

1/2 SPACE

URBAN LANDSCAPE DESIGN APPROACHES FOR GOTHENBURG RIVERSIDE DEVELOPMENT

A detailed 3D architectural model of a riverside development in Gothenburg. The model shows a dense cluster of white, rectangular building blocks of varying heights, situated along a curved riverbank. The river is represented by a light blue area. The surrounding landscape is depicted in a light grey tone. The model is viewed from an elevated perspective, showing the spatial arrangement and density of the proposed development.

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Urban Landscape Design Approaches for Gothenburg Riverside Development

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Abstract

Nowadays, rising water level is a problem faced by many cities which has put alert to us. If we don't continue paying more attention to these issues, we will lose our homes. Therefore, it is time to change the way we build our cities. This paper uses flood control as a precondition and proposes an urban landscape design method for riverside development.

Gothenburg is the second largest city in Sweden and has serious flooding problems when facing the potential extreme weather. Based on data analysis, there are two main reasons that cause the flood issue: one is the saltwater intrusion, and the other one is climate change. There are many abandoned industrial areas next to water in central parts of the city which need to be renewed. Such as Ringön, our study site, its central location and proximity to the water become important opportunities to get more attention and development. Ringön area has a good chance to be changed into public space and residential area, especially the waterfront area.

This paper depends on the methodology of Ian Thompson's theory of three principal value systems that influence landscape architectural practice- Delight, Community and Ecology. We have a profound understanding and knowledge of how to use resources of a riverfront space, then we put forward our design concept, the 1/2 space theory which combine the methodology and system theory together.

The design proposal is based on the concept of 1/2 space theory which analyses the site background and design process. These studies have ended up in analysis for the further evaluation both locally and regionally. The consequences of the project is to alleviate the local flooding problem, bring a comfortable living environment to citizens, as well as promote the Delight, Community and Ecological values to Ringön and the places nearby, and in the end, to achieve an urban sustainable development.

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TABLE OF CONTENT

Abstract.....	05
Acknowledgements.....	06
CHAPTER ONE INTRODUCTION.....	09
Background.....	10
Objectives.....	11
Method and structure.....	12
Definitions.....	13
CHAPTER TWO DELIGHT, COMMUNITY, ECOLOGY.....	14
Delight.....	16
Community.....	17
Ecology.....	18
The relationship between Delight, Community and Ecology values.....	19
The waterfront landscape.....	20
CHAPTER THREE 1/2 SPACE.....	22
System and parts.....	23
This is not just a space.....	23
Combination of space with Delight.....	26
Combination of space with Community.....	28
Combination of space with Ecology.....	30
Combination of space with DCE.....	32
CHAPTER FOUR SITE ANALYSIS.....	34
Gothenburg.....	35
River city	37
Water system.....	38
The northern riverbank	39
Flooding issue	40
Historical transformation of waterside	42
Site context.....	43
Why Ringön?	44
Current condition.....	45
The general current situation.....	58
Detailed situation.....	59
SWOT analysis.....	64

CHAPTER FIVE DESIGN PROCESS.....	65
Overall concept.....	66
Concept of design	67
Flooding control.....	68
Shore design.....	70
Functional distribution on inner side of the embankment.....	71
Residential building design.....	73
Design-the first block.....	75
Design-the second block.....	78
Design-the third block.....	80
Design-the fourth block.....	81
Design-the fifth block.....	83
CHAPTER SIX DESIGN PROPOSAL.....	85
Master plan.....	87
Views of the whole site.....	89
Sections and views of each blocks.....	91
CHAPTER SEVEN EVALUATION.....	105
After design- create a public space sequence	106
After design-create an urban recreation system.....	107
After design-new Ringön in the commercial network.....	108
After design-new infrastructure and accessibility in Ringön.....	109
After design-no barriers.....	111
After design-meeting places.....	112
After design-flooding scenarios.....	113
After design-evaluation diagram.....	114
CHAPTER EIGHT CONCLUSION.....	117
FIGURES AND TABLES.....	119
REFERENCES.....	123



CHAPTER ONE

INTRODUCTION

Background

In the modern era, coping with peak water level is a problem faced by many cities which has put us on the alert. Nowadays, after experienced urban flooding, people become more aware of the dangerousness of flooding. As a result, more and more efforts have been put on developing flood control methods in urban areas. Until now there are three methods treating this problem: retreat, defend and attack. With the contrivance of new technology, urban areas have transited from industrial city to creative city. Through plenty of urban design projects, coastal and waterfront areas have become common urban public space with great importance.

Gothenburg is the second largest city in Sweden. From 2006 till now, the flood has been bringing problems to this city. Most parts in Gothenburg are in a relatively low location compared with the height of the river. Because of climate change, it will be a serious problem when facing the potential extreme weather in the future. Due to the global warming, undoubtedly, flood has become one of the most urgent issues in this city.

This paper has chosen Ringön as the site of analysis and design. Ringön is an industrial area in Gothenburg which is located between E6 and Göta Älv River. It consists of both new and old buildings; some of them used to be engineering-based industries, but now, what we can see along the river bank are just derelict buildings, old boats, etc.

However, more and more shops, offices and dwellings have appeared in this area recently. That is to say, renovation of this area has now been included in the planning schedule of Gothenburg municipality.

Objectives

During the working process of this master project, we intend to contribute to the general exploration of three main problems:
First of all, adopt a kind of flood control method, which can adapt to the site and even to the whole urban development.
Secondly, create a comfortable, safe, changeable public space for the local citizens. Additionally, realize the environmental, aesthetic and social values in the riverfront landscape.

Method and structure

As a starting point of this thesis, we introduce the main objectives through a literature study evaluated by different meanings of key words, such as climate change, flood, public space, sustainability and urban landscape planning and design. This way, readers will have a comprehensive understanding of this paper.

Following this study, we introduce and use Ian Thompson's theory in landscape architecture: Delight, Community and Ecology (DCE). We use this theory as the main methodology to analyze the values of riverfront landscape.

The methodology study is followed by a design concept introduction. Through deeply analyzing Ian Thompson's theory, we put forward our own theory, which is also the concept of our thesis- 1/2 space. And all the site analysis, proposals and evaluations in this thesis are base on this theory.

We present a design problem at a place in Gothenburg city (mainly focus on the flooding aspect). Follow this narrative description, we analyze Ringön industrial area, presenting its context structure. In order to carry out the applicable site analyses, the pre-investigation about Ringön will include current condition maps with different elements and structures such as transport, green structure, public space and so on, as well as plenty spatial observations and site visit photos. This is followed by a SWOT analysis, which introduces the Strengths, Weaknesses, Opportunities and Threats of the Ringön area.

The design process is the fourth part. We combine Ian Thompson's theory and our design concept, and then zoom into the Ringön riverside, and show the steps of our design.

The fifth part is a design proposal to this site which is presented by computer-drawn master plan, sectional drawings, and views visualizations using AutoCAD, Photoshop, Illustrator and Sketch Up.

After the comprehensive design, follows future program evaluations and a reflective discussion. This part shows how our proposal may change the local flooding environment and people urban life through Delight, Community and Ecological aspects. Also we do a further evaluation of our proposal with the surrounding areas in the end of this part.

We finish our thesis with conclusions which summarize the main point of the whole project and the experience we gained during the design and planning process.

The ideas provided by the paper come from our own understandings of the suggestions given by our tutor. Professional books and journals also serve as important sources of information. Concerning the case, Gothenburg municipality website and internet are also a kind of important media for us to obtain up-to-date data, statistics, and official documents during the work with the thesis.

Definitions

Climate Change: a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years.

Flood: water covering previously dry area.

Public Space: a social space such as a town square that is open and accessible to all, regardless of gender, race, ethnicity, age or socio-economic level.

Sustainability: requires the reconciliation of environmental, social and economic demands.

Urban landscape planning and design: the collective term used to describe the process of designing and shaping urban landscape.



CHAPTER TWO

DELIGHT COMMUNITY ECOLOGY

There are three principal value systems which influence landscape architectural practice- Delight, Community and Ecology – which seeks to discover the role that the profession should be playing now and for the future (Ian H. Thompson, 1999).

Delight

No matter in which period, many landscape architects or architects are much concerned with beauty, but what makes a place beautiful?

Delight and aestheticism is an innate tendency of man existing in him from the first moment of his birth and lives within him all his life (Mohsen Faizi, Mehdi Khakzand, 2008, p120). In modern times, beauty is one of the most important points to attract people. The concept of beauty has had a chequered career in the history of aesthetics (Ian H. Thompson, 1999, p13).

Both Plato and Aristotle associated beauty with aspects such as unity, regularity, simplicity, proportion, balance, measure and definiteness (Ian H. Thompson, 1999, p15). In the eighteenth century, landscape gardening, in so many ways the forerunner of landscape architecture, already was considered to be an art form with similar status to painting or poetry (Ian H. Thompson, 1999, p55). Now, as an important art form, landscape architecture is the belt which can connect art, people and environment together. It not only expresses ourselves in the environment, but also helps us understand ourselves in the art. The only way we can bring art to the environment, is design (landscape architecture). Besides, landscape can also improve the visual amenity and show the spirit of a place.

An attractive place might satisfy the client's love of rational order or gratify his sense of control, but how does it measure up against criteria for sustainability? It isn't enough to have aesthetic value in a place only.

Community

"We can't live in pictures, and therefore a landscape designed as a series of pictures robs us of an opportunity to use that area for animated living" (Pencil Points November 1938, as cited by Ian H. Thompson, 1999). Many landscape architects focus on the form when they are dealing with the matter of urban public landscape, but they fall short of understanding and thinking about the design concept and its social significance.

However, landscape architecture plays a very important role in contemporary human living environment. The social value is the key character of landscape architecture. The ultimate goal of landscape architecture design is improving people's social life; therefore landscape architecture plays an important role in the creation of social and public spaces in environmental systems. Public contribution in creation of these spaces can help this important issue. Like Treib said, the landscapes should be for people, although addressed to a variety of purposes, landscape design ultimately concerns making outdoor places for human use (Marc Treib 1993, as cited by Ian H. Thompson, 1999).

There are two aspects in the community that we should understand. Primarily, the social values of nature must be recognized, as Swaffield argued, the power of social value of nature must be harnessed, rather than resisted. Nature in the city must be cultivated, like a garden, rather than ignored or subdued (Simon R. Swaffield, 2002, pp175). Secondly, the landscapes are for people. Thompson mentioned that the landscapes are for people, although addressed to a variety of purposes, landscape design ultimately concerns making outdoor places for human use (Ian H. Thompson, 1999, pp98).

Ecology

If a place only has aesthetic and social values, the landscape theory will be incomplete. Man has been cruel to nature around him and this behavior has already led to many disasters. Landscape ecology is of course not a new concept. No matter in which environment, landscape architecture must be associated with the natural environment. We should encourage ecological civilizations and pay more attention to the balance of the eco-system and keep the city development sustainable.

The works of landscape architecture represent a new type of practice, one that makes the natural world-its ecological and geological process, its rapid phenomena, and its invisible substructure-more evident, visibly legible (Elizabeth K. Meyer, 2000). Considering the necessity of confronting the environmental challenges in today's world and eliminating them in the format of various expertise, emphasizing on the main bed of landscape profession which means the nature and its inevitable role in protection and sustainability of the environment (Mohsen Faizi, Mehdi Khakzand, 2008, p118). A good landscape can save the planet and change the environment. For landscape architects and urban planners, sustainable development seems to suggest the need for more compact and contiguous growth patterns at higher densities and for greater reliance on mass transportation (H. Barton, 1998, as cited by Ian H. Thompson, 1999, pp156).

The ecological thought not only has major changes on ideas and methods of landscape design, but also greatly influences the image of landscape. The landscape design no longer stays in the small world but it begins to dip into large scale field. Therefore, today, we need sustainable development to increase the ecological value of landscape architecture. Planning for sustainability requires some priorities. Rather than planning the human habitat first, by allocation land for housing, industry or recreation, and only then seeking to preserve what remnants of other habitats remain, we should be putting the best habitats first whilst also taking steps to ensure that the hydrological cycle is disturbed and polluted as little as possible (Punter and Carmona, 1997).

The relationship between values of Delight, Community and Ecology

Delight, Community and Ecology theory also presents the development of how people treat and feel landscape in different times. Thompson argues that if there is a conflict between a designer's aesthetic sensibilities or ecological ideals and the community's or ecological ideals and the community's aspirations it may be possible for the designer to persuade people to accept their point of view (Ian H. Thompson, 1999, p122).

As figure 1 shows, the ecology, social and aesthetic missions of landscape architecture are overlapping, each two values have converged segments. For example, The 'Ecological Approach' embodies both ecological and social values, but tend to decrease aesthetic concerns. Functionalism is a social ideal which also has an aesthetic dimension, as well as the natural aesthetics own the ecological and delightful part (Ian H. Thompson, 1999, p8). There is an area in the centre of this diagram where all three value fields overlap, which is tri-valent design.

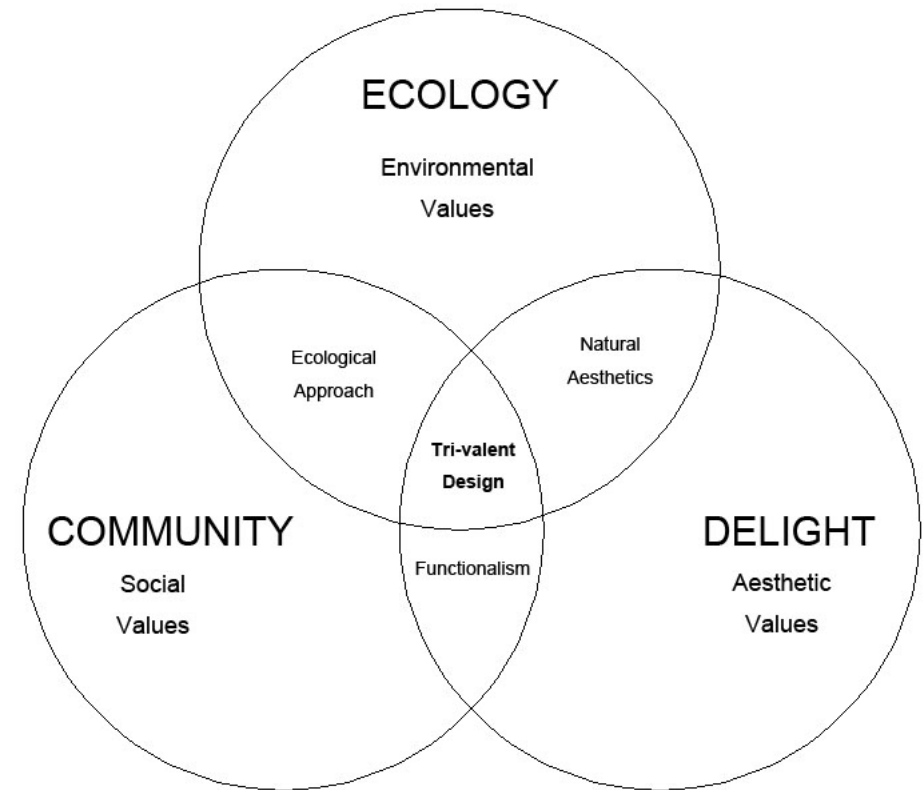


Figure 1: Overlapping value fields in landscape architecture

The waterfront landscape

Professor Kongjian Yu has claimed that the human being should treat the water as a friend. In the modern time, the flooding means not only disaster, but also a good fortune. Because the water is a living ecosystem, the authenticity and integrity of the water is not its purify, but the harmonious relationship with land and living beings (Kongjian Yu, 2011). Generally, the waterfront landscape is the land near the edge of sea, lakes, rivers and other water forms. Urban water becomes an important factor which is the origin of the city and the urban culture. It also becomes one of the most important urban sustainable development elements.

The most important feature of waterfront landscape is that it is a complex issue and involves several research areas. According to the common space of human being activities and natural development processes, the urban river and waterfront landscape have lots of functions in the urban natural and social system, such as water conservancy, transportation, recreation of ecological functions and so on. The waterfront engineering involves shipping, river harnessing, water conservation and supply, flood control, vegetation and animal habitat protection, water quality, energy, urban safety as well as architecture and urban design aspects.

The urban river can bring an additional quality enhancement and aesthetic to the environment. That is to say, the more the natural resources of waterfront landscapes are left, the more natural aesthetic the landscape can present. Express by-passes, overpasses and subway tunnels and their installations including artcraft edges weaken the river's capacity for presenting its aesthetics (Mohsen Faizi, Mehdi Khakzand, 2008, p120). In the Community aspect, waterfront landscapes constitute an important part of the urban public open space which can improve the habitability of the city, as well as provide a stage for a variety of social activities. It is also important to consider the human activities in the riverfront since when the human contact with the river gets more intense, the possibility of interactions between these two increases too (Mohsen Faizi, Mehdi Khakzand, 2008, p119). The natural factors in the urban waterfront landscape achieve harmony and balanced development between human being and environment. If diversity of waterfront landscape plant is increased, it will improve the urban environment, refresh the air and decrease sound pollution.

Important aspects in evaluation landscape	Important features
Delight	Passing of the river
	Attractiveness of riverfront
	Arrangement of the biodiversity
	River dimension in width and length
	Passing of bypasses and overpasses, etc. and the quality of man-made environment
Community	Modes of man's transportation in the riverside and defining walk ways and bike ways
	Formation of public events
	Worthiness of the river as a cultural heritage
	Physical relationship of man with the water
	Defining leisure and tourist units beside the river
Ecology	Biological diversity
	Water quality
	Environmental pollution (air, noise,...)
	Diversity of (green spaces) plants and trees and their quantity

Table 1: Important features in the evaluation of waterfront landscape

Based on Thompson's theory, two Iranian landscape architects Mohsen Faizi and Mehdi Khakzand listed a table which shows several related features in the aesthetic, the social and the environmental effective factors in waterfront landscape. And we think that this diagram is a really good one for us to study and apply. Depend on our analysis background and method, we use important aspects in evaluation landscape instead of effective factors in landscape, the related features is changed to important features.



CHAPTER THREE

1/2 SPACE

After deep study of DCE theory, we combine Ian Thompson's theory with philosophic thinking of system and put forward our own theory called 1/2 space which is the main concept of this thesis.

System and parts

Anything regardless of their size range can be seemed as a system in certain conditions. The so called system is an organic whole that consists of a number of elements with specific functions. This is a kind of philosophical thinking, and in this thinking, a unique system has four characters: optimizing trait, stabilizing trait, connecting trait as well as integrating trait. That is to say a system is an organic whole that consists of different parts; all the parts are indispensable part of the system; the system has more advantages than any of its part; system and parts are mutually dependent.

This is not just a space

1/2 Space is the concept, the principal axis of the design project to achieve the methodology of this paper—Delight, Community and Ecology.

1/2 Space means the space which will be created is not just a space generated by professionals, but a space which will have other functions and other meanings. In other words, the space is not a traditional public space but a unique system which will realize its unique values as time going on.

According to philosophic thinking of system, when combining different parts together they may probably enhance each other and then maximize their advantages. In the end, an organic system will appear. Landscape design is an ever changing process, so design is just the beginning step, therefore, the term space we mention in this paper is traditional public space which is just one part of the system; it is a site without too many meanings so it is just half of the new public space we want to produce. Besides the space element, what we want to add to the organic system are the main aspects called Delight,

Community and Ecology—the methodology of this paper. After the space has been created, it will be visited by kinds of people, used in different ways, it will affect the environment. Therefore, the terms flood protection, generating urban character, sustainable management, achieving humanism which are included in the three main aspects: Delight, Community and Ecology will be achieved over time.

Delight, Community and Ecology are the values of the project besides space. After those values are being achieved over time, an organic riverfront site system will be generated. According to the table by Mohsen Faizi and Mehdi Khakzand which has been mentioned in chapter two, there is no doubt that the system theory can also be applied on this riverfront project in terms of the Delight, Community and Ecology.

In this paper, what kind of elements have DCE values and how those new elements added to the space can help the space become a unique site system can be found in this chapter. We divide the main content of this chapter into four parts, they are: Combination of space with Delight, Combination of space with Community, Combination of space with Ecology as well as combination space with DCE as the conclusion part of this chapter. More specifically, the first character optimizing trait can be related to how to optimize the existing structure in urban environment while the stabilizing trait can be connected with analyzing the conflict, the changing tendency of those landscape elements. How to relate the site design to its surroundings is the third part and the last integrating trait can be applied to generate and analyze new characters and functions of the whole project.

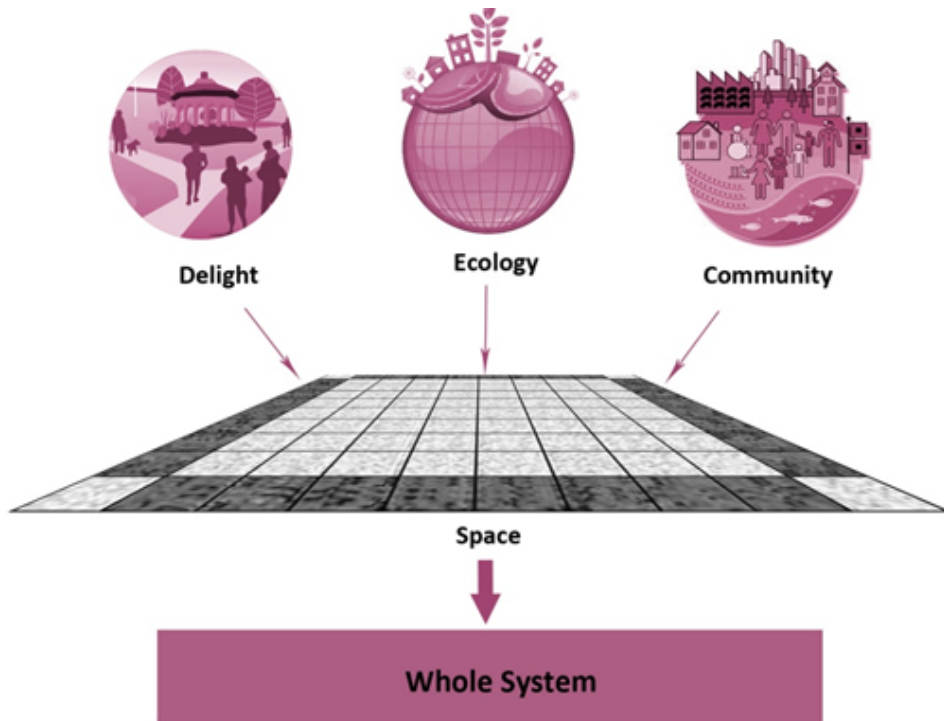


Figure 2: Main concept of the 1/2 space

Landscape is not 'land', it is not 'nature', and is not 'space'. (Ingold, 2000)

The first thing to emphasize is that in this chapter, we take the site which a designer works on as a whole system. As to space, we consider it as a base while the Delight, Community and Ecology represent three types of elements, that is to say, DCE are the three major components of the system. Since we are working on waterfront space, this chapter is mainly talking about the theory used in the waterfront landscape design and planning. As Ingold argued, landscape is changing all the time and has different meanings in different aspects (Ingold, 2000).



Figure 3: Concept for landscape design

Combination of space with Delight

Important aspects in evaluation landscape	Important Features
Delight	Passing of the river
	Attractiveness of Riverfront
	Arrangement of the biodiversity
	River dimension in width and length
	Passing of bypasses and overpasses, etc. and the quality of man-made environment

Table 2: Important features in the Delight aspect of waterfront landscape

As it is mentioned in the last chapter, Delight is an innate tendency and beauty is one of most important points to attract people, which is the aim of designers. As a result, Delight is no doubt one important part of the whole system which also has the four traits in a site:

The optimizing trait of Delight

When we are working on spaces along a river, there are already some delight elements existing in the original space, and some of the elements have their own value and deserve to be maintained during the design process. According to our 1/2 space theory, the original area is the original system which has a stable structure. The optimizing trait requires optimizing the original structure, that is, to make our space more beautiful as well as to enhance the ornamental value of the entire space.

As mentioned in the last chapter, waterside spaces have kinds of elements which can give people the feeling of delight, like various vegetations, as well as qualified waterscape and landscape subjects designed by people, etc. In other words, new things like those kinds of elements can also be added to the site under the premise of maintaining the original feature. If we can use those new elements well, it is true that they will play a very active role and make the area more beautiful and more attractive.

The stabilizing trait of Delight

After designing by professionals, the existing site system will be broken and

replaced by a new system which will have new coastal landscape, new species, new activities of people, etc. To make the area more beautiful and more attractive is a goal of professionals. However, we should know that the original landscape may already have been adapted by people, especially residents. As a result, for those people, trying to adapt to a new landscape in a familiar area may be difficult and the new landscape may not meet their aesthetic requirements. So professionals must do extensive investigation before design, so people will not think that there are something incompatible between the new landscape and their own life style. In other words, as changes always are difficult the investigations are necessary in order to maintain the relative stability of the entire site system.

The connecting trait of Delight

Looking at a site as a whole system is not absolutely right, because the site we are going to design is a small system compared to a city or even larger outside environment that can be considered as a larger system. Small systems belong to the large environment, so changes in the environment may affect the small system. In the meantime, the changes of small system will also affect the outside environment. The site can be seemed as a small part of the big regional environment, so it cannot be isolated, because some main characteristics should be similar to the big environment and then the system can be more stable.

The aim of taking the site as a system is to facilitate our design and study. If we consider the site as a unit, the outcome will have its own characteristics, to some extent, which are different from the big environment.

Specifically, the delight feeling can be gained from landscape design, vegetation, etc. Meanwhile, in order not to be too obtrusive, the delight elements of the surrounding environment are also necessary to be studied, such as why the environment is attractive, what kinds of elements have those features that can attract people, etc. More generally, as to a city which can be considered as a big environment, we should know what the local people like, what is attractive, what kinds of vegetations are growing, as well as what kind of riverside spaces people like to spend time in.

Landscape architects and planners' task is to make the design of the site match the overall environmental background and make the site become an organic part of a stable city system. Transformation will inevitably produce changes, only if we grasp the general direction can we reduce the conflicts such as inconsistency between the feature of the site and the urban characteristics. Then the new site will become permanent and be more attractive in the city.

The integrating trait of Delight

Whether the subject is in the country or city, desert or forest, summer or winter, the subject appears to be part of the surrounding landscape (Amidon, 2006).

Through adding new elements to an entire riverfront site, the site will have new features and new functions so that people will like enjoying the scenery there because they can find the elements which can produce delight sense. Therefore, some people will plan to come and spend their time on this site. In other words, a well-designed site system is not only a place people pass by and stop randomly at, but a destination where people have more expectations of how to use it.

Combination of space with Community

Important aspects in evaluation landscape	Important Features
Community	Modes of man's transportation in the riverside and defining walk ways and bike ways
	Formation of public events
	Worthiness of the river as a cultural heritage
	Physical relationship of man with the water
	Defining leisure and tourist units beside the river

Table 3: Important features in the Community aspect of waterfront landscape

Just to bring some elements of Delight in a riverfront site cannot be a reason why a public space exists. Landscape designers are not creating stand-alone art objects; they are making spaces which will be used by people and which will change and develop over time (Richardson, 2008).

Man is a socialized creature, so besides natural needs, there are also some special needs that only human beings have.

The optimizing trait of Community

The urban riverside landscape is designed for people, so it is part of the society and is a stage for human to perform. Professionals' aims are to provide space and facilities for people to use in order to achieve variety of purposes, such as walking, sightseeing, social communicating, sporting and traveling.

According to our 1/2 space theory, in the site, elements existing for people to use are the original elements of the site system. As a designer or planner, we can keep some functions of those elements. At the meantime, the purpose of reconstruction is to provide people more chances of interaction with

landscape as well as with other people. Therefore, multifunction is an inevitable trend, through adding new elements and new facilities such as pavement, garden buildings and garden furniture, more people and more kinds of activities will emerge in the space. Then the value of the whole site system will be enhanced and make the city more vital. Besides, restoration of some important part of the system is also a very important part, also a reason why landscape can be part of the society. As Antrop argued, conceptually landscapes have a holistic and complex character, which bridges natural and cultural aspects, they are valued in many different ways (Antrop, 2005). It is in people's nature to integrate what they perceive immediately with what they know and remember (Meinig, 1979). So as professionals, we should respect the history of the system and try to add new things during the design process.

The stabilizing trait of Community

As it is listed in the diagram, there are types of elements in a site system which belongs to Community perspective, such as formation of public event, leisure unit, tourist unit, etc. These new elements may change some functions of the system, and change the way of people's behavior. For example, original spaces in the site may disappear, new features of the site may attract more tourists, then living environment of the surrounding residents will be changed, then residents have to adapt to the new site system. If there are too many conflicts between the new landscape and local people, this new system will lose its existing value, in other words, the pre-survey is important, otherwise the outcome will become a failure in the end.

The connecting trait of Community

The connecting trait of community request professionals to make the features and functions of the site match the main feature and function of the outside environment, such as commercial, recreational, leisure function, etc.

Like it is mentioned in the Delight part, there is nothing that can exist independently without the outside environment, the small site system is part of a big system, and therefore, its delight elements will be affected by the large environment. Meanwhile, the small system will affect and to some extent change the delight elements outside environment.

Similarly, we take the waterside space as the small system. Following the multi-functional trend, this little system should have more features in order to meet the diverse needs of different groups of people. If the system can meet the needs of a variety of people, it will add more vitality to the city. At the same time, the small system should be a component of the outside environment, meet people's preferences and match activity patterns in a larger area, even the whole city. Then the site system will be more valuable, and won't be isolated from the big environment.

As a result, surveys of the environment outside the site are essential, such as what kind of activities people like to do, how they interact with the landscape, and what kind of facilities they would like to use. During the design process, we find that some of the spaces in the site should have relationships with the surrounding area with regard to the connecting trait.

The integrating trait of Community

When the riverfront space has new facilities and new constructions, it will have new functions and new features. Therefore people will be attracted to this new system, not only because of the new features of these elements, but also because it will become an activity center where people do not have to go back and forth, but can do all kinds of activities in the same place. In other words, the whole site itself will become a huge meeting place. From a bigger point of view, the site will not only be a place where people can enjoy the scenery, but a good place to spend a day meeting each other.

If through design, the entire city can have a few more meeting places, the community network of the city will become more systemic. And if such sites are increasing in number, the whole city will become more attractive undoubtedly.

Combination of space with Ecology

Important aspects in evaluation landscape	Important Features
Ecology	Biological diversity
	Water quality
	Environmental pollution (air, noise,...)
	Diversity of (green spaces) plants and trees and their quantity

Table 4: Important features in the Ecology aspect of waterfront landscape

The optimizing trait of Ecology

Nowadays climate change and pollution have become serious problems. So the designers have to concern about them during design process and act as environmentalists do. Some important elements that can change the environment are water and plants. The main problems we have to solve are improving the environment, alleviating pollution and changing micro-climate.

Besides meeting the aesthetic and activity needs, landscape architecture should also play a role in protecting the environment. The organic combination of water and plants is the best among all methods. At the same time, adding more vegetation will strengthen the effect of environmental protection. According to our 1/2 space theory, the optimizing trait of a system is to optimize the structure with an aim to optimize the overall function of the system. From the ecological aspect, the original structure consists of the water resources and existing vegetation. As professionals, we have to make good use of water resources and optimize the vegetation system. More specifically, making good use of water resources can avoid disadvantages and enhance advantages of water, in other words, using water to nourish vegetations, cleaning the air and preventing disasters such as floods. Optimizing vegetation structure is to optimize the existing plant systems, such as increasing plant diversity and so on. Green is a cure for our unhealthy environment because it can prevent our resources from disappearing and entire species from extinction. If we all work hard enough, green might even solve the problem of global climate change (Mass, Winy, Hackauf, Ulf.&Pirjo,2010). So using green elements well will make the site have profound significance.

If we can combine water and vegetation perfectly, the ecological values of the new system will no doubt be enhanced and at the same time make some contribution to the improvement of the environment, then help to achieve the best features of the overall system.

The stabilizing trait of Ecology

Water, vegetation and soil can form a small ecosystem improving the environment, generating micro-climate, and providing comfortable and healthy environment for people to enjoy.

The design itself is a process which is changing all the time. Therefore, designers should have predictability that means we should think of the most possible local situation that may occur, such as floods, species invasion and so on. Especially when we are working on waterside landscape, the flood problem, of course, is the priority we should take into consideration. If the site is faced with flood problem, we should provide flood control measures, such as building flood protection walls and flood control embankments and planting a variety of vegetation. Besides, we should be aware that flood is not totally a bad thing, for example, making flooded landscape is also a very good idea in landscape architecture. This kind of landscape can help people learn more about floods, understand natural transformation, and appreciate the ecological characteristics. Besides, it can remind people of protecting the environment. If local species are the main species in the new site system, the new system can remain stable to some extent and this new system can maintain its stability.

The connecting trait of Ecology

Because the new site is a part of the outside environment, the ecological system also has to be combined with surrounding environment. Firstly, water itself is a big system, so riverfront site is a part of the big environment. When working on riverfront landscape, we should consider it as a part of the landscape of the entire coast and should combine the characteristics of other parts of the coast with the characteristics of the site. If other parts of the coast also have to be rebuilt, we would have to pay more attention to the

consistency of the overall features, such as the characteristics of flood control facilities and the waterscape features so that the site would not be too obtrusive in the big environment. In addition, the plants will form a green system with the surrounding green spaces, which can play an important role in improving the urban environment.

The integrating of Ecology

Ecosystem is an inseparable whole which consists of water, soil, and vegetation. There are various features of the ecosystem. So once it is formed, it will play a significant role and it will have powerful force that a small garden or a small piece of water do not have. Like it is said before, the whole river is a water system which has lots of functions. Flood protection measures of the whole river, such as flood control facilities, water plants, and changing topography, mean a lot to a city which can reduce substantially the losses caused by flooding for a city.

Besides plants growing on the land, aquatic plants are also parts of the ecosystem. So planting those species is a good way to increase species diversity. Meanwhile those plants can also play a positive role in flood control. If we combine all the ecological factors together in a site system, the system will have far-reaching significance in addition to the aesthetic function. Also, we have to realize that the urban ecosystem is more difficult to form than the natural ecosystem because of some factors such as limited area of urban green space, economic limitation or some other constraints.

Combination of space with DCE

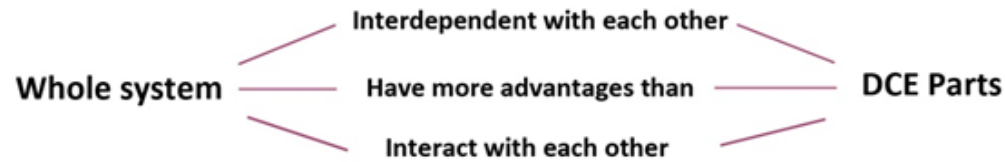


Figure 4: The relationship between whole system and DCE parts

As it is mentioned before, we consider the site as a whole. Elements which form the DCE structures are parts of a whole system. And we analyze some possible challenges and advantages after elements turned into an integrated system. Of course, the outside environment should be considered as a bigger system. As it is mentioned before, the aim of taking the site as a system is to facilitate the interpretation of what can be brought to people by landscape design as well as what can be brought to the whole city or even a region by landscape design.

More specifically, according to the theory of system, we need to master the relationship between the entire site and all its components as well as grasp the general direction during design process, at the same time, coordinate the relationship between them with an aim to achieve the best situation that the site can be shown to everybody.

Firstly, we should know that the system and all its parts are interdependent. As mentioned previously, the site is composed of three major kinds of elements, Delight, Community and Economy. On the one hand, if we lose any part of the site it will not be a complete whole, for example, if a site does not have vegetation, water or public space, it will not be a good waterfront space. On the other hand, any part which is separated from the site system will lose its own meaning and function that it had before. For example, if we isolate a meeting place out of the site system, and put it anywhere else, without elements of Delight that can alter people's feelings and elements of Ecology that can change the micro-climate, in this site may not be so attractive and

cannot become a distinctive waterside public area.

Secondly, the site system is not just the subject where all elements of DCE stack together, but a unique whole which will have all advantages of the elements as well as have more features and functions that any elements do not have the moment the site system is formed. Just like the integrating trait of system mentioned before, systems have more advantages than any element, and it can be found in three perspectives: Delight, Community and Ecology. More specifically, from Delight perspective, when the elements of Delight are combined with the Community and Ecology elements, more people will be involved in the site and variety of vegetation will be seen in the site system, and the micro-climate will be better, so that the Delight feeling will be increased by those elements, and the whole site will be more vital and more beautiful. From Community perspective, when the elements of Community have been combined with Delight and Ecology elements, the scenery of the whole site will become better and give more pleasant feelings, meanwhile the environment is also better, then subconsciously, people would like to enjoy their time in such a good place with both beautiful scenery and good micro-climate, then people's interaction with the site will increase, in other words, the elements' function of Community will be improved a lot. From Ecological perspective, when its elements are joined with Delight and Community elements, the ecosystem is no longer just part of nature, but it becomes a small ecosystem which can exist in the society. If there are more and more such types of systems existing in a city, their function of improving the environment cannot be ignored. If a place just have vegetation with environmental values, the function of the space will be too simple and cannot bring enough interests that a city wants to obtain, but when combined with the elements, it can bring other values of Delight and Community aspects, this ecological part can be more reasonable to survive in a city. This way Ecology element can play a great job in a social environment.

Finally, we have to recognize that the whole system and the three main parts are interacting with each other. Space is the base of the overall system and it is interacting with values that are corresponding to DCE aspects. On one hand, the overall site system should lead the development direction of all the parts

which is the general direction of the design process. Only after mastering the general direction of the site's main feature and main function can designers or planners work on the design or plan details. In other words, only if we know the general direction can we know what the details will look like, or else the development of the whole site may go in the wrong direction and cannot reach our desired aim ultimately. On the other hand, the role of the elements cannot be ignored; the changes of each part have a significant impact on the entire system and will change the feature of the whole site to a certain extent. For example, if the proportion of Ecology part is increasing continuously, the site will become more and more naturalized and ecological. If the proportion of Community part is increasing, it will make the site more urbanized. As professionals we have to master the main direction of site development and try to formulate in early time in the design process in order to achieve the best effect.

To sum up, taken the space as a base, DCE as three big parts, professionals have their duties to combine them as an organic whole, and make sure the whole system can play its best role and become an organic part of the whole city. The site should be attractive and have its own function and meanings, meanwhile, make sure that the feature of the site match the feature of the outside environment is the prerequisite.



CHAPTER FOUR

SITE ANALYSIS

Gothenburg

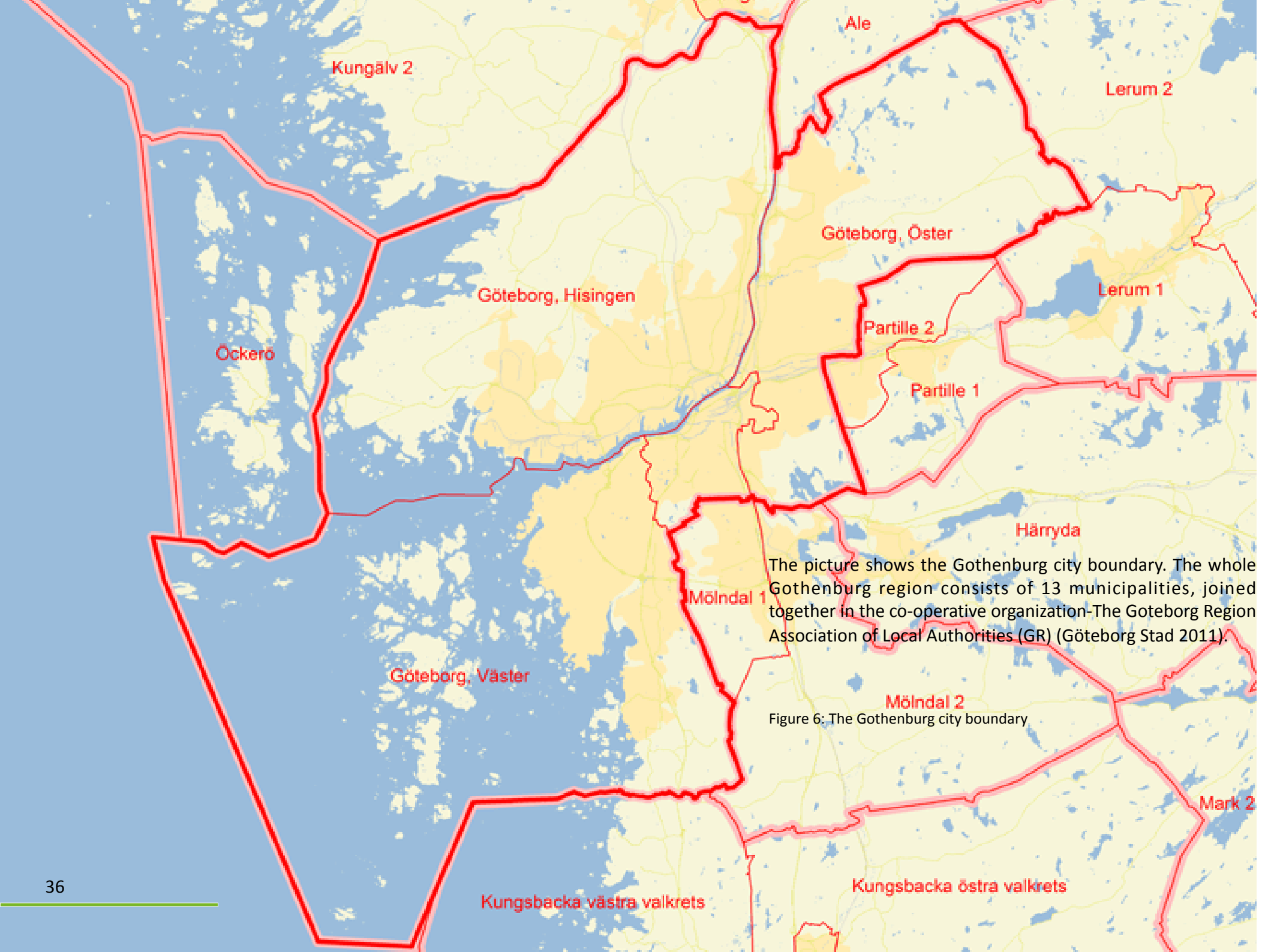


Gothenburg was founded in 1621 by King Gustav Adolphus. It has the largest seaport in the Nordic countries and today it is the second largest city in Sweden, the fifth largest in the Nordic countries (go:teborg website). Historically, shipping has been the largest employer followed by industry. Today, Volvo, SFK, and Ericsson are the largest employers in this area.

The city has a diverse history with Swedish, Dutch, Scottish, and English influences among others. The city was planned by Dutch urban planners so that it closely resembles the design of Amsterdam. Due to its strategic location Gothenburg was seen as the “gateway to West” with shipping activity and had traders from all countries (Gothenburg Municipality website).

Gothenburg is located on the west coast and The Gothenburg Metropolitan Area (Stor-Gothenburg) has 816,931 inhabitants (Gothenburg Municipality website). The city has second largest airport of Sweden, well developed roads, and railways connection to other parts of Scandinavia and Europe. Gothenburg has a sufficient public transport system, while the tram system is important for it.

Figure 5: The location of Gothenburg



River city

Regional development strategy

According to the regional development strategy, the local municipality hopes that Gothenburg will become a river city in the future. Since the city centre is divided into two parts by the crossing river Göta Älv, Gothenburg has a unique possible opportunity to grow and expand. Therefore, the city of Gothenburg has launched the project River City Gothenburg with a broad political support (Göteborg Stad 2011).

The municipality has decided that the whole city should develop outwards from the centre. In this way, it can strengthen the region as well as satisfy the demand for attractive business sites. Complementary development at strategic nodes could make effective use of limited land resources (Göteborg Stad 2011).

Since the project of River City Gothenburg is composed by a relatively short strip along the waterfront on both sides of Göta Älv, it can be regarded as the key area.

Based on the municipality's report, the purpose is to outline visions and strategies for the area and to develop methods for transdisciplinary cooperation, through dialogue as well as through exchange of information. This objective is thought to secure a sustainable approach towards urban planning not only within the project but in the city as a whole (Göteborg Stad 2011).



Figure 7: The river city

Water system

The water natural systems have a significant impact on the development of Gothenburg's city development. The city was founded in early 17th century, and thanks to its good location, the city has been serving as the main Scandinavian port for many years.

The big regional water way of Gothenburg is the Göta Älv River, which is running from the Lake Vänern to the port. Göta Älv is the largest and longest body of water in Sweden and runs through ten municipal communities before it discharges its water into its estuary in the harbour of Gothenburg (Marianne Karlsson, 2009, p8-9). Today, the river is an important transport route that connects central Sweden with Scandinavia's largest port. The height differences (44 meters) between Lake Vänern and the sea have been regulated through extensive lock systems and have also been harnessed for electricity production (Marianne Karlsson, 2009, p9). The river is divided into two parts, creating the island Hisingen. The river has attracted industrial development to the region which has made it both prosperous and polluted.

Water quality is a big concern, from that the water system is the habitat of plants and animals. Meanwhile, the quality can also indicate whether it is influenced by pollution as well as salt intrusion from the sea.

Nowadays, water is used by consumers in many ways, such as transport connection, drinking water as well as water supply for the industry and power production. Human activity has shaped much of the water system, for example by constructing the harbour and city centre canals, burying water ways, filling parts of the river, etc. The main issue of flooding in Gothenburg is the rise of the sea level. The level of the river Göta älv is, in the Gothenburg area, more dependent on the sea level than of the draining of Vänern. The water in Gothenburg is of high interest for the so-called extreme weather group which has developed a number of reports concerning the climatic factors that affect most area in Gothenburg.



Figure 8: The regional water system- Göta Älv River

The northern riverbank

According to the Älvstranden Process report, a new part of the city is expanding along the two sides of the river. The expansion started in the 1970s, when three ship yard areas and four port areas on the north shore of the Göta Älv River, right in the heart of central Gothenburg, which were made available for other uses (Lars Ivarson, Mats Andersson). In recent time, the formation of northern riverbank has gone through four stages:

The first steps: 1975–1980

The first step of the northern riverbank development was to restore full employment in this area. The shipping industry, energy sector and other kinds of industrial production plants should be rebuilt. As a complement, a research institute moved to the abandoned Lindholmen shipyard in Gothenburg (Lars Ivarson, Mats Andersson).

The early years: 1980–1985

Svenska Varv AB presented its first overall strategy in 1982. Land and property came under the administration of Eriksbergs Förvaltnings AB in 1985, with Bengt Tengroth as the managing director (Lars Ivarson, Mats Andersson).

The Eriksberg area was planned as a “new city”, mainly consisting of buildings. The Slottsberget/Lindholmen area was little wooden houses and workers’ barracks which would become a new residential area and converted into privately owned homes. Additionally, an education and research facility would be set in the Lindholmen region.

The take off: 1985–1990

During these five years, some new general plans of the basic ambitions for the area were presented.

In Eriksberg, a new building area was planned, as well as a joint effort of several educational institutes in Gothenburg opened its doors in the Lindholmen’s knowledge centre. Chalmers University of Technology moved some operations here and the vision of the Instructive City evolved (Lars Ivarson, Mats Andersson). Most of the old industrial buildings were renovated into

new, smaller businesses in LundbyStrand. In the biggest shipyard buildings, a gradual, small-scale process developed into large scale projects.

The re-start: 1995–Now

The city of Gothenburg took over the primary responsibility for projects and companies. A new president and a new board with a non-political chairman were selected. The central parts of the riverside became the primary focus, expanding from the middle (Lars Ivarson, Mats Andersson).



Figure 9: The areas along the Göta Älv River

Flooding issue

Flooding is currently a major problem in the Gothenburg city, which was highlighted in the flood events of winter 2000/2001 which caused extensive damage and disruption in the urban area (Marianne Karlsson, 2009, p8). Higher water levels threaten to damage not only the ground (land slide) and buildings, but also basic infrastructural systems such as roads, railroads, electricity circuits, fresh water uptake, grey water distribution and day water distribution (Anna Jarkiewicz, 2010). There are two main reasons behind the flooding of Gothenburg, one is the saltwater intrusion, and the other one is climate change.

Saltwater intrusion

Saltwater intrusion is the movement of saline water into freshwater aquifers (Barlow, Paul M. 2003). And the high risk of flooding issues in Göta Älv River is generally due to the saltwater intrusion. The saltwater intrusion from the sea leads to closure of the raw water intake in Göta Älv, and thus the river velocity is becoming a key issue. Because the concentration of sea water is higher than the fresh water, the salt water is under the raw water. When the storms come, it has less time to mix the two kinds of water together, which leads the salt water to push the raw water to the urban land. And this problem is getting worse in recent years.

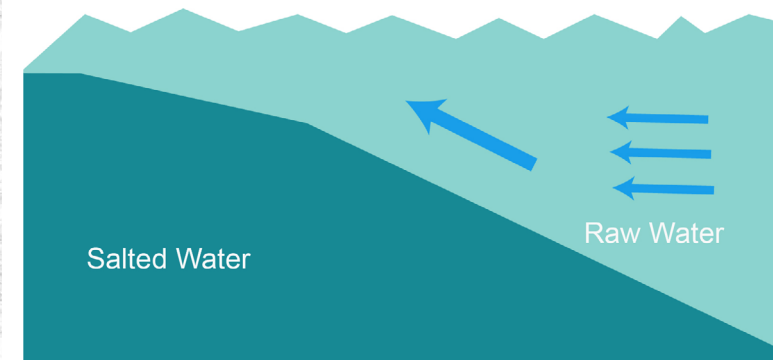
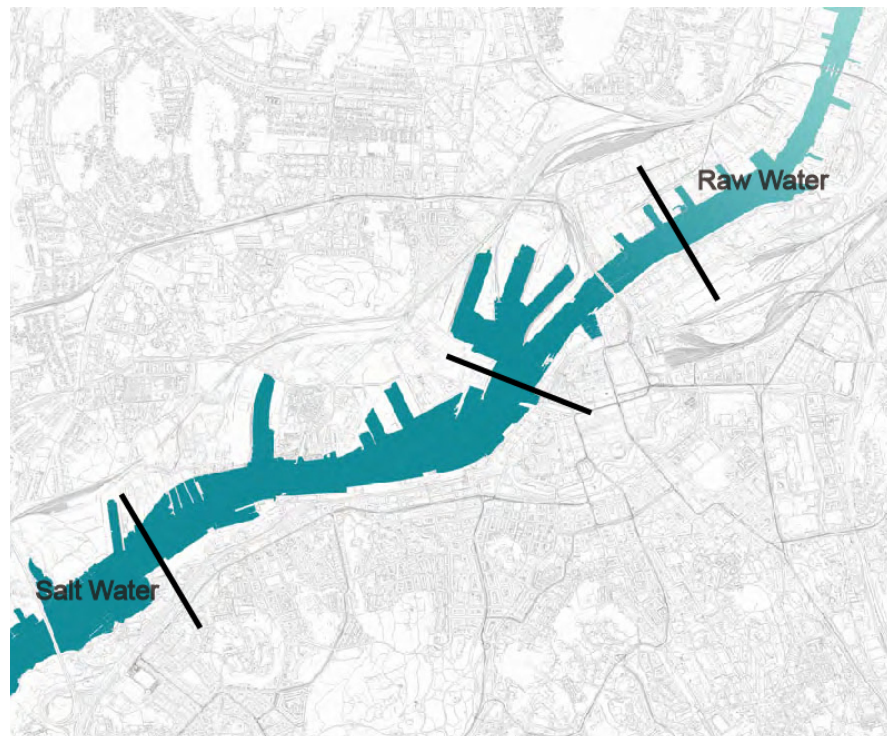


Figure 10: The intrusion of salt water causes flood when storming comes

Climate change

The fact that the sea level will raise due to climate change, increases the risk of saltwater invasion into the raw water intake from the Göta River, which means that the climate changes pose extra risks for places close to the coast (Göteborg Stad, 2010). In the report of Gothenburg municipality, it is mentioned that under extreme weather conditions, such as heavy storms, there would be major flooding for low-lying areas alongside the river. Other risks in the wake of climate change are that the urban infrastructure will be disrupted, the landslides will occur in the river valley or that sewage water may overflow (Göteborg Stad, 2010). According to IPCC reports, the sea-level is expected to rise 0.2–0.6 meters globally over the next hundred years and then continue to rise for many hundreds of years. The Nordic sea level will rise by 1.8-2m in 100 years (IPCC Fourth Assessment Report, 2007).

Increasing precipitation and higher water levels currently bring great problems in the area and are expected to increase in the future (Marianne Karlsson, 2009, p18). For example, since 2005, the water level rises up to 1.8m in Gothenburg in the case of extreme weather events. This kind of event has happened 2-3 times in Gothenburg and it is predicted to occur even more frequently (Maryam Sepehr, 2010, p29). As landscape architect Ulf Moback said, to counter the flooding issues in the city, the entrance floors shall be located at least 2.8m above the normal water level and the minimum height of rail stations must be 3.8m above normal water level (Ulf Moback, 2010).



Figure 11: The flooding in 2008

Historical transformation of waterside

Because of the urban sprawl, the transformation of the waterside in the Gothenburg city started from the beginning of 19 century.

1809: Around the original fortification of the city from the 17th century lies marshland. The city is placed there for protection purposes.

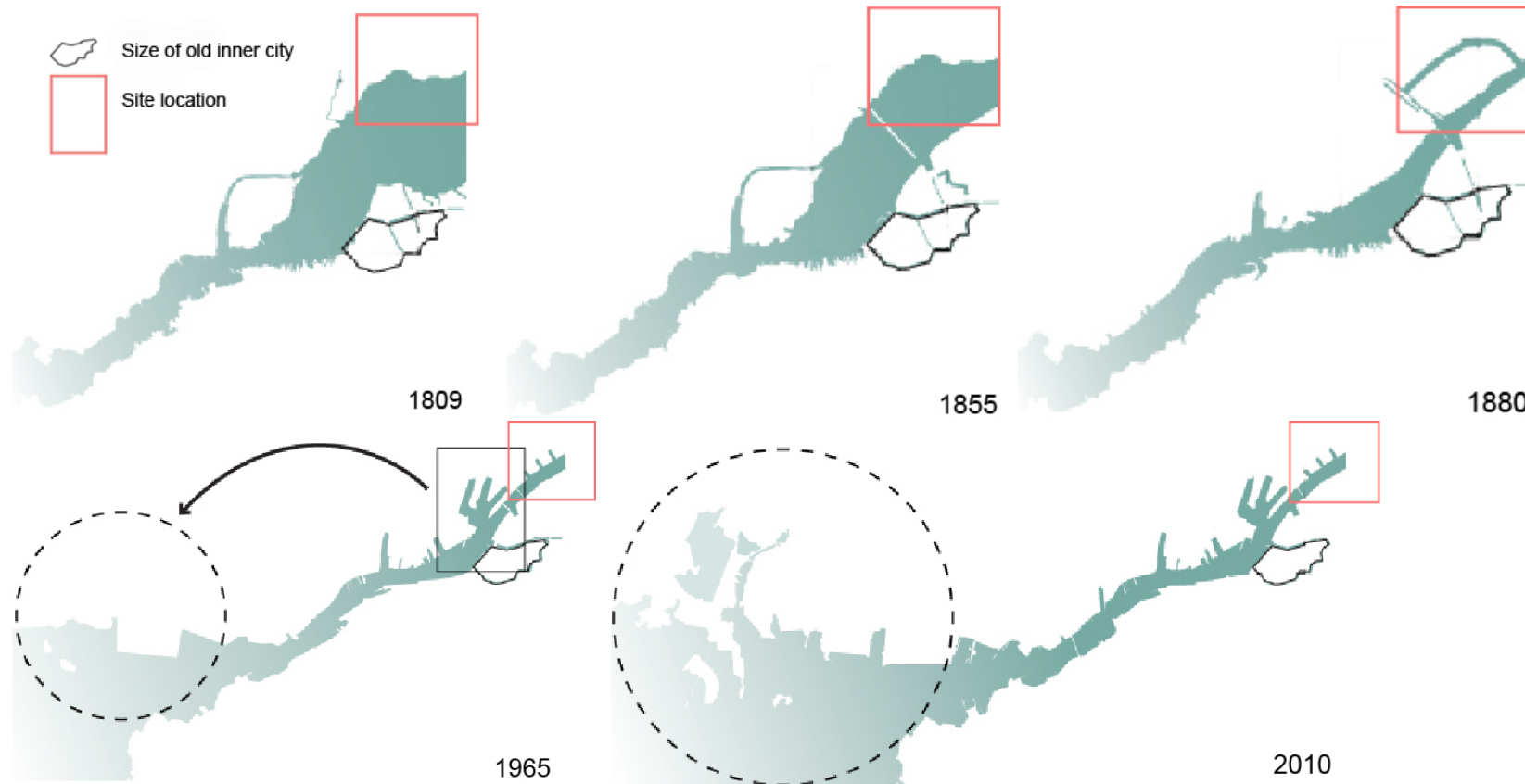
1855: The area Gullbergsvass on the Southern shore is now landfill.

1880: The area Tingstadsvass and Ringön on the Northern shore are also landfill.

1965: The big shipyard industry was located central parts of town. The harbour was moved to the western outskirts of the city.

2010: The harbour expands even further and is now bigger than ever - the biggest port in Scandinavia. The former industrial sites, which in central parts of town are developed for housing as well as host for new business.

According to the historical water edge, more wetland turned into landfills, housing and industrial areas, which aggravated environment balance. The result has been that the Göta Älv River is much slimmer than it once were (Anna Jarkiewicz, 2010).



Site context

Ringön is our study area which is situated between E6 and the Göta Älv River and is an industrial area in Gothenburg.

The history of Ringön is not very long. In earlier time, this place was covered by reeds and water. During the 1910s, a number of small business companies were established in Ringön area. Since 1920, the construction of a rail network and a bridge brought a different shape to Ringön. Between 1960-70, plenty of ship buildings were moved to this place, which led Ringön to be perceived as a storage tray for miscellaneous objects, resulting in a poor physical environment (Michael Koucky, Kristina Petersson, Kim Stenberg, 2005, p16).

Based on the Gothenburg urban planning strategy in 1985, most of Ringön was marked as the industrial area, and some areas around Göta River should be used for port purposes (Michael Koucky, Kristina Petersson, Kim Stenberg, 2005, p16). Ringön is consisting of both new and old buildings. In the current situation, there are approximate 200 companies in Ringön.

In 2005, Gothenburg Environmental Administration argued that Ringön should acts as a “greenhouse” for the company (Michael Koucky, Kristina Petersson, Kim Stenberg, 2005, p16). What we can see along the river bank now are just derelict buildings, old boats, etc. More and more shops, offices and dwellings are however popping up in this area now. As a result, renovation plans for this area has also been included in the planning schedule of Gothenburg municipality.

In the long term the area is a major resource for Gothenburg’s growth, but no decisions have yet been made about future changes (Lars Ivarson, Mats Andersson).

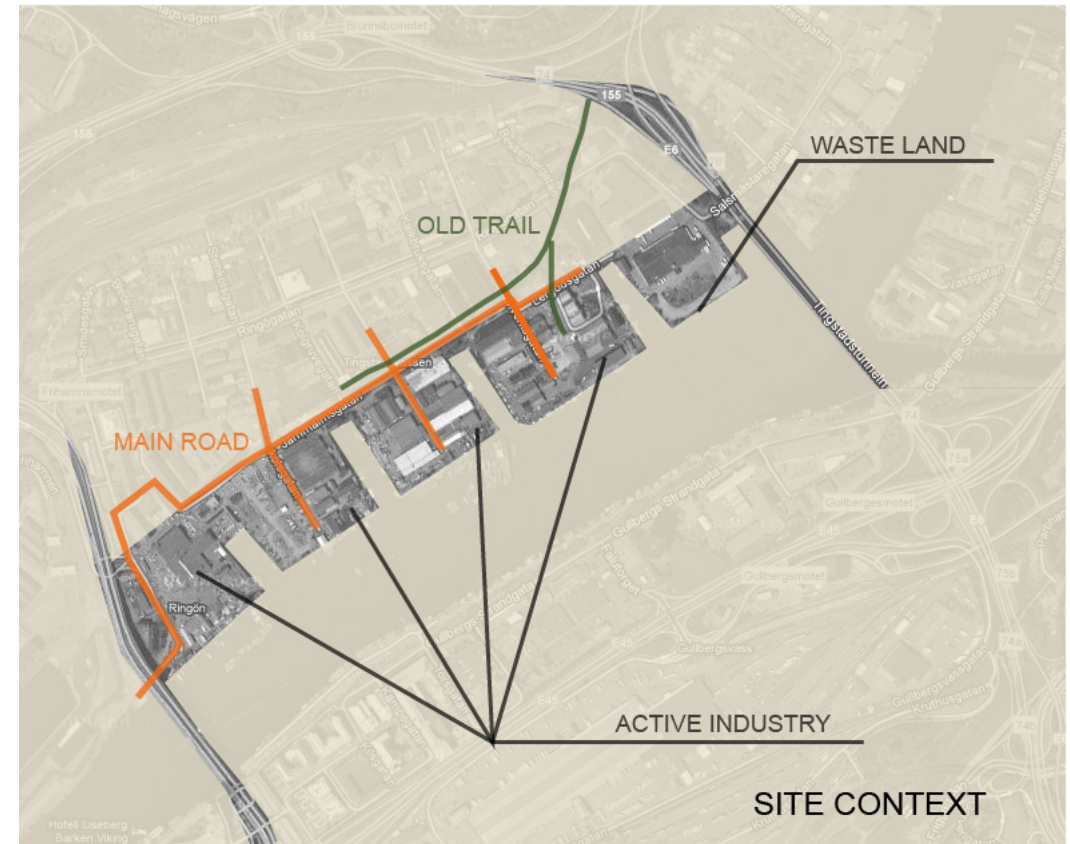


Figure 13: The site context of Ringön area

Why Ringön?

For many reasons, Ringön is suitable for exploring the opportunities for future development.

Ringön is one of the sites where there are plans to be developed in the name of Älvstrandsprocessen (to build along the water front) and holds large potential (Anna Jarkiewicz, 2010). It is also an area in the centre of Gothenburg city where there still is no concrete and detailed plan for changing this place. Its serious flooding issue and ground pollution have already affected people's normal life and industrial business. However, its central location and proximity to the water become important opportunities to get more attention. According to a new urban plan from Gothenburg municipality, a new bridge will be built as a substitution of Göta älvbron which will bring more people and traffic from the centre to the other side of the river, as well as the new bridge will integrate and enhance Ringön and city centre closely. With the expansion of the city, Ringön doesn't suit for an industrial area anymore. It's better to change it into public space and residential area. Therefore, we think Ringön area deserve a good plan and design, especially the waterfront area in Ringön.



Figure 14: The bird view over Ringön area

Current condition

The surrounding neighbourhood (Community Aspect)

Central Älvstaden is the centre of Gothenburg which is located on both sides of the river. For many years, the city has been developed both along the southern and northern sides of the river. Now the municipality and planners are going to integrate the entire area to some extent. Therefore many things will happen in this area and one of the main goals is to reduce the mental distance between Hisingen and other parts of Gothenburg (Centrallaalvstaden website).

The municipality needs to consider what is appropriate to be built in the area of Central Älvstaden and how to do it. There are already lots of small scale companies in Ringön, which has already become the soul of the Central Älvstaden. In other words, if there is no serious flooding issue in this area, this region will be developed much better and more benefits will be added to the whole city.



Figure 15: The bird view of the whole Central Älvstaden



Figure 16: The surrounding neighborhood near Ringön area

There are six areas nearby Ringön. Four of them are former industrial and shipyard sites which have been developed or will be developed into liveable city districts.

Frihamnen and Gullbergsvass are two areas used to be industrial and shipyard sites, but now they are abundant areas. In 2008, a discussion started in the Gothenburg municipality about the future development.

Lindholmen was also used to be an old shipyard site. Today, this area is a science park which will meet 17,000 people in 230 developing companies and universities. It's also an International Science Park, with a focus on three areas: mobile internet, intelligent vehicles, transportation systems, and modern media and design (Lindholmen Science Park website). And an IT University is close by.

Kvillebäcken is an area which nowadays mostly consists of shopping and work places. The western-southern part of it is going to be developed soon into a mixed neighbourhood (Maryam Sepehr, 2010).

Like Ringön, Brämaregården was used to be a wetland, but was filled in 1870s and since then it has been a residential area with common inner-city structure.

Precipitation (Ecological Aspect)

The occurrence of flooding not only relates closely to the local weather, especially the precipitation, but also has a strong connection to the intensity of precipitation. The graph shows the temperatures, precipitation, wet days, sunlight, wind speed, frost in Gothenburg city. Based on the statistics, Gothenburg receives on average 670 mm (26.4 in) of precipitation annually or 56 mm (2.2 in) each month. There are 163 days annually on which greater than 0.1 mm (0.004 in) of precipitation (rain, sleet, snow or hail) occurs or 14 days on an average month. The month with the driest weather is March when on balance 29 mm (1.1 in) of rain, sleet, hail or snow falls across 10 days. The month with the wettest weather is July when on balance 86 mm (3.4 in) of precipitation falls across 14 days (www.climatetemp.info/sweden/gothenburg.html). The precipitation in the second half of year is higher than that in the first half one, so most flooding may happen in the autumn or winter.

Winds from the southern part have the strongest precipitation frequency. The wind is mostly blowing from northeast or east during the snowfall. In the summer, the rain falls more frequently with winds from south or southeast that in at the opposite direction.

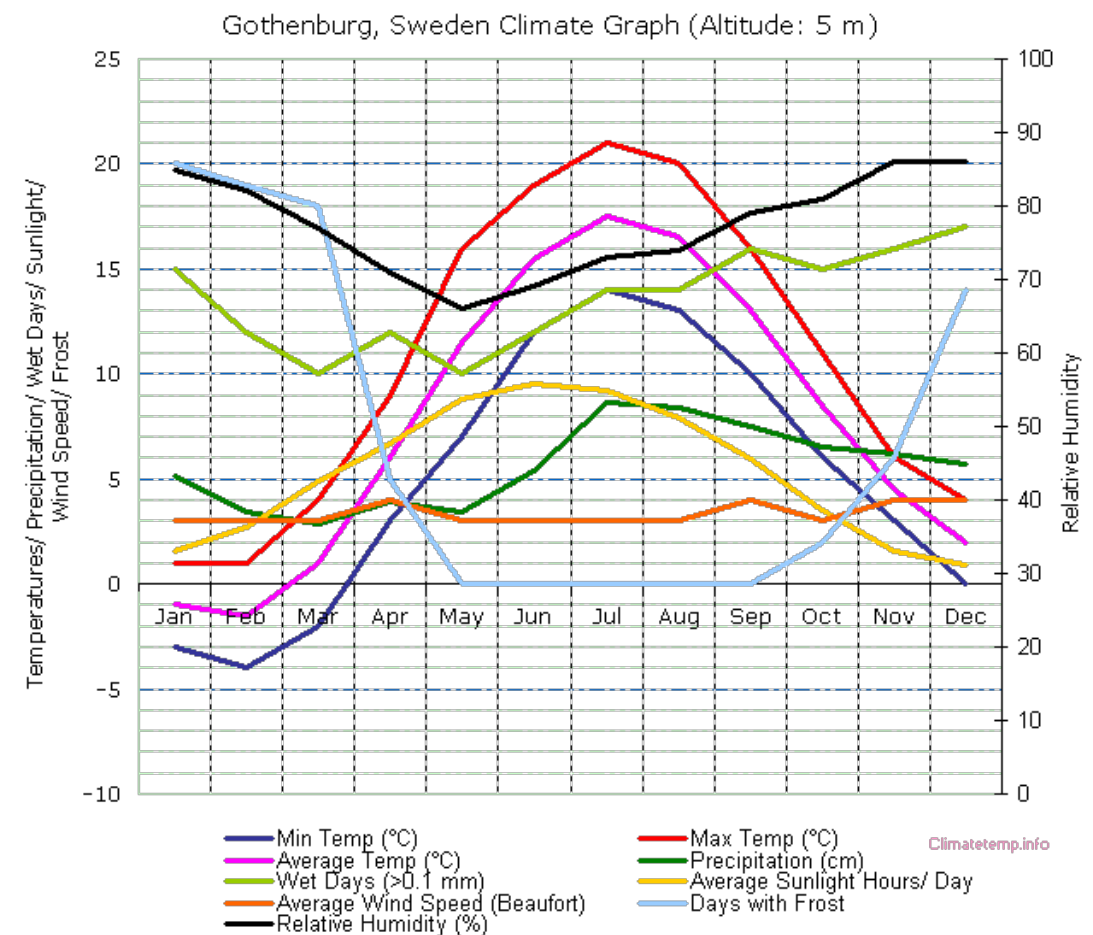


Figure 17: Gothenburg Climate Graph



Figure 18: The ground condition and places nearby

Ground Condition (Ecological Aspect)

The whole city was consolidated around low-lying areas of reeds and clay soil ringed by rocks. Over the years, the former reed beds have been dried out and by the help of in-fill made into surfaces ready to build on (Göteborg Stad 2011). Ringön is constructed by dredging and filling materials (Michael Koucky, Kristina Petersson, Kim Stenberg, 2005). As the map shows, most parts of Gothenburg are located on deep clay, the risk for landslide and erosion are high in Gothenburg since it's literally floating on clay. The fact that large part of it's central parts are landfill of what used to be marshland makes the risk even higher.

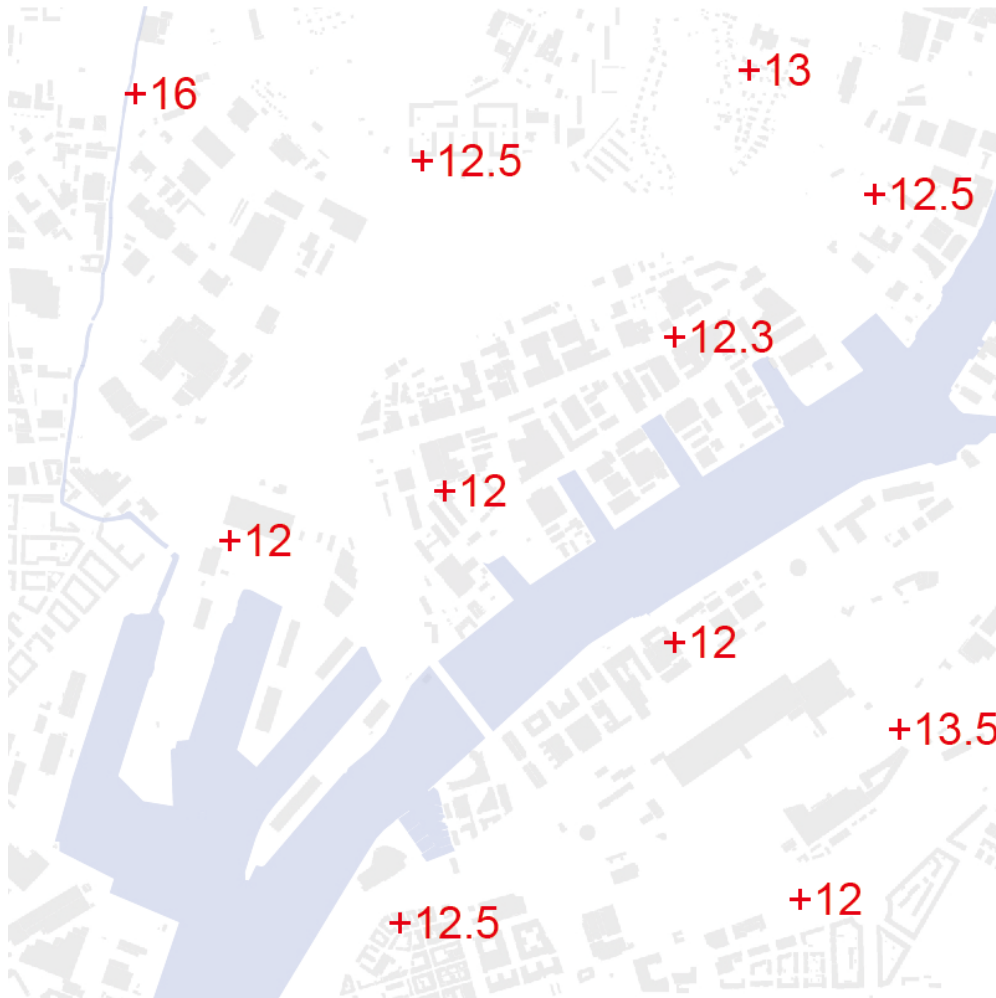


Figure 19: The topography in Ringön and places nearby

Ringön Topography (Ecological Aspect)

The main features of the topography of Gothenburg are the low plains on both sides of the river Göta älv, the steep-sided valleys, and the hills with smooth crests. This landscape, probably with the greatest height differences of any Swedish town, influences the built-up area. The plain on the southern side of the river was used first, then the valleys and finally the hills. Some valley sides are too steep to maintain any buildings.



Figure 20: The infrastructure and accessibility in Ringön and places nearby

Infrastructure and Accessibility (Delight and Community Aspect)

This map illustrates how Ringön is connected to other parts of the city through both major car roads and public transit routes.

One old port railway in the Ringön area was used for transport in the old time, as well as one main road cross Ringön from the west to east, which connects the other regions nearby.

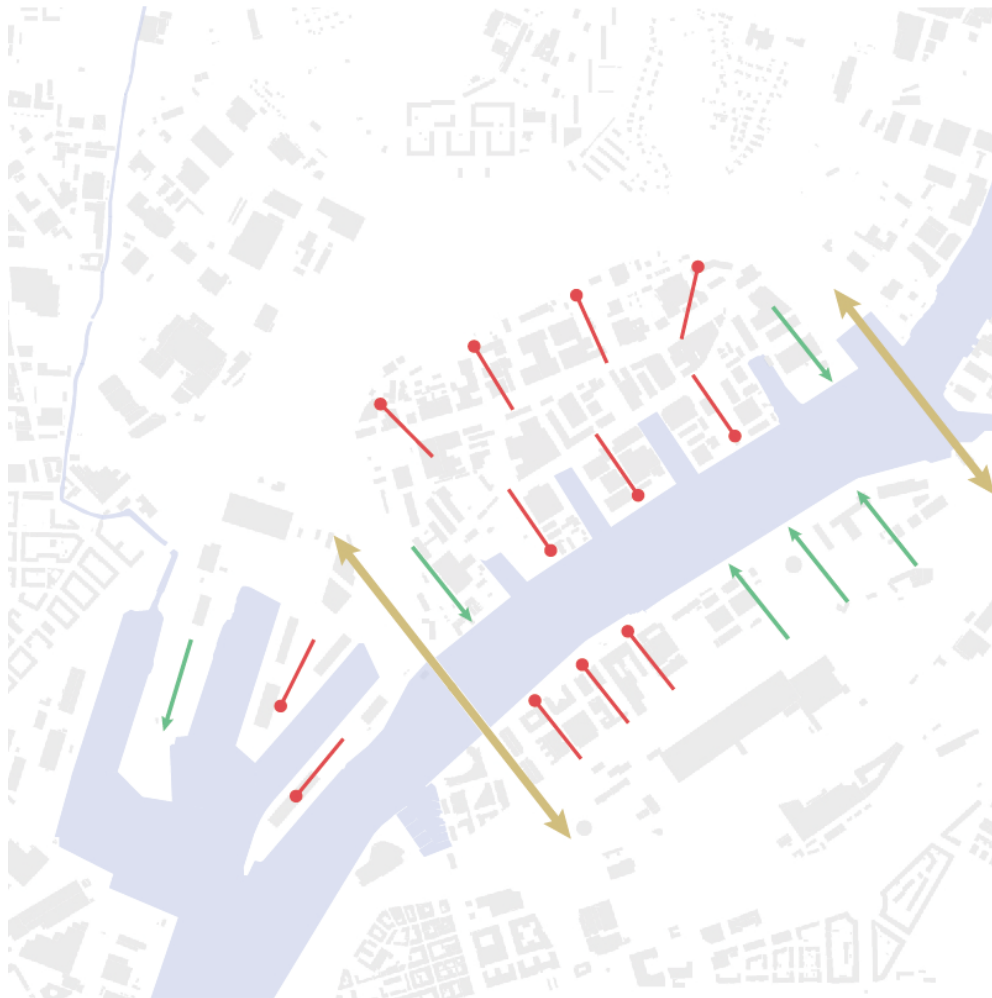
In the neighbourhood, the bridge and tunnel connect to the Ringön and the city centre, and this infrastructure also creates great barriers around Ringön especially the port railway and the highway which pass through north part of Ringön. These barriers disconnect Ringön from its western neighbour, Frihamnen, a former harbour, as well as the northern, Brämaregården, which is the only housing area around this site.



Figure 21: The infrastructure and accessibility in Ringön and places nearby

The second infrastructure and accessibility map shows bicycle and walking routes for the citizens, as well as bus routes and bus stops.

We can see that the area is accessible by bicycle or by foot. But little number of buses would not bring more people to this area from the city centre or the other parts to Ringön.



The Barriers (Community and Ecological Aspect)

The barriers map shows the accessibility from other urban areas to the riverfront. Most areas in Ringön are blocked with poor accessibility, so that people in this area can't reach the water or other areas nearby easily, which bring more disadvantages and obstruct the local future development.

- Blocked end
- Connection
- Access to the waterfront

Figure 22: The Barriers in Ringön and places nearby



Figure 23: The green and blue structure in Ringön and places nearby

Green and Blue Structure (Delight, Community and Ecological Aspect)

The adjacent image depicts the differentiating types of green and blue structures that exist in and around the study area. These different kinds of spaces provide a multitude of activities and mediating circumstances. In the Ringön area, there are just a few small sizes of areas for public recreation and an abundant green land. And there is an urban agriculture land nearby along the port highway, but nobody can reach.



Figure 24: The permeable surfaces in Ringön and places nearby

Permeable Surfaces (Ecological Aspect)

Hard impermeable surfaces trap water above the ground, increase the potential for flooding: Green structures and permeable surfaces mediate the impact of storm water run-off through infiltration and storage. Accordingly, such surfaces can lessen the impact of storm and flooding events. This image illustrates the approximate percentage of permeable surfaces. The areas are defined by transportation corridors or other significant barriers.

Note: The numbers correspond to the aerial images demonstrating green structure coverage. Because there are less green lands located in Ringön, most of the water will accumulate on the ground surface.

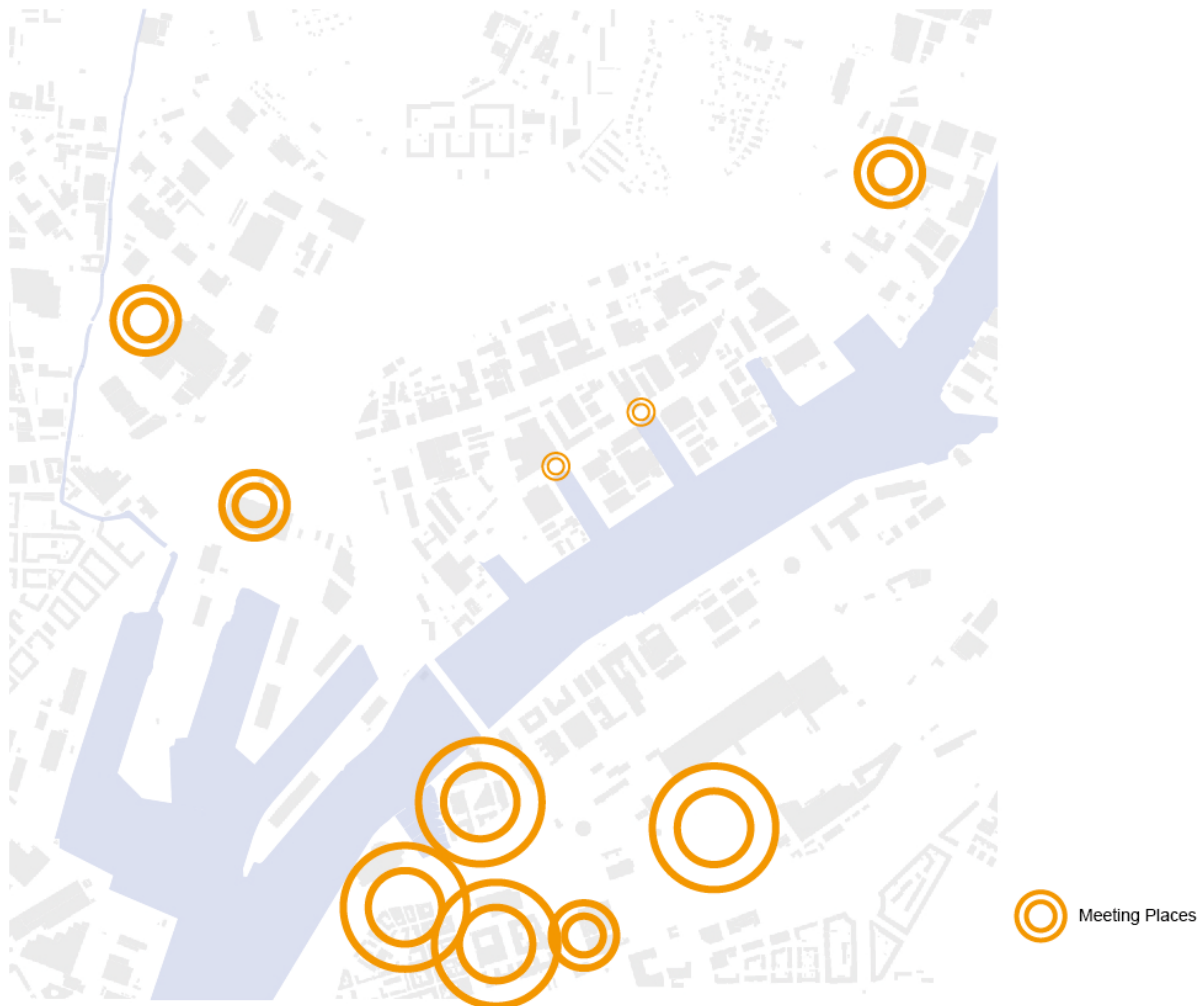


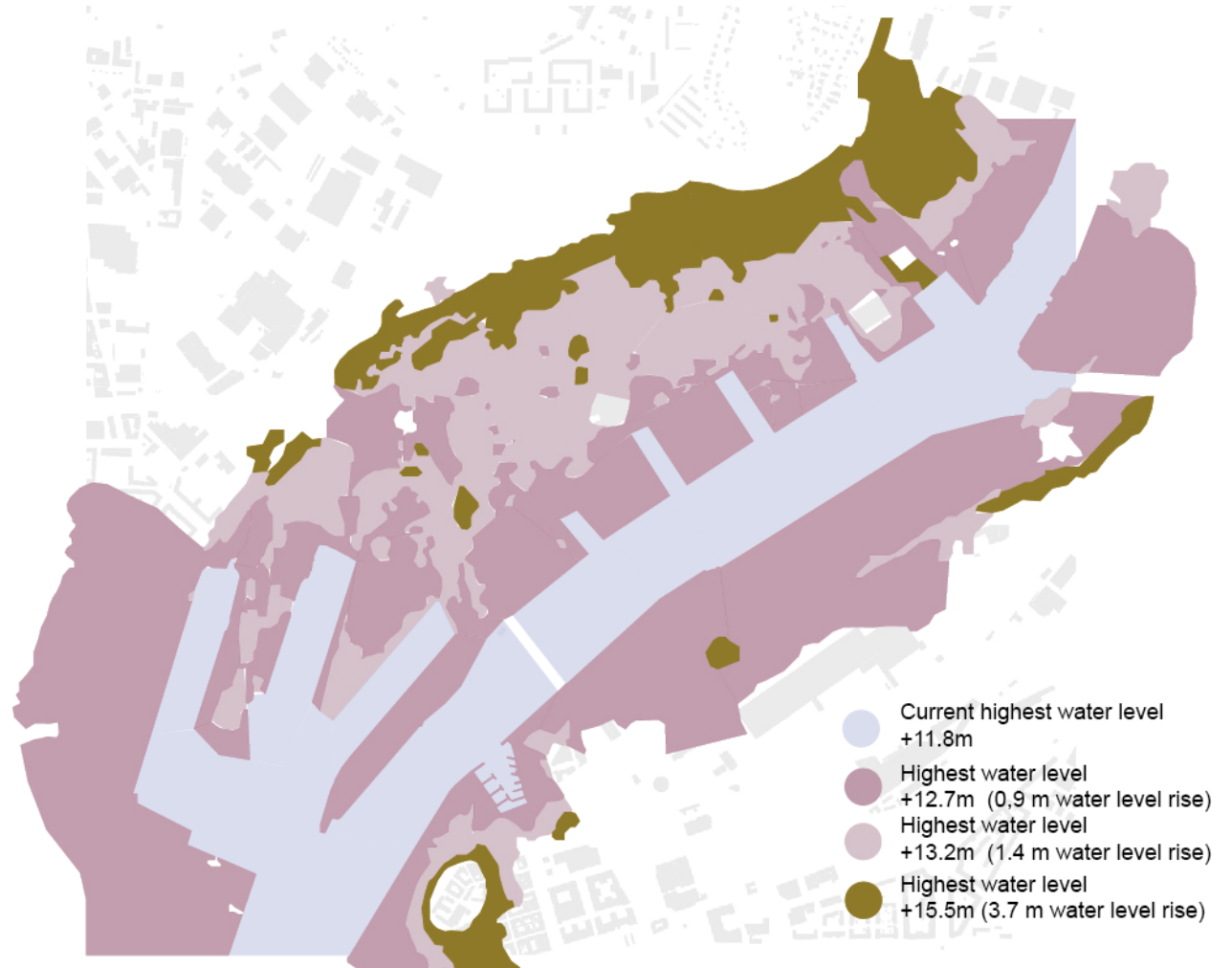
Figure 25: The meeting places in Ringön and places nearby

Meeting Places (Delight and Community Aspect)

The map shows that most social meeting places are concentrated in the downtown, such as the central station and shopping malls. But a small number of meeting places are located in Ringön. These two areas are desolated, lack of management and care, as well as a few of the meeting places in various places nearby the Ringön area.



Figure 26: The flooding scenarios along the waterfront



Flooding Scenarios (Community and Ecological Aspect)

Large areas in the central Gothenburg lies under the current extreme water level. Ringön is proximal to the water because of its low altitude. The flooding issue has already become one of the risks in this place. The flooding scenarios images show how the flooding influences the Ringön area.

When the highest water level reaches 12.3m point, the waterfront in the research area will be covered by water. When the water goes up to 15.5m, the entire Central Älvstaden will be flooded.

Site's flooding level (Community and Ecological Aspect)

Today, the highest river level is around 11.8m. The illustrations show that when the water level rises from 0.5m to 2m, the consequence will be worse. If the area is to be exploited, the flooding issue has to be taken into consideration. When the river level increases to 2m, the water will almost cover the whole Ringön area, which means the flooding could be a disaster threatening the citizens' normal lives and companies' business.

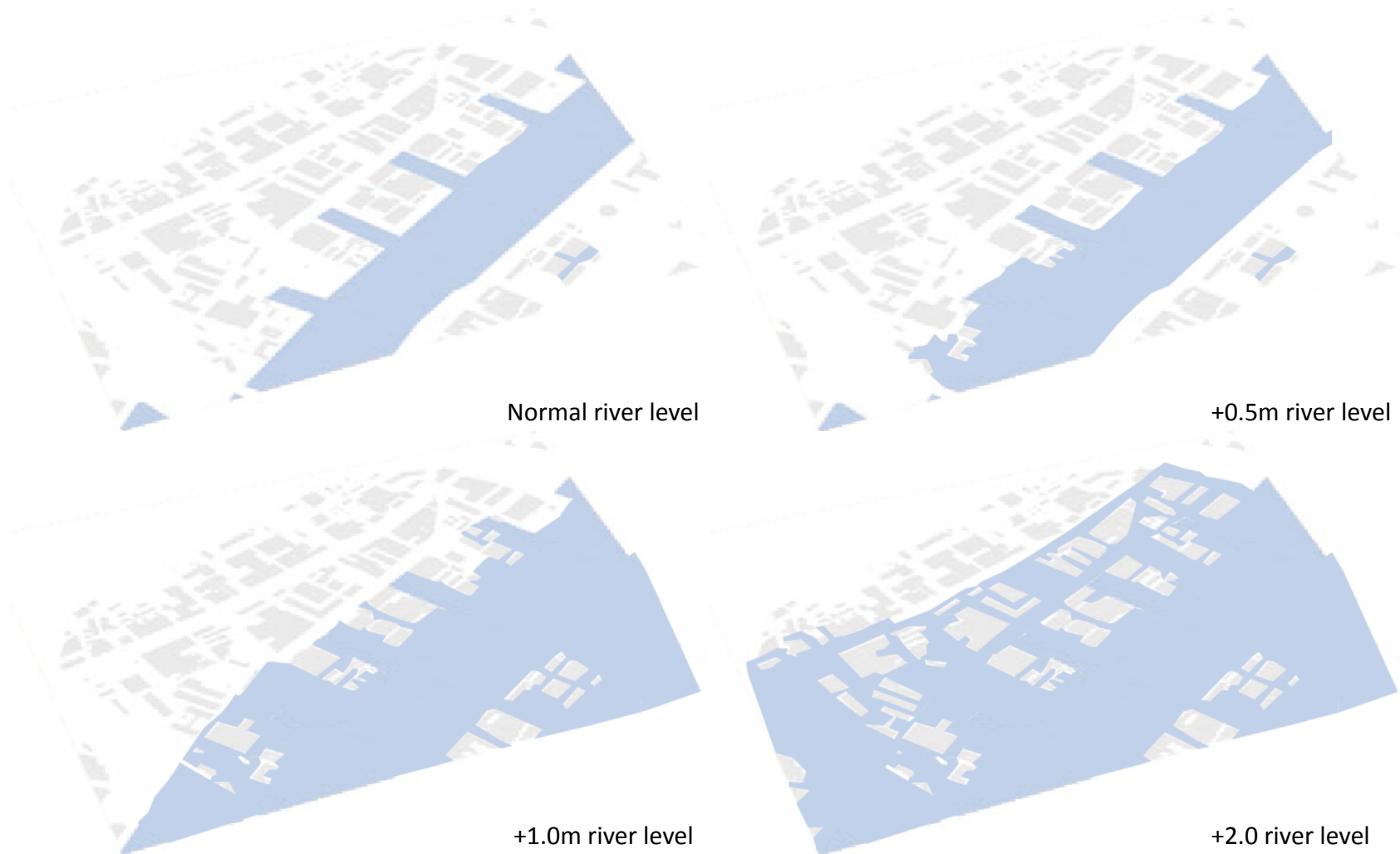


Figure 27: The site's flooding in different levels

The general current situation

- Transportation: non-accessibility, the bridge is too high to block the flow into this area
- The other side of water: the industrial area, lower scenery
- The whole area situated in a low altitude
- In the project of Central Älvstaden, this area is the last one to be planned

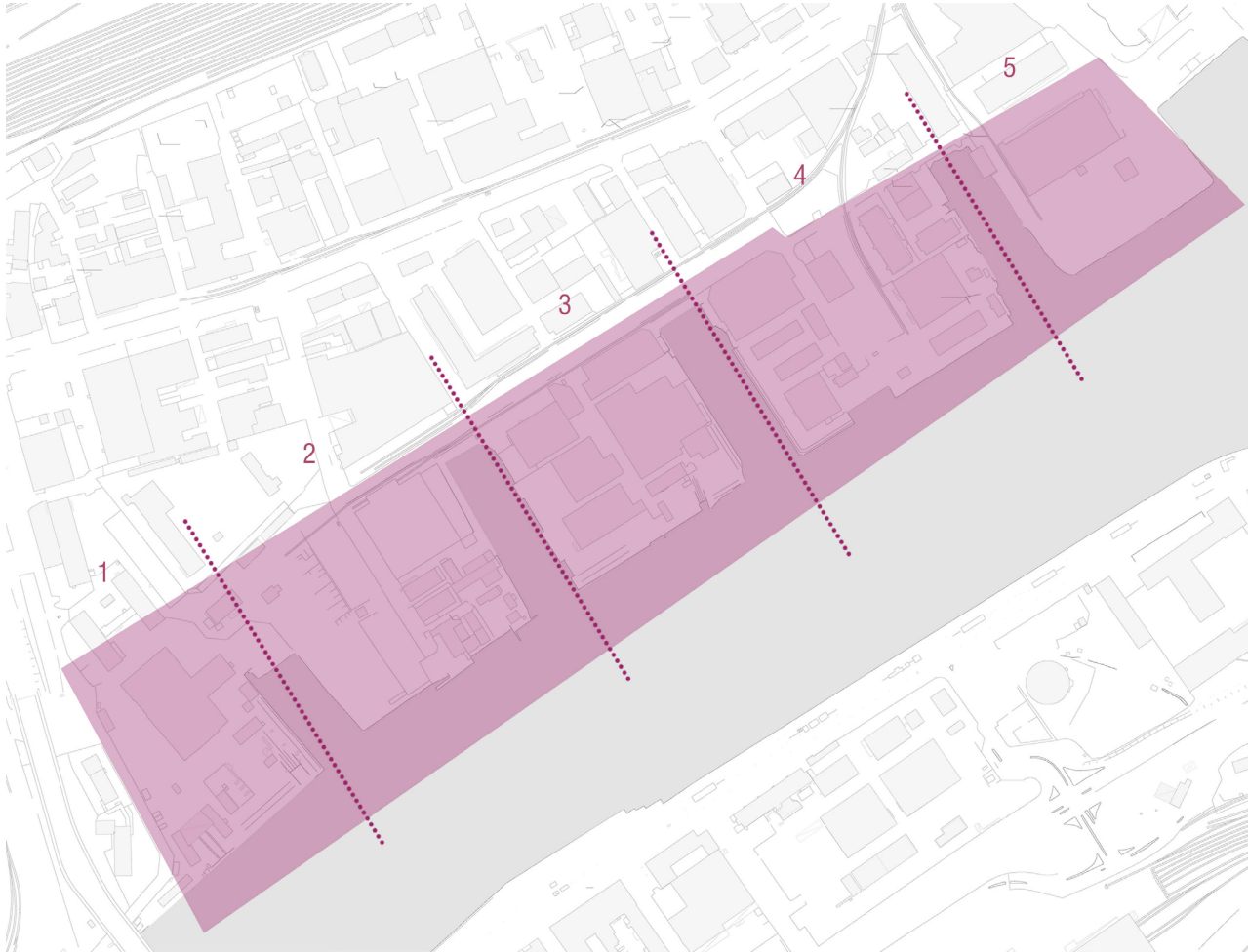
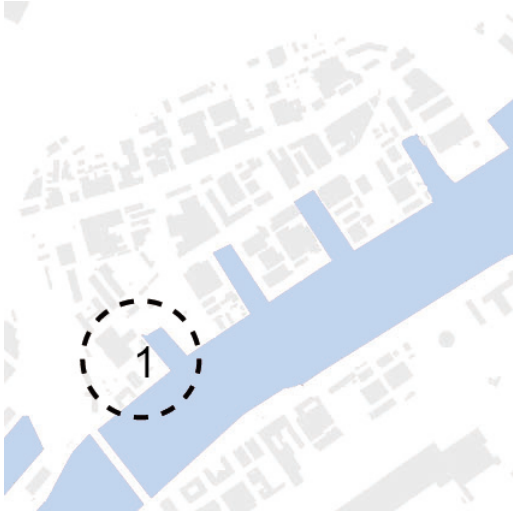


Figure 28: The size and boundary of five blocks

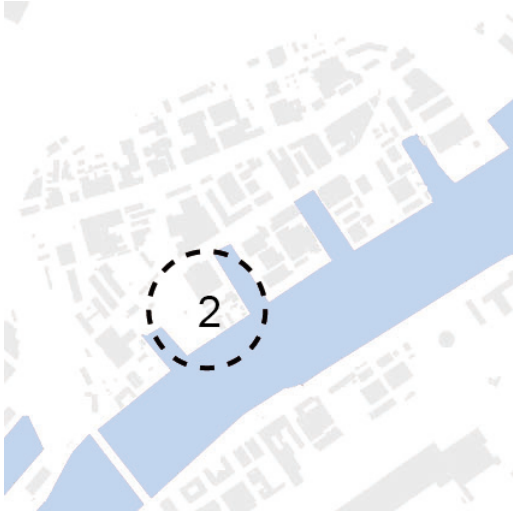
Detailed situation



The first block

- Nice view
- Non-accessibility
- Close to the bridge, sound and air pollution
- Active ship company
- Low altitude
- Dirty
- Plenty of useless ships
- No vegetation
- Have some wooden planks
- Useless port trail

Figure 29: Detailed situation of the first block

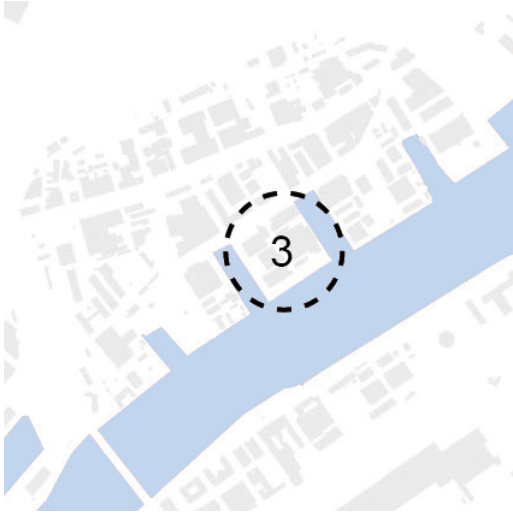


The second block

- Covered by park and nature construction machines
- Dirty
- A wall is along the river, so people couldn't access to the water
- A waste Chinese dragon boat nearby
- One restaurant for the workers
- A big car parking lot
- Quite and safety
- Muddy ground



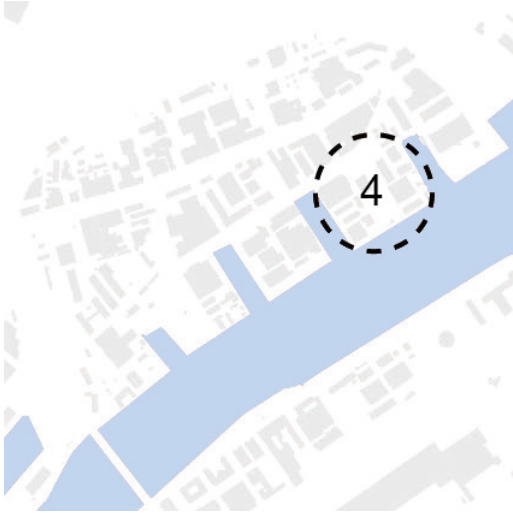
Figure 30: Detailed situation of the second block



The third block

- Useless train trail
- Careless public place
- No access to the water
- Dirty
- Many big cranes for transportation
- Plenty of business companies
- A mount of careless water plants
- Nice view on the other side of water

Figure 31: Detailed situation of the third block

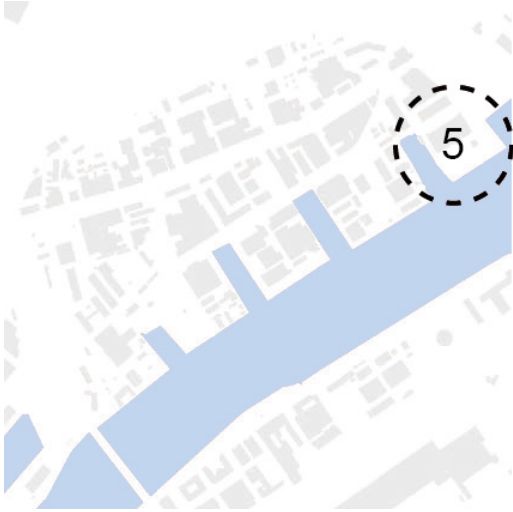


The fourth block

- Regular ground
- Undelightful view in the other side of water
- Some big companies
- Lots of buildings and big machines
- Careless plants nearby the waterside



Figure32: Detailed situation of the fourth block



The fifth block

- Desolate the concrete and grass mix together
- Nothing but full of useless ferries
- So many crashed stones near the shore
- A wide wooden plank along the waterfront
- Next to the tunnel, too much traffic

Figure 33: Detailed situation of the fifth block

SWOT analysis

Strengths	Weakness	Opportunities	Threats
<p>Delight</p> <ul style="list-style-type: none"> Proximity to the water Flourishing centre is on the other side by the river <p>Community</p> <ul style="list-style-type: none"> Close to the city centre Dynamic and growing area, has development opportunities A university nearby Kvillebäcken has plenty of shopping and work places, which increase more job opportunities Bridge Gotaälvbron and Tingstadstunneln, which become the important transportation nodes Cohesion between the companies Low prices on land Good infrastructure <p>Ecology</p> <ul style="list-style-type: none"> Some water plants are growing in the river 	<p>Delight</p> <ul style="list-style-type: none"> Untidy and bad landscape Poor pavement <p>Community</p> <ul style="list-style-type: none"> Separated from the urban area Poor public traffic Heavy traffic surrounding Large barriers: industrial areas, railway track No obvious meeting points Little activity, dead silence Lack of identity (Industrial) Few proper public transport nodes Lack of bus station and bus routes Contaminated land Disintegrated blocks <p>Ecology</p> <ul style="list-style-type: none"> Less green space and no recreation Sound pollution, air pollution Bad micro-climate 	<p>Delight</p> <ul style="list-style-type: none"> Proximity to the water Future public spaces with great scenery More waterscapes <p>Community</p> <ul style="list-style-type: none"> Attract for the residential Expand communication Jobs Close to the city centre Students New bridge in 2014 Fast development in the neighbourhood <p>Ecology</p> <ul style="list-style-type: none"> Lots of space for vegetations which can reduce pollution Better climate Central Älvstaden project 	<p>Community</p> <ul style="list-style-type: none"> Loss of industrial companies, losing money The waste port railway Maintenance of public Old industrial heritage <p>Ecology</p> <ul style="list-style-type: none"> Flooding Climate change and globe warming

Table 5: SWOT analysis about the Ringön area



CHAPTER FIVE

DESIGN PROCESS

Overall concept

The overall design concept is to create a diversity characters in the whole Ringön area, which also include the three aspects of Delight, Community and Ecology.

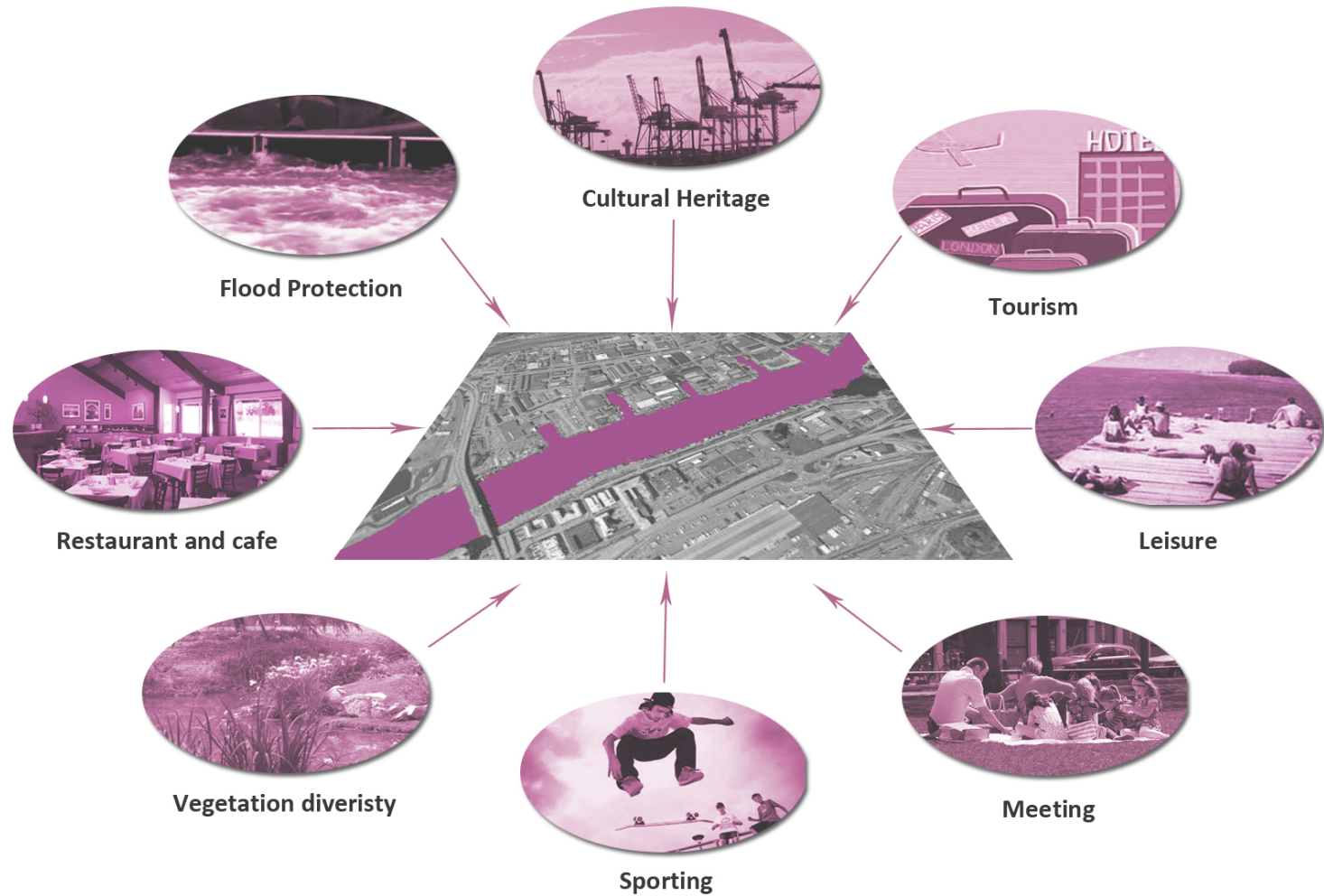


Figure 34: The overall design concept

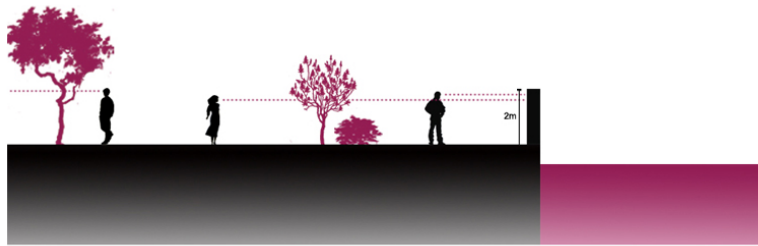
Concept of design

The site we want to redesign is located in Gothenburg; the main problem we must take into consideration is the flood problem. As a result, the primary task is to protect the site from the flood. After that, the other perspectives can be considered. So the first step is to think about flood protection.

We want to protect the site from the flood in three perspectives: Delight, Community and Ecology (the figures in this chapter are just illustrations not real sections).

Flooding control

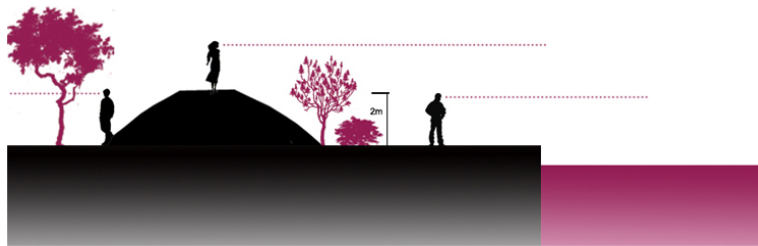
The formation of flooding control method one: Adding protection subjects (Delight and Ecological aspects)



Solution 1: After consulted some flood control professionals, we found that adding flood control wall is the best way to protect the site from the flood.

Advantages: The most secure method that can keep flood from the site.

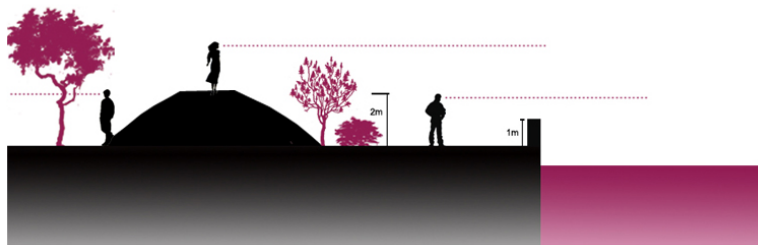
Disadvantages: If we add 2 meters wall along the bank, the sight will be blocked completely, so there will not be any water view. The site will not be so attractive if people cannot stay close to water. If the wall is constructed along the bank, people may feel being surrounded by walls and feel uncomfortable because the height of the wall is higher than human eye height. Besides, the project will cost a lot and the long duration of construction will also bring huge pressure to local people.



Solution 2: Change the flood protection wall into an embankment which located in the middle of the site instead of being along the bank. This embankment can divide the whole site into two parts: the space near the water and the space inland. Also one path will be constructed on the top of the embankment.

Advantages: Using the embankment instead of water protection wall as sort of cushion, people will not feel the pressure generated from the wall. One way up on the embankment, can be one main route along the site, along with a main road, people will have more kinds of experience. The site view will also be verified through vegetations and garden furniture on both sides of the embankment which means more different levels of scenery will be generated.

Disadvantages: the public space near the river may be flooded even when the flood is not so serious. This solution may damage some landscape and vegetation existing and maintenance of the embankment will also cost a lot.

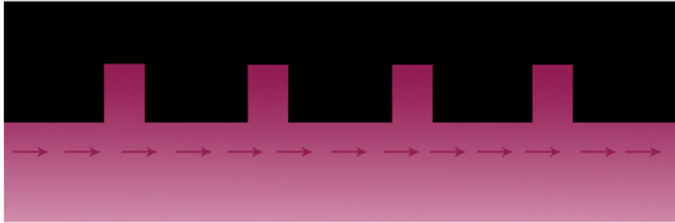


Our solution: Besides the embankment, one meter high wall shall be added so that if the flood is not so serious, the public space near the water will not be flooded.

Besides the advantages, there will be one more protection, and the viewing sight will not be blocked as in the first solution. Hydrophilic viewing platforms can also be attached to the top of the flat wall.

Figure 35: The solutions of flooding control method one

Formation of Flood Control Method Two: the shape of line between land and water (Delight and Ecological aspects)

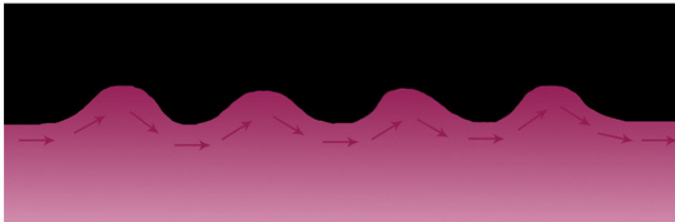


Solution 1: If we remain the original shape of the bank.

Advantages: Saving labour and materials during construction and reduce investment and cost.

Disadvantages: The waterfront area consists of five areas and it is not convenient if people want to go through the whole space near the river. People need to go and turn back five times, so no one would like to use the waterfront space if the traffic situation remain the same.

Then the good resources near the water will become useless. Besides, the shape of the bank is not conducive to flood control. It cannot effectively reduce the speed of flood as well as reduce the impact of the flood.



Solution 2: Change the shape of the line to a curve.

Advantages: This kind of shape is much more beautiful than the former one. During construction we do not need any earth from anywhere else. We can just put the earth excavated from the area locally to form the new bank shape. Then the flood protection area is widened so that the flow rate may be decreased. Transportation will be more convenient. One main road along the bank will be constructed so that more people will be attracted to this riverfront public space.

Disadvantages: Large volume of construction.



Our solution: Increased roughness of the bank surface.

The bank line will be more like the coastline of nature.

The area of flood protection is expanded and the flow rate of the flood is decreased to some extent because of the roughness of the bank.

Figure 36: The solutions of flooding control method two

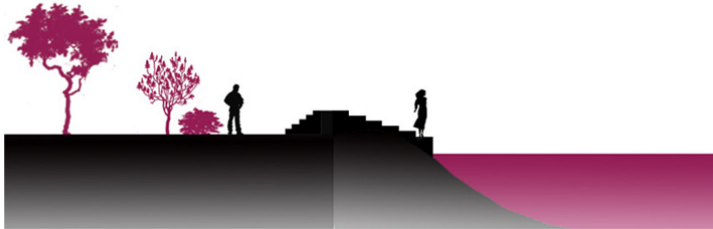
Shore design



Solution 1: If the embankment is covered with many kinds of plants.

Advantages: The best for flood control, more close to nature, more green will be add to the site.

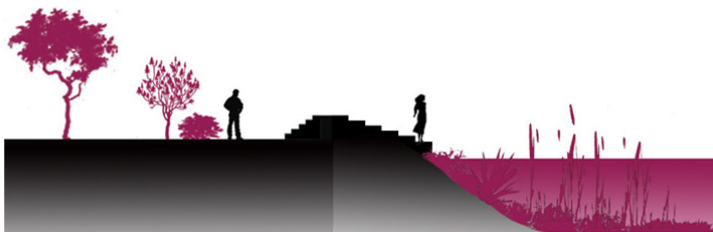
Disadvantages: Not easy to make people have a chance to interact with water, to play with water.



Solution 2: Put stairs and large stones instead of vegetation along the river.

Advantages: It is easy for people to interact with water.

Disadvantages: Too urban, too much concrete with less vegetation is not good for people to relax their mind as well as relieve their stress.



Our Solution: Combine the two solutions. (Delight, Community and Ecological aspects)

Make the riverbank aquatic-based, with some stairs and platforms in appropriate places.

It is a clever integration of artificial and natural methods.

Figure 37: The shore design

Functional distribution on inner side of the embankment

1. Have public buildings on the western part of the area.
2. Have residential buildings in the centre of the area.
3. Have a park on the eastern part of the area.

Why such functional distribution?

1. Placing commercial buildings, small restaurants as well as coffee shops in the west.

Reason: On the western part of the site, there is a big bridge nearby, which is one part of the highway, in other words, this part is really accessible.

Just on the opposite side of this area is the business district, which means that it is beneficial for investment, and expedition of business district as well as improving revenue for the whole city.

2. Placing residential area in the centre of the site.

The centre part of the site is away from the main traffic road, so it is away from the main flow with less noise and better air quality.

Besides, it is also not far away from the river and not far away from public spaces along the river. It will help residents enjoy the scenery and spend their leisure time there.

3. Placing a park on the eastern part of the site.

This part is with less flow, and the transportation is not convenient.

It is near another main road with lots of noise and the air quality is not good.

Adding a public space surrounded with plants can block noise and at the same time purify the air.

For people (visitors and residents), it can also be used to provide a larger green space for people to use.

Functional Distribution on the waterfront side of the embankment (Delight, Community and Ecological aspects)

1. Western part of the area:

It is near the main bridge and the business district, so it is with heavy traffic and large noise, so it is not suitable to place private space in this part. It is better to use it as a large public area with the function of distributing the flow.

Large public area means it can contain a large crowd of people. As a result public events as well as business events can easily be held in this area.

2. Middle part of the area:

Because it is near the residential area, smaller public space used for activities of smaller groups of people is more suitable for this place. Meanwhile, for smaller size of space and smaller groups of people, it is also appropriate to increase vegetation in this kind of space.

Besides, trying to meet needs of different groups of people (children, adolescents, adults) can make the area multifunctional.

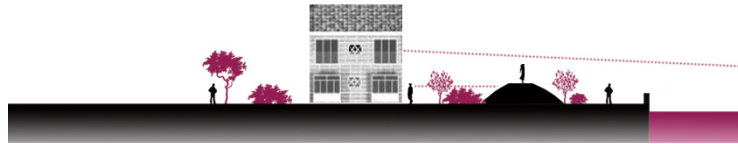
3. Eastern part of the area:

In order to block the noise, we can plant a lot of more vegetations and it can be connected to the park on the other side of the embankment.

Another experience can also be generated. According to the characteristics of the flood, flooded wetlands can be constructed here and biodiversity can be increased.

Residential Building Design

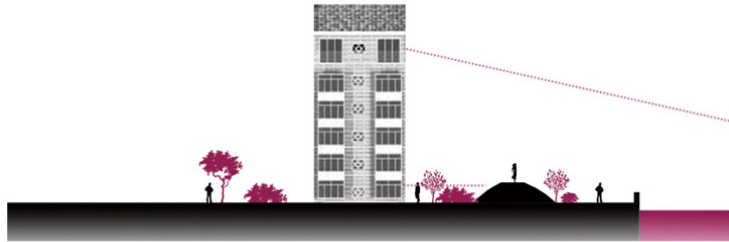
Location and height of residential buildings (Delight and Community aspects)



If the buildings are close to the embankment:

Using low-rise buildings:

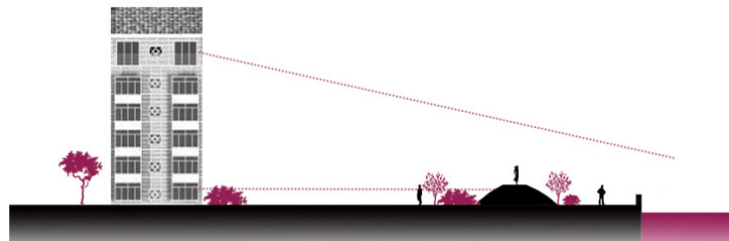
Because of the embankment is nearly 2 meter high, if residential buildings are too close to the embankment, they may feel stressful and the overall view of the site will be blocked, especially from the ground floor. Besides, less people can live here if we use low-rise buildings.



Using high-rise buildings:

The view of residents will be better. However, because of closeness to the embankment, the scenery will not be so good for people live in the ground floor, the view will just be block by the embankment, and they can see nothing but the embankment.

If the buildings are near the embankment, it means that they are quite near the public area along the river, so that the common life of residents there may be interfered.



If the buildings are at some distance from the embankment:

We can use high-rise buildings and the buildings shall be some meters away from the embankment. However, the sight of residents living on the ground floor will also be blocked, so it would be better if we elevate the layer, which means using the ground floor as garage or storage room instead of residential room.

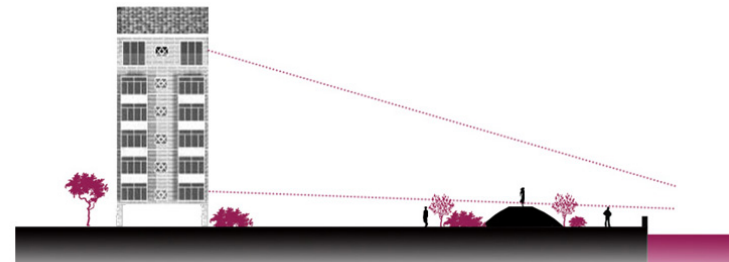


Figure 38: The location and height of residential buildings



Shape of Residential buildings (Community and Ecological aspects)

If the shape of the building is in rectangle, all the residents will have great viewing of waterscape. But if all the residential buildings are in this kind of shape, there will not be any private space for residents and no micro-climate will be generated for residents.

If we use block shaped building, it will generate micro-climate and private space for residents only.

Figure 39: The shape of residential buildings

Design-the first block

Location of public buildings (Delight and Community aspects)

Consideration: Public buildings (Restaurants and Cafes) are needed in this block because it is the most public space in the site.

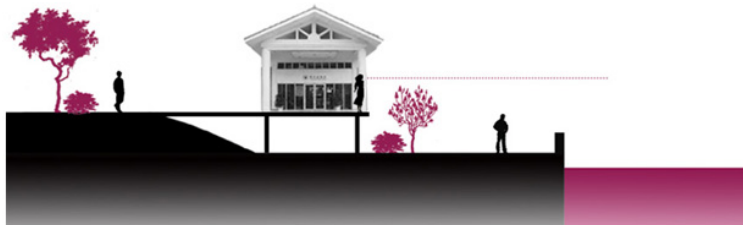
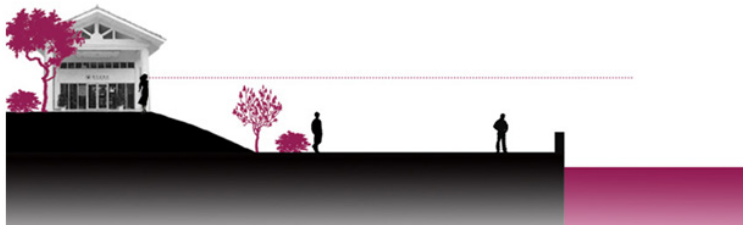


Figure 41: Location of public buildings in the first block

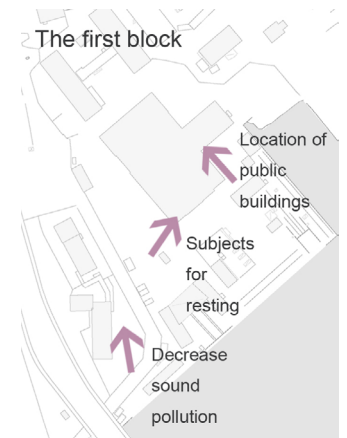


Figure 40: Process of proposal in the first block

Solution 1: Placing the buildings near the water.

Advantages: It is quite close to the river, so it is easy to enjoy the waterscape when eating or drinking coffee inside the buildings.

Disadvantages: If the flooding increase more than 1 meter, construction will be flooded and people cannot reach the buildings.

Solution 2: Placing public buildings on the embankment.

Advantages: It is much safer because the buildings will not be flooded and it is near the main path and easy to reach.

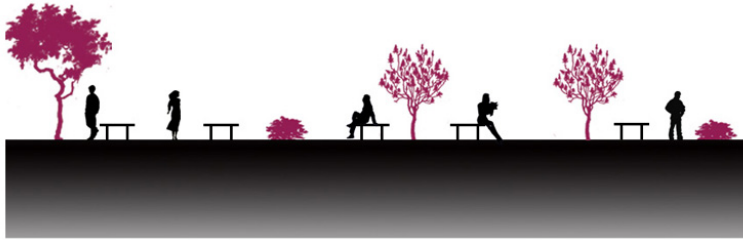
Disadvantages: A little bit far away from the water, it is hard to view the scenery near the water.

Our solution: Placing public buildings on platforms as high as the embankment but near the water.

It is near the water, so the scenery is better, also the building will not be flooded because of the height of the platform. People may have unique experience because of the rised platform. Although they are on the platform, they are connected with the main path on the embankment, so it will not cause any trouble for people to access.

Subjects for resting (Community aspect)

Consideration: Resting areas are needed, because it is the largest public area of the site.



Solution 1: Using chairs

Advantages: There will be lots of people in this public area so a quantity of chairs are needed.

Disadvantages: Those chairs will occupy a big area.



Solution 2: Change the chairs into ground lawns.

Advantages: Lawns can accommodate more people than chairs, meanwhile more activities may be held on lawns besides sitting, such as picnicking and lying down under the sun.

Disadvantages: If the height of lawns is the same as the ground, flow may cross through the lawns easily.



Our solution: Elevated lawn

Separated spaces are generated, which can separate flow. Besides, the advantages of solution 2 are remained.

Figure 42: Subjects for resting in the first block

Decrease sound pollution (Ecological aspect)

Consideration: Put vegetation in the west of the square to decrease noise and screen off traffic visually.



Figure 43: Decrease sound pollution

Our solution: Plant many trees under or next to the new bridge, separate the urban public space from the heavy traffic.

Increase people's interaction with water (Community aspect)

Consideration: Adding wooden landing stage and placing viewing platform.



Figure 44: The method of increase people's interaction with water

Our solution: Adding wooden landing stage

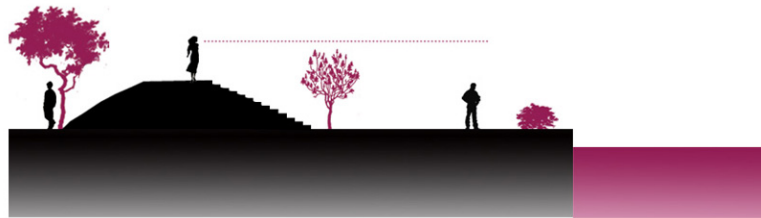
Adding wooden landing stage which can be used for boats.

The wooden landing stage also form an internal space for water-related activities.

Design-the second block

The space between embankment and shore (Delight and Community aspects)

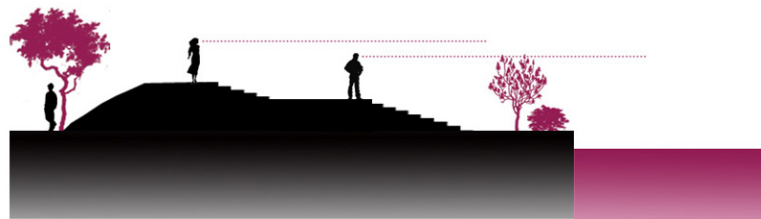
Consideration: Connect the path on the embankment and the shore with the benches and add vegetation to the site.



Solution 1: Formation of steps and ramps.

Advantages: Accessibility

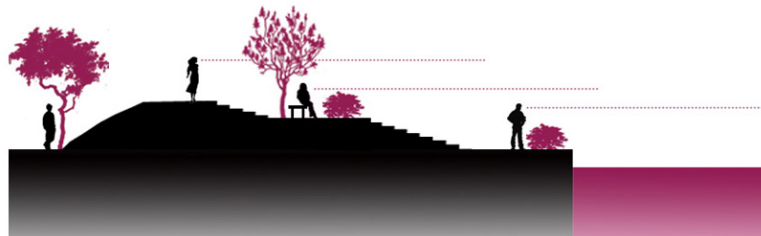
Disadvantages: Just steps, boring place with single function where no one can stay for a while. Ramps for disabled people will also be taken into consideration.



Solution 2: Adding big platform as a buffer between the steps.

Advantages: People can stay for a while and enjoy different level viewing generated from the steps.

Disadvantages: Still very boring.



Our solution: Add benches and plants.

People can rest while enjoying the scenery, plants can make people be more close to nature, meanwhile, small spaces formed by plants can also keep flow from the resting people, so that they will not be disturbed.



Figure 45: Process of proposal in the second block

Figure 46: The space between embankment and ground space

Industrial heritage (Delight and Community aspects)

Consideration: Emphasis that this area used to be an industrial area.

Our solution: To keep one small ship which belongs to the factory on the site is a good way to remind people that this site was occupied as a ship industrial area.

It is a unique mark, a symbol of the site.

Vegetation (Delight and Ecological aspects)

Consideration: The diversity of vegetation.

Our solution: There are already some aquatic plants growing in this inlet. If we take advantage of this, enlarge the number and species of plants, a small aquatic plants garden can be made.

Wooden bridge (Community aspect)

Consideration: Increase delight and community values, make traffic more convenient.

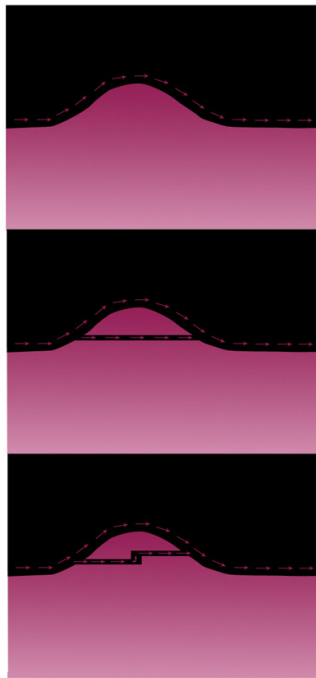


Figure 47: The pattern of wooden bridge

Solution 1: If set a straight bridge.

The bridge can shorten the distance.

It is a new experience for people to walk over the water and plants.

Our solution: If we fold the bridge.

A space for people to stay for a while will be produced in the middle of the space.

People can stop and enjoy the scenery over the river.

Design-the third block

Set a place for children (Delight and Community aspects)

Consideration: Set a playground.

It is a good place for children to play, because it is close to the centre of the housing area.

Set a place for adults (Delight and Community aspects)

Consideration: Set a sand pool.

Playing with sand is one of waterside leisure activities; people can enjoy the sunshine and do some sports on the sand.

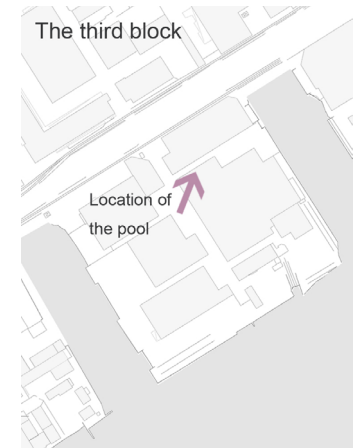
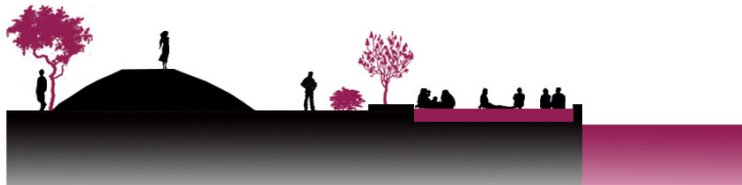


Figure 48: Process of proposal in the third block



Location of the pool:

Near the shore:

People are more close to water and feel more relaxed. But because of flooding, the sand will be washed away and deposited in the river.



Near the embankment:

Placing the sand pool inside the embankment, people cannot reach the water from the pool, but it will not affect the leisure activities which can be held on the sand. Children can also share one part of the sand so we put two areas near each other.

Figure 49: The location of the pool in the third block

Design-the fourth block

Adding protuberant platform (Delight and Community aspects)

Consideration: On the opposite side of this block, scenery is less attractive because it is industrial area on the other side of the river. So we want to add more scenery elements in this block to compensate.

Adding protuberant platform:

It could be another sensory experience, because people can enjoy the scenery at a higher level, and the distance between them and the water is shorten.

The space under the platform:

We put flower beds, sculptures, etc. in front of the platform in order to eliminate the strange sense of space under the platform.

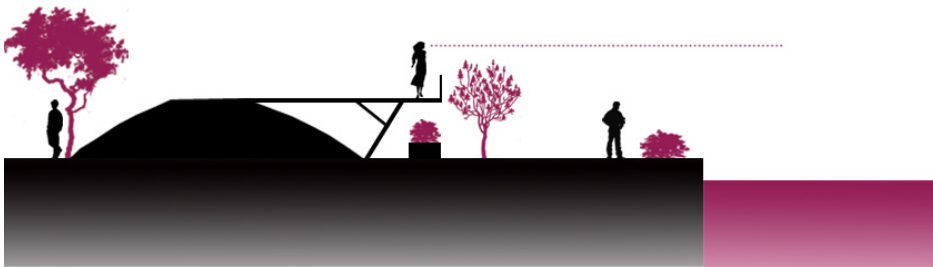


Figure 51: Adding a platform in the fourth block

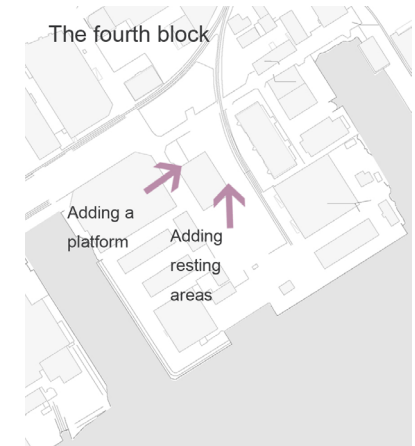


Figure 50: Process of proposal in the fourth block

Industrial Heritage (Community aspect)

Consideration: Industrial heritage protection.

Remain the iron shelf near the river. The self is used to carry heavy stuffs, so keeping it is a kind of industrial heritage protection.

It is also a mark of the site and it can guide people to move forward.

It will make one more meeting point for people to stop and talk to each other.

Adding resting areas (Community aspect)

Consideration: Increase people's resting areas in this site.

Placing half private resting areas and plant grass and flowers, hedges, etc.

We want to make the block as a transition of public areas and leisure areas. After walking a long distance from the main bridge, people may feel tired, so it is a good place to have a rest both mentally and physically.

Besides, vegetations are beautiful and belong to nature.

Facilitate the transport of people (Community aspect)

Consideration: Adding slopes.

Placing slopes made of concrete to connect the path on the embankment and the ground.

It is another way of walking down a ramp instead of steps. The main use of it is private barging for the residents, so that they will not be disturbed by other boats barging in the first block. For residents, it is a connection between the transport inland and the river.

Design-the fifth block

Change the pattern of shore (Delight, Community and Ecological aspects)

Consideration: Make effective use of the unique landscape generated by flood, and make the block connect to the park on the other side of the embankment.

There is nearly nothing in the fifth block, and it is near a main road which makes this part noisy and isolated. Meanwhile it is also near the river and surrounded by some water plants which can be effectively utilized.

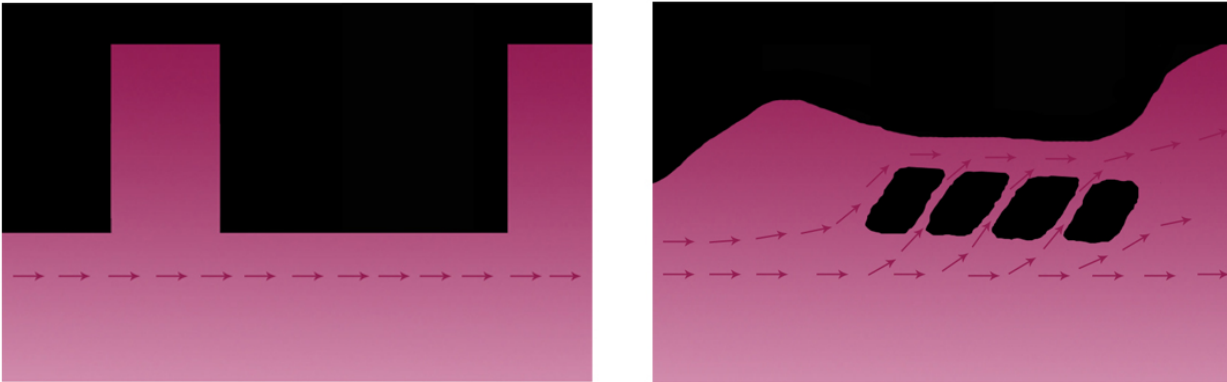


Figure 53: Change the pattern of shore in the fifth block

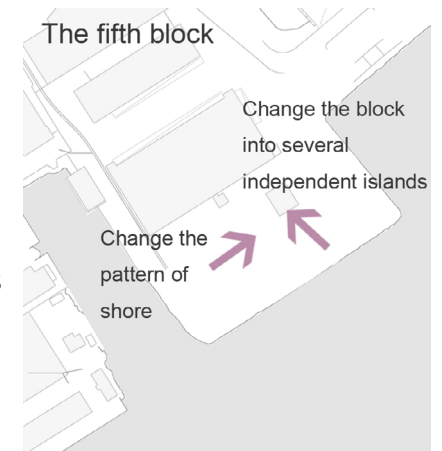


Figure 52: Process of proposal in the fifth block

Change the block into several independent islands (Delight, Community and Ecological aspects)

Flooding land with a unique landscape can be generated which can avoid flooding other spaces of the site.

The land and the islands can be connected with a bridge, so that if the islands are flooded, it will not impact the pedestrians too much.

The shape of these islands can also play the role of reducing the flooding to some extent.

People can be more close to water, to water plants even to nature.

Plant diversity is increased.

New experience for people when the islands are not flooded and flooded.

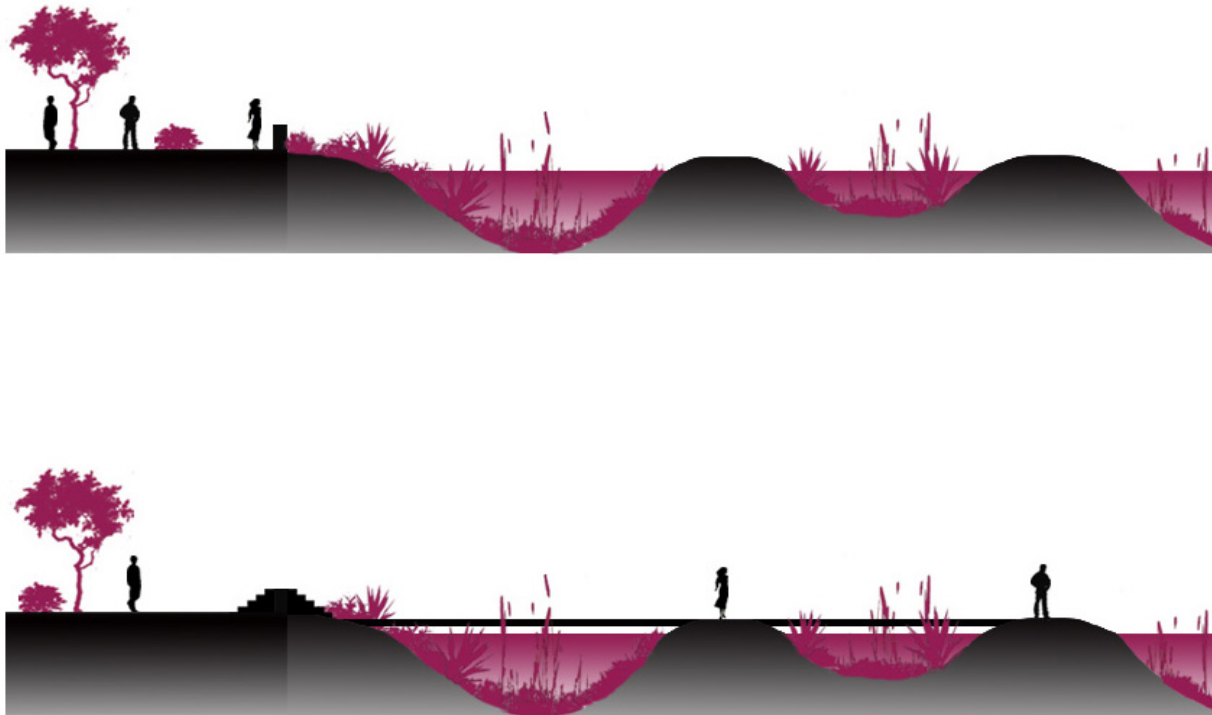


Figure 54: Change the block into several independent islands



CHAPTER SIX

DESIGN PROPOSAL



Figure 55: The master plan



Master plan

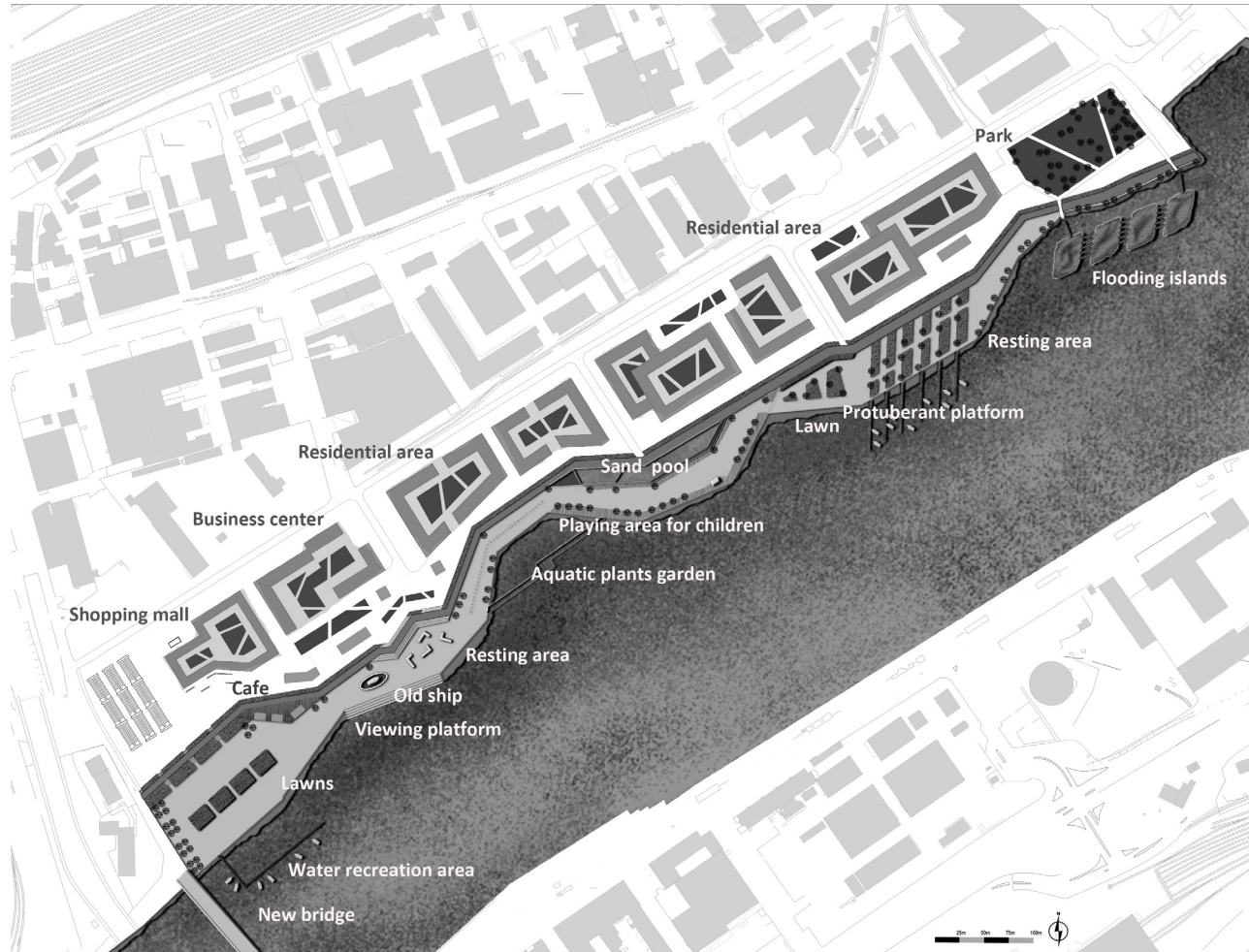


Figure 56: Contents

As the master plan shows, there are two parts at our site which are separated by the two meter high embankment. We have some thoughts about the contents of the inner side, but not in detail. The aim for this part is to solve the flooding problem and coordinate the development of the entire region. The river side is the part we focus on. In order to meet different requirements of different people, we designed various types of space with different kinds of facilities. At the same time, with an aim to make our design more attractive, we also took people's physical and physiological requirements into consideration.

We consider the new bridge as a starting point, and the flooding islands as the end of the whole site. Different spaces are distributed along the route, from open to half open and enclosed. Firstly, we set up a square with a distribution role beside the main bridge. Following the square are spaces for site viewing, playing, resting, as well as enjoying nature like islands. The purpose of the design is to consider the physical and psychological needs of people. When having a small trip to this site, people will have different kinds of experience, from jollification to peace, from urban character to more nature. Of course, there are more than one entrance to the site, people can choose to go directly to their favorite place and spend time there, children can, for example, go directly to the sandbox and their playground from residential buildings and the elderly can go directly to the east of the naturalized space to find tranquility.

In all, we believe we have created a multi-functional riverfront space that can enrich people's leisure times.

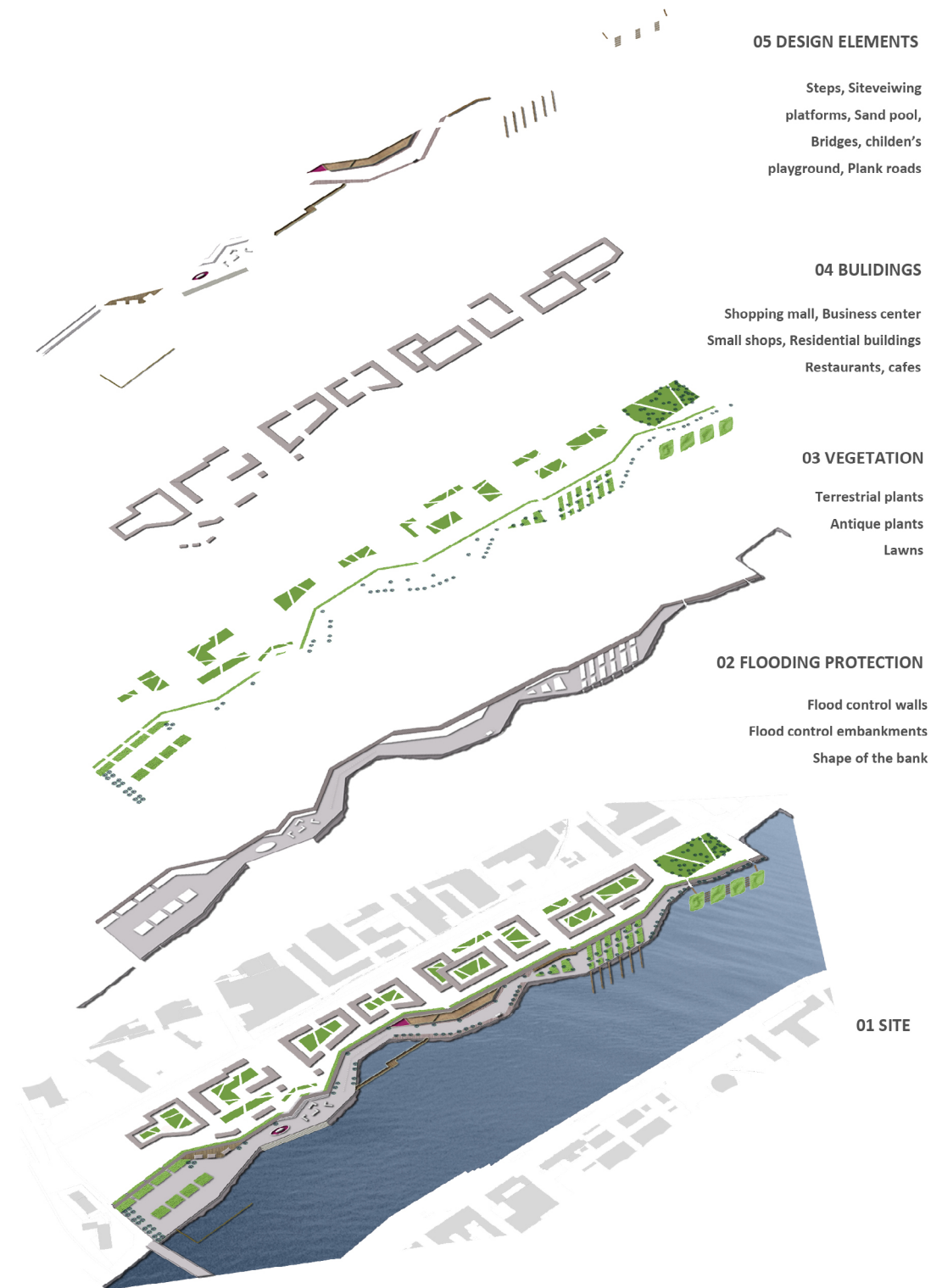
This is a more detailed illustration of our master plan. In our opinion, the new site consists of flood protections, vegetations, buildings and some other design elements.

Our master plan can be understood from the illustration that flood protection is the major problem we should deal with. The transformations of the shape of the shore, the flood protection wall as well as the two-meter-high embankment are all designed for flood protection and we also have to make those objects well designed.

According to our plan, we provide open, half open and enclosed green spaces, such as big lawns, aquatic plants areas and wooden areas. At the same time, we also have many kinds of buildings to meet various needs of people, such as shopping malls, cafes and shops. Further on we provide facilities for people to do various types of activities, such as viewing platforms and sand pool.

After these parts have been combined and a renewed space is generated which is an organic and attractive waterfront space, integrated into the rest of the city.

Figure 57: The different functions and layers of our proposal



Views of the whole site



Figure 58: An overview illustration of our design from west to east.

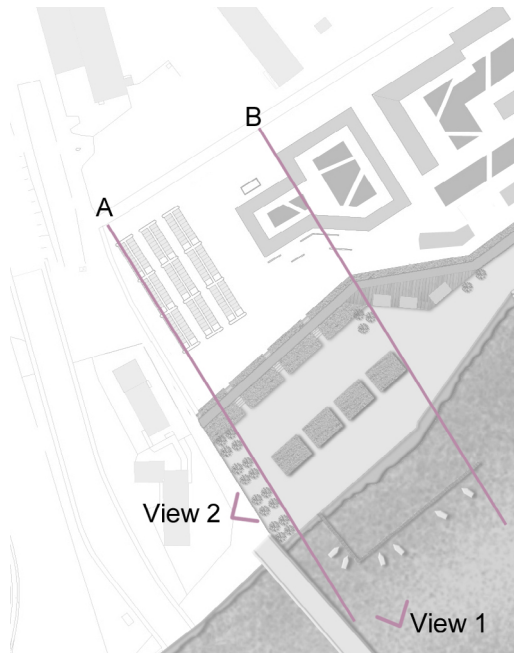


Figure 59: An overview illustration of our design from east to west.

Sections and views of each block



Figure 60: The size and boundary of five blocks after design



The first block

A and B are two sections we picked from the first part of the site, in order to understand the scale of the site and design details.

Figure 61: Sections from the first block

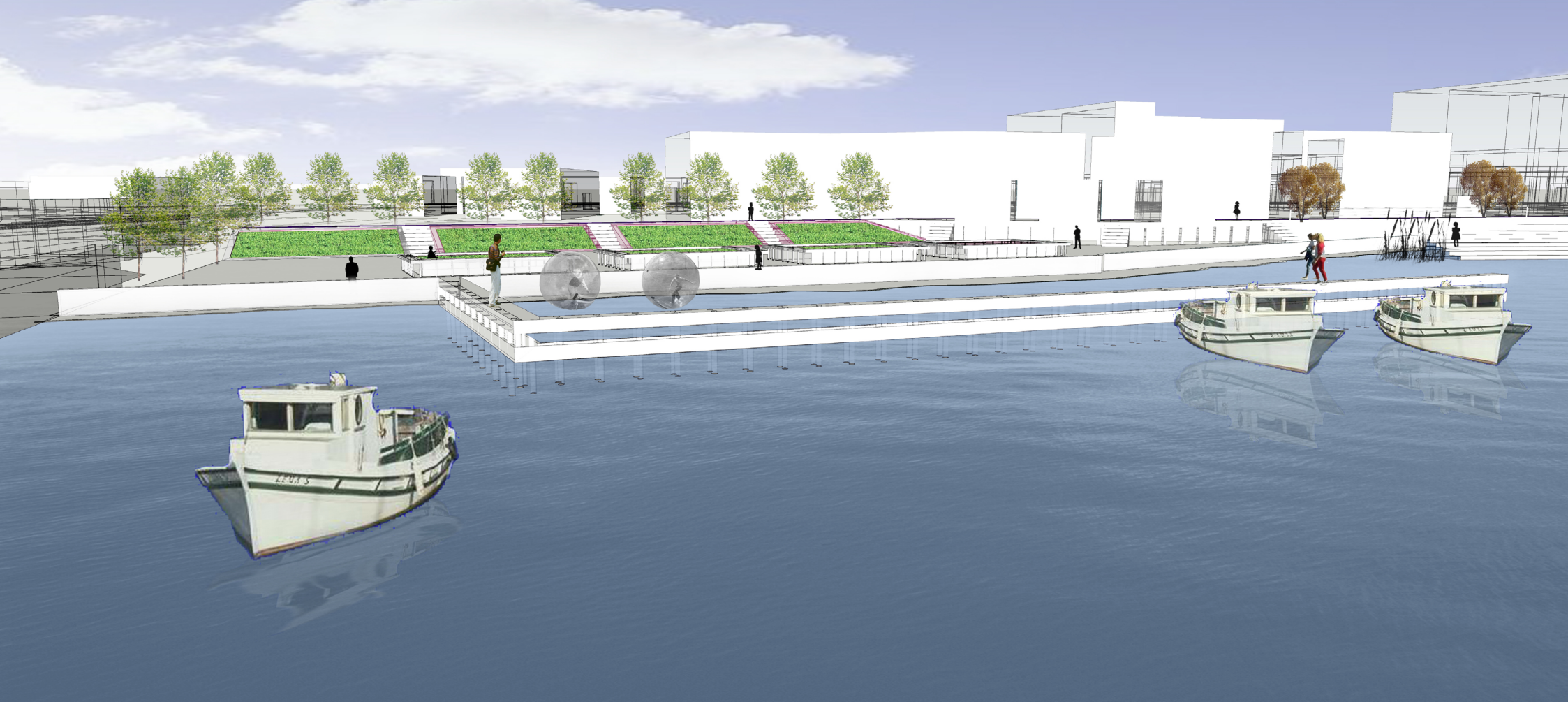


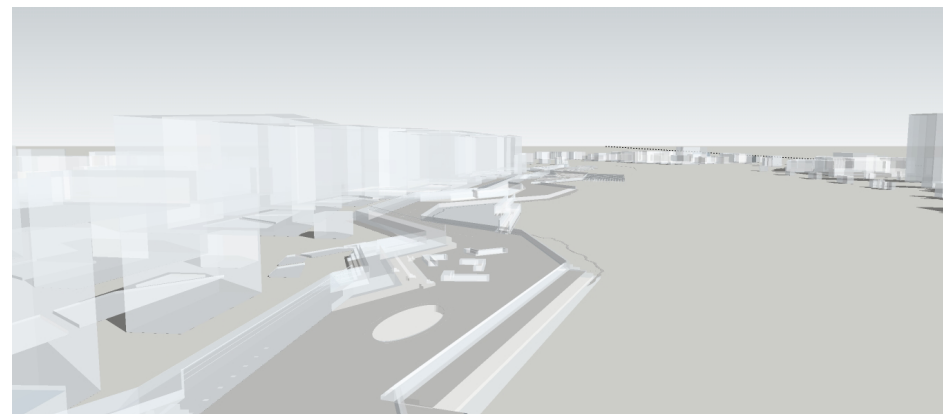
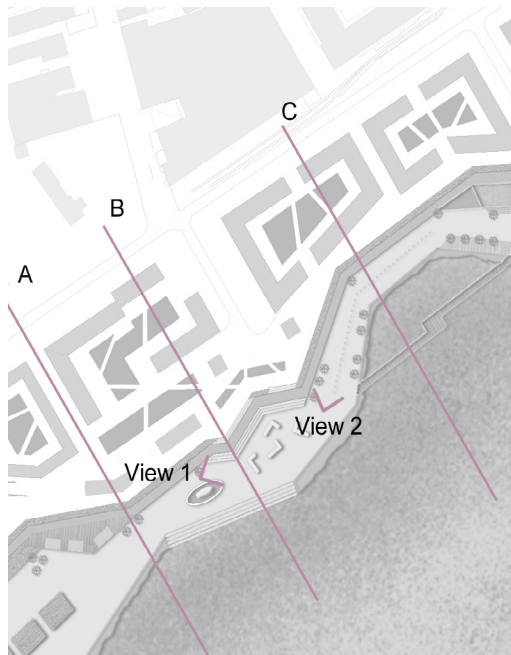
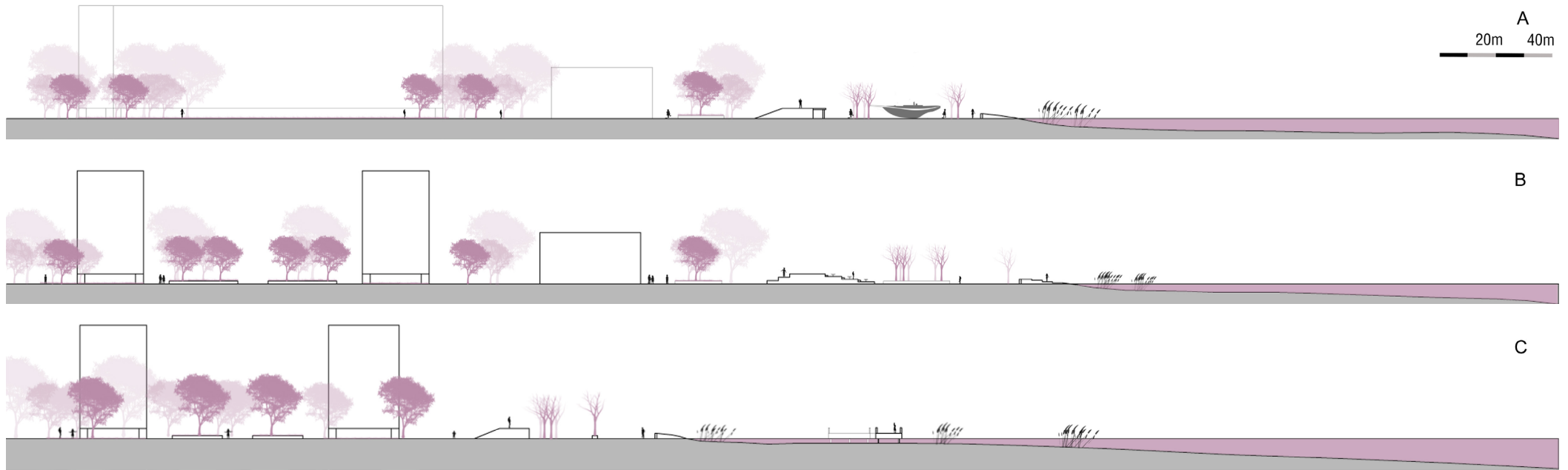
Figure 62: View 1 from the first block



Figure 63: View 2 from the first block

These are detailed views from the first part of our site. We can see the wooden landing stage, a water activity area and the big square which is designed to be an entrance. Also a part of the viewing steps can be seen from this point.

What we want to present is an open public place where people can enjoy the scenery, play and spend time.



The second block

These are sections that we selected from the second part of our site. Because the width of steps in this part is different, people can choose to have a rest on the steps or just pass by. And we retain a ship as a heritage protection. We put the ship at a lower level than the ground so that if the water level changed, it will present a different landscape to people.

Figure 64: Sections of the second block



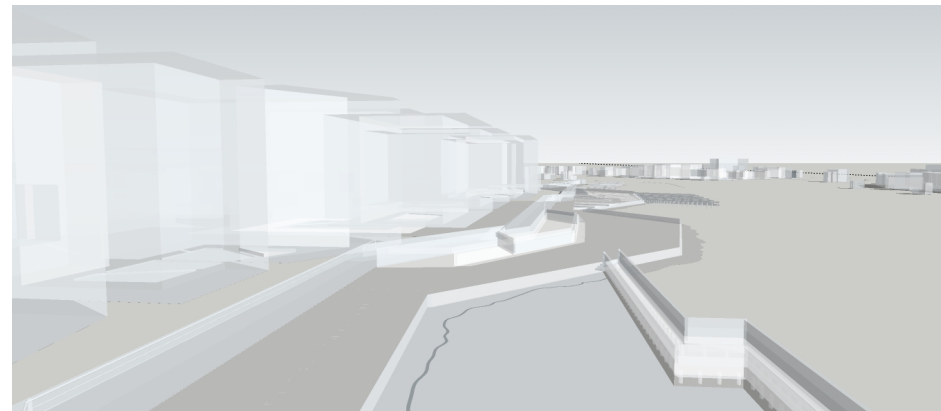
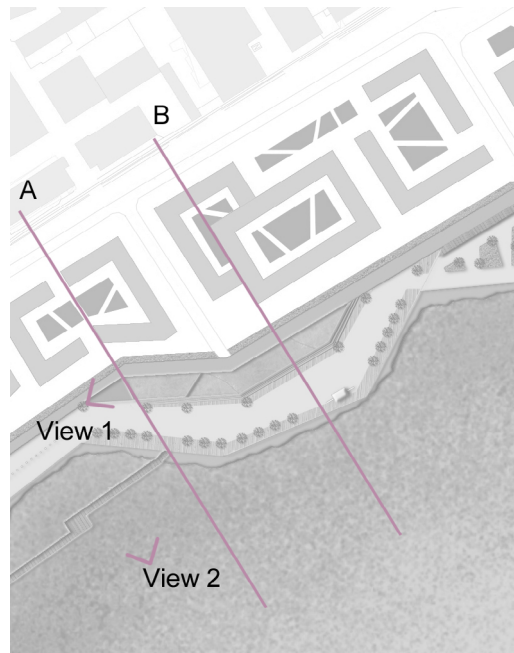
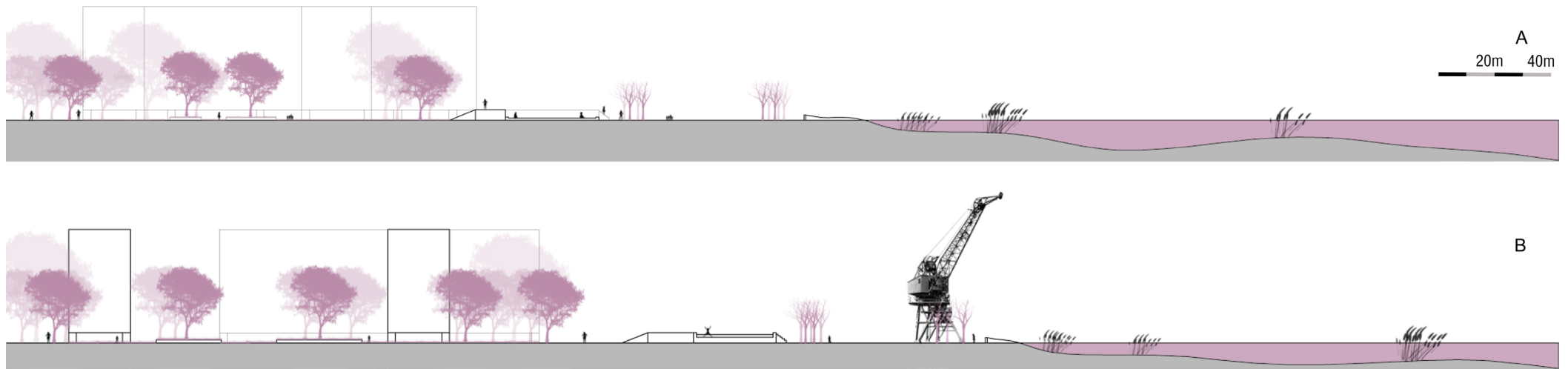
Figure 65: View 1 from the second block

This is a view from block two, and we can see that there are large platforms and together with the flower beds it generates a semi-open space. After walking through the open area in the first part, people can choose to stop and have a seat and enjoy the scenery, take a look at plants and then continue to move forward.



Figure 66: View 2 of the second block

This is another view from the second part. We can see the array tree plots which play a guidance role as well as provide a semi-private space for people. On the right side of the wooden bridge is an aquatic plant area. Together with the trees, a moist cool micro-climate will be created and it will bring a sense of comfort to people.



The third block

A and B are sections that we selected from the third part of the site which is an open public space for different kinds of people to have fun. They show the width and structure of children's play area, sand box as well as the old industrial machine, etc.

Figure 67: Sections from the third block



Figure 68: View 1 of the third block

This view is from part three. With the sand pool, we want to give people a feeling of staying at a beach. We also hope that adults and children can enjoy time together in the same place. We divide the sand pool into two parts and set up a children's play area beside the pool with a number of play equipments for children so that both adult and children can have a pleasant time in this area.

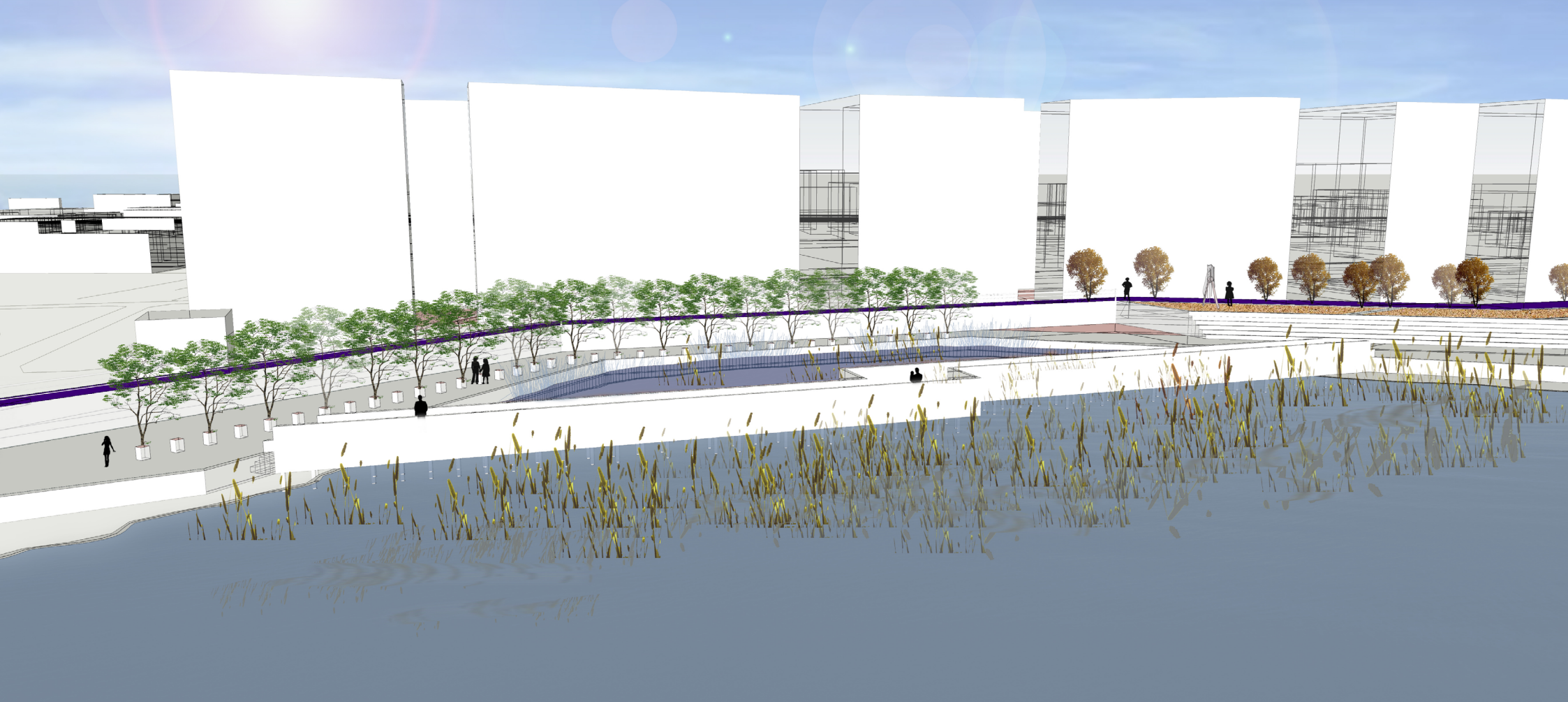
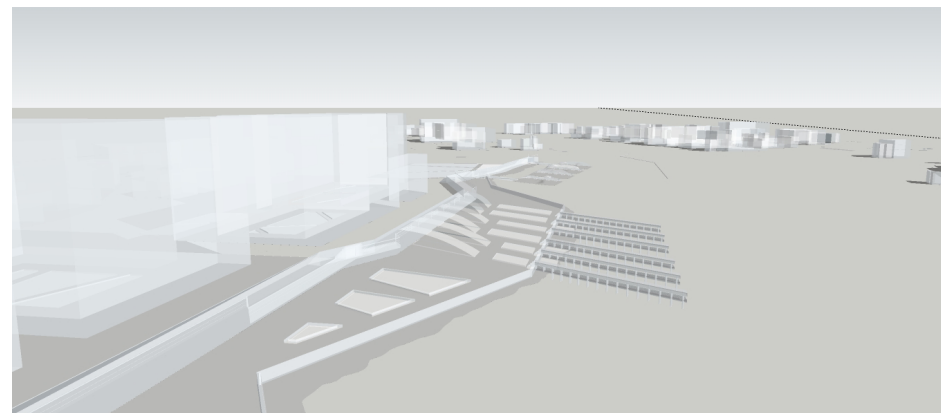
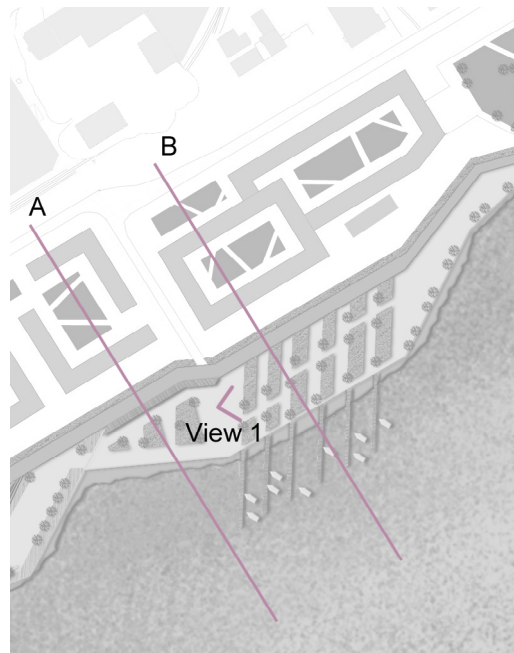
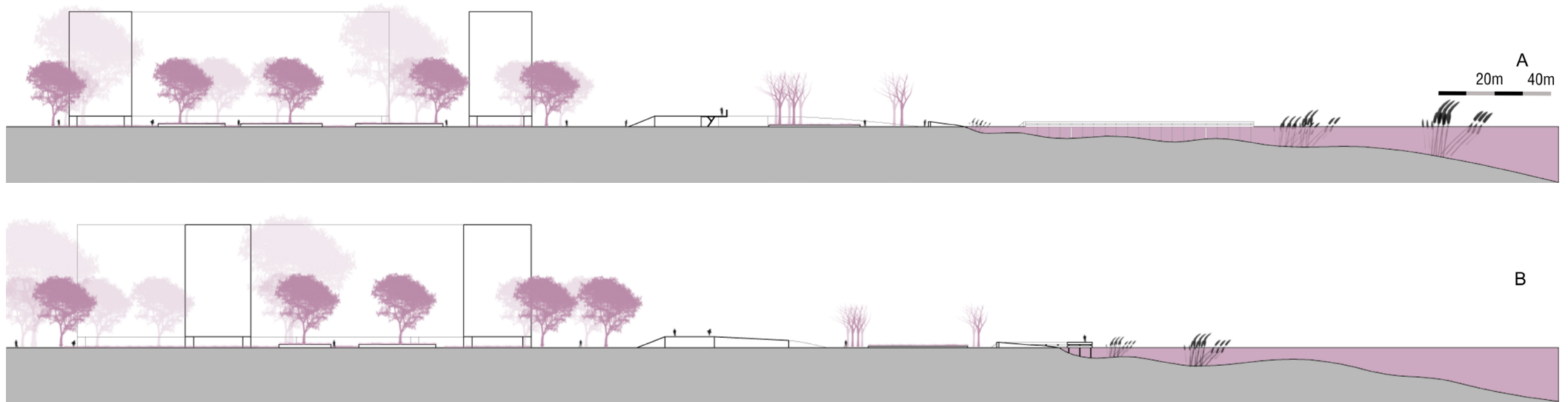


Figure 69: View 2 from the third block

This view shows what the aquatic plant area could look like. There is a wooden bridge crossing over this area for people to enjoy the scenery. Wood material of the bridge will make people feel close to nature and they may feel like walking on the water. Besides, walking between beautiful plants is a great feeling that will make people love this area very much.



The fourth block

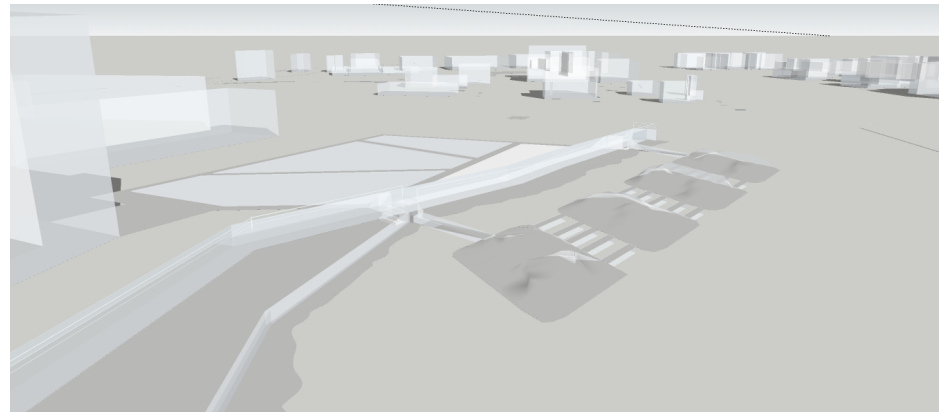
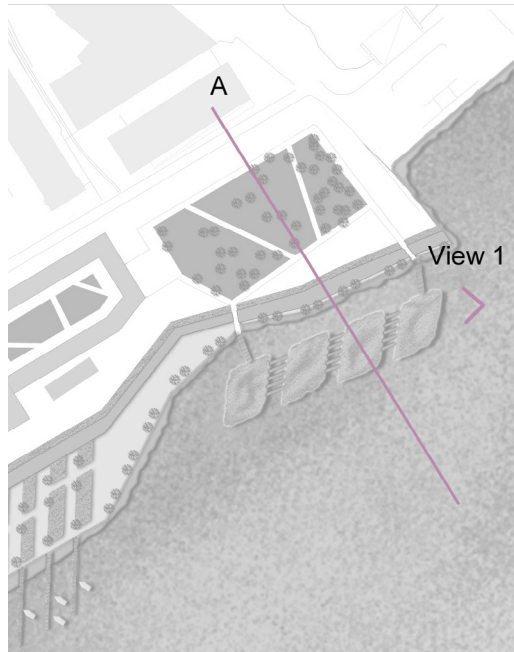
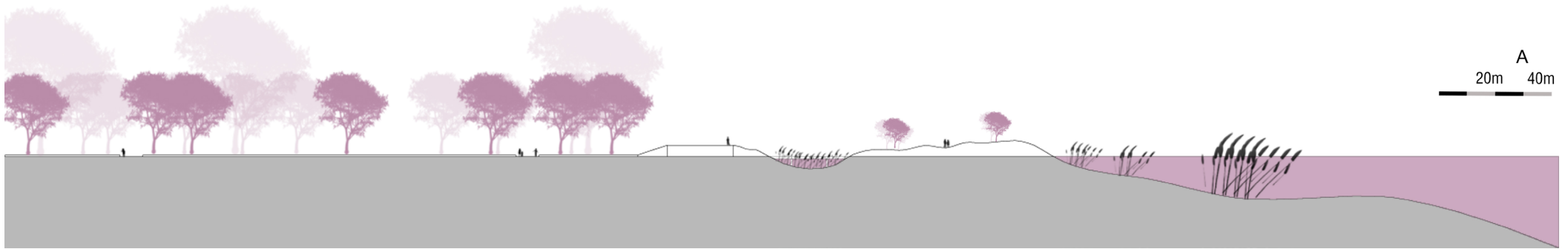
A and B are sections that we selected from the fourth part of the site which is an half-open public space for kinds of people to rest and appreciate the scenery. They show the structure and width of lawns, protuberant platform and wooden landing bridges, etc.

Figure 70: Sections from the fourth block



Figure 71: View 1 from the fourth block

View of the fourth part. In this area, people can use the slopes with different angles to move between the embankment and the shore. It is a good area for people to have different experience. There are lawns near the slope for people to use as they want. At the same time, steps near the lawns are connected to the wooden landing stages for private small boat. These are also a kind of viewing platforms for people to have an opportunity to be more close to the river and enjoy the waterscape.



The fifth block

A is section that we selected from the fifth part of the site which is an private space for kinds of people to enjoy waterscape and be more close to nature. They show the structure and width of park, embankment as well as the flooding islands, etc.

Figure 72: Section from the fifth block

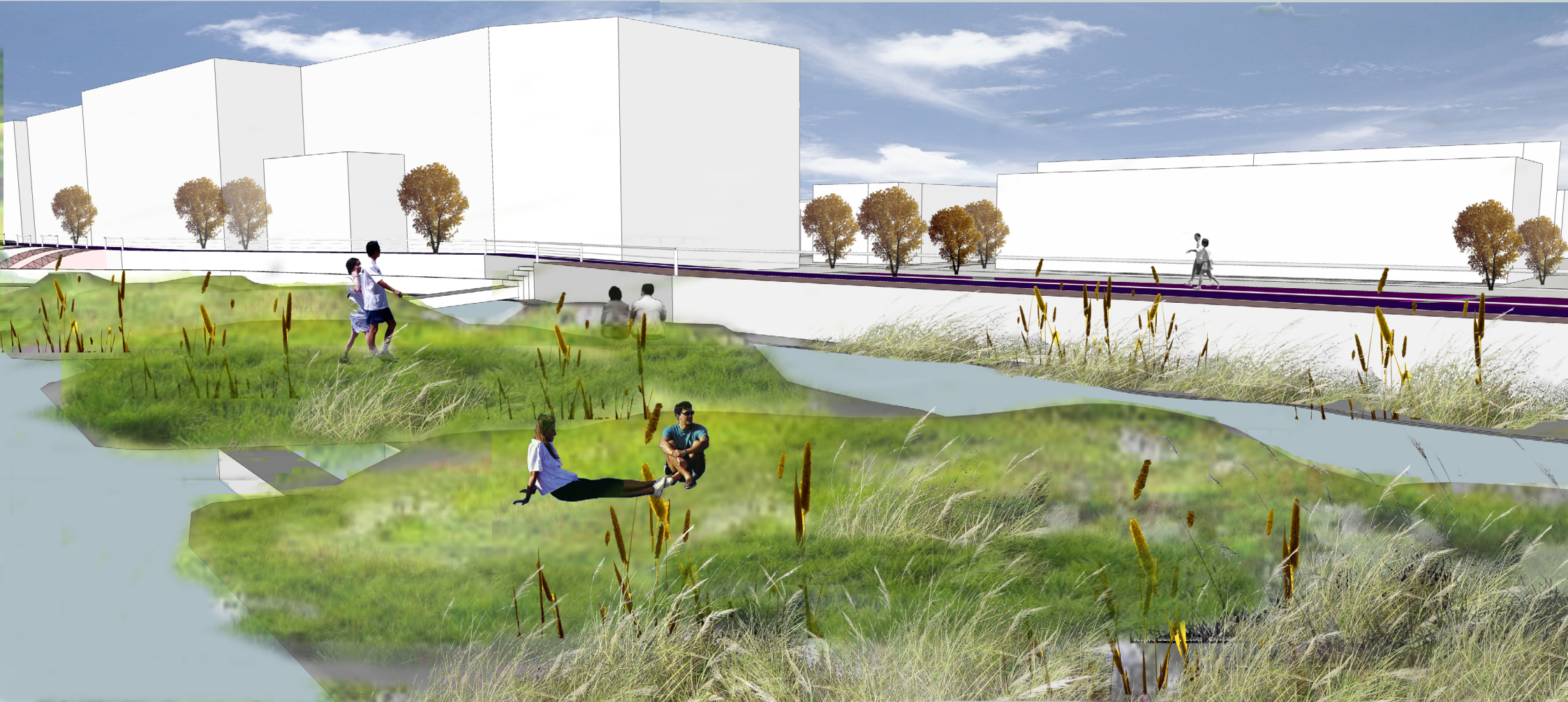


Figure 73: View 1 from the fifth block

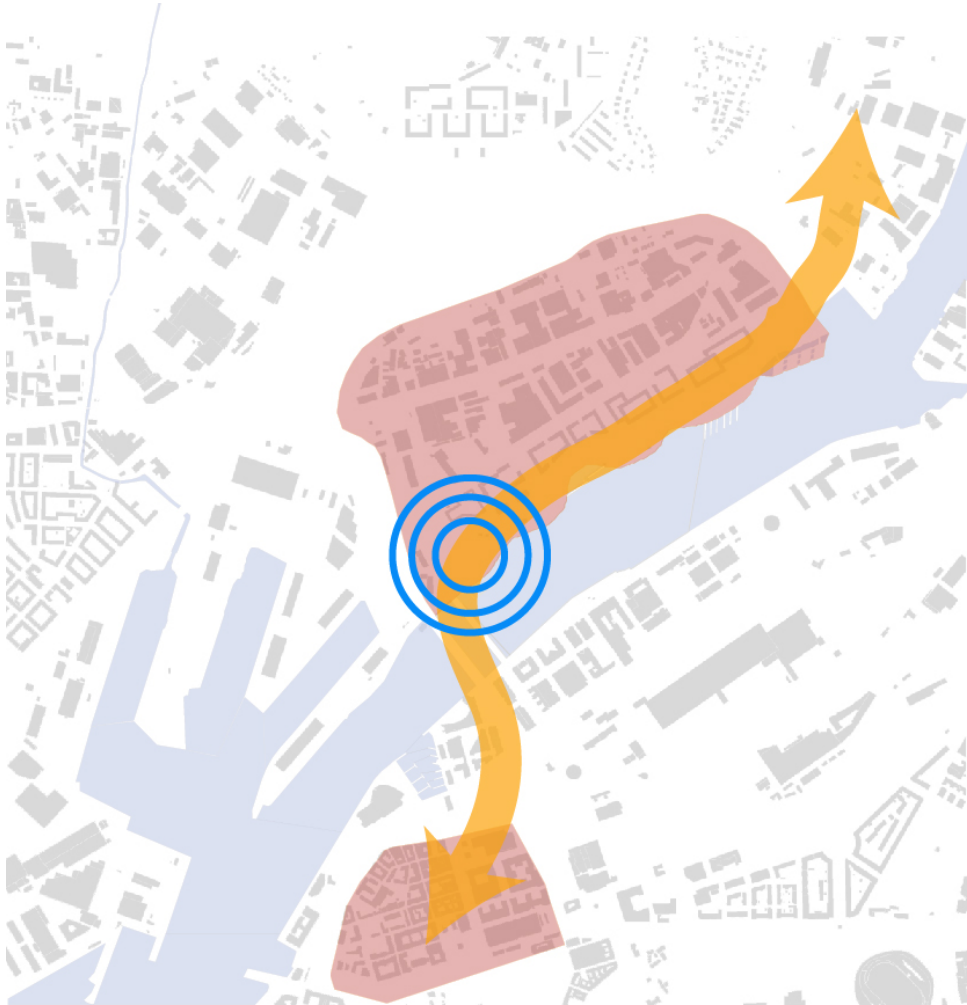
This is a detail view from the last part which shows one of our creative designs. We believe that the flood is more than a negative thing; instead, it can be well used. Therefore we made islands that can be flooded in this part. When the water level change, the landscape will become different, which is rare to be seen in an urban environment. People can enjoy the scenery from the riverbank. They can also go to the islands so that they can have a chance to be close to some kinds of waterfront plants through bridges, and at the same time they can experience natural terrain of the islands. The bridges are at a low level, so when the water is above the warning level, the bridges will be flooded, therefore people can not go to the islands which is a method that may guarantee people's security when the flood comes.



CHAPTER SEVEN

EVALUATION

After design-create a public space sequence



The new Ringön riverbank is a place that can not only introduce a kind of flood control, but can also create a comfortable, safe and changeable public space for local citizens. This public space links and integrates the whole Gothenburg from the city centre to the northern undeveloped area, which creates a public space sequence that holds social and aesthetic values. (Delight and Community)

Figure 74: A public space sequence

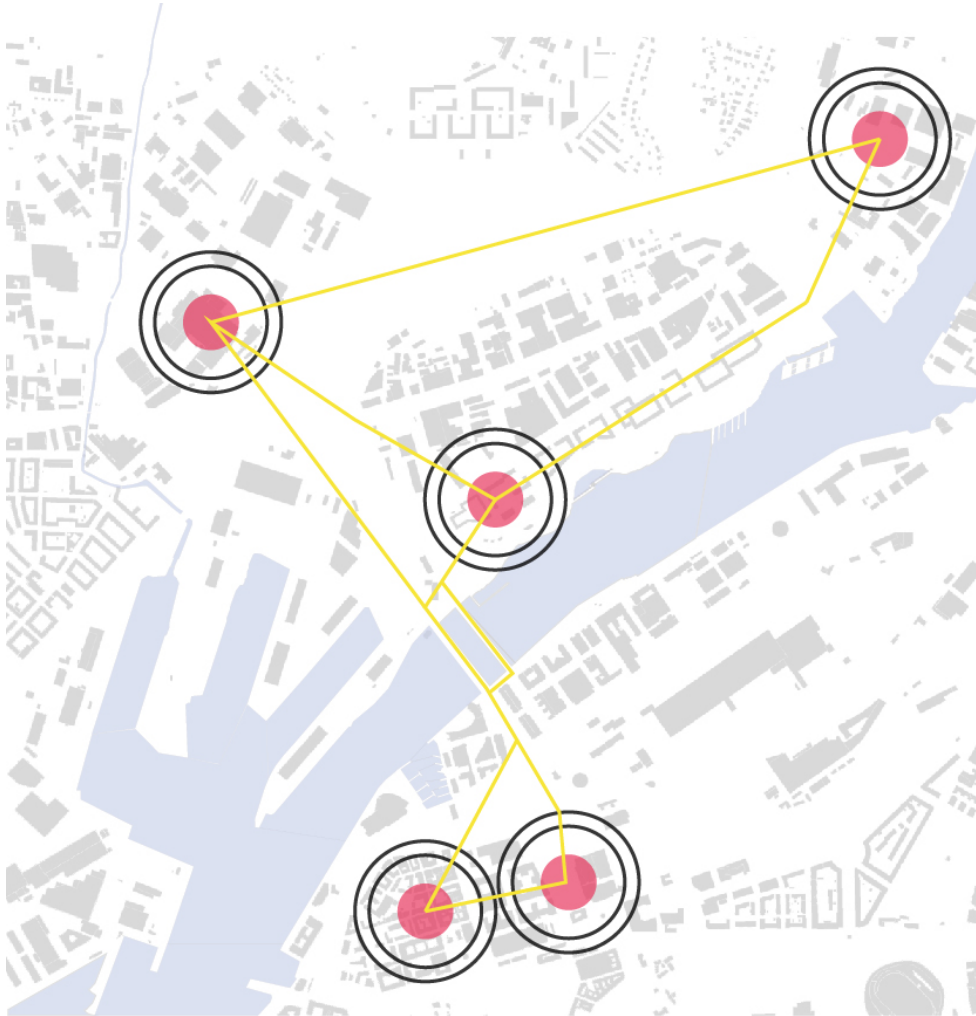
After design-create an urban recreation system



The waterfront landscape in Ringön area decreases the number of waste lands. It can also be a popular area for both tourists and locals. It will provide shade and great views over the river. Meanwhile, a new urban green structure system will be settled. A playground in Ringön is a place primarily for children. The whole recreation along the riverbank holds all three values (Delight, Community and Ecology) which let people simply feel comfortable when enjoying it. (Delight, Community and Ecology)

Figure 75: An urban recreation system

After design-new Ringön in the commercial network



The Ringön area will become a new commercial centre because several shopping malls and supermarkets will be opened here. Besides, an urban commercial network will be established by the Ringön commercial centre, and its central location integrates the northern and southern part of city. This prospective will improve the social value. (Community)

Figure 76: New commercial network

After design-new infrastructure and accessibility in Ringön



In order to attract more people and having more activities in this site, it is necessary to improve the public accessibility and connection between the two sides of the river. Therefore, our proposal increases the number of public transportation routes and stops. (Delight and Community)

Figure 77: New infrastructure and accessibility



In future more bicyclists and pedestrians can move through this place. The reconstructed area can enhance and integrate the communication between north and south.

- Bicycle and walking route
- - - Bus route
- Bus stop

Figure 78: New infrastructure and accessibility for bicyclists and pedestrians

After design-no barriers



We propose that the site and the areas nearby should have good connections to the water. We make use of the abandoned and underused open space along the river both by renovation of the existing urban structures and by proposing new ones. In the coming decades, the new bridge will hold an extremely important position in the urban development. However, the northern part of Ringön will still be blocked by the highway. (Community and Ecology)

Figure 79: No barriers in new proposal

After design-meeting places



After design, more meeting places are settled. The map shows that the social meeting places are not only concentrated in the central city, but also are dispersed in other areas. A few numbers of meeting places are located in Ringön which attracts more and more people and tourists to this place. However, there are still less meeting places in various places nearby the Ringön area. (Delight and Community)

Figure 80: Add more meeting places

After design-flooding scenarios

After design, the one meter high wall and two meters high embankment are added which protect the waterfront landscape. When the water level rise 0.5 meter, nothing is changed except at small places along the fifth block. When the water is 2.0 meters higher than the normal water level, the flooding can affect whole places along the river except residential areas are still safe. (Community and Ecology)

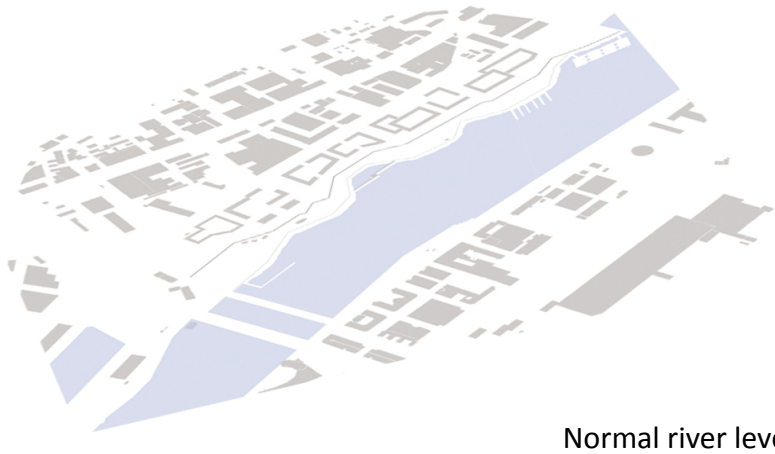


Figure 81: The site's flooding in different levels

After design-evaluation diagram

We list three diagrams show effects and consequences of our proposal. Also, we put forward some mitigations in terms of some bad consequences we can think of.

Important aspects in evaluation landscape	Important Features	Effects	Consequences	Mitigations	Balance
Delight	Passing of the river	A new way will be added in the site near the bank, which can make the traffic more convenient	Traffic of the entire region will also be more convenient	None	Positive
	Attractiveness of Riverfront	The new waterscape will make the site more beautiful	Attract more people to come to and spend their time in the site If the water level rises over one meter, some parts of the site will be covered by water, so that these spaces cannot be used during that time	Set more spaces like the flooding island that can show people different landscapes that can change with water level	Moderate
	Arrangement of biodiversity	Kinds of species will make the new site rich of colors	The entire site will be more beautiful and more attractive	None	Positive
	River dimension in width and length	Shoreline will become more smooth, and the site will become more accessible	The spaces in the new site are well connected with each other which will make people have a sense of a whole system	None	Positive
	Passing of bypasses and overpasses, etc. and the quality of man-made environment	New landscape facilities will make the site multifunctional	People are also part of landscape, which can give the site more vitality Different of spaces will make the site multifunctional and meet different kinds of needs of people	None	Positive

Table 6: Evaluation diagram of the Delight aspect

Important aspects in evaluation landscape	Important Features	Effects	Consequences	Mitigations	Balance
Community	Modes of man's transportation in the riverside and defining walk ways and bicycle paths	<p>Ship industry will be moved away.</p> <p>Nature of land will be changed from an industrial area to residential area and green spaces.</p> <p>The shape of the bank will be changed</p>	<p>Income will be less than before</p> <p>Government will spend more human resources and material resources</p>	<p>Add more commercial buildings beside the new space as well as increase employment opportunity, also play an important role on regional development</p> <p>Try to reduce earthwork</p>	Moderate
	Formation of public events	Meeting places will be increased which can enrich people's daily lives	The city will be more vital, together with the surrounding places ,it can form a network, a system	None	Positive
	Worthiness of the river as a cultural heritage	Some old subjects along the waterside reminds people what this place used to be	<p>Improve cultural heritage</p> <p>Building demolition will be a huge project, cause environmental pollution to some extent.</p>	Municipality should do great preparation: do budget well, use advanced machines and use air purification devices	Moderate
	Physical relationship of man and water	People will have more chance to be close to water and a variety of interaction with the new landscape will be increased	A new waterfront space will be formed	None	Positive
	Defining leisure and tourist units beside the river	Add new tourist attractions for the city, the number of tourists will be increased.	<p>Promote tourism industry.</p> <p>An excessive number of tourists may affect the local people's normal life</p> <p>Noise pollution and more garbage will be generated.</p>	<p>Strengthen management</p> <p>Increase maintenance professionals</p> <p>Add more signs to increase people's environmental awareness.</p>	Moderate

Table 7: Evaluation diagram of the Community aspect

Important aspects in evaluation landscape	Important Features	Effects	Consequences	Mitigations	Balance
Ecology	Biological diversity	Plants will be increased	Species diversity	None	Positive
	Water quality	Aquatic plants will be increased and water penetration will also be increased Flood protection walls can be seen in the area	Improve water quality, flood control walls and embankment can protect people from the flooding problem	None	Positive
	Environmental pollution (air, noise,..)	Native species will play an important role for environmental improvement	Reduce noise pollution	None	Positive
	Diversity of plants and trees and their quantity	Increase plant species, meanwhile, retain local species	Improve micro-climate Increase human resource and fund investment	None	Positive

Table 8: Evaluation diagram of the Ecology aspect

To sum up, through the evaluation diagrams, it can be seen that our proposal has ten positives and four moderates in terms of all the related features of Delight, Community and Ecology.



CHAPTER EIGHT

CONCLUSION

To sum up, this thesis includes two subjects according to our master program study: landscape design and landscape planning. As to landscape design, we designed a waterfront space in Gothenburg which can be taken as an example on how to achieve flood control protection and landscape design at the same time. As to planning, we tried to take some measures of flood control protection methods into consideration, such as changing the shape of the shore line, using flood control walls and embankments, planting aquatic plants, etc. Meanwhile, we also thought about how the new space may affect the entire city, such as transportation system, green system, commercial system, etc.

As to our preparation, first we decided our methodology and design concept. Through studying the landscape theory of Ian Thompson which includes the Delight, Community and Ecology perspectives, we reached a profound understanding and knowledge of how to use resources of a riverfront space. Then we put forward our concept, the 1/2 space theory, which combined the methodology and the system theory together. After this theoretical background, we began our investigations of Ringön, which is the name of the site. Through field visits and investigation of documents, we collected considerable information of the site, such as climate, soil condition, transportation situation, green spaces distribution, statistics of water level and flood situation and so on. After the data collection we made a SWOT diagram which is used commonly to analyze the site with an aim to back our design proposal.

After those analyses, we began to propose solutions on the main problem (the flooding). That is to say, by understanding the environment as a precondition, we tried to make this the starting point of our proposal. To a certain extent, we can say our proposal is suitable to the local conditions, such as we put floodwalls, flood control embankments, water plants and flooding areas in the site which are about around the main issues. Besides, we also took saving manpower, material and financial resources into consideration with an aim to increase the feasibility of our proposal, for example, we tried to consider mass balance when changing the shape of the embankment. Because design is a changing process, we changed our proposal several times during the last few months as it can be seen in chapter five. Through master plan, sections and views, we finally show our design proposal. Also, we do not forget to think of

and propose mitigations in the balance diagram in the end.

The aim of our thesis is to make a design proposal to express our idea on how to redevelop a riverfront industrial area and generate a new public space, where the flooding protection is the prerequisite. We would like to provide a possibility for Gothenburg future development, meanwhile, through our proposal, we want to tell people that waterfront space is more than a space, it is a system consisting of many types of elements, with many kind of functions and significance. Beside Delight functions, the system also has Community functions and Ecological functions. In the long run, the new system may even make contributions to the development of the whole city.

We must admit that lots of data about our site is in Swedish, and that is a limitation to us. Also about half a year for us to spend on the thesis is not enough to develop a proposal. Therefore, our ideas may not in all extents be so comprehensive and inclusive.

As it is said before, design and planning is a process whose outcome and implementation process is changing constantly. We must admit that our thesis may have a lot of aspects that we, with our limited knowledge, do not think about before, such as unreasonable design details which cannot be implemented. But we have worked very hard during the last half year, and we will keep on learning, and strive to improve our proficiency.

Figures and Tables

Figure 1: Overlapping value fields in landscape architecture

>Source: Thompson, Ian H. (1999), Ecology, Community and Delight, Sources of values in landscape architecture

Figure 2: Main concept of the 1/2 space

Figure 3: Concept for landscape design

Figure 4: The relationship between whole system and DCE parts

Figure 5: The location of Gothenburg

>Source: <http://nordg.com/>

Figure 6: The Gothenburg city boundary

>Source: <http://www.val.se/val/ep2009/rostmottagning/vallokal/kommun/14/80/index.html>

Figure 7: The river city

>Source: Göteborg Stad (2011), River City Gothenburg, invitation international workshop

Figure 8: The regional water system- Göta Älv River

Figure 9: The areas along the Göta Älv River

>Source: Gothenburg City Planning Authority, 2003

Figure 10: The intrusion of salt water causes flood when storming comes

Figure 11: The flooding in 2008

>Source: Ulf Moback's report

Figure 12: The historical transformation of waterside in Gothenburg city

>Source: Jarkiewicz, Anna (2010), Gothenburg: a vulnerable city, access in: <http://www.resilientcity.org/index.cfm?id=23157>

Figure 13: The site context of Ringön area

Figure 14: The bird view over Ringön area

>Source: Google map

Figure 15: The bird view of the whole Central Älvstaden

>Source: <http://www.centrala Alvstaden.nu/om>

Figure 16: The surrounding neighbourhood near Ringön area

Figure 17: Gothenburg Climate Graph

>Source: www.climatetemp.info/sweden/gothenburg.html

Figure 18: The ground condition and places nearby

Figure 19: The topography in Ringön and places nearby

Figure 20: The infrastructure and accessibility in Ringön and places nearby

Figure 21: The infrastructure and accessibility in Ringön and places nearby

Figure 22: The Barriers in Ringön and places nearby

Figure 23: The green and blue structure in Ringön and places nearby

Figure 24: The permeable surfaces in Ringön and places nearby
Figure 25: The meeting places in Ringön and places nearby
Figure 26: The flooding scenarios along the waterfront
>Source: Map of flooding, <http://www.goteborg.com>
Figure 27: The site's flooding in different levels
Figure 28: The size and boundary of five blocks
Figure 29: Detailed situation of the first block
Figure 30: Detailed situation of the second block
Figure 31: Detailed situation of the third block
Figure 32: Detailed situation of the fourth block
Figure 33: Detailed situation of the fifth block
Figure 34: The overall design concept
Figure 35: The solutions of flooding control method one
Figure 36: The solutions of flooding control method two
Figure 37: The shore design
Figure 38: The location and height of residential buildings
Figure 39: The shape of residential buildings
Figure 40: Process of proposal in the first block
Figure 41: Location of public buildings in the first block
Figure 42: Subjects for resting in the first block
Figure 43: Decrease sound pollution
Figure 44: The method of increase people's interaction with water
Figure 45: Process of proposal in the second block
Figure 46: The space between embankment and ground space
Figure 47: The pattern of wooden bridge
Figure 48: Process of proposal in the third block
Figure 49: The location of the pool in the third block
Figure 50: Process of proposal in the fourth block
Figure 51: Adding a platform in the fourth block
Figure 52: Process of proposal in the fifth block
Figure 53: Change the pattern of shore in the fifth block
Figure 54: Change the block into several independent islands
Figure 55: The master plan
Figure 56: Contents
Figure 57: The different functions and layers of our proposal

Figure 58: An overview illustration of our design from west to east.
Figure 59: An overview illustration of our outcome from east to west.
Figure 60: The size and boundary of five blocks after design
Figure 61: Sections from the first block
Figure 62: View 1 from the first block
Figure 63: View 2 from the first block
Figure 64: Sections of the second block
Figure 65: View 1 from the second block
Figure 66: View 2 of the second block
Figure 67: Sections from the third block
Figure 68: View 1 of the third block
Figure 69: View 2 from the third block
Figure 70: Sections from the fourth block
Figure 71: View 1 from the fourth block
Figure 72: Section from the fifth block
Figure 73: View 1 from the fifth block
Figure 74: A public space sequence
Figure 75: An urban recreation system
Figure 76: New commercial network
Figure 77: New infrastructure and accessibility
Figure 78: New infrastructure and accessibility for bicyclists and pedestrians
Figure 79: No barriers in new proposal
Figure 80: Add more meeting places
Figure 81: The site's flooding in different levels

*Figures without source are made by authors

Table 1: Important features in the evaluation of waterfront landscape

>Source: Mohsen Faizi, Mehdi Khakzand (2008), City, Stream, and Environmental Values, Shiraz City Stream. Pages113-126 In: Wybe Kuitert (Eds.). *Transforming with water: Proceeding of IFLA World Congress 2008*. The Netherland.

Table 2: Important features in the Delight aspect of waterfront landscape

>Source: Mohsen Faizi, Mehdi Khakzand (2008), City, Stream, and Environmental Values, Shiraz City Stream. Pages113-126 In: Wybe Kuitert (Eds.). *Transforming with water: Proceeding of IFLA World Congress 2008*. The Netherland.

Table 3: Important features in the Community aspect of waterfront landscape

>Source: Mohsen Faizi, Mehdi Khakzand (2008), City, Stream, and Environmental Values, Shiraz City Stream. Pages113-126 In: Wybe Kuitert (Eds.). *Transforming with water: Proceeding of IFLA World Congress 2008*. The Netherland.

Table 4: Important features in the Ecology aspect of waterfront landscape

>Source: Mohsen Faizi, Mehdi Khakzand (2008), City, Stream, and Environmental Values, Shiraz City Stream. Pages113-126 In: Wybe Kuitert (Eds.). *Transforming with water: Proceeding of IFLA World Congress 2008*. The Netherland.

Table 5: SWOT analysis about Ringön area

>Source: By authors

Table 6: The evaluation diagram of Delight aspect

>Source: By authors

Table 7: The evaluation diagram of Community aspect

>Source: By authors

Table 8: The evaluation diagram of Ecology aspect

>Source: By authors

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