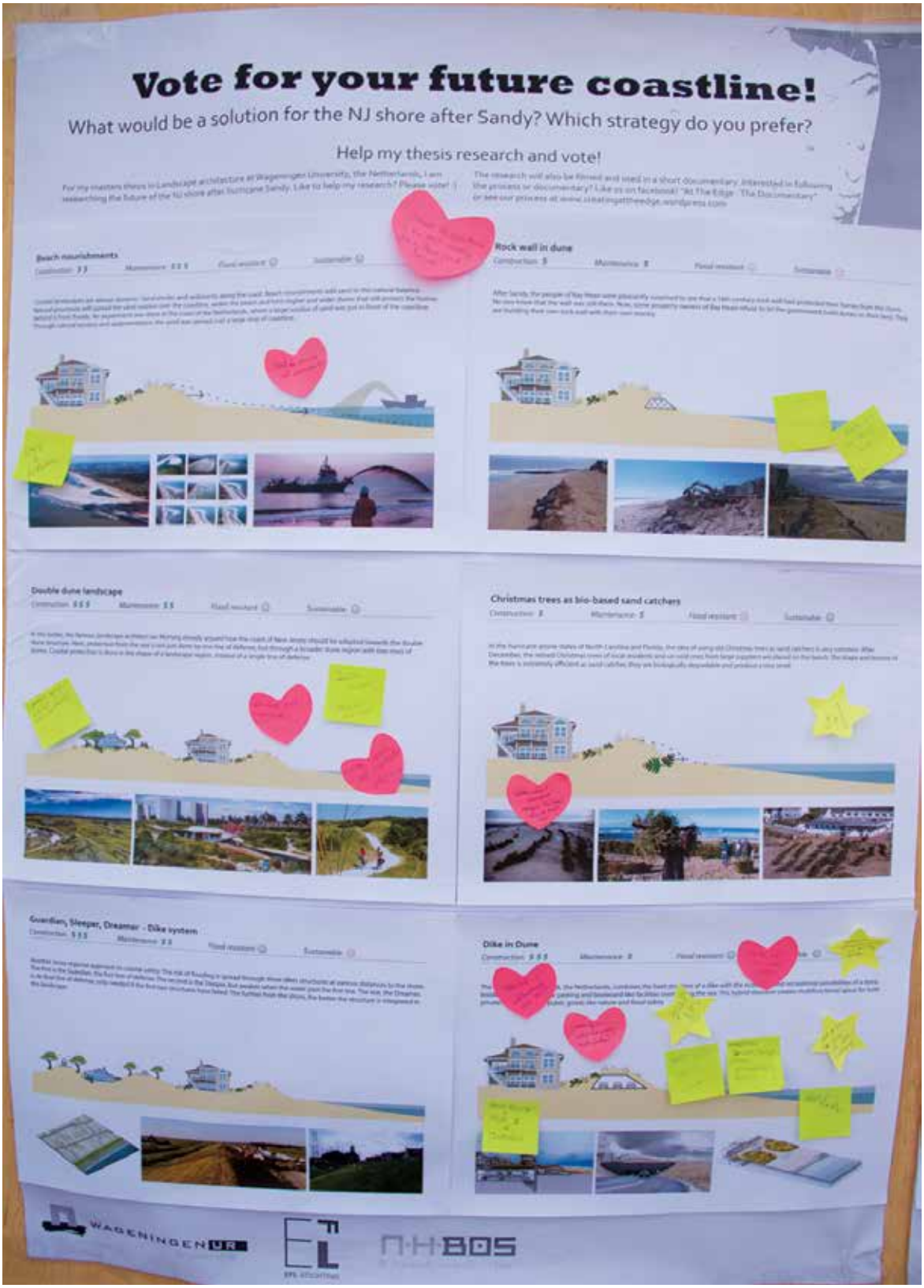
Poster 3, 24 juli 2015



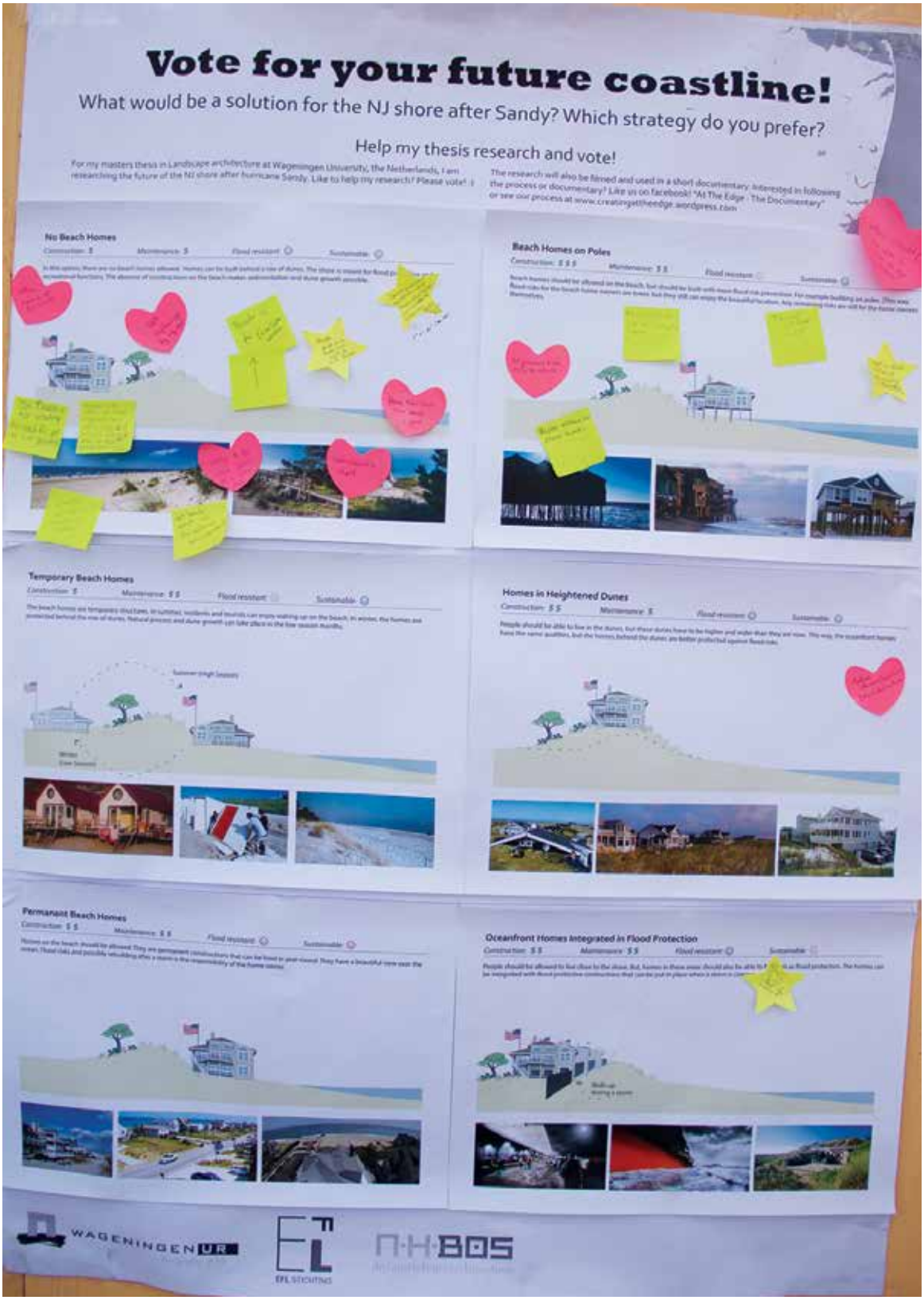
Poster 3, 24 juli 2015



Poster 2, 31 juli 2015



Poster 3, 31 juli 2015



Flood protection options

Group A (without video)

July 23

Beach Nourishment

1	"Appearance is better"	Local
2	"Keep the look"	Local
3	"Makes good sense"	Local
	Local votes: 3	
1	"Most "Natural"	Visitor
2	"Maintain the view of the ocean"	Visitor
3	"Maintain ocean view"	Visitor
4	"Looks coolest"	Visitor
5	"Contains natural elements, not parking or re-landscaping"	Visitor
6	No written comment	Visitor
	Visitor votes: 6	
	Total votes: 9	

Rock Wall

1	"To protect houses"	Local
2	"Strongest defense strategy"	Local
3	"Great idea"	Local
4	"Seems to be most preventative"	Local
5	"Hope will work"	Local
6	"Still have view"	Local
7	"Best solution"	Local
8	No written comment	Local
	Local votes: 8	
1	"Seems like the best idea and keeps the beach"	Visitor
	Visitor votes: 1	
	Total votes: 9	

Double Dune Landscape

1	"Extra parkland"	Local
2	"Have to have dunes, sensible	Local
3	"(D"	Local
4	"-)"	Local
5	"-)"	Local
6	No written comment	Local
7	No written comment	Local
	Local votes: 7	
1	"Best appearance when completed"	Visitor
2	"Best bet"	Visitor
3	Appearance and sustains wildlife	Visitor
4	"More protection"	Visitor
5	No written comment	Visitor
	Visitor votes: 6	
	Total votes: 13	

Christmas trees

1	"Fresh scent"	Local
2	"Good recycle as well"	Local
3	"Good use of x-mas trees"	Local
4	"People keeping clean"	Local
5	"All natural and makes sense"	Local
6	"Decorate the trees!"	Local
7	"Recycle!"	Local
8	"Back to nature"	Local
9	No written comment	Local
	Local votes: 9	
1	"Used trees put to 2nd use"	Visitor
2	"Cheap!"	Visitor
	Visitor votes: 2	
	Total votes: 11	

Dike System

1	No written comment	Visitor
	Visitor votes: 1	
	Total votes: 1	

Dike in Dune

1	"Protection and use by people"	Local
	Local votes: 1	
1	No written comment	Visitor
	Visitor votes: 1	
	Total votes: 2	

Group B (with video)

July 24 and 31

Beach Nourishment

1	"Natural"	Local
2	"More beach is better"	Local
3	"Effective"	Local
4	"More beach --> Beach activities"	Local
5	"More beach, is main attraction"	Local
6	"Sorry surfers :("	Local
7	"Like the look of the beach, sand protection"	Local
	Local votes: 7	
1	"More natural - less walls, diversions etc"	Visitor
2	"Good for economy and environments"	Visitor
	Visitor votes: 2	
	Total votes: 9	

Rock Wall

1	"Rock will reinforce dune"	Local
2	No written comment	Local
3	No written comment	Local
	Local votes: 3	
	Total votes: 3	

Double Dune Landscape

1	"Beautiful landscape"	Local
2	"Benefits development. Protects environment"	Local
3	"Natural looking"	Local
4	"I prefer more natural environments"	Local
5	"Area remains consistent"	Local
	Local votes: 5	
1	"Not fake and mand-made"	Visitor
2	"Help prevent future flooding"	Visitor
3	"More natural. Not man-made. Looks nice"	Visitor
4	"Best protection, back to beach for views"	Visitor
5	No written comment	Visitor
6	No written comment	Visitor
7	No written comment	Visitor
	Visitor votes: 7	
	Total votes: 12	

Christmas trees

1	"Hoping it actually works"	Local
2	"Serves the environment"	Local
	Local votes: 2	
1	"Sustainable + cheaper. Recycle the trees! + they do smell nice	Visitor
	Visitor votes: 1	
	Total votes: 3	

Dike System

Total votes: 0	

Dike in Dune

1	"Think of the future"	Local
2	"Interesting concept"	Local
3	"By far the best idea"	Local
4	"Get $ for & bring in jobs + economy	Local
5	"Works well in other countries"	Visitor
6	"Preserves environment while also serving a function"	Local
7	"Innovative. Considers multiple problems. Still aesthetically pleasing"	Local
8	"What she said" (links to previous)	Local
9	"Win/win"	Local
10	"More tourist = more $ + protection	Local
	Local votes: 10	
1	"Creative Design: ecological + economy (multifunction)	Visitor
2	"Cost vs. benefits +"	Visitor
3	"Effective & multifunctional. Good design"	Visitor
	Visitor votes: 3	
	Total votes: 13	

Group A (without video)

July 23

No Beach Homes

1	"Keep the look alive"	Local
2	"Stop wasting money just dunes"	Local
3	"No homes - not smart"	Local
4	"Sustainable, cheap, good for the future"	Local
5	"Keep the look alive"	Local
6	"Least costly, most flood resistant & sustainable"	Local
7	"Nature!"	Local
8	"Homes shouldn't be allowed on beach"	Local
9	"No homes"	Local
10	"No homes on beach"	Local
11	No written comment	Local
	Local votes: 11	
1	"Prevents flooding and unnecessary building"	Visitor
2	"This is right"	Visitor
3	"Beach is for public access (see california coastal case!)"	Visitor
4	"Best for money"	Visitor
5	"More natural"	Visitor
	Visitor votes: 5	
	Total votes: 16	

On Poles

1	"Papilo este es el methodo mejor"	Local
2	"Safe attraction"	Local
3	"Safest way to build"	Local
4	No written comment	Local
	Local votes: 4	
1	"Seems to be more practical"	Visitor
2	"Safe and pretty. People still get great beach view"	Visitor
3	No written comment	Visitor
4	No written comment	Visitor
	Visitor votes: 4	
	Total votes: 8	

Temporary

1	"Affordable for everyone"	Local
2	"Unique ide that is flexible"	Local
3	"Fantastic idea.. *heart* it"	Local
4	"Temporary is mobile"	Local
5	"Great idea, safe"	Local
	Local votes: 5	
	Total votes: 5	

Heightened Dunes

1	"Still allows people to live on shore with low risk	Local
2	"Sustainable not bad for environment"	Local
3	"Easy and good"	Local
4	No written comment"	Local
	Local votes: 4	
1	"Makes the most sense"	Visitor
2	"Maintains new but protects from [illegible]"	Visitor
3	"These won't get flooded"	Visitor
4	"Best compromise of sustainable + [illegible]"	Visitor
5	"Brings income to community"	Visitor
6	No written comment"	Visitor
	Visitor votes: 6	
	Total votes: 10	

Permanent

1	"Bungalows easy to repair"	Local
2	"Houses are just fine"	Local
	Local votes: 2	
1	*picture of heart and smiley*	Visitor
	Visitor votes: 1	
	Total votes: 3	

Integrated

1	"Economically & aesthetically pleasing"	Local
2	"Flood panels"	Local
	Local votes: 2	
1	"Flood protected + still have a view"	Visitor
	Visitor votes: 1	
	Total votes: 3	

Group B (with video)

July 24 and 31

No Beach Homes

1	"The Beach is for visiting. No need for ppl to live permanently"	Local
2	"The Beach is for public use, homes on beach limit public access and are built in a place that can never truly be protected from significant storms"	Local
3	"Beach is for everyone"	local
4	"Beach preservation should come first. Homes should be near beach not on beach. Beaches should be public only"	Local
5	"People that have these are selfish with beach"	Local
6	"Let beach exist in its natural environment"	Local
7	"removes you from community in to nature"	Local
8	No written comment	Local
9	"Landscape idea"	Local
10	"Take away our beach freedom"	Local
11	"Don't want to party on anyones yard"	Local
12	"Less is more"	Local
13	"There's no need"	Local
14	"Safe beach"	Local
15	No written comment	Local
16	No written comment	Local
	Local votes: 16	
1	"Home then dune then beach is good"	Visitor
2	"Going to the beach should be a little trip"	Visitor
3	"Not sustainable any way else"	Visitor
4	"Selfish, beach is not for living"	Visitor
5	"more public, less private beach area. Keeps boards +culture alive"	Visitor
6	"Easy access to beach, not on beach"	Visitor
7	"Keep costs of rebuilding down"	Visitor
8	"Costs benefits less maintenance"	Visitor
9	"Unsustainable. Stupid."	Visitor
10	No written comment	Visitor
11	No written comment	Visitor
	Visitor votes: 11	
	Total votes: 27	

On Poles

1	"Pilons are strong, lots held during the storm"	Local
2	"The water will flow under"	Local
3	"More effective over time"	Local
4	"Add a dune in front for double protection"	Local
5	"good way to start transition"	Local
6	"North Carolina does this"	Local
7	"Seems to make the most sense"	Local
	Local votes: 7	
1	Not permanent, it can easily be rebuilt	Visitor
	Visitor votes: 1	
	Total votes: 8	

Temporary

	Total votes: 0

Heightened Dunes

1	"Like the sand look of the height for protection"	Local
	Local votes: 1	
1	Costs *check sign*, Benefit *check sign*	Visitor
2	"Multi-use"allows homes/taxes/views/ecological/flood resistance"	Visitor
	Visitor votes: 2	
	Total votes: 3	

Permanent

	Total votes: 0

Integrated

1	"Homes should serve to protect"	Local
2	"Working with nature"	Local
	Local votes: 2	
	Total votes: 2	

IX Significance Calculation

Significance overall votes

The chance p that the measured results between group A and only arises from sampling-errors is, according to a basic statistical T-test

- poster-2 : p < 0.4%
- poster-3 : p < 0.7%

Significance more long-term votes

To know if group B votes significantly more on long-term options, a ranking eneds to be made. This ranking is don on the following criteria. The intervention strategy should:

- Be future-oriented. Not an intervention that is building back what was there before, but that is adaptable to uncertain climatic futures.
- Provide space for multiple possible functions. This makes the intervention beneficial for many groups and interests.
- Be an intervention that focusses on prevention of similar impacts like Sandy
- Add spatial quality to surrounding landscape

The criteria are evaluated per option. The evaluation ranges from •• (-2), • (-1) , • (0), • (+1) to •• (+2).

For poster 2:

	Adaptability / Future-oriented	Multi-functional	Prevention of storm impacts	Spatial quality	Score
A Rock wall inside dune	• A bit, partially adaptable, partially not	• Yes, adds ecological function on top	• Yes, prevents erosion of dunes	• A bit, natural look over hard structure	+2
B Bio-based Sand catchers	• A bit, adds to sedimentation process	• A bit, re-use of material, but no other function after	• A bit, effect is small	• Yes, can add form and smell	+1
C Double dune structure	• Yes, adaptive towards multiple futures	•• Yes, provides many possible functions	•• Yes, prevents flooding and strengthens coast	•• Yes, able to add new spatial quality	+7
D Beach nourishments	• Yes, very adaptive but also washes away again	• Yes, adds space for activities	• Yes, strengthens coast	• Yes, but not new qualities	+4
E Guardian Sleeper Dreamer	•• No climate adaptive qualities, hard structure	• A bit, can be combined with some functions	•• Yes, prevents flooding and back-up plan	• A bit, can add form and structure	0
F Dike in dune	• A bit, partially adaptable, partially not	•• Yes, provides many possible functions	• Yes, prevents flooding	•• Yes, able to add new spatial quality	+5

For poster 3:

	Adaptability / Future-oriented	Multi-functional	Prevention of storm impacts	Spatial quality	Score
A Permanent Beach homes	•• No, opposite of adaptive	•• No, inhibits other functions	• No, more structures in harm's way	• No, only for the homeowner	-6
B Integrated in flood protection	•• Yes, very adaptive to storm situations	• A bit, adds and inhibits other functions	• Yes, but also extra structures in harm's way	• No, only for the homeowner	+2
C No Beach homes	• Yes, adaptive to future with climate change	•• Yes, space for many other functions	• Yes, no structures in harm's way	• Yes, for the public	+5
D Temporary Beach Homes	•• Yes, very adaptive to storm situations	• Yes, with seasonal change	• Yes, no structures in harm's way	• A bit, varies per season	+4
E On Poles	• A bit, deals with higher water level but not adaptive structure	•• No, inhibits other functions	• A bit, only for the homeowner	• No, lessens spatial quality of the beach	-3
F On Heightened Dunes	• A bit, deals with higher water level but not adaptive structure	• A bit, adds and inhibits other functions	•• Yes, prevents flooding	• Yes, but mostly for the homeowner	+3

The order is from high to low: Double dune structure, Dike in Dune, Beach nourishments, Rock wall inside dune, Bio-based Sand catchers, and Guardian Sleeper Dreamer. The options of poster three are ranked, according to the same criteria, as follows from high to low: No beach homes, Temporary Beach homes, On heightened dunes, Integrated in flood protection, On poles, Permanent Beach homes.

Significance tested through the Mann-Whitney Permutation Test.
Group A vs. Group B
Hypothesis "Order A-votes < Order B-votes" : $p < 0.8\%$

Locals (A vs B)
Hypothesis "Divisions are different": $p < 0.4\%$
hypothesis "Order A-votes < Order B-votes" : $p < 1.9\%$

Visitors (A vs B)
Hypothesis " Divisions are different ": $p < 31\%$
hypothesis "Order A-votes < Order B-votes" : $p < 7\%$

Significance less dividedness of votes

Based on the Shannon-entropy, where H is the level of disorder and bits are the units.
Extreme order (when everyone votes for the same thing) : H=0 bits
Extreme disorder (every option the same amount of votes) : H=2.58 bits (according to the six options that were given)

For poster 2
Group A votes with 0.32 bits less entropy than random
Group B votes with 0.17 bits less entropy than group A

For poster 3
Group A votes with 0.26 bits less entropy than random
Group B votes with 0.99 bits less entropy than group A

ABSTRACT

While Ian McHarg already warned about coastal vulnerability of the New Jersey Shores in 1966, Superstorm Sandy reminded the world in 2012 once again about the persistent cycle of storms and rebuild along the Jersey Shore.

In this thesis, human-centered research focusses on why this repetitive cycle persists in New Jersey, USA. Through academic filmmaking, this norm is challenged by encouraging awareness and discussions about the future of this coastal landscape. Design aims to show an alternative that links a regional and long-term perspective with local and short-term benefits, for the case study of Asbury Park, NJ.

A landscape analysis shows the natural vulnerability of the shore landscape, pressured by extreme urbanization and political fragmentation. Plans to deal with the flood risks, often struggle at the link between regional goals and the individual culture of the US.

The documentary shows different perspectives on how to rebuild to encourage understanding of the complexity of the situation and to spark reflective discussions on current norms.

A discourse analysis of filmed interviews extracted common grounds from all the contrasting perspectives, that form a base for design choices.The reflective function of the documentary was tested though community outreach posters, were participants voted on their favourite rebuilding options after half of them saw a video clip about long- and short-term strategies. After seeing the video, participants voted more often for long-term options with large investments and also voted less divided.

The design for Asbury Park combines the double dune landscape of McHarg with local identity and preferences, whilst also linking to larger regional goals. This is done through constant changing of design and research scales. This way, the design connects local benefits to the larger goal of a paradigm shift towards a more sustainable way of coastal management.

Research, Film and Design on the Coastal Landscape of New Jersey after Superstorm Sandy
Master Thesis in Landscape architecture at Wageningen University
Marit Noest - February 2016

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