



DESIGNING WITH THE AESTHETICS OF WATER

A PHENOMENOLOGICAL
EXPLORATION OF
HERBERT DREISEITL'S WORK

TESSE BIJLSMA

DESIGNING WITH THE AESTHETICS OF WATER

A PHENOMENOLOGICAL
EXPLORATION OF
HERBERT DREISEITL'S WORK

June 2013

TESSE BIJLSMA
LANDSCAPE ARCHITECTURE
WAGENINGEN UNIVERSITY

Colophon

© Wageningen University, June 2013
Tesse Bijlsma
info@tessebijlsma.nl

All rights reserved. No part of this
publication may be used without
permission of the author or the
Wageningen University Landscape
Architecture Chairgroup

Chairgroup Landscape Architecture
Droevendaalsesteeg 3
6708 BP
Wageningen
The Netherlands

Examiners

Dr. Ir. I. Duchhart
Wageningen University

Ir. R. van Etteger MA
Wageningen University

Supervision

Ir. R. van Etteger MA
Wageningen University

Dr. Ir. M. van Buuren
Wageningen University

PREFACE

This minor thesis allowed me to investigate two subjects that have been fascinating me for years. On one hand landscape aesthetics, because wherever we are, whether unconsciously or well thought through, we evaluate landscapes. To explore this phenomenon has been a huge educational surplus for me as a landscape architect and as a person. On the other hand, the topic of water has fascinated me since childhood. Born near the Dutch 'Deltawerken,' with the sea just miles away, water is rooted in my life. Later on, I became fascinated by paintings on waterscapes, on the properties that water evokes on the surroundings. Contrary, I was displeased by water when a forceful shower wet my trip back home after college, while seeing the streets gullies failing to take up any more water. Moreover, this thesis allowed me to explore the work of an inspiring artist and his even inspiring work.

I want to thank Herbert Dreiseitl for taking a large amount of time for the interview, which helped to set track for the rest of this thesis. Moreover, I want to thank Ingrid Duchhart for pushing me over the edge to go to Germany. And thanks to Rudi van Etteger, Michael van Buuren for supervising me, critisizing the work and help me proceed in knowledge.

Finally, I want to thank Bart Cosijn, for his help on interview techniques, Christian Fritsche for his help on information of the Potsdamer Platz, Renée de Waal for her vision upon the research proposal, my parents for supporting me in multiple ways. And a thank you for my thesis colleagues, who joined for coffee, who reflected upon the work and created the pleasant atmosphere in the thesis room.

With this thesis, I want to develop the knowledge on the aesthetic experience of water systems for landscape architects for their future designs.

The manifestations of water play a role in the everyday lives of humans. Not only do we need water as a resource for consumptions, water is interwoven in the urban landscapes as well. Water and urban areas is not merely a functional relationship, the former addresses aesthetical experiences for the inhabitant of the urban areas as well. This thesis gives guidelines on designing with the aesthetics of water by exploring the ideas behind and the lived experience of the work of Herbert Dreiseitl.

Lived experience, phenomenology and aesthetics.

To understand lived experience, that result in aesthetic experiences, a literature study has been performed to elaborate on these topics. Experiences in landscape happen somewhere in the mind in the interaction of a person's senses and his surroundings. Lived experiences are the actual experiences someone has in a landscape through sensory experience by vision, hearing, smell-taste and touch. The study of these experiences is called phenomenology. The bodily senses combine the gained input to form an image of a particular environment. This picture forms the basis for aesthetic experience, which involves an evaluation of a certain place after knowledge is gathered through the senses.

Properties and behaviour of the water in urban areas.

A second literature study explores the properties and behaviour of water and how these elements take shape in urban landscapes. The physical and chemical properties of the water element, such as the high viscosity and high surface tension, result in the behaviour of water such as the appearance of the spherical shape of a droplet and the meandering of rivers. External effect such as wind or obstacles in the river flow create ripples, waves or eddies. In a natural way, water moves in a hydrological cycle from precipitation, through runoff or groundwater flows to surface water, from where it evaporates in to clouds, which then close the cycle to precipitation again. In the urban water cycle, fresh water is brought in the city and is disposed as dirt water out of the city. In between,

precipitation inserts this system, while reuse is scarce. Therefore the urban cycle is not closed. With climate predictions in mind – higher intensity of rainfalls on an impermeable urban surface – water in cities becomes more often problematic. Recent approaches for these problems are SUDS, the urban harvest approach, or water squares.

Herbert Dreiseitl's approach to water aesthetics.

An interview with Herbert Dreiseitl on water aesthetics gave the following position of the designer towards designing with water and aesthetics. Dreiseitl sees nature as big inspiration, by looking at what it is doing in its natural behaviour. Water itself is selfless, it cannot be grasped but can only be steered. Aesthetics is something that follows out of a meaningful thing if the context and function is right. Also important in aesthetics is purity and simplicity, and bringing this to a high performance.

Some examples given by Dreiseitl on his work with water aesthetics are an art installation in Gelsenkirchen, the Potsdamer Platz which marked the breakthrough of Dreiseitl, Bishan Park in Singapore and smaller projects such as the Water traces in Hannoversch Münden.

Phenomenological analysis and design principles.

The lived experience of some of the realized works has been explored critically through a phenomenological analysis. In these cases the difference between the intentions of the design and the realized outcomes are explored. All three case projects focus upon rainwater catchment in urban areas, showing the water during runoff processes. The three selected projects are the Potsdamer Platz in Berlin, 'Water traces' in Hann. Münden and the Vivaldi project in Amsterdam. The observations of these cases show pitfalls and advantages. Moreover, the observations are translated into five principles for future design.

Five principles for designing with water-aesthetics.

I. Combining natural behaviour and artificial systems. Dreiseitl's work shows the inevitable use of cisterns for a continuous flow, but by showing 'natural' variances of water in urban areas on top of the artificial flow of water, then this natural behaviour of the water can be experienced.

II. Investigate multi-seasonal properties of design elements. The work shows the differences in seasons, such as the reed of biotope which changes in size, colour, but the difference is experienced in the experience of wind and noise as well.

III. Investigate full aesthetic properties as an input for design. The designs of Dreiseitl show different aesthetic experiences that are gained from the properties of water. These insights of Dreiseitl have been obtained via experiments with water.

IV. Design holistically by combining an artistic and landscape approach. The aesthetic experience of the water can be emphasized by the design of the surrounding landscape. The experience of water is therefore not an end but a mean.

V. Design for action rather than passive experience. A water element in the urban areas seems more interesting if interaction is possible, rather than merely passive experience. Dreiseitl's work in Hann. Münden shows the distinctive design of the interactive elements, which guide for using them and exploring their features.

The lived experience of the designs gives insight in the design-experience relationship. The designs may not be the landscapes that after construction are experienced holistically, but they are designed to tell stories. By that, municipalities get convinced, since the designs create imagination which results in affinity with the design. This can inspire both students and professionals in landscape architecture.

1. Introduction	2	PART IV. CASE STUDY ANALYSIS	
Fascination for water		6. Potsdamer Platz, Berlin	35
Purpose statement		Approach	
Thesis context		Plan analysis	
Definition of concepts		Landscape analysis	
Guide for the reader		Phenomenological analysis	
PART I. RESEARCH FRAMEWORK		Evaluations	
2. Research set up	5	7. Water traces, Hann. Münden	49
Hypothesis		Approach	
Research strategy		Plan analysis	
Methods		Landscape analysis	
Evaluation		Phenomenological analysis	
PART II. THEORETICAL BACKGROUND		Evaluations	
3. Lived experience and aesthetics in landscape	11	8. Vivaldi, Amsterdam	61
Reality and landscape		Approach	
Lived experience and phenomenology		Plan analysis	
Aesthetic experience and landscape		Landscape analysis	
Conclusions		Phenomenological analysis	
4. Water and the urban environment	16	Evaluations	
Water properties and behaviour		PART V. EVALUATION & CONCLUSIONS	
The water cycles compared		9. Conclusions	69
Challenges and approaches for urban water systems		10. Discussion	74
Conclusions		11. Reflection	75
PART III. DREISEITL'S AESTHETICS OF WATER		References	76
5. Interview with Dreiseitl on the aesthetics of water	25	List of images	79
Inspiration and fascination		Appendices	80
Aesthetics: meaning and character			
From art to landscape architecture			
Future challenges			
Conclusions			

1. INTRODUCTION



Image 1.1. The sublime landscape, painted by Caspar David Friedrich in 1818



Image 1.2. The beautiful reflection in 'the water lily pond,' painted by Claude Monet in 1899

The manifestations of water play a role in the everyday lives of humans. Whether we use the tap water for drinking or have to cycle through the rain or have to endure droughts because of the absence of water, human lives are interwoven with the phenomenon of water. This relation is therefore interesting to investigate for a landscape architect. How does water actually work in landscape? And what can designers do with it?

This chapter starts by explaining why I chose this specific topic for conducting a research by showing my fascination for both water and aesthetic experience. This is followed by the purpose statement to show why one should study this phenomenon. Finally, the context in which this thesis takes place is outlined by showing the fundamental thoughts on which this thesis is based.

FASCINATION FOR WATER AND AESTHETIC EXPERIENCE.

By looking at paintings of waterscapes it is not hard for one to identify multiple features of water. The dramatic crests of a sea during storm or fog covering the land, as can be seen in the painting by Caspar David

Friedrich, result into some sublime landscapes. A different feature is the calm reflective and twinkling properties of the very same element such as the famous series of painting by Claude Monet. These painters understood the larger entity of water, not just technically or as resource but also its aesthetical features.

If one opens up an atlas of old cities, one sees the fabric of these cities is often interwoven with water. Usually, cities developed either along a small stream or large river and used this same water in varying ways. Trade, water intake and sewage disposal were all usages of the same water. It is therefore not possible to see the cityscape without water, but in some cases water is merely used for the sake of raising real estate prices (Bade 2012). This process of de-aesthetisation of water disturbs me while I am eager to find the full range of properties that water has to provide functional and aesthetical experiences. It is therefore my personal goal to understand how these qualities of water can be integrated in design work.

THE PURPOSE STATEMENT

The purpose of this study is to

explore designed water systems in the urban environment. The focus hereby lies upon the actual experience of the water system. This approach of a landscape puts emphasis on the realized outcomes of the design process. By that, guidance in designing with water can be provided for professionals in landscape architecture .

Multiple landscape architects and urban designers work with water and aesthetics in their daily life. Herbert Dreiseitl in particular, is a German designer who shifted from art into landscape architecture. Since he was trained in art instead of traditional landscape design schools, his approach towards lived experience may give new insights in the experience of urban water systems for landscape architects.

THESIS CONTEXT

The fundament of this thesis rests upon two main threads. First, aesthetic qualities of landscapes have been degenerated in the past centuries. Due to industrialization and urbanization landscapes have impoverished in variety, naturalness and vista quality and the consequences of this is the loss of

sense of mystery and monotonous simplified landscapes (Nohl 2001; Kaplan & Kaplan 1989). Small scale activities in landscapes have been replaced by large profitable units which do not necessary relate to the specific landscape. This economy of scale can be seen in urban landscapes where surfaces are flattened and sealed with an impermeable top layer, and where neighbourhood-size drainage system take the place of local hydrological systems. Because of that, aesthetic experiences in the urban environment are limited.

Second, the element of water made life possible on earth and via erosion it contributed to the shaping of the surface (Woodward 2000). Even today we are interwoven with the presence or absence of water. For one, the presence of water is a possible thread to his daily environment. For example, the Netherlands lies within a delta of several rivers and 60% of their inhabitants live underneath the sea level which may cause trouble when river dams are incapable of protecting. Moreover, assumed increase in future extreme precipitation and the rapid urbanisation, the adaptability of the water in urbanized areas has become harder and harder. Several theses have approached this issue in a functional or technical way (van Dijk & Veul 2010; Jieyan 2011), other theses have aimed to link this to aesthetics (van Lierop & Mathijssen 2010).

For others, the absence of water is problematic. In deserts one would love to have some extra rain or river discharge in order to drink or irrigate one's crops. So because of geographic properties and meteorological factors, and consumption as well, mankind is dealing with water presence or scarcity on a daily basis.

DEFINITIONS OF CONCEPTS

The following concepts are fundamentally important for the understanding of the content of this thesis. Moreover, these concepts can have different connotations in different languages or cultures which is why they are explained in the light of this thesis.

Landscape:

In this thesis, landscape is defined as both the physical structure of the earth's surface and the inclusion of people who inhabit it. This includes the way people have modified it and the ways they see or frame the landscape (Spirn 1998, Merriam Webster 2012). Within landscape, the focus lies on urban landscapes; the experiencing of public spaces.

Aesthetics

Originally aesthetics refers to gathering knowledge via the senses of the mind (Porteous 1996). In this way, humans make sense of their environment and value their experiences in ways of beauty or ugliness (Brook 2013). So the aesthetic experience in short is that environmental information is obtained by the senses, processed by the mind from which a judgement is made about whether or not we like a landscape. (See chapter 3)

Phenomenology

In the phenomenological branch of philosophy, 'phenomena' are studied via lived experiences of humans (Wylie 2013). Phenomenology in landscape puts focus upon embodied experiences of said landscape.

Water

The focus in this thesis lies upon experiencing water in the urban environment. Water has different connotations. One can look at its

physical and chemical properties, at its flow and movement and shaping of the landscape and as a means of resource (consumption) and waste (disposal). Moreover, the attributes determine the shape in which water is present and experienced, such as fog, liquid or solid. This concept is deepened out in chapter 4.

Aesthetics of water and phenomenology

This thesis is thus about the perception of water by the senses and the experience that follows. Phenomenology is the means of getting to that aesthetic experience.

GUIDE FOR THE READER

The structure of this report is as follows. Chapter 2 contains the set up of this research including the hypothesis, research questions, strategy and methods.

In Chapter 3, the theory on aesthetics and phenomenology in landscape is explained. This is followed by Chapter 4 on the theoretical background on (the experience of) water in the urban environments.

Chapter 5 is a summary of the interview with Dreiseitl on designing with water aesthetics.

Chapters 6-8 contain the approaches, designs, landscape analyses and phenomenological analyses of the Potsdamer Platz in Berlin, water traces in Hannoversch Münden and Vivaldi in Amsterdam.

Chapter 9 includes the reflection on the validity of the methods and results of this thesis.

Chapter 10 provides the conclusions from this research, followed by the reflections in chapter 11.

Part 1.

RESEARCH FRAMEWORK





This chapter outlines the research that has been undertaken. It starts stating the central research question that guides this research and the sub questions that are being answered in the report. Moreover, the chosen research strategy is explained together with the necessary methods and the way of getting towards conclusions about this topic.

CENTRAL RESEARCH QUESTION

What design principles on the aesthetics of water can be derived from the work of Herbert Dreiseitl, through an exploration of the ideas behind the design and the lived experiences of the realized works.

SUB RESEARCH QUESTIONS

Sub questions:

On the topic of landscape experience, it is questioned what lived experience is in landscape and how it works. Moreover, the role of aesthetics in landscapes is questioned as well.

On the topic of water, it is questioned what the properties and behaviour of water are. Next, the differences between the natural and urban water cycles are questioned. Finally, the future challenges and approaches are investigated in this chapter.

The approach of Dreiseitl is investigated by questioning what the position of Herbert Dreiseitl is on water aesthetics.

Finally it is questioned what the lived experience of the cases are by investigating the realized outcomes via a phenomenological analysis.

RESEARCH STRATEGY

The phenomenon of water aesthetics is addressed through a qualitative research. Seen in both a pragmatic and social constructivist worldview, a 'research on design' is performed. See image 2.1 for the flowchart of the research.

The research on design consists of a combination of desk research and field research. In the desk research, first a literature review is performed, but to do so, a small research on literature reviews is done.

In order to conduct the interview, a research on interviews is done as well. For the case studies, a desk research on landscape analysis is done as well.

For the field research, an interview with Herbert Dreiseitl is planned on the 5th of December 2012. This interview addresses the inspiration, the vision towards aesthetics and the input for the cases to research. The interview is followed by a plan analysis of realized works of Dreiseitl (both in a desk analysis and phenomenological analysis).

These elements are combined and

reflected upon by evaluating the field research results with the found body of literature on the topic. Conclusions that can be drawn, based on the case of Dreiseitl may help as a guide for future research.

METHODS

Literature review

A literature study is performed on the concepts of- and the interrelation between water and aesthetics. For this literature review, a systematic approach by Gatrell et al. (2005) is used. This approach consists of several steps of dealing with the amount of literature. The first step is to identify the general body of literature on a subject by addressing colleagues, peers and advisors.

Since the topic of aesthetics is broad, several sub topics are explored in advance. In environmental psychology, the views of Jacobs (2006), Bell et al. (1994), Malnar and Vodvarka (2004), Porteous (1996), Thompson (2013) and for the overview Carlson (2009) are used. For the sub topic of phenomenology, the main writings are Wylie (2013) and Merleau-Ponty (1962) and for sensory experience, the writings of Bell (1999), Porteous (1996) and

Scope

Strategy

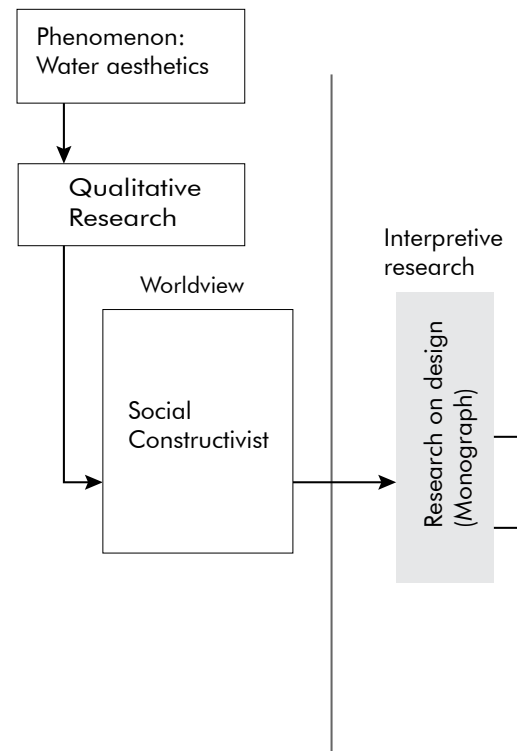
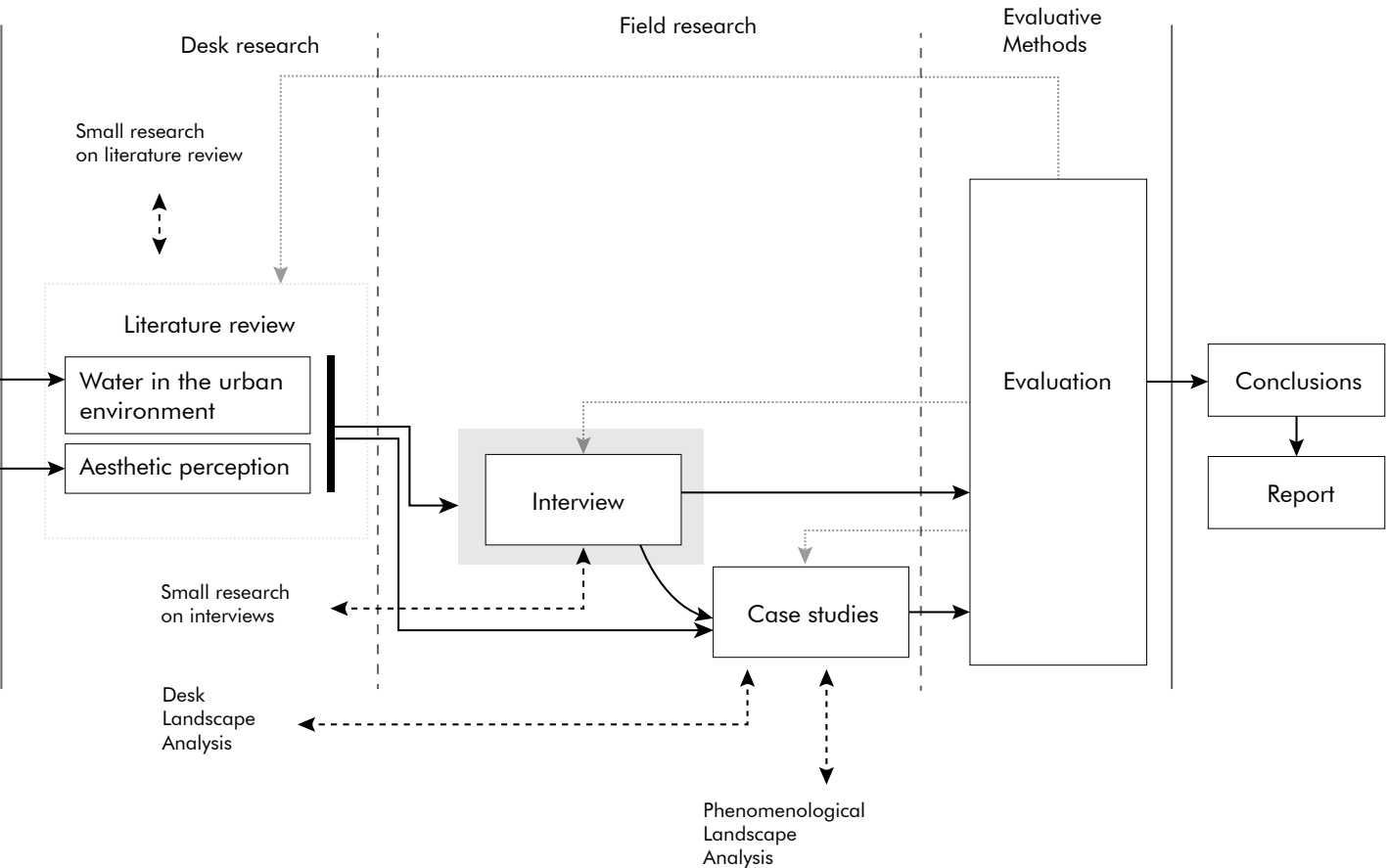


Image 2.1. The schematic overview of the research.

Carmona (2003) are used. Then, for the sub topic of aesthetic experience, Porteous (1996), Brook (2013), Bourassa (1991) and Saito (2007) are used as main literature.

For the theoretical part of water, the main body consists of writings from Pötz & Bleuzé (2010), Schwenk (1990), Motloch (2001), Hall (1984), Meyer et al. (2006) combined with readers and lectures from the Wageningen University (van Dam et al. 2012; Kuwaja Roeleveld 2013). Student theses of the past years will help in identifying the common knowledge.



The literature list was not the original starting list, but has evolved through snowballing within the body of literature until the amount and quality of the found knowledge was satisfying.

In the second step, this literature is put in a conceptual and methodological review so an appropriate body of knowledge is formed. The conceptual review puts emphasis on the focus of the research within the researcher's world view.

The third step is the write down of the literature review. In this step the

found literature is summarized and categorized. The strategy in this phase is to divide the literature in content themes, which follow from the literature itself. For each theme, the literature will be reviewed and synthesized and summarized into key arguments, while providing a link to the next theme, so that the review has a logical structure (Carnwell & Daly 2007).

The fourth step is the narrowing of the scope. This means that the last paragraphs of the literature review will form the bridge towards the project's research.

Interview

"Interviews are a fundamental research method for direct contact with participants, to collect first hand personal accounts of experience, opinions attitudes and perceptions" (Martin & Hanington 2012). An in-depth interview is a qualitative research technique that involves conducting intensive individual interviews to explore their perspectives on a particular idea, program or situation (Boyce & Neale 2006 p.3). Moreover, in-depth interviews are useful when you want detailed information about a person's thought and behaviours

or want to explore new issues in depth. Interviews are often used to provide context to other data (such as outcome data), offering a more complex picture of what happened and why.” In-depth interviews give more detailed information than what is available through other data collection methods, but they may contain some bias, consume a lot of time and cannot be generalized because of the small sample size (Boyce & Neal 2006).

The structure of the interview is as follows. In the introduction, the purpose, confidentiality, duration and method is communicated. In the main part, the questions are asked (open-ended rather than close ended, factual before opinion, use of probes such as asking for examples, elaboration, further explanation, anything else, move from general to specific, positive before negative, unaided before aided). After these questions, the closing key components with additional comments and next steps are communicated (Boyce & Neal 2006).

An interview with Herbert Dreiseitl (Artist, designer and landscape architect) took place at the end of 2012. This interview is the key in combining literature findings with observations. Moreover, the expertise of Herbert Dreiseitl is fundamental in order to raise further questions. The goal of the interview is to gain insight in the thinking of Dreiseitl on water and aesthetics and how this works in the design processes. Moreover, the view of Dreiseitl on water and aesthetics in practices is asked, by elaborating on his preferred works in practice. This will lead to the cases to be observed.

Case study analysis

From the interview, several cases will come out as potential to be studied more in depth. One of the benefits of a case study is that a practitioner or researcher can evaluate whether or not a project has failed or succeeded (Francis 1999).

Landscapes consist of both the physical structures and the inclusion of the inhabitants, so in order to understand the landscape, both the physical and the experiential landscape need to be investigated. De Hoog, Sijmons and Verschuuren developed a model for landscape planning in the Netherlands, named the ‘Layer approach’ in which the substratum (abiotic), the networks and the occupation layers were distinguished (De Hoog et al. 1998). The vertical relationships between these layers that have different timeframes, result in the physical landscape including the activities on the surface (van Schaick & Klaasen 2011). However, this model only accounts for the physical changes in the landscape, and does not consider the mindscape from the model of Jacobs (2006). Kersten and Noordhuizen (2011 p.45) proposed an additional experiential layer to the traditional ‘triplex model.’ The same can be applied to the new layer approach. Therefore, a phenomenological landscape analysis is performed along the physical landscape analysis (see image 2.2).

Physical landscape analysis.

The physical landscape analysis is thus derived from the ‘layer approach’ of De Hoog et al. (1998). First, the abiotic layer is described by its bedrock, relief, soil type and water network. In the model, the second layer is about the infratructural networks, in which traffic systems are

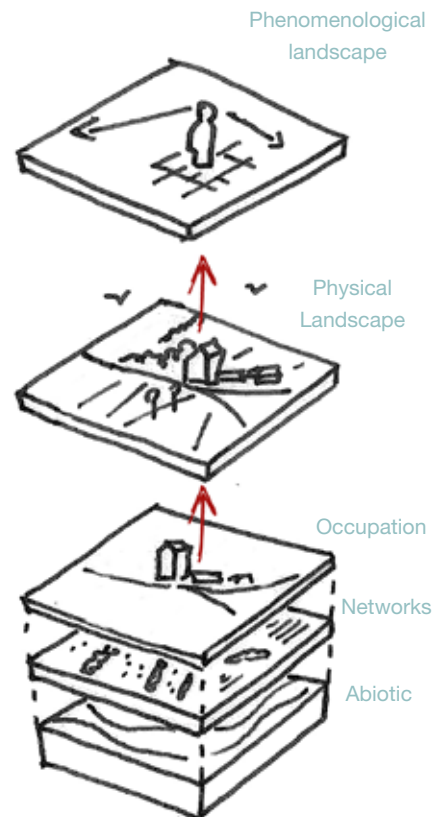


Image 2.2. The expanded model of De Hoog et al. (1998) with the abiotic, network and anthropogenic layer forming the physical landscape, being the basis for the experiential or phenomenological landscape (Kersten & Noordhuizen 2011 p.45).

explained spatially. The third layer, the occupation or anthropogenic layer is described in detail, which consists of the patterns of human settlement, such as buildings and public spaces.

Phenomenological landscape analysis

“As landscape architects, we produce landscapes so that people can enjoy them. They enjoy this in the way of walking, looking at flowers, sitting in the sunshine, so they experience phenomena in the landscape” (van Etteger, forthcoming). Moreover, “phenomenology is concerned with attaining an understanding and proper description of the experiential structure of our mental/embodyed



Image 2.3. Phenomenological research in action. (Source A.C. Bijlsma)

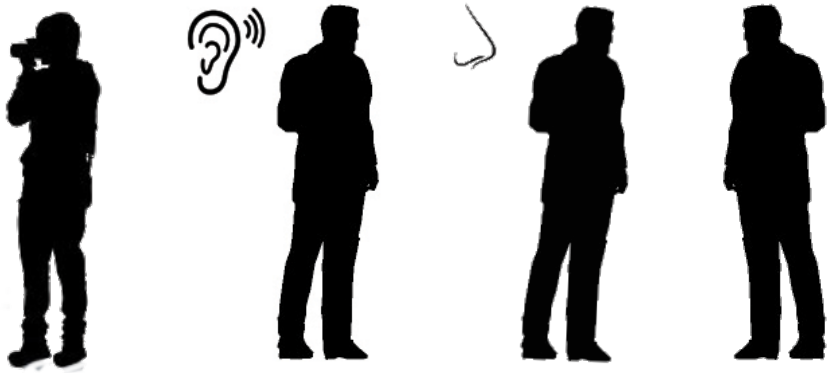


Image 2.4. The different senses in interpreting the environment; vision, audial, smell / taste and touch.

life, not an explanation” (Gallagher and Zahavi, 2008). “Phenomenology is not a subjective account of experience, it is an account of subjective experience” (Gallagher and Zahavi 2008).

The phenomenological analysis is based on the method of van Etteger (2013) and is done via a first-person analysis (see image 2.3), consisting of three levels. The first step is a walk of a pre-determined route through the landscape in case while an unbiased mind is maintained. Afterwards, the experience of this route is described in words, without explaining what one sees. By recollecting information from the memory, the unconscious part of the brain is used. The second step is a detailed ‘stop and analysis walk.’ Every 50m, at pre-determined points, the observer stops and explains what is coming in through the senses. This is reflection, but without prejudice. The result of these steps are photographs of the scene, sound recordings, smell and taste descriptions and descriptions of haptic feelings, which later on are transformed into readable schemes. The third and final step is describing why things are as they are. This is a return to the observation, which describes where the noises, smells

etc., found earlier are coming from. This explains why you see what you see and why a walk is easy or hard. (Based on Gallagher and Zahavi 2008; Malnar and Vodvarka 2004; and van Etteger, forthcoming).

The multisensory observations are done by taking pictures, making videos and sound recordings as well as sensory drawings (see image 2.4).

For this research, the following measurement standards have been used. For the visual sense, a 360° panorama is taken at 1.8m height with a Nikon D40 photocamera, which is afterwards translated into a drawing. Moreover, the visual input is written down during a one minute observation.

For the hearing sense, a 1 minute sound recording is made via the smartvoice recorder application on a mobile phone. This recording is then translated into a sound schedule showing the different sounds and their volume in decibels. Also, the observed sounds are written down.

For the haptic sense, a description of the temperature, wind as well as the roughness of the surface texture is written down.

For the smell / tasting sense, a description is made of smells at the point of observation.

EVALUATION

The gathered data are summarized and findings are related to the interview with Dreiseitl and his approaches as described in the book to see the relation between the design and the realized outcomes. Moreover, the findings in the field are backed up by findings from the literature.

Part II.

THEORETICAL BACKGROUND



3. LIVED EXPERIENCES AND AESTHETICS IN LANDSCAPE



The way we experience landscapes is a complex process. Since landscapes include people and different people can experience the same object differently, studying all experiences is a lot of work. However, it is possible to describe the way some people experience landscape and it is possible to show commonalities across experiences.

Starting at the concept of aesthetics in landscape directly would be insufficient in order to completely understand the process of experiencing landscape. Therefore, an attempt is made in this chapter to clarify these concepts by starting with an exploration of the largest context in experiences: reality. Second, the position and the manifestation of lived experience (or phenomenology) following from reality is explained. In this part, the working of sensory experience is emphasized. From this, it is possible to address the concept of aesthetics which is explained through a brief overview of the definition and the manifestation in landscapes.

REALITY AND LANDSCAPE

As landscape architects, we produce landscapes. Those landscapes are

designed and used by people. But the very same landscape can be experienced differently by different people. This reality is not something static and therefore the experienced reality is not the same for everyone. As argued by Jacobs (2006) reality can be divided in three modes: physical reality, social reality and inner reality. If these modes are then related to landscapes, the following can be explained. The landscape in physical reality is about matter, about things that are objective and exists. For instance, trees and hills exist, not depending on whether they are noted or are appreciated, they are simply there. It is a 'material reality described as a system of facts in which laws of nature apply. The landscape in social reality is about power, culture and laws and is about 'rules that regulate the behaviour of those who belong to the group for which the rules apply. An example of such a reality is the division between public and private. Third is the landscape of inner reality, the mindscape. 'Inner reality is constituted by consciousness or states of mind.' This reality is subjective since it exists in the person only (Jacobs 2006 pp.8-9).

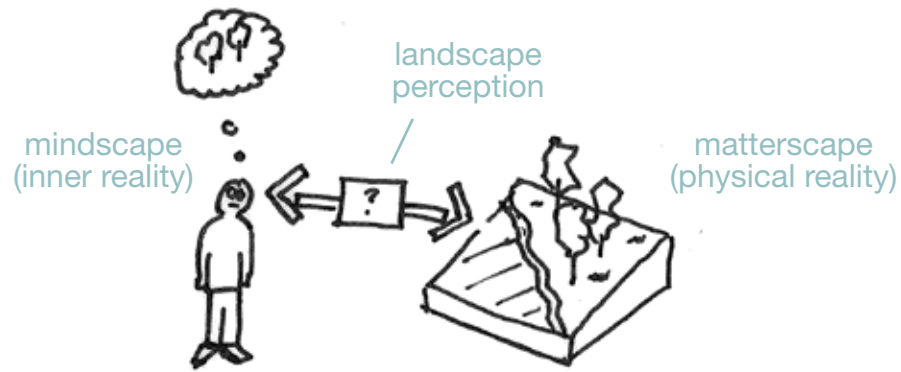


Image 3.1. A model of reality (based on Jacobs 2006).

The focus of these realities for landscape architects lies in the combination of the physical landscape and the mindscape. A landscape architect alters the physical landscape by which the mindscape of the beholder changes. Contrary to (Dutch) landscape planners who alter laws and regulations in order to steer behaviour and change the frame of experiences (Jacobs 2006). The division of actual input of the physical landscape and the processing in the mindscape is well known in the world of environmental psychology. Several psychologists notice the distinction between processes that gather and interpret environmental stimulation (Bell et al. 1996; Bell 1999; Carmona 2003; Malnar and Vodvarka 2004).

This gives us a model of reality (Jacobs 2006), in which the physical landscape (the matter) interacts with the beholder (mindscape) in a mutual relationship (Kaymaz 2012). It is the landscape that provides clues for the beholder to be experienced, but the mental concepts of the beholder are imposed upon the landscape, which is why there is a mutual relationship. The same physical landscape may therefore be experienced differently by other people (see image 3.1).

“Landscape is composed of not only of what lies before our eyes but what lies within our heads” - D.W. Meinig (1979)

LIVED EXPERIENCE, PHENOMENOLOGY & LANDSCAPE

In order to study the experience of landscape, we address the concept of lived experience, or phenomenology as it is called in philosophy. Phenomenology, as defined by Wylie (2013), is “a branch of philosophy that tries to explain or express the meaning nature of things in the world – phenomena – through a focus upon human lived experience” (p.54) while “leaving the wider context of politics and economics of landscape in the background” (Wylie 2013 p.59). The underlying thought is that in order to experience the world, one has to be part of it, an embodiment of the landscape

(Merleau-Ponty 1962). The difference of phenomenology with the model of Jacobs is that phenomenology emphasises on the person to be part of the landscape rather than being an outsider who interacts with the landscape (van Etteger, forthcoming; see image 3.2). Thus, “Landscapes can be understood as phenomenological ideas of bodily practices, dwelling and inhabitation” (Wylie 2013). This means that we experience landscapes as a body with all the senses interacting with our surroundings rather than a set of scientific instruments (van Etteger, forthcoming). So to understand the experience, it is necessary to understand the way the environmental interacts with humans through the bodily senses.

Sensory experience

As argued before, the information of the world around us is collected by our senses of sight, hearing, touching, tasting and smelling (Malnar and Vodvarka 2004 p.41; Swanswick 2002). How these senses work is briefly explained here.

Vision (visual system)

Most of our environment is perceived by our eyes. More than eighty percent of our sensory input is visual (Rock

Full embodied experiences

Observer as part of landscape



Landscape

Image 3.2. The embodied phenomenological experience

and Harris 1967; Porteous 1996 p.31; Kaymaz 2012) and this makes vision the dominant sense (Moore 2003 p.28; Kaplan & Kaplan 1972). Moreover, the medium of sight is the main way of our thinking system, we picture something in our head as if we would see it (Bell 1999 p.40). Visual images are gained through photoreceptors within the eyes adjusted by the pupils for fixation and convergence (Gibson 1966). The eye can see differences in distance, light intensity and colours (Porteous 1996 p.32) but in order to see, we need light and with this light we can detect these differences and picture the spatial dimensions (Bell 1999 p.40). Light is electromagnetic radiation and from these rays, the visible spectrum is divided in the colour of the rainbow, with each colour having its own wavelength. When light moves through an instance, like water, it is altered. If a lot of this light is scattered, the blue end of the spectrum is addressed, which is why seas and skies are blue (Bell 1999 p.40-42).

For example, in ponds we can see a reflection of the surroundings. Trees, buildings and people are reflected, though a bit blurry, in still water. If wind or a flow modifies the movement in the water, the reflection is harder to

see but instead it is possible to see ripples and small waves in the pond.

Hearing (auditory system)

Another way we perceive the environment is by our ears. Our hearing system works through sound waves reaching the mechano receptors in our ears (Gibson 1966), which we interpret as noise or in patterns and sense order, rhythm (Bell 1999 p.40). We hear ambient sounds of singing birds, of running water eventually crushing on a cascade or the sound and noise of traffic. "Sound perception is information poor, but emotionally rich. But, we can hear further than we can see" (Porteous 1996 p.35).

For example, we hear water if it hits something. A drop of water falling onto a water surface is a short but loud noise. Try to imagine that sound and, because of mental concepts, it is possible to reproduce a falling drop and the sound it makes. Another example is when a wave hits the edge of a pool one can hear a splashing sound. Or on a larger scale when a wave is rolling over the beach it makes a gurgling sound.

Touch (haptic system)

Our sense of touch or tactility is a

haptic sense with the skin being the largest sensory organ and is extremely sensitive (Porteous 1996 p.37). Active touch is the use of mechanical energy so we can distinguish shape, texture and pressure (Bell 1999 p.40), which is sensed by mechano receptors and thermo receptors (Gibson 1966). Although it is often assumed that the 'touching' of landscape is done by the hands, much of our experience of texture comes through our shoes from our feet and through our bottoms when we sit down (Porteus 1996 in Carmona 2003 p.87). In this way we can feel direction, elevation and the degree of resistance felt underfoot, which can be categorized as 'kinaesthetics' (Bell 1999 p.40). Passive touch is sensed by the sensory cells in our skin, by which means we can feel temperature, humidity and pain (Bell 1999 p.40).

A good example of touching water is the rain on our skin during a shower. When a shower starts, we often feel the first drops on our body even before seeing the surroundings becoming wet. Another example is the water we take from a fountain in a city on a summer's day to gain some refreshment. By doing so, one tries to cool the temperature of the skin.

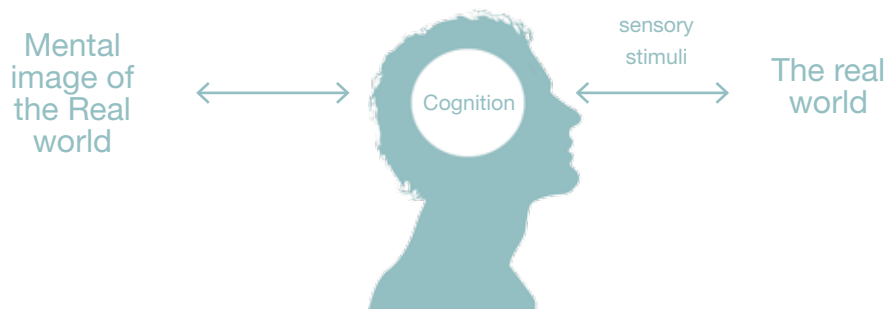


Image 3.3. The process of aesthetics (Based on Malnar and Vodvarka 2004).

Smell & Taste (Smell-taste system)

Our sense of smell is not well developed, however it is of great importance for warning us of poisonous food, for example (Porteous 1996 p.36). Via our nose we can detect small amounts of chemicals in the air which can travel long distances (Bell 1999 p.40). To do so, we use chemo and mechano receptors which tell us the composition of the smell or nutritive values in taste (Gibson 1966). “Odours arouse feelings of pleasure, well-being, nostalgia, affection and revulsion” (Porteous 1996 p.36). Smell is information poor and emotionally rich as well (Carmona 2003 p.87). Taste is our sensory experience via the mouth, usually related with food. We can taste sweet, sour, salt and bitter (Bell 1999 p.40). Taste and smell usually work ‘in concert’ and are different ways of experiencing the same phenomena (Gibson 1968 in Malnar and Vodvarka 2004 p.42) but when they are combined we obtain ‘flavour’ (Bell 1999 p.40).

Water itself contains no chemicals that we can smell, but it is an agent of chemicals such as the smell of a sewer or the smell in flowers. The same goes for taste, because when we drink a glass of water it is hard to distinguish different tastes but it is

possible to imagine the texture and concept we have with drinking water.

AESTHETIC EXPERIENCE AND LANDSCAPE

Aesthetics are often related to arts, but aesthetics manifest in landscapes as well. Some even claim that “Landscapes are aesthetic objects” (Kaymaz 2012 p.254). To show this relationship, first a brief outline of the definition is given, which shows the dispute of the concept as well. Second, the aesthetic judgement is explained since we prefer some landscapes over others.

The origins of the word aesthetics point towards gathering knowledge via the senses (Porteous 1996 p.19). The meaning of the word aesthetics is derived from the Greek word for sensory perception, *aisthetikos* (Stanford Encyclopedia of Philosophy 2013; Harper 2012). So, originally it was a form of cognition via the senses of smell, taste, touch, seeing and hearing (Buck-Morss 1992 p.6; Oxford English dictionary 2012).

Disregarding the original meaning of the word, the American Heritage dictionary defines the aesthetic as “pertaining to the sense of the beautiful

(American Heritage dictionary in Isaacs 2000 p.146). This is expanded by Brook (2010) who addresses aesthetics as the “exploration and examination of experiences of feelings such as beauty or ugliness and the value we ascribe to them.” Therefore, experiences have also to do with aesthetic judgements such as beauty, landscape appreciation or dislike.

So the aesthetic experience in short is that environmental information is obtained by the senses, processed by the mind from which a judgement is made about whether or not we like a landscape (see image 3.3). So in lived experience, a person stands next to a tree, which gives information to the eyes on the shape and the colour of the tree while the ears catch the rustle of the leaves, this can be processed to a judgement of that person appreciating the tree. That same tree can be disliked when its cones fall off in spring and hit the person on the head, reaching his sense of touch. So in this example it is shown that lived experience can provoke different

aesthetic judgements on the same object.

CONCLUSIONS

In this chapter, the concept of aesthetics has been addressed via a small detour. A model of landscape experience has been presented, which shows the iterative process between the physical reality of the landscape surface and the inner reality of the beholder. This lived experience manifests via the bodily senses that pick up information from the environment. The way the different senses obtain their information is shown and the lived experience combines all this bodily engagement as a whole rather than separate instruments. This information forms the basis for the aesthetic experience, which involves the judgement whether or not a landscape is regarded as beautiful.

4. WATER AND THE URBAN ENVIRONMENT

In order to see the water - aesthetical relationship, the concept of water is deepened out. Water is not just a chemical ensemble, although this molecular scale gives clues on its behaviour, water has implications in philosophy, engineering, arts (Metz & van den Heuvel 2012). It moves in flows and in cycles and is the basic element for life to happen. People adapted towards the way the water behaved by their settlement patterns, and as a basic need for life, water still is an important aspect of our lives.

In this chapter, within the context of water aesthetics, the questions of what water is, what the role of water in urban environments is and what the challenges for water in the urban environment are, are explored. To answer these questions, the small scale is addressed at first, by exploring its chemical properties, its shape and the behaviour of this in landscapes. This brings us to the broader natural water cycle, which is then narrowed down to the urban water cycle including the effect on the sensory system in order to answer the second question of the role of water in urban environments. This leads to the final topic of what challenges and approaches are already present.

WATER PROPERTIES AND BEHAVIOUR

Physical and chemical properties

Water consists of two hydrogen atoms that share their electrons with an oxygen atom. The changing configuration of the internal position of the molecules is reason for an extraordinary high viscosity, a high resistance, high surface tension, high capillarity and a large distance between melting and condensation (Pötz & Bleuzé 2010 p.16). Although this distance may be large, the points of melting and condensation take place within the temperature range of our planet. It is therefore that we experience the different physical phases of water as gas, liquid or solid state. Water vapour can be seen in fog because of either the cooling or heating of water by the atmosphere. We see the liquid state daily when we open a tap or cross a river or as a droplet falling down. The solid state can be noticed in winter time, when surface water freezes over, or when snow crystals fall down from the sky. So, the basic properties and behaviour of water can be found in its chemistry, but this has a lot of consequences when these molecules stick together to form a larger whole.

Shape of water flows

Water, as a liquid, tends to take and maintain a spherical shape. If this cannot be achieved by water because of gravity, it moves in weaved surfaces, creating loops and meanders (Pötz & Bleuzé 2010 pp.17-18; see image 4.1). Water always seeks a lower level because of gravity. "It finds many ways of maintaining a balance between the spherical form natural to it and the pull of earthly gravity (Schwenk 1990 p.13). "Water is always on the way somewhere at some point in one of its great or small circulatory systems" (Schwenk 1990 p.14). The rhythm of the water's meanders depends on the particular space a river has. The meandering is due to finer movements within the flow of water. These movements result into inner currents, or secondary revolving currents (Schwenk 1990; see image 4.2). As well as the movement downstream, there is a revolving inner movement in the cross-section of the river. In this cross section, water revolves about the axis of the river. (Schwenk 1990 pp15-16; image 4.3). Because of this, in a natural way, rivers meander because of the reduction of the spherical shape of a drop towards a circle. But when the circle closes, the river bends towards the



Image 4.1. Behaviour of a drop of water and a river (Schwenk 1990 p13; p15).

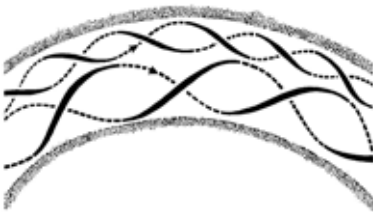


Image 4.2. Secondary revolving currents (Schwenk 1990 p.17)

other side (Pötz & Bleuzé 2010 p.17-18). Otherwise, if lots of sediments are dropped in the river, a braided river is created. The flow of a river is almost like a poem, as described by Spirn (1998 p.139) “a river moves in a swirling helix, pushing a river into a series of sweeping curves that meander across the land. Its force swings against one bank, eroding and erasing, scooping a deep pool, sweeps across the other bank more slowly, releasing sediments from suspension, forming river, laying down new ground.”

Waves in water occur because of two causes. The first manner is when flowing water meets an obstruction, such as a rock or bridge pillar. Here the wave pattern itself does not move. The second manner is when waves are created by wind, in which waves move over the water surface, but where the water itself stands still. In water, rhythmic wave patterns such as eddies occur because of the passing over of a wave which creates a cavity making the wave to roll up. At the borderline of uniting flows with different velocity, phase, or temperature these eddies can occur. (Pötz & Bleuzé 2010 p18).

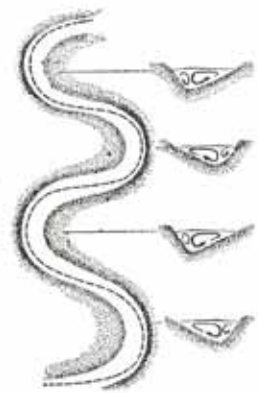


Image 4.3. Secondary revolving currents causing the river to meander (Schwenk 1990 p.16)



Image 4.4. When a wave curls over, it forms a vortex (Schwenk 1990 p.37).

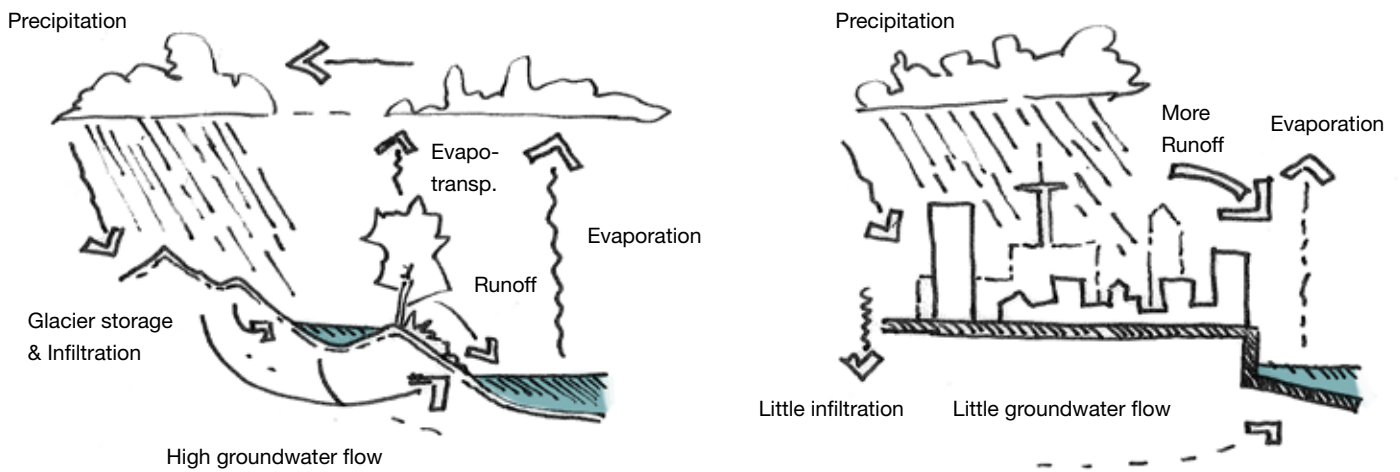


Image 4.5. The natural hydrological cycle and the Urban hydrological cycle (Image based on Motloch 2001 and Auckland City Council 2010).

THE WATER CYCLES COMPARED

These flows bring us to a bigger whole. The amount of water on earth is constant, but the proportions between the different 'reservoir' - places where water stays - are constant changing (Pidwirny 2006). Water itself is the largest editor of landscape by changing the geomorphology of coastal and river areas and erosion of land. Water equalizes the landscape by eroding higher parts and dropping its sediments in the lower areas. Water edits the particles of rocks, sand and clay to its spherical shapes. Moreover, it transports sediments, moving, erasing and growing banks and therefore modifying the river bed (Meyer et al. 2006 p.50). Every flow has three zones where several processes happen. Upstream is the production or catchment zone, in which rainwater is caught as well as the melting of snow cover such as glaciers. Second is the transport zone, in which water is transported via streams and rivers. Third is the deposit zone, in which sediments are dropped and the river ends in an ocean, sea or lake (van Dam et al. 2012 p.6) In landscape, two main water cycles can be identified. The bigger one is the natural water cycle,

as taught in geography classes, and the smaller – unclosed – urban water cycle (see image 4.5). Both will be explained here.

Natural water cycle

The natural water cycle has water either as vapour in the air, as surface water in lakes, rivers and seas and as ground water in the soil (see image 4.6). The movement between these reservoirs happens mostly because of the processes of precipitation, runoff, infiltration, evaporation and transpiration (Pidwirny 2006). Water in the atmosphere drops down by precipitation as rain, hail, sleet or snow. Partly, this is stored as frozen in glaciers. The largest part is intercepted by the ground and becomes of use for plants. From these plants the water is evapotranspired to the atmosphere. Otherwise, water vaporizes directly from the surface. A part is infiltrated in the deeper soil so it is stored in aquifers and the last part flows because of runoff towards rivulets, streams, rivers, lakes, marshes back into the ocean. In between these systems water moves because of either gravity or pressure in a horizontal way or seeps up or down (Pötz & Bleuzé 2010 p.20; Motloch 2001 p.69-70).

Precipitation

Water falling from the atmosphere upon land or water surface either in liquid or solid state is called precipitation. The mean annual precipitation in the Netherlands is 700-900 mm per year (KNMI 2010a) and for Germany this is 600-800 mm per year (Maps of the World 2007). This can be either in droplets of fog, rain or as hail or snow (Kujawa-Roeleveld 2013).

A droplet is a small portion of water which we can experience in liquid state. It is a synthesis of the colours of the direct environment and shows what is up or down by its light intensity. It falls of a string of water from the tap and recreate its spherical form before entering the pool below. We see drops every time it rains or on our windshield from the car or dripping from the roof after a shower. By observing a drop one can see the viscosity of the element of water (Pötz & Bleuzé p.16).

Fog is a cloud of small condensed droplets of water, suspended near ground level (Pidwirny 2006). It limits the view during movement while the fine particles attach to your eye lashes and the little drops cool your skin. In the higher atmosphere, these



Image 4.6. From left to right: water as rain (a), snow (b), fog (c), drop (d), flow (e) or surface (f). Multiple sources

particles form clouds. These clouds can be experienced from large distances, where the landscape with “sky, river, sea and mountains” that are the context for these clouds. (Spirn 1998 p.142). An artist cannot design the sky but one can frame a view to offer an experience of the sky alone (Spirn 1998 p.142).

Rain is liquid drops of more than 0.5 mm width falling from the atmosphere (Pidwirny 2006). One can see a shower coming from miles away, observing its path and concluding that you are going to become quite wet during your trip. Long sleeves of water falling down is one of the visual observations one can experience from rain. Other is the dripping of rain into a pool, which creates ripples and concentric circles on the mirror surface. Stones get darker, yellow sand becomes brown, red sand becomes darker. Moreover, rainfall shakes up the environment, bringing movement in leaves, and bacteria in soil, releasing nice aromas in the sky - which we smell directly after heavy rainfall (Npr 2007).

In frozen state, precipitation falls down either as snow or as hail. “Snow is precipitation in the form of small ice crystals formed directly

from the water vapour of the air at a temperature below zero degree” (Merriam Webster 2013). Hail is a frozen drop of water that expands to more than 5mm width within a thunderstorm because of updraft and by that attracting other drops creating ice balls (Pidwirny 2006).

Surface water: infiltration and storage
Because of porous soil layers, water can infiltrate into the ground. The infiltration capacity depends on the soil type and land cover (van Dam et al. 2012 p.21; Kujawa-Roeleveld 2013). If the surface is impermeable or the amount of rainfall is higher than the infiltration capacity, run-off occurs. On one hand this is due to both meteorological factors such as the intensity of rainfall, the amount and the duration but also due to the direction of the storm and earlier precipitation. On the other hand, land use, soil type and vegetation and topography can cause run-off. If so, water flows over the surface towards surface water (Kujawa-Roeleveld 2013). There, water is stored in ponds, lakes, rivers, seas and oceans.

In larger quantities, droplets together form a flow of water. This flow is, depending on the amount of obstacles in the pathway, clear and

dynamic. One can see ripples, eddies and waves when flows cross other or move over an object. Water falling down a cascade forms a blanket over the rocks and in the case of large cascades, water vapour mystifies the area with a layer of fog. The roaring sound of the cascade enters our sensory system by our ears. Usually, we first hear a stream or cascade long before we see it. The refreshing splash in the face when we come across a water stream during a hike addresses our haptic system, we can experience the water as it streams along our hands or over our feet. During the same hike, one could use their hand in order to drink from the river stream, tasting the pureness of untreated water. Moreover, since a river transports lots of particles, it takes along multiple aromas which are then spread around the flow basin, reaching our nose. Moving water can both be subtle and dynamic, it can flow unnoticed or show its presence by splattering and splashing. It can contain lots of force and ‘mask the loudest of urban noises’ (Motloch 2001 p.75). The rate of flows and the condition of the edge, the height and nature of the fall determine the sensual aspect of flowing water. In cascades, ‘water falling over a smooth edge form sheet

like cascades, while water flowing over a rough edge is turbulated and aerated' (Motloch 2001 p.76).

Still water, like lakes, have visual and psychological reflective properties (Motloch 2007). It gives the eye a mirror of the surrounding landscape. This works because light is only partially taken up by the water while the rest is reflected back which is why we can see reflections. Large water surfaces also produce a cooling effect upon its surroundings. Affected by the wind, ripples occur on the surface and these ripples can evolve to waves by increased wind speeds. Moreover, a pool of water in combination with wind can result in a cooling effect which might be pleasant in several parts of the world, but can increase the cold feeling in colder areas of the world (Motloch p.72). During subzero degree days, still water freezes over. The liquid water is then solid, so one can see it, stand on it, feel it and slip upon it. At lower temperatures, even moving water is able to freeze, stopping its motion.

Evaporation and transpiration

The phenomenon of water transforming into water vapour and thereby moving into the atmosphere

is called evaporation. Transpiration is the same phenomenon but here the vapourization occurs after the transportation through plants (Kujawa-Roeleveld 2013).

The urban water cycle

Within the system of the natural water cycle, a smaller, unclosed water cycle exists, namely the urban water cycle. For settlements, supply of clean water for household and industrial use and the disposal of wastewater is necessary (Hall 1984 p7). In the Netherlands, clean water is gained from groundwater or purified surface water (Pötz & Bleuzé 2010). After use, this water is transported to treatment plants where the sewage is cleaned and disposed into surface water again (Pötz & Bleuzé 2010). In cities, the precipitation is dealt with differently than the natural water cycle. Only a little part is infiltrated directly into the soil and drained towards surface water but most is caught on the street and transported to the surface water by gullies and the sewage system (Meyer et al. 2006 p54). So there is less infiltration than in the natural cycle and the run-off rates are higher (see image 4.7). This causes rivers to flood after rainfall, but because of low ground water flows, the same rivers dry up in during droughts (Kujawa-

Roeleveld 2013).

Water in the urban environment

So, much of the water in the urban environment is transported directly into the sewage system. In older city districts, this is done via a combined sewage system, which is designed to dispose the water as quickly as possible and transport the sewerage together with rainwater to a treatment plant. The result of this during peak rainfall is the disposal of dirty water onto the surface water, if the treatment plant's capacity of cleaning is insufficient. Later, this system was improved towards the separated system in which sewerage and rainwater are separated at source. The rainwater is directly disposed on the surface water. But because rainwater from streets could possess pollution, the new standard is the improved separated system, in which the first fraction of rainwater is transported to the sewage as well (Pötz & Bleuzé 2010).

Although much water is transported directly into the sewage system, still water is present in the urban system in several ways. The oldest form of water in cities is via canals. These canals were dug out to supply material for the construction of the

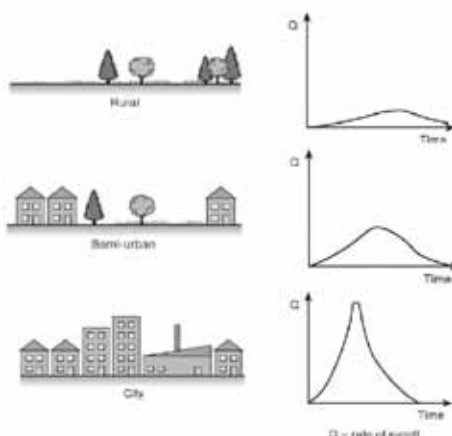


Image 4.7. Peak rainfall and runoff charts in different urban typologies (Butler and Davies 2000).

city, but for drainage purposes as well (Meyer et al. 2006). Moreover, in earlier times, canals were a mode of transport as well both because of its easy accessibility and by that means they had a representative function of the city as well (Meyer et al. 2006). Examples of this form of water in the city are the canal district in Amsterdam, and the canals in Venice.

Another presence of water in cities is by rivers. Most cities were established next to rivers, mostly because of the supply of water or transportation (Motloch 2001). In these times, people accepted the role of rivers and floodings and only after the year 1000 city inhabitants started to defend themselves against the water, and by that turning its back to the river (Hooimeijer 2007). Only in the recent decades, urban planning rewound this process by dike heightening and flood control, but these are no permanent solutions. Examples of this can be seen in Hamburg (Hafencity), Bremen and Rotterdam.

CHALLENGES AND APPROACHES FOR URBAN WATER SYSTEMS

The process of urbanization is cause of three major problems in relation

to water. First is the quantitative and qualitative supply of water resources (Hall 1984). There is a rising amount of water that is necessary for consumption and industry because of increased population, economic development and improved living standards. Moreover, the quality of water decreases because of pollution (UNESCO 2012). Second is the prevention of flooding within urban areas. This is caused both by rising river discharges and increased precipitation on hard surfaces. Third is the disposal of waterborne wastes without polluting the local water resources. (Hall 1984 p8).

Climate change and water

Climate change is not a new concept, instead there have always been changes in climate such as ice ages (Pötz & Bleuzé 2010). However, within the last decades, the drivers and impacts of climate change have changed themselves (Leemans 2012). Because of an increase in the earth's temperature due to increased CO₂ output, several changes have already been noticed. Some of those changes are that precipitations systems change (increase in northern hemisphere, decrease in southern hemisphere), a trend of increasing wet and dry extremes happen and

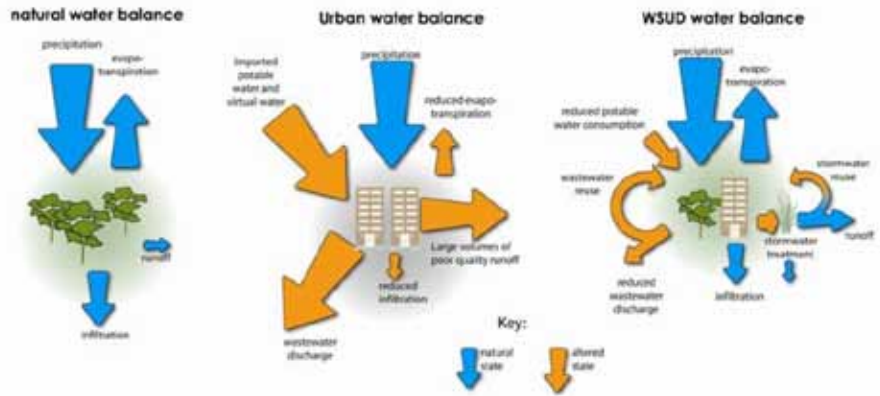


Image 4.8. WSUD Principles (Waterbydesign.com.au)

glaciers are melting (Ludwig 2012). For future predictions about climate there is much uncertainty. This is why the Intergovernmental Panel on Climate Change (IPCC) uses scenarios for predictions on what is likely to happen. These models predict an increase in temperature of 1 to 2 degrees between 1990 and 2050. In the most extreme scenario, the increase of peak rainfall in summer is 27% in 2050 and 54% in 2100 (Pötz & Bleuzé 2010; KNMI 2010b)

Many of those predictions address the topic of water. Because of the earth's natural variability and human interventions within the water cycle, the status of water resources is constantly changing (UNESCO 2012). Some of these changes include increased flood potential, changes in seasonality of flows, decreasing snow areas, groundwater depletion and change in soil moisture (UNESCO 2012).

Approaches towards urban water management

In order to (trying to) restore the urban water balance and to adjust to possible future conditions, several approaches towards urban water have been developed. Holistic approaches

address the topic of supply, cleansing, and runoff decrease of water in urban areas. One of those approaches is the urban harvest approach by Claudia Agudelo-Vera or the SUDS (Sustainable Drainage Systems) approach. Solely intercepting runoff rates and providing aesthetic experience of urban water are approaches such as the design of water squares by De Urbanisten.

SUDS

Sustainable drainage systems attempt to mitigate stormwater runoff in urban areas. This is done via several interwoven principles. One of those elements is reducing runoff rates, to prevent urban and downstream flooding. Moreover, natural groundwater recharge is encouraged to decrease the impact on the aquifer and river baseflows and aesthetic value of areas is increased and opportunities for biodiversity are enhanced. Finally, pollutants in the stormwater are minimized to protect surface water quality (CIRIA 2007; see image 4.8).

Urban Harvest Approach

In the Urban Harvest Approach (UHA) the city is seen as a metabolism. Currently this metabolism is linear, where water is inserted into the city,

then used and finally disposed to the treatment plant. Because of growing urbanization, there is an increase in pressure on valuable resources, more wastewater is produced while there is a lack of integration between planning and resource management. The problem of water is that for every use, the highest quality is supplied, while only a certain quality is needed for most usages. The UHA approach tries to close the cycle of water within the city itself by minimizing the demand, by minimize the waste output via cascading (reusing of rest quality), recycling and recovering and by multi sourcing using local and renewable sources. This process is applied on three scales, namely building level, block level and city level in order to achieve the highest potential in self sufficiency (Agudelo-Vera 2012).

Water squares

De Urbanisten, a Rotterdam based design office in urban design, developed a water square in Rotterdam in order to both show the investments in rainwater processing by making it enjoyable and create the opportunity to enhance environmental quality (De Urbanisten 2013). In this approach, water is held in the public space after peak rainfall until the



Image 4.9. Design for a water square in Rotterdam (De Urbanisten)

city's drainage system has enough capacity again (see image 4.9).

CONCLUSIONS

In this chapter, water in the urban environment has been explored by first exploring its chemical and physical properties on a small scale. These properties account for behaviour in the larger scale, when water sticks together to form drops or flows or surfaces. Since water is always somewhere, the closed natural water cycle and open, not self-sustaining urban water cycle have been explained technically, together with their sensory values. The differences lie mostly in the way drainage occurs, and by that the recharging of groundwater. Since these systems are based on the current situation, future predictions and implications of climate change have been addressed, resulting in more and more extreme precipitation in urban areas while the amount of impermeable ground increases. Finally, recent approaches for future urban water management have been explored such as SUDS system; the Urban harvest approach and water squares.

Part III.

DREISEITL's AESTHETICS OF WATER



Interactive water element creating intercrossing waves in Hann. Münden, Germany.

5. INTERVIEW WITH HERBERT DREISEITL ON THE AESTHETICS OF WATER



“Water is far from just being a designer’s resource or material: it begs to have its vital possibilities rediscovered.” This quote is part of the philosophy of Atelier Dreiseitl as mentioned on the website. The atelier was established in 1980 by Herbert Dreiseitl “with a goal to promote sustainable projects with a high aesthetic and social value” (Atelier Dreiseitl 2013). This philosophy on a deeper meaning of water and aesthetics was the trigger for interviewing Herbert Dreiseitl, the founder of the atelier.

A layer of snow has covered the landscape of Überlingen am Bodensee as I approach the German design firm’s office on one of the first days of December for an interview with the artist Herbert Dreiseitl [HD] to talk about his experiences with the aesthetics of water. The interview takes place in the afternoon in his room with a spectacular view over the landscape of the Bodensee area.

The following fragments are highlights of the entire interview. The recording of the complete interview can be found in the appendix. This interview is used to clarify the position of Dreiseitl towards aesthetics and water. First, Herbert Dreiseitl

explains about his inspiration in and fascination for water, followed by his position on aesthetics. Then the shift from artist to landscape architect is explained, as well as the shift in work and future challenges.

INSPIRATION & FASCINATION

[HD]: “In history, art and science have been linked, for instance if you look at the water research of Leonardo Da Vinci, an important person in my studies. He was an engineer and he was an architect. If you go into art, you have different scales. You can go into the very small scale, like the art of a drop and at the same time, in science you can go to a very specific detail. On the other hand, you can go to a very large scale like the ocean; the salt concentration in water and to see not only the horizontal but also the vertical movement in water. This is just science, and the space between science and art is very fragile; it is not a borderline but it is a seamless transition.”

“I had a dream when I was a little boy, and that dream was to be an artist. On the other hand I was totally fascinated by water. I was playing with water in water streams, actually not far away from here in the mountains. I did a lot

of observations and playing, which I think is very good. While even now I like this to play in the water and just to observe and get on a hiking tour in the mountains just to watch the same piece for an hour and just see how this piece dramatically changes. Within one minute the whole thing looks different, or even in seconds. Most people don't know this because they don't have the patience, they don't take the time to really look."

"For my whole career I was first looking at the phenomena of water



Image 5.1. The water studies by Leonardo da Vinci painted around 1508.

itself. I made little experiments, at first water fountains on a very small scale and then I learned to go bigger and bigger and learned from the small processes to think about large processes, up to big scales like entire cities. How should a city function with his water? Usually when you come from the other point - an engineering point - you only see the problem and try to fix it, which is a different direction. When you are only aware of the problem and you fix it you are not healing, you are only repairing, and repairing means fixing something until it breaks again, and then you have to repair it, again. Instead, you should think about a holistic healthy situation that doesn't need any more repairing, since it is a self regulating system."

"Even our reaction to climate change is in that manner. For example the way nature is trying to repair our input on the landscape. Of course the water level is what we say 'out of control' - but the planet actually starts to heal itself by melting ice bergs, rising water, having more evaporation to get into a more stable situation. It always has a balance."

"I'm not a dreamer, because I know that we are far away from finding

these solutions to climate change, but I am thinking about our cities. They could be healthier and our water cycle is important. It is about food security, temperature control, dust pollution, reduction, filtration of polluted situations, refilling the groundwater aquifer. So moving from art, the phenomena from something where you can study nature or natural structures, I was moving to large scale and thinking about what would be a healthy situation."

Observing nature

[HD]: "Before I got into the large scale projects of entire cities I was interested in the small scale proportions first. The difference is that a lot of designers, or people who work with water, have a piece of art in mind and then using water as something that is added on as decoration. So something is build and then afterwards the water is doing something to the build element. For me a strong inspiration is nature. You see that we are not copying nature but we can say something on what water is doing in its natural behaviour. We are observing certain things, we are discovering things and as an artist it is an interesting point to filter out special phenomena and then to start working with this."



“When you are only aware of the problem and you fix it you are not healing – you are only repairing – and repairing means fixing something until it breaks again – and then you have to repair it again.”

Image 5.2. The artist Herbert Dreiseitl. Adapted from The Harvard Graduate School of design.

Water is selfless

[HD]: “The fascinating thing is to work with water is to work with nothing since water is invisible; you cannot see it, you cannot even smell it because you only smell something that is in the water or has already a relationship with water. Water by itself is completely poor. If you put your hands in the water and you are not moving you will not feel it, you will only feel some pressure because density is higher but only when you start to move your hand, or when you blow over the surface, or when you have light, or when you bring it in motion, then you will hear suddenly something; then something tells you, this must be water. So, actually it is not water itself, but it is the way how water reacts to the environment, the surrounding, how it dances with light or how light dances on water. But by itself, water is always completely selfless; it’s fragile; it’s passive; it is taking everything and therefore open to all influences”

can be open to more than just a place because this is describing, this whole phenomena is describing much more than just this location, it describes the vortex, its horizontal and vertical axis, it has always a connection to something greater, much bigger.”

AESTHETICS: MEANING AND CHARACTER

[HD]: “In all the work, aesthetics have an important position, but it must always have a meaning. I am not keen to see aesthetics for themselves. For me, aesthetics follow from a meaningful thing. The old way to say it was ‘form follows function,’ but that might be not the correct way to say it since it is a bit too narrow. However, one can say that if the right context and the right function are brought together and the periphery is right, you come to the point. An important point when it comes to aesthetics is that unnecessary things are not added, but that things are purified: which means to make it as simple as possible, *simplicity*. The biggest art for and in aesthetics is to bring this simplicity to a high performance, and then this is really doing something. For example, I find fountains or art installations which are just overdone not beautiful, or aesthetic. I think



Image 5.3. Aesthetics: purify things, make it as simple as possible. Then, taking this simplicity to a very high level.

Philosophy

[HD]: “It’s fascinating to think about water philosophically and using that as an entry for design. It is about a simple thing, simplicity again. It is to tell a narrative, a story, to tell the beauty of water. Water is so selfless, it

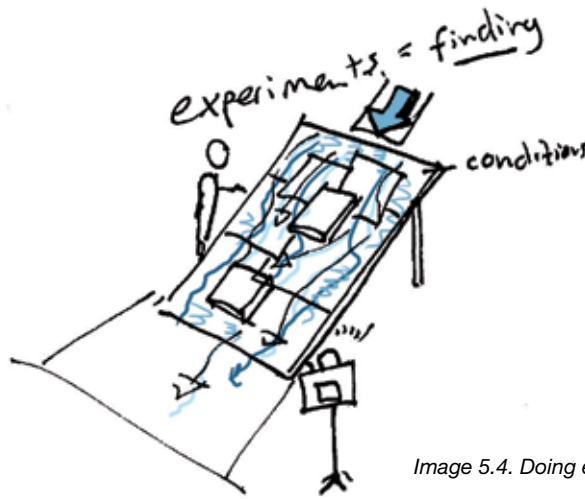


Image 5.4. Doing experiments is finding.

they are just boring. People produce such unaesthetic design today.”

“Aesthetics is not just a water installation, but also the surrounding. What is it in? When there is a phenomena of a ring vortex or a light installation but with a shopping mall around it, it doesn’t work. This is because all the senses around the object would kill this. Instead, if there is a quiet room, dark with a little light and there is just one thing in the middle where a drop falls in and the reflection creates an explosion of light waves and one sees this interaction; *this* is art, this is really fantastic. Because of the purification and then the purity of the phenomena of one thing is so powerful that it touches our soul and our spirit. If there is too much of it, the aesthetics are meaningless.”

“This also counts for different cultures. I think water is so basic, but everywhere, regardless of the political group you are in, it might vary. It is often distinguished in ‘you are left or right, people are conservative or progressive,’ but I think it doesn’t fit anymore; It is old. You’ll find the so-called conservative people being progressive and the progressive ones are conservative in other ways. If

you study that you’ll find support of people you would never think to get support from. People having different cultures, languages, and different ways to celebrate and to talk, but the basic need for water is directly related to life. Also, life is something you cannot grasp; you cannot hold it; since if you try to hold it you have lost it already. It is just like water. If you start to hold it, it slips through your fingers, so to work with water you’re almost forced to work with the surroundings. It is to work with the conditions where life can happen, but one can never work with life itself. Life always comes, it is possible to create the conditions for a flower to start to bloom, but one cannot create the flower itself; the framed conditions are created. So that’s very much with life, and I think everywhere, whatever we think, people are deeply touched with water and this relation can be traced back in different cultures. People are so crazy today fighting each other about religion. But if one studies religion, it is seen that basic things about life and water are always the same. Either the Jewish, the Christians, the Muslims or Hindus, all these religions share a deep wisdom about water. So in the basic, they are the same. It’s only that they have different languages and we are much

too intellectual today to see that common ground.”

FROM ART TO LANDSCAPE ARCHITECTURE

[HD]: “These professional terms (artist, landscape architect) don’t fit very well, at least from my point of view. I started as an artist and I was thinking more holistically as an artist to work with very small things. In an early stage, I was working mainly with rhythms, flow forms with John Wilkes. Later I was doing experiments to see how I could work with movement of water, like a spiral or like a vortex. I was working with surface structures and did a lot of experiments in my studio. Downstairs we have a studio where we can make experiments to do everything full scale, so for large projects as well. I do a lot of experiments figuring and finding out what can be done. So I started small scale, thinking about the large scale. I was interested in lots of things about sound and light, about water and colours, water and materials which are related like glass – glass is liquid, it is still in the viscosity very dense, it is not flowing very fast but still flowing. If one would have glass for a hundred years It would be much thicker in the bottom and then you

would have to turn it around. Water in glass is very fascinating, to bring that together in art.”

“To go into water, one has to hold back, to observe, to think about the process and then finally, slowly an idea might come up and then by bringing it up, one can work with sound and light reflection. For me this was for me a very inspiring thing.”

“The early work was more like a traditional way of working; because that was how I was trained and I was working more with objects and stone and with forms and shapes. The water was going through and I guided the water, took care of the movements so water could do something. Later I got more in the phenomena where water actually doesn’t need stone or a fixed form anymore but where the water then suddenly can express in air, can express itself with light, it goes through movements in the three-dimensional space in different ways. Nowadays I am even moving away from physical water towards light installations, which actually brings the water as an idea out into the space. I think that is important to work as an artist, that you don’t remain at the physical substance all the time, but that you get to a

point where you get into a more spiritual dimension. I think it is very important for art to make a bridge to a different dimension and actually to get into concepts where people start to make movements which are like a translation of the physical realm into a different one. There are good examples even in historic places, such as the Japanese gardens: the ones about water don’t have water in it; they have sand and how they put the stones resembles an ocean, or a lake. It is an old concept but artistic and spiritual as well.”

DREISEITL’S PROJECTS

[HD] “It is hard to say which projects are my best, because how do you say which child is the best, they are all different, and you cannot compare them. Each one has assumingly some lucky conditions and these conditions make one ‘child’ to bloom and therefore develop well. The projects I really liked were projects that had a lot of resistance and difficulties so I had to put much energy in it.

Gelsenkirchen

For example, one that doesn’t exist anymore is the cooling tower in Gelsenkirchen. We spend much money and energy on it and then

it only flowered for two summers before it was put into fire and disappeared. The project was about telling the story of steam, about rain, flow. The steam was coming down and merged into drops so it started to rain. This is telling the story about water, evaporation. It is about how water starts to exist, how water comes down, and then how water is flowing so it is going into different appearances of water. It was such a fantastic project, and everyone who was involved still remembers this. I think the phenomena in the cooling tower made a fantastic project but there are many others.

Potsdamer Platz

From the big ones, a milestone was Potsdamer Platz in Berlin, that made me international famous. I liked to work on this project since it was so difficult to convince the big developers. At the time we had a small company and as a young person, only having some experience but not much money and then suddenly have to work with these huge companies such as Daimler Chrysler. There, I had to defend my design to people like Renzo Piano who were all telling me what to design; they said ‘just make a reflecting pool.’ They wanted to have clean water and it should be a

reflecting pool because they wanted to see the façade of their building in the water. No one was interested in water itself and biodiversity, plants, and how water can be healthy. I told them to see the water in the context first. Where is the water coming from and where is it going; what is the water doing? Can we harvest rainwater? Of course we can! But we have to do it on the roof surface, so I had to convince them to get all the water from the roofs and let it go through a special treatment train. But before it goes into the ‘train’ they needed to change the materials; because the rooftops were made of copper and sink on the rooftops and I said that I didn’t want any of such materials in anymore. Their first reaction was defensive and negative, but I convinced the client and said that if they really wanted to do a sustainable project then they had to take care of the rooftop because it would influence the water and if you want to have good water together with a ground breaking project of ecology within a dense city then it matters. And I still remember that the CEO of Daimler Chrysler said, ‘yes, I want that, so you tell me what is needed and I will tell all the big guys to follow. And that is what happened.’

Bishan Park

“Another project I liked is the one we opened this year, Bishan Park. For this project, I was awarded at the architectural festival award for best landscape of the year. All my “children” are all a bit different, I’m not repeating since I am not a designer who has a special style. So Bishan Park, for instance, was a new story. It was about how to bring a monsoon drainage canal into an urban park setting within a dense city. We opened up the concrete canal in a green manner. Now, during the weekends it is full with people. With the design, we brought biodiversity back and brought a more natural structure in it. It is an amazing difference what happens there. Singapore is an artificial society; since it is all about don’t touch, don’t move, and watch your step. Therefore, people almost think that their insurance company should take responsibility about their feet and the steps they take. It is amazing. It is also what you find in the US. We are so far away from natural processes and this is a big danger in a society where everything is so artificial. In order to make the move back we need to explain that ‘dirt’ is beautiful, and then dragonflies can reappear, that frogs come out. Now there is biodiversity, rare birds



*Image 5.5. “Some of the kids at Bishan Park had never touched natural water before.”
Image: Qihui He.*

“We forgot, besides all technology, to celebrate the beauty and the aesthetics of water.”

are coming in and you can go there and touch it. It is an amazing project because some of the kids had never touched natural water before. They only know it from a tap but never in the outside. They always have to keep away, stay away, because it is ought to be dangerous. But here they can touch it.”

Hannoversch Münden

“In the small scale I have quite a number of projects, but one that I liked very much was the Wasserspuren in Hannoversch Münden. Again a big challenge, first because of working in a bigger group with other artists together while making the step of going out of the normal range and working with sound and working with light.”

FUTURE CHALLENGES

[HD]: “Nowadays, It is about environmental questions and challenges in society. It relates back to the environment in a way of to find and negotiate between the inner side and outer side about how it is possible to use water as a metaphor for that. Therefore art has to be completely different in its outreach and I am searching for that for the future, since there will be less space.

“We have to be much better, on one hand in the physical way in how we work with water, about pollution, cleansing systems, to avoid overuse of water, to find ways of recycling, but on the other hand we forgot, besides all technology, to celebrate the beauty and the aesthetics of water since there is a strong connection - and I think it needs research because we are unconscious - between water quality and its appearance, its beauty, its celebration of what we value.”

CONCLUSIONS

Following from the interview, Dreiseitl's approach towards design with water and aesthetics can be summarized as follows. First, nature is a big inspiration for him, not for copying but to look at what it is doing in its natural behaviour. Second, for Dreiseitl, water itself is selfless, it cannot be grasped, but only steered within the environment. Third, aesthetics is something that follows out of a meaningful thing that happens if the right context and the right function come together. And finally, important elements in aesthetics are purity and simplicity and then taking this simplicity to a high performance.

This interview transcription has been authorized by Herbert Dreiseitl for publication within the Wageningen University. See appendix E

Part. IV

CASE STUDY ANALYSIS





In landscape architecture, evaluating realized projects – cases – are the basis for education, innovation and testing of the profession (Francis 2001). By critically evaluating three cases designed by Dreiseitl, generalizations and principles are sought for in order to educate and advance knowledge.

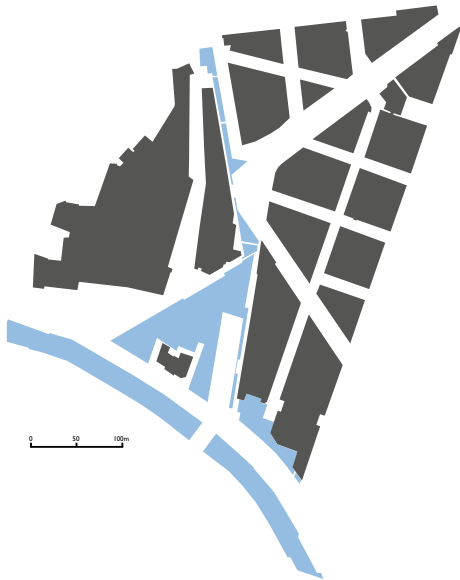
ANALYSIS OF THREE CASES

For an analysis of the realized work of Herbert Dreiseitl, three cases have

been selected. All three projects focus on rainwater catchment in urban areas, and showing the water during the run off process. The projects are on different scales, in different cities and from different years. Based on those criteria, the three cases that have been selected are the water features at Potsdamer Platz in Berlin, the water traces in Hannoversch Münden and the pond at the building of Ernst & Young in Amsterdam (Former ING building). See table 1 for the context details.

Case	Potsdamer Platz	Water traces	Vivaldi
City	Berlin	Hannoversch Münden	Amsterdam
Context	Dense urban area with modern offices, theatres, casinos and a shopping mall.	Small historic city centre	Business park at city outskirts with modern offices
Year of construction	1997-1998	1999-2000	2005-2007
Site area	25,000 m ² *	1100 m ²	1760m ²
Rainfall	530 mm / y	680 mm / y**	819 mm / y
Water surface	12,000 m ²	180 m ²	1230m ²
Flow rate	8333 L / m	400 L / m	-
Water depth	30 – 185 cm	4 cm	5-10 cm
Cistern volume	2000 m ³	35 m ³	100 m ³
Water treatment	Purification biotope (1,900 m ²)	Reversible automatic sand filter	Cleansing biotope (2,5 L/s), skimmer, coarse filter
Catchment area	Paved roofs (32,000 m ²) and Green roof (12,000 m ²)	Church and Town hall (2000 m ²)	Green roof

Table 1. Context and technical details of the three selected cases (Based on Dreiseitl & Grau 2005 p.166-170; *Measured by author; ** Landesforsten 2013).

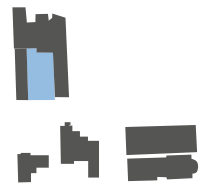


Potsdamer Platz, Berlin

Overview of the three cases in map (source Bing Maps) and urban density.



Water traces, Hann. Münden



Vivaldi, Amsterdam

STRUCTURE OF THE CASE STUDIES

For every case, at first the design approach of the project is explained through the interview with Dreiseitl in combination with the office publications (New Waterscapes, 2005 and Project sheets from the office). This is done to find out what the plan is supposed to do and how it is supposed to be experienced.

Second, a landscape based approach towards the projects is performed, by explaining the landscape setting and an explanation of the water system.

Third is the phenomenological analysis on-site of the three cases, explaining the actual multi-sensory experiences of the places. The descriptions per observation point can be found in appendices A to D. In this part, the analyses that have been

extracted from the observations are presented in order to give guidance for future designs.

Finally, the cases are evaluated based on the approaches, their systems and how they are actually experienced.

APPROACH

According to the designers, the proposal for the reconstruction of the Potsdamer Platz happened as follows. Dreiseitl started working on the design of the Potsdamer Platz right after the Berlin wall came down. The design goals were to create a vibrant urban construct with not only office use, but leisure use as well while only little space was available (Dreiseitl & Grau p.46).

Dreiseitl came up with a design that convinced the senate and investors by using water as a defining element in the public space. Moreover, he proposed to use rainwater for flushing toilets and watering green areas. Water is treated on site by purification biotopes where the water is cleaned biologically and chemically. At the Marlene-Dietrich-Platz, the water flows towards the lowest point via steps from the main water body. Here rhythmic wave structures are formed. Next to the plaza, the water drifts over cascades from two sides and then flows to a narrow channel (Dreiseitl & Grau pp.46-50).

During the interview, Herbert Dreiseitl mentioned his experiences during the design phase of the Potsdamer

Platz. He was told to create a reflecting pool, so the façade of the Daimler Chrysler building (of the commissioner) would be reflected well. “No one was interested in water itself and biodiversity, plants, and how water can be healthy. I told them to see the water in the context first. Where is the water coming from and where is it going; what is the water doing?” Dreiseitl convinced the commissioner to catch the rainwater at the roofs and cleaned it naturally on site, although their first reaction was negative. “If they really wanted to do a sustainable project then they had to take care of the rooftop because it would influence the water and if you want to have good water together with a ground breaking project of ecology within a dense city then it matters.” With that, Dreiseitl managed to convince the CEO of Daimler Chrysler. (Dreiseitl 2012).



The Daimler Chrysler Building.

PHYSICAL LANDSCAPE ANALYSIS

Abiotic layer

The landscape near Berlin is formed by the river Spree. This river cuts through the landscape, leaving a valley with plateaus on the side. These plateaus consist mainly of valley sands, fine sand and moraines (Senat Berlin 2009). A side branch of the river Spree is the Landwehrkanal, flowing parallel to the big river. The investigated site is adjacent to the Landwehrkanal, which is also its drainage carrier (see image 6.1).

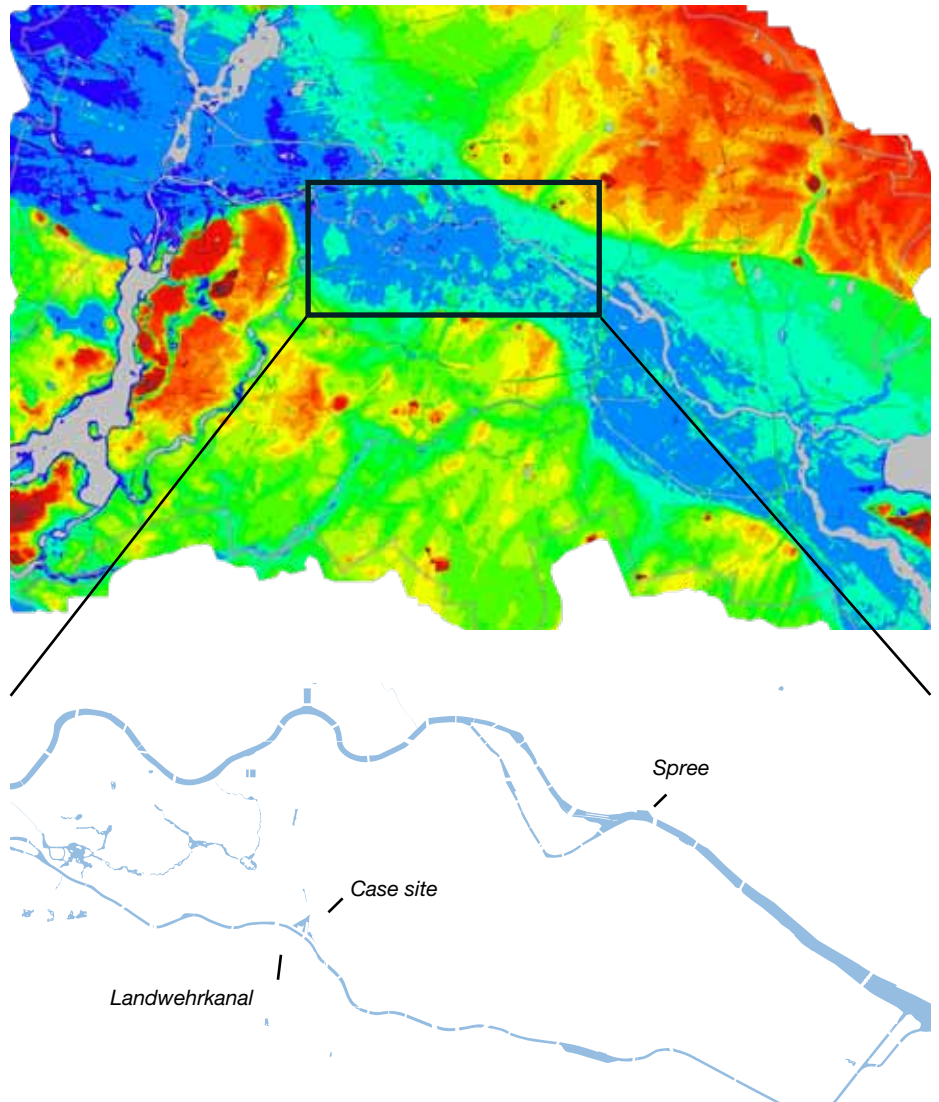


Image 6.1. The abiotic layer of the Berlin area and the water system. (Adapted from Senat Berlin 2009).



Network layer

On the city scale (image 6.2A), it becomes clear that the site is positioned at the city's inner ring, which follows a large part of the Landwehrkanal. Approximately 20.000 to 30.000 vehicles pass this point on a daily basis (Senat Berlin 2009).

Underneath the Potsdamer Platz is the train and subway system of Berlin, which both have a station within 500 m of the case site.

On a smaller scale (image 6.2B), it is seen that the two busy roads go around the project area. They touch the edges of the designed site.

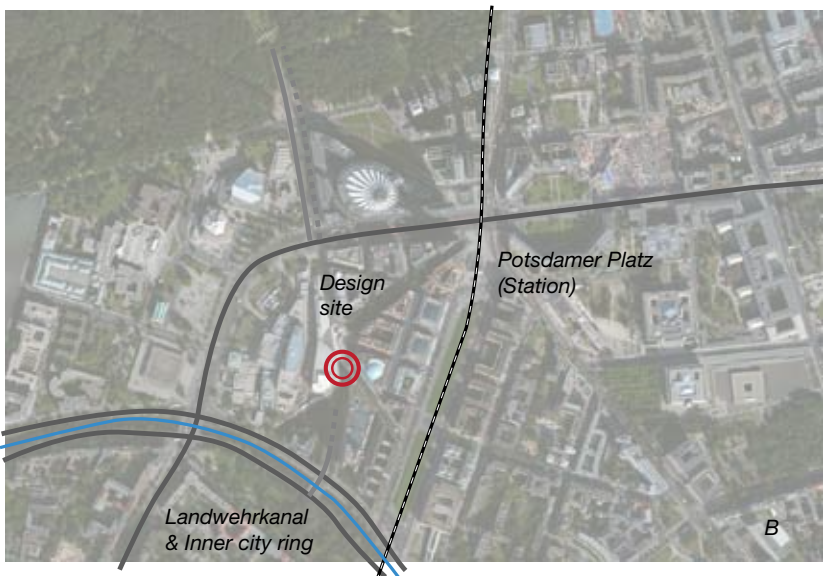
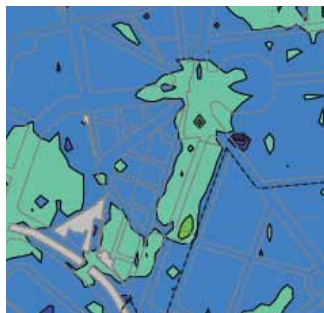


Image 6.2. Network maps of the city of Berlin (A) and and a focus upon the case site (B)

Height differences



35 - 37.5 m
32.5 - 35 m

Evaporation



50 - 100 mm / y
100 - 150 mm / y
250 - 300 mm / y

Surface Run off



> 400 mm / y
350 - 400 mm / y
250 - 300 mm / y

Soil association



Aggregated surface
Medium / fine valley sands

Image 6.3. Abiotic and Occupation layers and the consequences for the water balance (Adapted from Senat Berlin 2009).

Occupation layer

Although the majority of Berlin has been renewed after the war, the sewage system is still relatively old. The complete inner city's sewage is a combined system, in which rainwater is added to grey and blackwater. In total, 570 mm of precipitation reaches the study area. Because of the impermeable soil, from this, 50-100 mm is evaporated at place, while more than 400 mm is run off into the public domain. Only 70mm is percolated into the soil (Senat Berlin 2009). Because of the human interventions, at the site, the soil type is made of loose lithosols, regosols and calcaric regosols, because the

building sites have been built upon aggregated soil (see image 6.2).

The area around the Potsdamer Platz has been transformed through time quite radically. After the war, with the division of West and East Berlin, the Berlin Wall was constructed over the middle of the Potsdamer Platz. Therefore, lots of buildings had to be demolished. After the wall went down in 1989, plans for reconstructing the area were presented. Several quarters were developed by large companies such as Sony (Sony Centre) and DaimlerChrysler. For the latter, Dreiseitl designed the public space (Fritsche 2013).

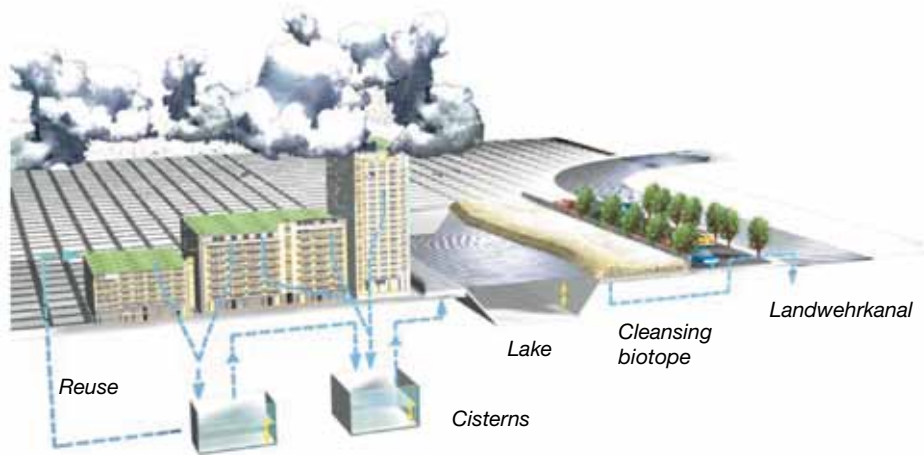


Image 6.4. The system of rainwater catchment and processing (Dreiseitl & Grau 2005).

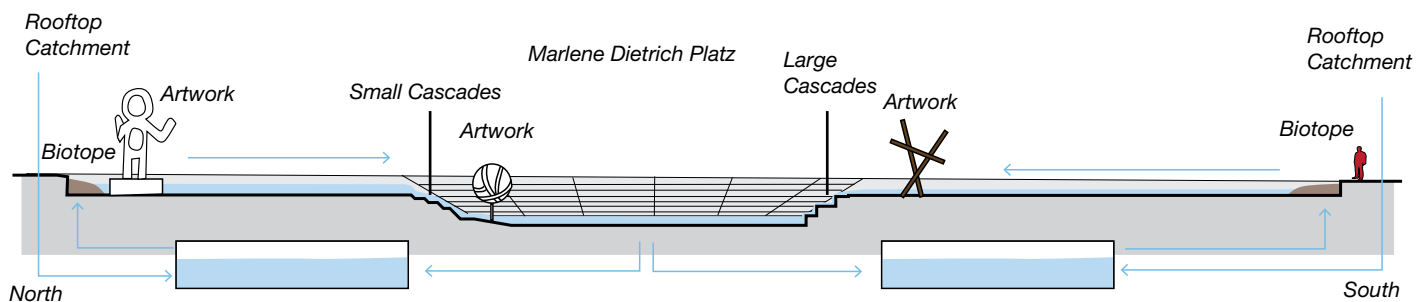


Image 6.5. Cross section of the water feature

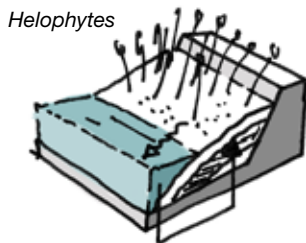


Image 6.6. Cleansing biotope

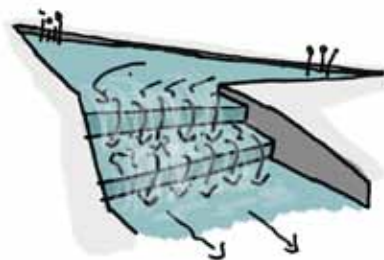


Image 6.7. Cascades in the canal

Plan analysis

The design itself consists of a system for rainwater processing. The rain is caught at the rooftops and then transported to several cisterns, from where it is both used as greywater input again for the adjacent buildings and it is put into the public water features via a cleansing biotope. (image 6.6). From the cleansing biotopes, water is held in the lake before it flows over some cascades (see image 6.7) where it returns in the cisterns. In case of overflow, the overshoot of water can be disposed in the Landwehrkanal.

As can be seen in the cross section, there is some elevation in the plan. The highest parts are at the biotopes at the side of the plan site. At the Marlene Dietrich platz is the lowest point, where the water is collected.

The cascades are formed by tiny differences in the surface underneath the water mirror. Since it flows over a smooth edge, the cascade is like a sheet (Motloch 2001). Because of these cascades, light is reflected in multiple angles (Motloch 2001).

The cleansing biotope is a visible way of cleaning water. It stabilizes the water quality and adds a dune-like view to the landscape (Dreiseitl & Grau 2005). Here, pollutants are filtered out as well as nutrients.

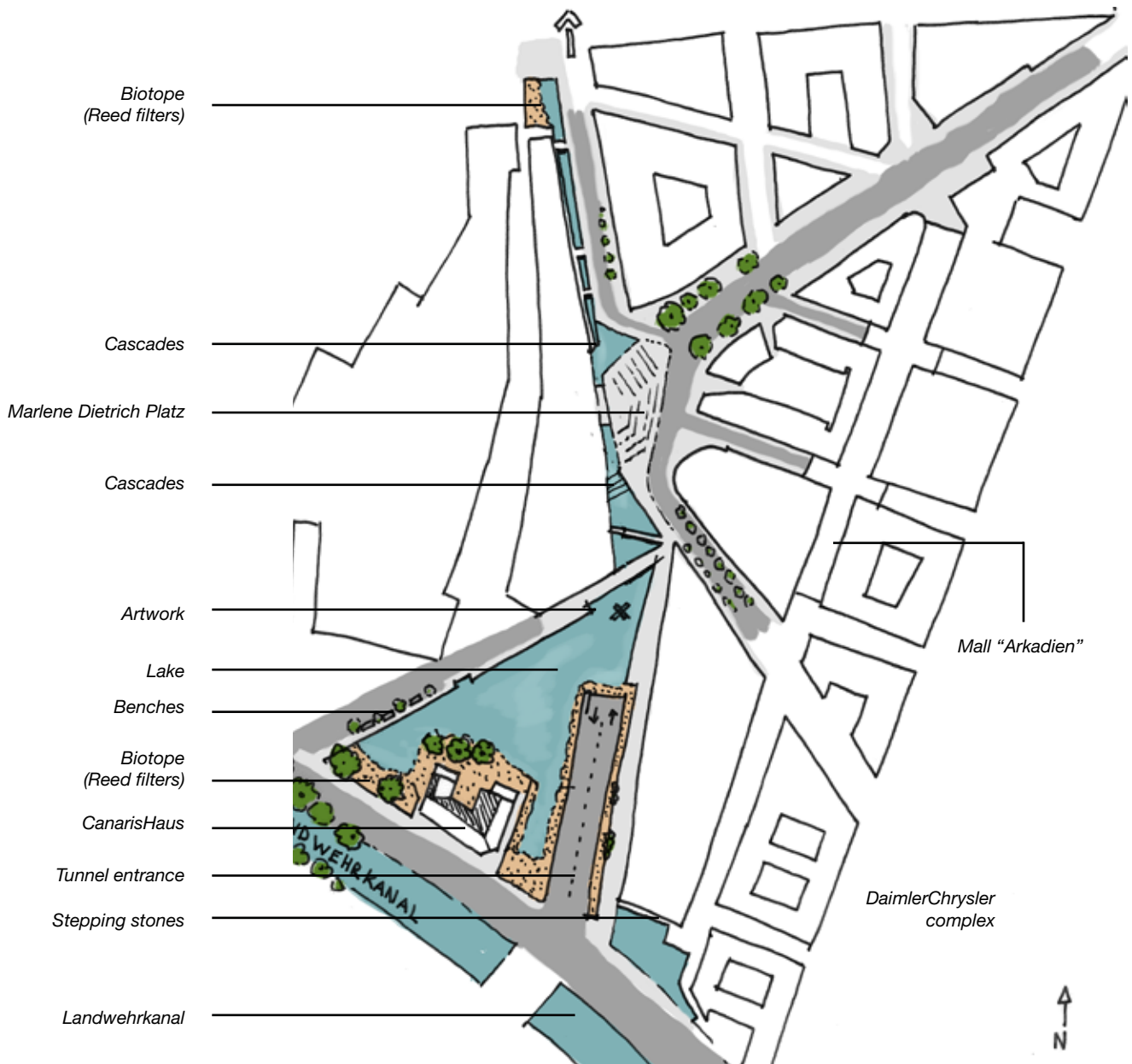


Image 6.8. Inventory of the design plan

PHENOMENOLOGICAL ANALYSIS

In order to show the experiential outcome of the proposed designs, a phenomenological study has been performed on the site in winter and spring 2013. From this study (see Appendix A and B) the following evaluations have been made.

Cleansing biotope

The cleansing biotopes at the edges of the lake have several features in common. The edge consists of medium height walls (one meter above the pavement, just too high to sit on) and the water level at the edge is higher than the pavement. Here, the water boils in via a pipe system, which can be seen in summer time. The water flows through filtering plants (*Phragmites Vulgaris*) towards the lake. The water in the lake is clear, but the bottom of the basin is dirty. Also, litter such as cans or bottles stick behind in the reed filters.

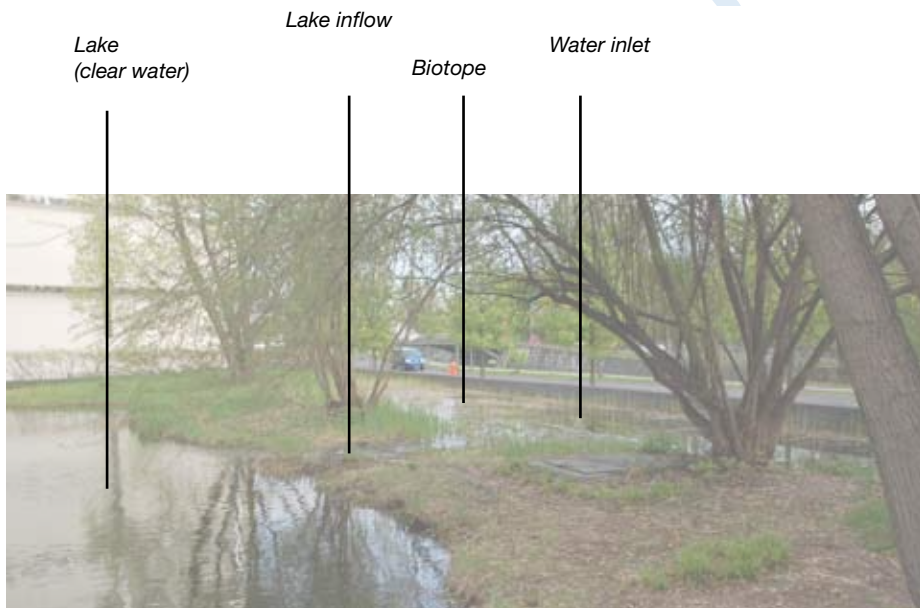


Image 6.9. The inner process of the biotope

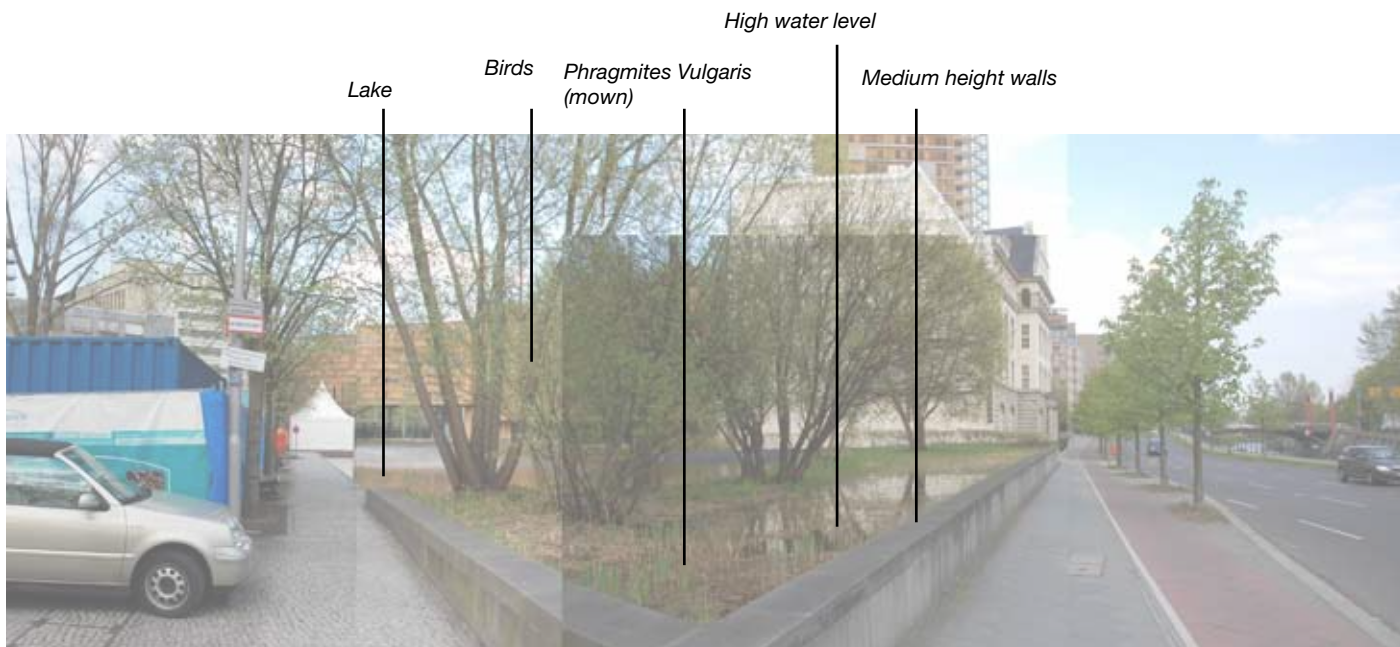


Image 6.10. The overview of the biotope



Image 6.11. The water inlet of the biotope is higher than the pavement.



Image 6.12. After the cleansing process, the water is clear, but the basin's bottom is dirty.



Image 6.13. Litter sticks behind the new grown reed.

The reed is mown after wintertime, but by then it has reached 2 to 3 meters height. In winter, when the reed has an orange colour, it also provides refuge against the wind and noises from traffic, as can be seen in the sound diagrams on the next page. These walls of reed offer quietness (or increased rest) to the lake area behind the biotope, but only if they're high enough.



Image 6.15. The biotope itself in spring; Green, short and a view upon the water

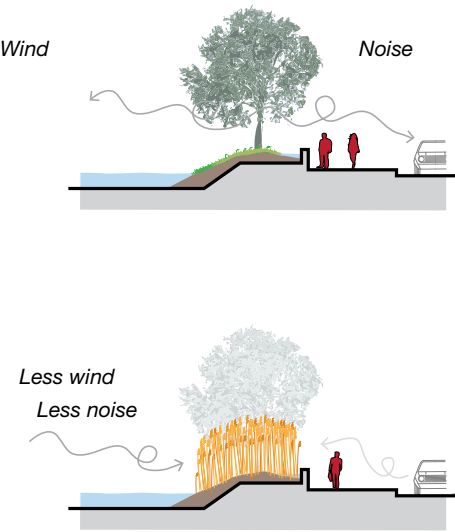


Image 6.14. The seasonal effects of a reed wall from a biotope.



Image 6.16. The biotope in winter. The reed is full grown and strongly orange.



Image 6.17 The Lake side of the biotope



Image 6.18. The busy city ring side of the biotope.

Lake side

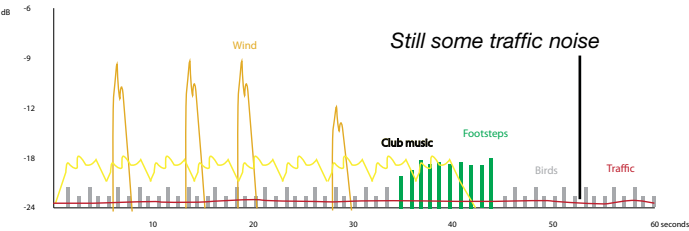


Image 6.19. Sound diagram of the lake side of the biotope in spring

City ring side

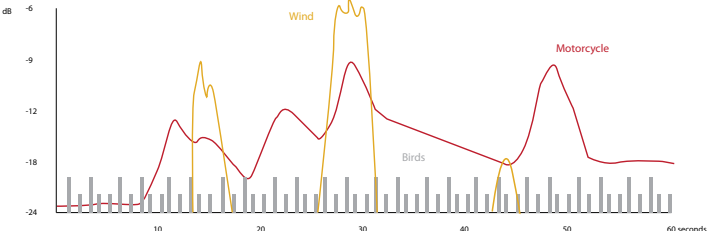


Image 6.20. Sound diagram of the city ring side of the biotope in spring

Barely any traffic noise
because of the reed wall

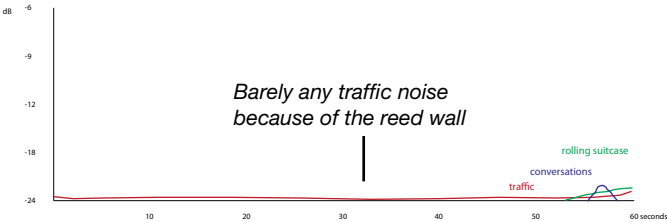


Image 6.21. Sound diagram of the lake side of the biotope in winter

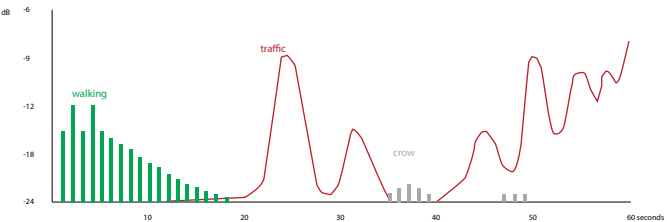


Image 6.22. Sound diagram of the city ring side of the biotope in winter



A. The inlet and inflow of water in the lake via the biotope

B. The reflection and little waves in the lake itself.

C. The splashing cascades

D. The sudden disappearance of the water.

Image 6.23. Progression of the experience of the water.

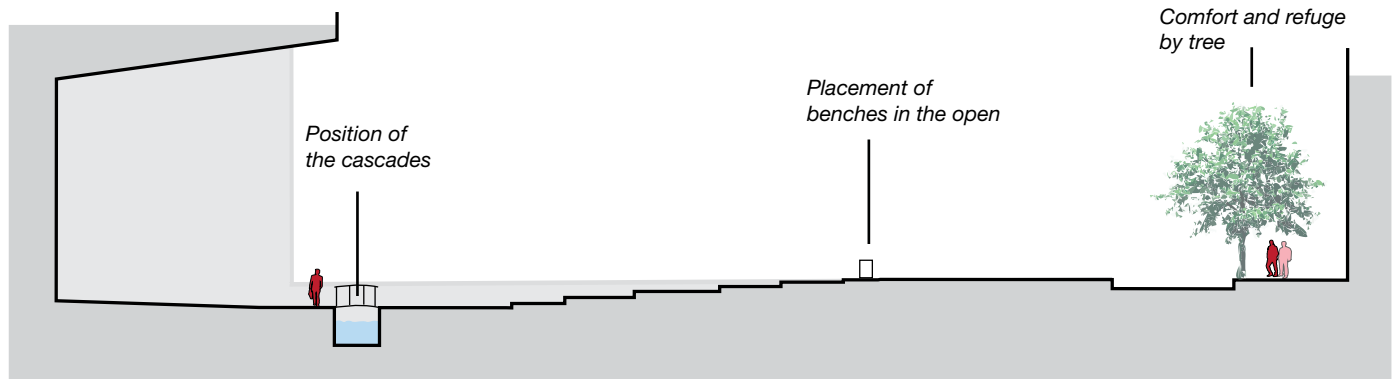


Image 6.24. Cross-section showing the position of the cascades in relation to the design of the square.

Water in its natural behaviour

One major point of Dreiseitl's design was the observation of water in its natural behaviour. In this natural behaviour, water is always somewhere in the hydrological cycle. It rains, the ground gets wet and water runs off the surface, after which it evaporates again. In the design, the water feature has a clear beginning and end. The water is put into the visible system via pipes in the biotope and flows towards a drain underneath the bridge in the center of the area. This does not show where the water is coming from (roofs) nor where it is going (eventually the Landwehrkanal). The design shows an artificial flow of water, comparable to a flow of water from the tap to the drain.

Because of that, there is no excitement in following the water. Expressed in hedonic values (the value of arousal in one's feelings) the following experience is felt. First, the water entering the system via the biotope has a soft value. Then passing the lake and the cascades with splashing water increases this hedonic value, but before it gets actually exciting, the water disappears under the bridge.



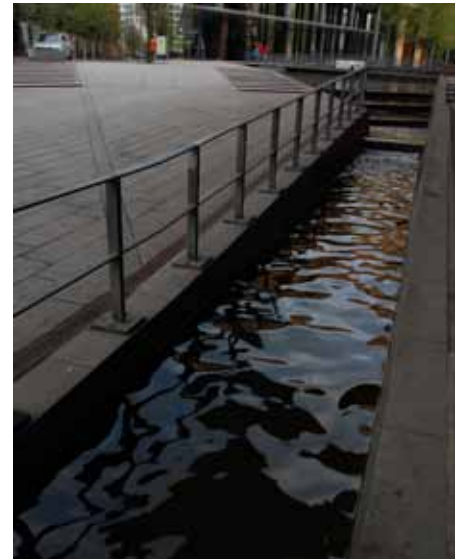
Image 6.25. Series of photos showing the detailed design of the cascades and the distinctive waves and ripples that are effected by that fine design.

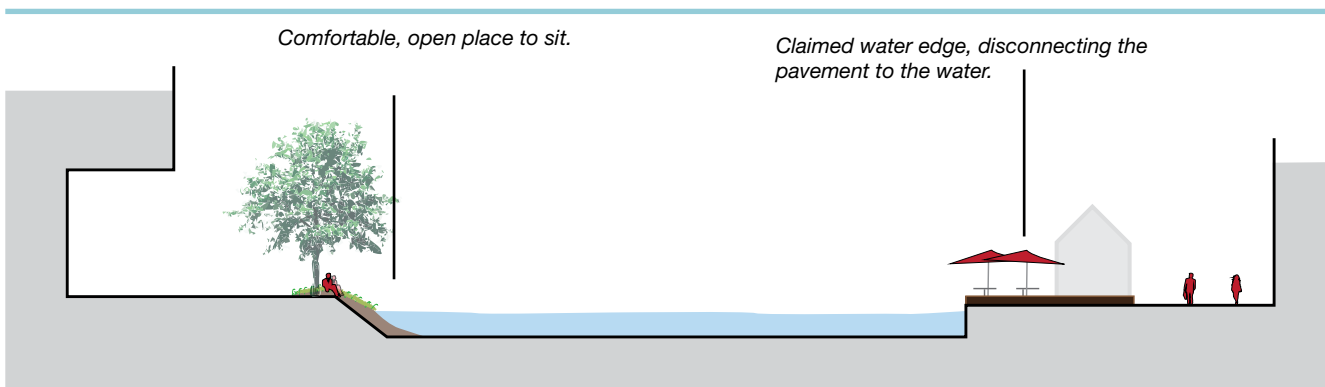
Cascades

The cascades themselves provide different experiences. The cascades differ in drop level, which results in different splashes and flows, ripples, waves and reflections but also in curved edge or subsurface level. The edges of the cascades however are also due to litter in the water, such as Big Mac boxes or natural litter such as sand.

From a phenomenological perspective, these cascades form the most experiential interesting part of the design because of the multi sensory sensations that these cascades provide. However, the

design of the square's furniture does not emphasize this experience. There are several blocks that are meant for sitting, but they have been positioned at the center of the space, in the open rather than near the edges and the water.





The Lake & Party terraces.

The lake shows two different sides. One side with soft edges because of vegetation and one side with hard edges from beach club-like party tents and terraces. The soft edge has back cover from the arcade and the buildings and by that provides a nice place for people to sit and stay. The hard edge has no back cover (the space is not well defined here) and the seats are in the open. Moreover, the positioning of the party terraces creates a barrier between the crossing pavement and the water. The space is claimed by the beach clubs and by that making the water less accessible. In winter time, this edge was just above the water, and benches and trees provided place to sit next to the lake (which was just snow and ice in that time). Also, the terraces are not occupied at all.

In winter, one can walk 10 cm above the water level

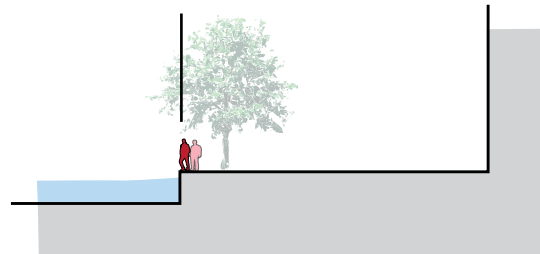


Image 6.26. Crosssection of the lake, showing the limitation of the public space via the terraces in summer time, and the regular view of the edge in winter time.

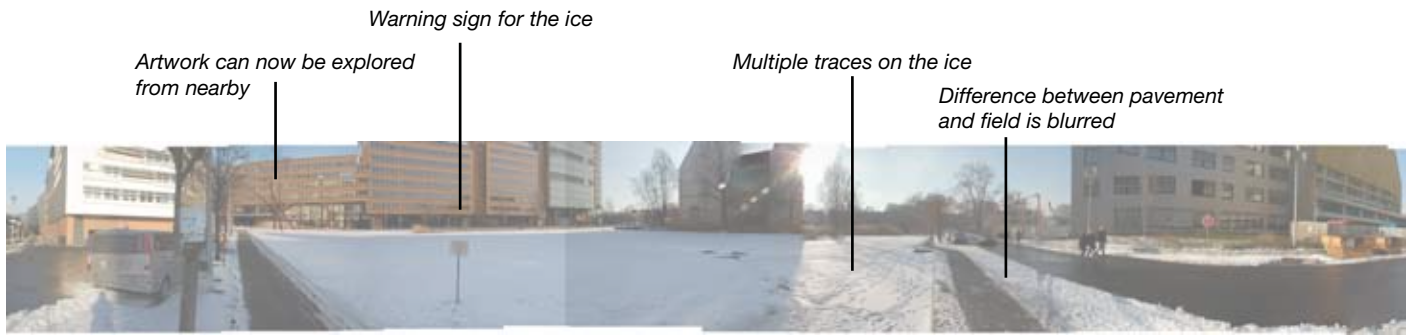


Image 6.27. Vision over the frozen and besnowed lake.

The effects of snow and ice

In solid (frozen) state, water adds a temporary experience layer to the landscape. Since water freezes over, people walk on it and create paths through the landscape which are not possible when the water is not frozen. Moreover snow blurs the distinction between pavement and grass; it is not clear anymore where the pavement starts and ends.

In the lake of the Potsdamer Platz, new paths are formed when the lake is frozen. Although signs warn for the ice people walk over the ice sheet to take a shortcut or to get towards the artwork in the center. So, new opportunities for experiences are taken when the landscape has been changed by the state of water.



Image 6.28. Photographs showing the traces over the ice towards the different artworks, despite the warning sign.

EVALUATION OF THE POTSDAMER PLATZ

In his approach towards the Potsdamer Platz, Dreiseitl tried to show the commissioners the context, where is the water coming from and where is it going. This formed the basis of the design, where water is caught at the rooftops, and purified in biotopes in the area before it flows over cascades, where it moves back via cisterns to the cleansing train again.

From the experience of this design, the following things can be noted. First, the cleansing biotope changes through the seasons since the reed is mown in spring. In winter, this reed provides shelter for sound and wind and has a characteristic orange colour, while in summer time litter sticks behind the small branches of green reed. This seasonal changes show the rhythm of the landscape (Motloch 2001).

Second, Dreiseitl mentioned in his approach to see the water where it is coming from and where it is going, to see it in its natural behavior. Stated in the theory is that water is always somewhere in the hydrological cycle (Schwenk 1990). In the design of

Dreiseitl, the water is pumped in via a tube, and leaves the area via a drain underneath the bridge. The elements from the natural behaviour of water are the catchment of precipitation (which happens on the roof) the surface run off (which is artificially held in continuity via the cisterns) and the runoff into the Landwehrkanal which happens out of sight. So, the visible part of the water system shows merely an artificial flow of water rather than resemblances from the behaviour of water in the natural cycle.

Third, the cascades themselves have fine detailing by which they show interesting movements in the water. Moreover, the sound of splashing mask several noises from the surrounding (Motloch 2001) and flowing water combined with the multiple reflections provide interesting experiences. However, the design of the adjacent square does not enhance these experiential values such as the positioning of the seating, placement of trees or other refuge objects.

Fourth, the lake itself, in summer time, has two distinctive edges. One side is a soft edge because of a vegetation gradient towards the water, which

provides suggestions for seating and staying at the water side with back up from the building's arcade. The other side is hard because of a straight lined edge with a beach-club terrace, which restricts people from getting towards the water by claiming the property.

Fifth, in wintertime, the same water body offers other experiences because of an ice sheet. Therefore, people walk on the ice, and can cut off their route or walk towards one of the artworks, which are normally impossible to reach.

07. WATER TRACES, HANN. MÜNDEN

APPROACH

The goal behind the square in Hann. Münden was to create 'paths followed by watercourses.' These water traces were to represent the rivers around the town. These rivers were present, but not experienced in the city and by representing the rivers on the three squares in the town, this link was aimed to be established (Dreiseitl and Grau 2005).

The redesigned square used to be a bus station on a historic site. Now it is an interactive square with a water feature that captures the sounds of the city and transforms this into ripples in the water by using vibrations on plates. Moreover, lights were used to reflect the movement of the water on the walls of the adjacent houses. This reflection is thus based on the steps of people in the water, by which they can leave a trace (Dreiseitl 2013).

PHYSICAL LANDSCAPE ANALYSIS

Abiotic layer

The relief around Hann. Münden is quite intense. The rivers Fulda and Werra have eroded steep valleys, and they merge together into the Weser. These rivers are typically mid-mountain river with extreme



Image 7.1. Hillshade map showing the relief around Hann. Münden. Source: Scilands.de

fluctuations in high and low river levels. Therefore, the city has been flooded multiple times.

The soil of the valley consists of rust-coloured forest soil of clay and sand (Hoyningen-Huene (1939). The lowest parts of the valley (around the rivers) consist of fine sand (Löss) and brown forest soils.



Image 7.2 Soil map of Hann. Münden and surroundings. From: Hoyningen-Huene (1939)

Network Layer

The city of Hann. Münden lies in a steep valley, and has therefore some distance to larger network elements such as highways. This highway connects the city to Kassel and Göttingen, nearby large cities. Only some regional roads hit the city's historic center. The city is connected to the regional railroad via a train station, which connects the same cities as the highway.

On a smaller scale, it is clear that the main roads do not pass through the city center and the case site. The rivers do pass the city center closely. Moreover, the rivers are used for tourist vessels and canoe boats.

Occupation layer

The city of Hann. Münden was established around 1200 and became a trade city. It is characterized by the timber framed housing throughout the whole city center (Tourismus Hann. Münden 2013).

The build up area of the city center contrasts highly with the surrounding buildings in colour and density. Near the city centre, several bridges cross the three rivers. Also, the energy of the water flow is used to generate power, while dams in the river keep boat traffic possible.

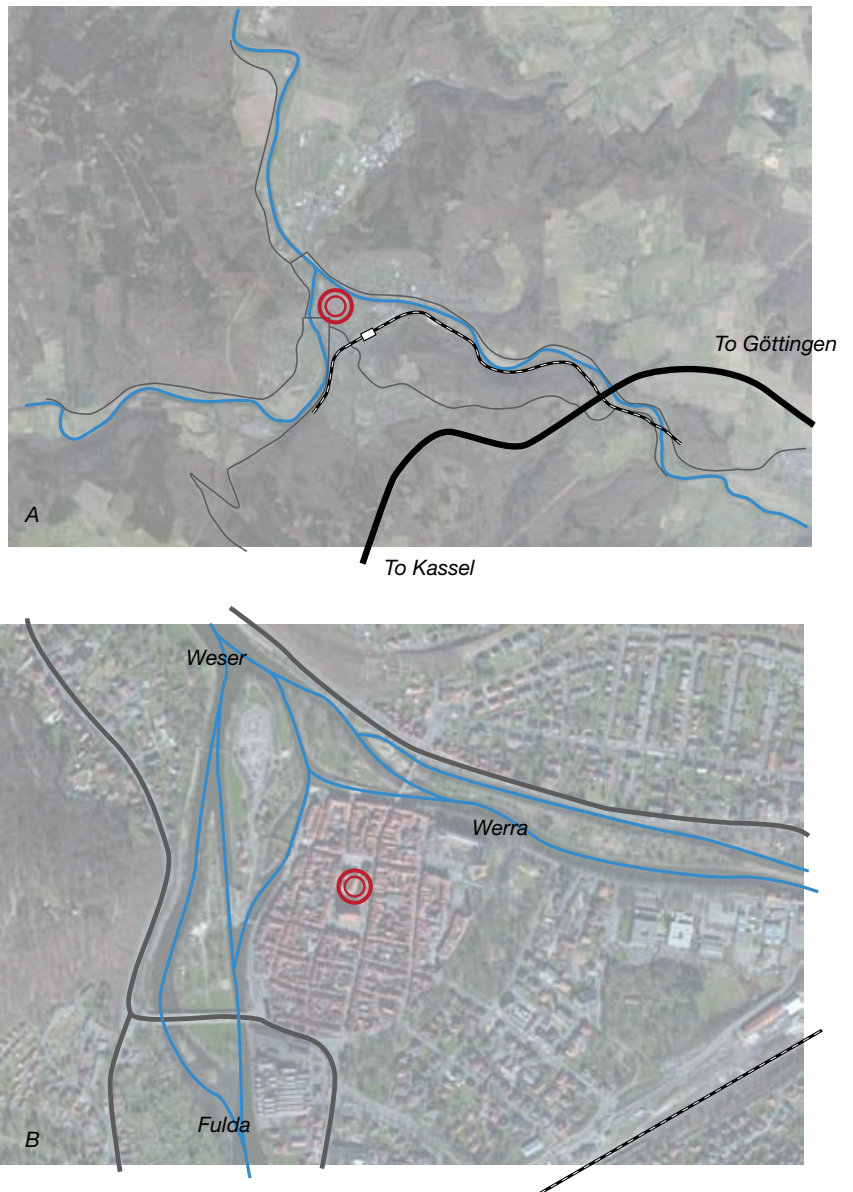


Image 7.3. Network map on high scale (A) and local scale (B).

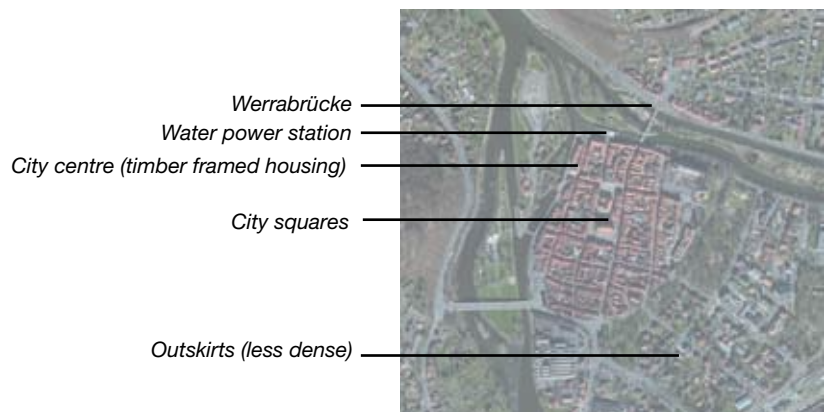


Image 7.4. Occupation map of the city center.

Plan analysis

The overall design of the water traces consists of three squares, the Kirchplatz, the square between the Church and the Rathaus and the Rathausplatz. In multidisciplinary working groups, six works of art were created on the squares (Dreiseitl & Grau 2005).

Dreiseitl designed the central water feature for the water traces. This water feature is fed by rainwater from the church and the Rathaus which have a total roof surface of 2000 m² (Dreiseitl & Grau 2005).

The water element consists of four 'terraced steps' where water flows through. In the first and highest step, the water is pumped in from a cistern. Each 'step' has a basin and is interlinked with the other steps via a slope with a certain pattern and a small level drop. The three different patterns 'reveal the rhythmic flow pattern on the surface of the water' (Dreiseitl & Grau 2005 p.134).

After the water is put through the feature, it is transported back to the cisterns.

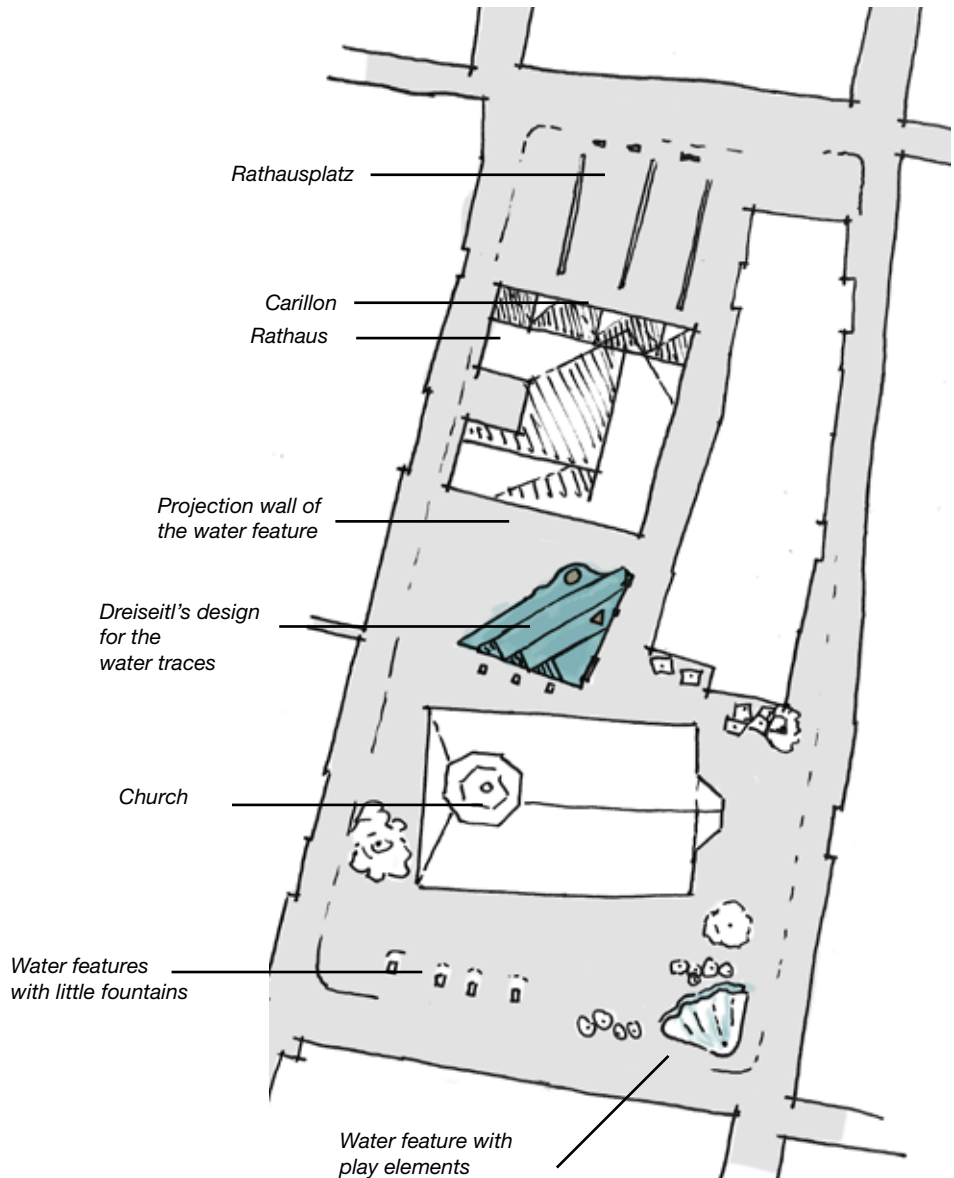


Image 7.5. Plan overview of the Water Traces design.

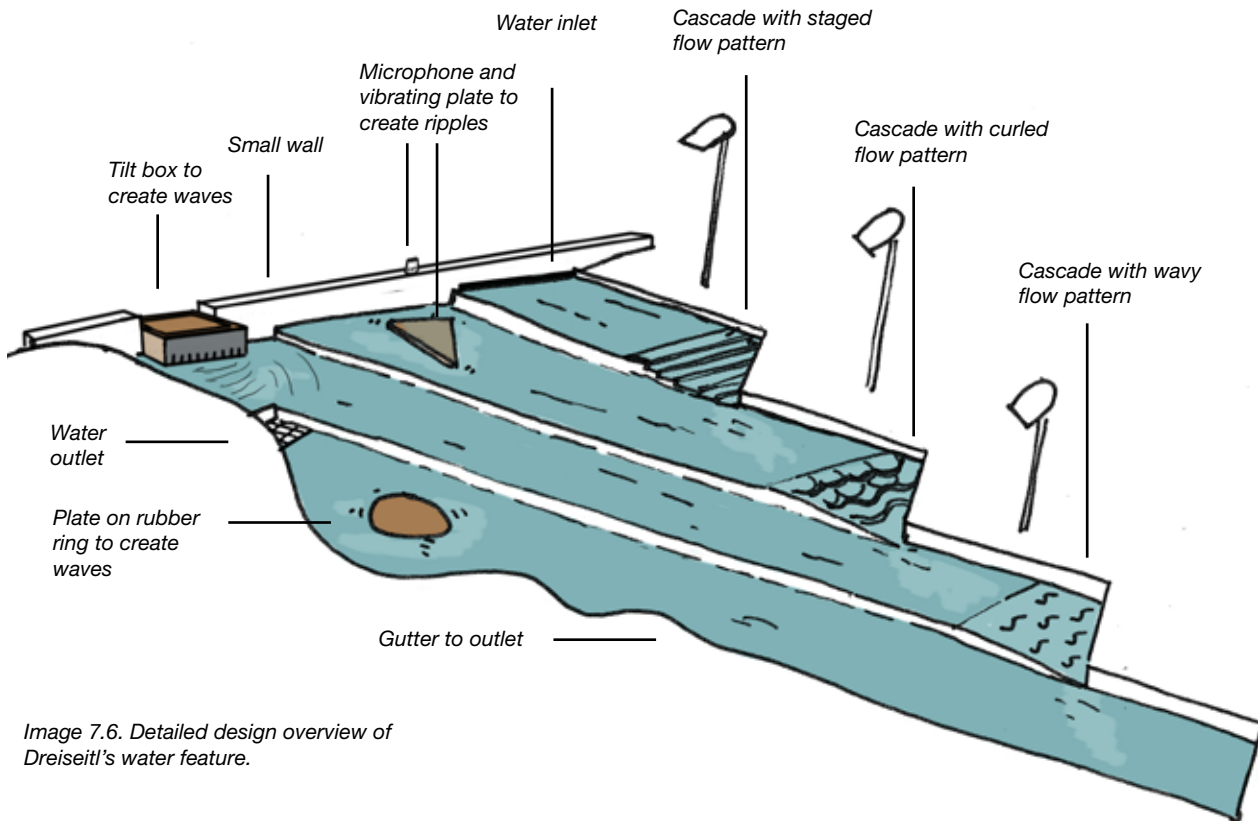


Image 7.6. Detailed design overview of Dreiseitl's water feature.

The design has several interactive elements as well. One is a microphone that catches sounds of the environment and transforms this sound into small ripples via a vibrant plate. Moreover, a plate on a rubber ring can be used to create waves. Third, a tilting box can be used to create waves.

Next to the feature are some light poles that reflect their light into the water and by that projecting water movement on the wall of the Rathaus.

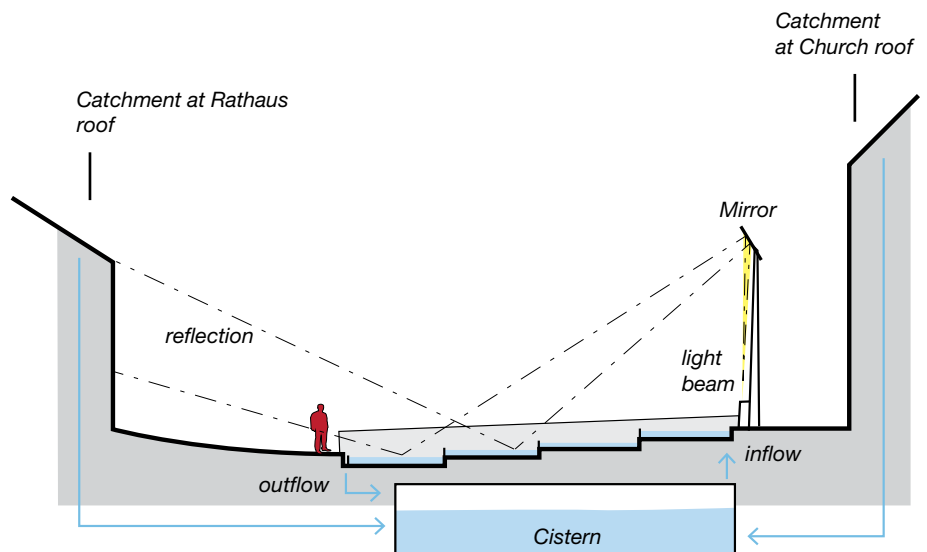


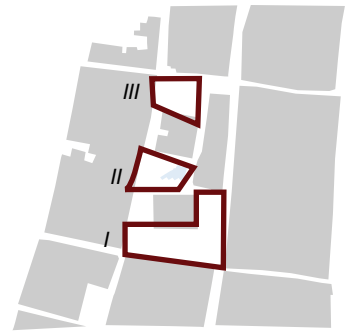
Image 7.7. Crosssection of the water feature with catchment and cistern functioning.

PHENOMENOLOGICAL EVALUATION

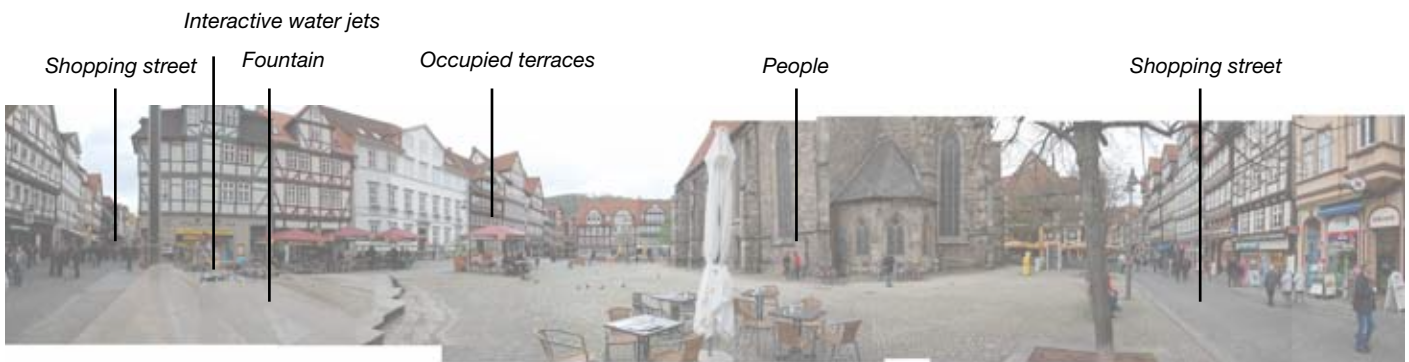
In order to show the experiential outcomes of the proposed designs, a phenomenological study has been performed on the site in spring 2013. From this study (see Appendix B) the following evaluations have been made.

Water traces

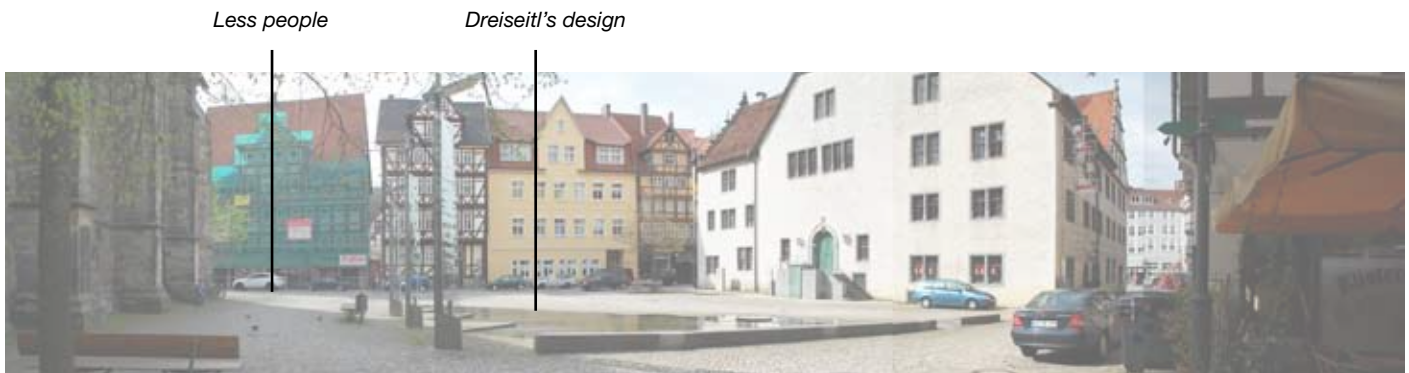
The overall concept of Hann. Munden was 'water traces' to show the dynamics of the rivers around the city. These traces would combine the different squares via a water theme. However, the result is that the different squares have water elements which have their own experiential values in vision, sound and interaction, but their link remains quite unveiled. Some small stones have to represent the traces, but one will only notice them by accident.



Position of the three squares



I



II



III Image 7.8. Properties of the three squares.

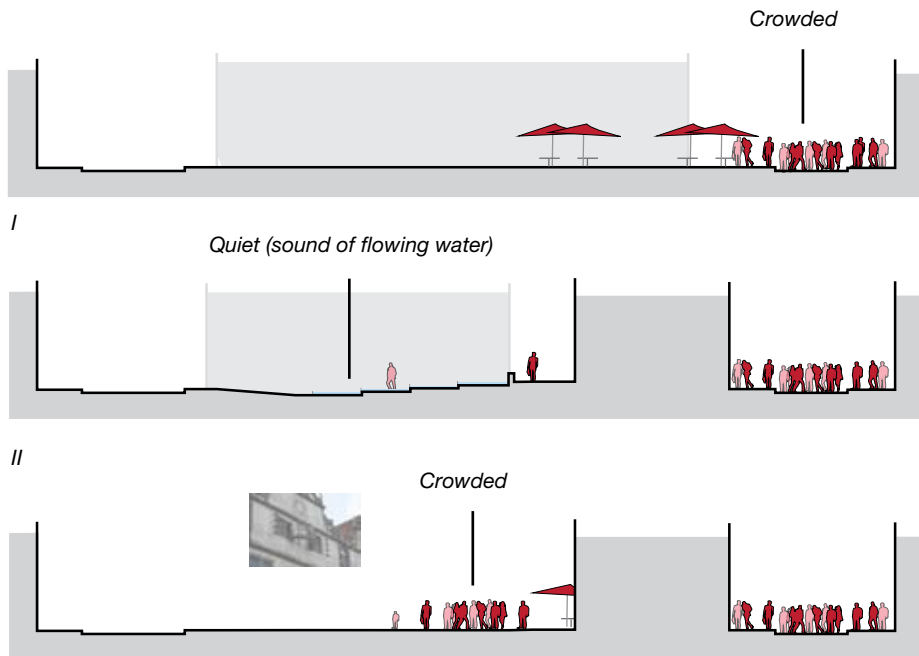
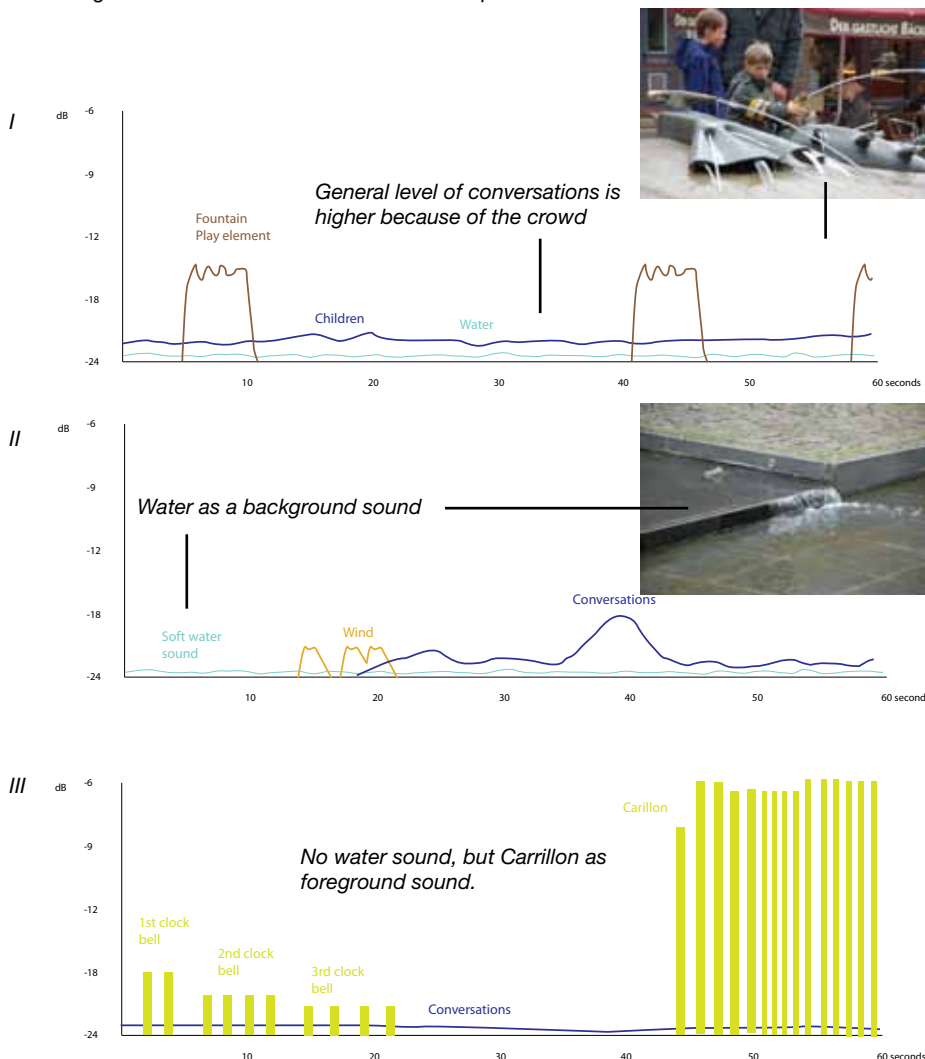


Image 7.11. Symbols in the stone pavement showing the water traces.

III Image 7.9. Distinctive actions on the three squares.



The three squares each have a distinctive character in experience. The first square is crowded and lively, since it is attached to the shopping street and serves as a place for terraces. It has several water features. The fountain on the corner of the square has interactive jets which are used by children. The sound of splashing water is interwoven with the sounds of the crowd and screaming children. The second square, with the design of Dreiseitl is less crowded. Here the soft sound of water comes to the foreground. Because of this soft sound, it is only possible to hear the water when surrounding noises are not much present. The third square has no water feature and is only occupied with people when the carillon plays. So, actually the traces are loose elements rather than a chain of water features. Their only connections manifest via the small stones marked with water related symbols.

Different angles of view, different observations

Since the water feature has been analyzed from different perspectives, some interesting results were found.

From the church's site (top panorama), the different stages of water are behind each other, and the little level drop results in that the water looks like one surface. From here, the surrounding is reflected as a mirror via the water surface. The yellow building and the white Rathaus can be seen well in the water feature. However, although the water is seen, it is not heard at this particular point. The little wall blocks the sound of the water flowing.

From the lower points, the stages are clearly visible (bottom panorama). Again, the surroundings are reflected because of the smooth surface of the water, but the mirror is interrupted because of the three stages. From this view, the long lines of the basin are well visible, as well as the three slopes with the different flow patterns. So from different perspectives, the same basin has different visual properties. At these lower points, the water is heard as a very soft sound in the landscape.



Smooth mirror
because of still water

Long lines

Slopes with flow patterns well visible

Blurry mirror because of flowing water



Image 7.17. Different views towards the same water feature.

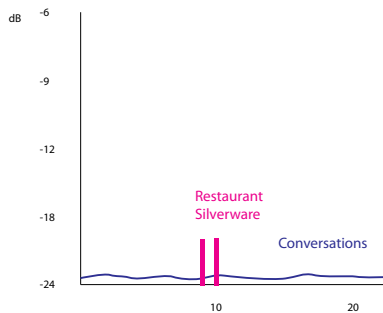


Image 7.18. Sound diagram of the upper observation point. Here the water is not heard flowing or splashing.

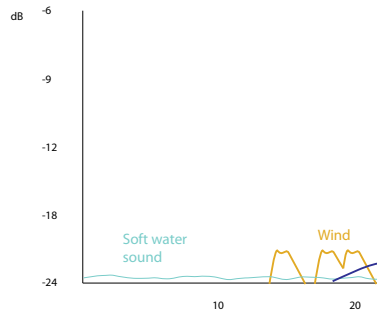
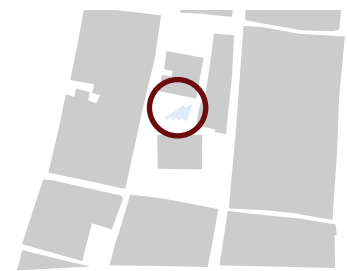


Image 7.19. Sound diagrams of the lower observation points. Here the water is heard flowing.



Image 7.12. People are exploring the interactive elements



Position of the analysis.



Image 7.13. The progression of waves of the round plate

Exploring the water features

The interactive elements of the water features are well used. At the first square, the limestone fountain (although not Dreiseitl's design it is interesting to observe) shows the magnetic effect on children. Some adjustable water jets that provide the flow of water make children run towards the elements to play intensively with the jets. The children can decide where the jet is headed and by that they can alter the flow of water over the surface.

Even more interesting are the interactive features of Dreiseitl's water element. The design of the basin results into flows over different patterns, but these are just passive. Contrary, three elements allow the user to alter the creation of waves in the basin. The first is a tilting box, where one can step on one side after another to create waves. It is interesting to see the development of the wave patterns as the waves hit the edge and bounce back while crossing the newer waves. The second one is a round plate on a rubber basis. Jumping on the edge

creates concentric circles to move away from the element. Third is a sound activated vibrating plate. The sounds of the environment are recorded via a microphone and then translated into vibrations, which on their turn create very small ripples in the water. The element reacts well on voice and other heavy sounds such as nearby trucks. In the latter case, the plate vibrates seriously hard. All the elements make clear that they are 'interactive' by their distinctive design. They stand out of the simple

design of the basin. But since it may not be directly complete clear what to do with it, people are trying and exploring these elements on what they do. Once they found out, you can see people explaining their findings to their relatives. Or for some people the interactive elements won't work, such as a man who was jumping on the round plate and then checking the vibrating plate if anything would happen there. This exploration is fascinating to see.

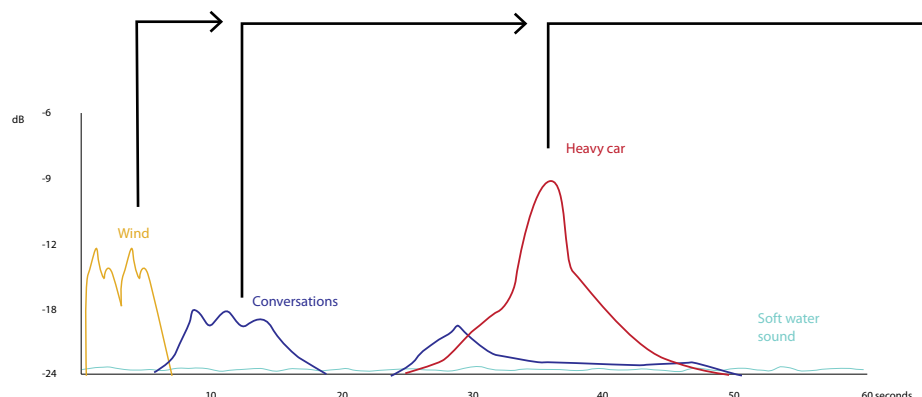


Image 7.14. Sound recording of the interactive water feature reacting towards environmental sounds.

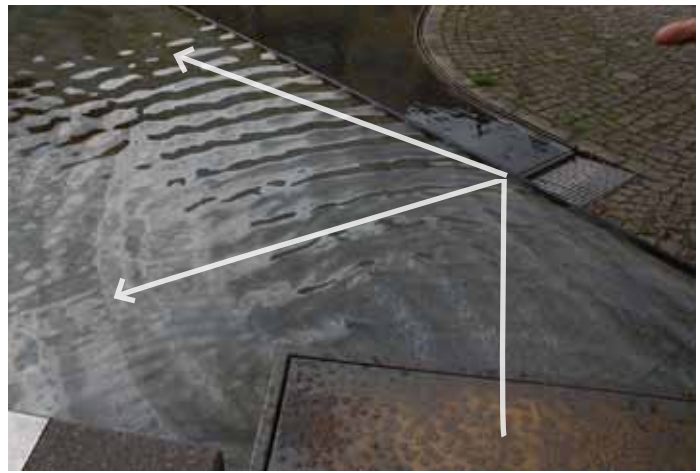


Image 7.15. The progression of the waves of the tilting plate. The waves hit the edge and are then scattered to different directions. The waves also show different reflections of the light and dark colours of the surrounding.



Image 7.16. The vibrating plate responds to sound of the environment via a microphone. The heavier the sound, intensive ripples come out of the plate.

Water Cycle

Also here, the approach of the design says the water is caught at the roofs of adjacent buildings. But the experience of the water is closer to that of tap-sink system. The water is suddenly in the landscape and after following the water slide to the lowest point, it disappears. It is stored in cisterns and moved away or refilled by rainwater, but this process is not visible. Thus, it shows an understanding in the movement of water, but not in the consequences of water in urban areas. In Hann. Münden particularly, which lies within the fusion of two rivers and has therefore been due to multiple floodings in the past, this could be something to think of and integrate in the city center when the approach is to make the surrounding rivers visible.



Artificial inlet of water



Outflow of water via a gully



Image 7.20. The way the water enters and leaves the visible part of the design's water cycle



Image 7.21. The fine detailed design for showing movements in the water.



Image 7.22. Three vertical light poles reflecting light beams onto the water feature



Image 7.23. Reflection of the light beams on the wall of the Rathaus

Intermerzzo: the Nightscape

Not only do landscapes differ in seasons (as has been seen in the Potsdamer Platz case), landscapes differ throughout the day as well. The design of Dreiseitl puts an extra layer over the landscape by emphasising the water feature with street lights. Although this is not part of the original analysis, it provides an interesting insight in water movement since the special designed street lights mirror in the water, which project the water movement onto the (back)wall of Rathaus. Not only does this light up the area, it also provides a surprising spectacle.

The light ensemble consists of both the three vertical lightpoles, which project a light beam upwards onto a trapezoid-shaped mirror, which then reflects the light beam onto different parts of the water feature. This causes three areas of water reflection on the wall.



Image 7.24. The light set-up of over the three flow patterns in the water.

EVALUATIONS OF 'WATER TRACES'

The approach behind the 'water traces' project was to create paths followed by watercourses through the center of Hann. Münden. The redesigned square by Dreiseitl is an interactive water feature which allows the user to see and modify the movement of water by action and sound.

From the experience of this design, the following things can be noted. First, the water traces themselves are not experienced as a whole or as a 'trace' but as loose water features with their individual experiential qualities. The squares that host these water features have distinctive characters, because of the space and the crowdedness. The design of Dreiseitl is in a less crowded square, where the soft sound of water comes to the foreground.

Second, the interactive elements are well used. People try (and sometimes fail) to modify the water flows or creation of ripples and see the effects of that action. Because of the design of the elements, it is quite clear what objects move and which do not.

Third, the water feature itself provides different visual experiences from different angles. From the upper side, it looks like a flat mirror, while from other directions the long lines and different steps of the water are visible. Also, the presence of sounds differs per angle, such as the water is almost not heard from the alley in between the church and the restaurants (upper side of the water feature).

Fourth, again the water is caught at the rooftops of adjacent buildings, while the experience from the water comes from a tap-like model. The water is suddenly there, and after following the 'water slide' towards the lowest point it disappears again.

APPROACH

The goal behind the Vivaldi Amsterdam project was to create a cutting edge design, including the water management. It was meant to be a 'high profile example of sustainable urban stormwater management. For the aesthetics, the building 'Drenthestaete III is 'echoed in the refined edge detailing of the water body' while water steps 'create a social space on the building side and extends into the basin,' and because of little height differences, subtle waves are created and are 'expressed into the basin by lines of underwater bubble jets' (Dreiseitl & Grau 2005).

PHYSICAL LANDSCAPE ANALYSIS

Abiotic layer

The abiotic layer of the landscape around Amsterdam was mostly formed during the last ice age. In the west, the dunes were formed, while at the current location of the city, the subsidence of Amsterdam was formed. Before 1250, this area was a swampy lake district where peat was formed (van Baaren 2010). From the dunes in the west and from the south by the river Amstel, the water flowed through this subsidence



Image 8.1. Height map of the Amsterdam Area, showing the sea dunes in the left, and the lower plains in the center, and the outflow towards the IJsselmeer on the right (AHN 2013).

towards the Zuiderzee. Because of the subsiding peat soil and the construction of dikes, the landscape later on transformed into the polder landscape (van Baaren 2010).

The area around Amsterdam is due to 900 - 925 mm precipitation per year (KNMI 2010a).

Image 8.2. The annual precipitation in the Amsterdam area is around 900 - 925 mm (KNMI 2010a)

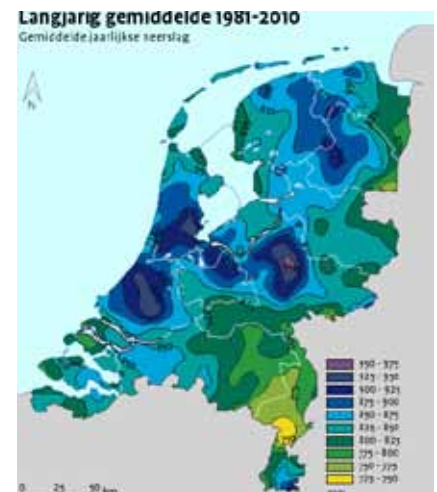




Image 8.3. Cross section of the Amsterdam area, showing the outflow of water from the polders, via the Amstel river towards the IJsselmeer.

Network layer

The case site is positioned alongside the busy A10, which is part of the outer ring road of Amsterdam. Close connections with the A2 and A4 account for lots of cars passing by each day.

Moreover, the location is situated near the railroad between Amsterdam Schiphol and Utrecht and the local subway system of Amsterdam.

Occupation layer

By building a dam in the river Amstel, the city of Amsterdam was established around 1250. Major shifts in the water system were made to control the water. The water management in the system is still based on the output to the Zuiderzee (now IJsselmeer). By different sluices and water pumps, the water is stage-wise transported to the lake. Because the polders are below the river height, water pumps are necessary to maintain dry soil in the polders.

The Vivaldi project is part of the Zuid-As (Southern Axis) business area development.

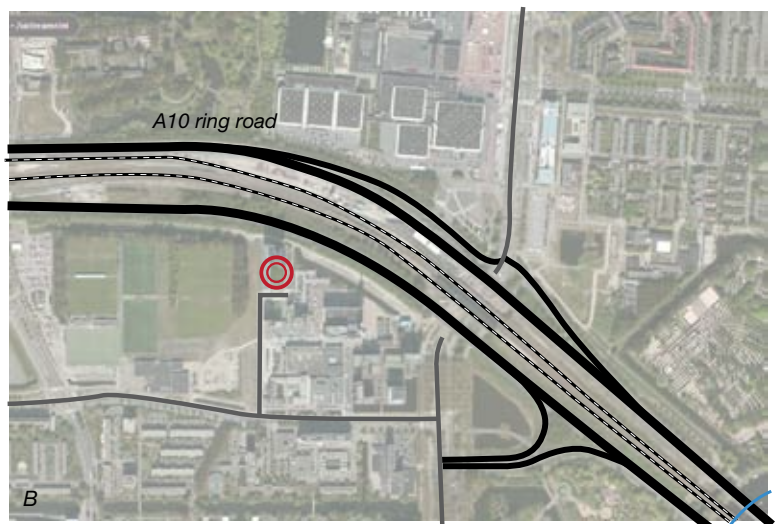


Image 8.4. Network maps of the Amsterdam scale (A) and Zuid As scale (B).

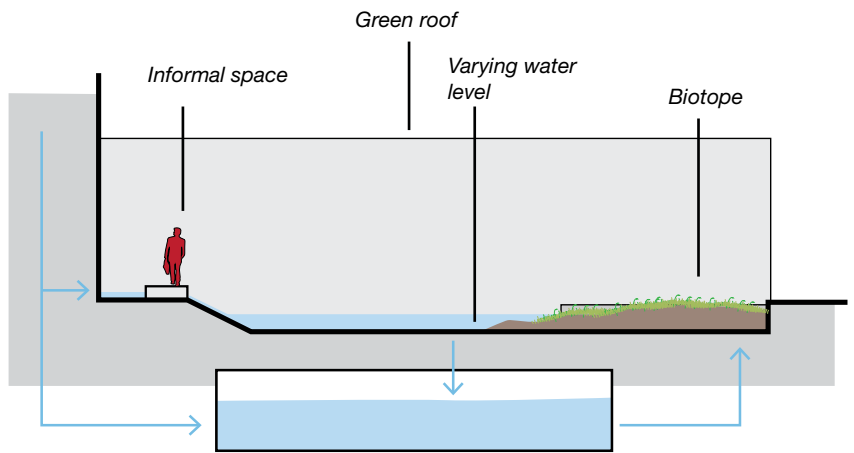


Image 8.5. Cross section of the plan, showing the basin with the informal space, biotope and varying water level.

Plan analysis

One of the main real estate constructions is the Drenthestaete III building, designed by Norman Foster and Partners (Dreiseitl & Grau 2005). This building is interwoven with a water design project by Dreiseitl that catches rainwater from the (green) roof which is filtered on site and reused (65%) within the building itself. By circulating water, the implementation of a cistern is necessary to provide water during the whole year. In case of excess precipitation and incapability of the system's buffer, water is released in the Spoorslagsloot canal (Dreiseitl & Grau 2005).

The visible parts of the system are the low cascade between the buildings and the wetland zone at the southern edge of the basin and the basin itself. (Dreiseitl & Grau 2005).

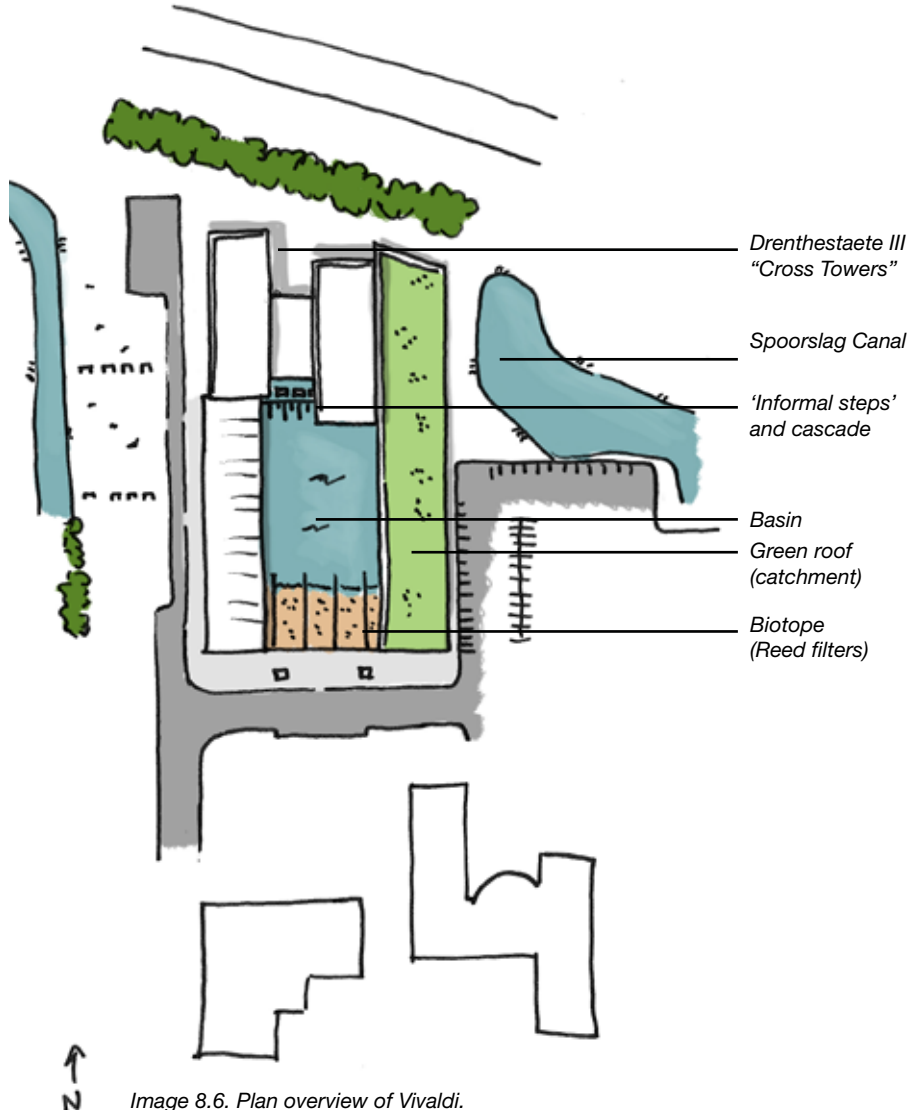
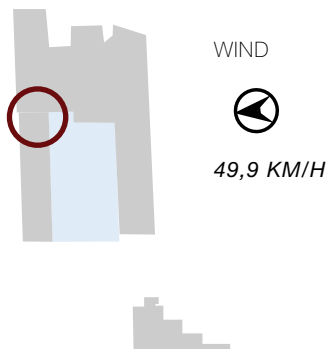


Image 8.6. Plan overview of Vivaldi.



Merely a reflection visible because of waves and light

Waves splash against edge



Image 8.7. Sensory input of water and wind.

PHENOMENOLOGICAL ANALYSIS

In order to show the experiential outcomes of the proposed designs, a phenomenological study has been performed on the site in spring 2013. From this study (see Appendix D) the following evaluations have been made.

Water and wind.

Because of the wind, lots of waves are produced in the basin in front of the Ernst & Young Building. These waves make a little splash when they hit the edge of the basin. Because of these waves, the reflection in the water is harder to see, since light is reflected into multiple direction rather than as a mirror. But the effect of wind onto water goes further than little waves. Because of the height of the building, strong wind squall (49,9 km/h) creates spirals of water.

Because of the positioning of the building in comparison with the actual wind direction (East) results in the lack of wind free areas. This makes the place not attractive to stay.

Direct reflection

Scattered reflection

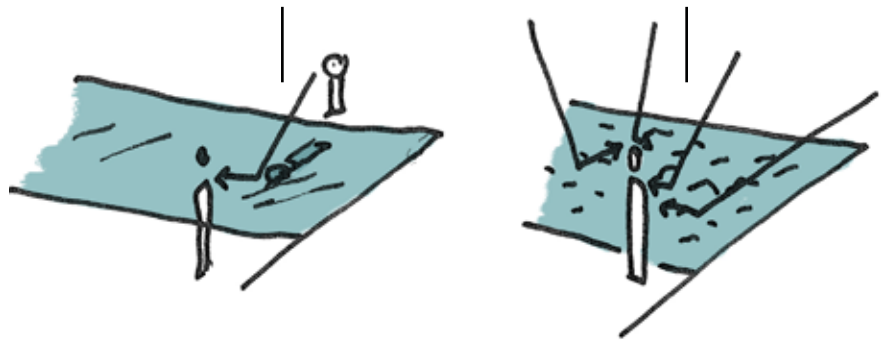


Image 8.8. The effect of wind (right) on the reflection of an object in the water. With lots of waves, there are multiple angles that reflect different sources of light towards the observer.

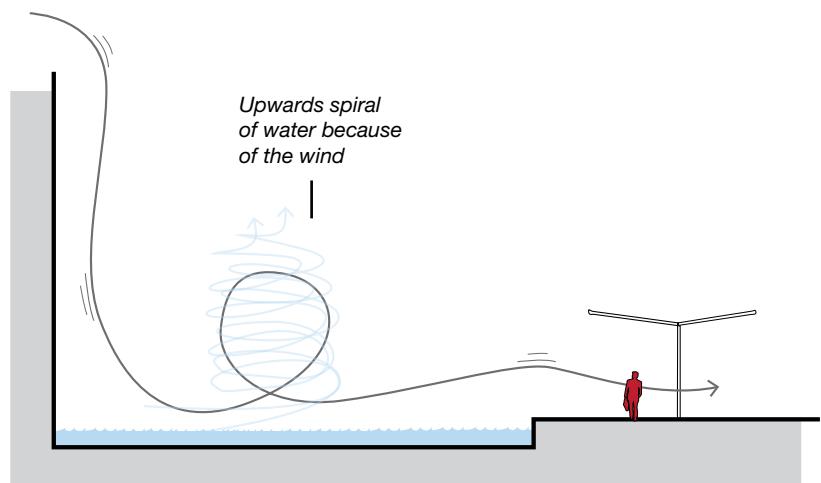


Image 8.9. The strong wind in combination with the high rise buildings create squall winds causing the water to whirl up.

Idea and Practice

The original idea included water flowing over a surface to create waves, while being expressed by bubble jets. Unfortunately, the element had been broken for several months and by that the original idea does not work to the full extent anymore. Also, the whole process of sustainable stormwater management is not quite to be experienced. The green roof cannot be seen, neither the reuse of water. The biotope is the only cue for on-site cleansing of the water, but does not tell anything about the varying levels that are caused by heavy storms.

This show the vulnerability of 'sustainable' water systems and their need for maintenance as also expressed in Dreiseitl and Grau (2005). "Regarding water features, many things can go wrong and maintenance is expensive" (Dreiseitl & Grau 2005 p.163). But because of that, what is left then is merely a basin, that in quiet weather solely reflects the building.

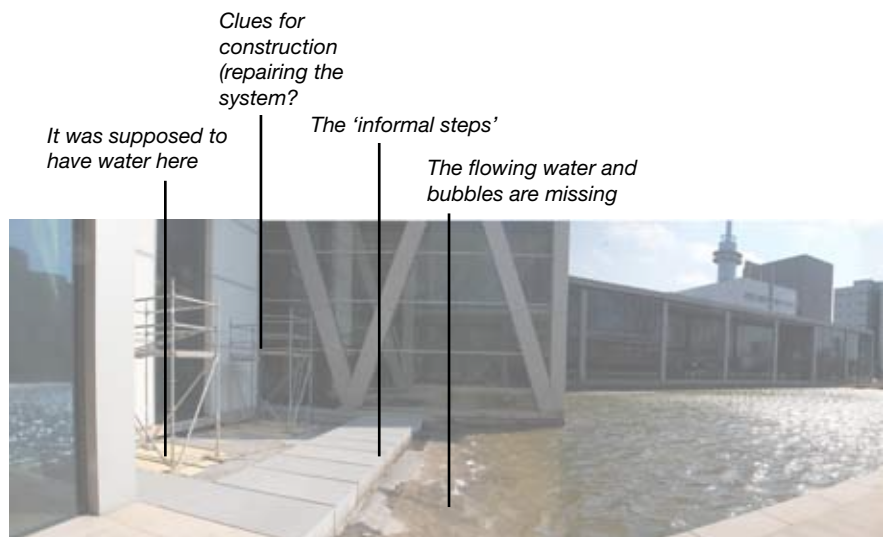


Image 8.10. The malfunctioning of the water system.

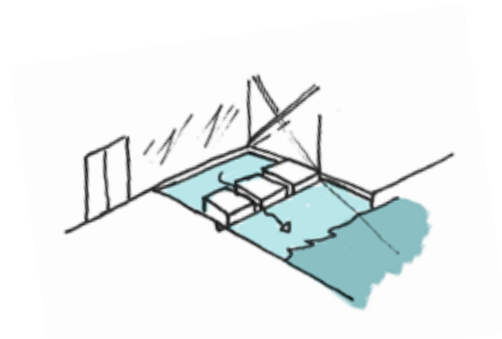


Image 8.11. The flow of water as was intended in the design.

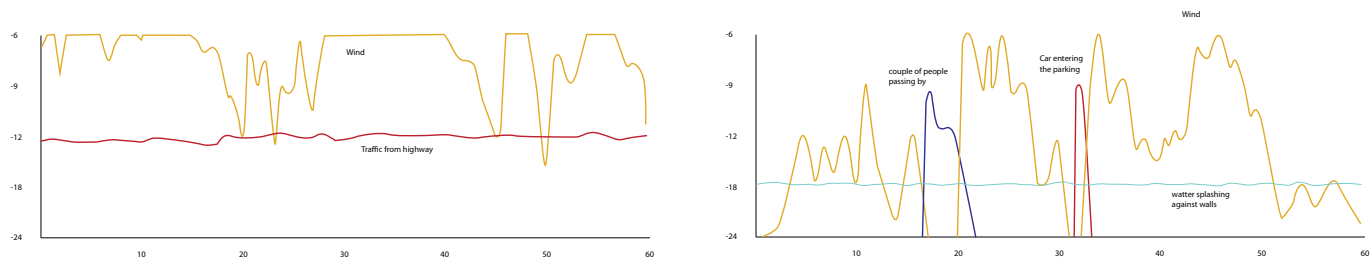
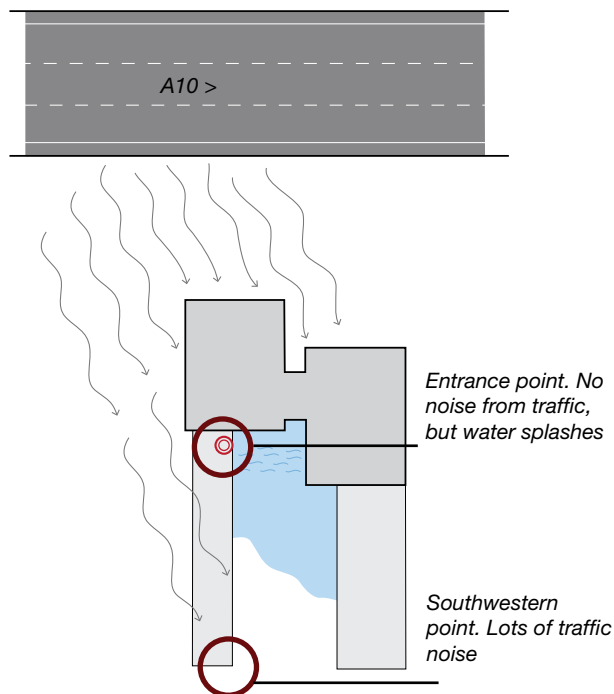


Image 8.12. The sound diagrams of the southern point (A) on the left, showing the traffic noise in red and the sound diagram of the northern point (B) on the right, showing the sound of water splashes in light blue.

Building and sound

Moreover, the position of the pool in relation to the building and the highway gives some insights as well. Since the A10 highway is part of Amsterdam's ring road, lots of traffic noise is produced. This can be noted in the sound diagrams. Here, in the first diagram which is recorded at the south-western corner of the site, the constant noise of traffic passing by (red line) has a relatively high decibel value. Contrary, near the entrance of the building, where the highway noise is blocked by the building, the soft sound of waves splashing against the edge is possible to hear, whereas in the other observation points, this phenomenon is not possible to distinct audially.



Here, the A10's traffic noise is blocked

The splashing waves

Here, the noise of the traffic is well heard

Image 8.13. The schematic overview of traffic noise and shelter because of the building



Image 8.14. The differences of positions in relation to the building and noises.

EVALUATIONS OF THE VIVALDI PROJECT

The approach for the Vivaldi project in Amsterdam was meant to be a cutting edge example of sustainable urban stormwater management. The design of the building was meant to be reflected in the refined edge detailing of the water body, which include a low cascade, a pool and a wetland zone.

From the experience of this design, the following things can be noted. First, the combination of wind and the water in the pool result into lots of small waves, which splash against the edge of the basin. Moreover, because of the waves, reflections are harder to see since light is scattered around. As stated by Motloch (2001) 'reflecting surfaces must be near grade for effective reflections (Motloch 2001 p.75). Also, with the observed wind direction, there are no refuge places on site.

Second, because a water element was broken for quite a while, the idea of water flowing over a surface could not be experienced. Such

events show the vulnerability of a water system due to maintenance and failure.

Third, the position of the building in relation to the highway A10 results in lots of traffic noises around the building, except for the entrance. Here the noise of the highway is blocked by the building and soft sounds of waves can be heard.

Part. IV

CONCLUSIONS, DISCUSSION & REFLECTION





This thesis aimed to give design principles on the aesthetics of water, through an exploration of the designs and lived experiences of the work of Herbert Dreiseitl. First, the concepts of lived experience, phenomenology and aesthetics have been explored. Next, the properties and behaviour of water in the urban environment has been investigated. An interview with Herbert Dreiseitl gives insight in his position towards water aesthetics. Finally, the analysis of the lived experience gives design principles on designing with the aesthetics of water.

LIVED EXPERIENCE, PHENOMENOLOGY AND AESTHETICS

In order to understand lived experience, resulting into aesthetic experiences, a literature study has been performed to elaborate on these topics. Experiences in landscape happen somewhere in the mind in the interaction of a person's senses and his surroundings. Lived experiences are the actual experiences someone has in a landscape through sensory experience by vision, hearing, smell-taste and touch. The study of these experiences is called

phenomenology. The bodily senses combine the gained input to form an image of a particular environment. This picture forms the basis for aesthetic experience, which involves an evaluation of a certain place after knowledge is gathered through the senses.

PROPERTIES AND BEHAVIOUR OF WATER IN THE URBAN LANDSCAPE

The second topic of the literature research focussed on the properties and behaviour of water and how these take shape in urban landscapes. The physical and chemical properties of the water element, such as the high viscosity and high surface tension, result in the behaviour of water such as the spherical shape of a droplet and the meandering of rivers. External effect such as wind or obstacles in the river flow create ripples, waves or eddies. In a natural way, water moves in a hydrological cycle from precipitation, through runoff or groundwater flows to surface water, from where it evaporates in to clouds, which then close the cycle to precipitation again. In the urban water cycle, fresh water is brought in the city and is disposed as dirt water out of the city. In between, precipitation

inserts this system, while reuse is scarce. Therefore the urban cycle is not closed. With climate predictions in mind – higher intensity of rainfalls on an impermeable urban surface – water in cities becomes more often problematic. Recent approaches for these problems are SUDS, the urban harvest approach, or water squares.

DREISEITL'S APPROACH TO THE AESTHETICS OF WATER

An interview with Herbert Dreiseitl on water aesthetics gave the following position of the designer towards designing with water and aesthetics. Dreiseitl sees nature as big inspiration, by looking at what it is doing in its natural behaviour. Water itself is selfless, it cannot be grasped but can only be steered. Aesthetics is something that follows out of a meaningful thing if the context and function is right. Also important in aesthetics is purity and simplicity, and bringing this to a high performance.

Some examples given by Dreiseitl on his work with water aesthetics are an art installation in Gelsenkirchen, the Potsdamer Platz which marked the breakthrough of Dreiseitl, Bishan Park in Singapore and smaller projects such as the Water traces in

Hannoversch Münden.

PHENOMENOLOGICAL ANALYSIS AND DESIGN PRINCIPLES

The lived experience of some of the realized works has been explored critically through a phenomenological analysis. In these cases the difference between the intentions of the design and the realized outcomes are explored. All three case projects focus upon rainwater catchment in urban areas, showing the water during runoff processes. The three selected projects are the Potsdamer Platz in Berlin, 'Water traces' in Hann. Münden and the Vivaldi project in Amsterdam. The observations of these cases show pitfalls and advantages. Moreover, the observations are translated into five principles for future design.

Observation: Artificial systems rather than 'natural behaviour.'

In all explored case projects, the natural behaviour of the water - where it is coming from and where it is going - can hardly be seen, although this was one of the intentions of the designs. All three projects have cisterns for storing water and artificially pumping it back into the visible train, which is necessary for continuous water flow.

Because of this practical problem, none of the projects shows actually where the water is coming from and none of them shows where it is going to. The water is circulated so that the aesthetic experience of flowing water comes out at maximum level. Here, the difference between designing for art and designing in landscape architecture is well shown. Dreiseitl uses the process of water (catchment, cleansing, flowing and runoff) in order to show several properties of the water as an artwork, which a landscape architect probably wouldn't think of, whereas a landscape architect looks at intercepting the water process in the urban area in order to retain runoff and cleansing in a natural way.

Design principle 1: Combining natural behaviour and artificial systems.

The work of Dreiseitl shows that if one wants a continuous flow of water, the use of cisterns is inevitable. However, this limits the experience of the natural behaviour of the design. When too much or too less rainfall needs to be processed, this difference can be shown in the 'visible' part of the design. This can be done by allowing differences in water level. On one hand, a continuous flow of water

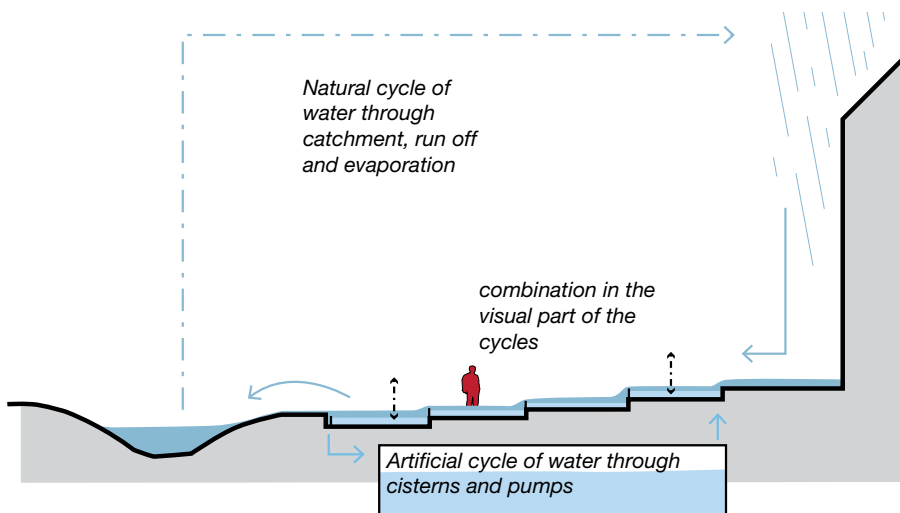


Image 9.1. Combining natural behaviour and artificial systems in design

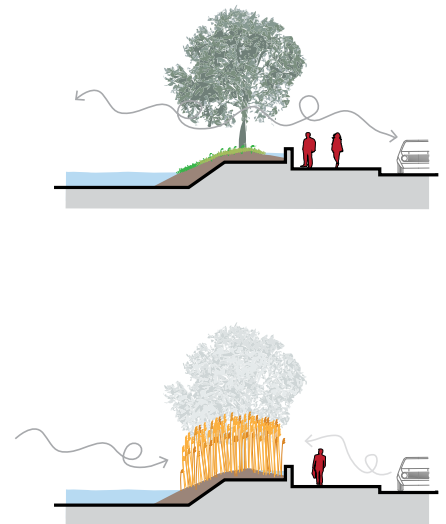


Image 9.2. Investigate multi-seasonal properties of design elements.

through the cisterns takes care for enduring water experience, since there is always some water. On the other hand, intensive rainfall is directly experienced in higher water levels and immediate run off, as would be expected in such conditions. In the latter case, one experiences where the water is coming from, and where it is going to.

Observation: seasonal differences

In the case project of the Potsdamer Platz design, where a multi-seasonal analysis took place, several observations show the

differences between two seasons. First is the cleansing biotope with the *Phragmites Vulgaris*, which grows up to 3 meters in wintertime. This 'wall' of vegetation protects pedestrians against certain wind influences, while stopping the traffic noise from the other side. In summer, this 'wall' is not present, and therefore the experience is different. Moreover, the intensive colours change through the seasons. Moreover, effects such as snow influence the landscape as well; it provides routes through the landscape which would be impossible otherwise, and places

can be reached such as mid-lake artworks.

Design principle 2: investigate multi-seasonal properties of design elements

Since landscapes change through the season and experiences go along this change, it is important to keep in mind the properties the designed elements contain. Exploring these properties help in designing experiential attractiveness throughout the year, rather than focussed upon a single season.



Image 9.3. Full aesthetic properties as an input for design

Observation: fascination and experiences

The designs of Dreiseitl give valuable insights in water in the urban environment and lead to interesting experiences of landscapes because of the detailed water movement and fine forms. The way Dreiseitl designed, addresses multiple senses rather than solely the visual. Also in the visual sense, Dreiseitl plays with colour, light, reflection and the finer properties of flowing water.

Design principle 3: Investigate full aesthetic properties as an input for design.

In order to use the full aesthetic properties of water, one can design the landscape while starting from multi-sensual experiences, such as Dreiseitl did. In here, the focus lies upon which aesthetic experiences can be taken from water itself, and then using that as a basis for the landscape design. Dreiseitl does this via experiments in order to see what water is doing in certain conditions and what experiences resulting from that situation.

Observation: Artistic versus landscape approach

The previous outcome shows an artistic approach towards water in urban landscapes. However, the holistic view of a water element within an urban landscape lacks. The artistic expression of water is put above the holistic experience of humans in the landscape. For example, in the Potsdamer Platz case, the design of the surrounding squares next to the water cascades do not comply the experience of the water. The water square, as designed by the Urbanisten, shows a design

of a square that is affected purely by rainfall, in which the experience of the holistic landscape is central instead of a water flow. Moreover, the Vivaldi project meant to show properties of water, but the lack of refuge restricts a pleasant experience of the same water. Also, the Vivaldi project shows the vulnerability of water systems, and lack of maintenance results in the malfunctioning of 'cutting edge' design.

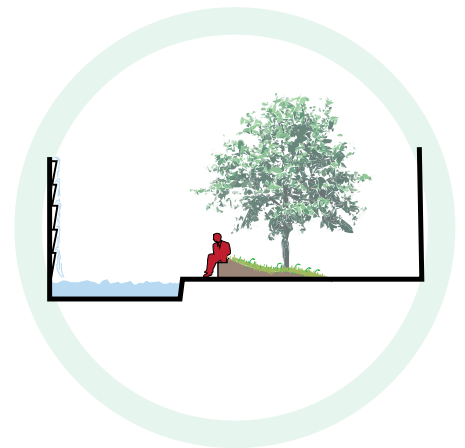


Image 9.4. Holistic design by combining an artistic approach and a landscape approach.

Design principle 4: design holistically by combining an artistic and landscape approach.

The multi-sensual experiences from water should be emphasized by the design of the surrounding landscape. So the artistic approach of the properties of water can be experienced better if the design of the landscape builds further on this experience. This means that the multi-sensual experience is not an end, but a mean and that positioning and form of the water element, trees and vegetation, routes, seats, etc. enhance the experience.

Observation: People's fascination for water

More design guidance can be taken from the designs since the realized works of Dreiseitl show the fascination and thrift to explore water within humans. The interactive elements of the Water traces project are logical because of their distinctive forms and colour and easy in usage, which allows for action rather than passive experience. This is a valuable guidance for landscape architects in designing with water.

Design principle 5: design for action rather than passive experience

A water element in the urban area is instantly more interesting if there is something to do. Flowing water is ought to be nice to hear and give calming effects on the mind, but to be able to actually interact with the water attracts a fascination in ourselves that keeps a lot of people stay longer near the water element in the designed landscape. The design of Hannoversch Münden is designed in such a way that the possible interactions are clear to be used, even for strangers.



Image 9.5. Design for action rather than passive experience.

Closing words: Storytelling

One final aspect of the design versus experience relationship is found in the selling of the design. From the phenomenological analysis, it appears that Dreiseitl is good at telling the story of water. Although the designs may not be the landscape that is experienced holistically, they are designed to tell stories, even though that story is not experienced on site. One has to take into account that designs are meant to be experienced, but in order to do so, a municipality has to be convinced. Such stories play a major role in convincing municipal board member, since they create imagination and affinity with a design. This factor may be one of the reasons of Dreiseitl's international success in landscape architecture, and can therefore inspire both students and professionals in landscape architecture.

The conclusions that have been drawn in the previous chapter need some context. Several choices have been made during the research that have influenced the development of this thesis. These choices and the context will be provided in this chapter.

NARROWING OF THE SCOPE

First, the field and the content of aesthetics have been discussed for many years. Different writings show different approaches and definitions of the meaning and range of aesthetics. This thesis has taken several writings of the same direction in order to be able to explain how one approach of aesthetics works. Because of this narrowing of the scope, the results of this thesis can therefore not be interpreted correctly if aesthetics is regarded as solely 'beauty.'

GENERALIZABILITY OF THE RESEARCH

This thesis has not aimed to provide a holistic view over the topic of water aesthetics. The thesis has rather focused upon one designer within the field of water aesthetics in order to give an understanding in the process. The outcome of this research can therefore not be applied in general to any designed urban waterscape but may provide guidance for future designs.

Moreover, the field of phenomenological research is relatively new. There are no positivistic scientific methods but

phenomenology aims to objectify subjective experience. It is necessary to keep in mind that the observations have been performed by 1 observer with a particular background in landscape architecture. Although it may be said that each of our individual experiences are different, there is always some common ground. All individuals have the same sensory mechanisms and we have the brains for processing this information into perception, so by that there is a 'high degree of universality' in the lived experience of landscapes. (Bell 1999 p.82). The moments for observing the case studies has been done by means of what was suited (travel, available time) and therefore are not completely random. In the case of the Potsdamer Platz in Berlin, the results of the first case study were not providing enough information to draw conclusions because of the weather conditions (frozen water, snow and cold temperatures) which gave reason to revisit the place in spring.

Next, the case studies have some factors influencing their phenomenological outcome themselves. As said above, the weather conditions influence the outcome in a large manner. The weather during the first case study in Berlin caused the absence of flowing water, and therefore limiting the observation of the core topic of the case study. Moreover, during the Vivaldi case study in Amsterdam, a strong eastern wind (5 on the Beaufort scale) diminished lots of other sounds and smells. Cases can therefore not be compared to the full

extent since the conditions are not the same. But, weather is part of the landscape and thus part of a specific location as well. Moreover, not all observations were possible due to other restrictions. The Vivaldi analysis was limited because it was not allowed to observe from the terrace at the water side because it was private property. Moreover, not only because of weather conditions but because of technical failure as well, systems such as in the Vivaldi project did not function well, influencing the observed aesthetic qualities.

LIMITATIONS

Restrictions in data availability resulted in different depth of the landscape analysis. For the case in Berlin, an atlas for the environment (UmweltAtlas) was available, providing the necessary and in-depth information for backing up the findings. For the Vivaldi case, information via well known sources such as Bodemdata (Alterra) and the general height map (AHN) of the Netherlands was available, in contrary to the case of Hann. Münden. There, only a very basic height map was found (SciLand) and a global soil classification was found dating back from 1939 (Hoyningen – Huene 1939). Moreover, the project leader of the Potsdamer Platz project for the Senate of Berlin had retired a couple of years ago, taking all the information about the design and construction process with him, says Christian Fritsche, the current project leader. Vital information could have been gained from a conversation with the former project leader.

In this chapter, personal reflections are made upon the process of the research itself. Shortcomings of applied methods and concepts as well as changes during the research are discussed here.

Aesthetics is a complex and vague concept and because of that, my perspective towards what aesthetics are, has changed several times. Literature that was found later on changed some perspectives or nuances in the text as well. Moreover, the starting point of the thesis laid in aesthetics of water while phenomenology came into thesis only later on when addressing the method for evaluating the cases.

The time span of this thesis has taken a little longer than originally planned. The aim was to be finished in late April, but because of the case studies which were constrained both to the weather (late spring) and availability of visiting the case sites (weekend, hotels and transport), the thesis took four weeks longer than planned. But due to this extension it was possible to get the interesting results that were hoped for in the beginning of the research.

The process of doing research in advance of using a method is a useful manner of preparing. In advance of the interview with Herbert Dreiseitl, a small research has been performed towards the theory and practice of doing interviews (with the help of Bart Cosijn from urban dialogue). This helped to structure the interview and prepared me for guiding the interview with different actions when necessary.

On the planning of a phenomenological analysis, the following can be recommended. The experience with this method points out that the most interesting results have been gathered from a multi-seasonal analysis. This takes time, but the process of the landscape can be explored better.

Because for me this was an experiment in getting to know this method better, the analytical degree developed along the way. Therefore, the later analyses (Potsdamer Platz in spring and Hann. Münden) could have a better focus. Also, mid-term supervision led to the improvement of the proposed method, such as elaborating more on the actual experiences rather than being descriptive.

Also, it will take a lot of reading in order to be capable of envisioning an experience for a broader public. During supervision I have been pointed towards my scope, or my view towards items which are often related to what I do. This, then, had an effect on the style of writing or for including things in the theoretical framework or leaving them out. This can be improved by reading more about landscapes in general, which helps during such analyses.

Moreover, on the method of phenomenological analysis itself, the following has to be reflected. I recommended to use a tripod for the panorama shots. In this analysis, the 360 degree photos were taken by hand but the horizon and angle of the photos differ because of that. Using a tripod will help to create better panoramas at the desk work.

- Agudelo-Vera, C., 2012. Dynamic water resource management for achieving self-sufficiency of cities of tomorrow. Wageningen University.
- AHN, H. &, 2012. Hoogheemraadschap Hollands Noorderkwartier en Algemene Hoogtekaart Nederland. Available at: <http://www.zeeniveau.nl/laagdroog.html> [Accessed November 1, 2012].
- American-Heritage-Dictionary, 2012. American Heritage dictionary. Available at: <http://www.ahdictionary.com/> [Accessed December 20, 2012].
- Atelier Dreiseitl. 2013. Office portfolio <http://www.dreiseitl.com/index.php?id=2&lang=en> [Accessed March, 2012].
- Baaren, V., 2010. Amsterdam Waterbestendig, <https://www.waternet.nl/media/164375/amsterdam%20waterbestendig.pdf> [accessed May 2013].
- Bade, T., 2012. Presentation at symposium "dag van de ruimtelijke kwaliteit."
- Beardsley, M.C., 1981. Aesthetics: problems in the philosophy of criticism 2nd ed., Indianapolis: Hartcourt, Brace & World.
- Bell, P.A. et al., 1996. Environmental psychology, Fort Worth: Hartcourt Brace College Publishers.
- Bell, S., 1999. Landscape: pattern, perception and process, London: E&F N Spon.
- Bourassa, S., 1991. The aesthetics of landscape, New York: Bel Haven press.
- Boyce, C. & Neale, P., 2006. Conducting In-depth Interviews: A Guide for Designing and Conducting In-Depth Interviews for evaluation input. , (May).
- Brook, I., 2013. Aesthetic appreciation of landscape. In P. Howard, I. Thompson, & E. Waterton, eds. The Routledge Companion to Landscape studies. New York, NY: Routledge, pp. 108–119.
- Buck-Morss, S., 1992. Aesthetics and Anaesthetics : Walter Benjamin ' s Artwork Essay Reconsidered. , 62, pp.3–41.
- Carlson, A., 2009. Nature & Landscape: an introduction to environmental aesthetics, New York, NY: Columbia University press.
- Carmona, M. et al., 2003. Public places, urban spaces: the dimensions of urban design, Architectural press.
- Carnwell, R. & Daly, W., 2001. Strategies for the construction of a critical review of the literature. Nurse education in practice, 1(2), pp.57–63. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/19036245> [Accessed November 1, 2012].
- Ciria, 2007. The SUDS manual.
- Van Dam, J. et al., 2012. Bodem en Water 1, onderdeel water, Wageningen: Wageningen University.
- Dee, C., 2012. To design landscape: art, nature & utility, London & New York: Routledge.
- Deming, E. & Swaffield, S., 2011. Landscape Architectural Research: Inquiry, Strategy, Design, Wiley. Available at: <http://books.google.nl/books?id=FMGq98KFI98C>.
- Dewey, J., 1934. Art as experience, New York: Berkeley Publishing Group.
- Van Dijk, P. & Veul, J., 2010. waterways to climate adaptation: a landscape-based design approach for sustainable urban water systems.
- Dreiseitl, H., 2012. Interview on water and aesthetics. Überlingen.
- Dreiseitl, H., & Grau, D. (2005). New Waterscapes: planning, building and designing with water. Basel: Birkhäuser.
- Duchhart, I., 2007. Designing Sustainable Landscapes: From Experience to Theory A. Process of Reflective Learning from Case-study Projects in Kenya. Wageningen University.
- Van Etteger, R., Forthcoming. The aesthetics of landscape architecture and designed landscapes. Wageningen University.
- Etymonline, 2012. Online etymology dictionary. Available at: <http://etymonline.com/> [Accessed December 20, 2012].
- Francis, M., 1995. A Case Study Method For Landscape Architecture, pp.15–29.
- Fritsche, C., 2013. Interview on the design of the Potsdamer Platz.

- Gallagher, S. & Zahavi, D., 2008. *The phenomenological mind: an introduction to philosophy of mind and cognitive science*, New York: Routledge.
- Gatrell, J.D., Bierly, G.D. & Jensen, R.R., 2005. *Research design and proposal in spatial science*, New York: Springer.
- Gibson, C.C., Ostrom, E. & Ahn, T.K., 2000. The concept of scale and the human dimensions of global change: a survey. *Ecological Economics*, 32(2), pp.217–239. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0921800999000920>.
- Gibson, J.J., 1966. *The senses considered as perceptual systems*, Boston MA: Houghton Mifflin.
- Gregory, R., 1970. *The intelligent eye* McGraw-Hil., New York.
- Hall, M.J., 1984. *Urban Hydrology*, New York, NY: Elsevier Science publishing CO., Inc.
- Harper, D., 2012. Online etymology dictionary. Available at: http://etymonline.com/index.php?term=aesthetic&allowed_in_frame=0 [Accessed April 23, 2013]
- Heft, H., 2010. Affordances and the perception of landscape: an inquiry into environmental perception and aesthetics. In C. Ward Thompson, P. Aspinall, & S. Bell, eds. *Open space: people space 2: innovative approaches to researching landscape and health*. London: Routledge, pp. 9–32.
- De Hoog, M., Sijmons, D. & Verschuuren, S., 1998. Herontwerp van het Laagland. In D. H. Frieling, ed. *Het Metropolitane debat*. Bussum: Thoth, pp. 78–84.
- Hooimeijer, F., 2007. *Stedenbouw in een waterrijke traditie. Ontwerpen met Water*, VROM.
- Hoyningen-Huene, P.F.F., 1939. *Die Niedersächsischen Böden*, Oldenburg: Gerhard Stalling A.G. Verlag.
- Isaacs, R., 2000. The Urban Picturesque: An Aesthetic Experience of Urban Pedestrian Places. *Journal of urban design*, 5(2), pp.145–180.
- Jacobs, M.H., 2006. *Production of Mindscapes: a comprehensive theory of landscape experience*. Wageningen University.
- Jieyan, Q., 2011. *Rainwater harvesting in metropolitan area: a design research in residential area in Rotterdam*. University of Wageningen.
- Kaplan, S., Kaplan, R. & Ryan, R.L., 1998. *With people in mind*, Washington D.C.: Island Press.
- Kaplan, S., Kaplan, R. & Wendt, J.S., 1972. Rated preferences and complexity for natural and urban visual material. *Perceptions and Psychophysics*, (12), pp.354–356.
- Kaymaz, I.C., 2012. *Landscape Perception, Landscape planning*. Available at: <http://www.intechopen.com/books/landscape-planning/landscapeperception>.
- Kerkstra, K., & Vrijlandt, P., 1988. *Het Landschap van de Zandgebieden; Probleemverkenning en Oplossingsrichting*. Utrecht / Wageningen: Directie Bos en Landschapsbouw, Ministerie van Landbouw en Visserij/Vakgroep Landschapsarchitectuur Landbouwniversiteit.
- Kersten, I.C. & Noordhuizen, J.R., 2011. *Vibrant Land, responsive engagement with the fragmented coastline of North Carolina*. Wageningen University.
- KNMI, 2010a. Regional differences in the extreme rainfall climatology in the Netherlands. Available at: http://www.knmi.nl/cms/content/90757/regional_differences_in_the_extreme_rainfall_climatology_in_the_netherlands [Accessed March 19, 2013].
- KNMI, 2010b. Sharpening the IPCC conclusions in to the Climate Change scenarios for the Netherlands. Available at: http://www.knmi.nl/cms/content/85176/sharpening_the_ipcc_conclusions_into_climate_change_scenarios_for_the_netherlands [Accessed March 20, 2013].
- Koh, J., 2008. On a landscape approach to design and an eco-poetic approach to landscape.
- Kuwaja-Roeleveld, K., 2013. *Urban Water cycle*.
- Landesforsten (2013) <http://www.landesforsten.de> [accessed May 2013].
- Leemans, R., 2012. *What is global change? Introduction to climate change*.
- Van Lierop, M. & Mathijssen, J., 2010. *Towards a new language of design*. University of Wageningen.
- Ludwig, F., 2012. *Impacts of water, introduction to climate change*.
- Malnar, J.M. & Vodvarka, F., 2004. *Sensory design*, Minneapolis: University of Minnesota Press.

- Martin, B. & Hanington, B., 2012. Universal methods of design: 100 ways to research complex problems, develop innovative ideas and design effective solutions, Beverly MA: Rockport Publishers.
- McHarg, I., 1969. Design with nature, New York: The Natural History Press.
- Merleau-Ponty, M., 1962. Phenomenology of perception C. Smith, ed., London: Routledge & Kegan Paul.
- Merriam-Webster, 2013. Online dictionary. Available at: <http://www.merriam-webster.com> [Accessed March 20, 2013].
- Metz, T. & Van den Heuvel, M., 2012. Zoet&Zout: Water en de Nederlanders, Rotterdam: NAI Uitgevers.
- Meyer, H., Josselin de Jong, F. de & Hoekstra, M., 2006. Het ontwerp van de openbare ruimte, Amsterdam: SUN.
- Moore, K., 2003. Overlooking the visual. The Journal of Architecture, 8(1), pp.25–40. Available at: <http://www.tandfonline.com/doi/abs/10.1080/1360236032000068497> [Accessed November 9, 2012].
- Motloch, J.L., 2001. Introduction to landscape design, New York: Wiley.
- Nassauer, J.I., 1988. Landscape care: perceptions of local people in landscape ecology and sustainable development. Landscape and land use planning, 8, pp.27–41.
- Nohl, W., 2001. Sustainable landscape use and aesthetic perception & preliminary reflections on future landscape aesthetics. Landscape and urban planning, 54, pp.223–237.
- NPR, 2007. The sweet smell of rain. Available at: <http://www.npr.org/templates/story/story.php?storyId=12716163> [Accessed March 19, 2013].
- Oxford, 2012. Oxford English dictionary. Available at: <http://www.oed.com/> [Accessed December 20, 2012].
- Pidwirny, M., 2006. “Physical Properties of Water”. Fundamentals of Physical Geography, 2nd Edition. <http://www.physicalgeography.net/fundamentals/8a.html> [Accessed May 2013].
- Porteous, J.D., 1996. Environmental aesthetics; ideas, politics and planning 1st ed., London: Routledge.
- Saito, Y., 2007. Everyday aesthetics, Oxford: Oxford university press.
- Pötz, H. & Bleuzé, P., 2010. Vorm geven aan stedelijk water: synergie van natuur, techniek en esthetiek, Amsterdam: SUN.
- Rock, I. and Harris, C.S. 1967. Vision and touch. Scientific American, 216, 96–104.
- Van Schaick, J. & Klaasen, I., 2011. The dutch layers approach to spatial planning and design: a fruitful planning tool or a temporary phenomenon. European planning studies, 19(10), pp.1775–1796.
- Schwenk, T., 1990. Sensitive Chaos 4th ed., London: Rudolf Steiner press.
- Senat Berlin (2009) Umweltsatlas Berlin. <http://www.stadtentwicklung.berlin.de/umwelt/umweltatlas/eib213.htm> [accessed May 2013].
- Spirn, A.W., 1998. The language of landscape, New Haven: Yale University Press.
- Spirn, A.W., 1988. The Poetics of City and Nature : Towards a New Aesthetic for Urban Design. Landscape Journal, 7(2), pp.108–126.
- Stanford Encyclopedia of Philosophy, 2013. <http://plato.stanford.edu/> [accessed December 2012].
- Swanswick, C., 2002. Landscape Character Assessment.
- Thompson, C.W., 2013. Landscape perception and environmental psychology. In P. Howard, I. Thompson, & E. Waterton, eds. The Routledge Companion to Landscape studies. Routledge, pp. 25–42.
- Tourismus Hann. Münden (2013) <http://www.hann-muenden.de/> [accessed May 2013].
- UNESCO, 2012. Managing water under uncertainty and risk. The world water development report 4. Available at: <http://unesdoc.unesco.org/images/0021/002156/215644e.pdf> [Accessed March 20, 2013].
- De Urbanisten, 2013. Het waterplein. Available at: <http://www.urbanisten.nl/wp/?portfolio=waterpleinen> [Accessed March 20, 2013].
- Wilson, E.O., 1984. Biophilia, Cambridge MA: Harvard University Press.
- Woodward, J., 2000. Waterstained landscapes: seeing and shaping regionally distinct places, Baltimore: John Hopkins University press.
- Wylie, J., 2013. Landscape and phenomenology. In P. Howard, I. Thompson, & E. Waterton, eds. The Routledge Companion to Landscape studies. New York, NY: Routledge, pp. 54–65.

Image 1.1 (p.2) Wanderer above the sea of fog, Caspar David Friedrich, 1818. <http://images.artid.com/images/blogs/768/7121591zoomed.jpeg>

Image 1.2 (p.2) Water lily pond, Claude Monet in 1899

Image 4.1 (p.17) Behaviour of a drop of water and river, Schwenk (1990) Sensitive Chaos p.13; p.15

Image 4.2 (p.17) Secondary revolving currents, Schwenk (1990) Sensitive Chaos p.17

Image 4.3 (p.17) Secondary revolving currents causing the river to meander, Schwenk (1990) Sensitive Chaos p.16

Image 4.4 (p.17) When a wave curls over, it forms a vortex, Schwenk (1990) Sensitive Chaos p.37

Image 4.6 (p.19)
A. Water as rain, http://24.media.tumblr.com/tumblr_lwgev2aOyW1r6psnzo1_500.jpg

B. Snow <http://softwaredevelopersgroup.com/wp-content/uploads/2011/05/snowing.jpg>

C. Fog http://1.bp.blogspot.com/_vivfw9IifUQ/TSvFar5N11I/AAAAAAAAALs/HX18DyrAJOo/s1600/fog.jpg

D. Drop <http://themavesite.com/wp/pictures/an-ant-pushing-a-water-droplet>

E. Flow http://www.ehow.com/how_4522488_purify-drinking-water-from-stream.html

F. Surface <http://ilpavone2004.deviantart.com/art/Water-mirror-57348099>

Image 4.7 (p.21) Peak rainfall and run off, Butler and Davies (2004) Urban drainage

Image 4.8 (p.22) WSUD principles, Waterbydesign (2009) http://waterbydesign.com.au/wp-content/uploads/2009/06/WSUD_arrows-sml.jpg

Image 4.9 (p.23) Water square, De Urbanisten (2013) http://www.nai.nl/museum/tentoonstellingen/digitaal/item/_pid/kolom2-1/_rp_kolom2-1_elementId/1_1013116

Image 5.1 (p.26) Water studies, Leonardo da Vinci (1509) <http://www.drawingsofleonardo.org/images/eddy.jpg>

Image 5.2 (p.27) Herbert Dreiseitl, <http://www.gsd.harvard.edu/images/content/5/4/549609.jpg>

Image 5.5 (p.30) Opening of the Bishan Park. Qihui He, CH2M HILL <http://www.ch2mhillblogs.com/water/tag/bishan-park/>

Image 6.1 (p.36) Height map of the Berlin Area, Umweltsatlas Berlin (2009) <http://www.stadtentwicklung.berlin.de/umwelt/umweltatlas/>

Image 6.3 (p.38) Abiotic and occupational layers of Berling, Umweltsatlas Berlin (2009) <http://www.stadtentwicklung.berlin.de/umwelt/umweltatlas/>

Image 6.4 (p.39) Rainwater processing at the Potsdamer Platz, Dreiseitl & Grau (2005) New Waterscapes p.48

Image 7.1 (p.49) Hillshade map of central Germany <http://www.scilands.de/>

Image 7.2 (p.49) Soil map of Niedersachsen, Hoyningen-Huene (1939) Die Niedersachsichen Böden, appendix

Image 8.1 (p.61) Height map of the Amsterdam area, Algemene Hoogtekaart Nederland (2013) <http://www.ahn.nl>

Image 8.2 (p.61) Annual precipitation in the Netherlands, KNMI (2010a) www.knmi.nl

Appendices

Appendix A: 13 Observations of the Potsdamer Platz, Berlin, Februari 2013

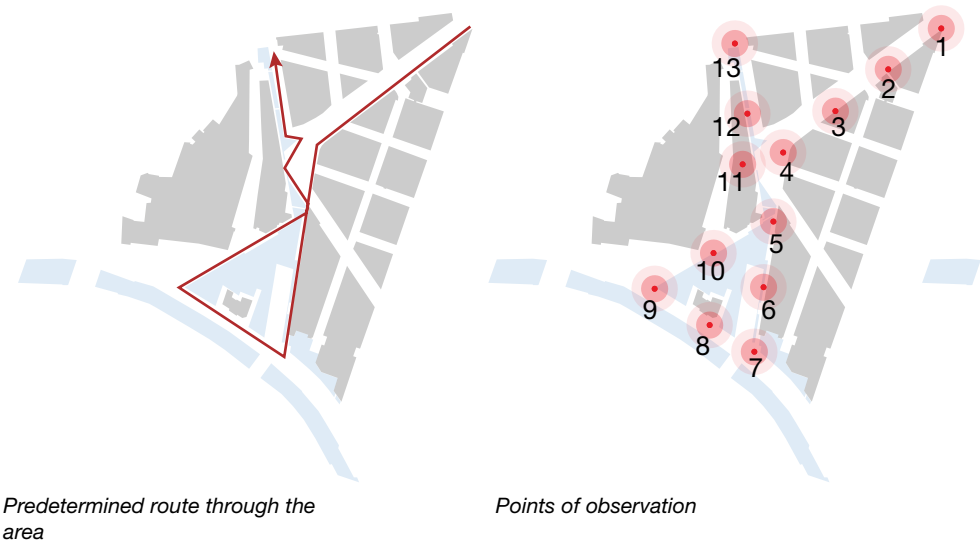
Appendix B: 13 Observations of the Potsdamer Platz, Berlin, April 2013

Appendix C: 6 Observations of Water Traces, Hann. Münden, April 2013

Appendix D: 3 Observations of Vivaldi, Amsterdam, April 2013

Appendix E: Authorisation of Interview with Herbert Dreiseitl

ROUTE



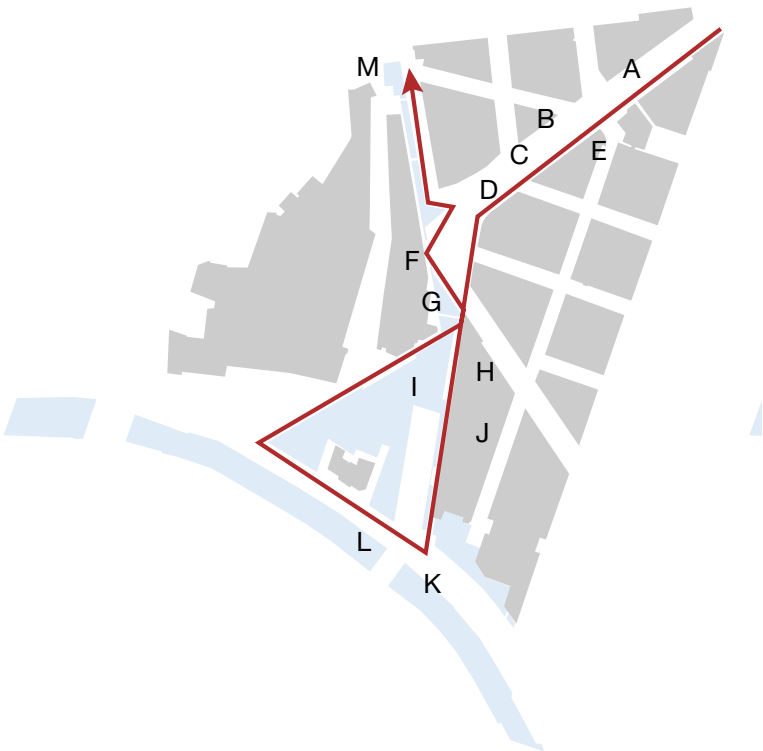
CONTEXTUAL METEOROLOGICAL CONDITIONS

Point	Time	Temperature	Humidity	Wind Dir.	Wind speed	Squall
1	12:12	-2,1°C	64%	Calm	0,0	0,0
2	12:25	-1,8°C	63%	NNW	1,9 km/h	2,4 km/h
3	12:36	-1,8°C	63%	NNW	1,9 km/h	2,4 km/h
4	12:47	-1,8°C	63%	NNW	1,9 km/h	2,4 km/h
5	13:01	-1,4°C	62%	SSW	3,4 km/h	4,8 km/h
6	13:13	-1,4°C	62%	SSW	3,4 km/h	4,8 km/h
7	13:24	-1,4°C	62%	SSW	3,4 km/h	4,8 km/h
8*	13:36	-1,4°C	62%	SSW	3,4 km/h	4,8 km/h
9*	13:44	-1,4°C	62%	SSW	3,4 km/h	4,8 km/h
10*	13:55	-1,4°C	62%	SSW	3,4 km/h	4,8 km/h
11*	14:47	-1,4°C	62%	SSW	3,4 km/h	4,8 km/h
12	14:59	-1,1°C	50%	ENE	4,2 km/h	4,8 km/h
13	15:09	-1,1°C	50%	ENE	4,2 km/h	4,8 km/h

Figure x. Measured weather data of the Prenzlauer Berg weather station, Berlin on January 25, 2013. Source: Weather Underground.
*Data missing from source.

EXPERIENCE THROUGH THE AREA

A	In the Alte Potsdamer Straße, the public space is dominated by event boards of the Berlin biennale.
B	The street is full of leafless large trees. This could be quite green in spring
C	Lots of people are crossing the street at different places and cross through each other within the crowdedness
D	The audience consists of elderly couples, but also businessmen and families
E	The entrance of Arkadien shopping mall is much present in the street scape
F	The casino is the most prominent element on the Marlene Dietrich platz
G	There is a little elevation (bowl) visible towards the entrance of the casino.
H	Along the white landscape of snow, some interesting red designed lightpoles are well visible. Here only few people are passing by.
I	In the snow scape, a sign says something about a warning for accessing the ice.
J	The building on the side is quite orange and has an arcade on the ground floor which is free of snow.
K	At the corner, there is a lot of traffic. Cars come and go from all directions.
L	The path makes me feel humble because of the very high reed.
M	At the end of the street, the colourful artwork catches the eye. Again a lot of reed is present.



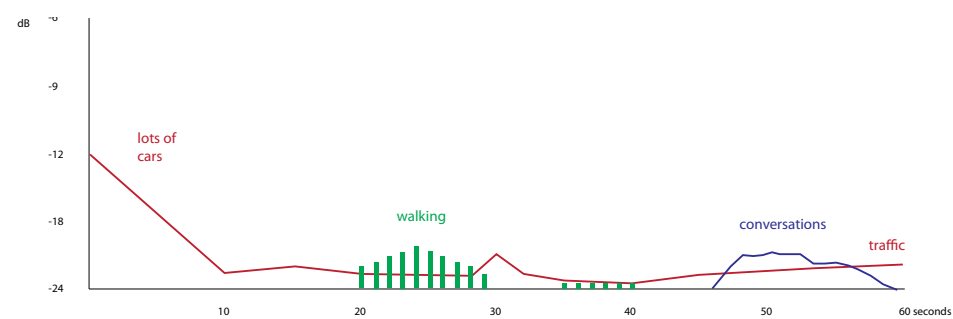
VISION



POSITION



SOUND



12:12 -2,1°C 0,0 KM/H

TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
The area has a lot of sky scraping buildings. At ground level, there are several iconic cones serving as light poles. The cubic entrances of the Potsdamer Platz railway station are much present on eye level. The ground surface is mostly covered with snow, flattened by the many footsteps on top of it. Small pathways have been cleared from the snow, but people tend to take the shortest route, even if it means to walk on the uneven and sometimes slippery surface of the snow. Action takes place mostly from people walking, either alone, hand in hand, or while laughing or discussing, and occasionally a cyclist, and a man standing on a corner just looking around.	The sounds in this area are mainly from cars and running engines. These are the background noises. At front are the sounds of people walking, exaggerated by the tiny black stones that prevent people from slipping. These sounds get louder as the person is walking by and decrease slowly afterwards. Moreover, there is the occasional sound of people having conversations or wild discussions.	At this point, no specific smell can be identified.	the air is cold but one can write down things without gloves. Also, there is no wind at this point, while the sun reaches the skin. The active haptic system notices the surface. This is unstable, mostly wobbly, because of the snow. Underneath the snow is a paved surface.

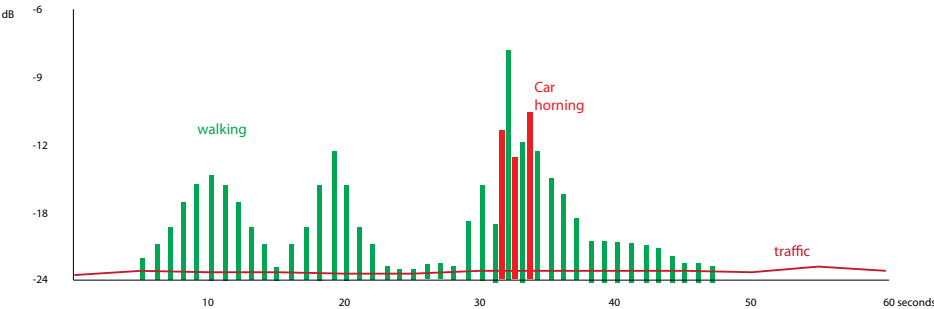
VISION



POSITION



SOUND



12:25

-1,8°C

1,9 KM/H

TEXTURE



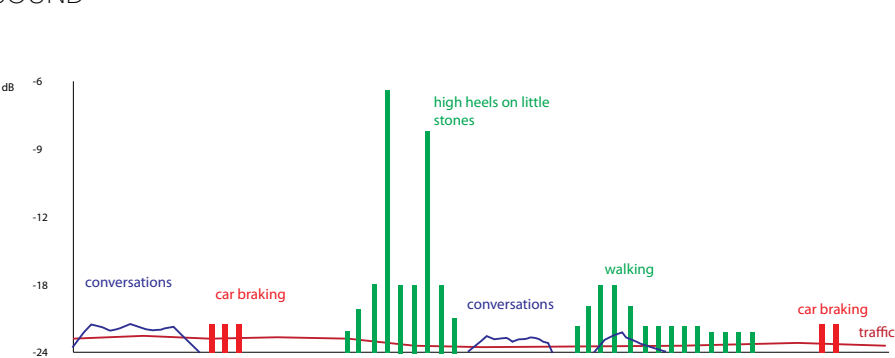
FIELD NOTES

Vision	Sounds	Smell	Feel
At this point, one is closely surrounded by buildings, next to the street. Between the sidewalk and the asphalt are lines of trees. At the ground floor, shops and entrances are present. The pavement is cleared from the snow, with multiple signs of the Berlinale on top of it. Alongside the road, a lot of cars are parks. In this landscape, people are either standing still and smoking or entering shops, carrying a bag of McDonald's food or driving around.	Because we are in a side-street of the main traffic, the sound noise is way lower than on the Potsdamer Platz. Again the main foreground sounds are those of walking, conversations and laughter.	At this point, no specific smell can be identified.	For the haptic sense, it is colder here. This is due to the position in the shadow of the big buildings. Also, a little breeze can be noted, influencing the sensed temperature. For the active touch sense, the path is well cleared from the snow, so the walking steps are even and balanced.

VISION



SOUND



12:36 -1,8°C  1,9 KM/H

TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
In the same street, a large part of the pavement is cleared from the snow, showing the trails of footsteps towards and from the building entrances underneath the arcades. Again the parked cars are very present in the visionscape. People are hanging around either in groups or alone, leaning against street furniture or standing still. A man is holding a photocamera, which might indicate him being a tourist. Some people are carrying shopping bags.	The sounds at this place varying from people walking, conversations and laughter, some car related sounds as braking and accelerating, combined with the sound of running engines. The sounds are shorter in duration than at the previous points, because less people walk by.	The only clear smell at this point comes from the smoke of a cigarette of a man passing by.	Since the place is quite shaded, which decreases the temperature. There is no breeze. The underground texture is solid, and is mostly snow-free.

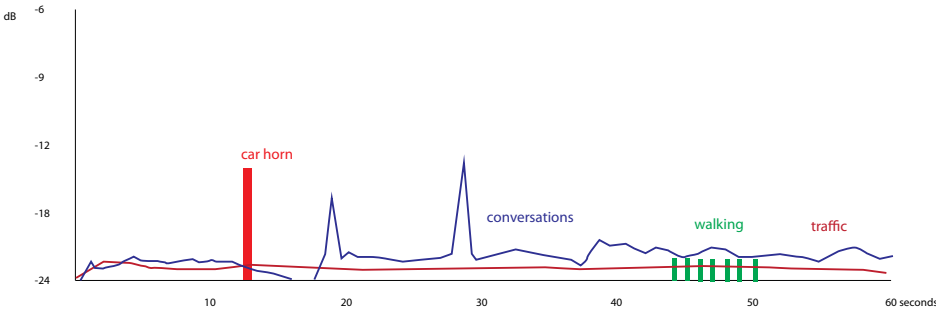
VISION



POSITION



SOUND



12:47

-1,8°C

1,9 KM/H

TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
<p>This is a big square where several roads meet. The square itself is shaped as a bowl, in which the lowest part has a little canal. At the edges of the square, mostly at the corners there are a lot of shops, cafés and restaurants. At the theatre side, big advertisements announce the current repertoire. Christmas-like decoration is still attached to several buildings. People are standing, walking and entering shops.</p>	<p>The soundscape consists of the running engines of cars, and driving cars. One of them sounds its horn. Some conversations are held during the passing-by, but they are rather continuous than sporadic.</p>	<p>From one place to another, the smellscape is quite present with a typical bitter city smell. On the background, the perfumes of passing people are noted, combined with flows of diesel exhaust fumes.</p>	<p>Because of the sun, the area feels warmer. For the underground, the texture is the same as before.</p>

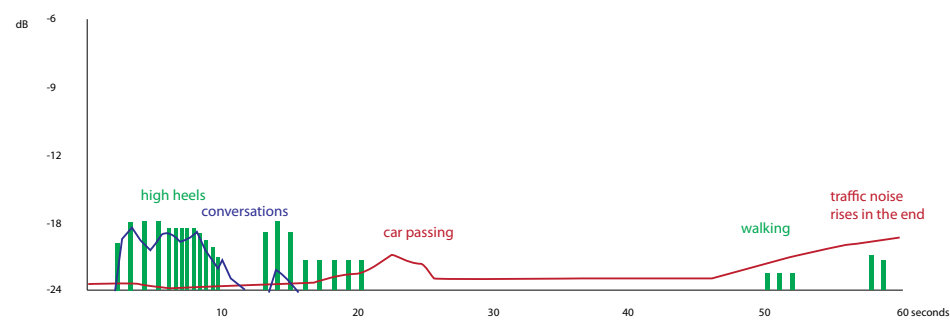
VISION



POSITION



SOUND



13:01 -1,4°C  3,4 KM/H

TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
At this point, a second open space opens up in the form of a frozen and snow covered lake. In the lake, there is a large artwork, carrying a little snow and having little drops of water falling down. At the bridge, crossing the sink canal of the lake, there is a life buoy attached. Moreover, there is a warning sign for entering the ice. Some buses pass by on the road. There are less people present here than at the previous spots. Some people are walking next to the water, most likely working people during lunchtime (time is 13:01).	The sounds present at this point are those of engines, walking steps and only very little background noise from cars, although this background noise rises in the end of the sound recording, probably because some traffic could pass through a green light.	At this point, no specific smell can be identified.	There is a little breeze coming from the direction of the lake, resulting in a chilly feeling.

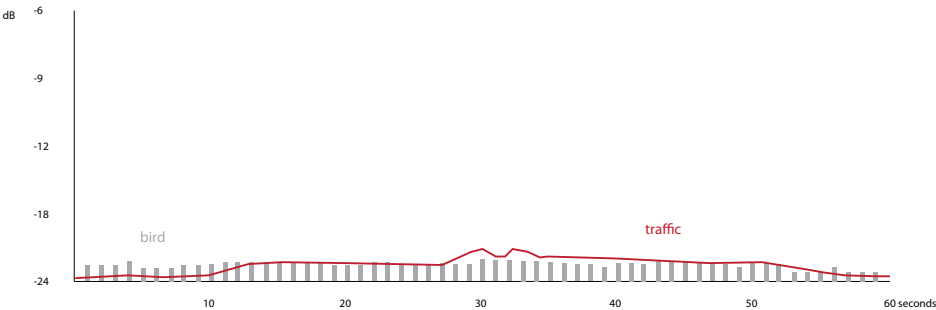
VISION



POSITION



SOUND



13:13 -1,4°C  3,4 KM/H







TEXTURE








FIELD NOTES

Vision	Sounds	Smell	Feel
<p>This point is at the edge of the lake, with one side backed-up by a big building. Between the observation point and the lake, there are several bushes and a car entrance for a tunnel under the lake. At another side of the lake, there is a big house, with something reflecting on the facade, mostly yellow colours. Contrary to these colours are the red colours of the light poles. People are walking, sitting and drinking coffee on the go.</p>	<p>There is some noise coming from the cars nearby. Especially when one car corners so tight, the slipping sound of rubber tyres is present. There is some conversation at this place. Noteworthy here is the sound of birds singing, which has not been noted before. This is a continuous sound.</p>	<p>The smell at this spot can be marked as a little sweet. This might have something to do with the presence of the bushes.</p>	<p>The sun is touching the skin, which makes it relatively warm. The ground surface, made from stone is again solid.</p>


VISION






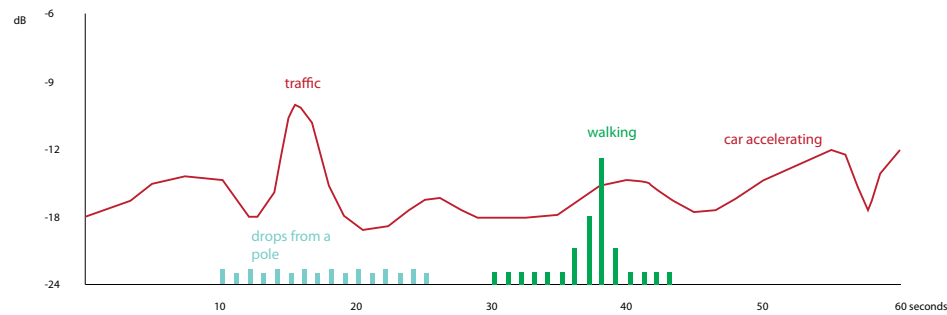


POSITION



13:24 -1,4°C  3,4 KM/H

SOUND



TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
At the corner of the lake, there is a small bridge crossing a sheet of ice, along with some stepping stones crossing this sheet. The area is characterized by high buildings and low bushes. A man is waiting for the red light.	There is a lot of traffic, resulting into much noise from cars braking and accelerating and honking. From one of the traffic light poles, drops are falling down. Small steps pass through these sounds.	The smell here is mostly of exhaust fumes of cars.	There is direct contact with sunlight on the skin. The surface texture is changing from smooth large bricks to smaller bricks with holes in between them. This different texture gives a different feeling under your shoes.

VISION

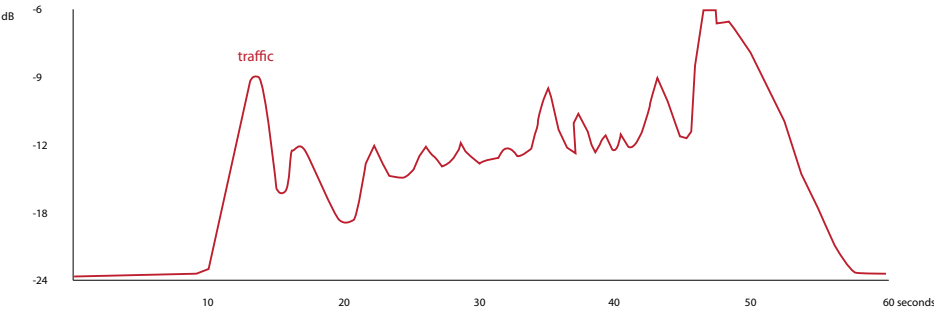


POSITION



13:36 -1,4°C  3,4 KM/H

SOUND



TEXTURE



FIELD NOTES

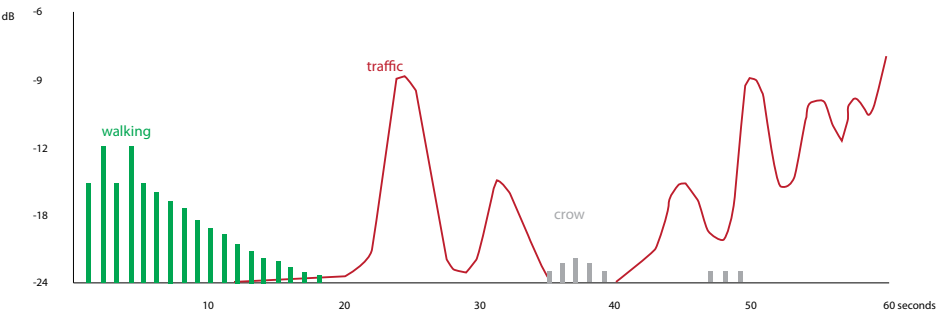
Vision	Sounds	Smell	Feel
There is a large entrance of a building (Canary house) with steps in front. High reed fields mark the sides. A berlin City tour bus passes by and car tracks in the snow on the sidewalk can be noted. People are walking and most of them walk into the house.	The sounds are mainly from the passing cars. Traffic is quite busy and chaotic at this point, resulting in late-braking and horning of cars. Some footsteps are heard over this background sound.	The smell here is mostly of exhaust fumes of cars.	A little breeze can be noted from the east. The surface is still of solid bricks

VISION



13:44 -1,4°C  3,4 KM/H

SOUND



TEXTURE



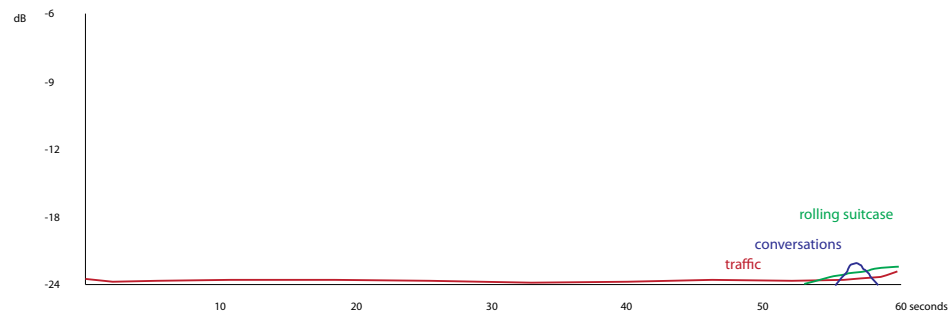
FIELD NOTES

Vision	Sounds	Smell	Feel
At this edge of the lake, the reed is mostly present. Next to the reed is a wall with snow on top of it. Adjacent to the lake are some trees with benches where people are sitting and texting. Behind these benches are some parked cars. One guy is asking directions.	The sounds here are from the footsteps of the people passing by, together with the increasing sound of approaching traffic. If one listens clearly, birds can be noticed.	The smell here is mostly of exhaust fumes of cars.	Suddenly, it is seriously colder. A cold breeze is coming from the south east. The surface is snow-free and therefore solid.



SOUND

13:55 -1,4°C  3,4 KM/H



TEXTURE



FIELD NOTES

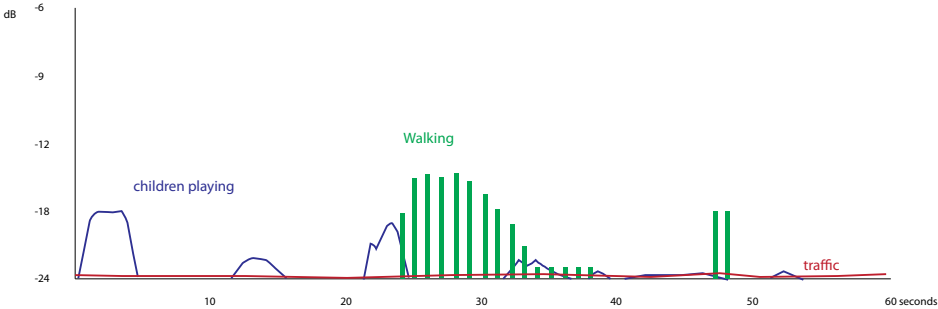
Vision	Sounds	Smell	Feel
The lake with the snow cover can be overseen from this point. The same big house (Canary house) is seen from another perspective (the rear side) and reflecting mirrors on the side facade of the building representing the construction frame of the house. There is a lot of sunlight coming in, not blocked by the couple of trees. Next to that is a footpath just above the surface of snow. People (tourists!) looking at the sign of the water design work. Others walk on the street. A man (assumingly a homeless person) sleeping on a bench	The sound of a suitcase rolling and slipping over the snow is very present. One man is whistling, while other having a conversation. There is a little background noise from cars. But it is mostly quiet.	At this point, no specific smell can be identified, merely a little sniff of diesel	Again, there is a little breeze from the south. The surface consists of little square stones.

VISION



14:47 -1,4°C  3,4 KM/H

SOUND



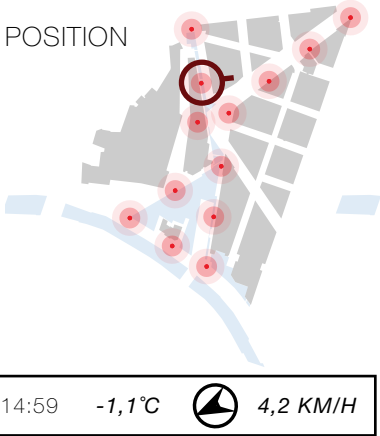
TEXTURE



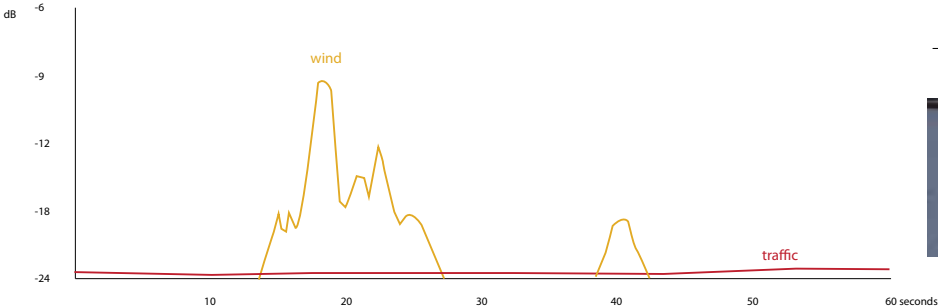
FIELD NOTES

Vision	Sounds	Smell	Feel
From here, the width of the square is overseen, with the stairs towards the ground level. At the road, some buses are holding still. In the square itself, there is a canal with a bridge over it. On the slope of the square is a cascade with a piece of artwork in it. There are some ice sheets in the canal ditch, they seem to be re-frozen. The area is characterized by long lines. Behind are some big advertisements. A man is slow-walking over the square. Children are playing, standing on the ice and touching the artwork, and throwing snow balls at each other	Noticed is a strange ticking sounds, which might indicate falling drops.	At this point, no specific smell can be identified, merely a little sniff of diesel	At here, it is cold, since there is no sun. Earlier (during the first walk), it was warmer here, but the sun has moved behind the buildings.

VISION



SOUND



TEXTURE



FIELD NOTES

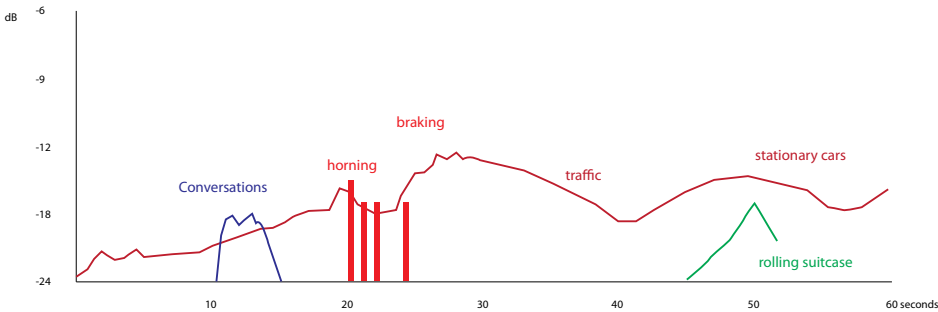
Vision	Sounds	Smell	Feel
A small canal lies next to a footpath. There are steps on the ice as well as some bridges over the canal. The same poles as earlier (with the red decoration) are present in the public space. There are trees in blocks across the street. There is a clear difference in grey surface (materials of asphalt and square) and orange tops (buildings). Lot of taxis pass by. Pavement is only cleared from snow on one side (the other side). The path next to the canal is not cleared. People are walking, watching the elements frozen in the ice.	Sounds of people walking. A car passes by. Little background noise from drops of water falling from the building. This is the only place where the wind can actually be heard clearly.	The smell here is mostly of exhaust fumes of cars.	The wind is cold, coming from the square. The surface is slippery, sandy and dirty. The snow has refrozen.

VISION



14:59 -1,1°C  4,2 KM/H

SOUND



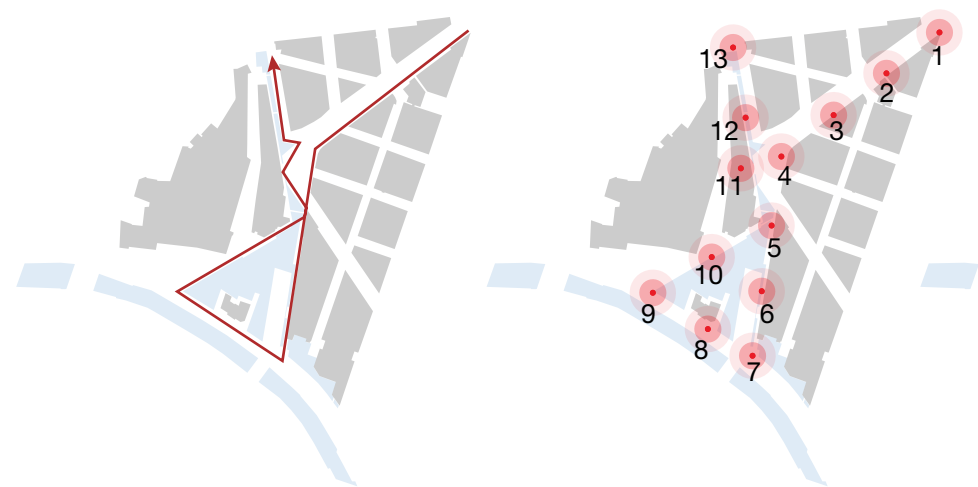
TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
<p>Most present visually is the large piece of artwork (sign: Keith Haring, 2 men boxing). Again, some steps on the snow, by which one can see that corners are being cut. Moreover, there are steps on the snow on the ice sheet towards the statue. There is a reed field on the edge covering the side. People are waiting for the lights, they are walking, calling (some in a foreign language), looking around, or drinking coffee. Most people walk on the edge near the water surface.</p>	<p>The sounds are mostly from conversations and cars (accelerating, horning). Sporadically, one can hear a suitcase rolling, but most sounds are overwhelmed by the sound of the cars.</p>	<p>The smell here is mostly of exhaust fumes of cars.</p>	<p>It is cold because of the shade (This is mainly because of time 15:09, sun has moved behind a building), because of the snow the surface is uneven.</p>

ROUTE



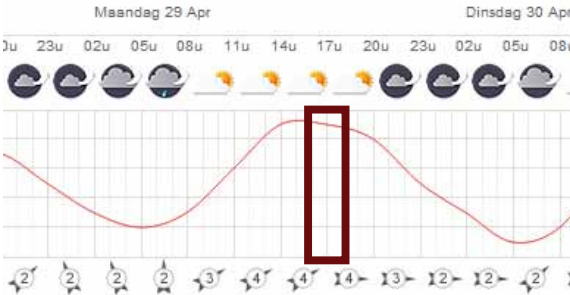
Predetermined route through the area

Points of observation

CONTEXTUAL METEOROLOGICAL CONDITIONS

Point	Time	Temperature	Humidity	Wind Dir.	Wind speed	Squall
1	16:44	16°C	32%	SW	22 km/h	28,8 km/h
2	16:51	16°C	32%	SW	22 km/h	28,8 km/h
3	16:57	16°C	32%	SW	22 km/h	28,8 km/h
4	17:04	16,5°C	25%	WSW	30,1 km/h	38,5 km/h
5	17:10	16,5°C	25%	WSW	30,1 km/h	38,5 km/h
6	17:18	16,5°C	33%	WSW	30,1 km/h	38,5 km/h
7	17:25	16,5°C	33%	WSW	30,1 km/h	38,5 km/h
8	17:34	17°C	33%	WSW	33,8 km/h	43,3 km/h
9	17:40	17°C	33%	WSW	33,8 km/h	43,3 km/h
10	17:50	17°C	33%	WSW	33,8 km/h	43,3 km/h
11	18:01	16,5°C	33%	WZW	18,8 km/h	24,1 km/h
12	18:11	16,5°C	33%	WZW	18,8 km/h	24,1 km/h
13	18:16	16,5°C	33%	WZW	18,8 km/h	24,1 km/h

Figure x. Measured weather data of the Prenzlauer Berg weather station, Berlin on January 25, 2013. Source: Weather Underground.



EXPERIENCE THROUGH THE AREA

A	The walk through the Alte Potsdamer Straße starts crowded.
B	There are lots of people until the Arkadien entrance. After that it is less crowded.
C	The trees are full of green, they are big and pleasant. Several trees are in pavement cages, while others have split around them.
D	In a side street, a statue is directly in the view line.
E	From the Marlene Dietrich Platz on, the audience is dressed in suit jackets and ties.
F	When the street is crossed towards the lake, the wind suddenly blows quite hard.
G	The view over the lake is nice and the edges are full grown with green vegetation
H	The high reed of last time is gone
I	There are quite some cyclist at the cycle lane
J	At the biotope, the water level is high. There is lots of trash in between the reed. It is not clear where the water is coming from.
K	At the lake, there are a couple of party tents directly next to the edge. In winter, one could walk here next to the water body. Now, the party tents are distracting, the edge is exploited commercially and does not invite to be at the water edge, but it distracts and obstructs for accessing the water side.
L	The cascades have a lot of details, which is nice, but after that, the water disappears underneath the bridge
M	At the canal, the water itself is very clear, but the floor of the basin is dirty.
N	The sidewalk is small, but the path other side of the water looks more appealing but is obstructed by plants

VISION

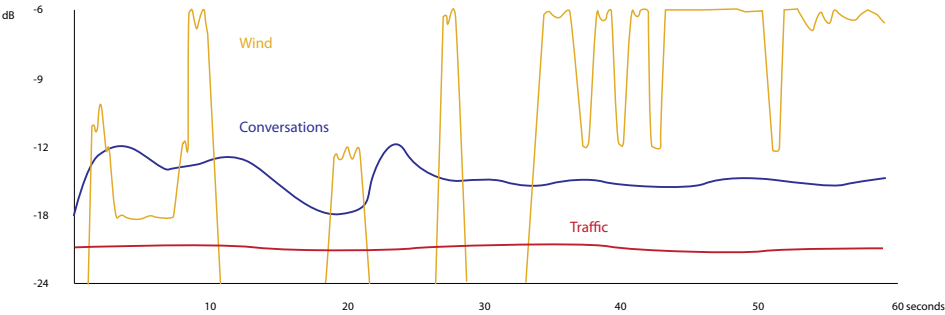


POSITION



16:44 16°C  22 KM/H

SOUND



TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
The area of the Potsdamer Platz is open. Although the edges consist of buildings, since a lot of streets come together here this place is not enclosed. Further on, in the Alte Potsdamer Straße an enclosure is visible because of a tree canopy.	The sounds in this area consists of conversations from walking people on the pavement and traffic sounds such as running engines and horns from the busy street	At this point, no specific smell can be identified	There is al little breeze coming from the Alte Potsdamer Straße. The surface consists of large solid bricks.

VISION



POSITION

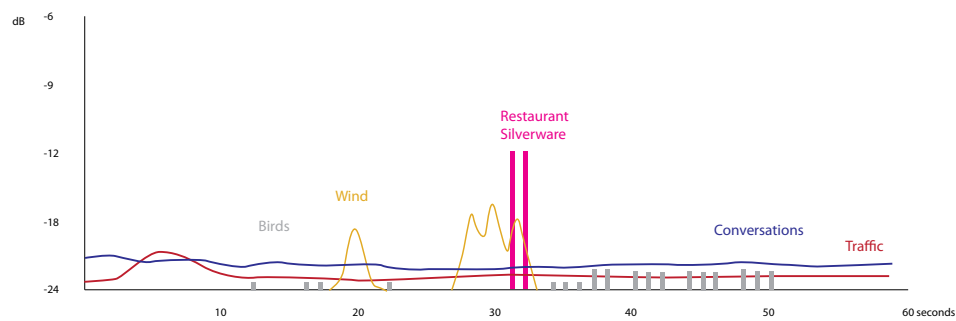


16:51

16°C

22 KM/H

SOUND



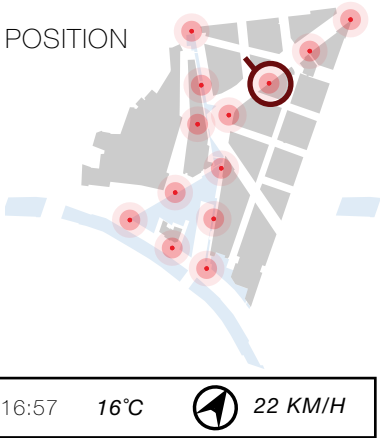
TEXTURE



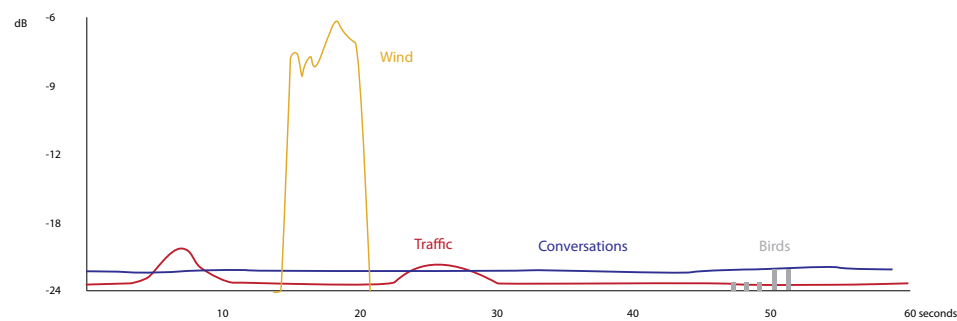
FIELD NOTES

Vision	Sounds	Smell	Feel
People move on the large bricks of the pavement rather than on the tiny stones. The terraces are empty at street side, but at places with the sun shield open, some people take a place. There is an enclosure of big trees. Some cyclists and cars pass the street. At the pavement, people walk towards the Arkaden shopping mall. There is quite some variation in the audience (Suits, parents, elderly, young ones).	Although less loud, car sounds are still present. A man is playing on a saxophone. Furtheron, conversations take place in combination with the sounds of walking and coughing.	The smell of oil can be traced, coming from the heater of the terrace. Also, food from the restaurant can be smelled.	There is still a little breeze, but it feels warm although the sun has disappeared behind the clouds. The surface is still steady.

VISION



SOUND



TEXTURE



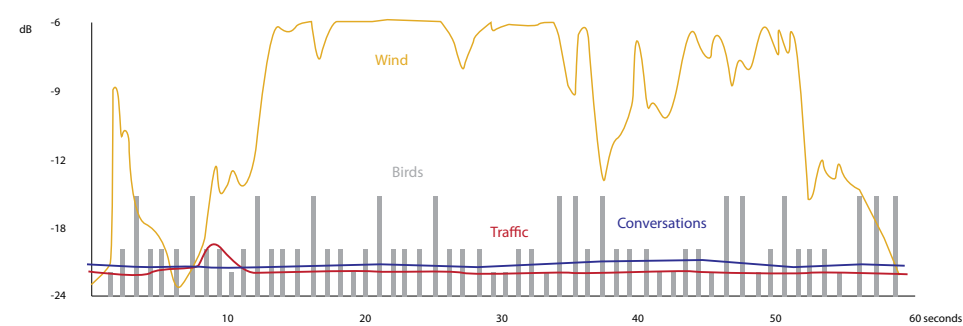
FIELD NOTES

Vision	Sounds	Smell	Feel
Fewer people walk at this point. There are still some big trees, but the terraces are fewer in numbers. Because of that, the parked cars are more visible. Also, the pavement looks wider because of that. People use the extra space to walk in the sun. Some doves fly and walk around leftovers of food. The sun shines through the leaves.	The sounds of this place come from cars, but also of people walking and having conversations. From the terraces, the sound of a spoon hitting a coffee cup is heard. Moreover, the sound of birds singing is very present.	The smell at this place contains something sweet,	There is a very little breeze, but it is warmer because one can stand in the sun here. The surface is still the same

VISION



SOUND



TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
This place is less enclosed, but it is surrounded by large buildings. There is a man waiting. Some flower compartments mark the end of the restaurant terraces, which are empty. On the square, the sitting elements (rocks) are not occupied as well. The threes are quite smaller than before.	The most prominent sound comes from the birds in the trees. Both the song they sing as well as the fluttering of their wings are heard. Moreover, the leaves make a sound as the wind trembles them. In the background, cars can be overheard.	At this point, no specific smell can be identified, merely a little fringe of diesel	There is more wind at this place (quite strong, level 3 or 4). The pavement is still the same

VISION





POSITION



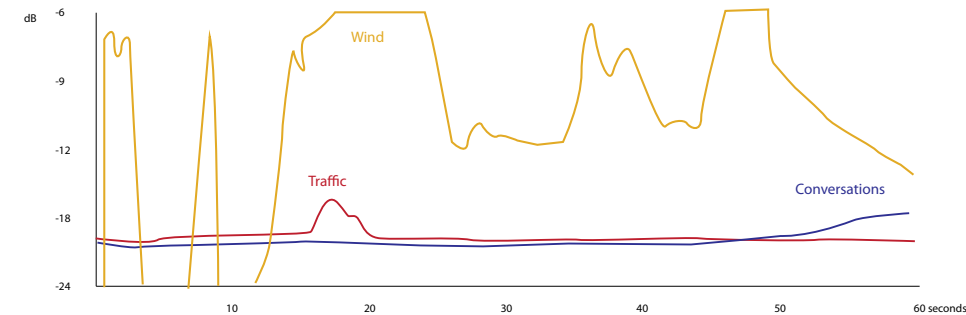
17:10

16,5°C



30,1 KM/H

SOUND



TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
From this point, the lake can be overseen. Ripples in the water occur because of the wind. Some vegetation at the edges draws the attention as well. This point is positioned in between several unenclosed spaces. Small trees accentuate the pavements. Only few people are here	The foreground sounds come from an air conditioning of a nearby building and from birds, cars, people walking, conversations, a cyclist, but there is no sound from the water heard.	The taste is both a bit sweet and fishy, as one could identify with still a water pond.	There is a lot of wind (strong). The pavement is the same.

VISION







POSITION

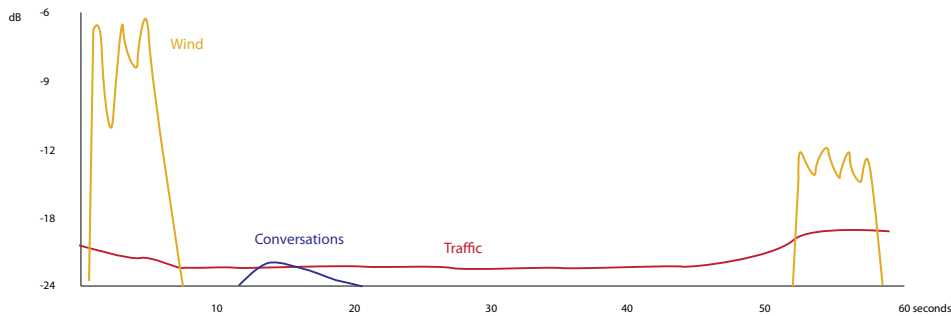


17:18

16,5°C

 30,1 KM/H

SOUND



TEXTURE



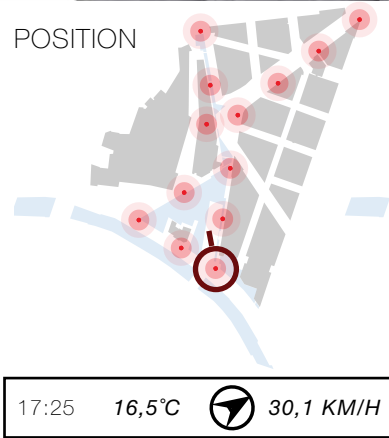
FIELD NOTES

Vision	Sounds	Smell	Feel
The trees dance upon the rhythm of the wind. Waves crash upon the edges of the pond. Across the pond, an artificial party beach club is erected with beach seats, but almost all are unoccupied. Some people sit at the edge of the pond. The vegetation at the edge grows out of the sand. Some fish can be noted in the water. Most people here wear suits.	The background sounds consist of the traffic nearby, with cars braking and accelerating and honking. Also a cyclist (bell) and the sound of the pedals and chain moving is present. People walking by with a suitcase (rolling), laughing. And the wind can be heard quite well.	Although the wind comes from the direction of the bushes, no smell can be identified.	It is warm, but windy (strong). Pavement is the same.

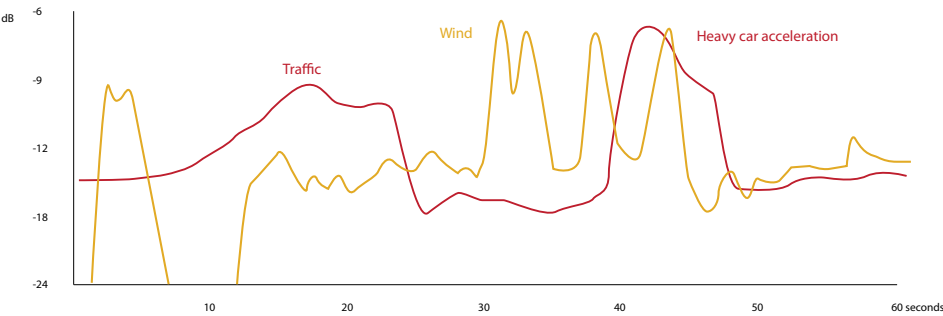
VISION



POSITION



SOUND



TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
At this point, the bridge is much present. Also there is more vegetation. The traffic catches the eye. While walking over the bridge, the waterfall at the left side is seen. What is interesting is that whenever there is a wave of wind, the amount of water in the waterfall increases a bit. Also, the wind creates patterns in the water.	The sound of the waterfall is quite present. Moreover, the traffic sounds are incredibly prominent. In between there some soft conversations and the ticking sound of the traffic light.	Neutral smell	It is warm because of the direct sunlight, but when the wind hits you, it is quite cold. It seems here that the wind comes from another direction (west). The surface now consists only of the small stones.

VISION



POSITION



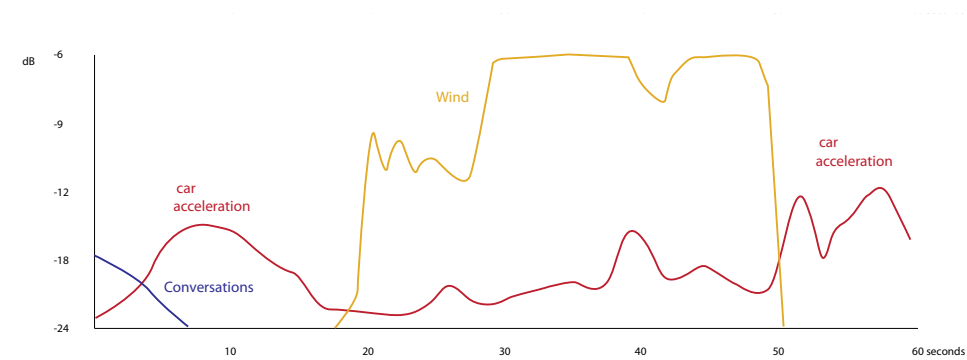
17:34

17°C



33,8 KM/H

SOUND



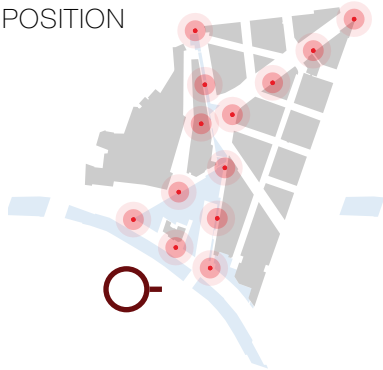
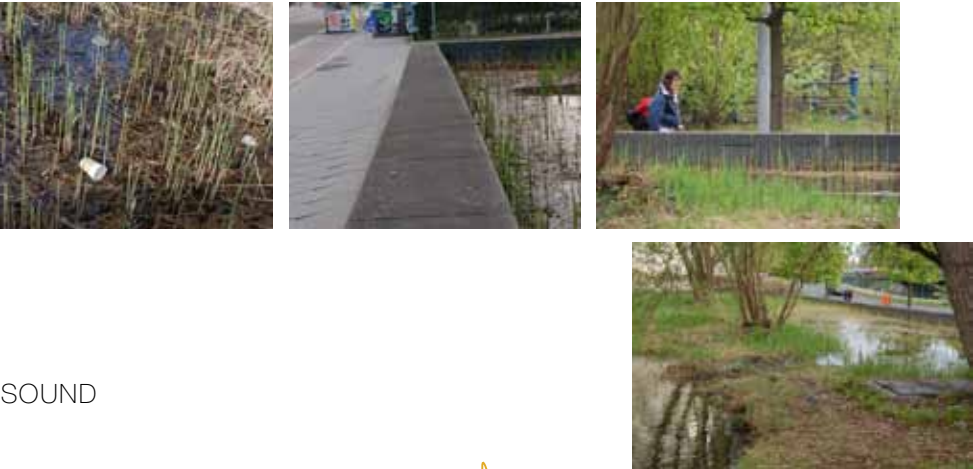
TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
The full green trees (Horse chestnut) alongside the road are prominently visible. Moreover, there are some clusters of trees in the biotope (water edge). It is much greener here than elsewhere.	The sounds here come from the traffic, but a lot from the wind as well (both directly as via the leaves in the trees).	At the point of observation, no specific smell can be identified. Though, diesel fumes were present while crossing the street.	Wind is most of the time quite still (normally light, sometimes light to strong)) but now comes from the east. It is warmer here (lack of wind). The surface is different than before and there is some elevation in the pavement (downwards slope).

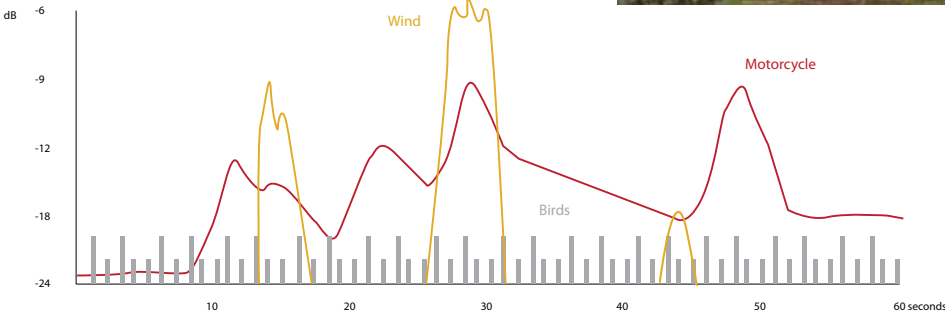
VISION



17:4017°C

33,8 KM/H

SOUND



TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
The biotope, which consists of mown reed contains litter. Lots of cans, bottles and other stuff is stuck in the low reed. The input of water via a tube is seen, as well as the water flow towards the lake (the water level at the edge is higher than the lake and the pavement). The lake mirrors the green colours of the surroundings. The water is clear, but one can see the stone tiles on the floor of the pond (they look dispositioned). The place is open, not enclosed.	The sounds here come from birds in the trees and cars. Just around the corner, one can hear the inflow of water in the lake.	The smells at this place come from smoke of a passer-by and the exhaust fumes from the cars. Other smells are hard to identify.	Wind strength is relatively low (light). There only a little elevation in the pavement's surface.

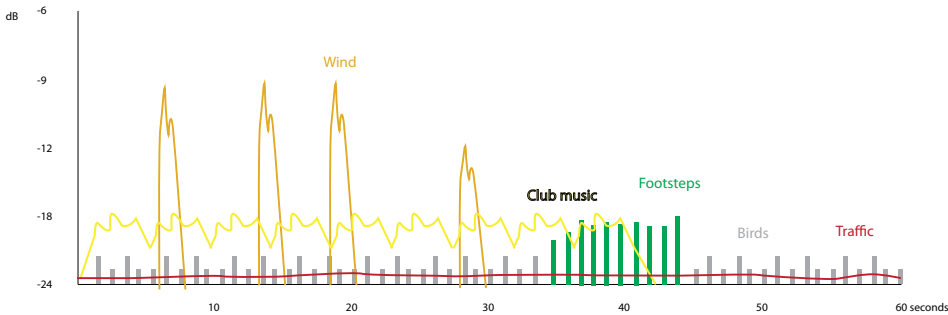
VISION



POSITION



SOUND



17:50

17°C

33,8 KM/H

TEXTURE



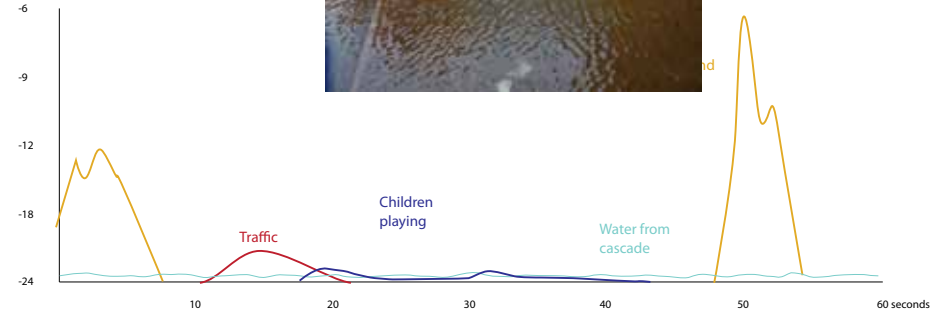
FIELD NOTES

Vision	Sounds	Smell	Feel
<p>This area is largely unenclosed, the edges are not well defined. While standing on the heightened temporarily wooden deck of the party tents, one sees the sun shields, palm trees and the benches pointed towards the water. There are some bars on the platform, but the area seems barely used. There is a view to the biotope though. Nevertheless, people walk behind the bars (although it is an undefined space). Because of the position and orientation of the bars, the water is closed out by this ‘property.’</p>	<p>Here, the music from the bars is well present. It suggests some beach sounds. Furtheron, there is the sound from walking, from cars and some birds on the background.</p>	<p>The smell of food coming from the bars is largely noticeable.</p>	<p>At here, there is a little breeze (strength 1 or 2). The surface consists of asphalt on the road and wooden bars on the platform (some bars are loose).</p>

VISION



SOUND



18:01

16,5°C

18,8 KM/H


TEXTURE








FIELD NOTES

Vision	Sounds	Smell	Feel
From here, the large empty square can be overseen. It not really an enclosed space because a lot of roads come together (lots of openings). Both left and right there are water cascades (left are small steps of falling water while right are some bigger steps). There is a lot of reflection (large subtle waves, creates large reflections). Although the water flows towards the same point, it disappears.	Here the sound of water splashing is in the foreground. This sound is echoed by the buildings behind. Also some birds can be heard and there is again little traffic in the area, as well as people walking and having conversations.	The smells are very hard to distinguish here, but a tiny bit of perfume can be smelled (passer by) and the smell of water is a bit present.	The wind has quite some strength (medium). It is a little cold but still present. The square consists of other bricks than the pavements in the surroundings. There is some elevation towards the lowest point.


VISION






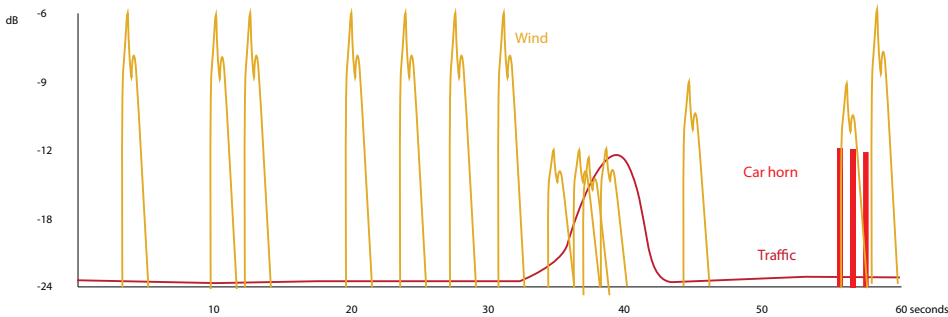


POSITION



18:11 16,5°C  18,8 KM/H

SOUND



TEXTURE



FIELD NOTES

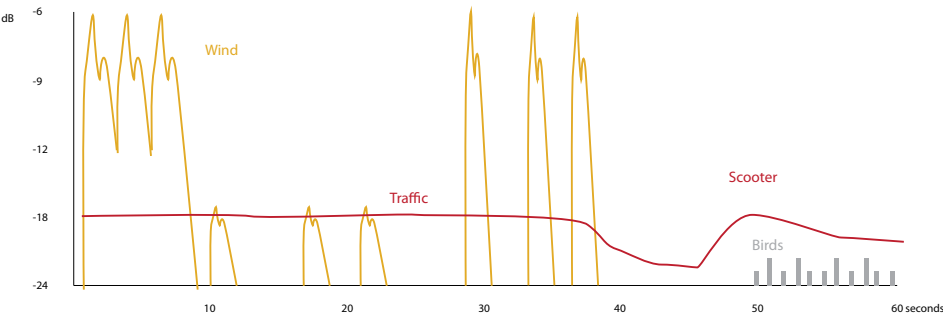
Vision	Sounds	Smell	Feel
The leaves of the trees are altered by the wind. There are ripples and waves in the water and the water flows over a cascade from the canal. The water is clear. Next to the water (other side) is a small pavement, but the property is claimed via some plants.	Again the wind can be heard quite well. Also cars are still present, more than on the square. Almost silently, the sound of the water over the cascades can be heard. A girl is running over the pavement.	There is a little smell of food, probably from one of the restaurants but it is hard to distinguish	The wind is powerful here (strong) and it is much colder.

VISION



18:1616,5°C18,8 KM/H

SOUND

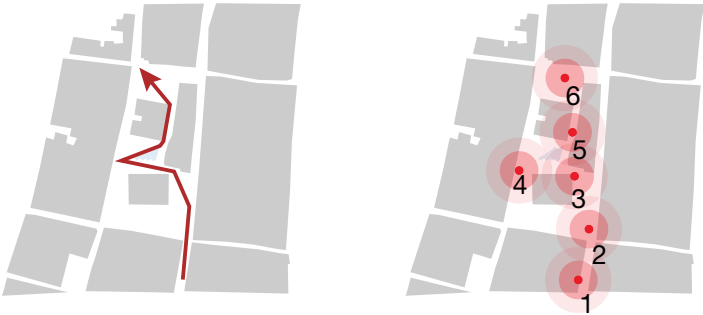


TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
<p>This place has no enclosure (open to almost all sides). The pavement pattern has been put through to the other roads. The biotope is well mown as well, and the two levels of water can clearly be seen. Also, water gurgles out of the statue (what is happening there?). The wind creates waves in the water. Moreover, people walk on the small pavement next to the water. The other side (with the entrance to the Hyatt hotel) looks more formal because of bigger pavement, trees in blocks and taxis.</p>	<p>The sounds come mostly from the traffic. But the sounds of water flowing through the reed can be heard as well, likewise the sound of water that is being pumped up or down (tube like unnatural sound). Again, sounds from walking and conversations can be heard.</p>	<p>At this point, no specific smell can be identified.</p>	<p>The wind is again strong here (4-5). There is no refuge. The underground is still the same (solid).</p>



CONTEXTUAL METEOROLOGICAL CONDITIONS

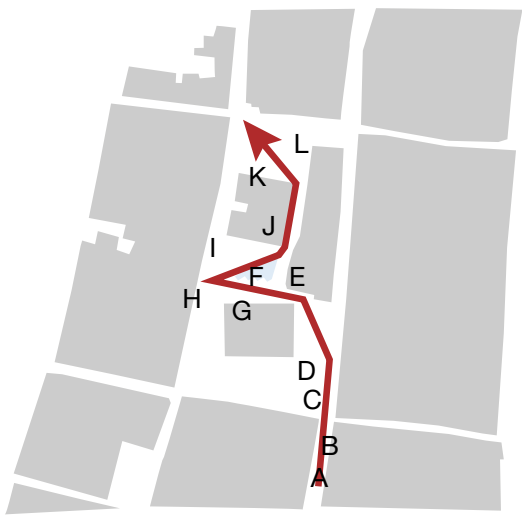
Point	Time	Temperature	Humidity	Wind Dir.	Wind speed	Squall
1	15:54	13°C	55%	SSE	6,4 km/h	17,7 km/h
2	16:08	13°C	55%	SSE	6,4 km/h	17,7 km/h
3	16:19	13°C	55%	SSE	6,4 km/h	17,7 km/h
4	16:30	13,3°C	52%	S	6,4 km/h	16,1 km/h
5	16:42	13,3°C	52%	S	6,4 km/h	16,1 km/h
6	16:54	12,4°C	67%	ENE	6,4 km/h	20,9 km/h



Figure x. Measured weather data of the Reinhardshagen weather station, near Hann. Münden on April 28, 2013. Source: Weather Underground

EXPERIENCE THROUGH THE AREA

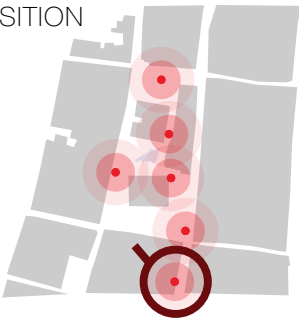
A	The walk starts at the main street and immediately passes through a crowded shopping street. I have to walk around people to move through, and there is quite some mumbling.
B	The clear sound of a church bell rings once.
C	At the square, a child is playing and yelling and runs towards a water element and starts to pull heavily on some water tap.
D	At here, people are either sitting or walking within the crowd through the main street. Is in nice to step outside the crowded street onto the square.
E	While walking through a narrow alley between the church and a terrace, the noises of the shopping street disappear into the void.
F	At the next square, the soft sound of flowing water is heard.
G	The vertical grey-blue poles are well visible
H	The water feature has several stages and the water can be seen flowing past some objects
I	The ground elevation has a little downwards slope towards the center of the square, but it is only a small difference.
J	Next, while walking through a narrow street towards the next square, a church bell plays a jolly song.
K	Quite some people are showing interest, looking up to the carillon of the Rathaus
L	But when the ‘play’ is over, the people are gone quickly.



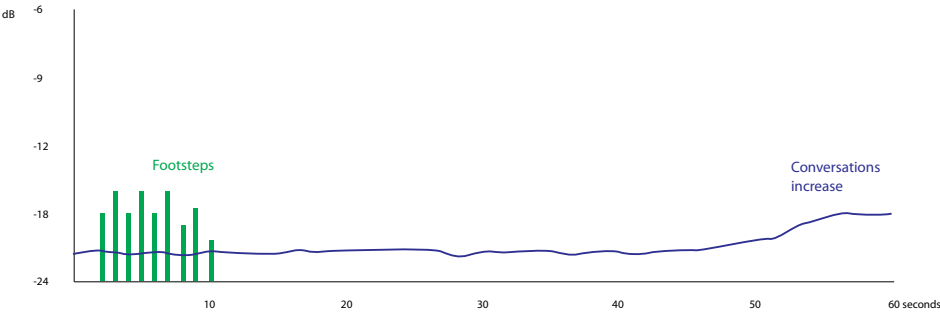
VISION



POSITION



SOUND



15:54

13°C

6,4 KM/H

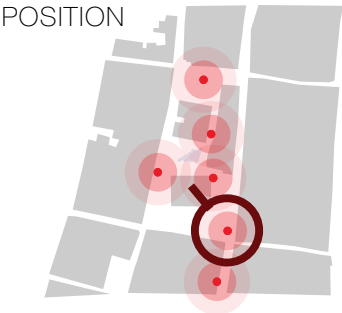
TEXTURE



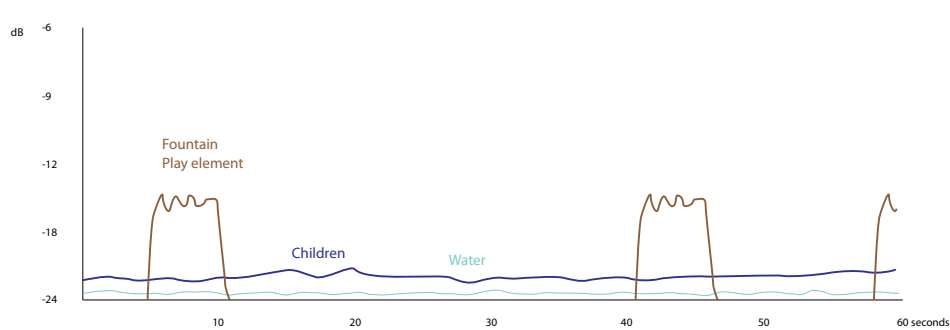
FIELD NOTES

Vision	Sounds	Smell	Feel
<p>This place is a shopping street (shops open on sunday). There are views towards the mountains at the edge of the streets, which create an enclosure. There are a lot of details visible in the timber framed houses (vakwerkhuisen) with drainage pipes painted in the same colour. The timber frames look well maintained, but some scratches in the fill material's outer layer show the original material (clay or plaster). Part of the church is visible at an adjacent square. This square is emphasized by an artwork on the edge in the shape of a vertical pole. People, both young and elderly, are walking hand in hand, eating ice cream. A car crosses the street, but the area is mainly car-free. The street and pavement are in the same material, but the pattern is different and the pavement is darker. The signs of the shops are well present, as well as the light poles.</p>	<p>Much noise comes from the shopping public via conversations and walking, running or a children's cart. There is a clear distinction between actual conversation nearby (foreground) and mumbling further away (background). Since it is 4 o'clock, three different church bells hit 4 times.</p>	<p>Vaguely the smell of a bakery can be identified. Also smoke from a passerby is smelled. Also there is something sweet to be smelled, like cotton candy or chocolate (there are some bakeries and pie shops nearby).</p>	<p>There is a very light breeze. The temperature is acceptable, it is not too cold which makes it a pleasant stay. The surface is steady and balanced. There is no elevation.</p>

VISION



SOUND



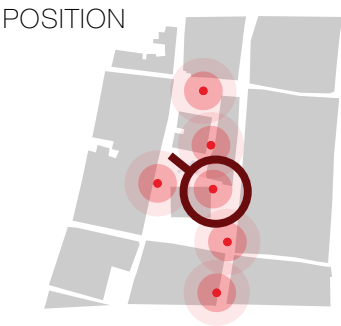
TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
At this square, the fountain (not Dreiseitl's design), made from sometime like limestone is visible. Water is flowing over it, ending on the pavement which has a gutter designed in the pavement's bricks in it. There are several water features on the square. The square has several terraces, but people only sit at the sides and under the sun shields. The majority of the people stay on the street side rather than on the square. Children are running across the square and instantly play with the water element. Moreover, there are quite some doves at the area. Finally, there is a sole tree within a frame construction.	Water is streaming and splashing when it falls in the gutter. There are some conversations and footsteps. A small truck is passing by.	Smell of new shoes from a shop nearby.	There is slightly more wind. Still agreeable. There is a different texture from small stones which makes it a little bit unsteady. Also, there is little elevation in the square (it is not flat).

VISION

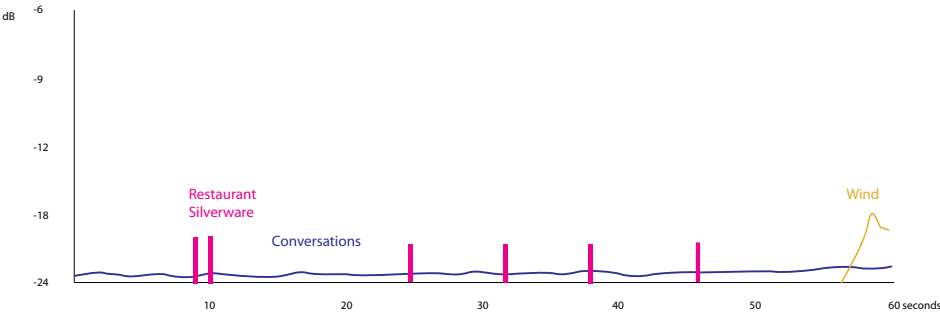


16:19

13°C

6,4 KM/H

SOUND



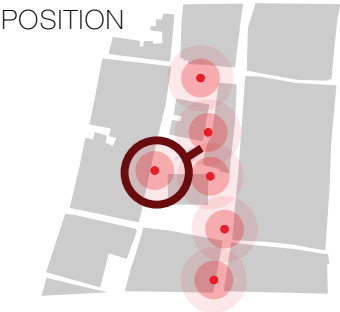
TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
Here, a water feature is seen with some elevation. Children are standing on a movable plate. A bird lands on the edge of the water. The vertical light poles are well visible. A person is standing on the edge of a water interaction element. Further away, parked cars are visible, as well as terraces.	The sounds come from the restaurant (glasses, forks). Children are playing (screaming, running). The sound of water flowing can be heard, as well as conversations and passing cars.	Smell is neutral. There is a little bit of a bistro smell noticeable.	There is more wind, which makes it a little colder. Sometimes there is difference in sun and shade, but since it is semi-clouded this differs per moment.

VISION

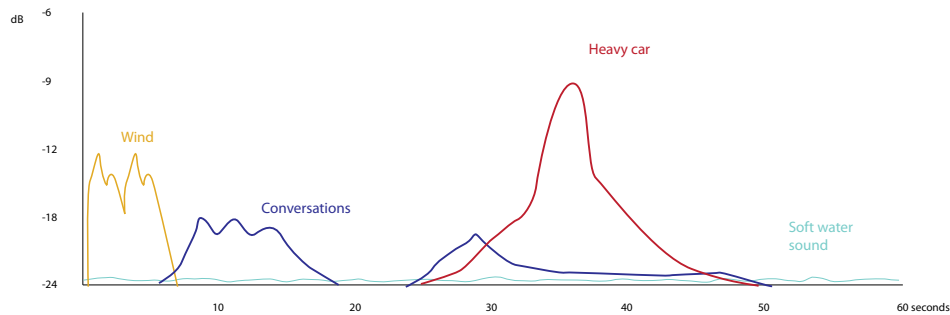


16:30

13,3°C

6,4 KM/H

SOUND



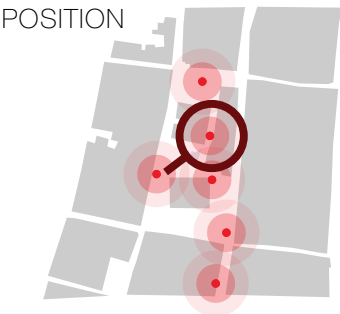
TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
From here, stairs in the water feature can be seen. Water is flowing over three different patterns towards the lowest part of the feature. There are some algae in the water. Also, some elements that react to movement or sound have effects on the water, and people are using these elements in interaction. A young cyclist races through the water. Some tourists take a couple of photos of the feature and explore the possibilities of the interactive elements, while some locals instantly play with these elements, they know immediately what to do.	The sounds come from water splashing (from the little cascade). Some cars are passing by, but it is quiet in between. There are some soft steps of people walking	The food of a nearby restaurant can be smelled.	There is some elevation in the square. Also a little breeze can be noticed. It is warmer than before. The sun appears sometimes behind the clouds.

VISION

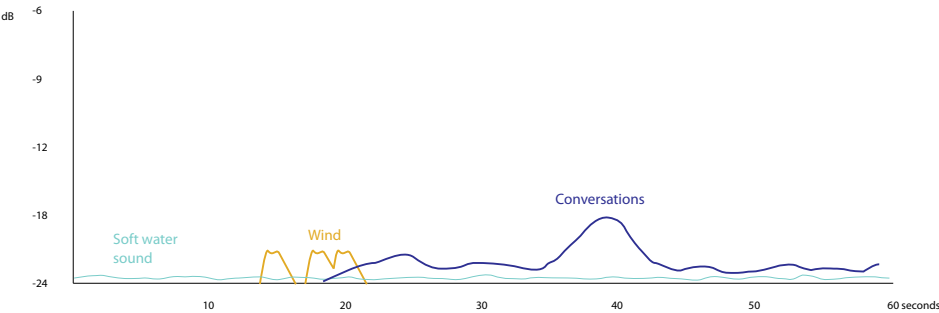


SOUND

16:42

13,3°C

6,4 KM/H



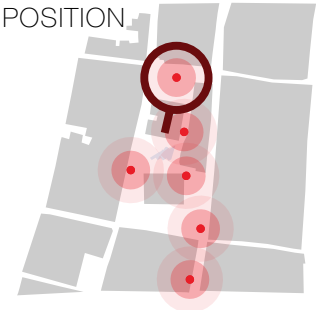
TEXTURE



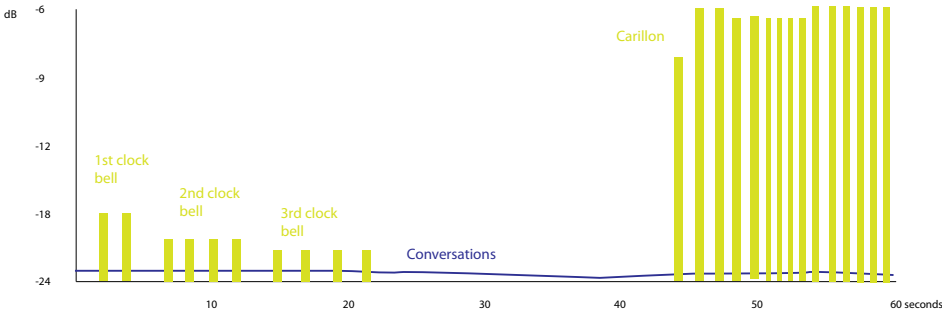
FIELD NOTES

Vision	Sounds	Smell	Feel
From here, the water feature has long lines. The space is quite enclosed. There is some elevation but it seems less drastic. The ground space is light (stones) with the water as a dark spot, there is a dark colourfull center and a light grey top. People are exploring the features of the water. One man is jumping on the round plate (which creates waves by itself and looks at the triangle for some effect, but that one is caused by sound such as little movement by voice or large vibration by traffic).	There is some water flow that can be heard. Also the air conditioning of the Rathaus is well heard. Again the sounds of the restaurant can be heard. Some conversations take place.	There is a little smell of food, like bread or pancakes.	There is little to no breed and no sun. The surface is a little uneven (small bricks with a pattern).

VISION



SOUND



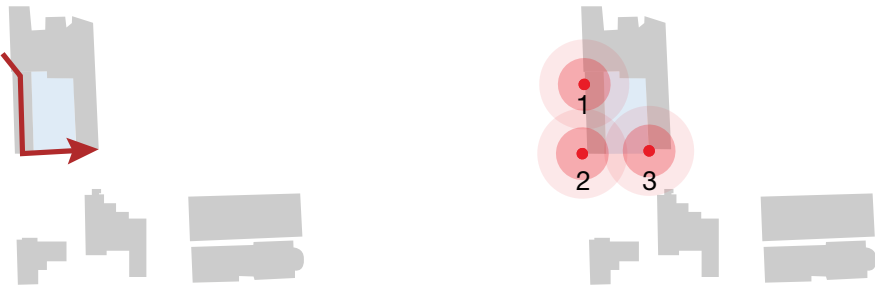
16:54 12,4°C 6,4 KM/H



FIELD NOTES

Vision	Sounds	Smell	Feel
The highly detailed Rathaus can be seen, with an empty square in front of it (the chairs are stacked). At the side (other small square) has a crowded terrace with people enjoying their drinks and shakes. All the benches are occupied at the square itself. People walk and cycle around the square. There is a clear distinction between busy / quietness. The square has some lines in the pavement that point towards the Rathaus. When the carillon starts together with the Doktor Eisenbart ‘play,’ up high in the Rathaus, it gets instantly busier with people watching upwards while standing still.	The background sounds come from cars that drive around the square and from conversations nearby. Three clocks strike 5 o’clock after each other, which ring in a carillon play as mentioned afore.	Also here, there is some food from the bistros nearby that can be smelled.	There is no breeze at this point. The temperature is the same. There is only little elevation. There are though some different textures than before (larger stones instead of the small stones).

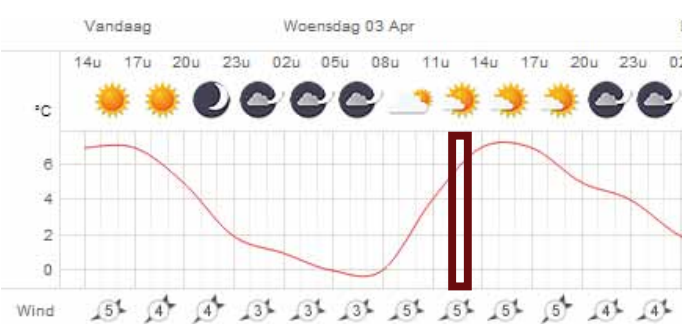
ROUTE



Predetermined route through the area

Points of observation

CONTEXTUAL METEOROLOGICAL CONDITIONS

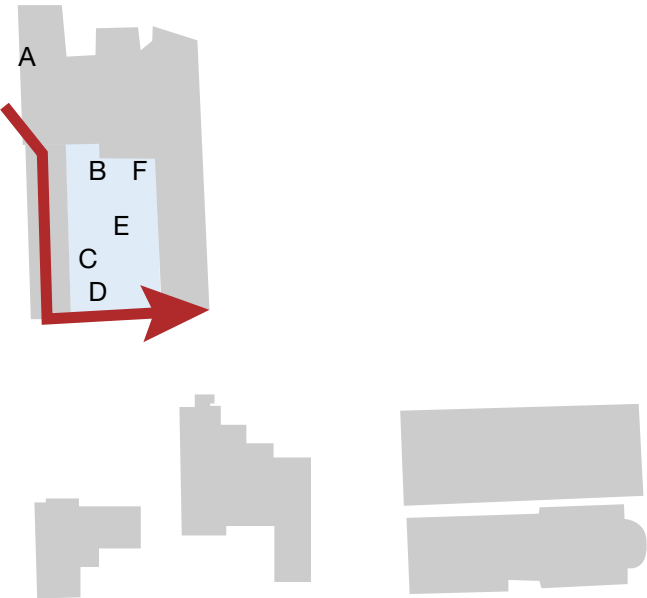


Point	Time	Temperature	Humidity	Wind Dir.	Wind speed	Squall
1	12:18	4,8°C	49%	O	49,9 km/h	49,9 km/h
2	12:26	4,8°C	49%	O	49,9 km/h	49,9 km/h
3	12:34	5,2°C	49%	O	25,7 km/h	40,2 km/h

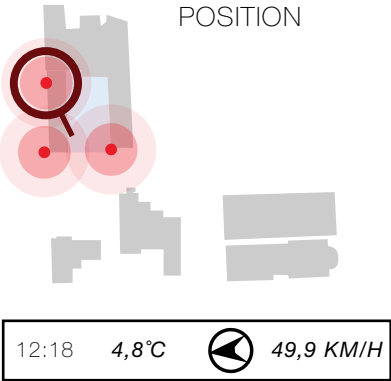
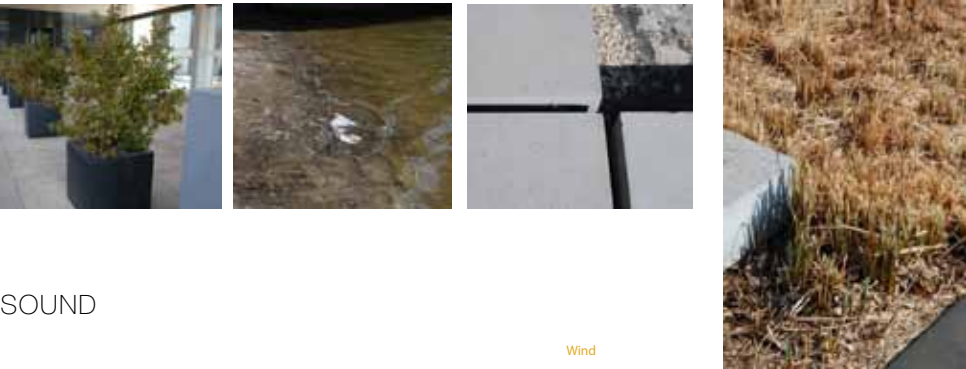
Figure x. Measured weather data of the Oud Zuid weather station, Amsterdam on April 3, 2013.
Source: Weather Underground

EXPERIENCE THROUGH THE AREA

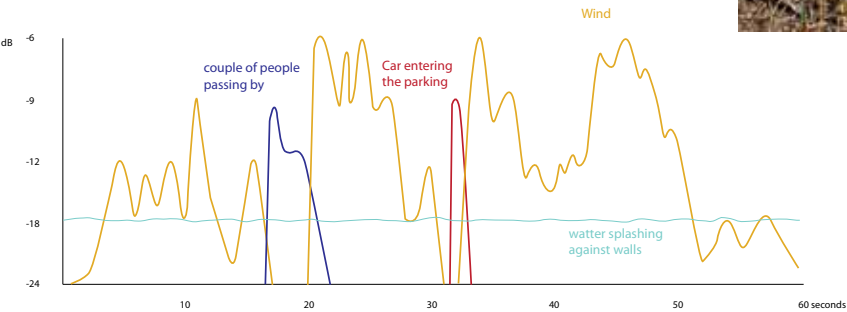
A	The walk past the basin moves over a very light pavement. With a light canopy.
B	Waves created by the wind are seen in the water of the basin
C	Wind is making the walk difficult and more than once unpleasant.
D	Some mown vegetation still has orange accents
E	The squall winds crash into the water and makes the water spiral upwards on several occasions.
F	There is a boat in the basin with construction men



VISION



SOUND



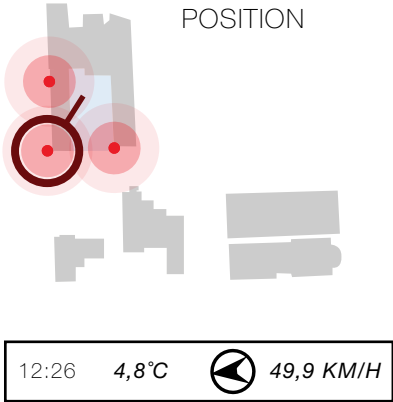
TEXTURE



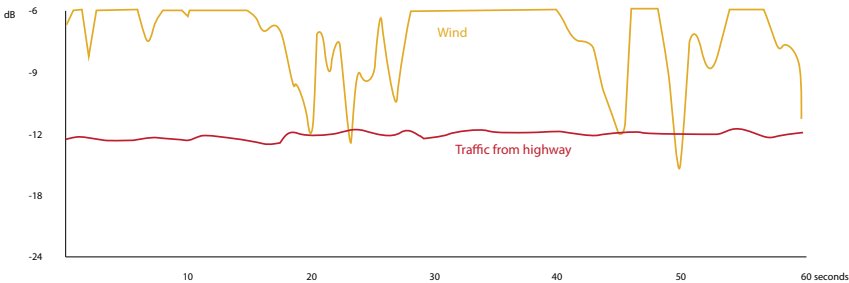
FIELD NOTES

Vision	Sounds	Smell	Feel
<p>The Zuid As area consists of several skyscrapers. Cross towers is a large building with recognizable X-like constructions. At ground level, an overhanging canopy with a wind screen and a building on the side suggest an enclosed space. Within this space, there is a basin with a little bit of water. The water is due to wind activity, since lots of waves are formed and spirals of water vapour rise up during windfall. Next to the pool are some construction elements as if something is not working properly. In a canopied terrace at the other side, some seats are stacked but not used. Only few people walking by and entering or leaving the building. Most action comes from (black sedan) cars driving in and out of the garage.</p>	<p>The sounds in this area are largely suppressed because of the wind. The wind blows pass the buildings and under the canopy, leaving little space for other sounds. One of the sounds resisting this wind supremacy is the sound of waves hitting the edge of the basin. Moreover, there are sounds of conversations, cars passing by and the sound of flags hitting the flagpole</p>	<p>At this point, no clear smells can be defined. Since there is a lot of wind, and the position is not downwind a source of smells.</p>	<p>The place (under the canopy) is cold. There is shade but in the sunlight, there is more wind (no refuge). The surface is solid and made from long tiles.</p>

VISION



SOUND



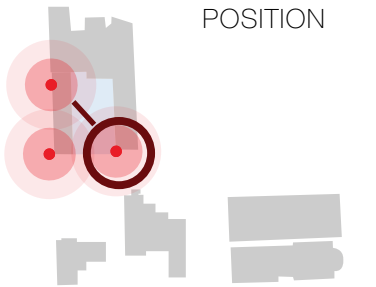
TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
At this point, there are some plant boxes standing on the pavement. In front of us there is the biotope within the water basin. Near the buildings, there is a boat with some construction elements inside. The cars entering and leaving the area are mostly black sedan cars. Only few people walk here. A man searches for a continuous bike lane but can't find the directions.	At this point, again the wind is the dominant sound. There are some conversations and cars passing by as well.	Again, no clear smells can be identified. So the smellscape is again neutral.	There is a little refuge from the top, but the wind is blowing me away. It is hard to stay at the same place. The seat on the west of the building on the grass have no wind and are in the sunlight.

VISION

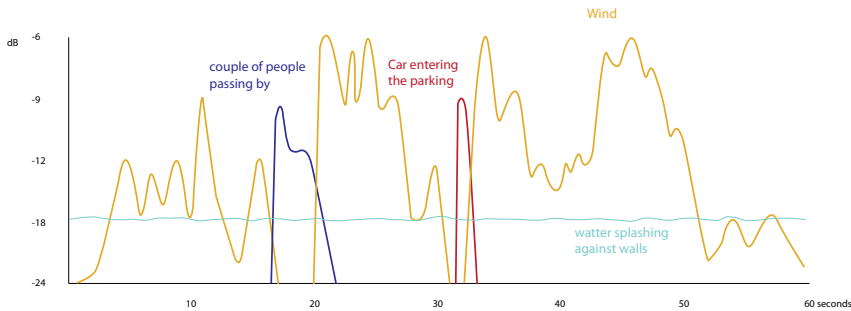


12:34

5,2°C

 25,7 KM/H

SOUND



TEXTURE



FIELD NOTES

Vision	Sounds	Smell	Feel
From this position, the biotope and the building can be overseen. With the waves in the pool, nothing extraordinary is seen. The biotope is cut and not exciting. People are walking from their cars or bikes towards the entrance of the building.	The sounds at this place again come from the wind and the flagpoles	No clear smells can be identified.	The place is cold because of the wind, but there is a little refuge from the surroundings. It is not as windy as in point 2.

13-05-13

RE: Interview water and aesthetics - authorisation confirmation request

RE: Interview water and aesthetics - authorisation confirmation request

Bijlsma, Tesse

Verzonden: dinsdag 7 mei 2013 18:33

To: Herbert Dreiseitl [herbert.dreiseitl@dreiseitl.com]

Dear Mr. Dreiseitl

Thank you for your quick reply. I will change the misunderstandings in the interview. The work will not be published outside the university at all. So for the university thesis I have your confirmation?

With kind regards and thanks for the help.

Tesse Bijlsma

13-05-13

Re: Interview water and aesthetics - authorisation confirmation request

Re: Interview water and aesthetics - authorisation confirmation request

GSD Dreiseitl [hd@dreiseitl.com]

Verzonden: woensdag 8 mei 2013 19:00

To: Bijlsma, Tesse

Cc: Bettina Wanschura [bettina.wanschura@dreiseitl.com]; Julia Dreiseitl [julia.dreiseitl@dreiseitl.com]

Yes

Just go a head and good luck Tesse!

Herbert

Prof. H. Dreiseitl

Nussdorfer Str. 9

D 88662 Ueberlingen, Germany

Tel: +49 7551 9288 0

Mobil: +49 172 8505608

www.dreiseitl.com

hd@dreiseitl.com

