

BROWN LINE REVOLUTION



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INTRODUCTION

1

Flowscape

"Flowscapes explores infrastructure as a type of landscape and landscape as a type of infrastructure, and is focused on landscape architectonic design of transportation-, green- and water infrastructures. These landscape infrastructures are considered armatures for urban and rural development. With movement and flows at the core, these landscape infrastructures facilitate aesthetic, functional, social and ecological relationships between natural and human systems. Through transdisciplinary design-based case studies at different scale levels Flowscapes seeks for a better understanding of the dynamic between landscape processes and typo-morphological aspects; here interpreted as flowscapes."

-----Nijhuis, S. · Jauslin, D. & De Vries, C.(2013), "Flowscapes"

Flowscapes

Design studio for landscape infrastructures

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The newly established Flowscapes studio addresses relevant sociocultural, ecological and technological issues from the perspective of spatial planning and design. Urbanization, ecological crisis and climate change are complex problems that only can be addressed transdisciplinary and from an international perspective – in particular regarding environmental issues and sustainability. While the technical challenges are considerable, the spatial and cultural challenges are by far the largest. Therefore, a new understanding of space-time condition of landscape – and its potential for change – offers promising opportunities to find new solutions to these problems. In order to redeem control over the processes that shape the built environment and its contemporary landscapes a fundamental review of the agency of landscape architecture design is required (Steenbergen et al., 2009).

Flowscapes is the graduation lab of the Master track Landscape Architecture. It is also open to students of other design disciplines and suitable for students with special interest for landscape architecture. Ecologically motivated architects or urbanists can give shape to their interests within the academic framework, while working in relatively small groups. The core of the graduation lab is a referred design studio, supported by complementary courses (Nijhuis et al., 2012). The design studio is concerned with the spatial design of new topographies by integrating programs into the 'genius of place' and – with regard to landscape development – the continuation of spatial quality and cultural identity. These designerly explorations require a multi-layered understanding of landscape: its spatial structure, history, context, as well as the ecological, economic and social processes involved. In this approach visual thinking and communication are considered to be crucial. Drawings, mappings and models

are used to reveal and create relationships, explore and elaborate landscape systems – in terms of geometry, quantity, velocity, force, trajectory – and for critical reflection. In this article we introduce the design studio and provide some background regarding the theme.

• Landscape Infrastructures

The design studio explores the infrastructure as a type of landscape and the landscape as a type of infrastructure (cf. Strang, 1996). It is focused on landscape architectonic design of transportation, green and water infrastructures. These landscape infrastructures are considered armatures for urban and rural development. With movement and flows at the core, landscape infrastructures facilitate aesthetic, functional, social and ecological relationships between natural and human systems. Through multidisciplinary design-based case studies at different scale levels the studio seeks for a better understanding of the dynamic



INTRODUCTION OF MY PROJECT

Subject

The theme of the studio is “Flowscape” . The studio explores infrastructure as a type of landscape and landscape as type of infrastructure.

In my study, I choose one particular kind of infrastructures, abandoned industrial transportation infrastructures (abandoned canal and train tracks) ---- “the brown lines” , to study how to use landscape approach to design and reactive them.

Through design-based study, I choose Essen, located in the center of Ruhr area where use to be the industrial center of whole Germany, as case study. In Essen, a typical post-industrial city, there are a lot of industrial transportation infrastructures currently out of use and become a problem in the city.

Research and design

Through theoretical study of landscape infrastructures, I summarize three main principles about planning and design landscape infrastructures:

- a) The landscape infrastructure is part of a dynamic, net-worked system.
- b) Multi-functionality
- c) The development is a process.

The three principles about planning and design landscape infrastructures are applied in the whole design process.

- a) The landscape infrastructure is part of a dynamic, net-worked system.
---Through understanding the abandoned transportation infrastructures in different systems, I defined the design task---a “brown line linear” park.
- b) Multi-functionality---Through consider different function of the city, I plan and defined the basic structure of the park.
- c) The development is a process---In the further design of the linear park, the park is considered as a continued progressing project.



Master Plan of Brown Line Park

Reflection

In whole Ruhr area, the whole design process of “the brown line” park in Essen, guided by the three principles of landscape infrastructures, could be adapted on the reactivation of all the abandoned transportation infrastructures. Cooperating with currently exist parks, the brown line parks could form a continually park system and achieve sustainable, connected, livable, green urban region.

In wider context, the need of new public open space, urban regeneration and ecological restoration is faced by many post-industrial cities all over the world. The process could be used as an example of using landscape infrastructure concept to reactive post-industrial infrastructures and bring good influences to all those aspects.

In general, in landscape practices, the concept of landscape infrastructure could help designers understand the structure of human living environment from an across discipline, systematic aspect. The principles from methodology study of landscape infrastructure are quite important in, especially, dealing with complex urban context.



View in the park

RESEARCH
QUESTION

2

2.1. BROWN LINES

Brown Lines

In my study, I choose one particular kind of infrastructures to study how to use landscape approach to design and reactive them--- abandoned industrial transportation infrastructures (abandoned canal and train tracks) ----"the brown lines".

These elements are located in many post industrial cities all over the world.



Abandoned Train Lines



Abandoned Canals

2.2. BROWN LINES IN RUHR AREA

In Ruhr Area, there are a lot of brown lines left on the ground.

Ruhr Area

Ruhr area is an urban area in North Rhine-Westphalia, Germany. With a population density of 2,800/km² and a population of some eight and a half million, it is the largest urban agglomeration in Germany. It consists of several large, industrial cities bordered by the rivers Ruhr to the south, Rhine to the west, and Lippe to the north. In the Southwest it borders the Bergisches Land. It is considered part of the larger Rhine-Ruhr metropolitan region of more than 12 million people.

It was the industrial centre of whole Germany in the 19th century.



Ruhr Area, Germany

Brown Lines in Ruhr Area

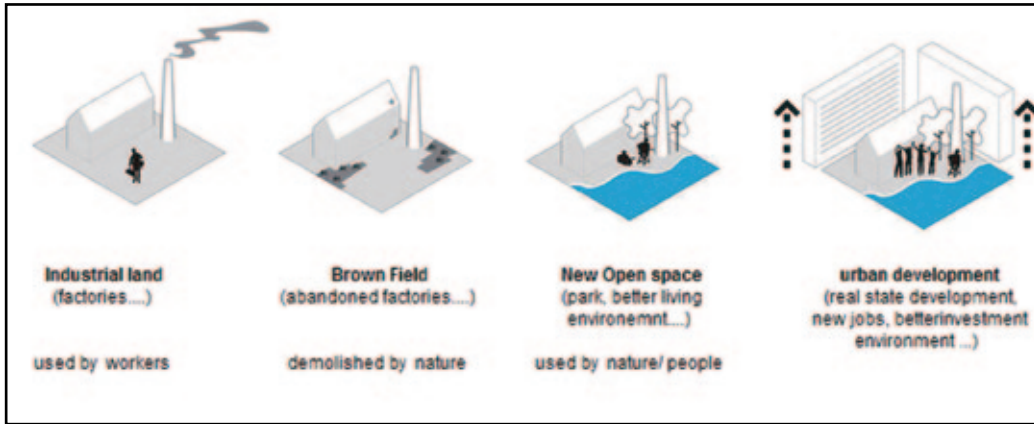
During the industrial development in the 19th century, a lot of train tracks have been constructed and a lot of nature water way have been transfered into artificial drainage canals



Train Lines



Canals



After the break down of coal and steel industry, the Ruhr Metopolis went through a serious renew of infrastructure (green, structure...) and economy.

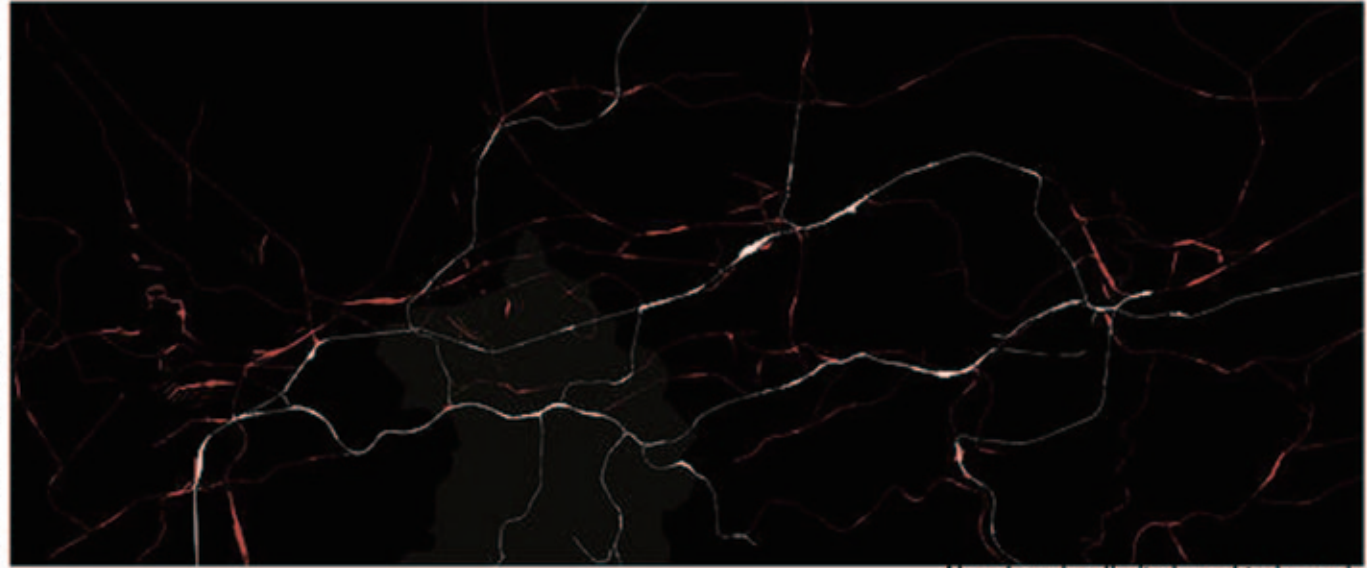
During the renew of infrastructures, the Emscher landscape park plays a big role in this urban development. The main concept of it is the spatial retreat of the coal and steel industry left behind large amount of brown field that are raised as the centennial chance of urban development and give new impulses to the open space system.

Brown Field development



Emscher Landscape Park

The Brown lines seems to be forgot in these landscape regeneration process. There are a lot of abandoned industrial transportation infrastructures left in Ruhr area.



Abandoned Train Lines



Abandoned Canals

Problem/ possibility of Brown Lines (Why we need to develop the Brown Lines?)

From urban public open space aspect (problem).

1. The abandoned brown lines are waste lands in the high density urban area where people area always looking for more open space.
2. The unfriendly artificial canal and wall-like train lines lie everywhere in the city, they become the barrier between or in communities and different district of city.



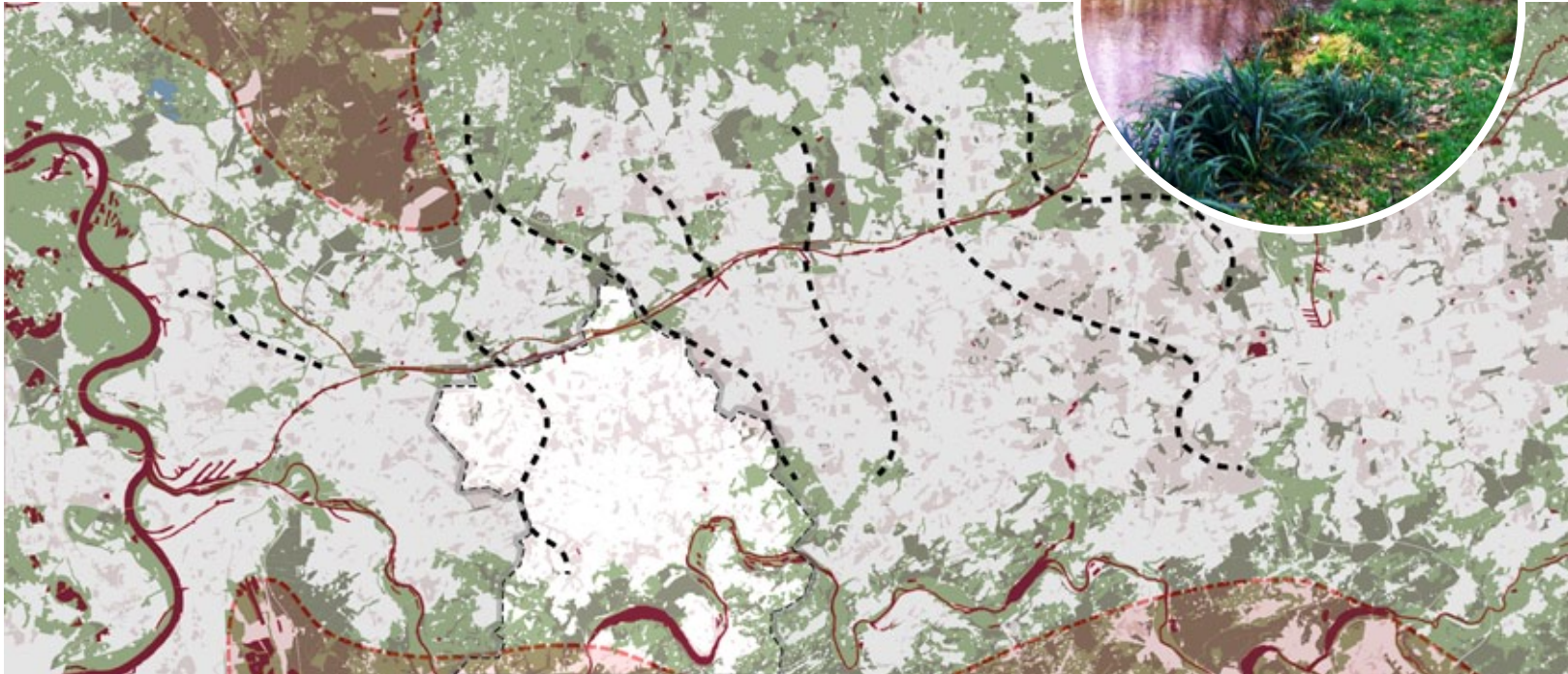
Waste Land in the city



Barrier in the city

From ecological aspect (possibility).

1. the artificial canals have the potential to work as ecological corridors to connect the green spaces
2. the train tracks are the habitats of brown field based animals and plants, and the canals have potential to be water front habitats



Canals have potential to work as ecological corridors and water front habitats

Train line as habitats

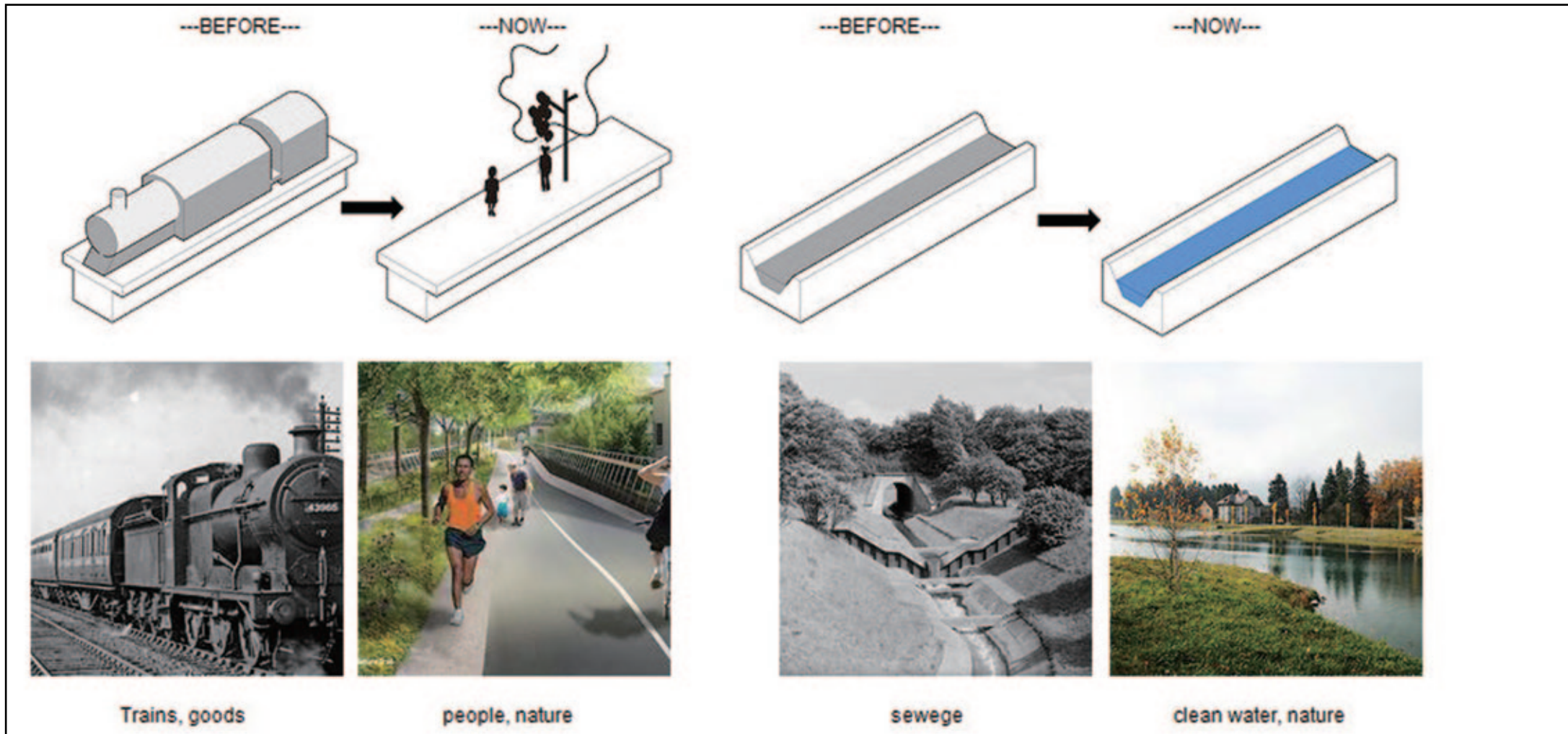
From esthetical and cultural aspect (why we can not just deconstruct them?).
The train tracks and canals stand for the industrial era in the history of Ruhr area.
They are considered as culture landscape.



Difficulties in reacting brown lines

1. Conflict between old "scape" and new "flow"

The design of the brown line facing the change of the "flows" (users) while the "scape" (spatial form) keep the same



Abandoned train lines

Abandoned canals

Brow Line



Brow Field



Linear Park, Green Route...



Museum, Park, Stage, Plaza, house...

2. Spatially linear character---Long and Narrow

(Compared to brown field development)

LONG

Multiple actors are involved in the development. The design and implement of the development is more complicated.

NARROW:

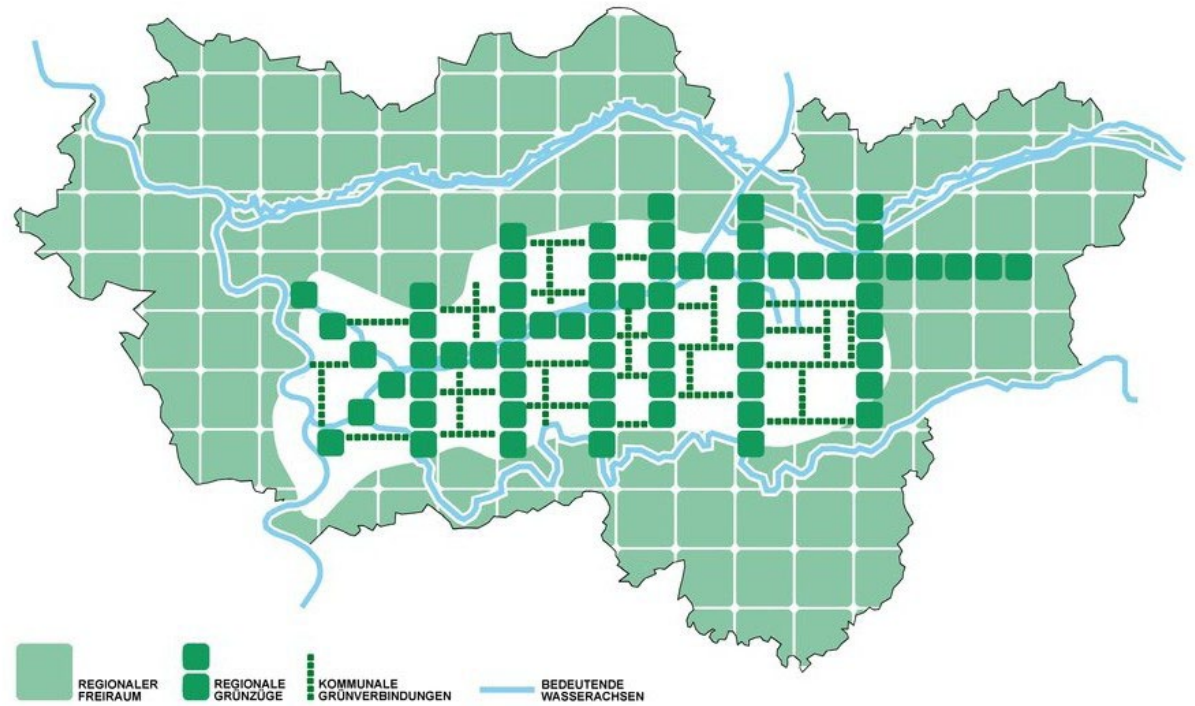
The possible new function of brown line area is limited due to its limit space.

Current Development of brown lines

Facing the problems caused by brown lines and the new phase of open development, networked and integrated, in Ruhr area

People started to notice the value of brown lines.

LEITBILD FREIRAUMSTRATEGIE





The ThyssenKrupp Quarter

Current development of brown lines in Ruhr area, Examples:

---The ThyssenKrupp Quarter---a new urban quarter developed on the site where some abandoned train tracks lied on. (deconstructed the train track)

---Green Route in Essen---build bike track on the train tracks.

---Läppkes mühlenbach---naturalize the canal



Green Route in Essen

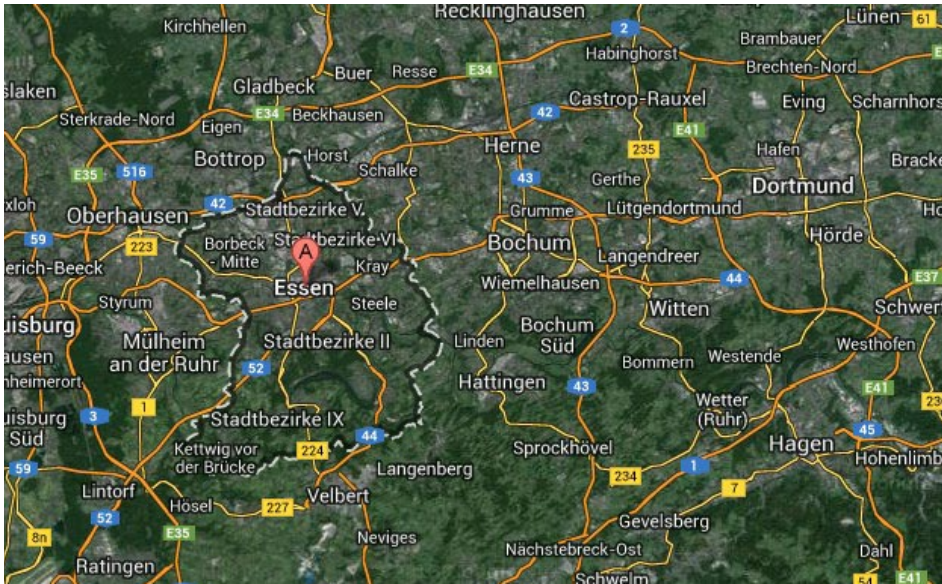


Läppkes mühlenbach

2.3. RESEARCH QUESTION

Basing on the analysis of the brown lines in Ruhr area, I come up with the research question:

How to regenerate abandoned transportation infrastructures to improve the public open space network and urban ecological system in the Ruhr area?



Essen in Ruhr area

Design as research

Use Essen, one of the center industrial city in Ruhr area, as case study to research.

Essen

Essen is a city in the central part of the Ruhr area in North Rhine-Westphalia, Germany. Located on the River Ruhr, its population of approximately 567,000 (as of 31 December 2012) makes it the 9th-largest city in Germany. For the year 2010, Essen was the European Capital of Culture on behalf of the whole Ruhr area.

Founded around 845 and historically linked to the centuries-old Krupp family iron works, Essen was one of Germany's most important coal and steel centres until the 1970s and attracted workers from all over the country; it was the 5th-largest city in Germany between 1929 and 1988, peaking at over 730,000 inhabitants in 1962. The city has since developed a strong tertiary sector of the economy, so it is sometimes called "desk of the Ruhr area". Essen is home to 13 of the 100 largest German corporations and seat to several of the region's authorities.

In 1958, the city was chosen to serve as the seat to a Roman Catholic diocese (often referred to as Ruhrbistum or diocese of the Ruhr). In early 2003, the universities of Essen and the nearby city of Duisburg (both established in 1972) were merged into the University of Duisburg-Essen with campuses in both cities and a university hospital in Essen.



Essen satellite photo



Essen topography



Essen view



As all the rest cities in Ruhr area the green rate in Essen have been greatly improved in the past 30 years.

However, go in to the city, especially in the north, with all the "green", you still feel industrial and crowded.

A landscape regeneration in Essen north is in need.



RESEARCH
AND DESIGN
METHOD 3

3.1. Theoretical research

Landscape infrastructure

The methodical line of approach of the studio is landscape infrastructure.

Through study of landscape infrastructures, I summarize three main principles about planning and design landscape infrastructures:

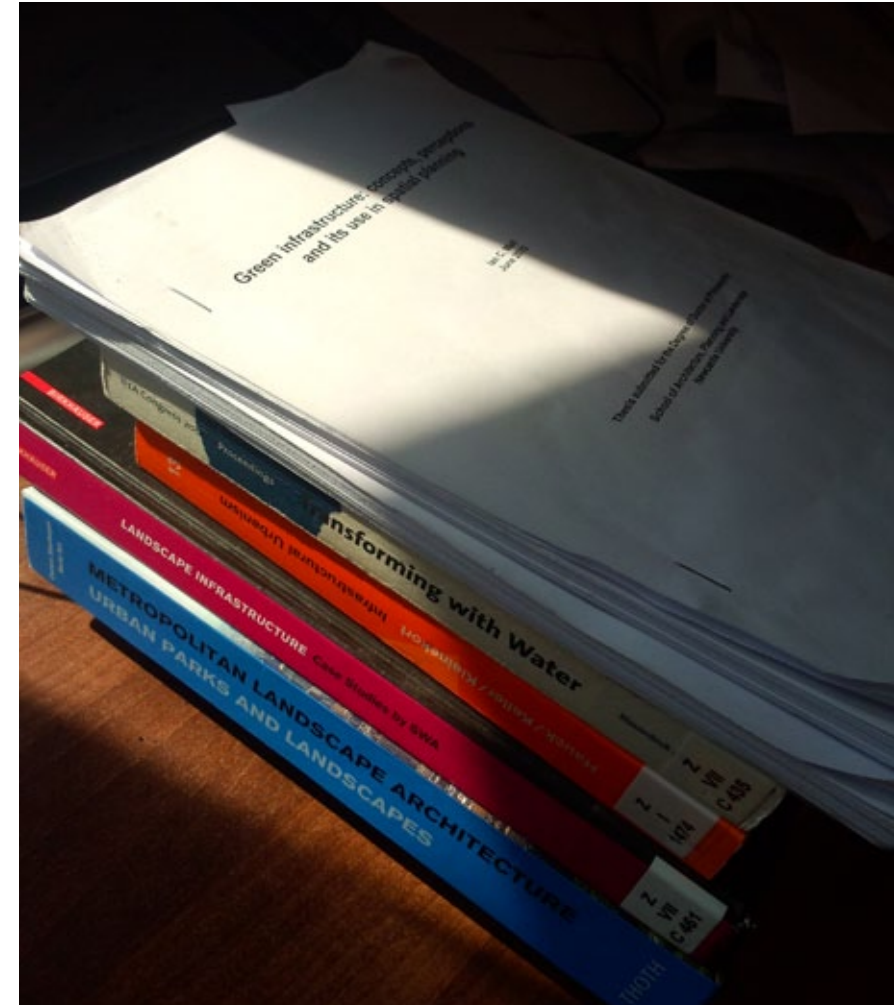
- a) The landscape infrastructure is part of a dynamic, net-worked system.
- b) Multi-functionality
- c) The development is a process.

And I apply these three principles in my research about reactivation of the abandoned transportation infrastructures:

- a) The abandoned industrial transportation infrastructures are physical corridors of flows in landscape system.
- b) Multi-functionality
- c) The development of the abandoned industrial transportation infrastructures is a Process and need cooperation of public and private, professionals and community residences.

for details see the methodology paper <Reactivation of the brown Lines-----

Methodological study of landscape reuse of abandoned industrial transportation infrastructure>



Theoretical study

Methodology paper

Reactivation of the brown Lines

Methodological study of landscape reuse of abandoned industrial transportation infrastructure

Ruohao Wu

Key words:

Landscape urbanism, Landscape Infrastructure, Brown Lines, Train tracks, Canals

Abstract

As many post-industrial city, there are huge amount of abandoned industrial transportation infrastructure in Ruhr area which could be developed as the new urban open space. Facing this problem, basing on study of landscape urbanism and landscape infrastructure, this paper discusses the methodology of landscape regeneration of abandoned industrial transportation infrastructures.

1. Introduction

In Ruhr metropolis, Germany, after the breakdown of coal and steel industry, it went through a serious renew of infrastructure (e.g. green, structure...) and economy. As one of the most famous landscape urbanism projects, the Emscher landscape park plays a big role in this urban development. The main concept of it is the spatial retreat of the coal and steel industry left behind the large amount of brown fields that are raised as the centennial chance of urban development and give new impulses to the open space system. However, in the brown field reactivation practices in the Emscher landscape park, the reuse of the abandoned industrial transportation infrastructures (canals& train tracks) is underestimated.

Facing this problem, this methodological paper is about landscape regeneration of abandoned industrial transportation infrastructures, using landscape infrastructures study as guiding tool.

In this paper, firstly, the theoretical studies of the landscape urbanism and landscape infrastructures are introduced. Secondly, based on the methodology study of landscape infrastructure, this paper discusses the application of the concept of landscape infrastructure in practice on brown lines. Practical projects about reusing of abandoned train tracks and canals were analyzed separately and principles in the reactivation of brown lines are stated.

2. Landscape Urbanism

Landscape Urbanism is a theory of urban planning arguing that the best way to organize cities is through the design of the city's landscape, rather than the design of its buildings (Wikipedia, unknown). The idea of landscape urbanism was developed by Ian McHarg's <Design with Nature> (1969), in which the ecological function as the driver of urban development was discussed. Since then, the working realm of landscape architecture was expanded to urban planning. With the influence of sustainable development principle, "the formulation of 'landscape as urbanism' was first articulated by landscape architecture James Corner in his research in the mid 90s". (Waldheim, 2002)

Since this time, the phrase 'Landscape Urbanism' has taken on many different uses, both in academia and in practice. "Landscape urbanism posits a process of city building that places landscape architecture as the formative step in urban development rather than the last, and says that landscape architecture's role lies as much in the design and planning of transportation and habitat corridors, storm water and sewage treatment infrastructure, remediation of post-industrial toxic lands, and long-term real estate processes, as in the design and construction of traditional parks and gardens. Landscape urbanism expands the scope of landscape architecture's inquiry and intervention. It tackles the intersection of design, policy and ecological planning in an inclusive effort to make better urban environments, across disciplinary boundaries." (Peck, unknown) or, from the aspect of the relation between landscape and contemporary urbanism, "... landscape as medium of urban order for the contemporary urban city". (Waldheim, 2012) An important practical application of this concept is the landscape infrastructures design, "a more organic use of urban infrastructure." (Corner, 2002)

2.1. Landscape infrastructure

Landscape infrastructure is "the hybridization of the two concepts, landscape and infrastructure, ... emphasis on the interaction of human with their environment, biodiversity and the relation between 'flows' and 'scapes' ... The flows are movements/process and the scapes are the spatial entities" (Nijhuis& Jauslin, 2013)

Due to different emphasis, the landscape architectonic exploration of landscape infrastructure is normally discussed in three groups: water infrastructures, green infrastructures and transportation infrastructures. Green infrastructures: The interconnected green space networks that maintain and develop natural ecosystem values and provide associated social, economic and aesthetic benefits to humans. Water infrastructures: water infrastructure consists of what is planned, designed and constructed to manage water and riparian zones. Transportation infrastructures: The technical systems which facilitate different modes of translation, energy supply, waste treatment and information dissemination. (Nijhuis& Jauslin, 2013)

The three groups of landscape infrastructures are not categorically separated in study. In fact, the division of landscape infrastructure groups is more about giving a point of penetration for landscape researchers to explore the whole groups of landscape infrastructures. For example, in <Green infrastructure: concept, perceptions and its use in spatial planning> (Mell, 2010), Ian discussed water infrastructure in stream corridor restoration case and implied transportation infrastructures as part in talking about the multi-functionality of green infrastructures; in <From Object Line to Vector Field--The Social Instrument> suggested “a means of developing urban strategies through the development of networks of landscapes with (transportation) infrastructure related to ecological system” and discussed the “integration of (transportation) infrastructures and water management” (Paul, 2011)

Under the mission of build sustainable city by using landscape infrastructures as development engine, the studies of these three landscape infrastructures lead to a similar conclusion about principles of landscape infrastructure development.

a) *The development is a process.*

“A holistic process that can be discussed at different levels simultaneously as it relates to both individual and the wider landscape” (Mell, 2010). For example, the experimental development strategy, “planning as learning” (Tjallingii, 2000), in Emscher landscape park, elaboration of master plan through realized and experimental of subprojects; or the cooperation in the development between individual and public in the development of New York High Line project.

b) *The landscape infrastructure is part of a dynamic, net-worked system.*

*The landscape infrastructures are corridors for different dynamic flows and any part of landscape infrastructure should not be considered as isolated. For example, the water circulation system in Amstelveen is rooted from the understanding of dynamic feature of water flows
The landscape infrastructures “should be used to develop interconnected networks of accessible and functional open spaces... that support ecological, economic and human interested by maintaining the integrity of, and promoting landscape connectivity, whilst enhancing the quality of life, place and the environment across different landscape boundaries” (Mell, 2010)*

c) *The space is Multi-functionality*

The landscape infrastructure development is a process of delivering multiple benefit to the same site. These benefits include, but not exclusive to, health, recreation and leisure, education, regeneration, connectivity, adding social inclusion, improves a sense of place and access.

2.2 Landscape reuse of abandoned industrial transportation infrastructures

An important topic in landscape infrastructure development and landscape urbanism is the reactivation of brownfield. In Ian Thompson’s critical review of landscape urbanism, he concluded: “...there are ideas with the Landscape Urbanism discourse which have great merit, among which I would include the breaking down of

professional distinctions, the integration of ecological thinking, the foregrounding of infrastructure, the interest in the positive use of waste materials and the emphasis upon functionality rather than mere appearance! (Thompson, 2012) and in landscape urbanism practices, there are many related projects which are realized and reached great success. Like in Emscher landscape park, the spatial retreat of the coal and steel industry left behind large amount of brown field that are raised as the centennial chance of urban development and give new impulses to the open space system.

In the brownfield field reactivation practice, the reuse of the abandoned industrial transportation infrastructures (canals& train tracks) is one of the most current branches. There are huge amount of industrial transportation infrastructure left abandoned in most post-industrial cities all around the world. They were overgrown with grass and weeds and became the boundaries of communities. However, due to their linear character, long and narrow, the development strategy of these abandoned industrial transportation infrastructures are just levied untouched and ruined or simply deconstructed. This situation has last for decades until recently, people start to understand the esthetical, cultural and functional value of them and the urge to transfer them into people friendly places. More and more projects are developed, like New York High Line project, and under developing, like the Queensway project (ENYA2014 competition)

The reactive of the abandoned industrial transportation infrastructures are facing the transfer of the 'flows'. As post transportation infrastructures, they are used to be the corridor of trains (train tracks) and industrial waste water (canals). Now the flows become plants and people (train tracks) and clean water (canal). But the 'scape' kept the old form: artificial, industrial style linear structure across the city and spatially isolated from context. The conflict between the respect of the old 'scapes' and need of new 'flows' is the distinguish question considered in this kind landscape infrastructures development.

Basing on the theoretically study of landscape infrastructure, the study of the developing principles of the abandoned industrial transportation infrastructures are developed from the following three aspect.

- a) The development is a process.*
- b) The landscape infrastructure is part of a dynamic, net-worked system.*
- c) Multi-functionality*

3 Application

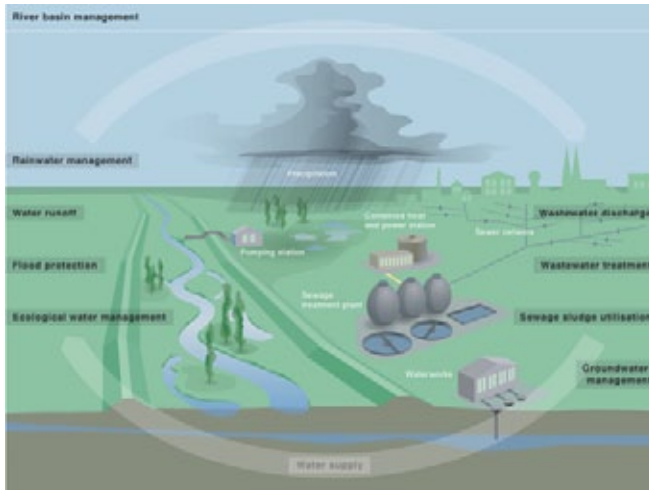
In Ruhr Metropolis, during the industrial development in the 19th century, a lot of new train tracks were constructed and Emscher river, an original nature river, and its tributaries were transferred to artificial sewage canals. After the break down of the coal and steel industry, most of the train tracks are not be used and the canals are no longer transporting sewages.

Nowadays, along the Emscher river, all these untouched brown lines, as nonfunctional territories in the high density metropolis, could be seen as the new possibilities of future urban open space development.

3.1 Abandoned Canals:

3.1.2 The conversion of Emscher river.

The river Emscher located at the center of Ruhr area, a region use to characterized by industry and mining as Germany's industrial heartland. "Over a century ago this sparsely populated landscape of water meadows transformed into an industrial conurbation, and the untamed Emscher turned into a man-made system of open waste waterways" (EGLV, 2014). Cities and companies have been dumping waste into the Emscher River for decades. With the decline in the mining industry a further structural change began, with traditional heavy industry giving way to the services and high-tech industries, people's expectations of cities and their surroundings also



EGLV. (unknown) a holistic approach to rivers Retrieved Jan 30, 2014, from: <http://www.eglv.de/en/waterportal/river-basin-management.html>

change. These developments are also reflected in a changing Emscher.

“The goal of the Emscher rehabilitation project is to restore the river to its natural state and enable the creation of leisure parks and new areas for economic growth on its banks.” (Kollatz-Ahnen, 2011) and water management is one of the most important part of this rehabilitation, “In (which), wastewater will be channelled through closed conduits and the river and its tributaries will be converted into natural waterways, step by step.” (EGLV, 2014)

The development of the canals, as the corridors of clean water flows, is part of the water management.

a) The canals are clean water corridors in the urban water system

In water management, the political boundary is meaningless. All the water bodies in this system are related and water flows circulate among them. Basing on the systematically understanding, the planners come up with the concept about the separation of clean water, storm water, circulation and sewage system.

Before the separation, “in this densely populated and developed region storm water mostly cannot find its natural way into the ground. As usually a high amount of ground is under roof, storm water will be discharged in the combined sewer system and run off to the wastewater treatment plant. This process has a whole range of expensive disadvantages. Wastewater sewers for example, have to be much bigger so as to safely manage incoming storm water flows, even in the event of heavy rainfall, and comparatively clean storm water that has been mixed with wastewater then has to be purified in a process involving considerable cost and effort. The discharged storm water is also then no longer available to supply groundwater renewal and basic flow in the bodies of water.” (EGLV, 2014) In the new water flows operation, storm water is collected from sealed surfaces and drained into the soil locally instead of feeding the sewer system. This move saves costs of building, extending and maintaining wastewater sewers, strengthen the natural hydrological balance with its wide range of ecological functions and nature like storm water management on-site makes water visible and enjoyable in all its diversity.

As far as the development of the canals, or the tributaries of Emscher river, spreading in the Ruhr urban area. The canals, as the corridors of clean water flows, are part of the clean water circulation. Free from the sewage system, ecological regeneration is happening on the canals to reform their original natural state and benefits the whole ecosystem as connection for biodiversity and nature resource exchange. More than that, with the convert of the canals and surroundings, they can also works as reserves for flooding prevention.

c) The development is a process

The regeneration of Emscher river is part of whole Ruhr metropolitan revival. The conversion of the Emscher system and the development of the New Emscher Valley is a project extending across generations.

It’ s a cooperation of different scale plan: in system, the canals are corridors of clean water and, in local, the canals are place where water can self-circulate and an attraction for people to gather around. It’ s a project need different groups to participate: different groups, like EMSCHERGENOSSENSCHAFT, AOW, AGW, are cooperating in the regeneration of Emscher river. The development of the canals consists of different projects, like: the LÄPPKES MÜHLENBACH project, the KÖRNE project and so on.

d) The multi-functionality of the canals



EGLV. (unknown) Läppkes mühlenbach – beispiel einer ökologischen gewässerentwicklung im bereich der emscher. Retrieved Jan 30, 2014, from: <http://www.eglv.de/wasserportal/flussgebietsmanagement/oekologische-gewaesserentwicklung/beispiel-laepkkes-muehlenbach.html>

With the development, the canals become a territory with multiple functions. For example, in the regeneration of Lämpkes Mühlenbach, a small tributary of the Emscher flowing near the cities of Essen, Mülheim and Oberhausen., the development of the canal brought multiple benefits to the local. Ecologically, it freed up of the stream, without reducing flood protection, recreated a close to natural waterway and wetland biotopes as a habitat for plants and animals and brought an ecological improvement and upgrading of the area around the stream. Spatially, it opened up the free space to improve its structure for recreational purposes and integrates the waterway into Grünzug B (green belt B) of the Emscher Landscape Park. Socially, it brought the experience of water and nature to people.

3.1.2 Storm water management in Rotterdam

For further discussion about the value and design principles of canals as the part of the clean water circulation in urban context, the storm water management plan in Rotterdam is analyzed here.

Facing the climate change, which increase the frequency of heavy rainstorms, and the original storm water system can't handle the volume, Rotterdam comes up with a creative concept about combining urban water management and urban spatial plan

In local scale, West8 and Architect Florian Boer of De Urbanisten (The Urbanists) designed some "water squares," a place functional works as part of storm drain systems and has the function of public recreation. In other words, it's a 'scape' which can hold different 'flows'. The water squares "act to hold the heavy runoff from storms. During sunny days, the plaza invites people to sit, lunch, read, watch and play. But as it rains, the water square begins to fill with water, and the deeper the rain, the more water will cover the square, creating new patterns. The squares spread the water-holding capacity throughout the city." (Moore, 2012).

In city scale, two principles are discussed in the water management of Rotterdam:

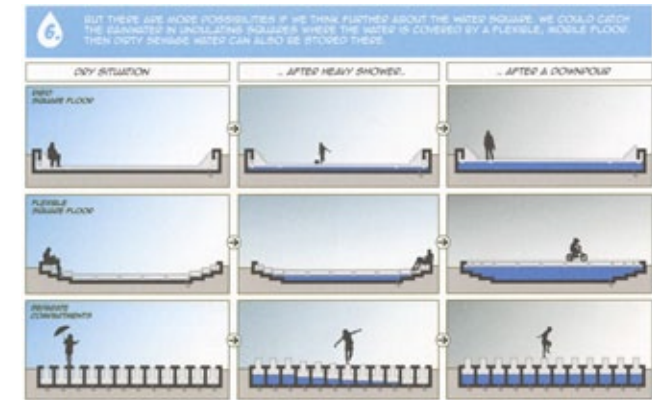
- a) Making room for the river: a recreational way to build reservoir in high density city. For example, Rotterdam has built a parking deck in Museumpark accounts for 10,000 cubic meters of water storage.
- b) Soak-store-release: In less dense neighborhoods, along the water way, designers combined the benefits of having the buffer of a floodplain with greenways that provide added health, recreation and connectivity benefits.

Water management strategy in Rotterdam shows a creative way to design water ways in urban context as storm drain system which bring both locally and regionally benefits. The principle of this water management is an across boundary cooperation of different urban function. There are three special marriages: reservoir with public open space, reservoir with transportation infrastructure, and water way with green way. Basing on this, the design of canals for the storm drain system can come up with three typological models: canal with open space, canal with transportation infrastructure and canal with green way.

3.2 Abandoned train tracks:

The current development strategy about abandoned train tracks in Ruhr is just levied untouched and ruined, simply deconstructed them or resurfaced them with concrete to make a bike route on it. The potential of the train tracks are barely explored.

3.2.2 High line Park



Moore, K. (2012) It's hip to be (a water) square. Retrieved Jan 30, 2014, from: <http://plancharlotte.org/story/stormwater-park-plaza-charlotte-mecklenburg-flood>



Moore, K. (2012) It's hip to be (a water) square. Retrieved Jan 30, 2014, from: <http://plancharlotte.org/story/stormwater-park-plaza-charlotte-mecklenburg-flood>

The New York High Line park is one of the most famous and successful project about the reactivation of abandoned train tracks. The High Line is a 1-mile (1.6 km) New York City linear park built on a 1.45-mile (2.33 km) section of the elevated former New York Central Railroad spur called the West Side Line, which runs along the lower west side of Manhattan. Inspired by the Promenade plantée, 1993, the High Line has been redesigned and planted as an aerial greenway. The main concept of the High Line is not complicate: a creative combination of a park and an abandoned high line. Noticing of the esthetic and culture value of the high line, James Corner Field Operations (lead team) developed a linear park on the structure of the high line. There are two design principles are applied in this development.

a) *The high line development is a process and are joined by different groups*

The development of the high line is divided in three sections. The first section of the High Line opened on June 9, 2009. It runs from Gansevoort Street to West 20th Street. The second section, which runs between West 20th and West 30th Streets, opened June 8, 2011. Cooperation. The third and final section of the historic structure, which runs between West 30th and West 34th Streets, is still under construction now.

From urban development aspect, the realization of the high line project became a drive of the neighborhoods' development. Socially, it becomes a communication center the people of the community. Economically, "the recycling of the railway into an urban park has spurred real estate development in the neighborhoods which lie along the line." (GREGOR,2010)

The high line is developed by cooperation of public and private. Different design groups participate in this projects, like James Corner Field Operations (Project Lead), Diller Scofidio + Renfro and so on. And, throughout the design process, community input has been central to the High Line project. "Since its(Friends of the High Line) founding in 1999, Friends of the High Line has held over two dozen community input sessions, to encourage neighborhood residents, business owners, and all interested members of the public to share their ideas for what the High Line could, and should, become." (Friends of the High Line, unknown)

b) *Multi-functionality*

The High Line project builds a multifunction space, which includes: recreation, social interaction, artistic appreciation, education, identity, sports, tourism, and all kinds of activities. It gathers the people and stimulate the urban development.

The New York High Line park is one of the most famous and successful project about the reactivation of abandoned train tracks. The High Line is a 1-mile (1.6 km) New York City linear park built on a 1.45-mile (2.33 km) section of t

3.2.3 Chicago' s Bloomingdale Trail Park

Inspired by the High Line in New York City, an abandoned 2.7-mile (4.4 km) stretch of elevated railway in Chicago is under construction to build a the city' s only pedestrian greenway and bike path running east to west, which ultimately will connect pedestrians and cyclists to trails that stretch nearly to the Indiana state line.

Similar to New York High Line project, the development of Chicago' s Bloomingdale Trail Park is plan by sections and involves participation of both public and private, so as professionals and people in the community.

Consider as part of urban fabric. It holds an alternative transportation system, the city' s only pedestrian greenway and bike path running east to west, which ultimately will connect pedestrians and cyclists to trails that stretch nearly to the Indiana state line.

3.3 Discussion

As urban development engine, the abandoned industrial transportation infrastructures redevelopment practices shares three principles

a) *The abandoned industrial transportation infrastructures are physical corridors of flows in landscape system.*

As original transportation infrastructures, the “brown lines” spatially keep the linear character. In the reactivation, the abandoned industrial transportation infrastructures, the physical corridors of flows, work as connecting elements in the landscape system (green system, water management system, open space system).

As corridor, the design considers the capacity of flows the speed of flows. Like gather people and increase capacity of users and try to let people spend more time in the park in high line projects or gather rain water and increase capacity of water restore and slow the speed of water flow in the water way projects.

As the physical corridors, the dynamic transportation of the flows on the corridors is isolated from bad environmental influences. Like clean water flow is separated from sewage in water system, pedestrian& biking routes are separated from urban fast traffic in urban traffic system and quiet leisure park is separated from urban noisy context.

b) *The development of the abandoned industrial transportation infrastructures is a Process and need cooperation of public and private, professionals and community residences.*

The linear character of the “brown lines” influences process of the development. They are always long and narrow and across different neighborhood and communities and sometimes are related to multiple owners and funders. As a integrate project, the across disciplinary cooperation in development is in need. And because that in different part of the lines the site condition is different, the project often is developed in section.

c) *Multi-functionality*

The development of abandoned industrial transportation infrastructures requires creative way of using space. The possible functions are: social interaction place, aesthetic object, Identity, ecological function, education, sports field, playground, garden ... The multi-functionality of the brown lines gathers more people and stimulates the ecological, cultural development then drive the community development.

4 Conclusion

Basing on study of landscape infrastructure, this paper discusses the methodology of landscape regeneration of abandoned industrial transportation infrastructures

In general, in landscape practices, the concept of landscape infrastructure could help designers understand the structure of human living environment from an across discipline, systematic aspect. The principles from methodology study of landscape infrastructure are quite important in, especially, dealing with complex urban context.

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3.2. RESEARCH AND DESIGN METHOD

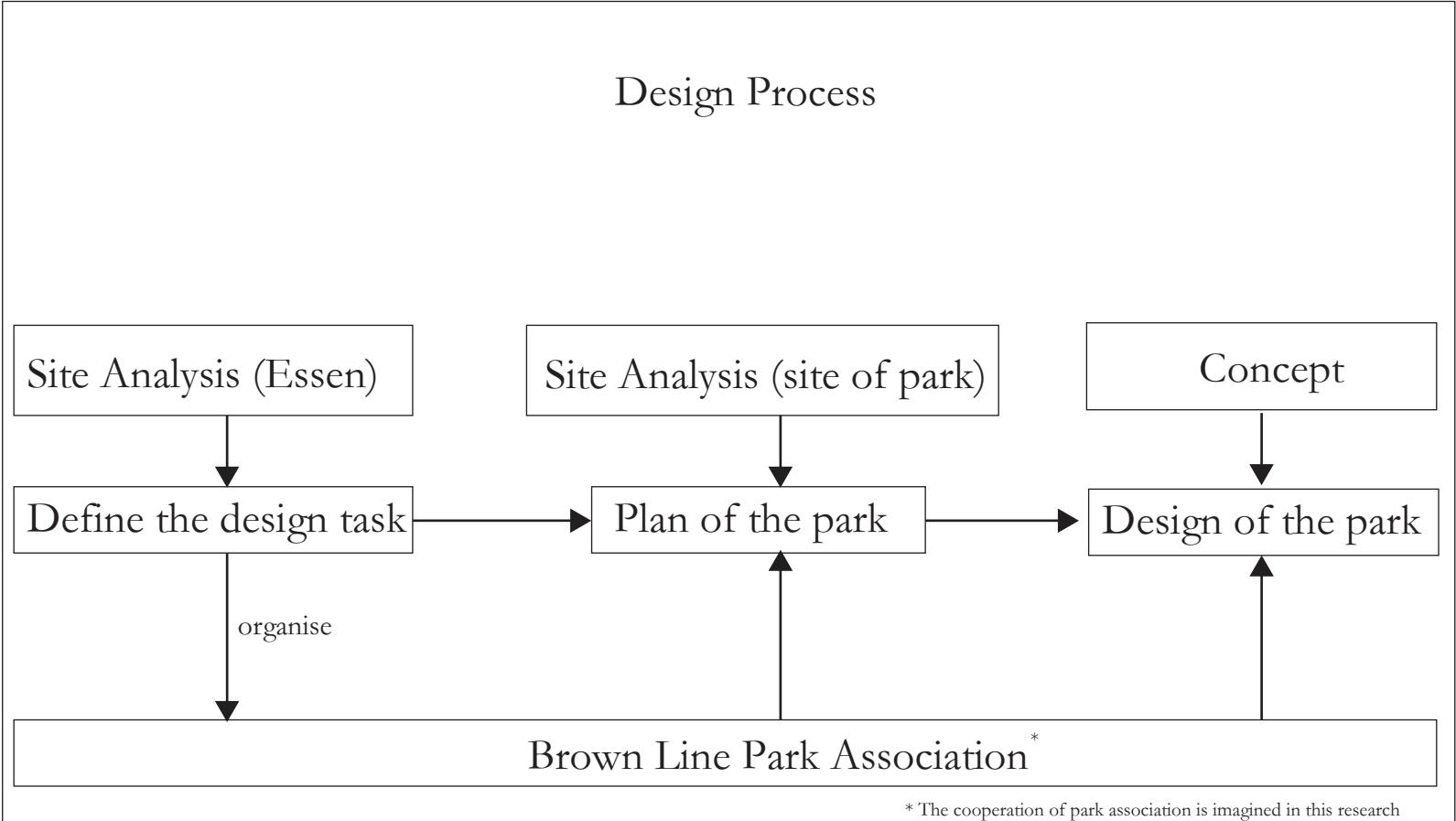
The relationship between research and design

The three principles about planning and design landscape infrastructures are applied in the whole design process.

- a) The landscape infrastructure is part of a dynamic, net-worked system.
---Through understanding the abandoned transportation infrastructures in different systems, I defined the design task---a “brown line linear” park.
- b) Multi-functionality---Through consider different function of the city, I plan and defined the basic structure of the park.
- c) The development is a process---In the further design of the linear park, the park is considered as a continued progressing project.

Landscape infrastructure principles

guide



Research Question

case study

Site Analysis (Essen)

Site Analysis (site of park)

Concept

Define the design task

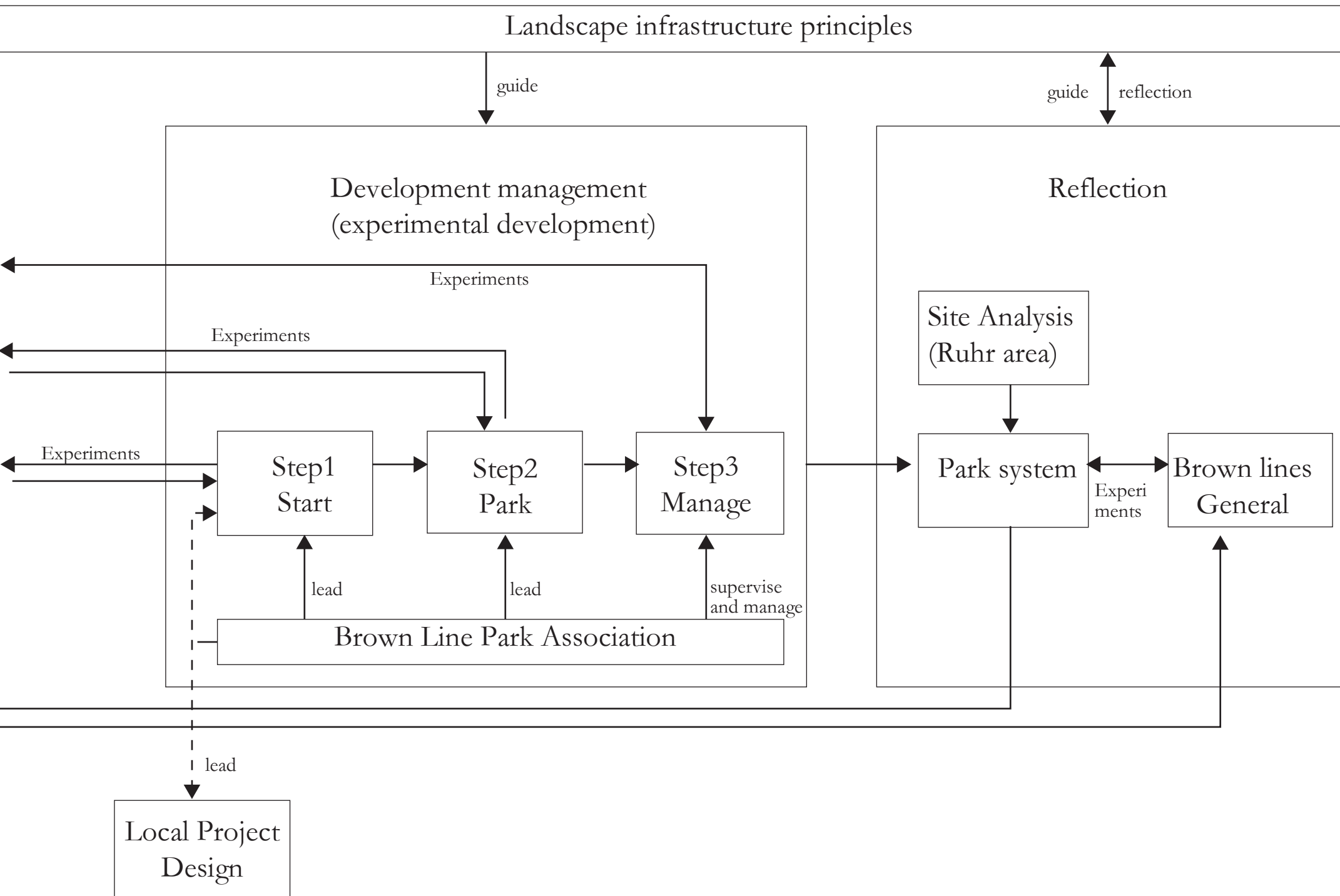
Plan of the park

Design of the park

organise

Brown Line Park Association*

* The cooperation of park association is imagined in this research



DESIGN PROCESS

4

4.1. DEFINE DESIGN TASK

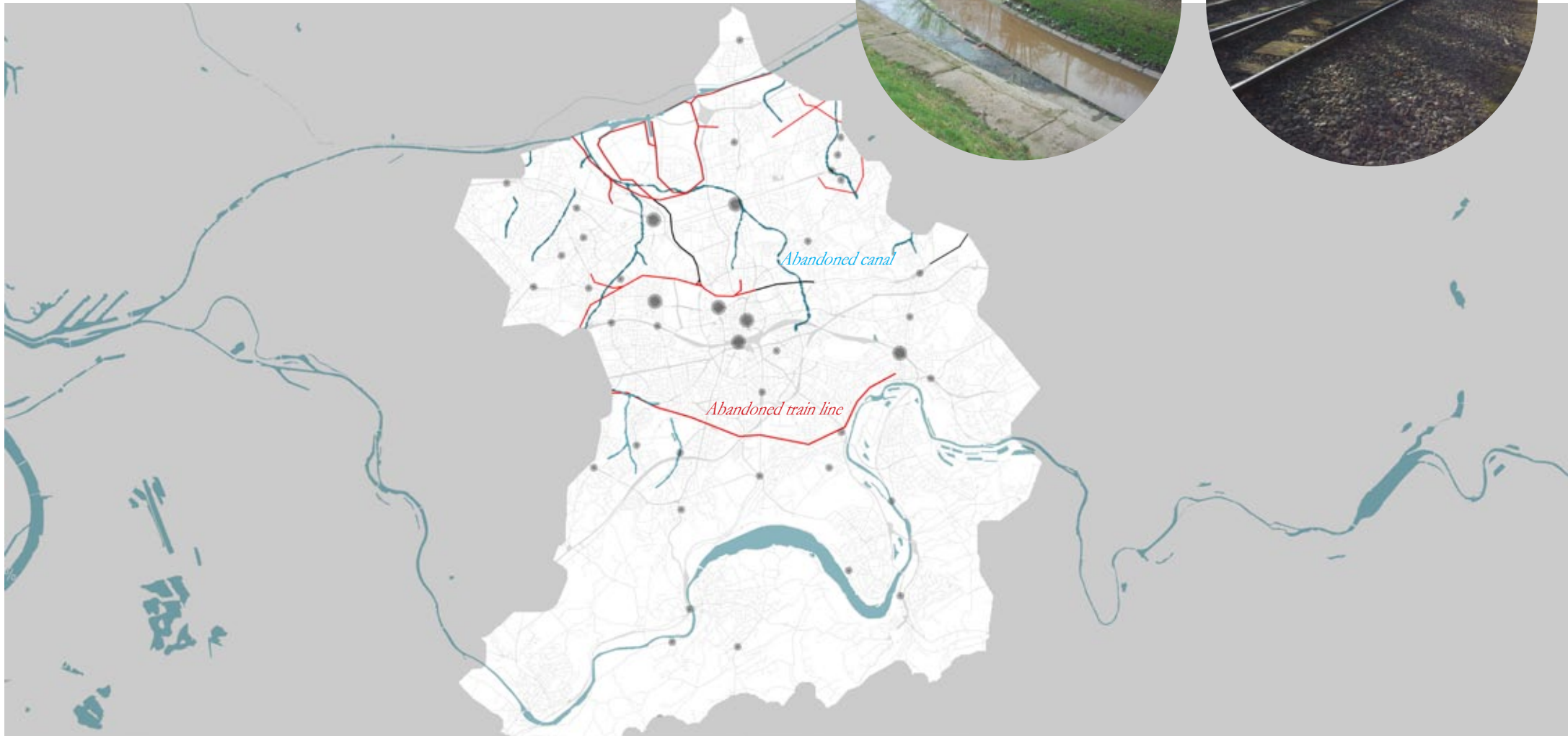
There are a lot of brown lines in Essen, which of them should be developed? or should be developed first and how to develop them?

Under the guidance of the landscape infrastructure is part of a dynamic, networked system. Basing on the problem and possibility of brown lines, the reactivation of the brown lines in Essen are considered mainly under public open space network improvement and ecological system improvement.

Abandoned canal



Abandoned train line



4.1.1 ESSEN PUBLIC OPEN SPACE NETWORK

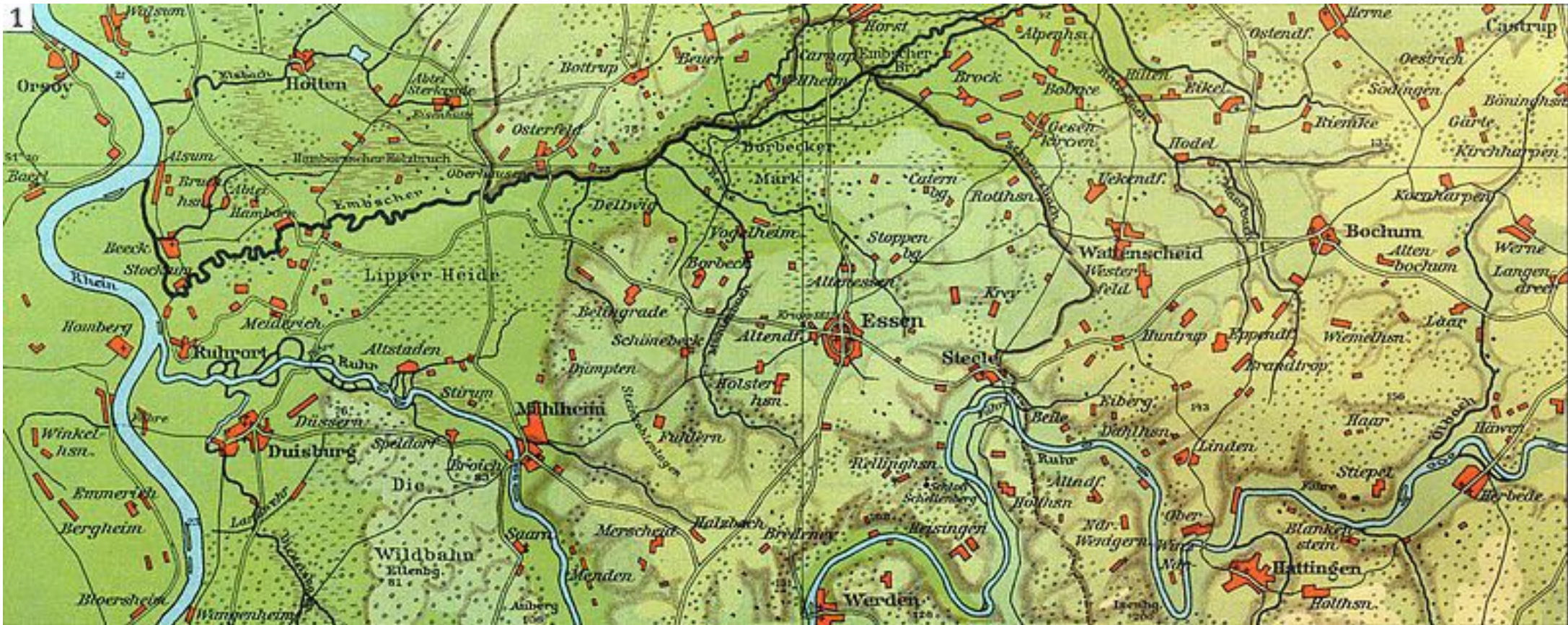
Essen Public Open Space development history

1. Before 19th Century

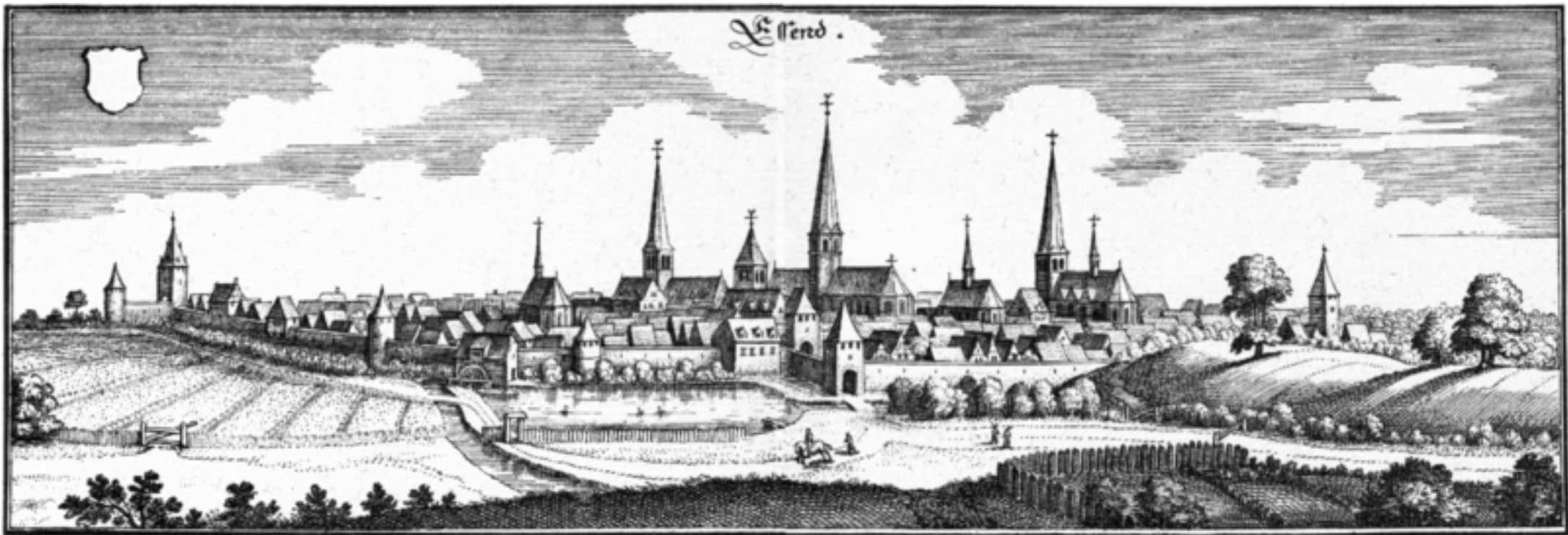
Before 19th century, Essen was a small town. Then town center have been developed to be currently city center, a historical and shopping center of the city.



City scale public open space center, Essen historical and shopping center



Essen before 19th Century



Essen before 19th Century



Industrial period of Essen

2. During and after 19th Century

Through the booming and break down of the coal and steel industry, the nature beauty of Essen north is damaged. The landscape quality of there is poor.



Essen during 19th Century

In Essen south, the nature beauty is kept with better living and employment environment. Till today, the Essen south is considered as the leisure and nature center of Essen.



City scale public open space center, Essen leisure and nature center



Essen south

greening the north of Essen- greening programs from the 1970s

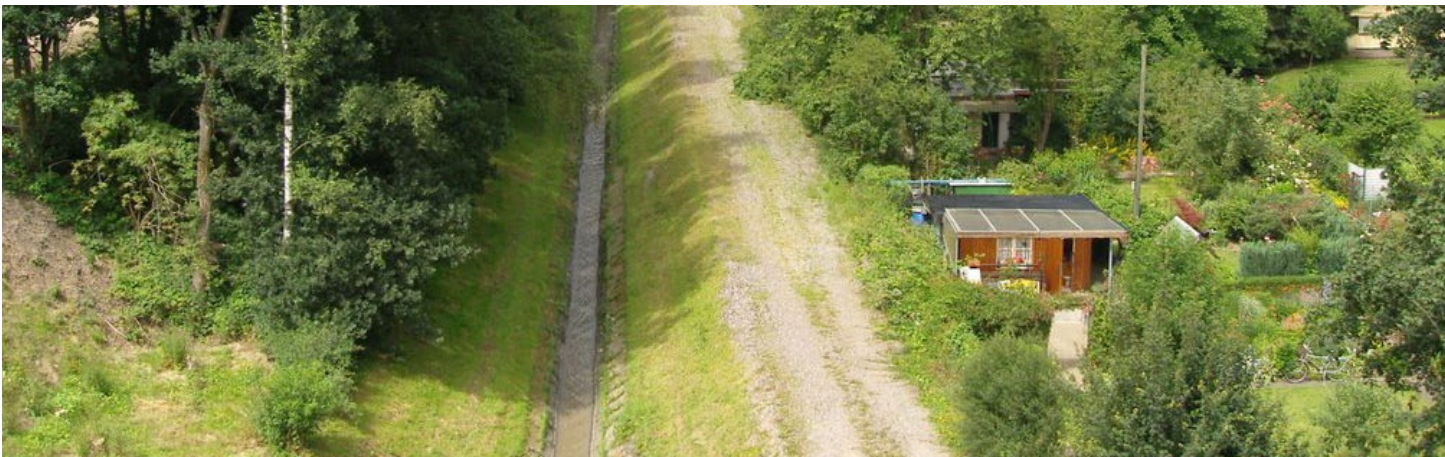
(Stadt Essen, 1989)



Gräben bei der Kokerei: Wichtiger Teil im grünen Verbundsystem
(Grün und Grün Essen)



Community green park



Green routes

3. Starting from 1970s (Brown field development)

Starting from 1970s, a brown field regeneration based development have changed the public open space network in Essen.

a. brown field based community green spaces have been developed in the Essen north to improve the living and working condition

b. a green routes network have been developed, mainly based on the brown lines, to connect public open spaces and integrate the city. They are mainly used for biking jogging and walking dogs

c. Culture monument
some culture landscape projects have been developed since 1970s. One of them, Zollverein Industrial Complex, have become the culture and leisure center of Essen.



✓ Green Routes

■ Community green routes



Zollverein Industrial Complex

4. Most recently

Following the concept of "living space creat urban space"

More projects are developed along the green routes. The three most recently public open space projects in Essen are three reservoir centered community park and a new urban quarter which located on the site of a section of train track.



The ThyssenKrupp Quarter



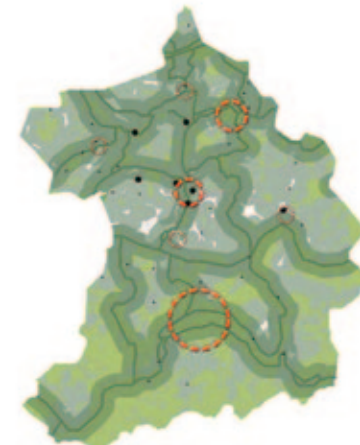
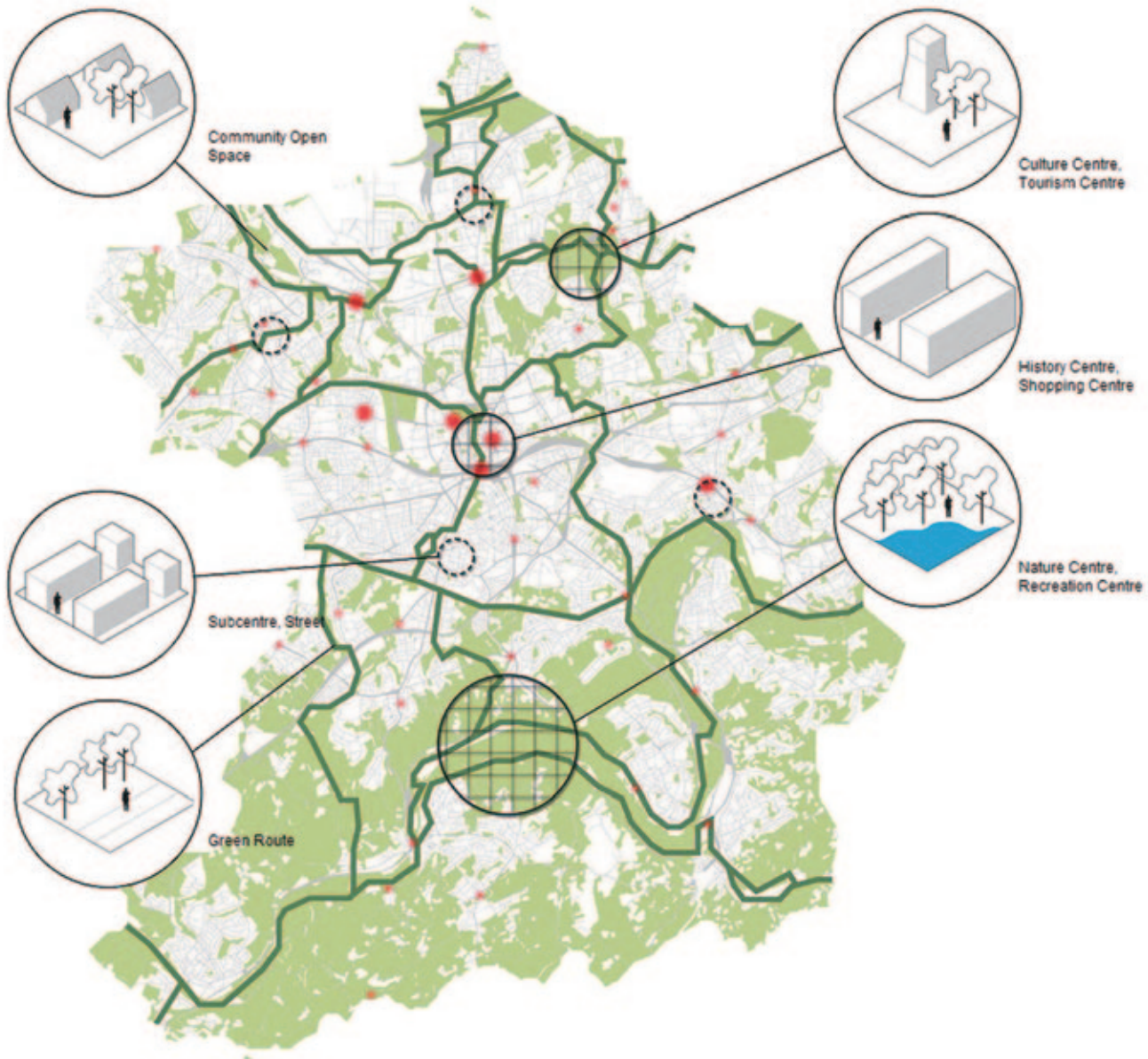
Park im Universitätsviertel



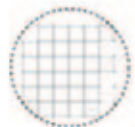



Niederfeldsee





Krupp-Park



Open space accessible (300meters)

-  **city scale open space centre**
Open space centre
-  **District scale open space centre**
Subcentres
-  Green Routes
-  **Community scale open space centre**
community open space

-  Transportation infrastructure
-  Important public traffic node

Essen Public Open Space Network

After all these years of development in public open space. Currently, in Essen, there forms a hierarchical public open space network

Green Routes Network

In the public open space network, the green routes networks plays a important role in it. They connected the public open space centers and communicate green spaces and integrate public open spaces inEssen.

However, the green routes themselves, currently just been used as slow transportation infrastructure, when they have the potential to work as across scale public open space and benefit both local and region,



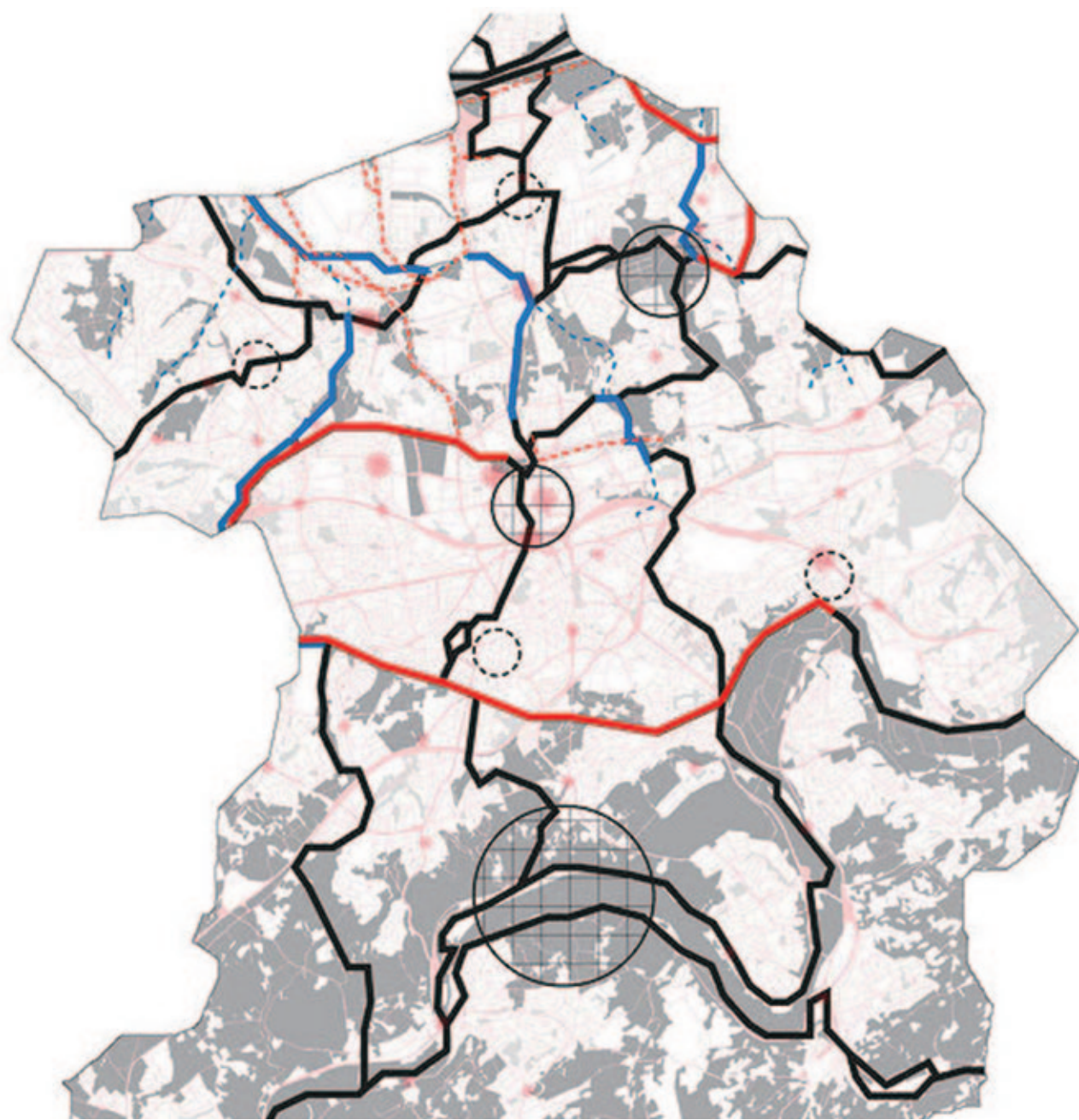
Brown Lines VS Green routes network.

Basing on the linear character, the location and current function of brown lines, the brown lines are strongly related to the green routes network. Through develop the brown lines, it could be a chance for green routes improvement.



canals as green routes attractions

Reactivation of train tracks (brown lines) as green routes



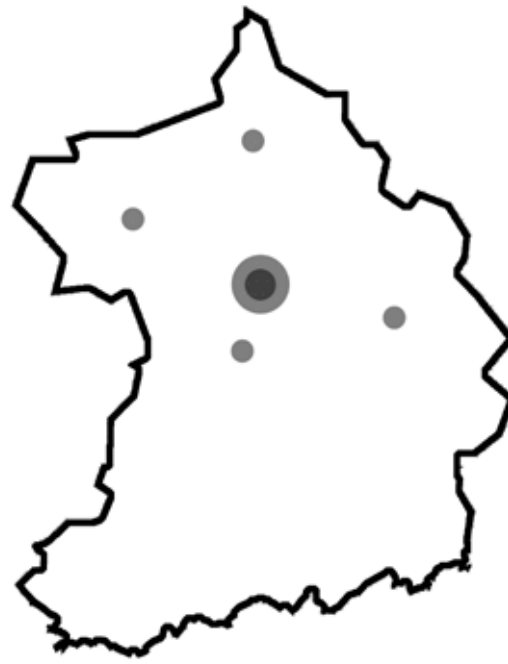
-  Canal Based Green Route
-  Abandoned Canal
-  Train tracks Based Green Route
-  Abandoned train tracks
-  Green Route



health care center



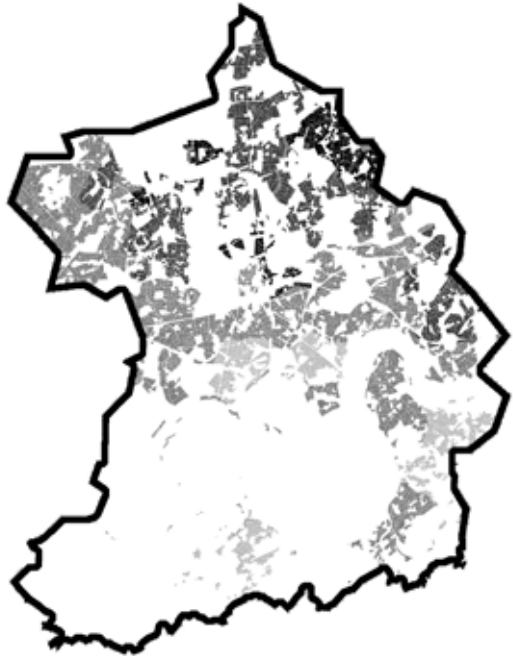
public facility center



shopping center



public open space center



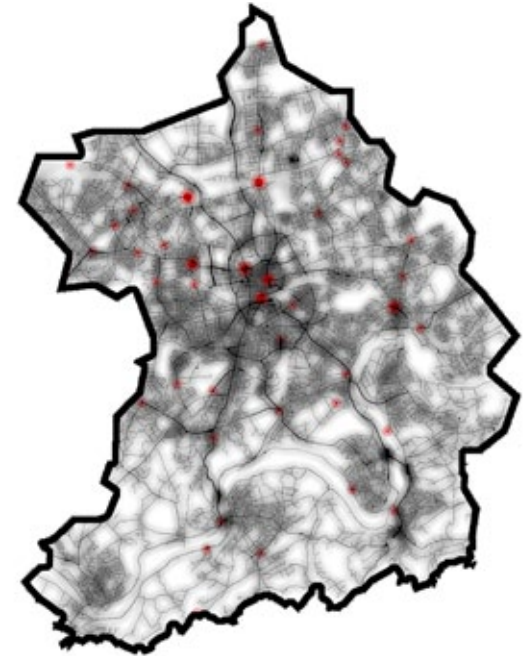
residential center



university center



work center



transportation center

Green route network improvement

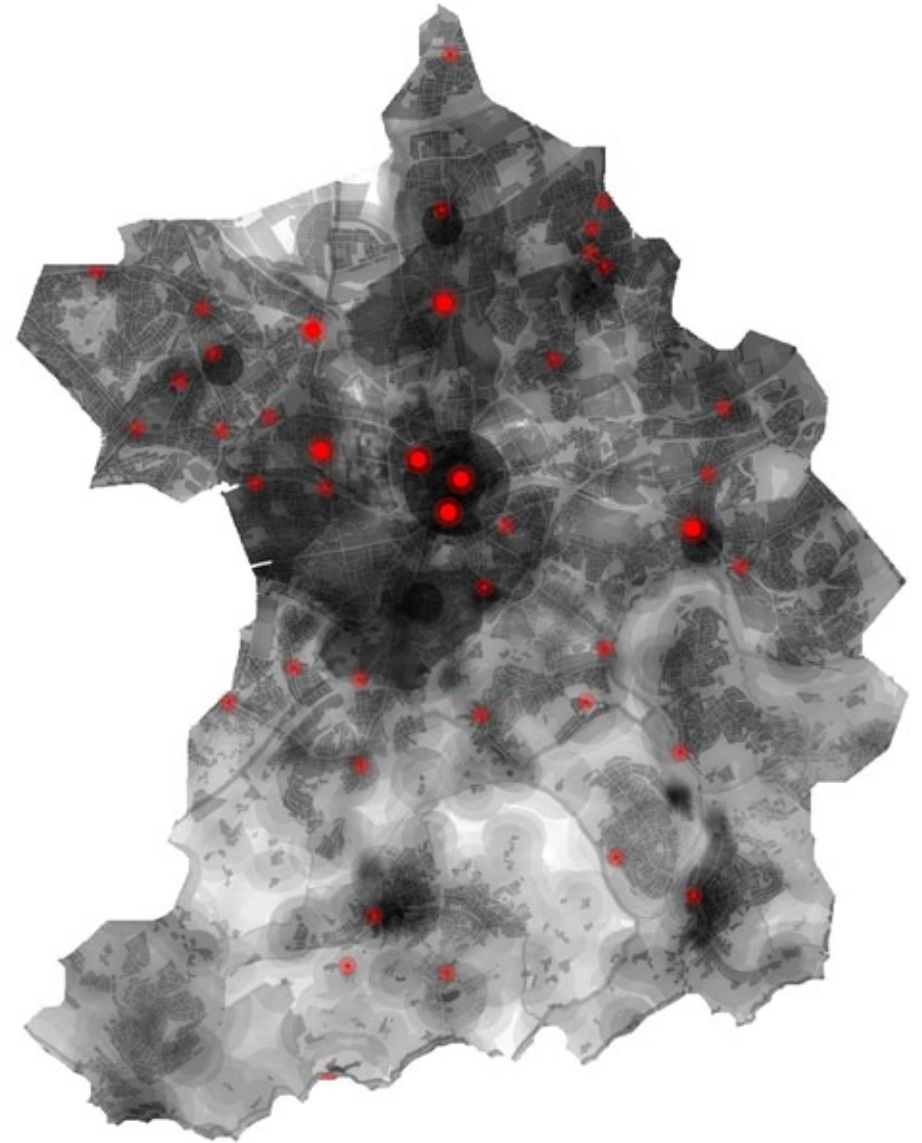
1. Green route based public open space development could bring more open spaces in city center area.

I did a series of mapping about urban functions to find out centrality of the city where more people go and where more open space are needed.

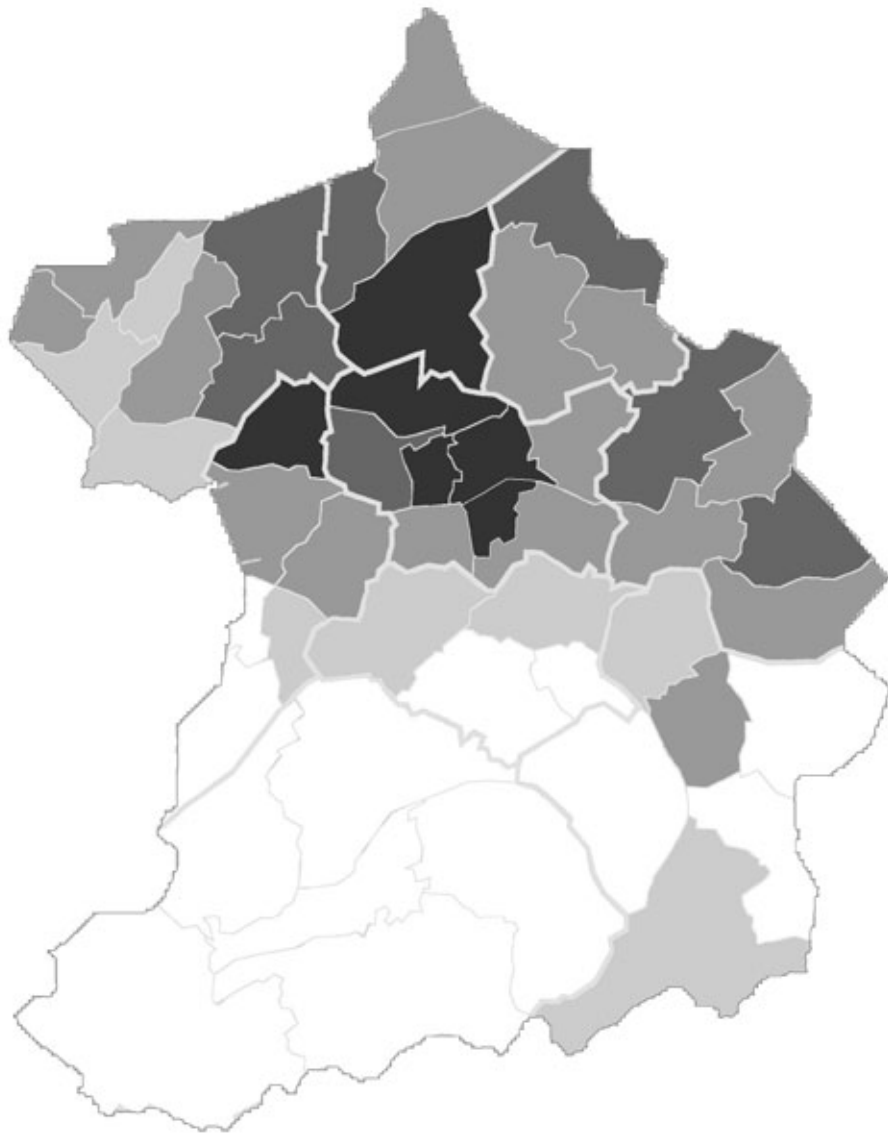
Through developing the green routes which go across the city centrality, they could become the new public open space center in it.



Green routes in centrality area



Urban centrality



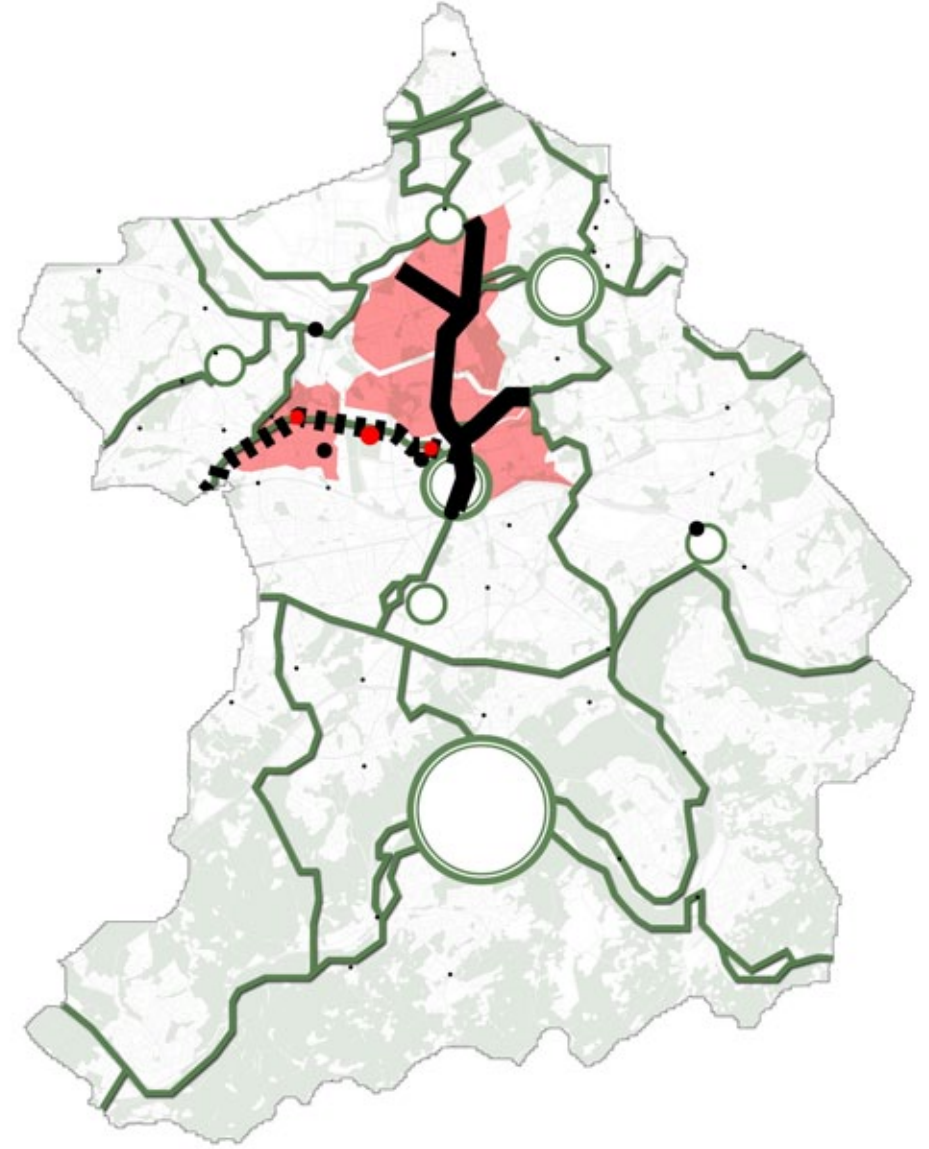
2. Green route based public open space development could be part of urban regeneration

"Y" shape area in the near north of Essen center is the poorest area in Essen (highest unemployment rate)

all the new public open space projects are happening in west wing of the "Y" area, it suggests that the government is trying to improve the situation through public open space development.

New open space development could be the engine of urban regeneration for it brings better living, working environment and more working opportunities.

Green routes based public open space development could be a part of this urban regeneration process.



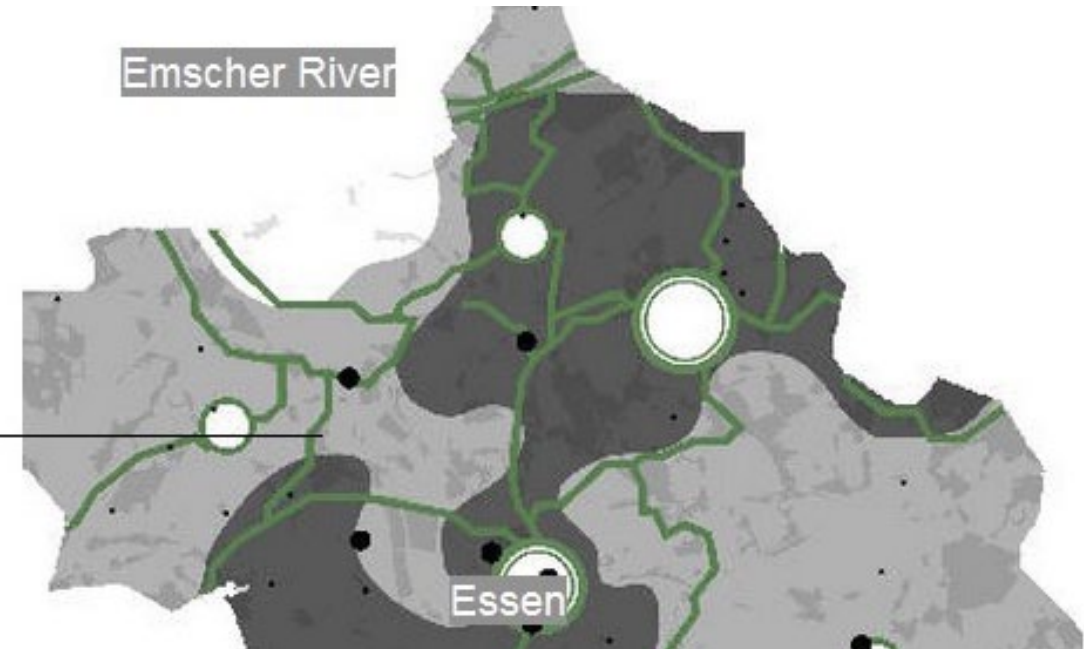
Public open space development base urban regeneration

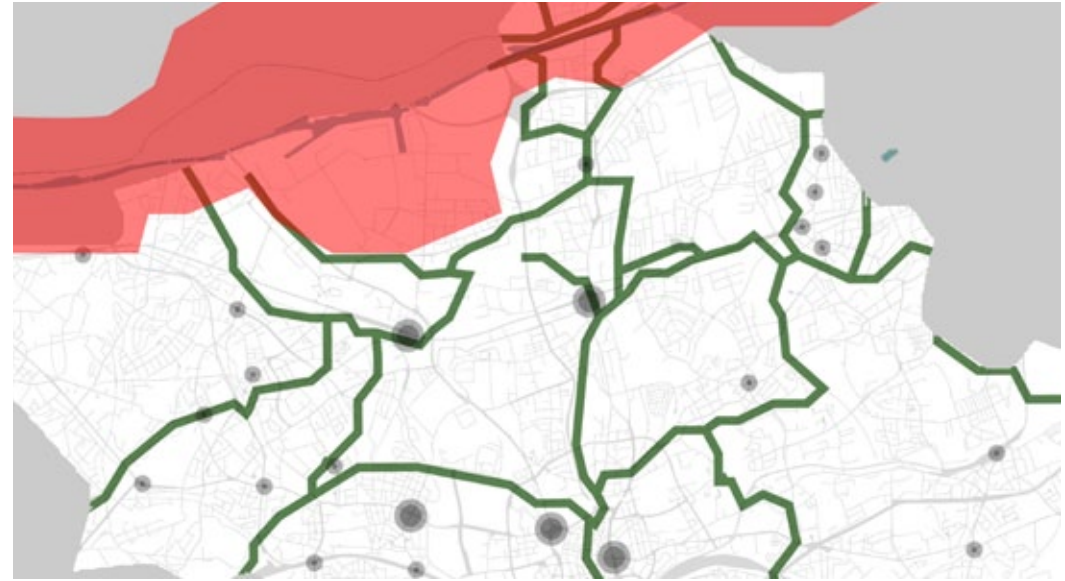
3. Green route based public open space development could be the start of new urban quarter

Emscher water band area is one of the lowest developed area in Essen.
In city and Regional plan, a new urban quarter will be developed in this area.

In regional plan, Emscher water band of Essen is part of Emscher river valley where would be developed as regional communicate center.

In Essen, Emscher water band could developed as new urban quarter. Basing on the industry situation of Essen and the current factories located in Emscher water band. The new urban quarter could be new energy research and produce center, where the energy companies could creat a image, build a brand and share some commom facilities as conference center.





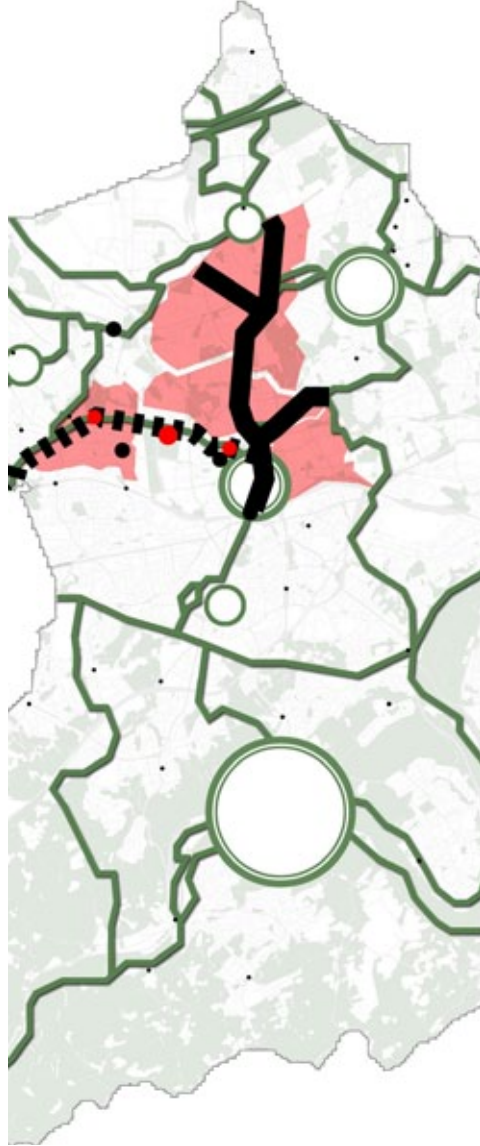
Emscher Valley---regiona communicate center



New energy produce and research center



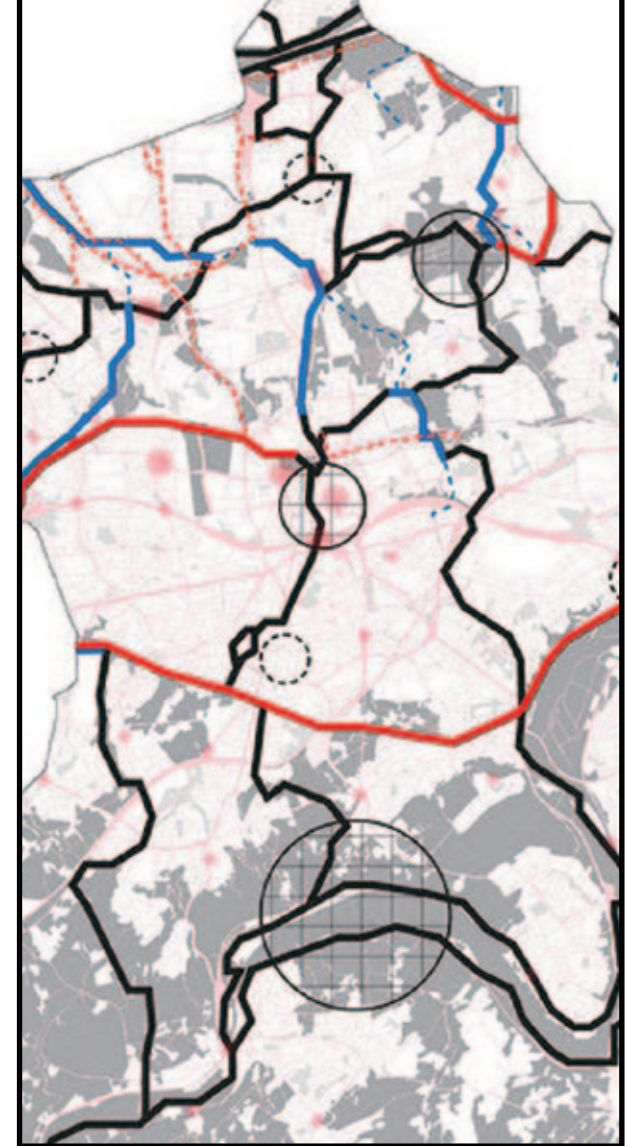
New open space in city center



Part of urban regeneration



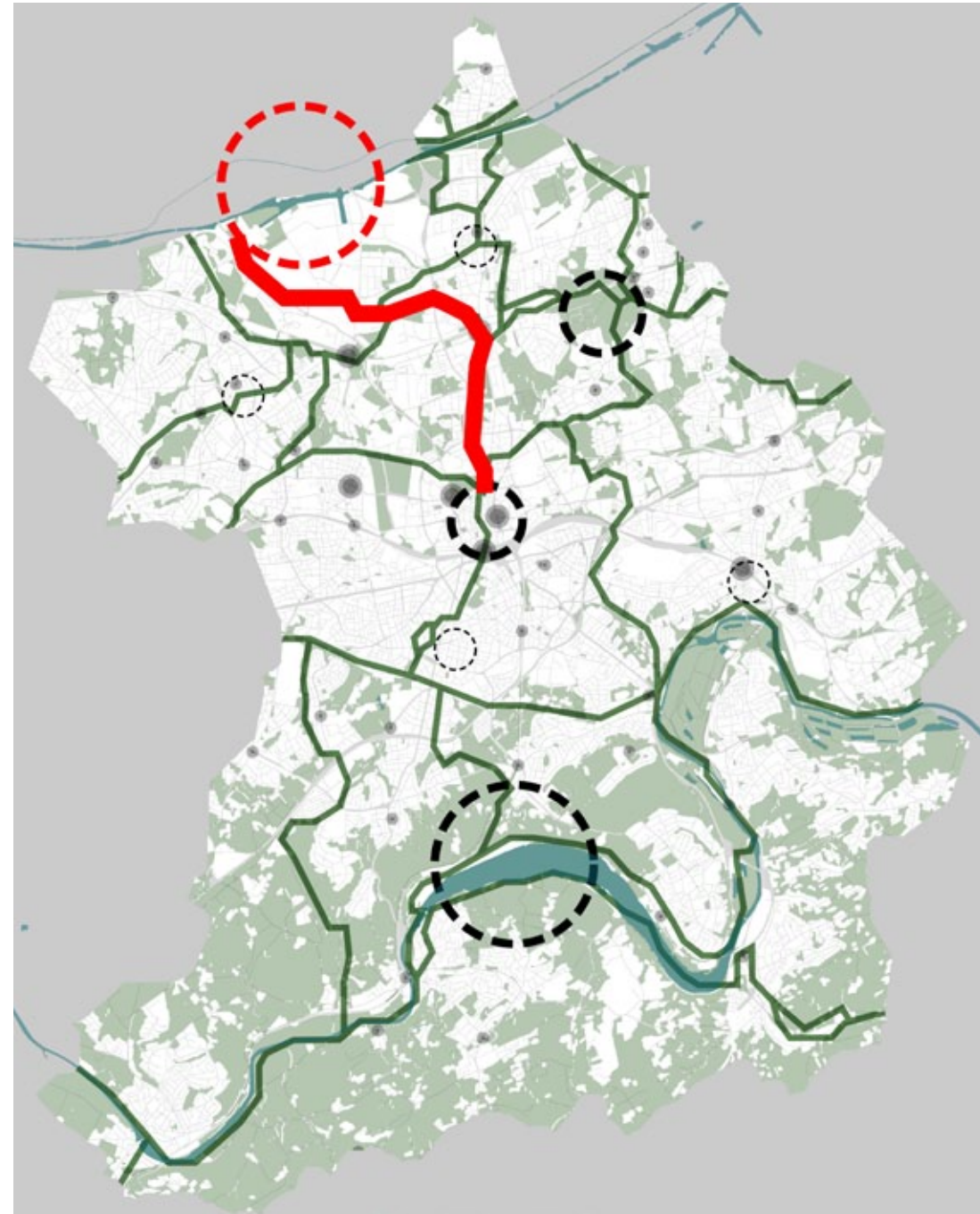
Start for new urban quarter



Brown lines in Green route network

Propose of brown line reactivation from public open space network aspect---
Green Route based Linear Park

Through the regeneration of the brown line along the green routes, it could creat new public open space in city center, could be a part of urban regeneration and could ba start for a new urban quarter.



Green route base linear park

4.1.2 ESSEN ECOLOGICAL SYSTEM

Essen Ecological System

During the coal and steel industry development in the 19th century the ecological system in Essen have been greatly damaged, especially in the Essen north.

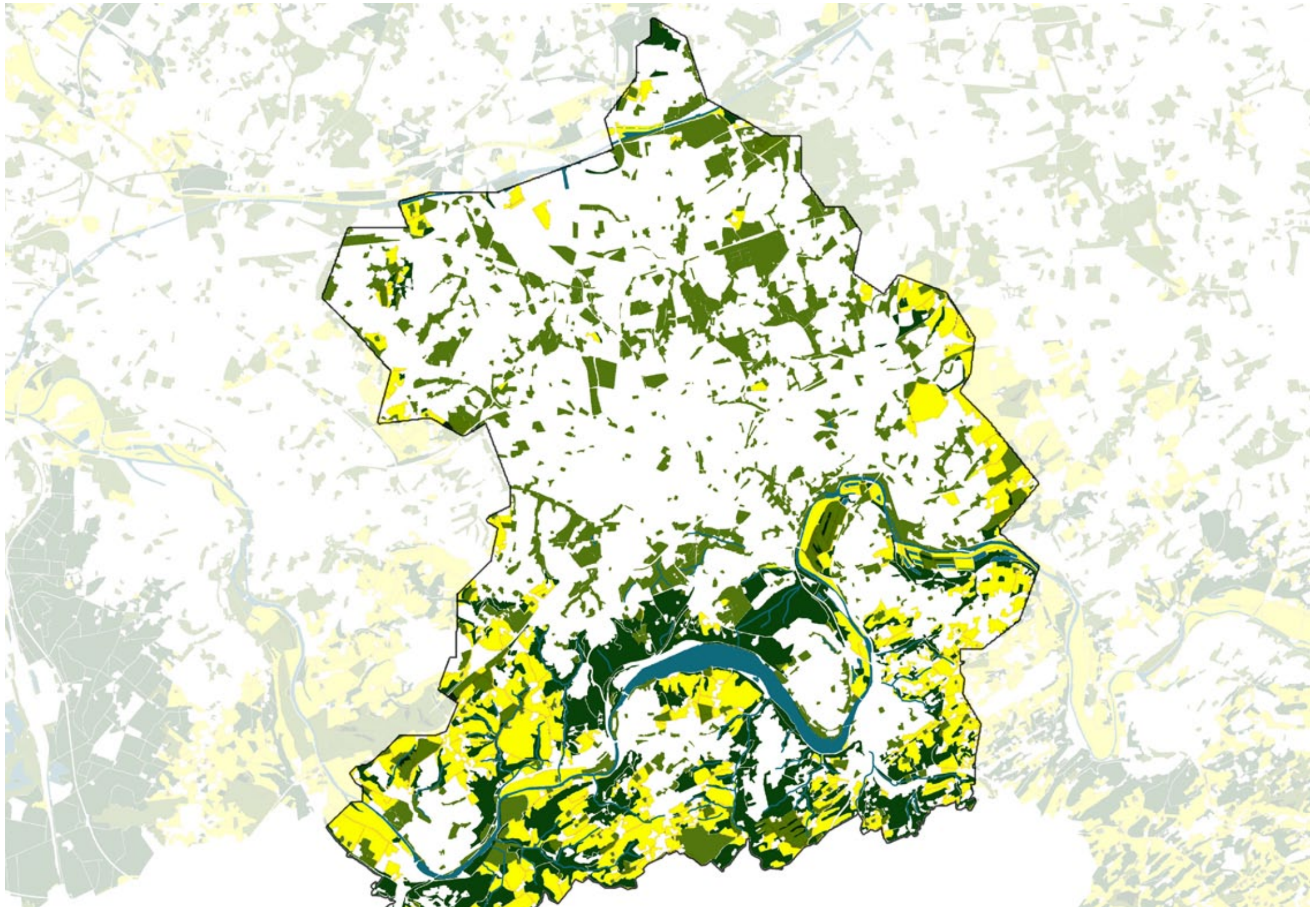
Since the break down of coal and steel industry, years of landscape regeneration have been happend in Essen



Essen in the 19th century



Essen today





physically continuous green groups



canal based corridors

Canals as green corridors

With the landscape regeneration of Essen in the past 30 years, the greening rate has greatly improved here

however, even the greening rate have been improved, many urban green spaces are not well connected to each other and not connected to green heart (Emscher river water based green heart).

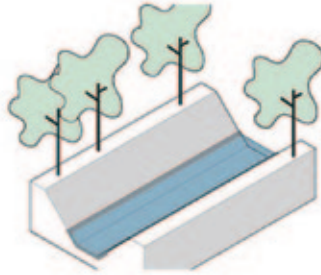
The landscape regeneration of the canals could be the corridors to connect green spaces.

The naturalise of the canals is happening in the upstream of one water way, the experiment learned from the exist projects could be adapted in the regeneration of the whole water way.

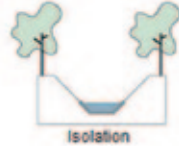
Artificial canal



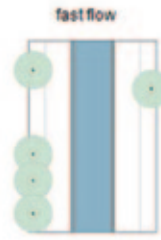
axonometric



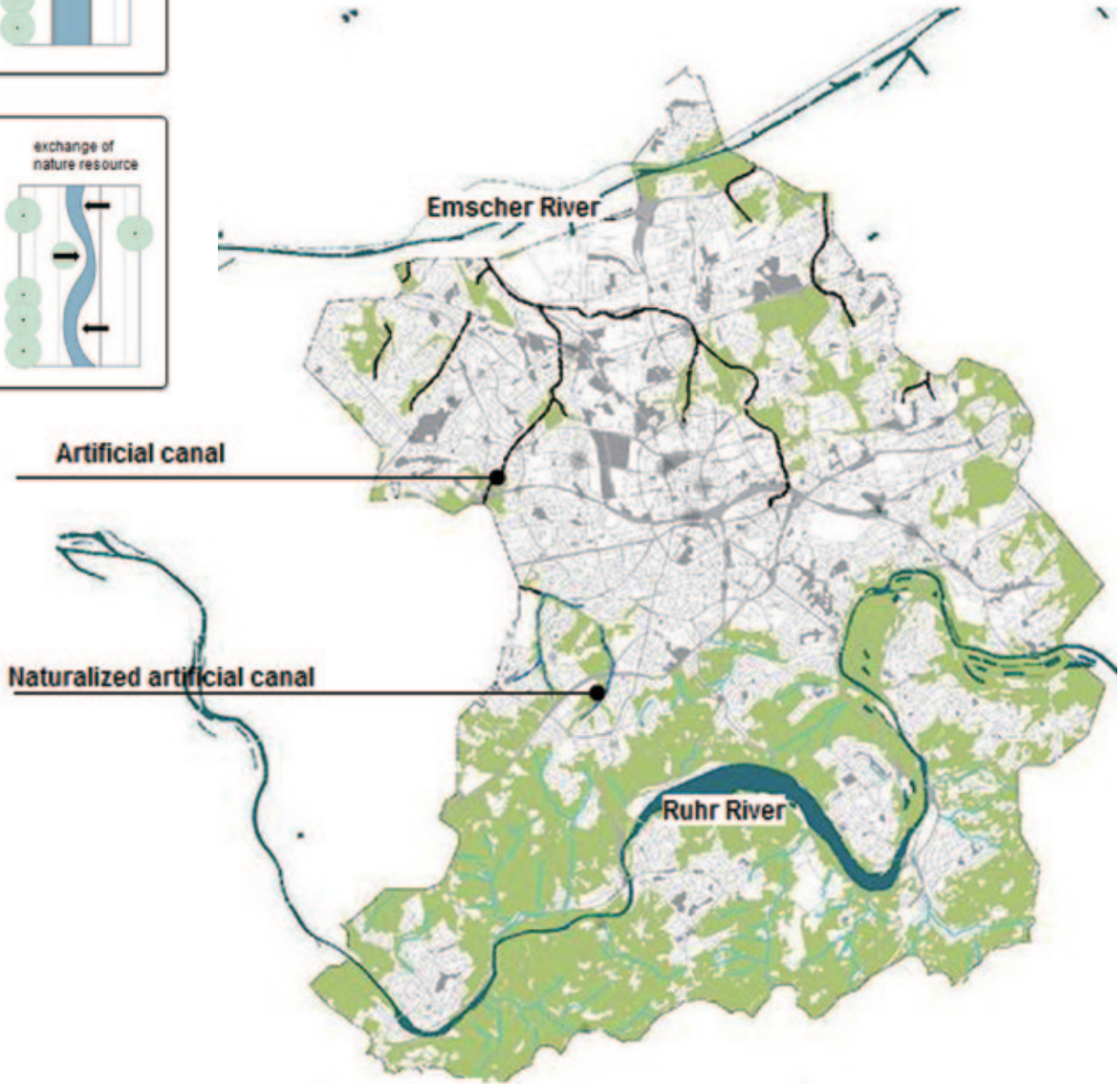
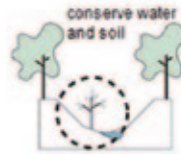
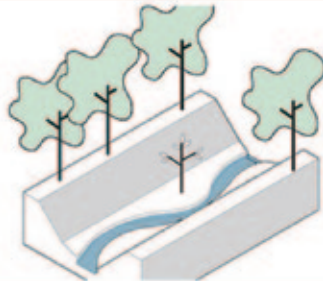
Section



Plan



Naturalized artificial canal





Controlled floodplain along canals for flood prevention

Facing the climate change, which increase the frequency of heavy rainstorms, and the original storm water system sometimes can't handle the volume and leads to urban waterlogging and flooding.



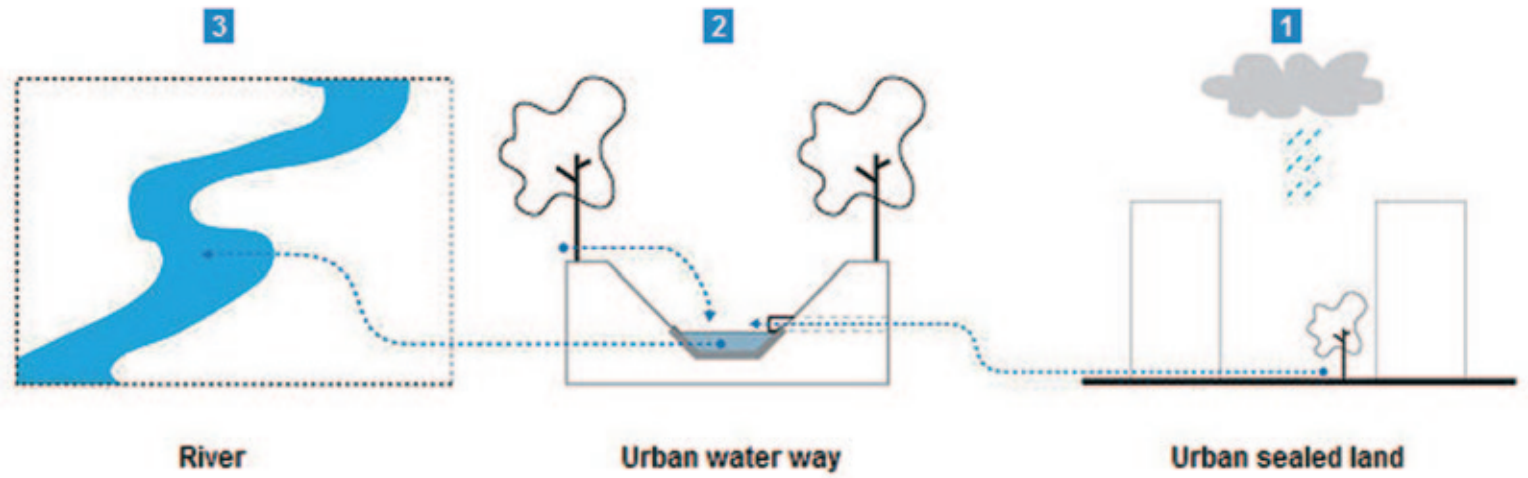
Water Flow



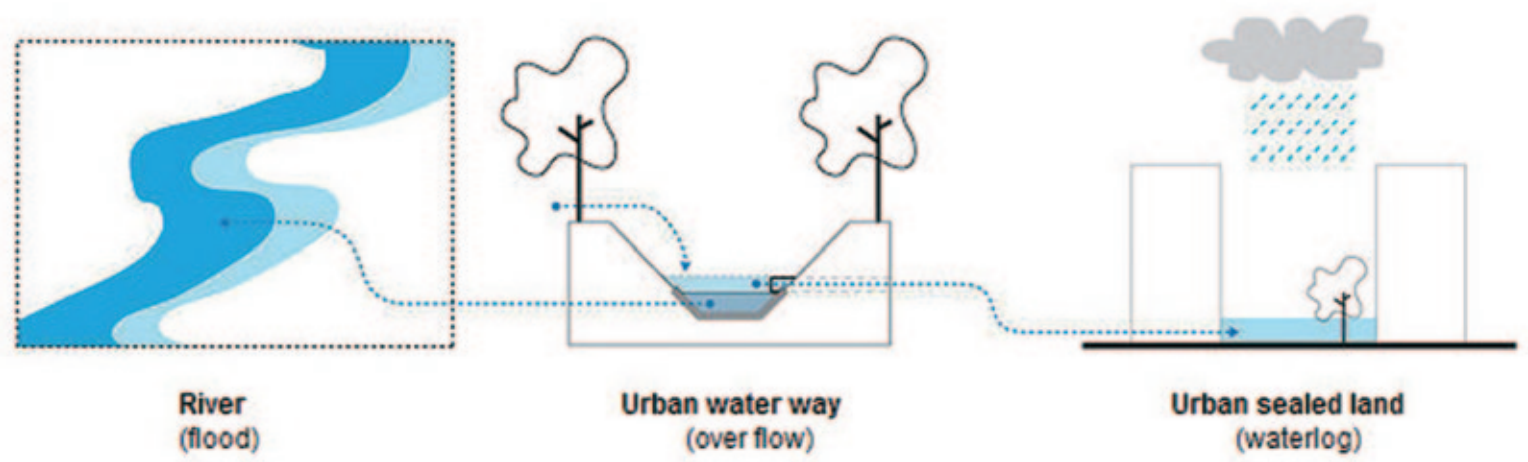
Drainage Zone

Looking at the current drainage system in Essen, developed from original nature water way, the canals are the main drainage route for rain water.

Urban drainage system



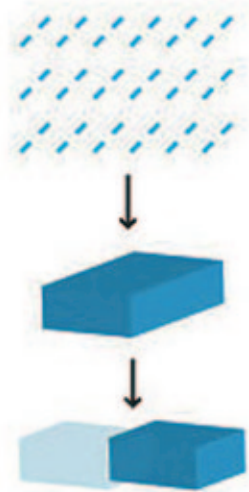
Flooding



Extreme Rainstorm 100mm per 24 hours

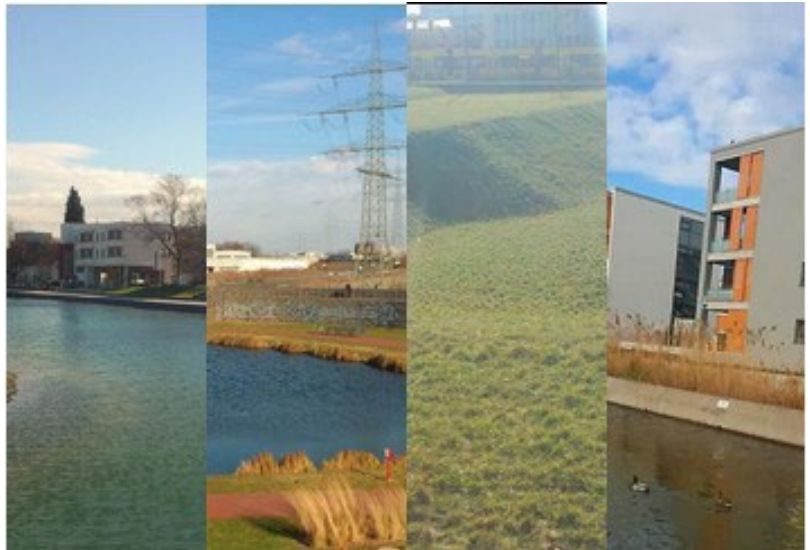
Drainage Area $52.3 \cdot 10^6 \text{ m}^2$

In Reservoir (Flooding) $2.62 \cdot 10^6 \text{ m}^3$



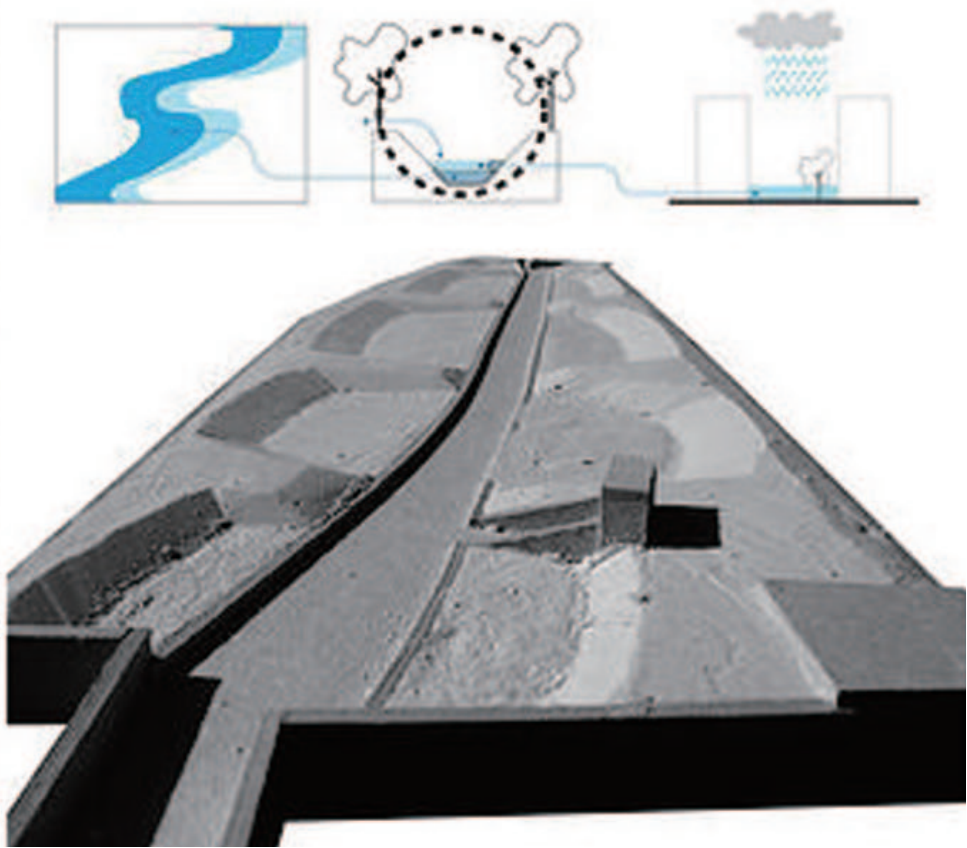
For flood prevention.

In Extreme rainy days, $2.62 \times 10^3 \text{ m}^3$ of rain water need a "room" in extreme rain storm days in order to prevent flooding



The recently constructed open space projects in Essen are showing the concern of flooding. The main strategy of currently constructed projects in Essen is to make reservoir in the city (solve the source of the water)

Basing on understanding the key role of the canals in Essen's drainage system and inspired by the BeglingerBryan Lower Factory Pond project by Ziegelbruecke. Design canals based floodpalin could really help the flood prevention



BeglingerBryan Lower Factory Pond



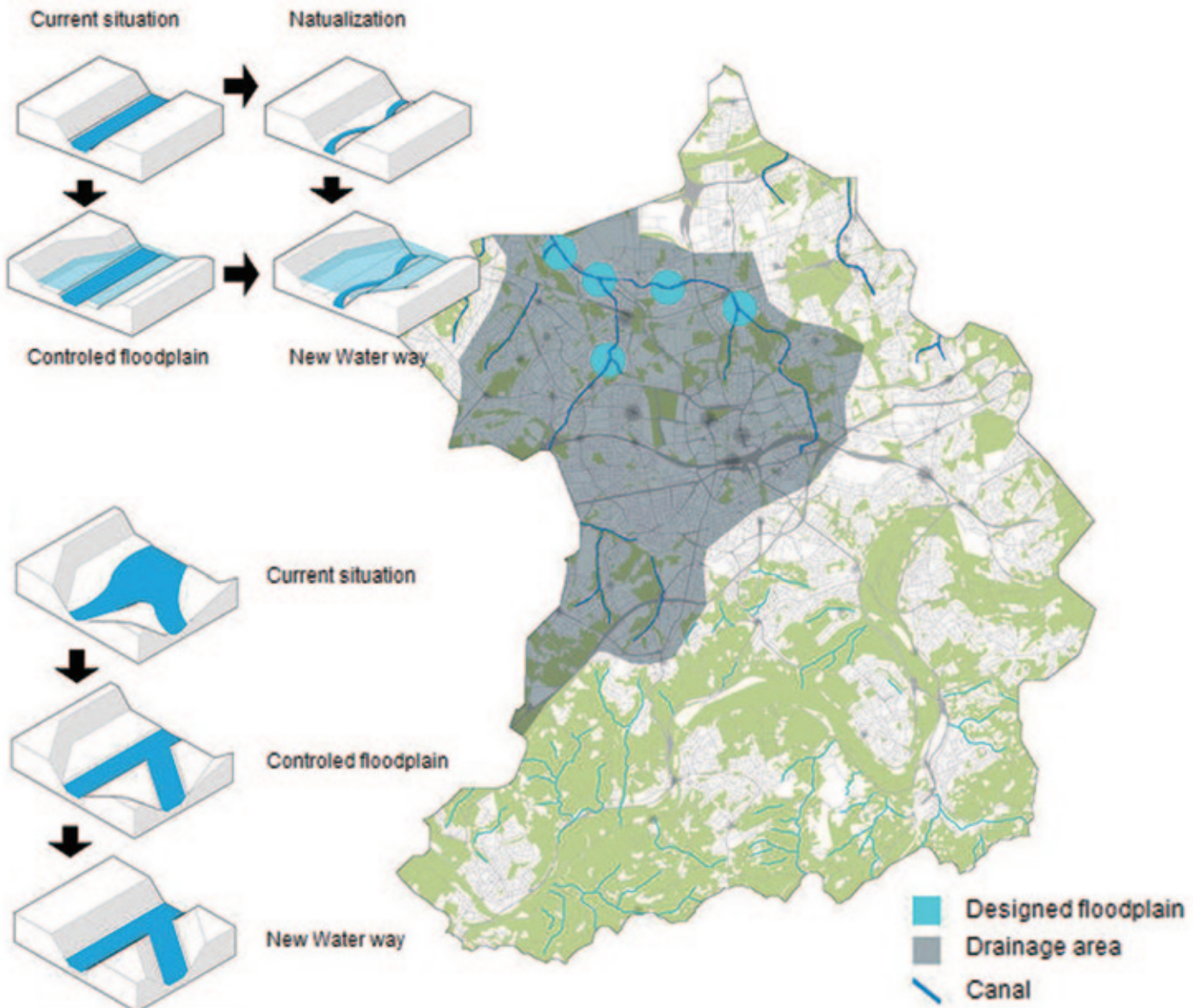
Looking at the current situation of the canals.

Down Stream:
Wider canal valley, fast water speed

Confluence of two water way:
Suddently increased water amount and speed of water damaged the water band

Up Stream:
Narrow canal valley, slow water speed

The main intervention of the water way based flood flood palin need to be happend on the confluence of two water way and downstream of water way.





Brown line base habitats

1. water side habitats

With the naturalisation of the water way the built of floodplain, more habitats for wild animals are created.

"Red Data Book species" in Ruhr area

Animal:

Skylark: open woodless landscape

Lapwing: open cultivated landscape area with low or sparse vegrtable

Small Emerald Damselfly; swallow, very sunny pools which often dry out in the summer

Plant:

Strapwort: open riverbanks

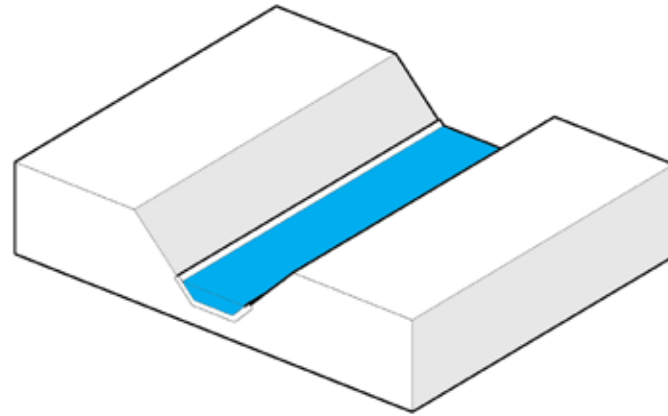


2. brown field habitats

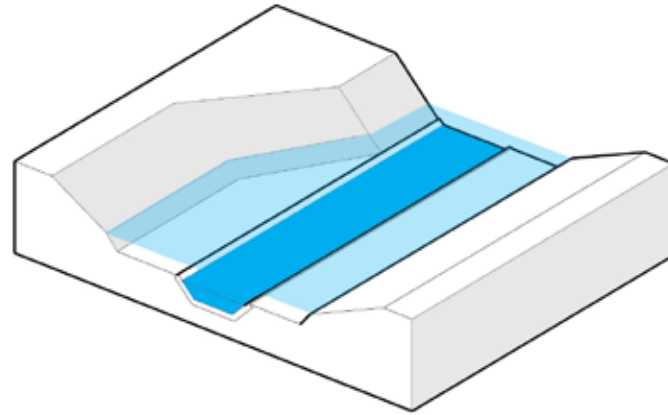
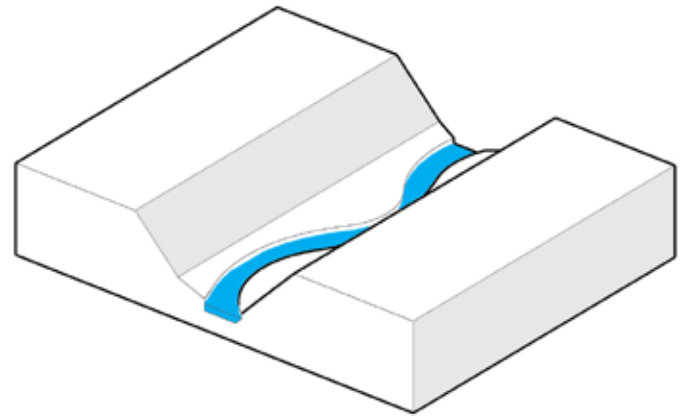
Through long times of abandoned, the site of abandoned train lines naturally have become habitats for some special plants and animals



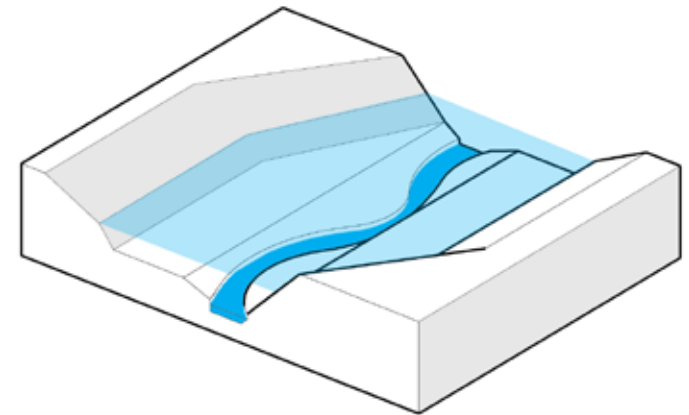
Canals



Naturalize



Floodplain



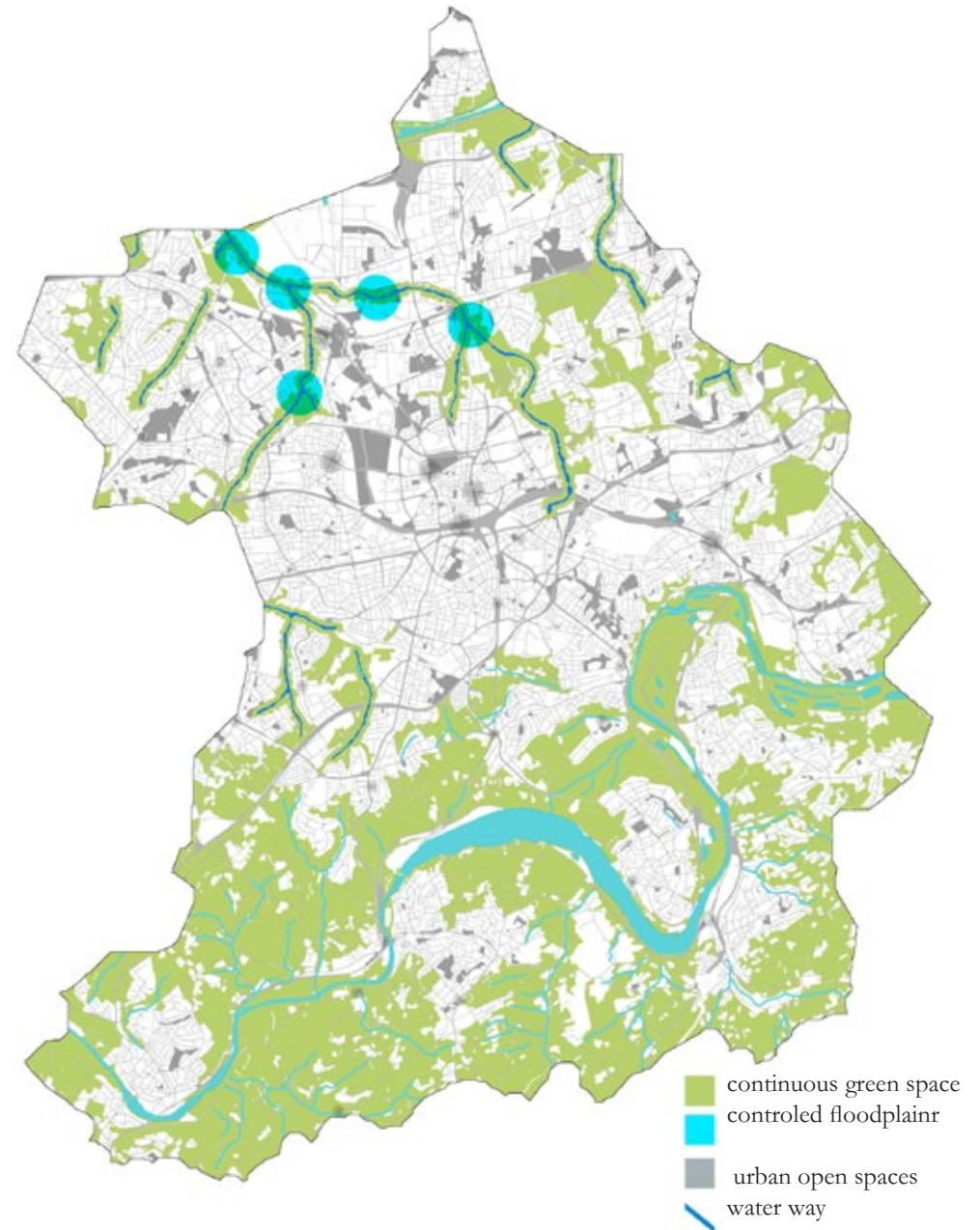
New Waterway

Propose of brown line reactivation from ecological aspect---

Generation of the water way

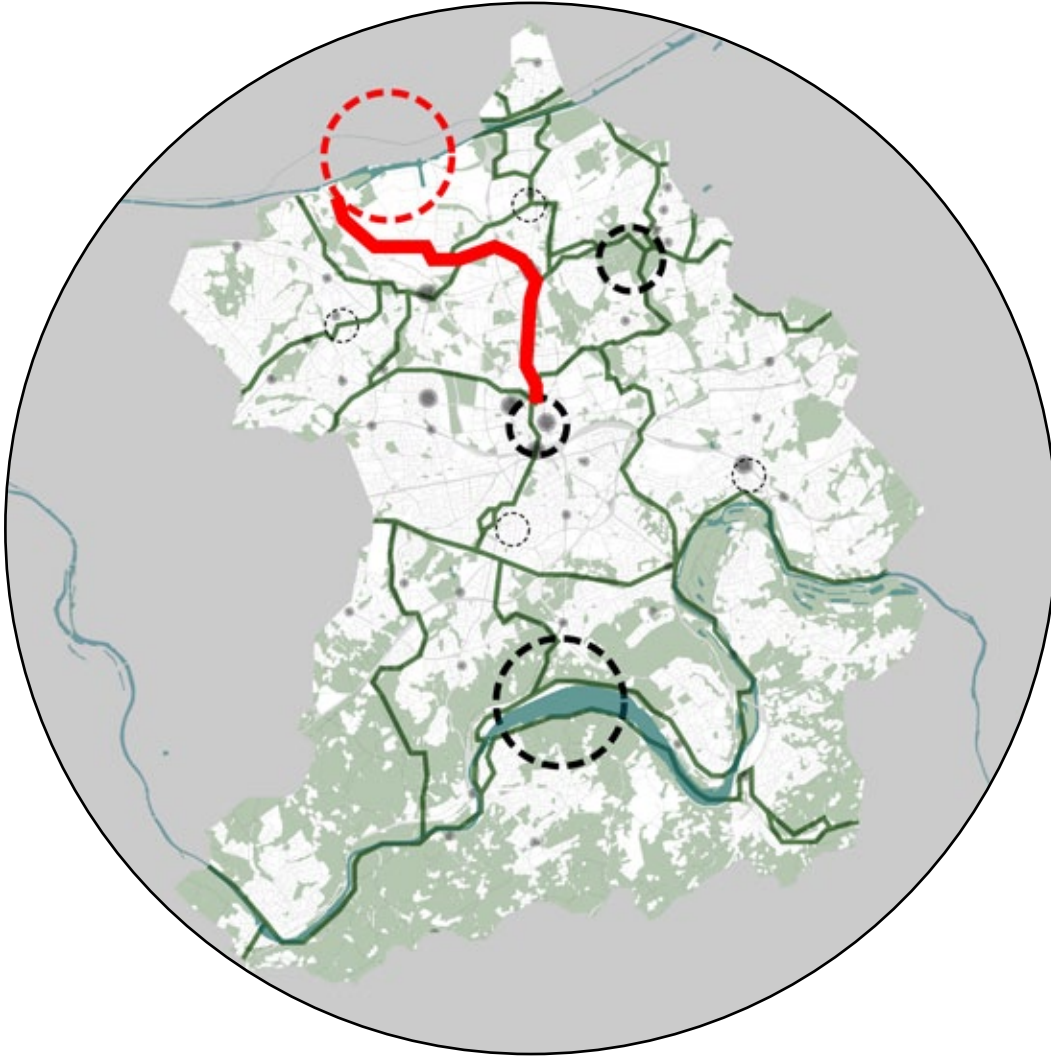
The regeneration of the water way include the natuarlise of the canals and construct the water side flood plain to connect green spaces and prevent flood.

Meanwhile new water front habbitats will be created and train track based habitats will be preserved.



Propose 1

URBAN PUBLIC OPEN SPACE DEVELOPMENT



Propose 2

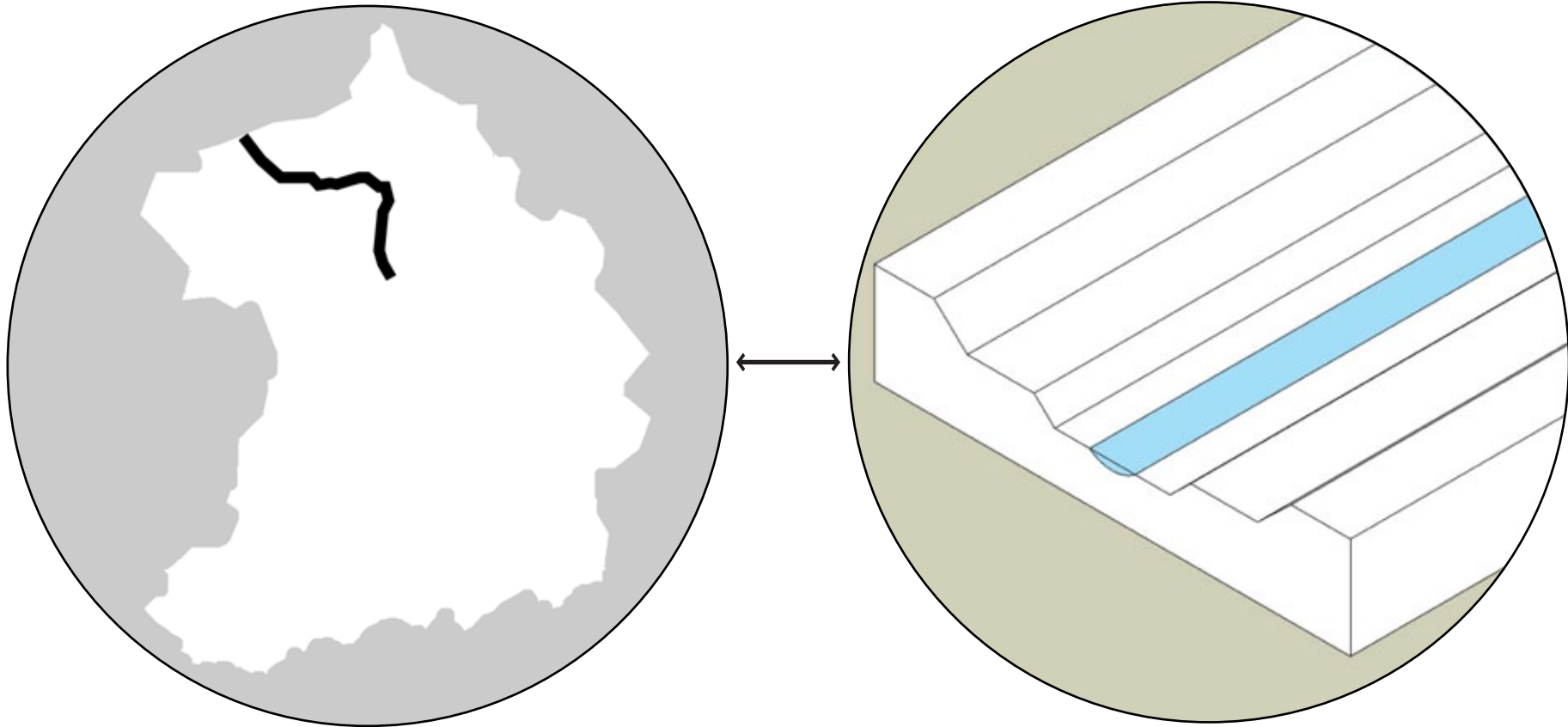
ECOLOGICAL DEVELOPMENT



4.1.3 DEFINE DESIGN TASK

On one hand, ecological development, water way regeneration, creates condition of urban public open space developing project, the linear park.

On the other hand, the linear park is an example project of the regeneration of all the water ways in Essen.



Green Route base
Linear Park

Regeneration of
Water Way



Design task

Comebine the two propose of the reactivation of the brown lines in Essen, I come up with the design task

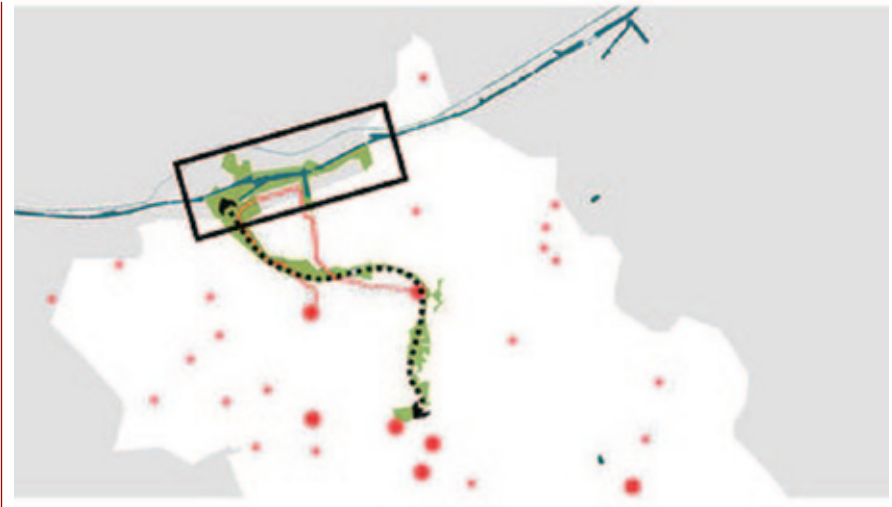
waterway regeneration based linear Park

Brown Line Park

Goals

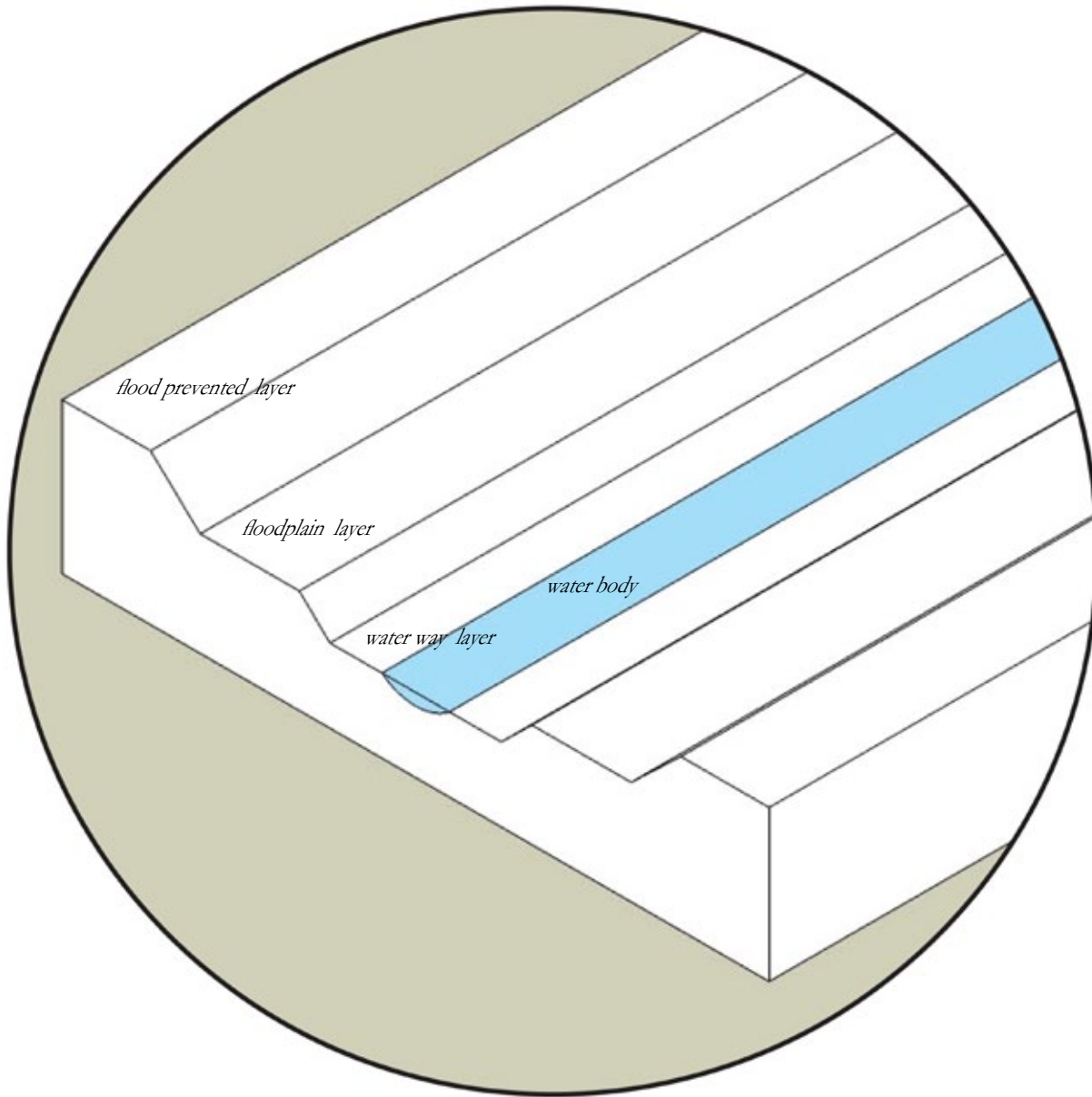
There four main goals in design brown line park

1. New Open space
2. New Way to Water
3. New Path to Emscher River
4. Engine of urban development



<i>New Open space</i>	<i>New path to Emscher River</i>
<i>New way to water</i>	<i>Engine of urban development</i>





Principle 1

The principle in dealing the canal is transformation.

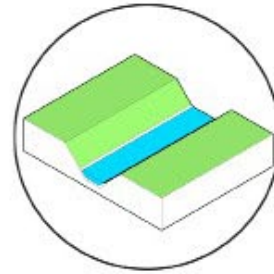
Through the regeneration of the canal, the new water way will become the identity and center of the park.

The new water way will have 3 layers:

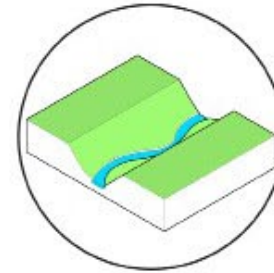
1. water way layer(will regularly be flood)
2. flood plain layer(will be flood in extreme rainy day)
3. flood prevented layer



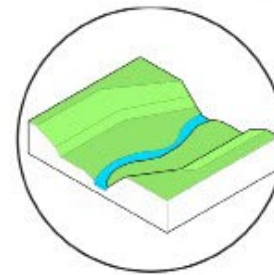
Current situation



Improvement: naturalise



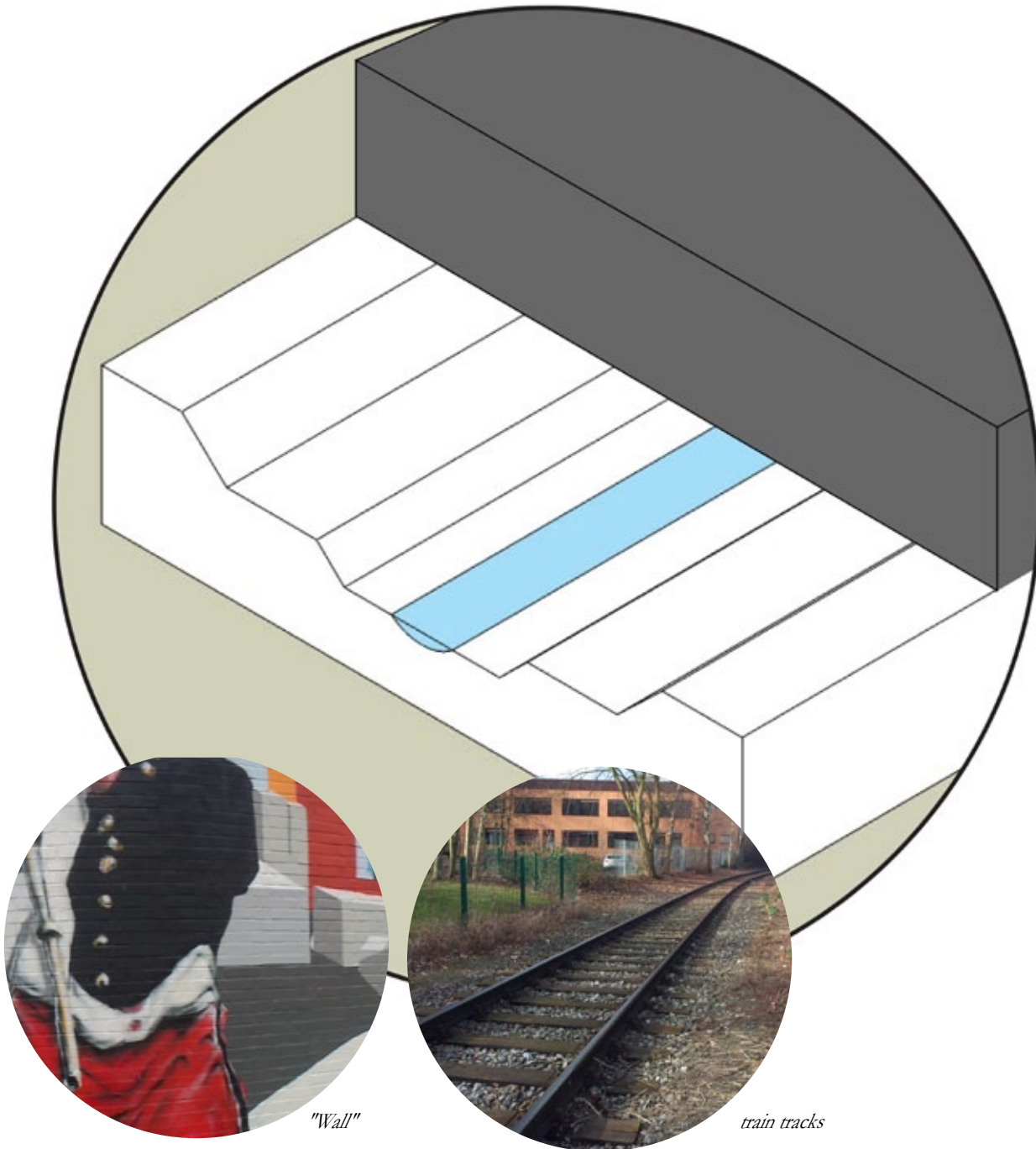
Improvement: Floodplain



Principle 2

Basing on under stand the ethtical,cultural and functional value, the principle in dealing the train tracks is preservation.

through the preserve and regeneration of the abandoned train tracks, the train tracks will become the identity and center of local projects.





4.2 PLAN OF THE PARK

To design the Brown Line Park, the first step is to organise a Brown Line Park Association and includes all the public, civil and private sectors who are involved and interested in this park. And Designer (me) will be considered as fourth member in the association.

Through Understanding the multi-functionality of the brownlines, the park will be planned by considering all the functions it has.

The plan will be presented in the park association and, in the end, the park association will discuss and decide to approve the plan or not.

4.2.1 BROWN LINE PARK ASSOCIATION

Public Sectors	<p>Finances Department</p> <p>Environment and construction Department (Green and Gruga Essen, Water, Real Estate Industry, Department of Roads and Transport)</p> <p>Plan Department (Office for Urban Regeneration and Soil Management, Office for surveying, and land, Department of City Planning and Building Regulations)</p> <p>Culture, Integration and Sport Department (Community College, Folkwang Music School, Department of Intercultural orientation / municipal integration center food, Sports and Bäderbetriebe Essen, Cultural Office)</p> <p>Youth, Education and Social Department (Youth Office, Job Centre Essen, Department of School)</p>
Civil Sectors	<p>Community Residential Association</p> <p>Environmental protection organization</p> <p>AGFS(the Association for Pedestrian and Bicycle-friendly Cities, Townships and Districts in North Rhine Westphalia)</p> <p>Turkish Immigration Association</p> <p>The Essen Cultural Advisory Council</p> <p>Turkish consulate general</p> <p>JHA(Youth Service Committee)</p> <p>Essen-Duisburg University</p> <p>Metropole Ruhr (Emscher Landscape Park)</p>
Private Sectors	<p>RWE Groups, Krupp Foundation</p> <p>Water Companys: WTE,SHT Group AG, SWE Stadtwerk Essen AG</p> <p>Theater and philhamonie Essen Company</p> <p>EVAG (Essener Verkehrs AG)</p> <p>Energy Companies: RWE Groups, E.ON Ruhrgas,Evonik Inustries, STEAG</p> <p>Real State Companies</p> <p>Construction Companies</p>
Designer	Ruohao Wu

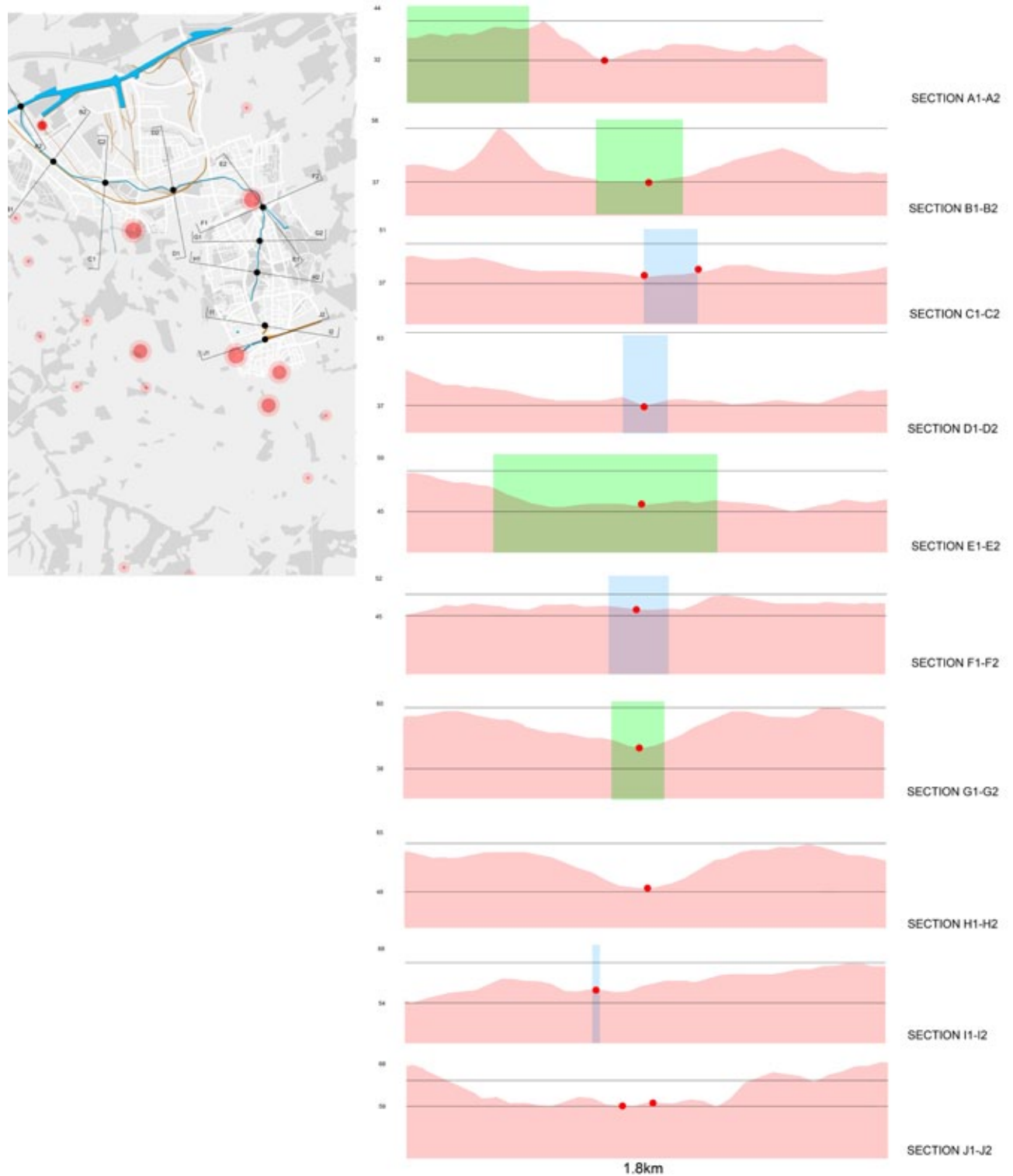


4.2.2 PLAN OF THE PARK

Plak as Floodplain

From ecological aspect, one of the main reason to develop the park is to develop it as a control floodplain area for flood prevention.

Consider the topography and urban fabric, I come up with the most reasonable floodplain area which would have least earth change and small influence on current exist buildings and residents



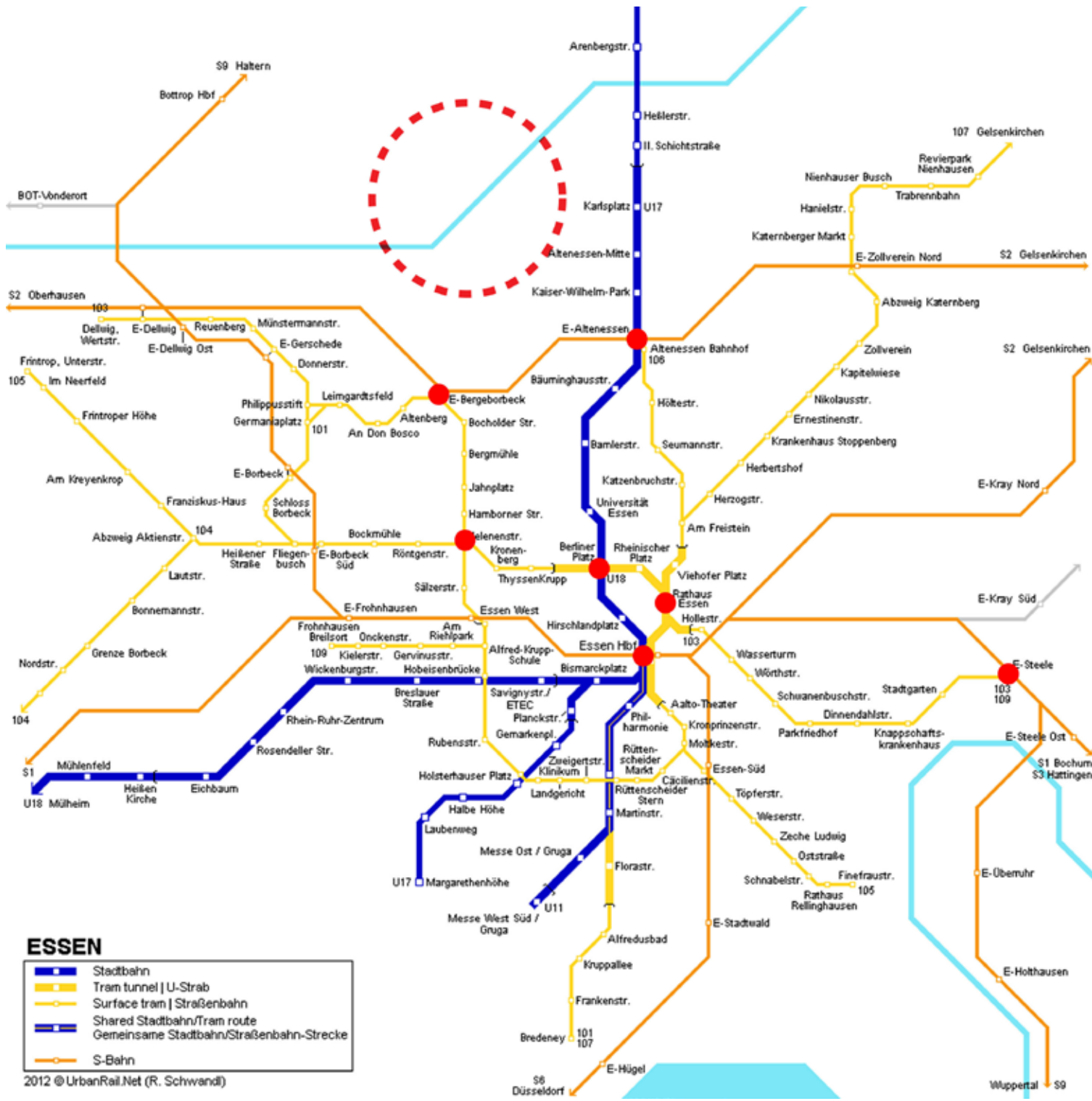


*Propose:
Floodplain area*

The floodplain area and the relate green space together define the scope of the park



*Propose:
Scope of the park*



- ESSEN**
- Stadtbahn
 - Tram tunnel | U-Strab
 - Surface tram | Straßenbahn
 - Shared Stadtbahn/Tram route
 - Gemeinsame Stadtbahn/Straßenbahn-Strecke
 - S-Bahn

2012 © UrbanRail.Net (R. Schwandl)

Current Railway System

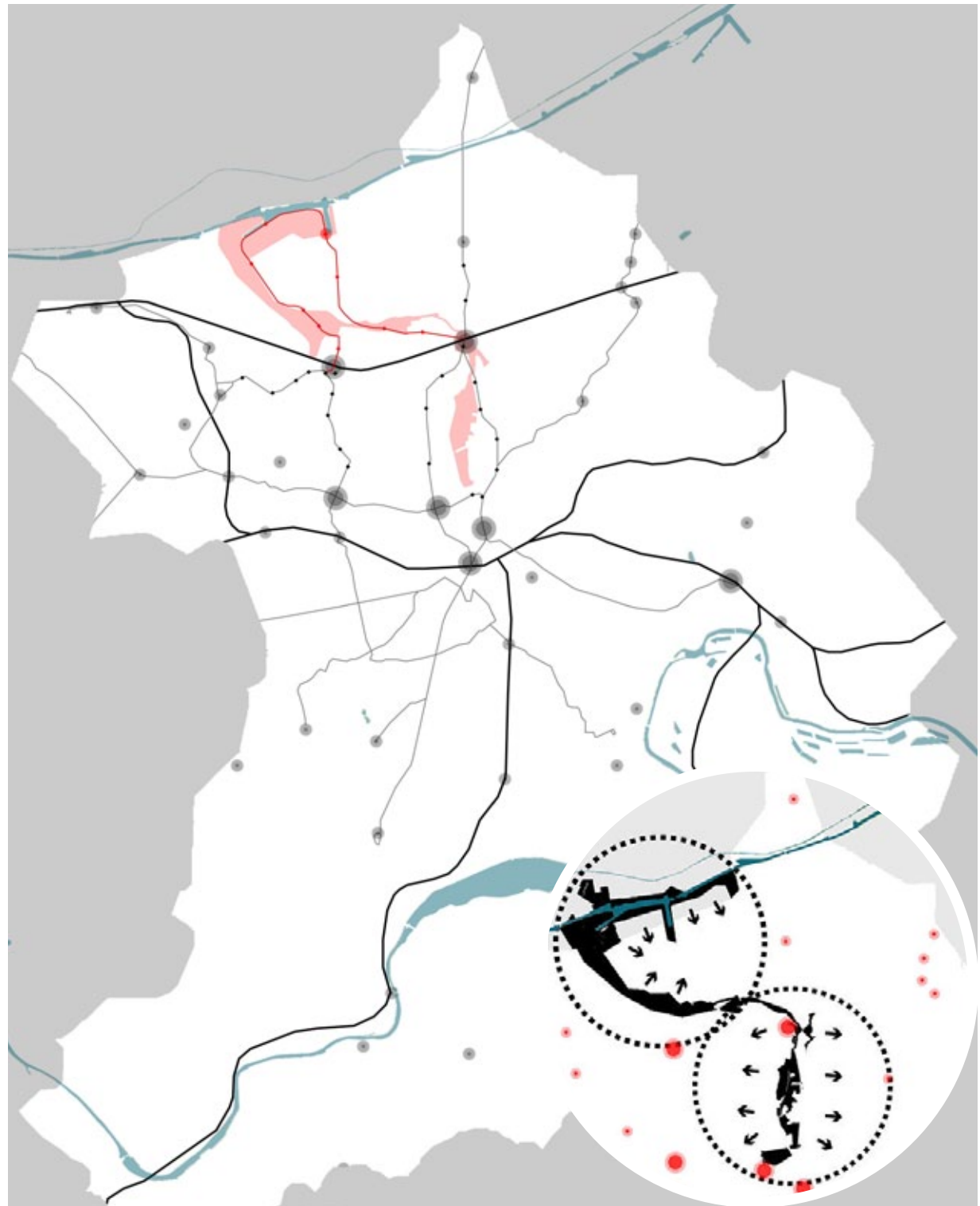
Plak as Urban development engine.

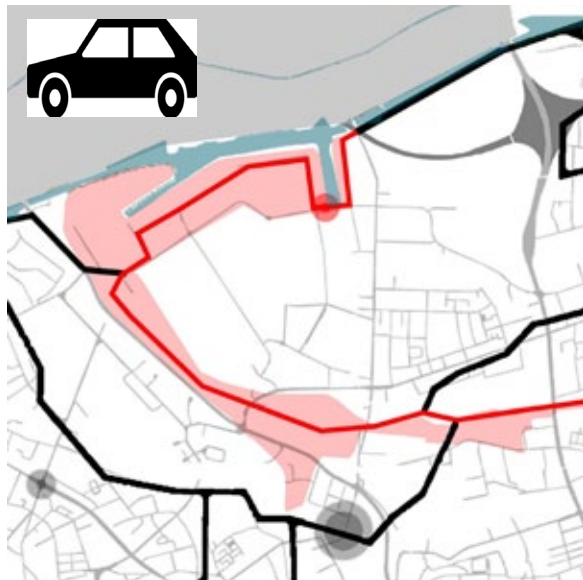
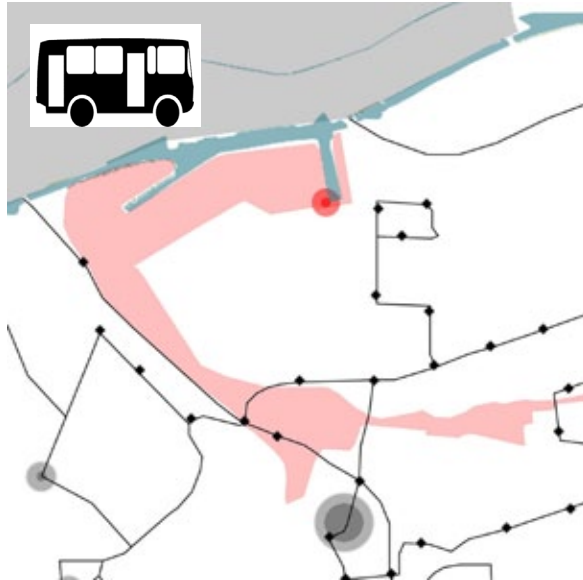
From urban development aspect, the development of the park could be a start for both urban regeneration and new urban quarter.

Inspired by transit oriented development concept, which is an exciting fast growing trend in creating vibrant, livable communities. Also known as Transit Oriented Design, or TOD, it is the creation of compact, walkable communities centered around high quality train systems. This makes it possible to live a higher quality life without complete dependence on a car for mobility and survival.

Basing this and through reuse one of the abandoned train tracks in the site, a new tram line will be developed as main intervention to promote the urban development along the site.

*Propose:
New Tram*



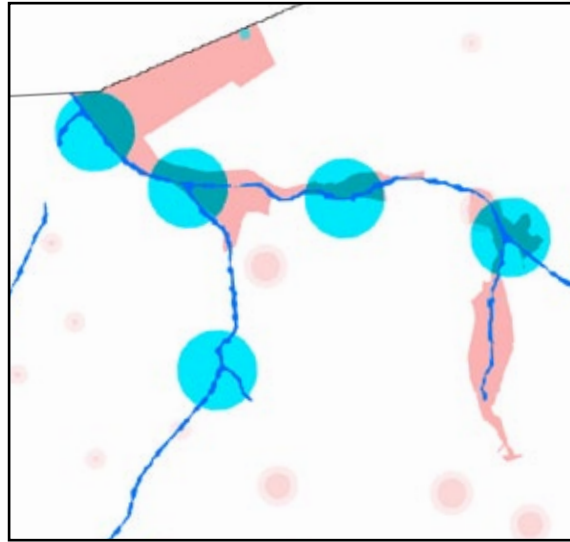
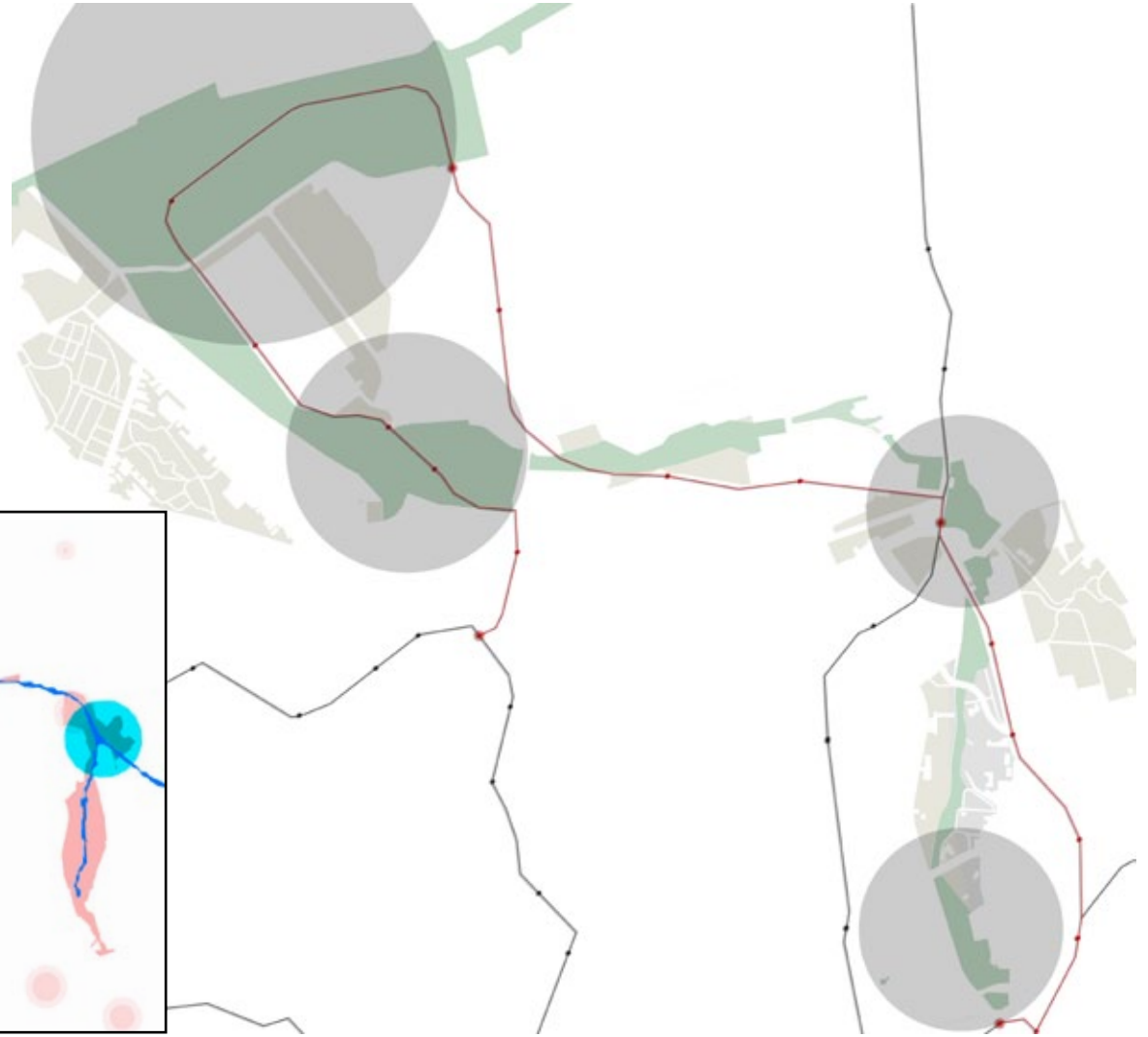


Centers

With the new tram, there are four multi-mobility node in the park in the new transportation system.

The confluences of the waterway, where is important area to design flood plain, are also located near the four multi-mobility node

This four node are considered as the center section of the park.



Multi-mobility

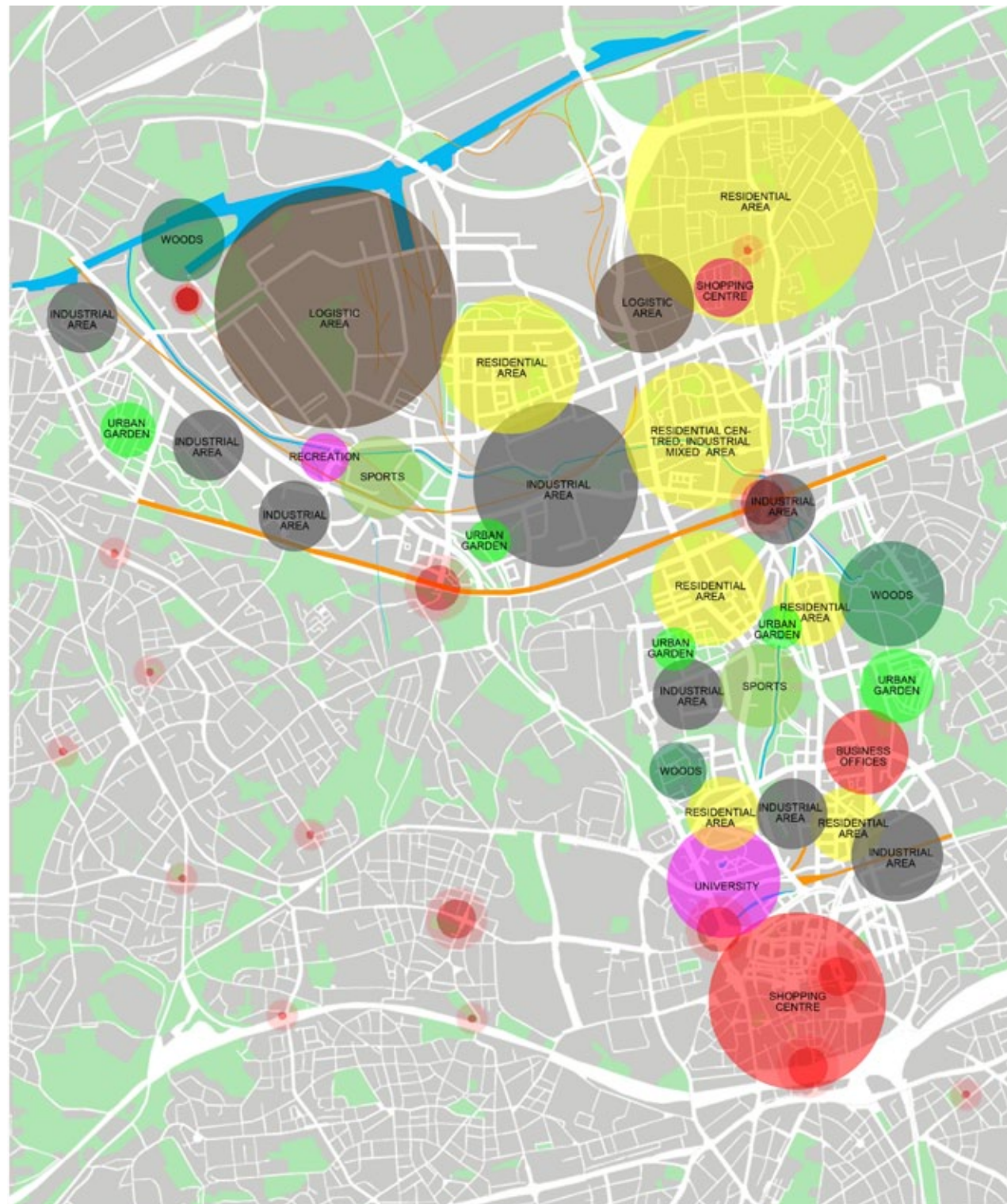
Confluent area (Floodplain)

Propose: Centers



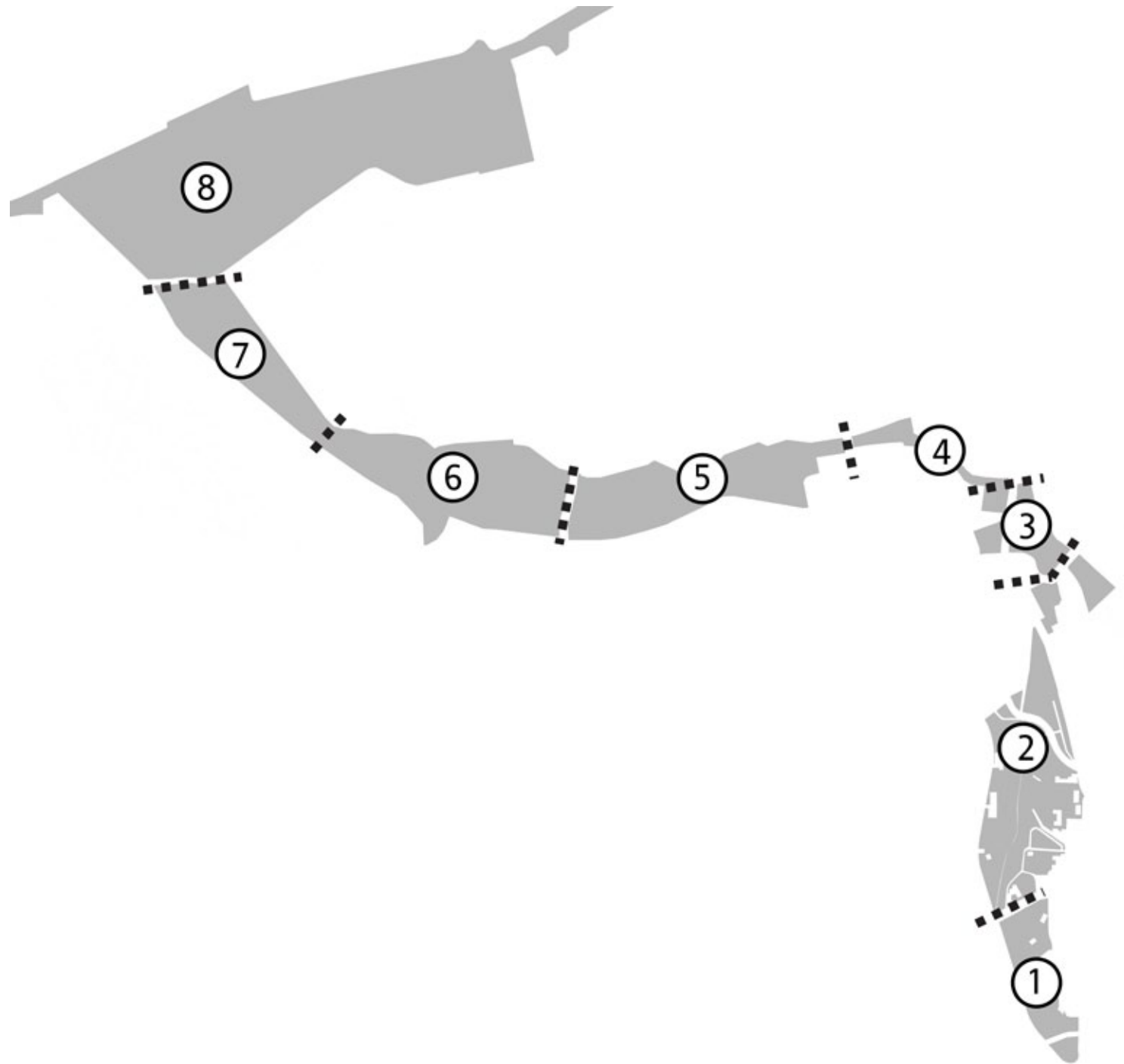
Analysi of the Site

Visit and analysis the site and every section and consider the goals of the park to define the topic of every section.



Sections

1. Entrance Park
2. Residential Park
3. Community center
4. Residential Park
5. Nature Park
6. Sport & performance Park
7. Wetland park
8. Emscher water band park
(new working area, new energy
factory)

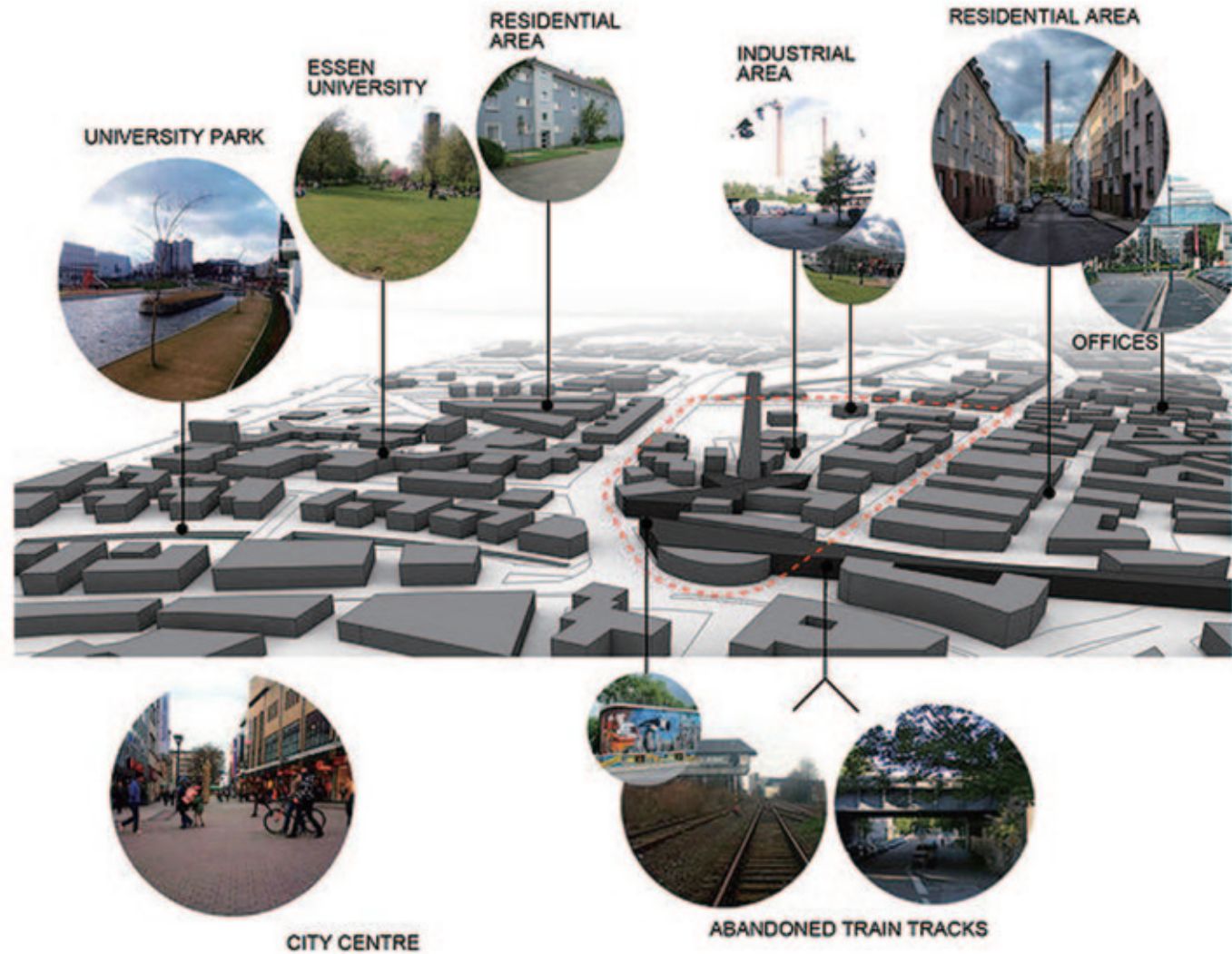




section Entrance Park

1

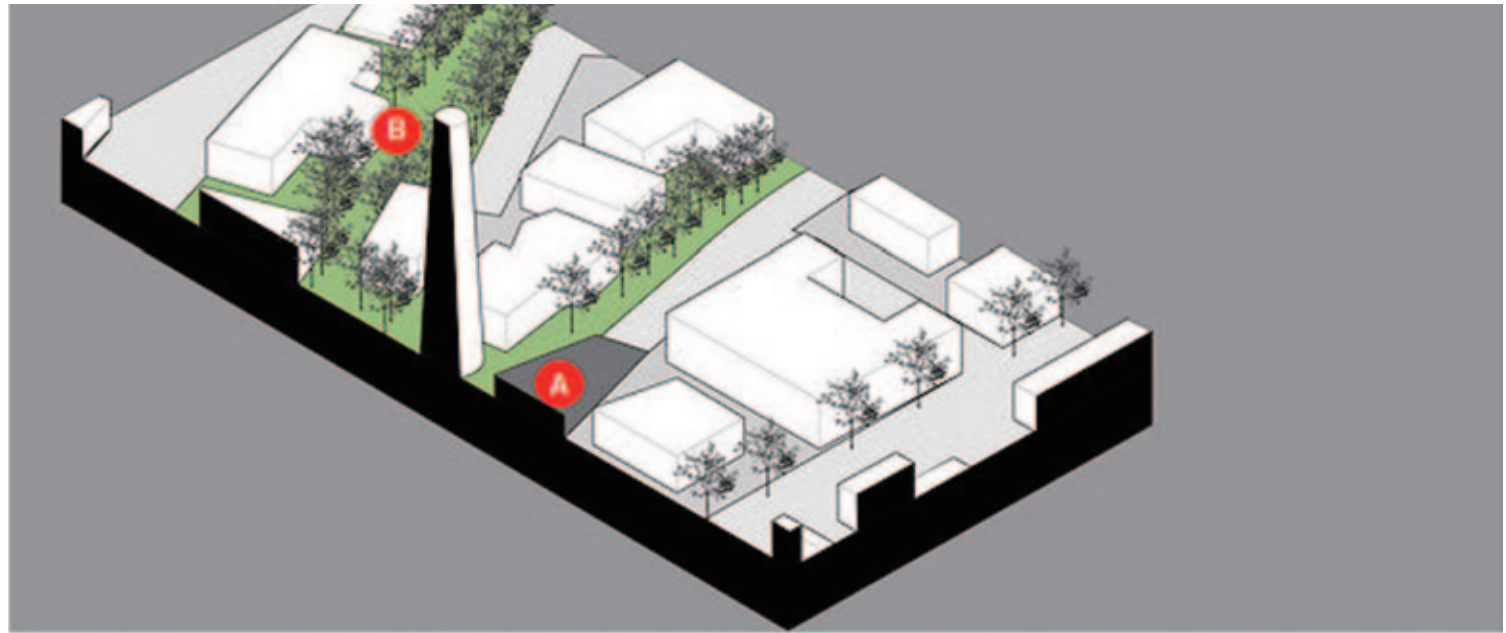
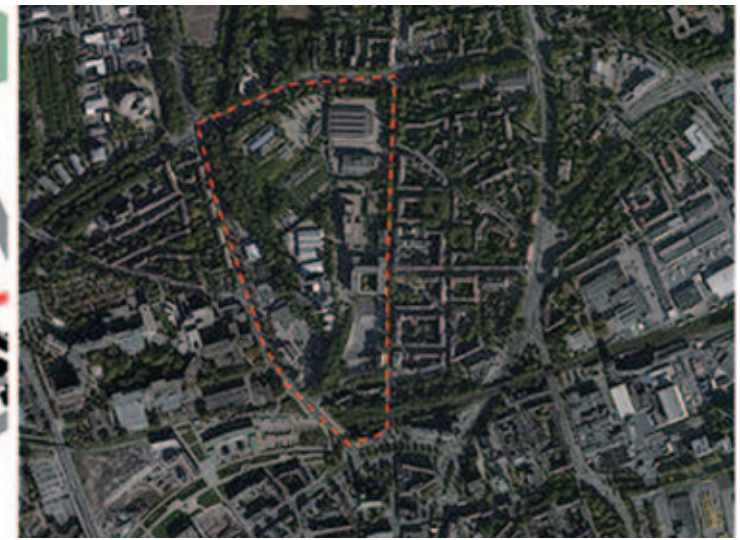
site
status



1. Green Space

2. RWE
Energy company

3. Shops



Problem/Challenge

Abandoned Train Track

Location

The site located at the south end of the park. Entrance of the park, the key connection between park and city centre

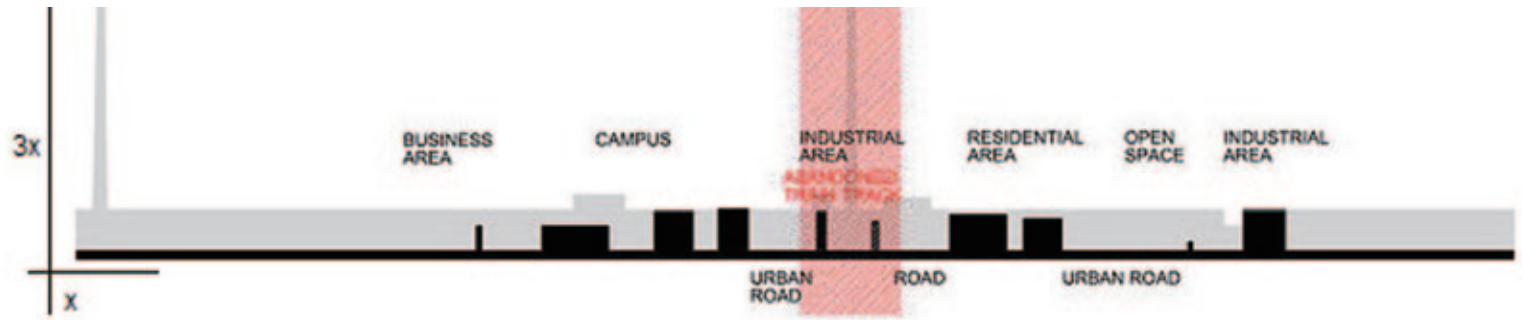


Barrier between linear park and city center

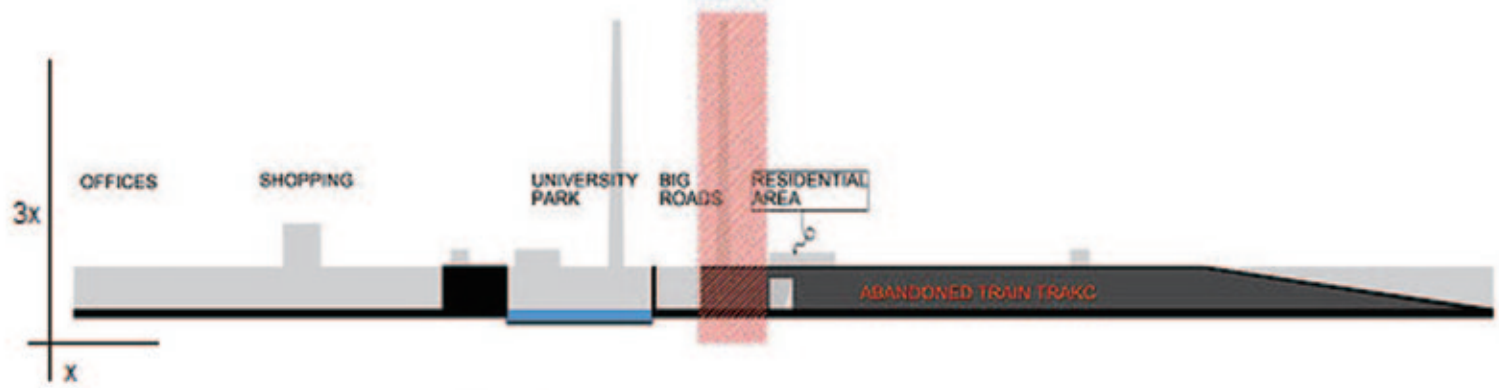
Barrier between residential area and "outside world" creat close, safe community consciousness. Clear definition of territory



Section 1-1



Section 1-1



Abandoned canal

Location
its the start and source of the water way

Current situation
Currently the canal is abandoned and dry, but still easily get flood after rain



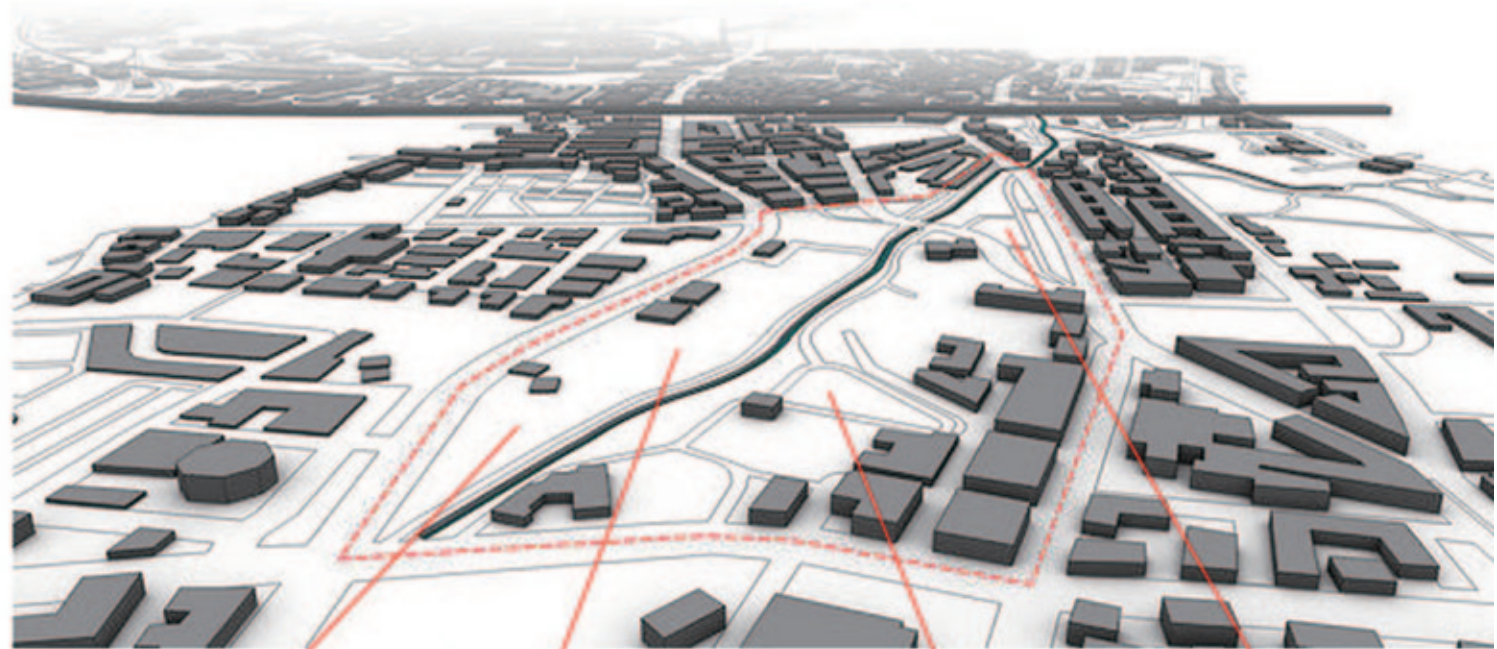


section

Residential Park

2

**site
status**



Car Practice
Yard



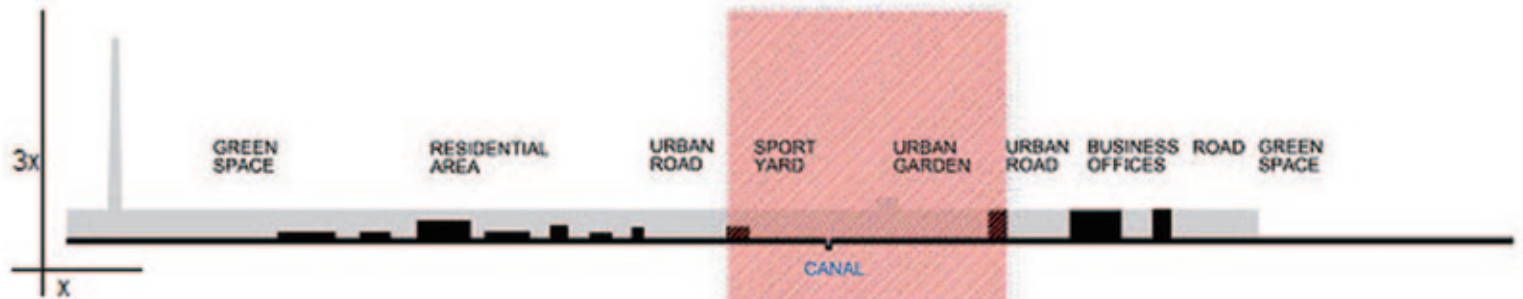
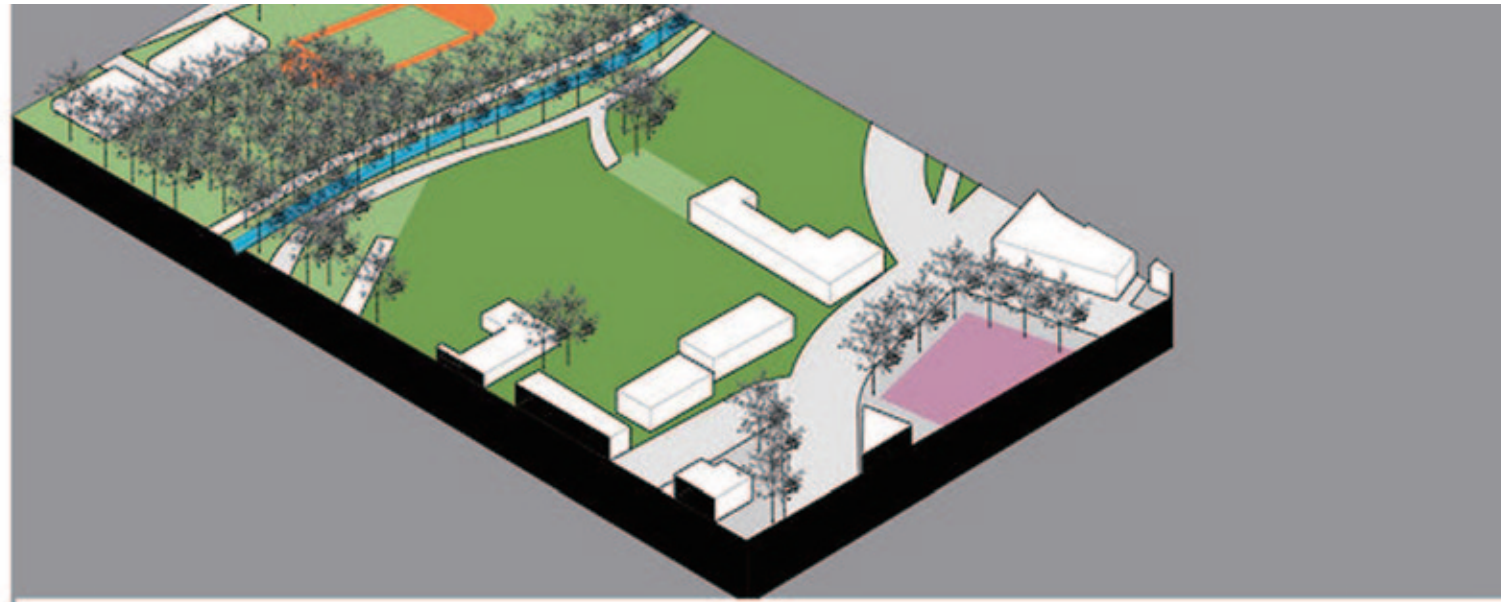
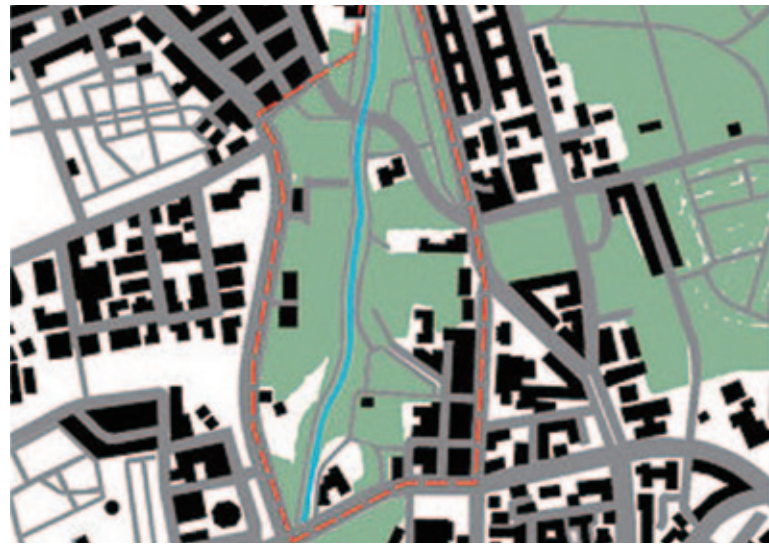
Sport Yard



Community
Green space



Allotment
Garden

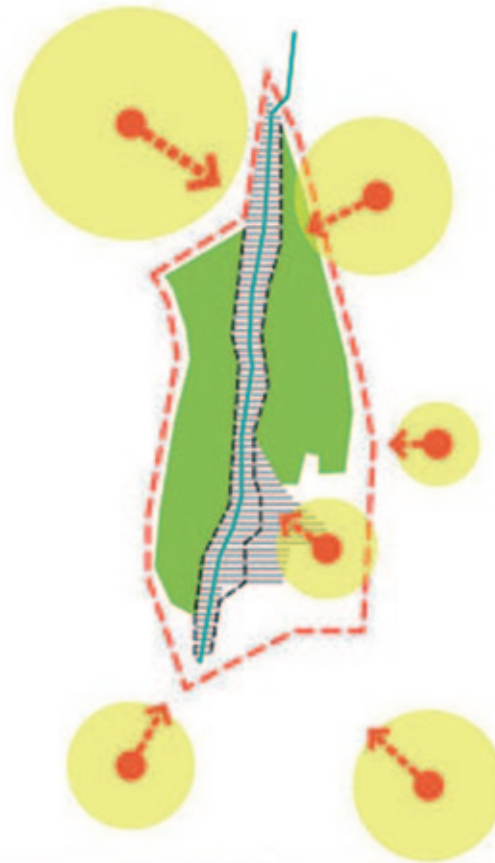


Problem/Challenge

Abandoned canal

site is a big green space between residential areas and is used by people around it.

The abandoned canal is a barrier in the green space divide the west and east side.

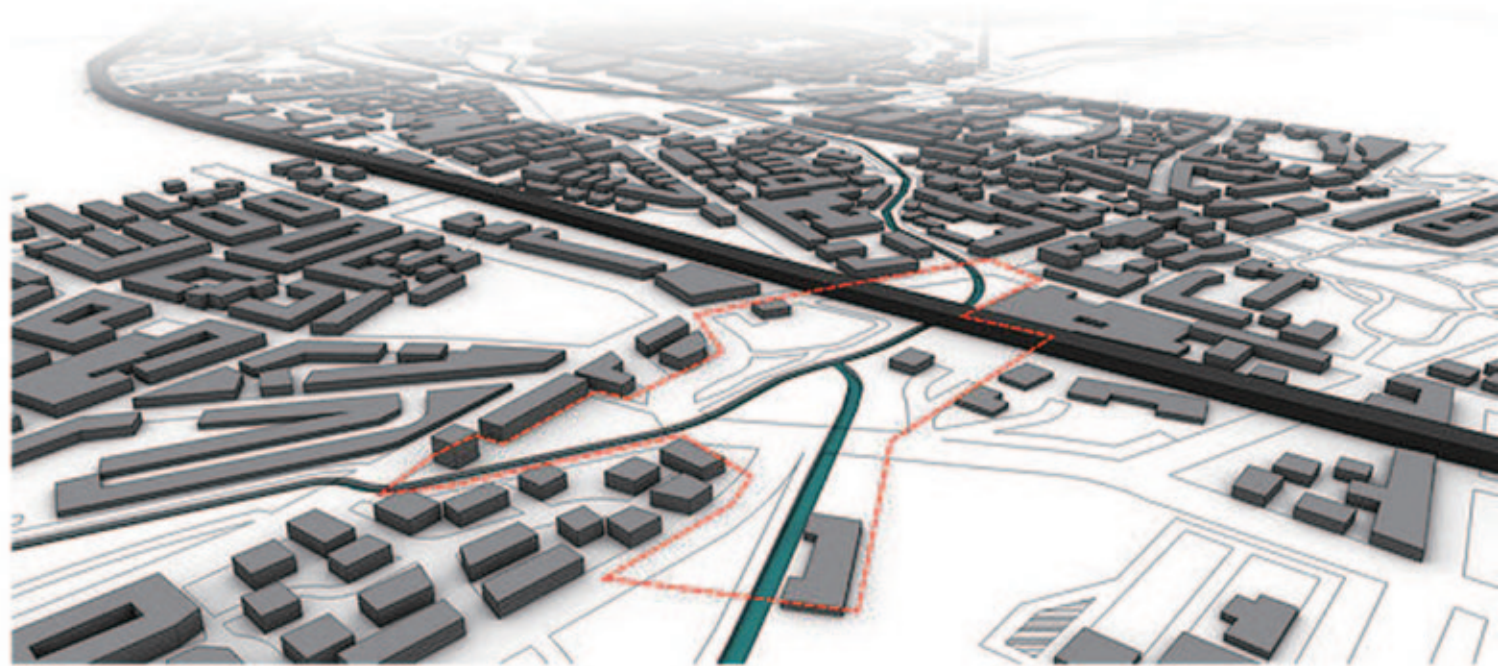


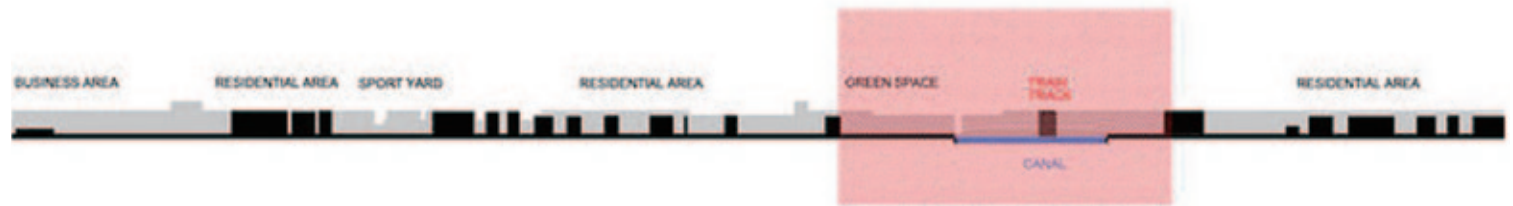
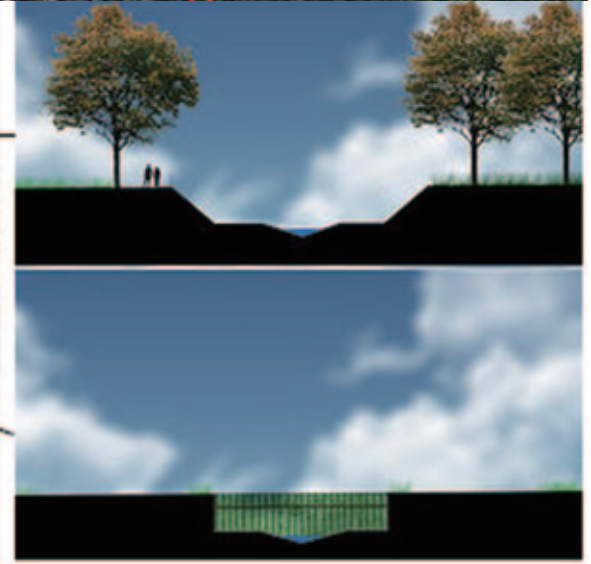
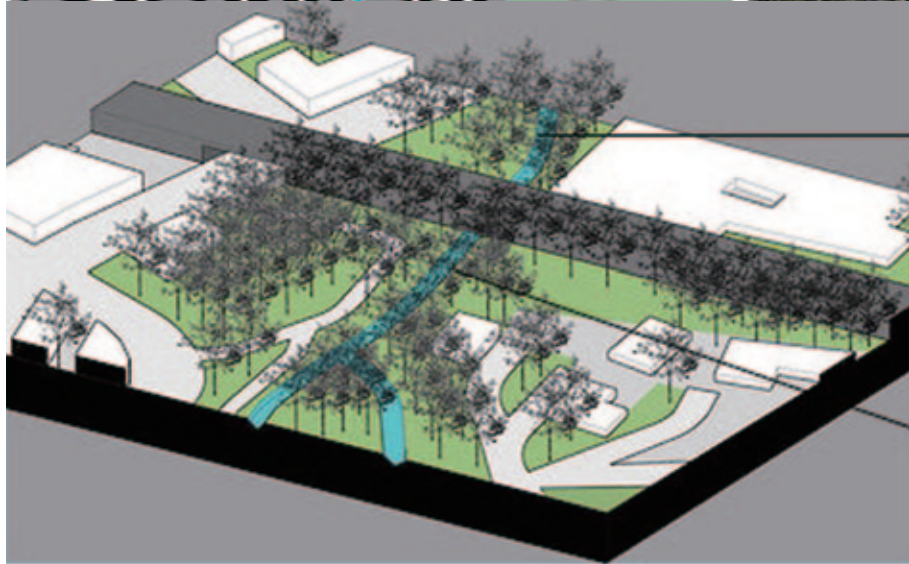


section
sub-center

3

site
status





Problem/Challenge

Abandoned Train Track

this section has a very good and transportation location

The center of the site, where use to be abandoned train track, have not been sufficient used,



Current situation:
Abandoned train
track, Waste land

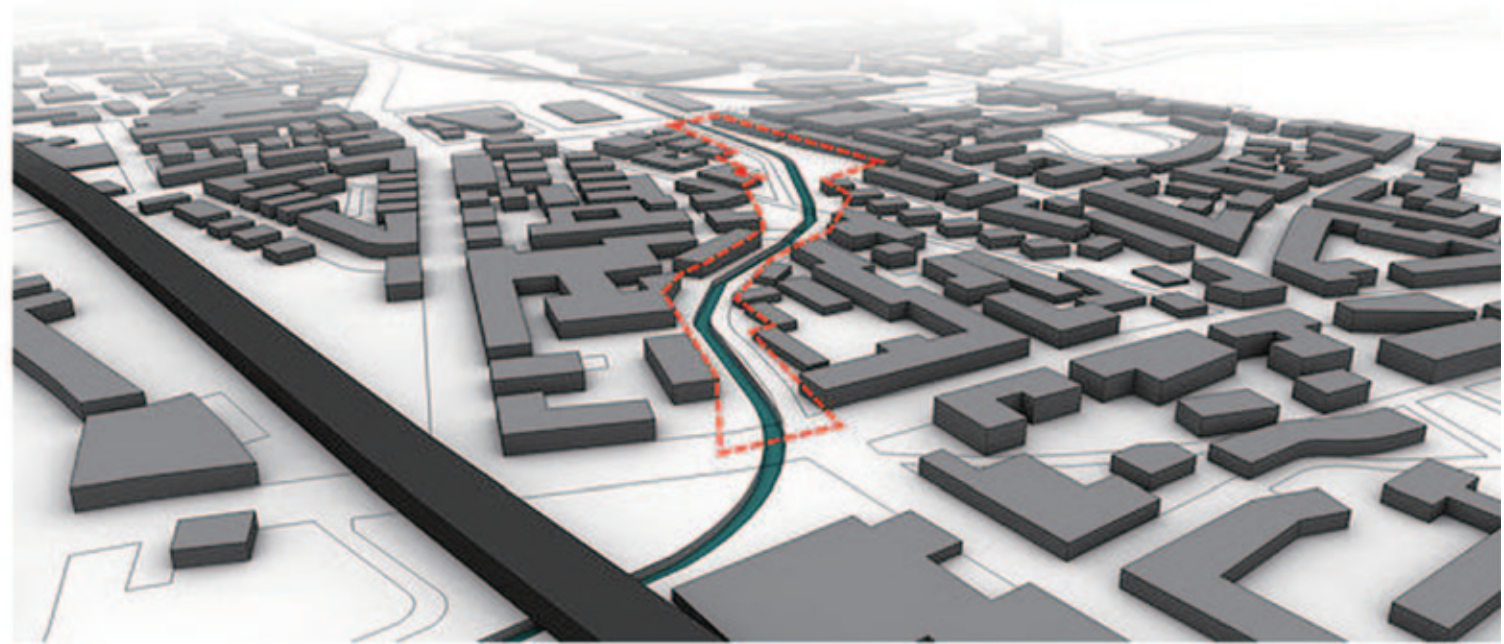


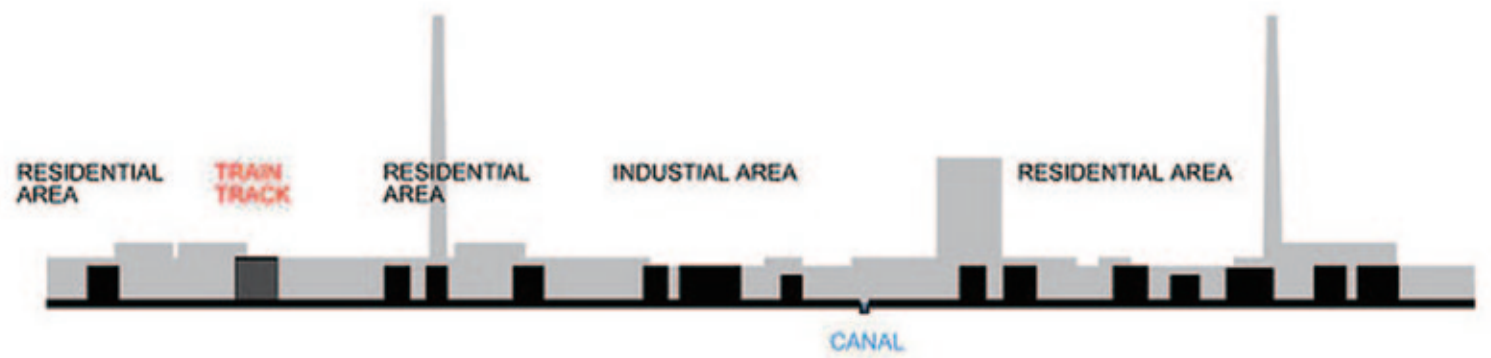
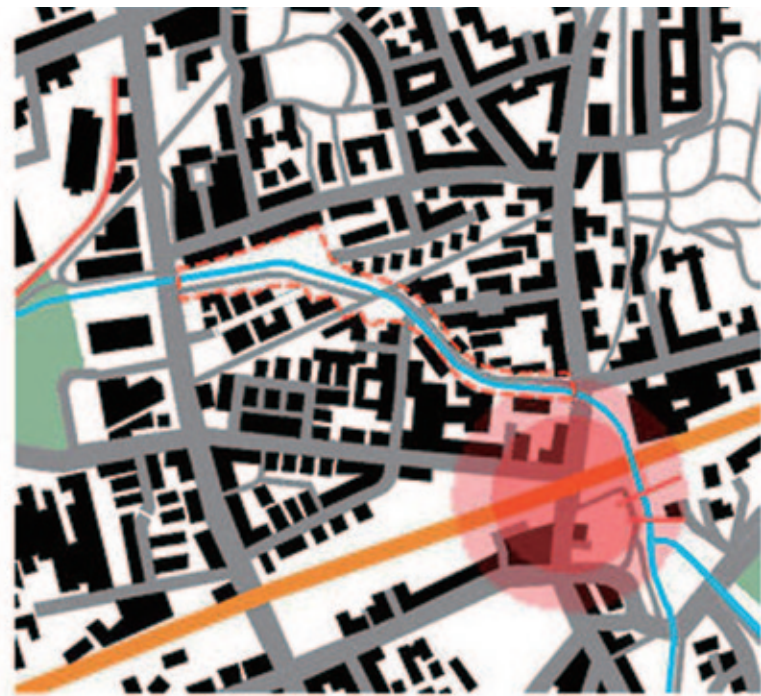
section

Residential Park

4

**site
status**



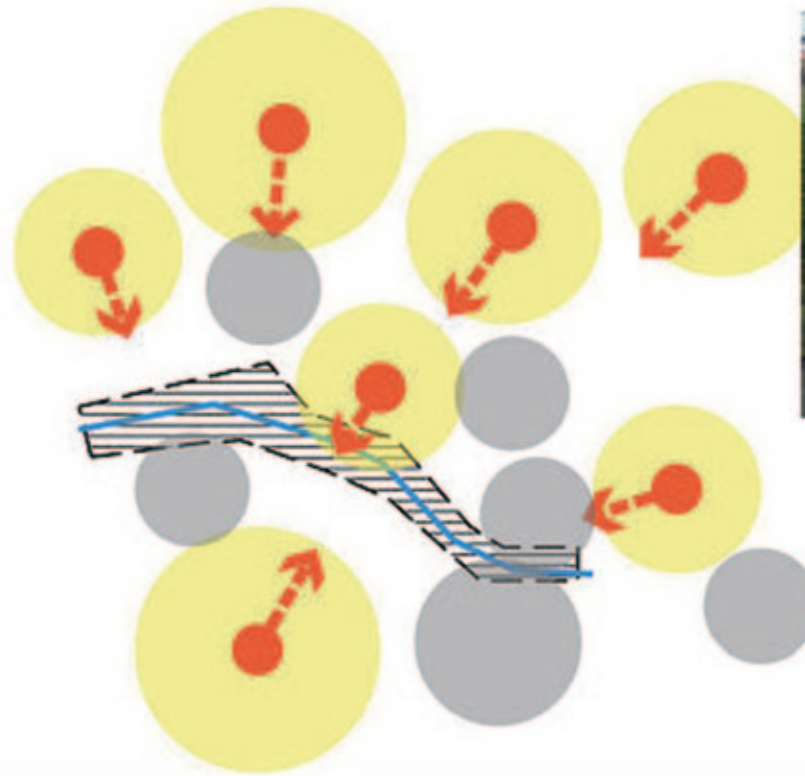


Problem/Challenge

Abandoned canal

this section located between houses.

The canal currently is the barrier in the community

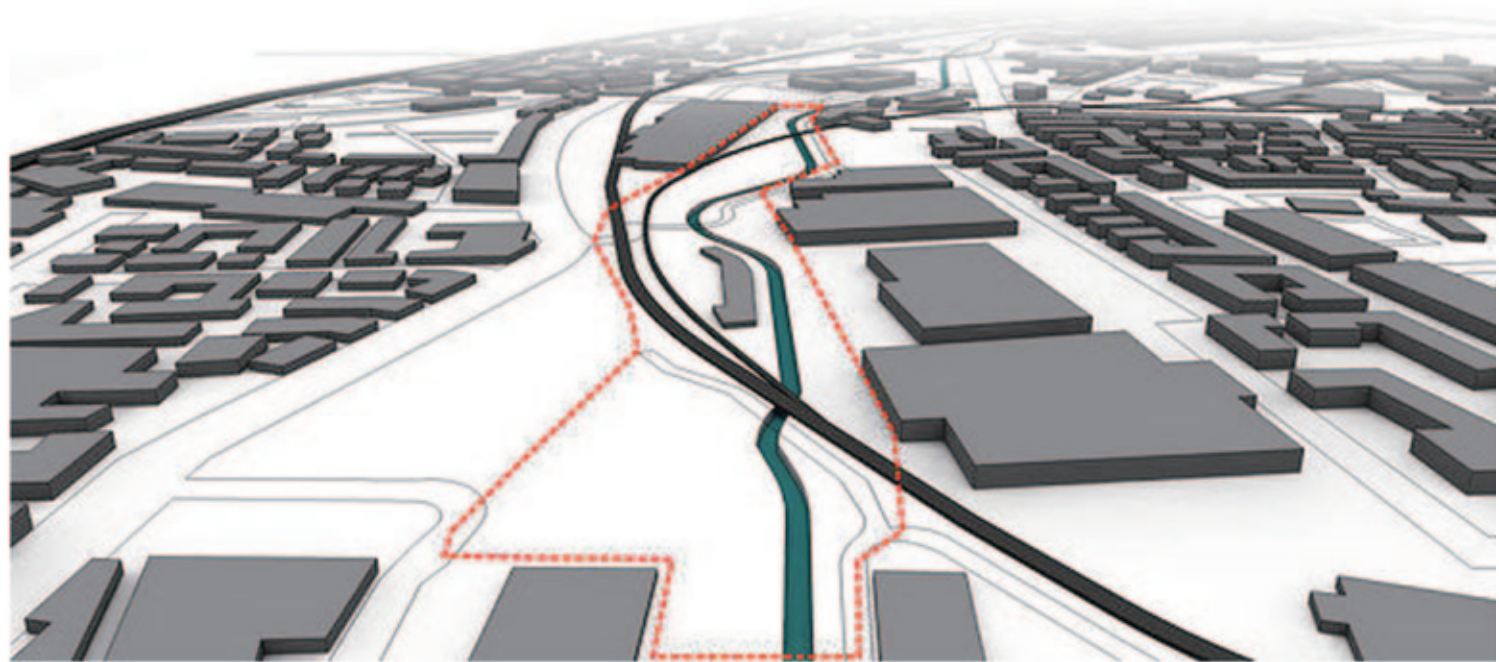


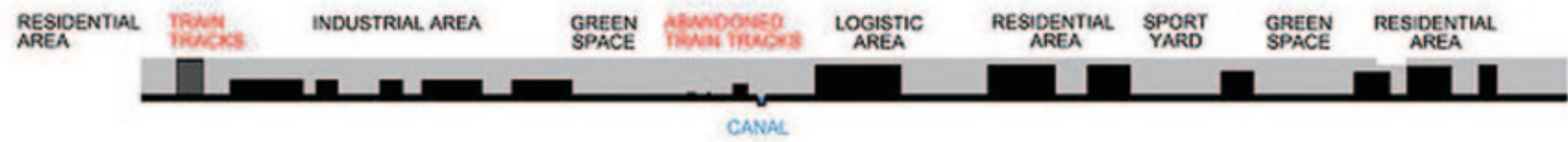


section
Nature Park

5

site
status





Problem/Challenge
Abandoned canal,
Train Track

this section located between
logistic area and factories.

plants are over grown and
few people used this area



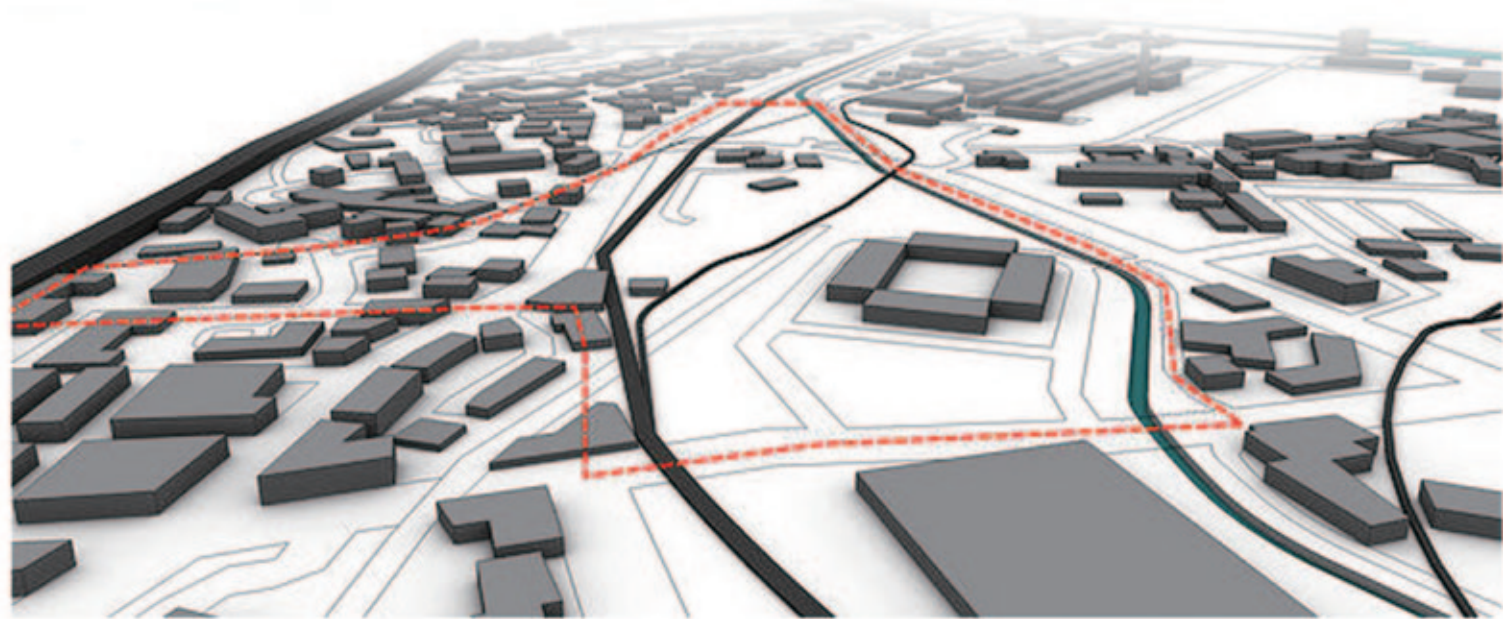


section

Event Park

6

**site
status**



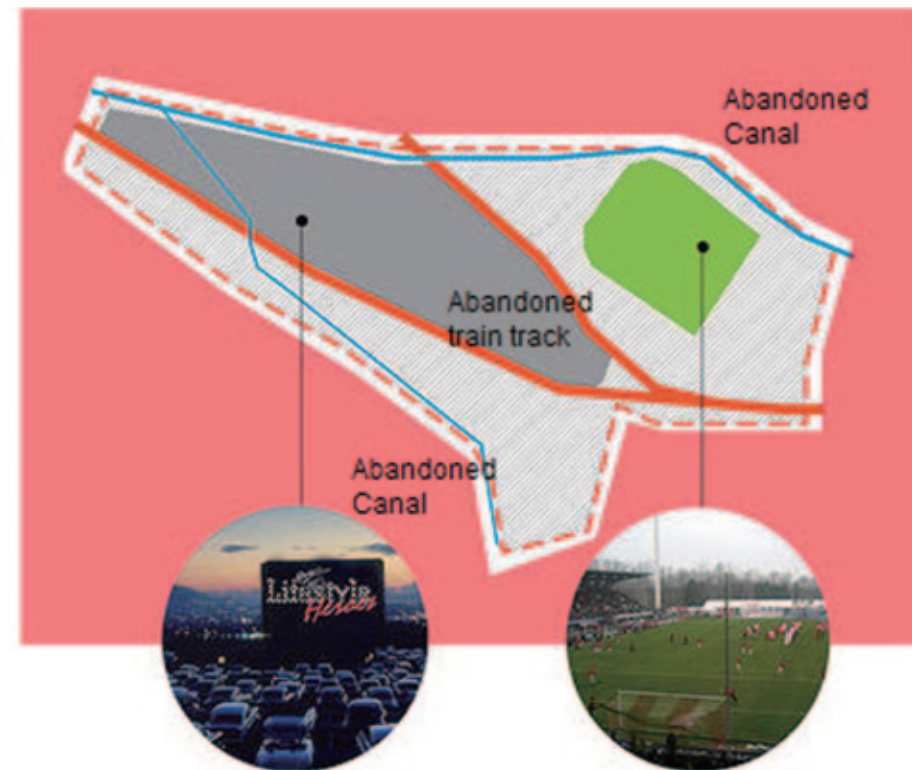


Problem/challenge

Abandoned canal, Train Track

This site is a big hard surface open space, including a football stadium and drive-in theatre, which is isolated from the outside by abandoned train track and canal

Influenced by the development of new Emscher water band urban quarter, this big open land is facing new change



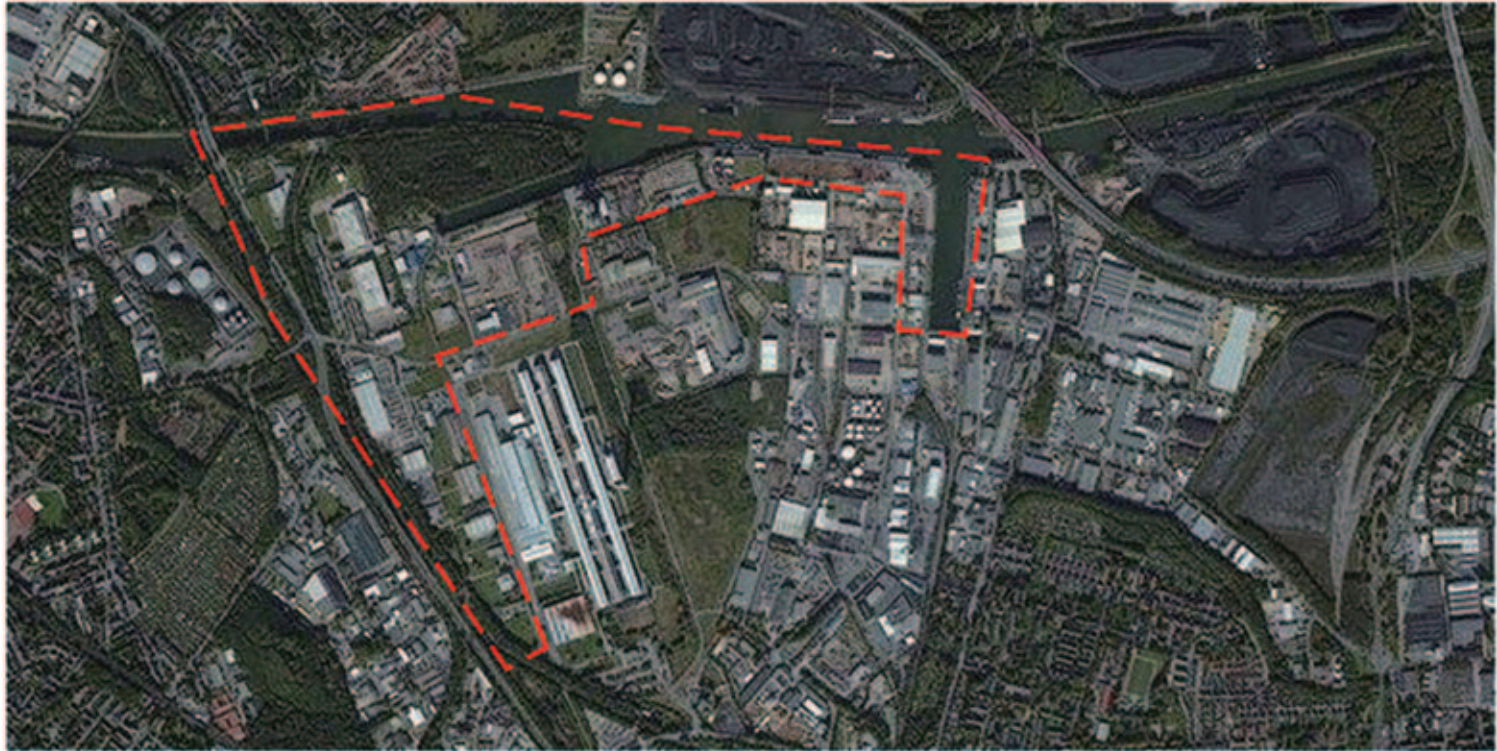


section **Wetland Park &
Water-band Park**

7,8

**site
status**





RESIDENTIAL
AREA

TRASH
TRACK

SHOPPING
AREA

GREEN
SPACE

INDUSTRIAL
AREA

ABANDONED
TRAIN TRACK

INDUSTRIAL AREA

GREEN SPACE

INDUSTRIAL
AREA & PORT

ABANDONED
TRAIN TRACK



CANAL

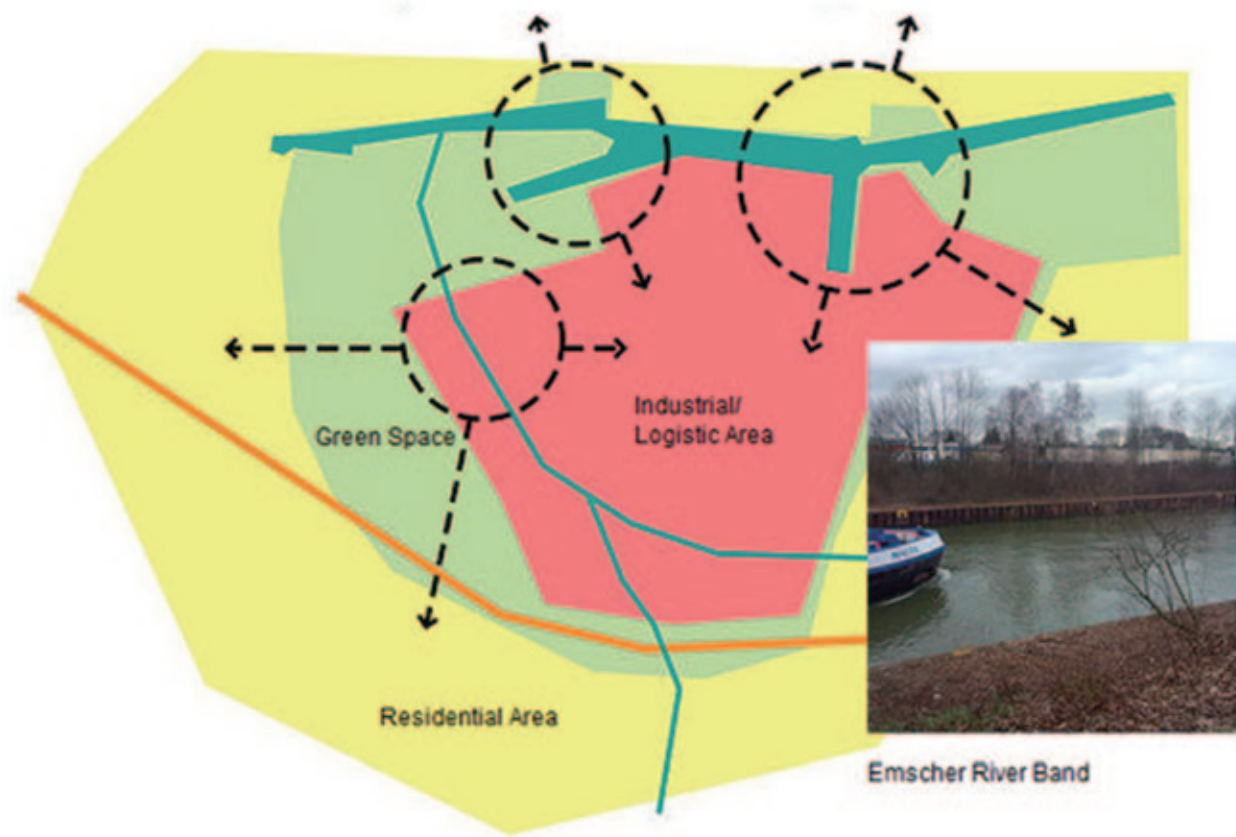
EMSCHER
RIVER

Problem/Challenge

Abandoned Canal, Train Track

This site currently is occupied with industrial and logistic buildings. In the future a new urban quarter will be developed here.

The regeneration of the abandoned train tracks and canals could be the star of this process.



Abandoned Canal



Abandoned Train Track

4.2.3 PLAN OF THE PARK

Basing on analysi, I come up with the plan and basic structure of the park, which includ3

8 sections

4 centers

1 new tram line

1 controled flood plain

8 sections

Sections

1.Entrance Park

2.Residential Park

3.Community center

4.Residential Park

5.Nature Park

6.Sport & performance Park

7.Wetland park

8.Emscher water band park (new working area, new energy factory)



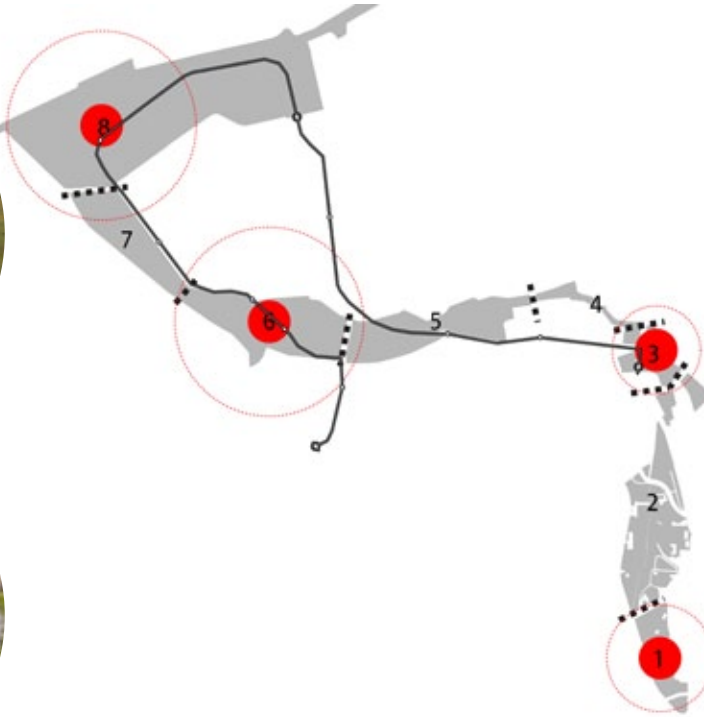
8



4



7



3



6



2



5



1

Basic structure of the park

When the plan of the park have been approved in the park association, I can work on the landscape design of the park.

4.3 CONCEPT

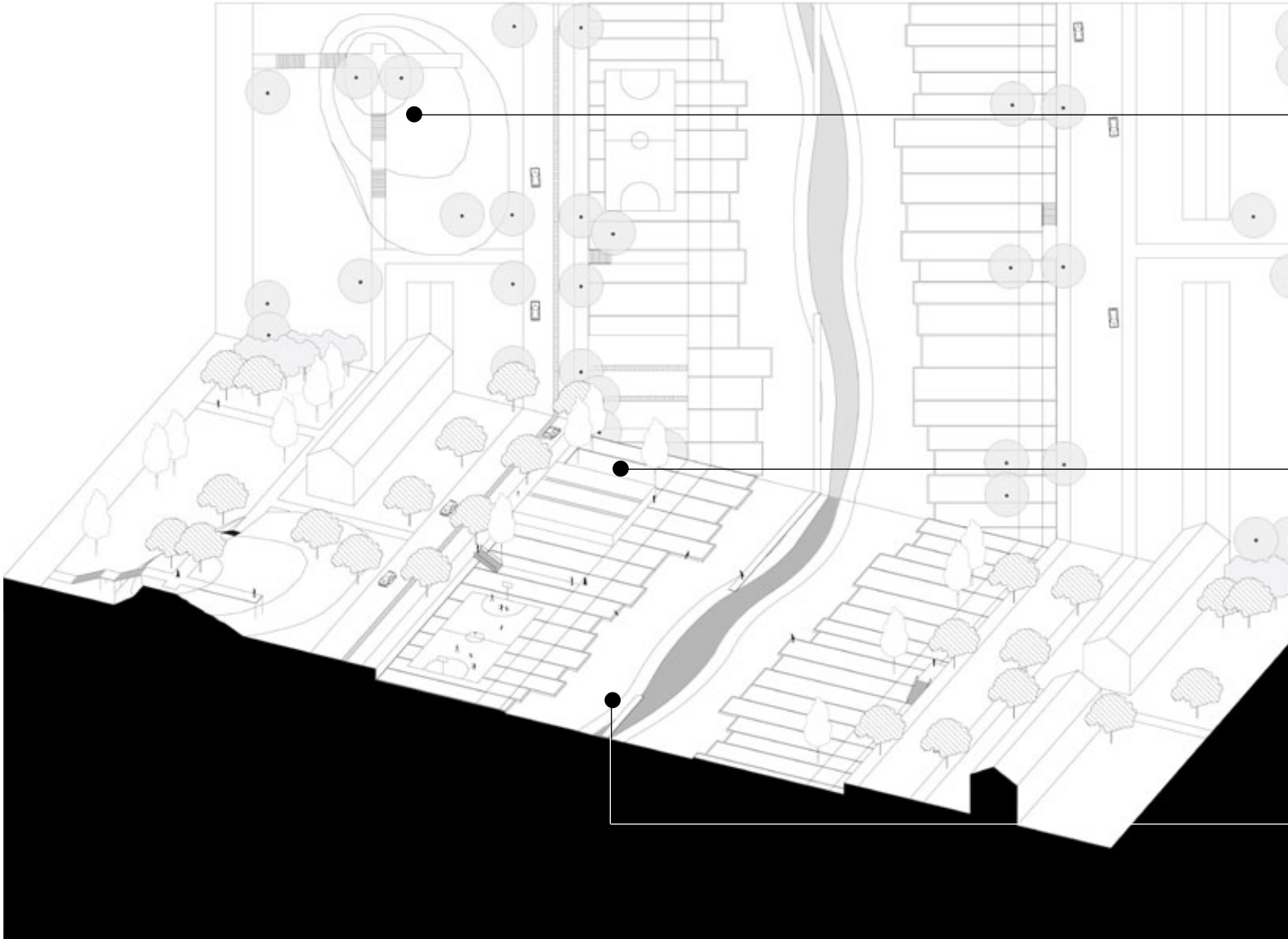
With the transformation of the canals and the preservation of the train lines, there are 3 layer of open space along the water way. This is the basic spatial form of the Park. On each layer they have different perspective of the water way and different relationship with the water.

On water way layer, water could flood it regularly but its also closest to the water.

On Floodplain layer, most time its dry. Because it need to be floodable, this layer is open and could be used for temporary functions

On Flood prevented layer, its safe from water, its the edge of the park and relatively far away from water.

Basing on the three layer and their different character, I come up with the concept to creat three experiment routes along the water way.



Urban route
Urban layer
(Flood prevented)



Culture route
Floodplain layer
(Flood in extreme rainy day)

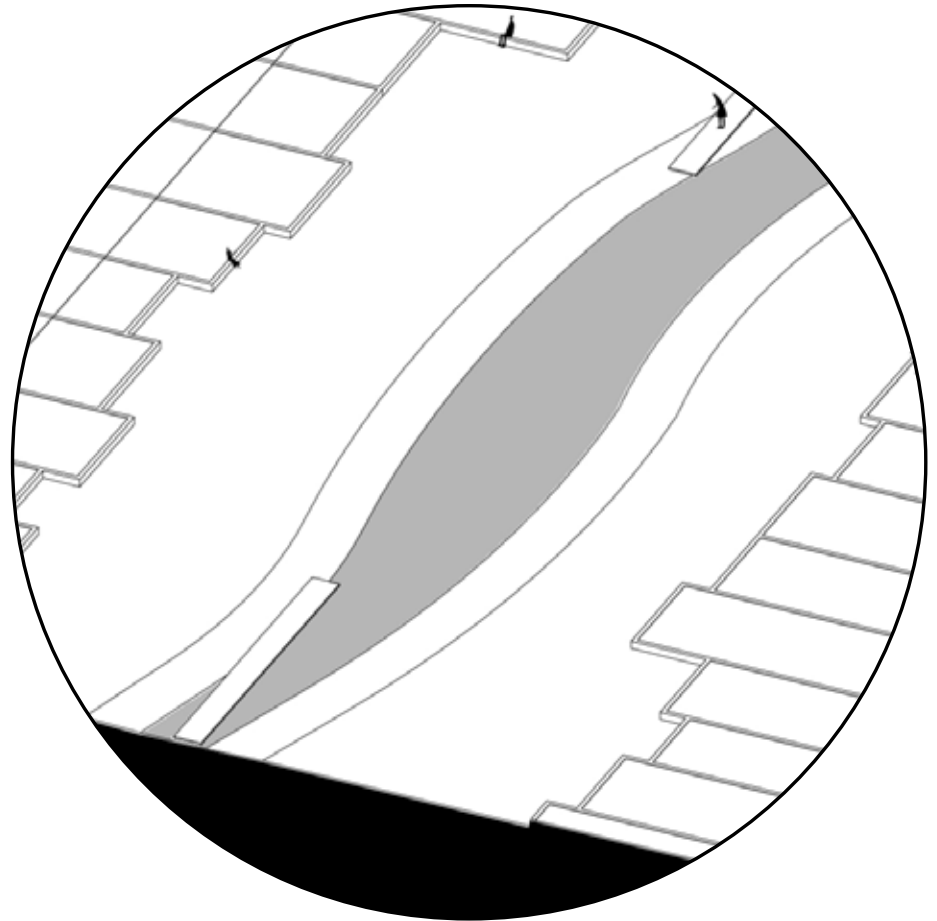


Nature route
water way layer
(Regular flood in rainy day)

Concept
three experiment routes

4.3.1 NATURE ROUTE

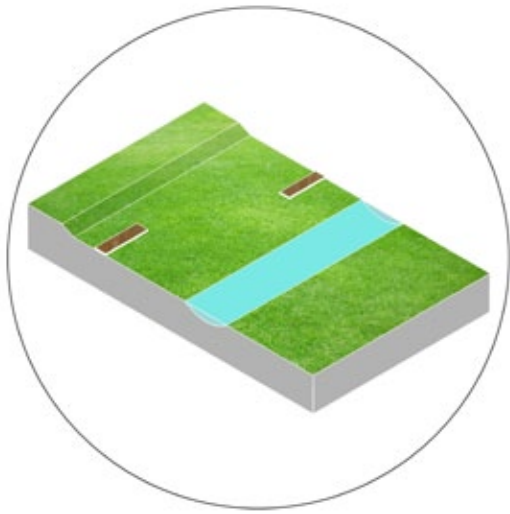
Basing on the water way layer, where water would flood it regularly, I design Nature Route



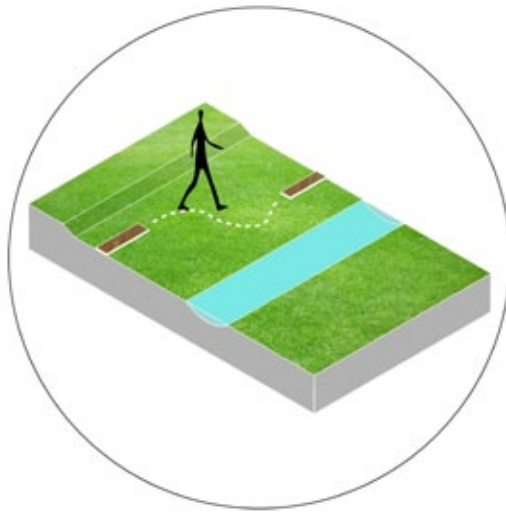
Concept: Walk your way

People's behavior is part of nature process.

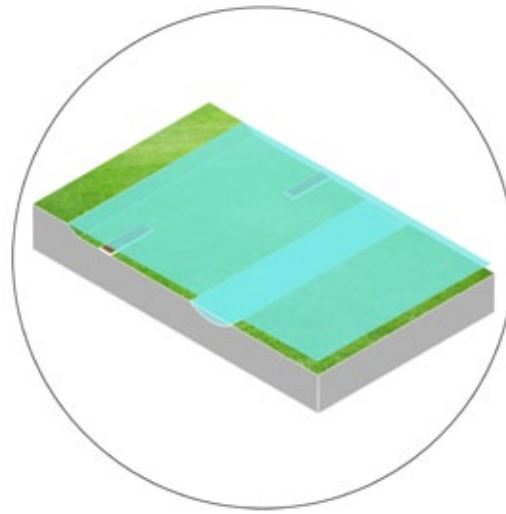
The physical intervention in the nature route is only a disconnected route along the water. From section to section, people need to walk their own way by foot. After a few times, there might be a path created by people's walking on the ground. But when the rain came, the land will be flood and the grass will grow fast after flood and the route will disappear. The land will back to begin, and people will need to walk their way again and again.



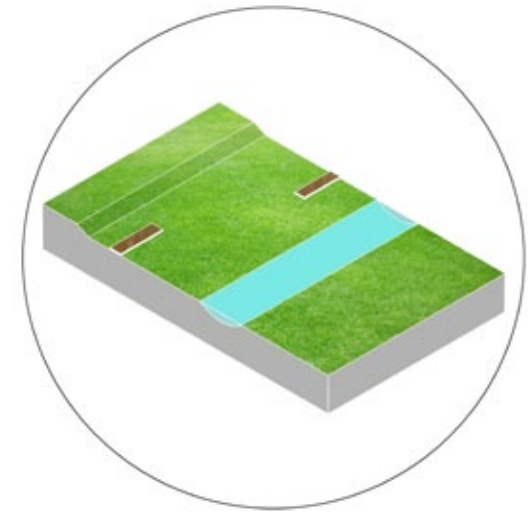
Constructed:
Disconnected routes along the water



People
walk their own way

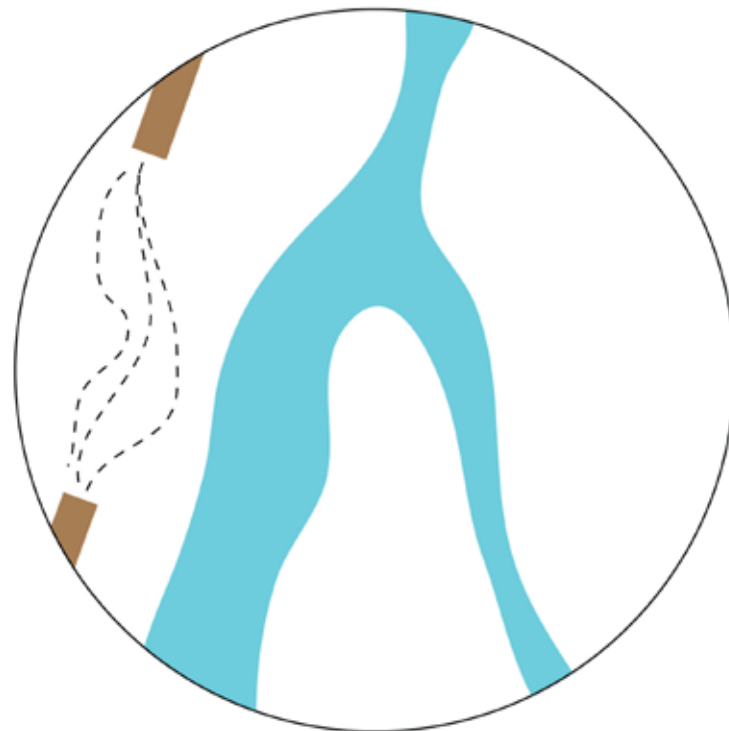
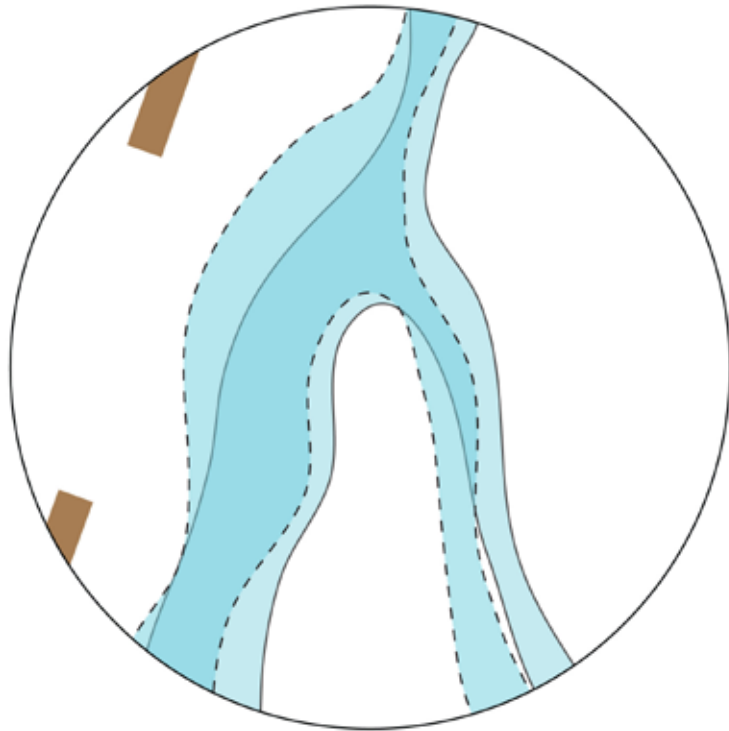


flood



*The grass grow back and land back
to original situation*

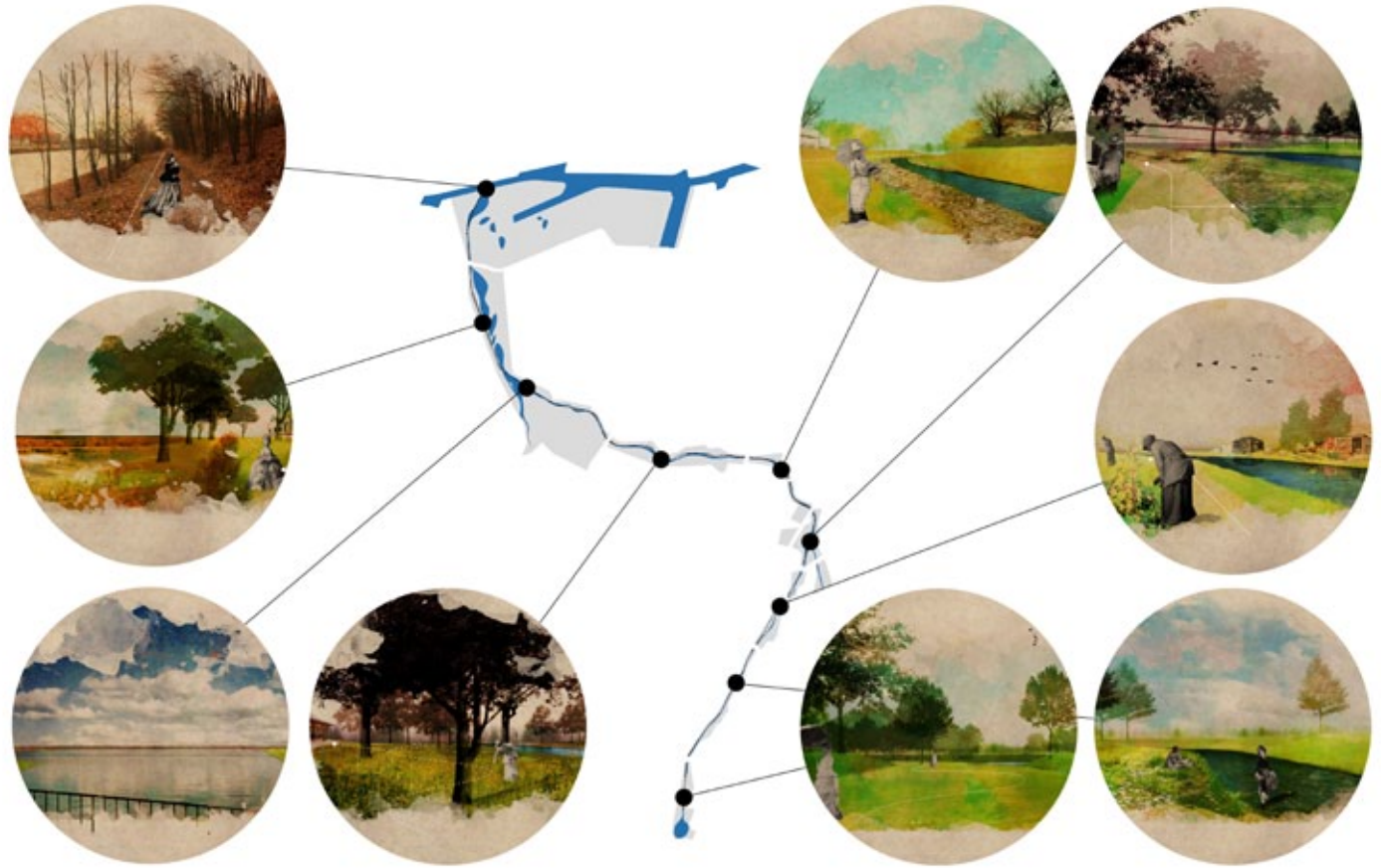
The route is dynamic, so is the water way. After the regeneration of the canal, without the concrete canal to limit the water flow. The water can flow freely in the water way layer. With times of flood, the water way will change as in the nature situation, so will be the routes along the water way



Experiment

Walking on the nature route, its inconvenient, rough. People might get wet or get mud on foot. So there will be less people and be quiet on this route. The people on nature route could hear the sound they normally will miss --- the wind, the water, the birds....--- and have some intimate time with family, with lovers or with themselves.

Continue going on nature routes. they might get lost and can't find the next section of the route. But its okey, because on this route, its not about going somewhere, its about enjoy the romantic moment and nature beauty in the park.



Experiment in the nature route



Design

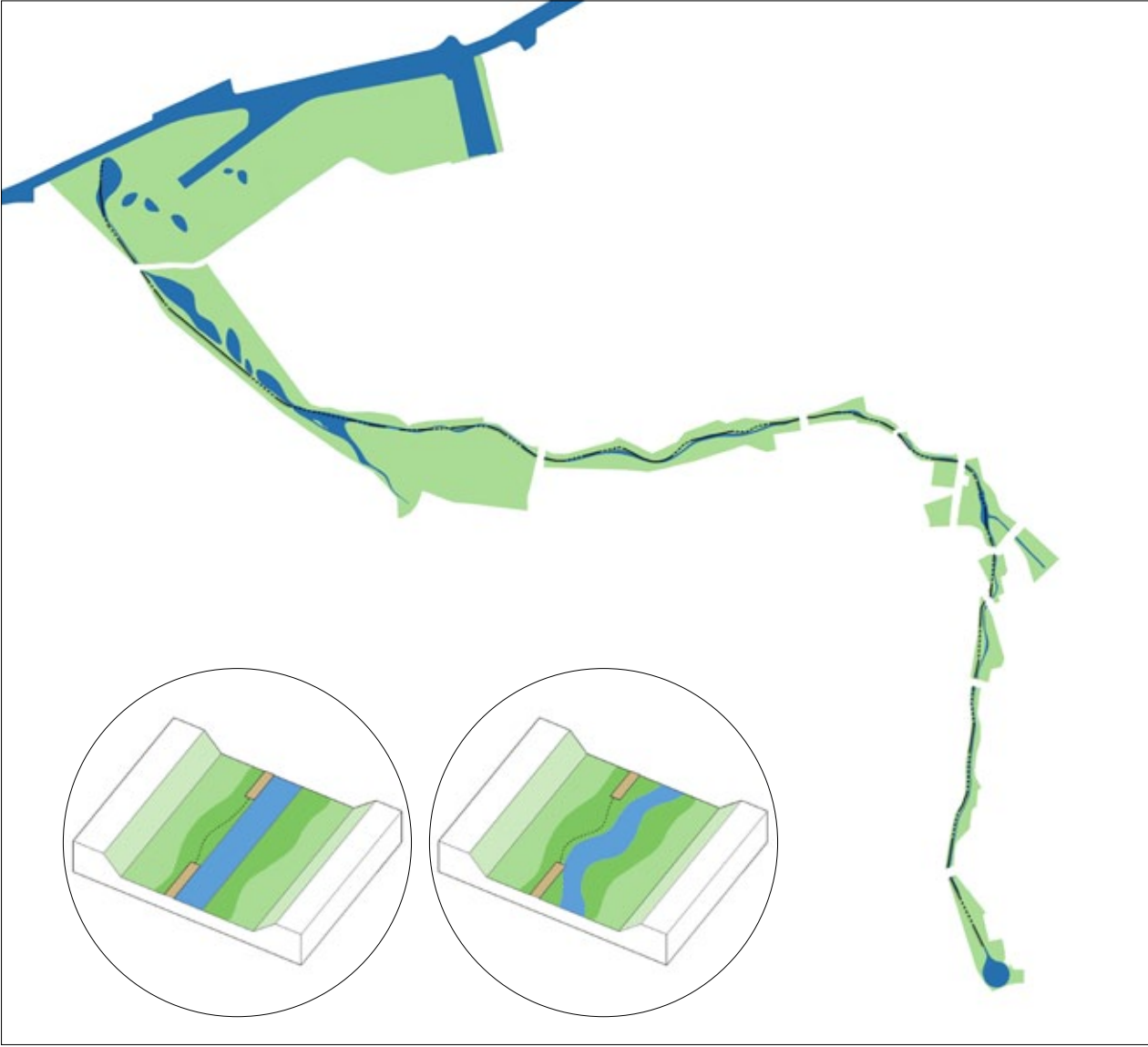
Path:

In design of the nature route, to remind the artificial canals which will be deconstructed, the route will be design along the canals but the water can flow through it easily.

Layer:

when its first constructed, the water flows as the way they did in the canals. After a few times of flood, the watr way will appear to be more "nature" form and the experiment people will have through the nature route will be richer.





Perspective on Nature Routes

Its quiet, poetry and romantic



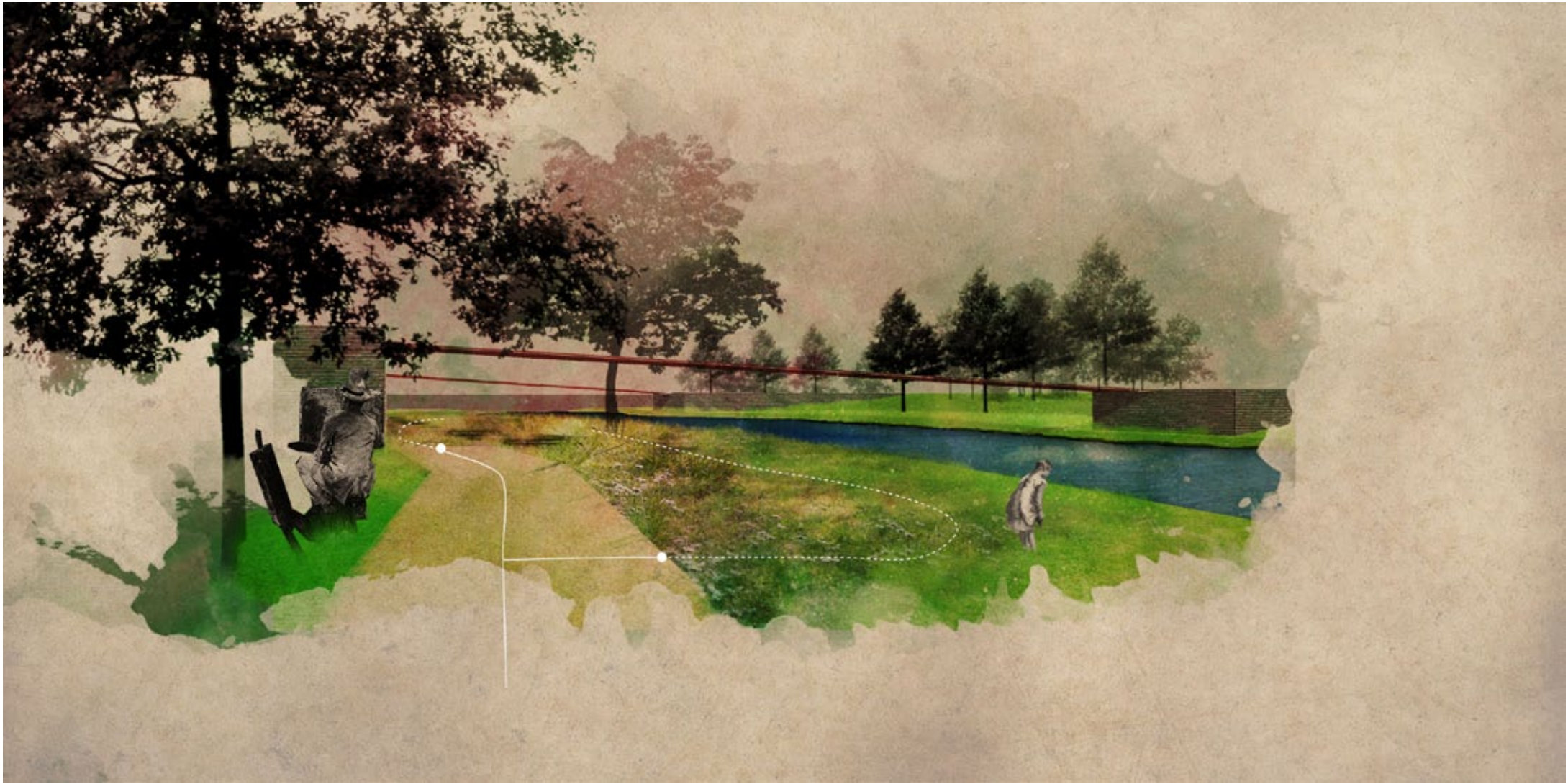
Enjoy the sunshine in woodless land in Entrance park



Play water in the stream in residential park



Enjoy the sunset in the garden of Residential park



Drawing the water valley in Grass land in the back of Community Center





Take a walk after dinner in Residential Park





Have a picnic in the woodlands in Nature Park



Swim at the reservoir at the Sport and Performance Park



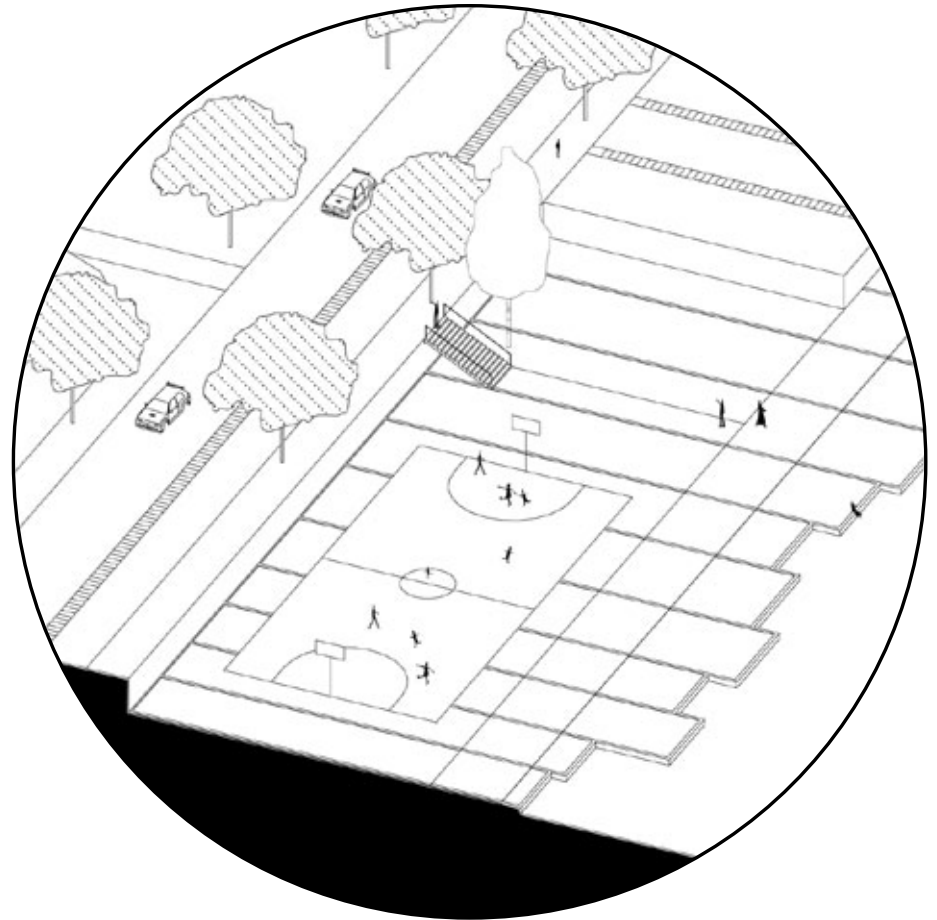
walk dog along the wetland in Wetland Park



Enjoy some alone time at the side of Emscher River in Emscher Waterband Park

4.3.2 CULTURE ROUTE

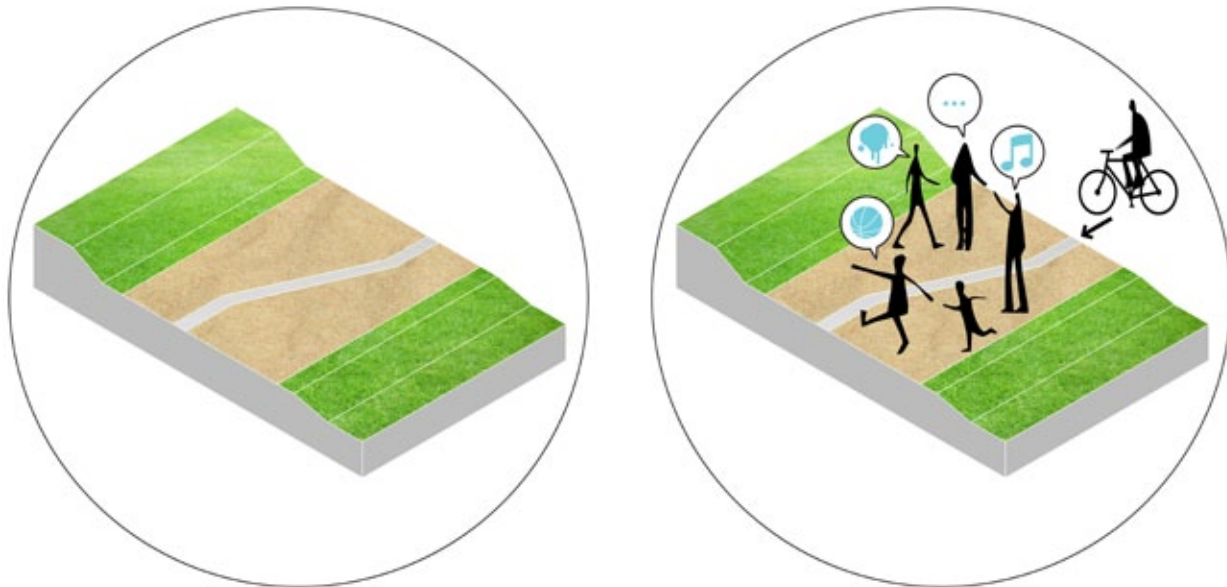
Basing on the floodplain layer, where it only be flood in extreme rainy day, I design Culture Route



Concept: A place for social interaction

The definition of culture in dictionary. Culture is the characteristics of a particular group of people, defined by everything from language, religion, cuisine, social habits, music and arts.

I design the culture route as the main route in the park which and plan the public activity spaces along it.

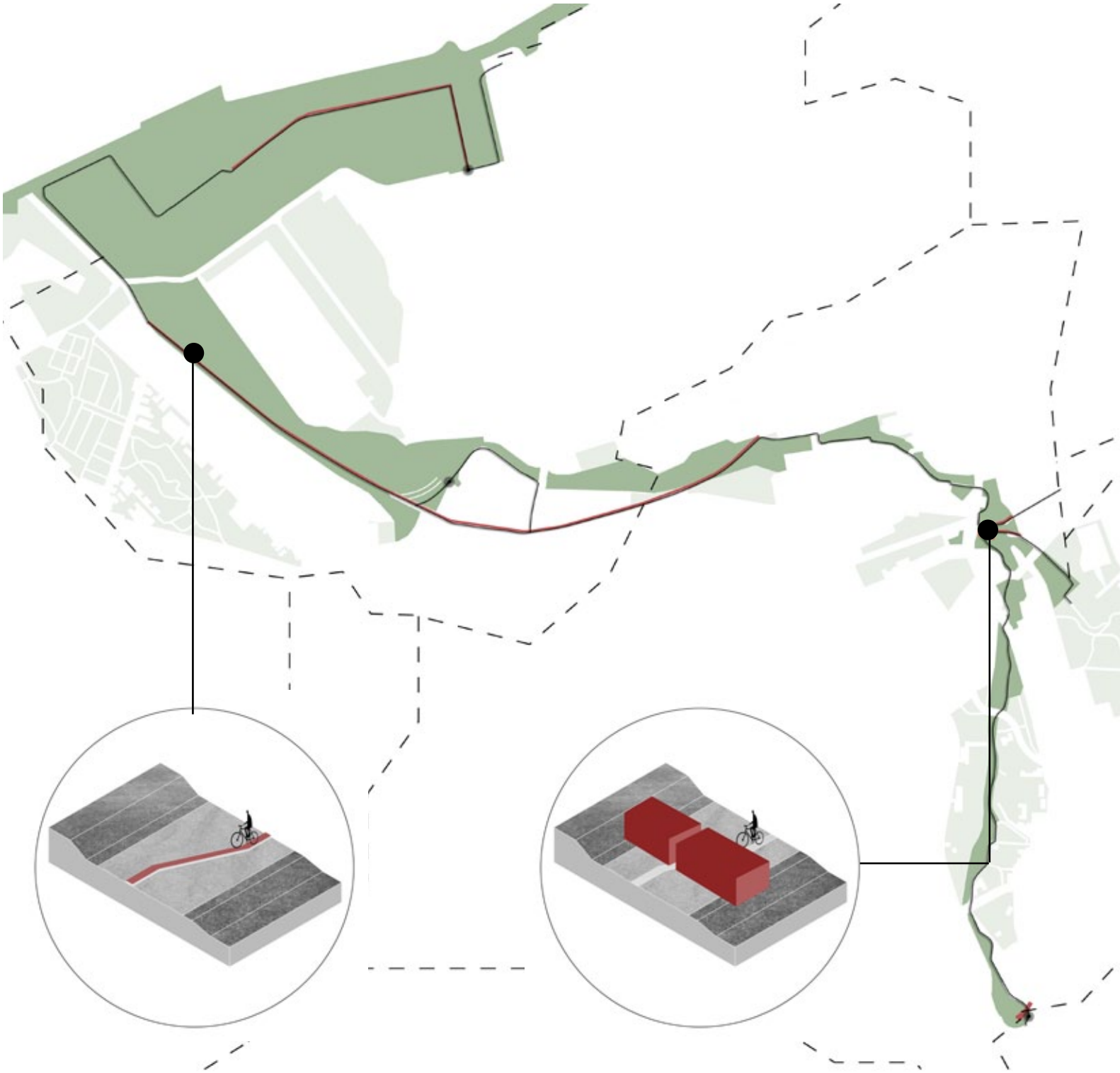


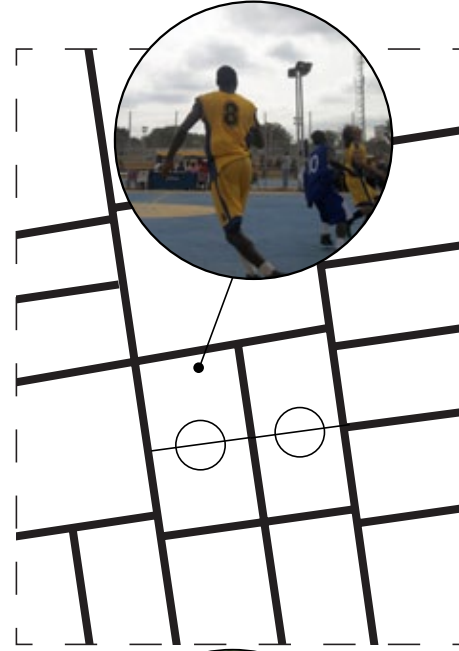
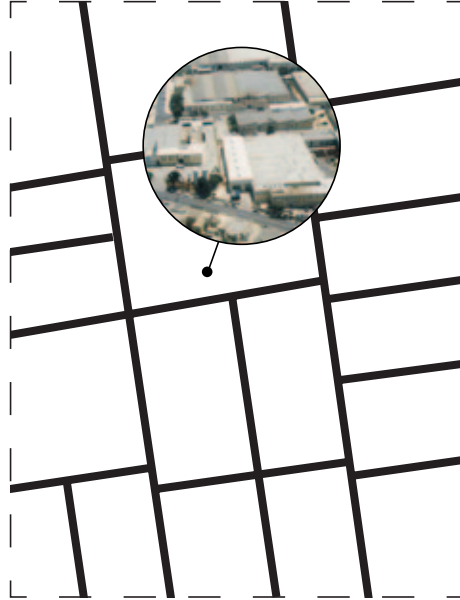
When people go on the route along it, they will see people palying, watch the art they maid, hear they talking, laughing, singing and, if they like, they can join them anytime they want.



Design (path)

In design, as the main route of the park and to highlight the abandoned train tracks, the culture route planned on or across the abandoned train tracks and become part of the green route network. The public activities open spaces are planned along it





Perspective on Culture Routes

On the culture route, people can experiment different aspects pf the culture.
The atmosphere is exciting, happy and alive.



Neighborhood gardening in the Residential Park



Children playing and people play sports in the Community Center



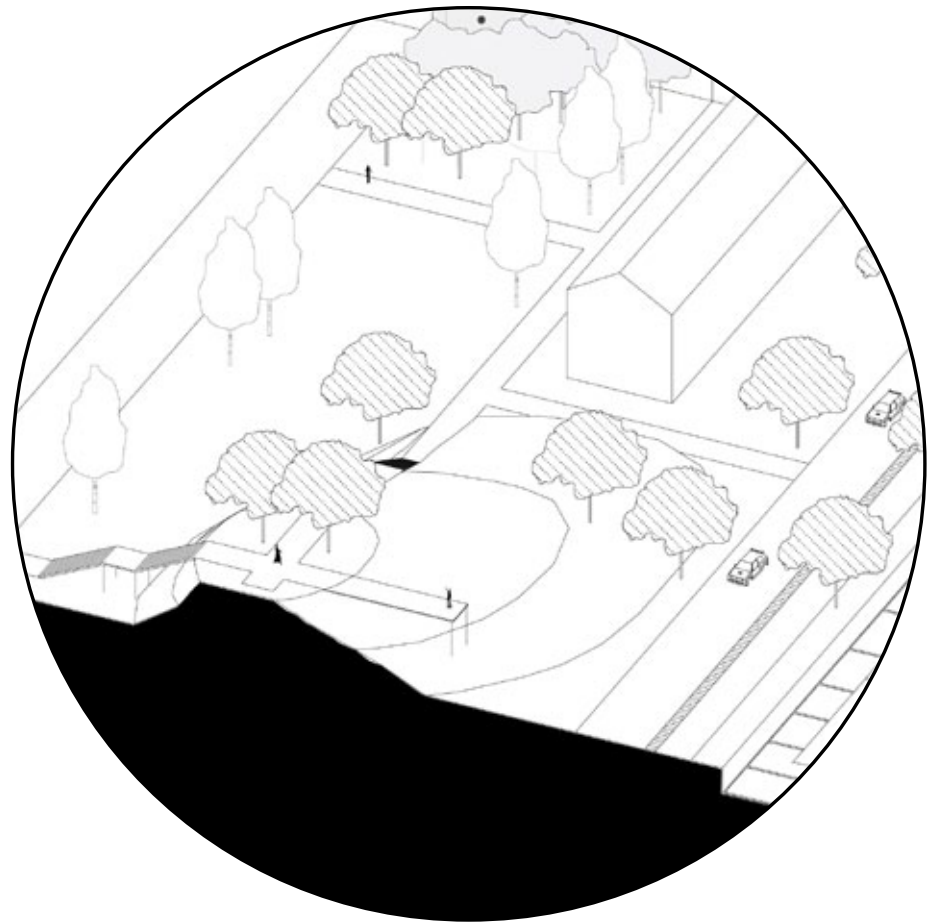
Family camping in the Nature Park



Young people having concert and performance in the sport and performance park

4.3.3 URBAN ROUTE

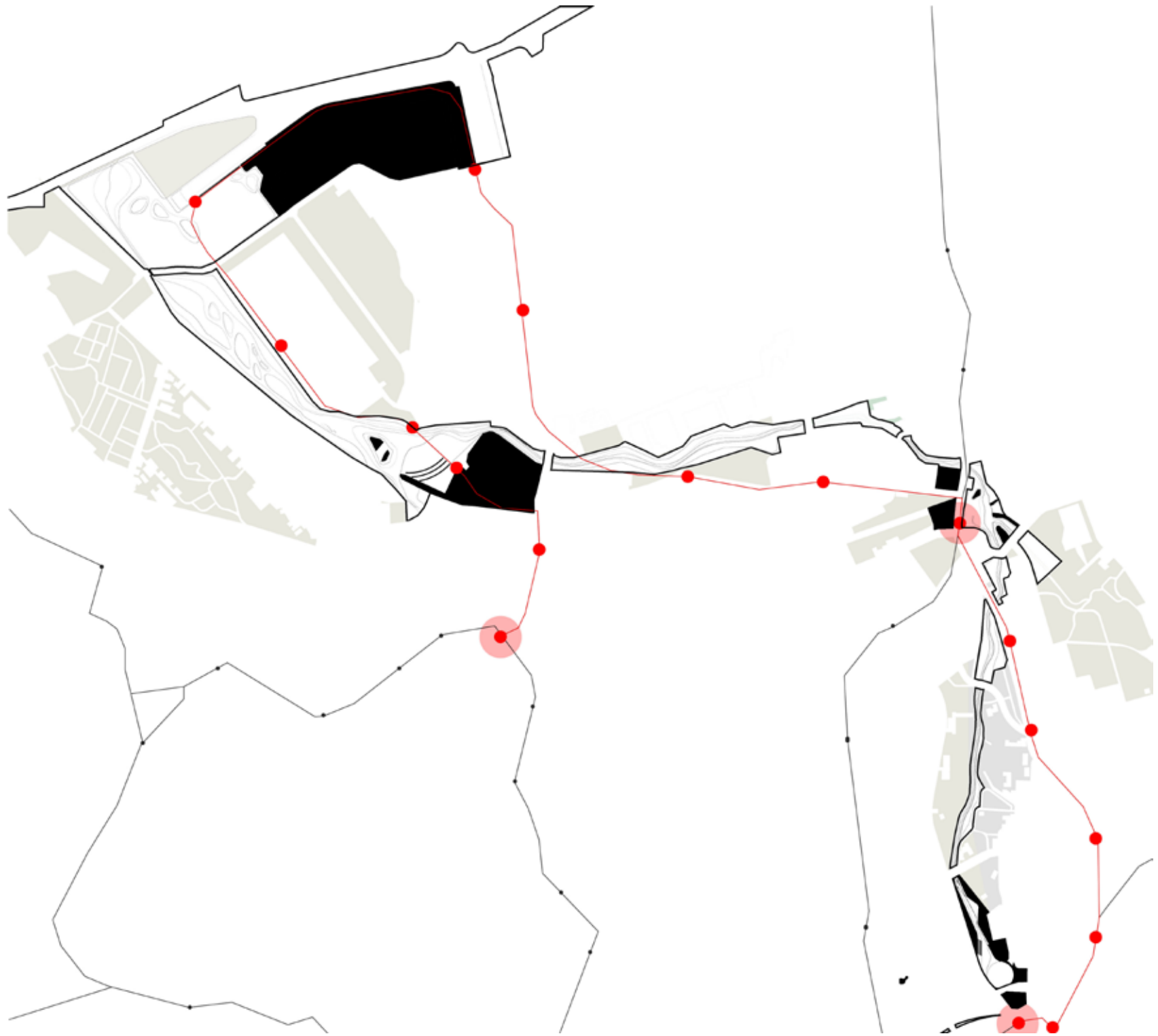
Basing on the urban layer, where it is flood prevented, I design Urban Route

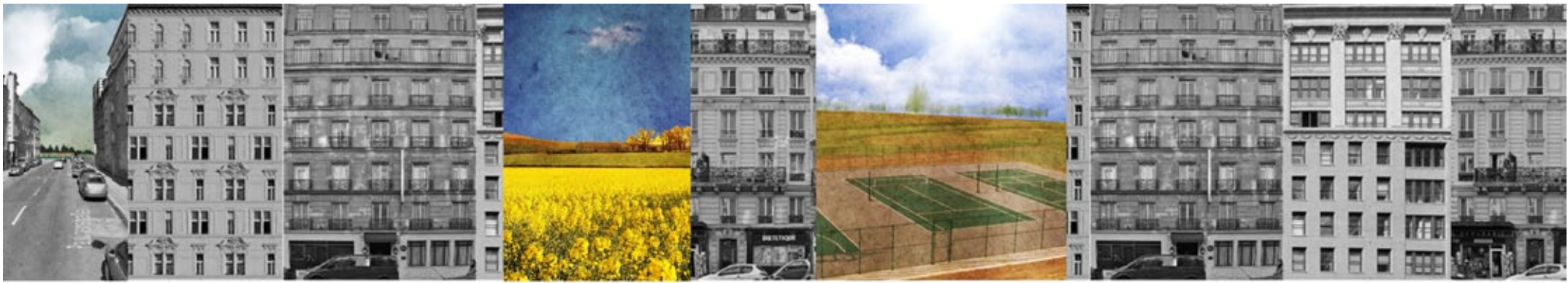


Concept: A tour shuttles between city and the park

Urban layer is the layer between city and park.

With develop of the new tram and connect with one of the exist tram line. I develop a "brown line park" special line. On which, people could experiment a tour shuttling between the city and the park.

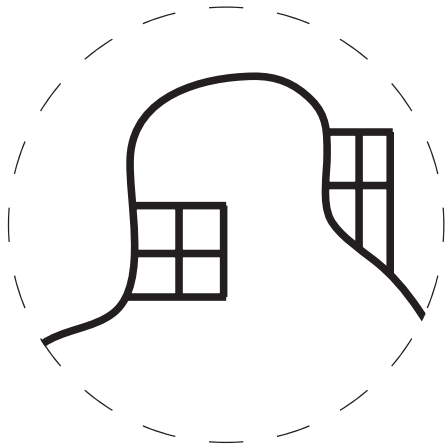




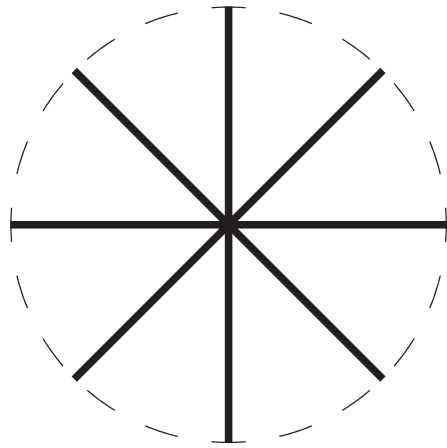
Experiment

Start from city center, you would first catch a glimpse of the park, then start the journey shuttling between city and park. After across a wood land, when you feel you will almost go into the park, there comes a big turn and you go into city again. After long time in the city, eventually, the tram go into the park and become part of it.

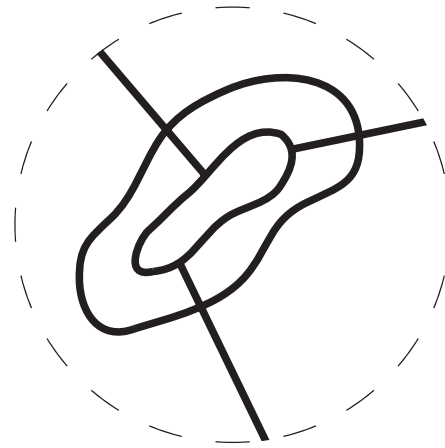




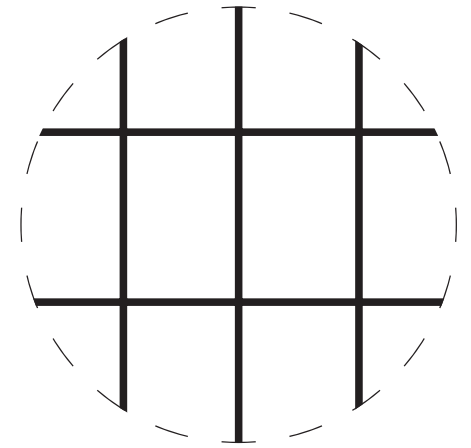
Transportation infrastructure oriented



Geometry oriented



Topography oriented



Urban zoning oriented



Essen



Paris



Rome

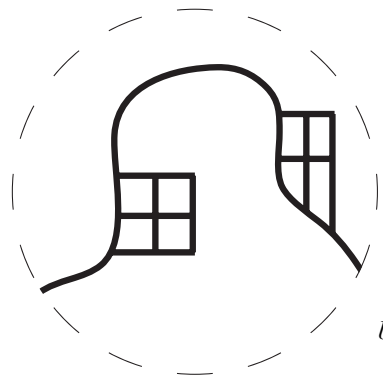


Rotterdam

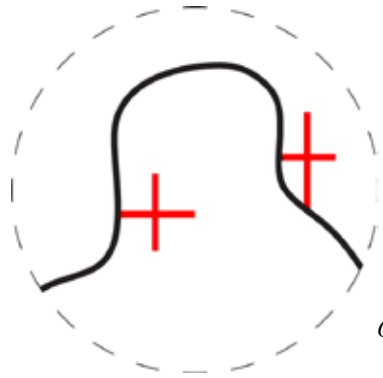
Design

Due to its industrial history, the urban plan in Ruh area is transportation infrastructure oriented.

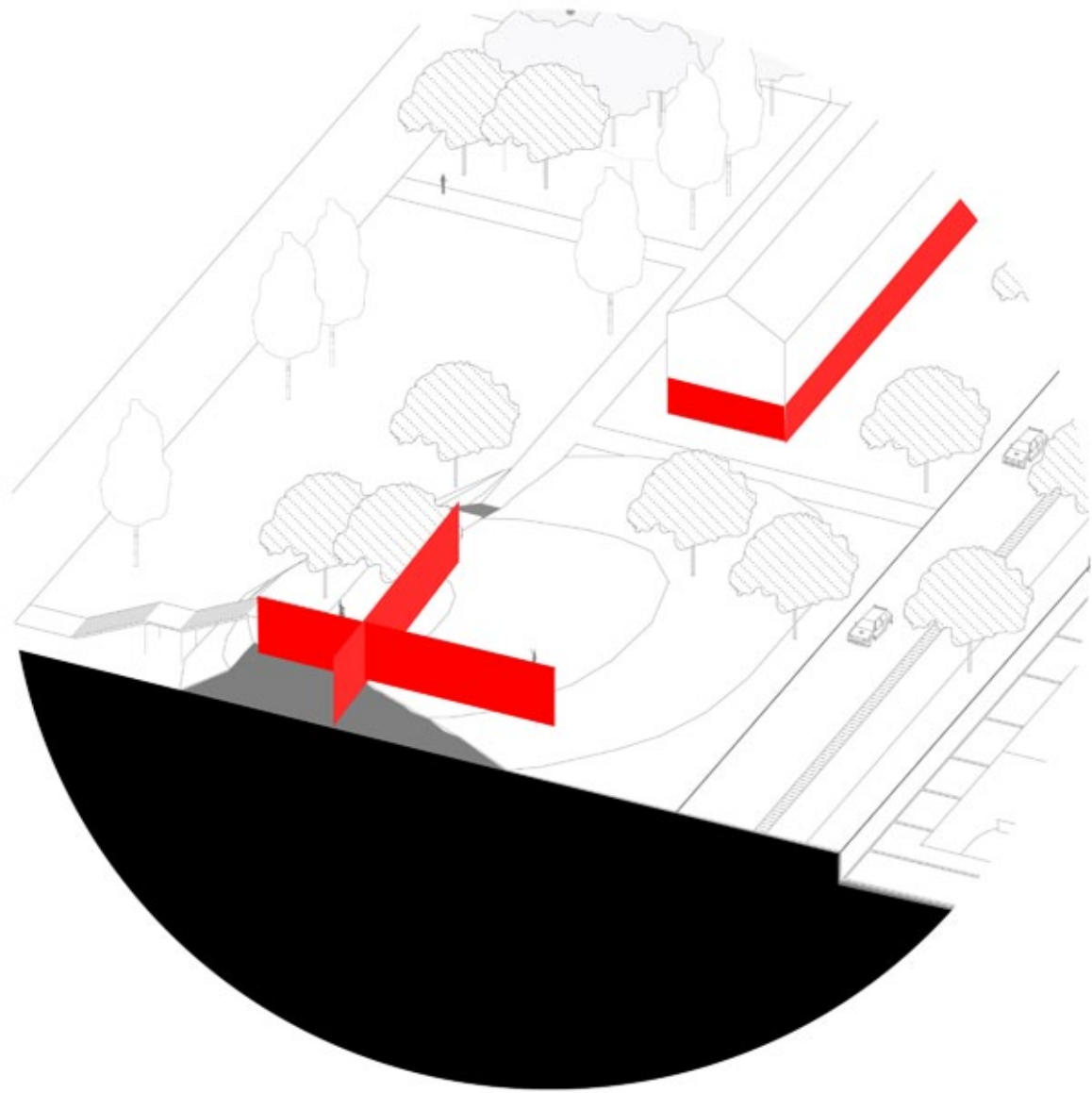
As a representation of this urban fabric. I design across walls that are, on plan, perpendicular to the roads.

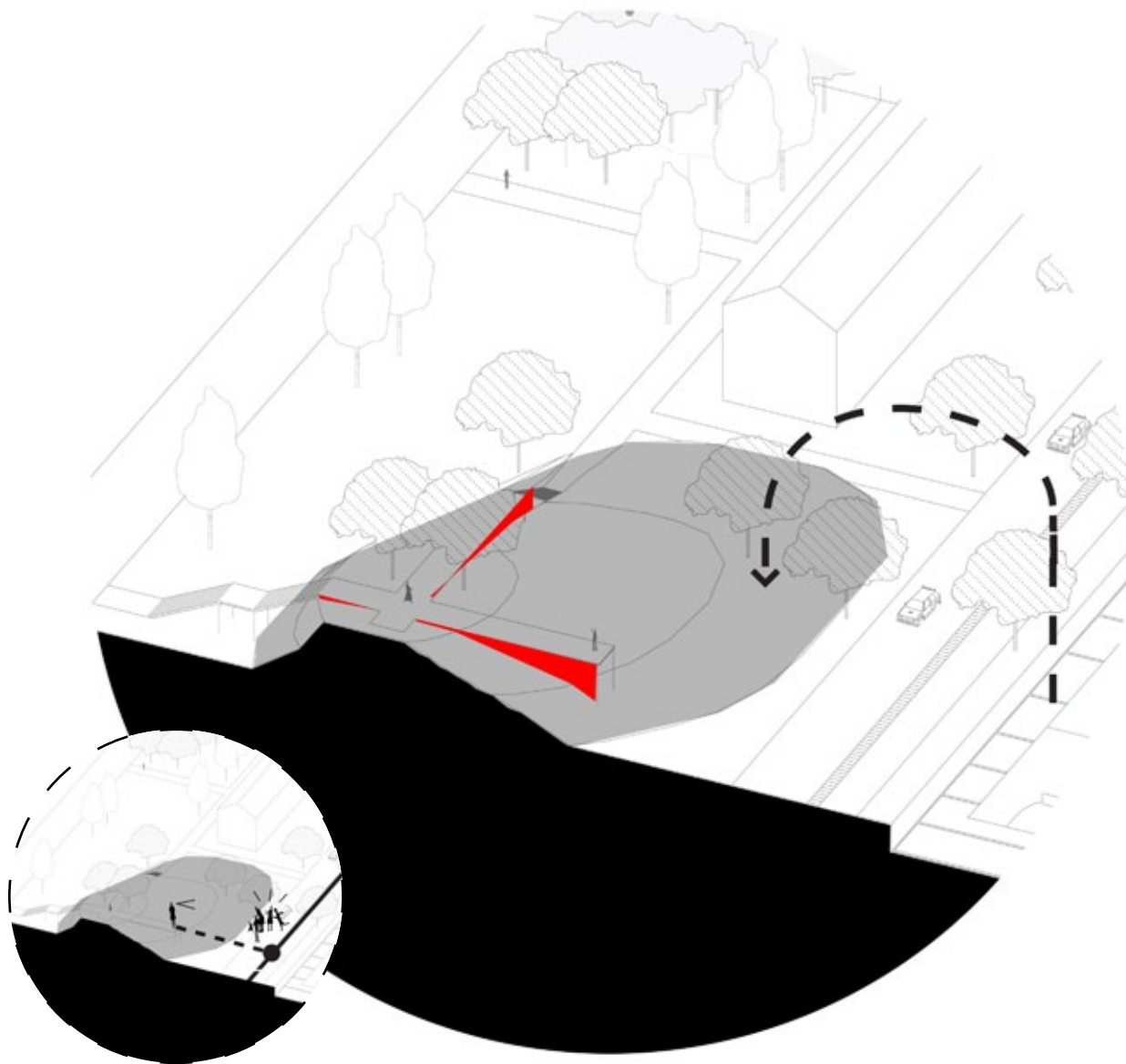


Urban fabric



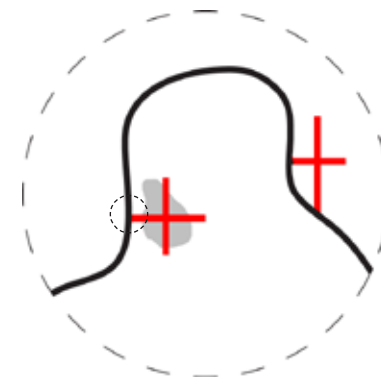
Cross walls





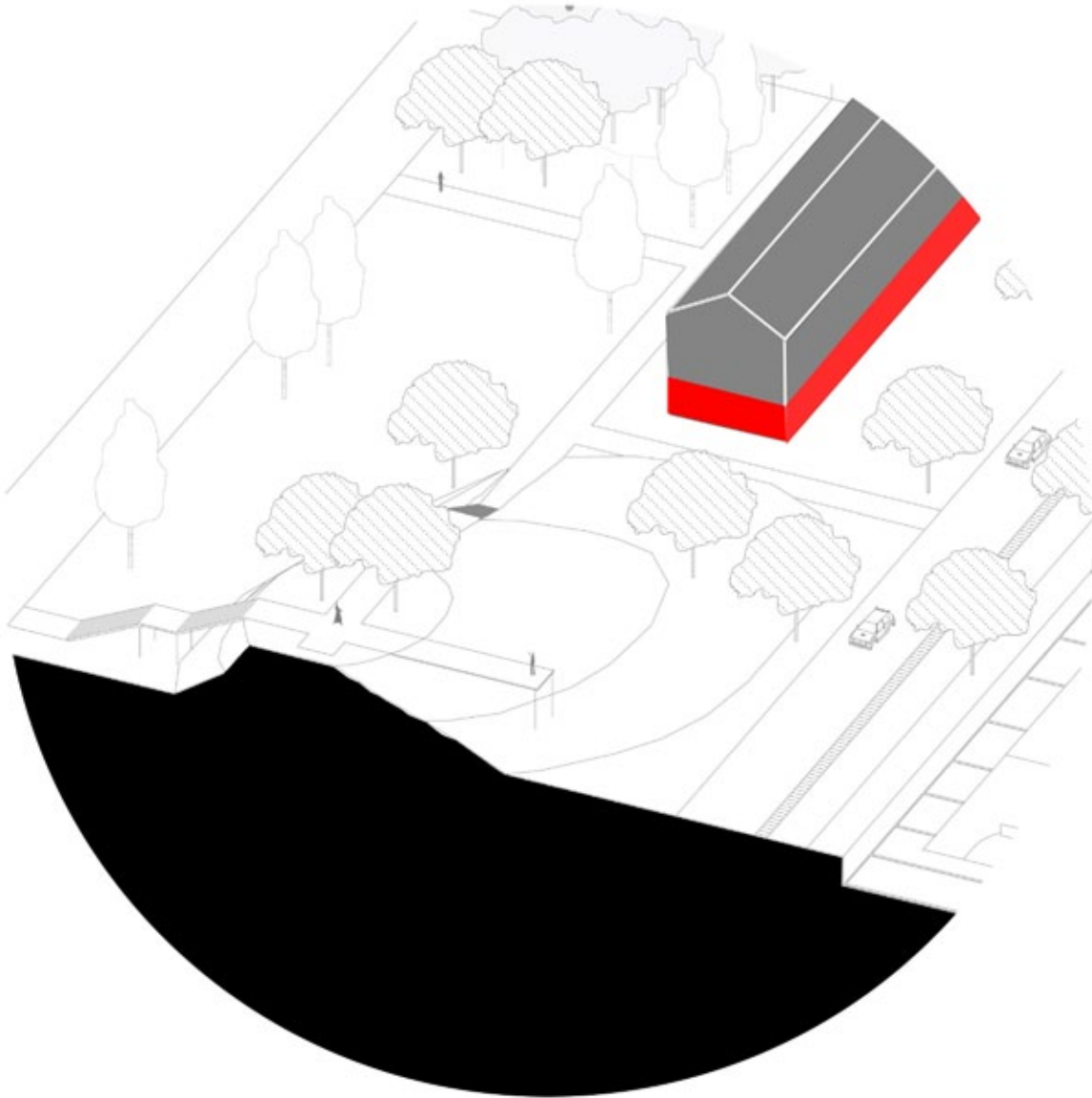
The earth, from the regeneration of the waterway, are accumulated along the walls.

The hills and space created by the earth changing along the tram, specially the tram station become a for visitor to stay and gathering as the entrance of the park and can have a glimps of the whole view of the park.



Hills

Also the "cross walls" become the walls of the new buildings that will developed following the new tram line.



New Buildings

4.3.4 THREE EXPERIMENT ROUTE

When you combine the three routes, they stand for three different experiment. In Nature Route, the park for you is the environment that embrace you. You dont see the boundary. You have the free to walk anywhere you want, its quite ,poetry and romantic.

In Culture Route, the park for you is a district people having fun in. You enjoy good time with friends, neighbors or even strangers here. Its alive, exciting and happy here.

In Urban Route, for you the park is view. You have the least freedom on this route, what you see, where you stop is all defined. But because of that, you can experiment the rhyme in the tour, shuttling between city and park.



Nature Route



Culture Route



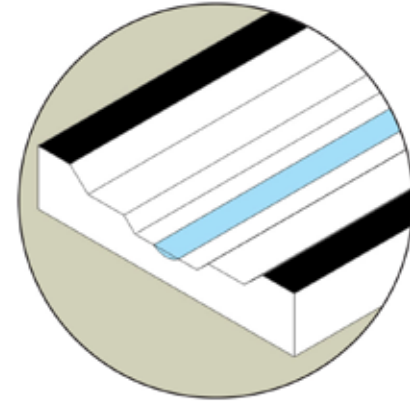
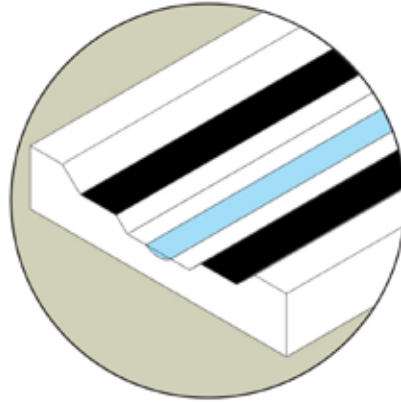
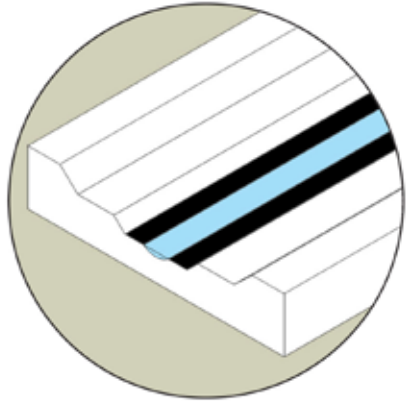
Urban Route

NATURE ROUTE

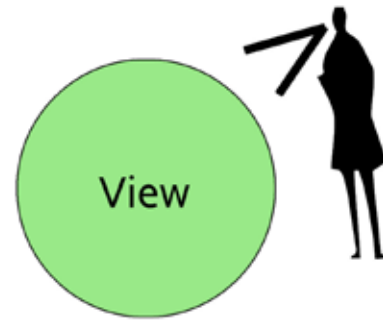
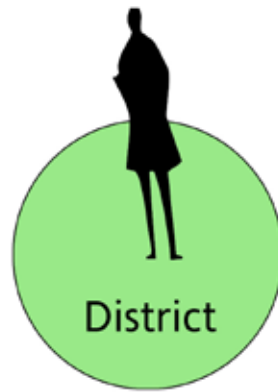
CULTURE ROUTE

URBAN ROUTE

Waterway layer



Understanding of park

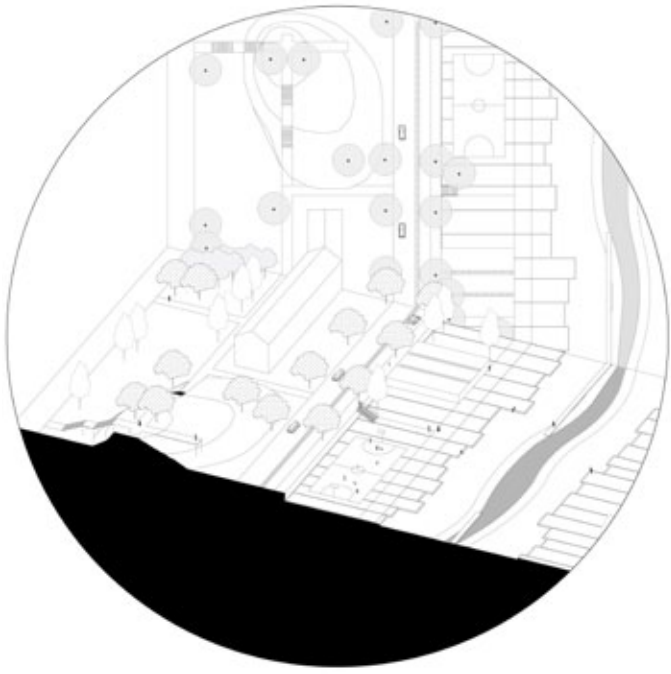


The path



4.4 DESIGN OF LOCAL PROJECT

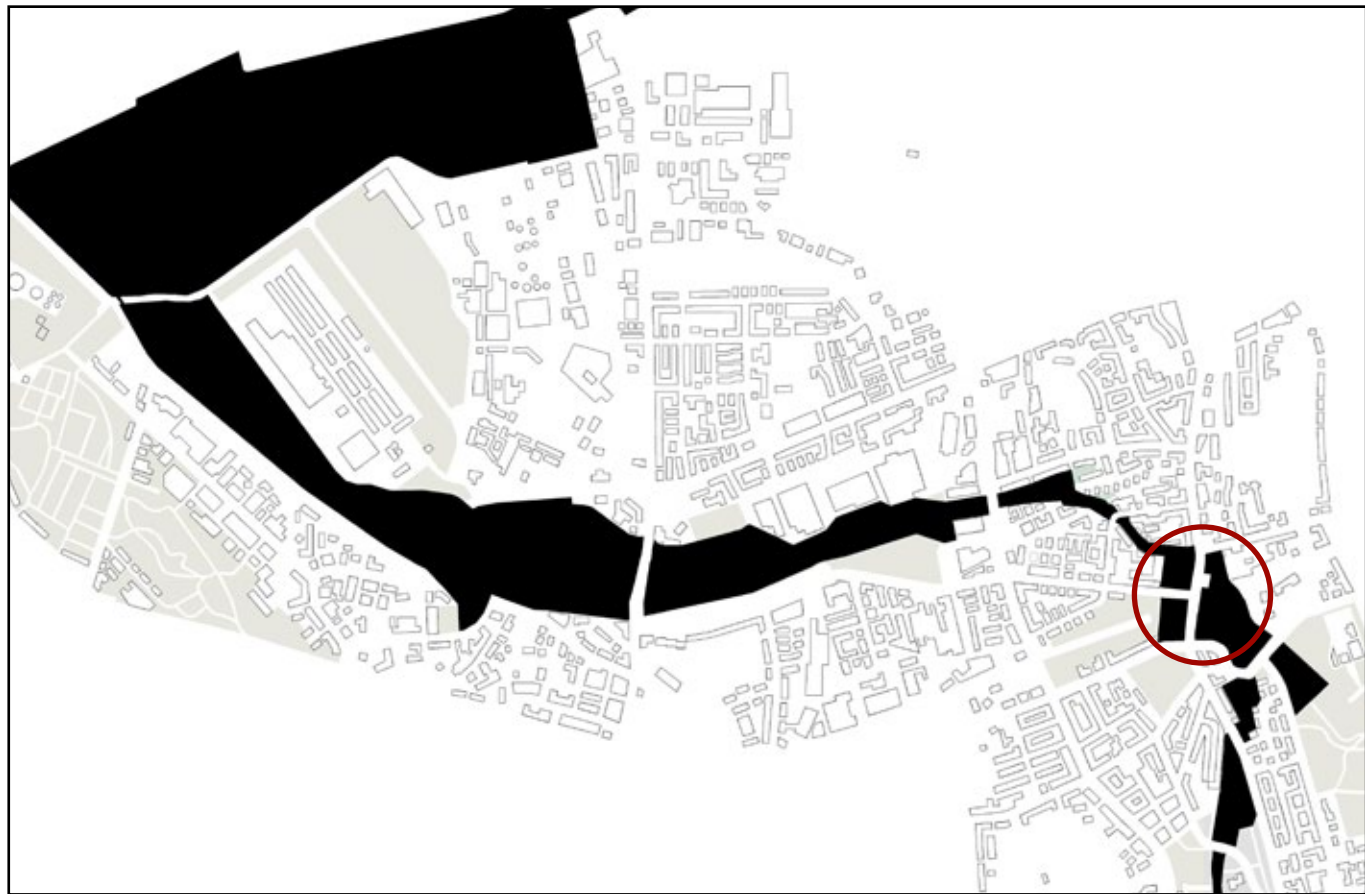
Use the concept of three experiment toue in local project design



4.4.1 COMMUNITY CENTER PROJECT

I use design of Community Center sector to show how the abandoned train track could become the center and identity of the local sector, how the three experiment routes will be developed and cooperate spatially and how all the acotor will cooperat in the development and how the development will be implement.

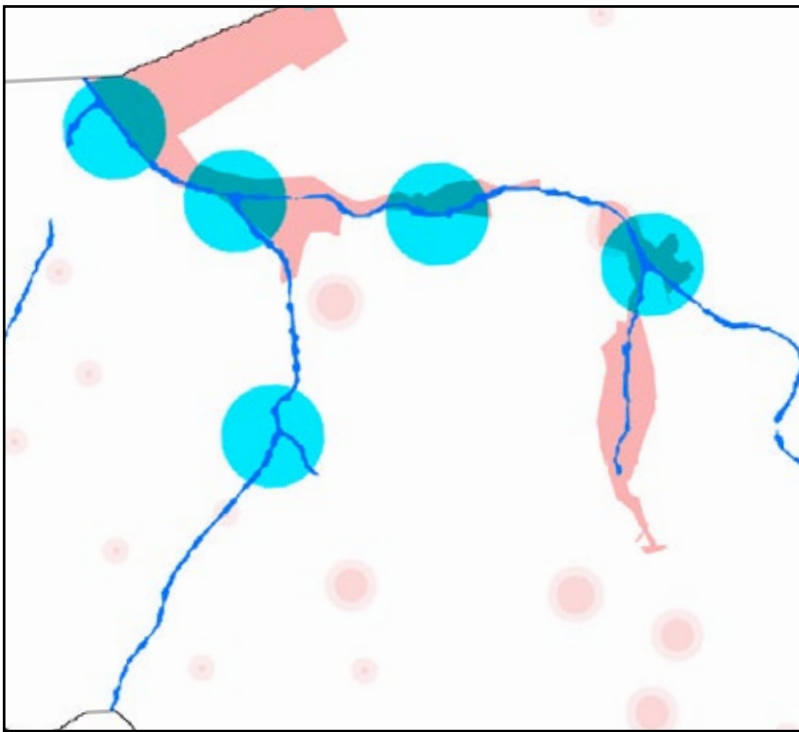
Currently, the site is a piece of waste land and a canal flow across it.



Coomunicate Center Section



Current situation of the site



Confluence of water way

Test Project , Office of Brown Line Park Association

As one of four center sections of Brown Line Park. The location of the site is important from both water management aspect and transportation network aspect.

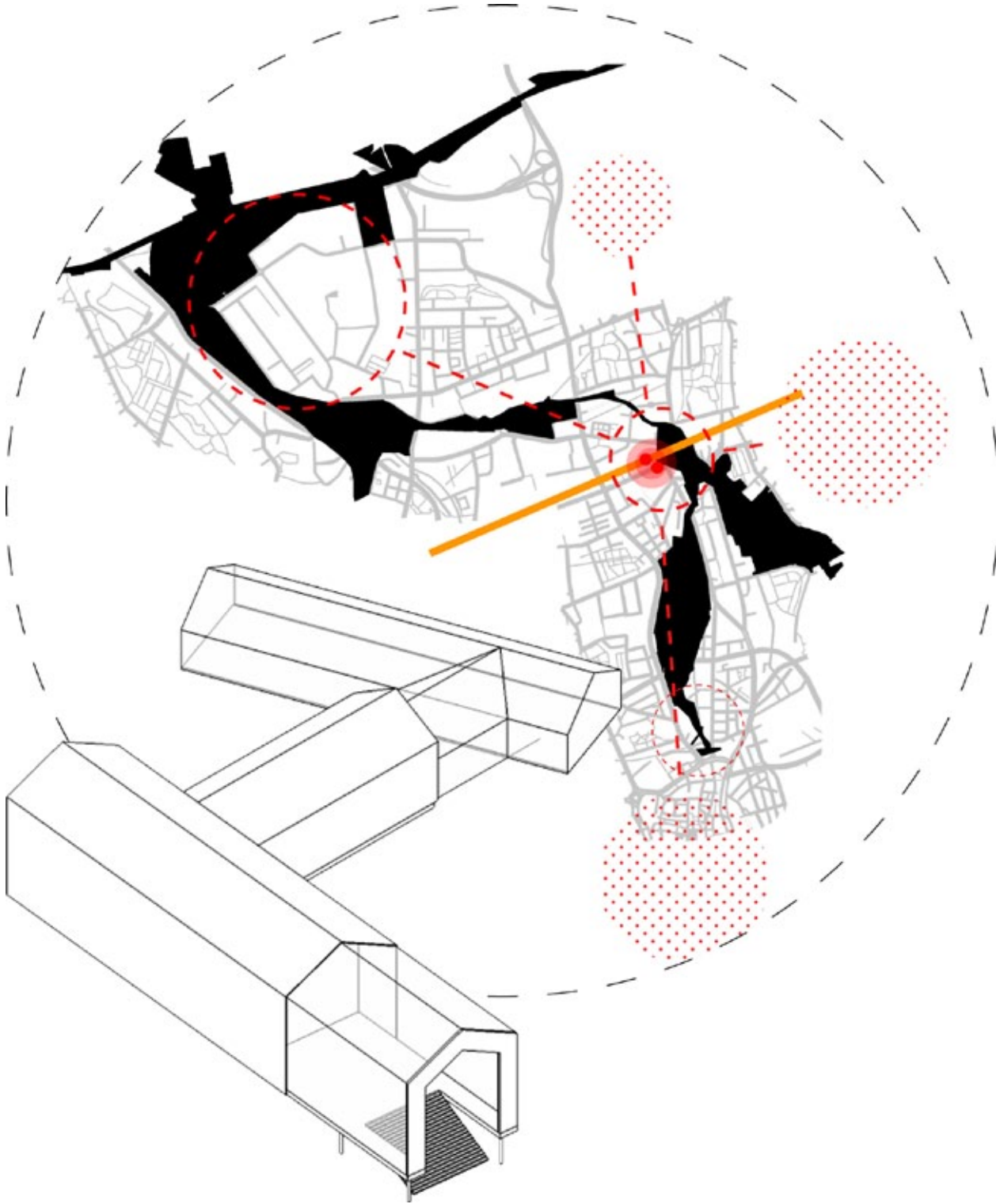
Through develop this section could be a test of the function of the park in ecological improvement and urban development.

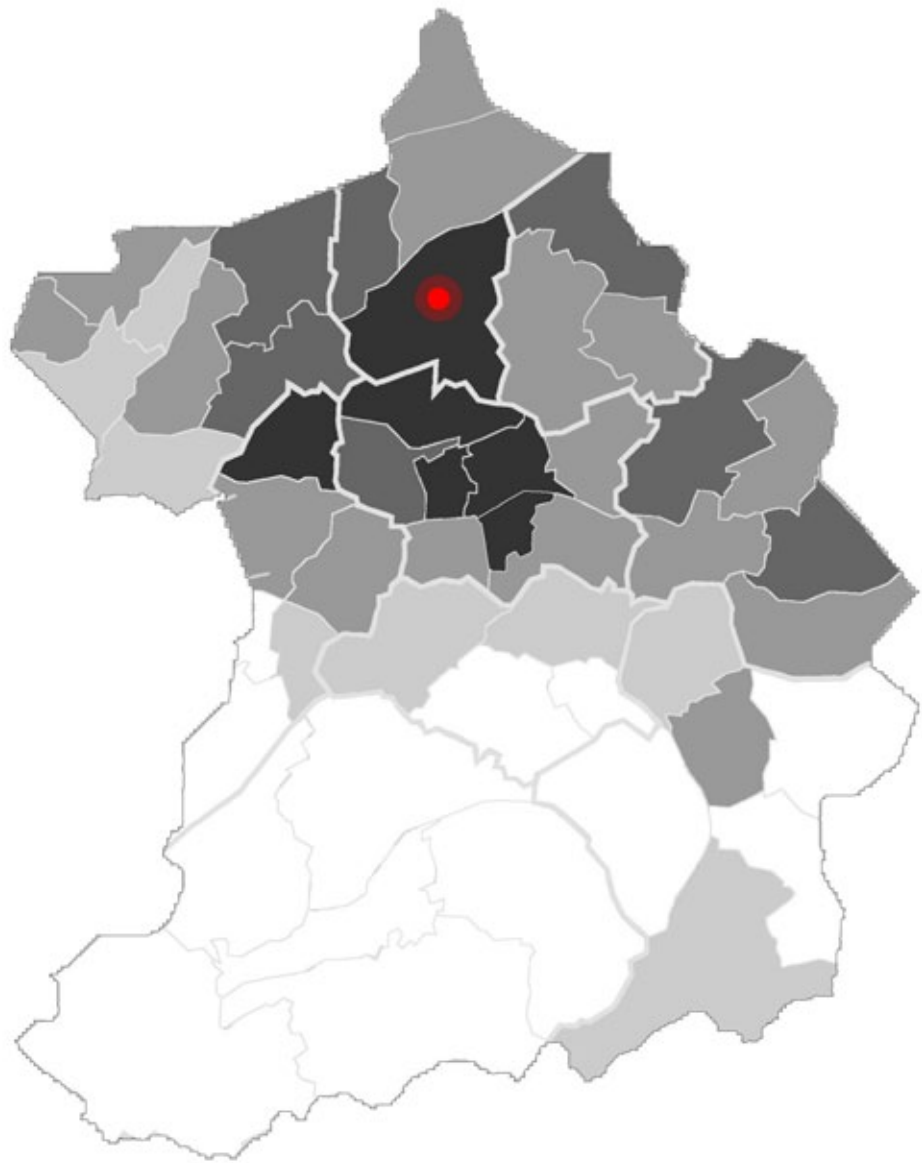


Multi-mobility Node

Located in the center of Brown Line Park, having good transportation location and easily connected to current exist public open space centers.

This section will be a good site to locate the office of the Brown Line Park Association and Information Center of the Brown Line Park





Unemployment rate

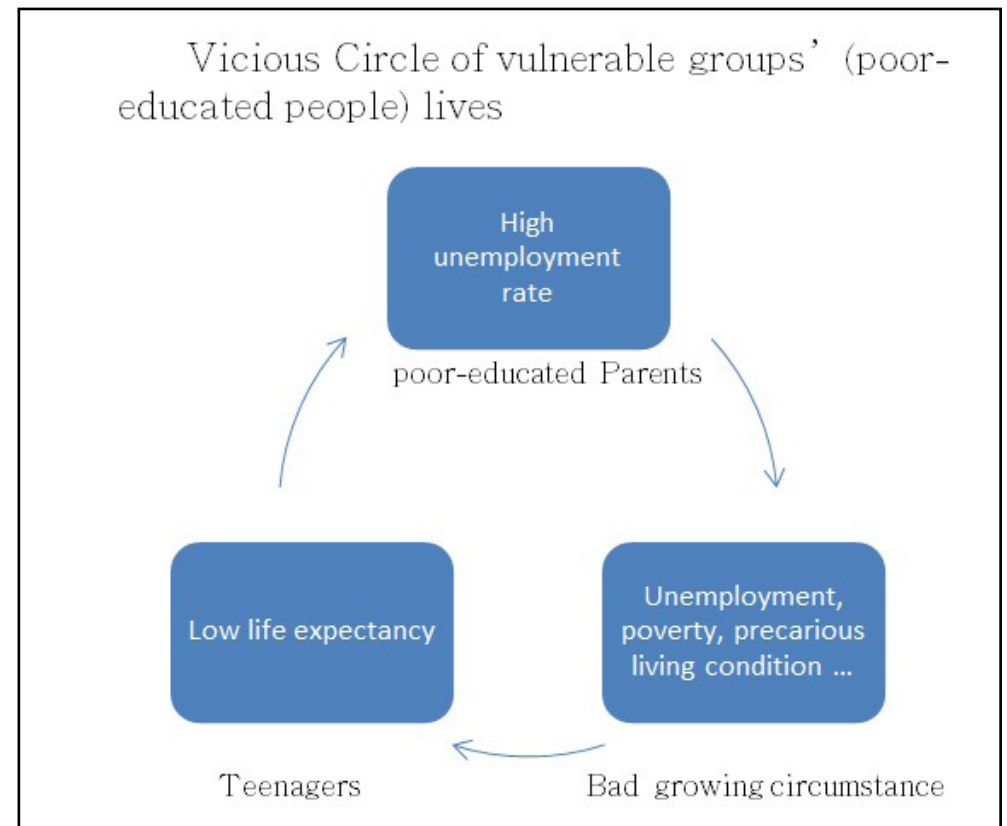
vicious circle of vulnerable groups' (poor educated people) lives

Main project for urban regeneration

Located in the center of residential area, where have the highest unemployment rate, this sector is the main project in Brown Line Park for urban regeneration.

Through analysis of the social problem behind the poverty problem, I find a vicious circle of vulnerable groups' (poor educated people) lives.

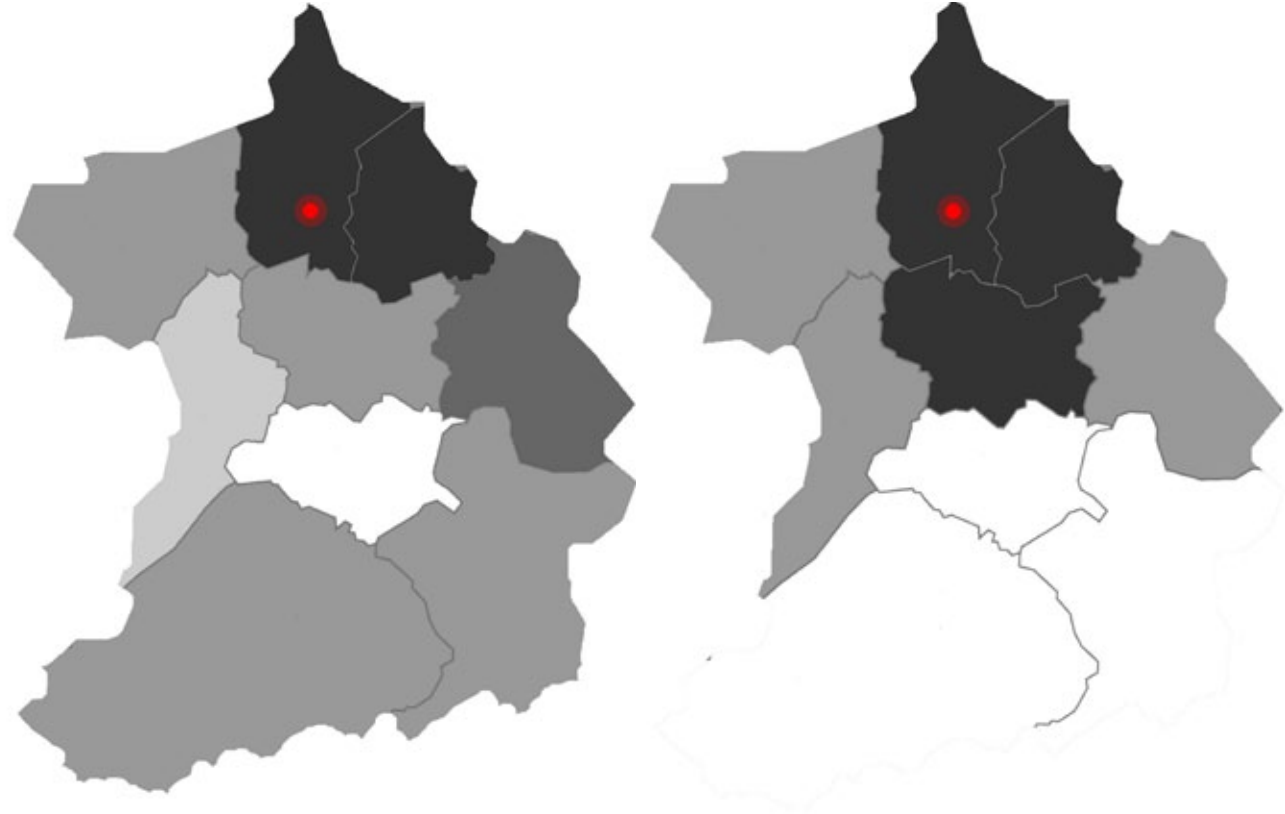
The poor educated parents have problem to find good jobs or any job, which leads to poverty and precarious living condition for teenagers. The teenager who grow in this kind of circumstance have extreme low life expectancy and become future low educated parents.



Consider the site also located in the area with highest youth rate and immigrant rate.

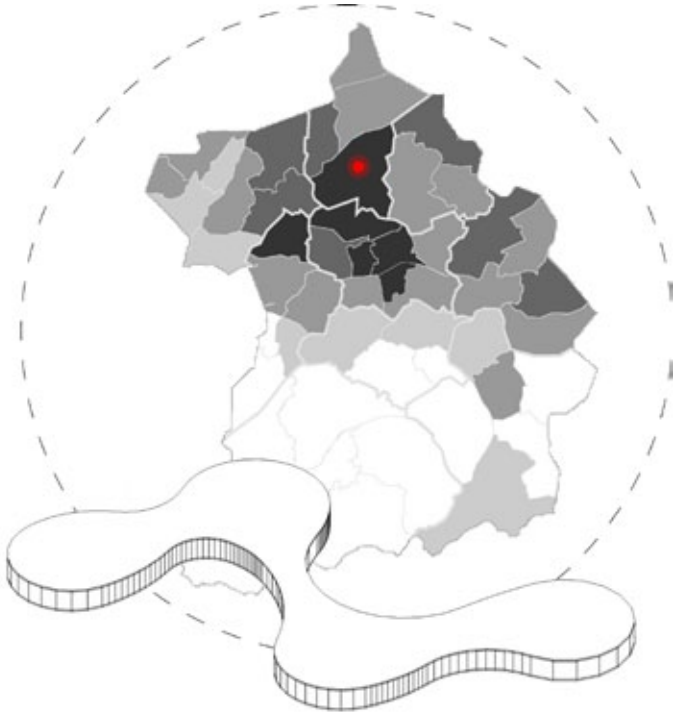
Except the landscape regeneration which would create better living and working conditions here. A community center which has adult education, youth care and immigrant integration functions in it would bring some changes to the site.

With adult education, the parents could find a job or a better job and give the children better living conditions and education opportunities. The workers in the community center could help the youth to grow confidence and open their view.



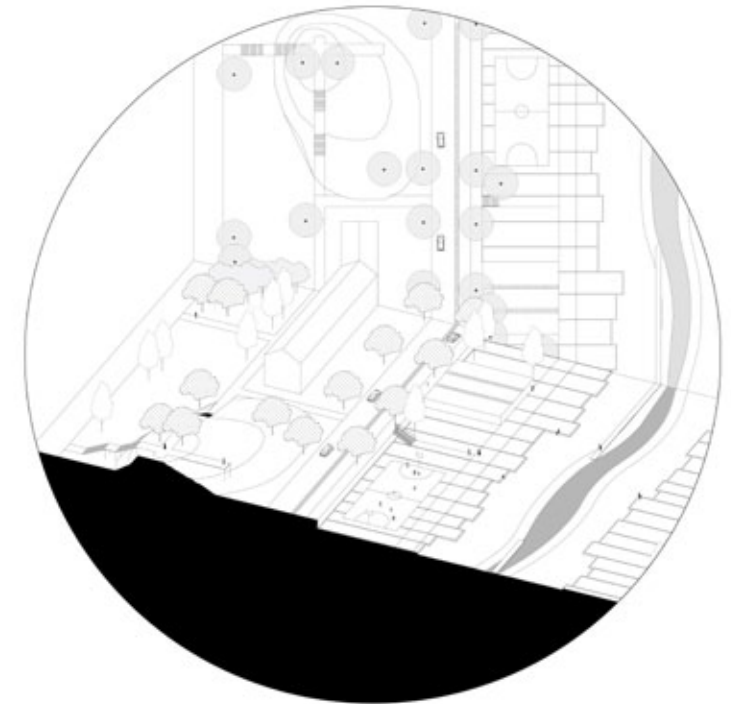
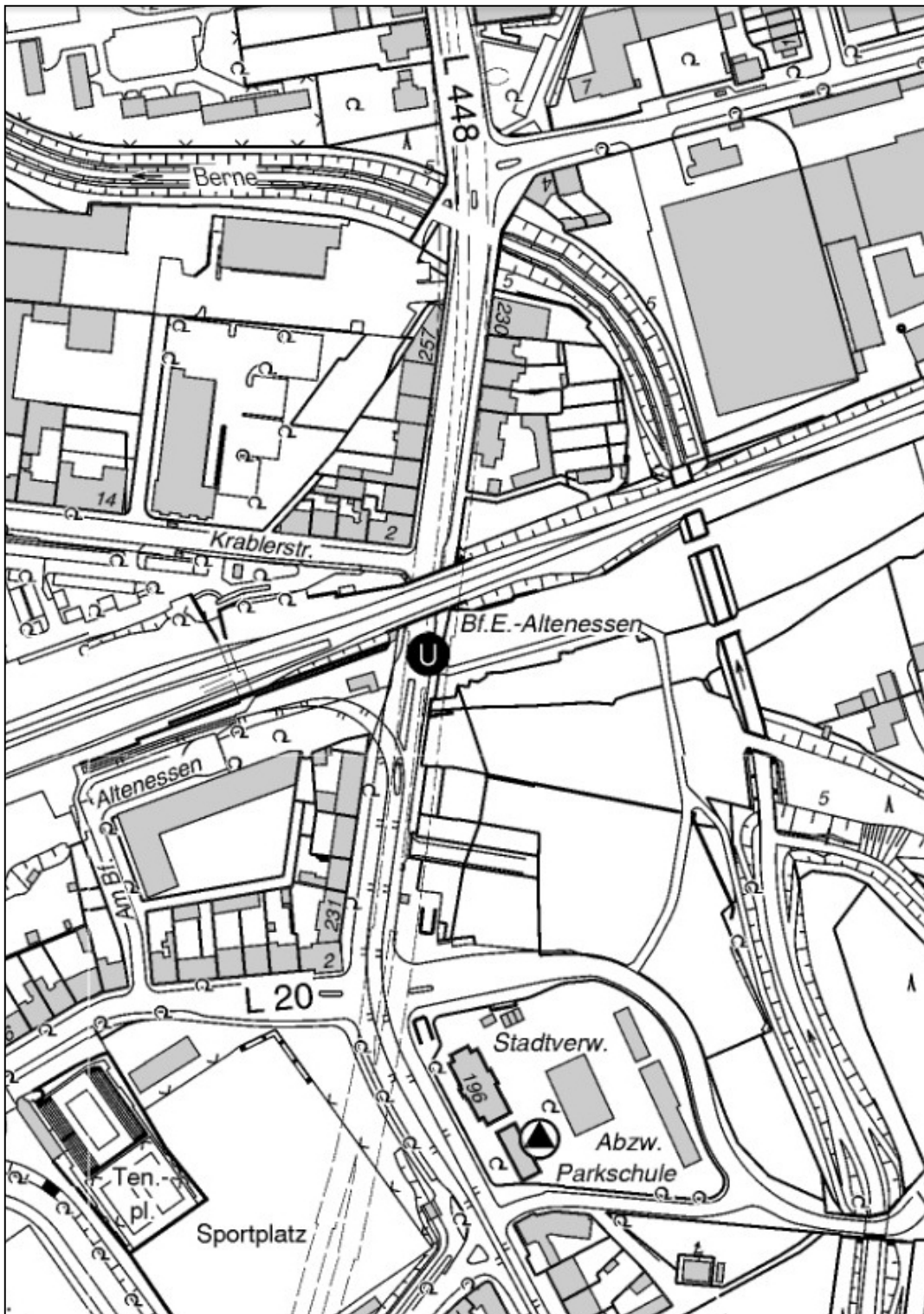
Youth

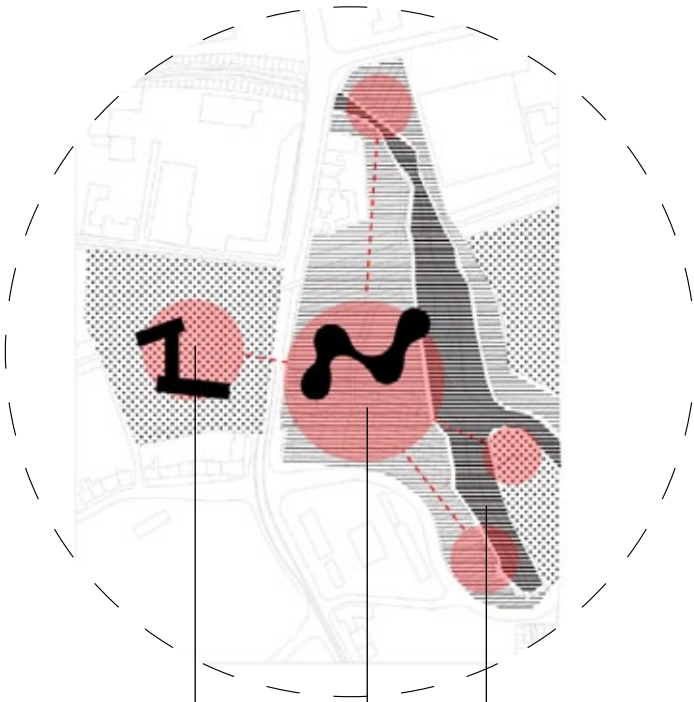
Immigrate



4.4.2 DESIGN OF LOCAL PROJECT

Use the concept of three experiment toue in local project design

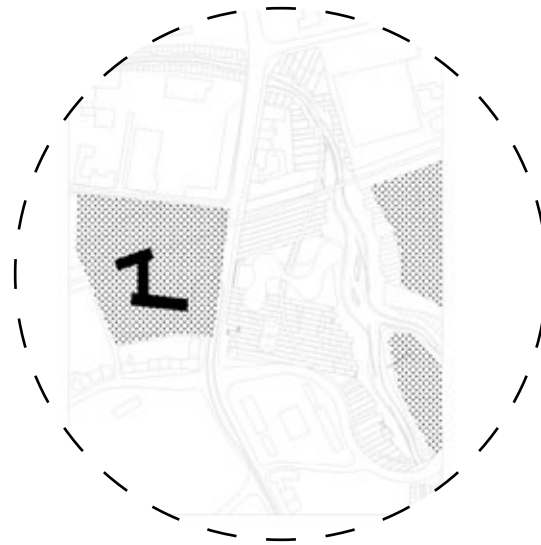




Urban Layer (Urban Route)
Floodplain Layer (Culture Route)
Waterway Layer (Nature Route)

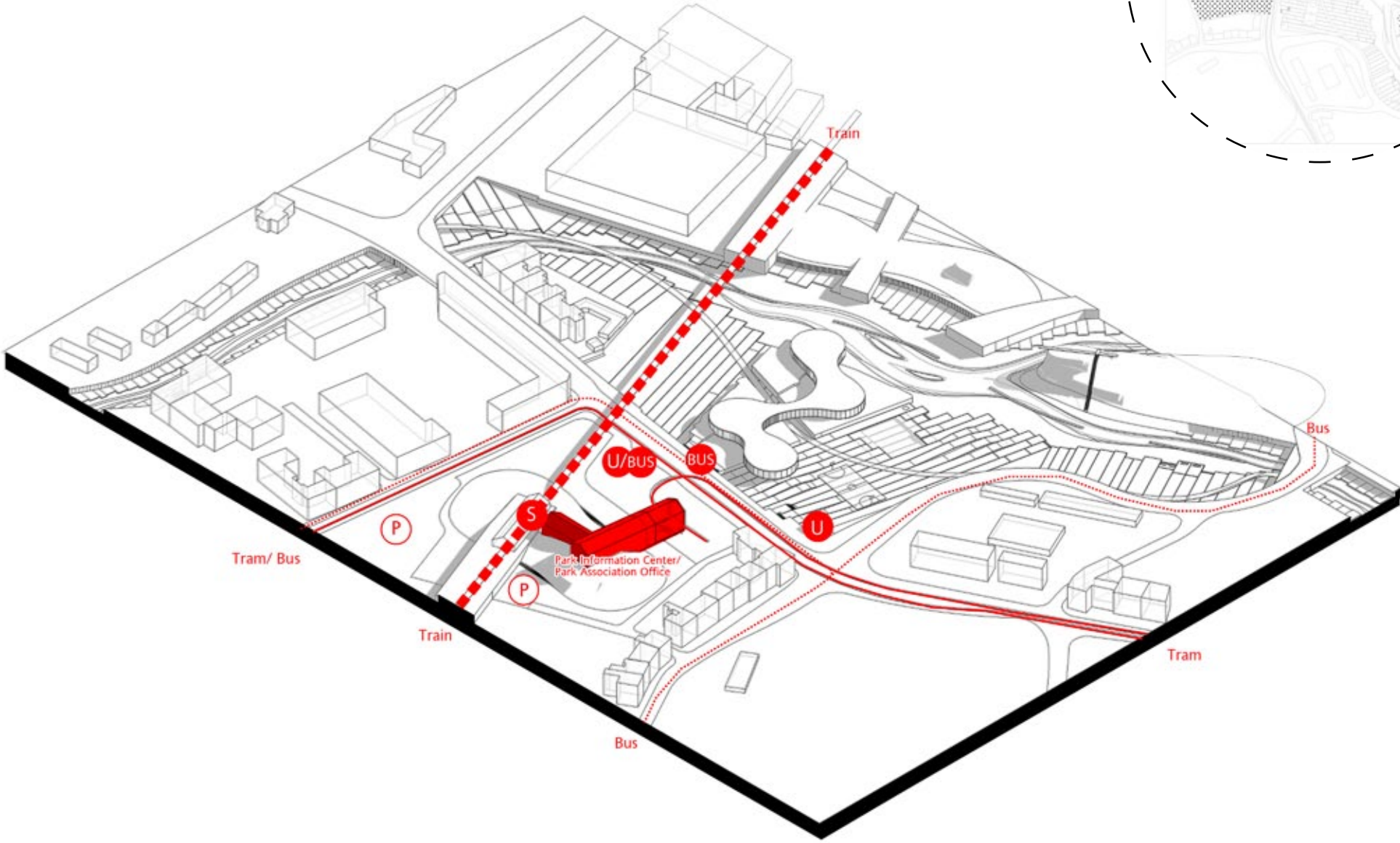
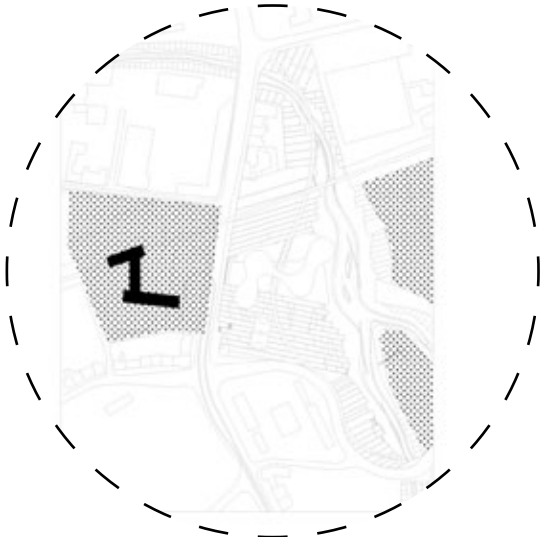


Master Plan



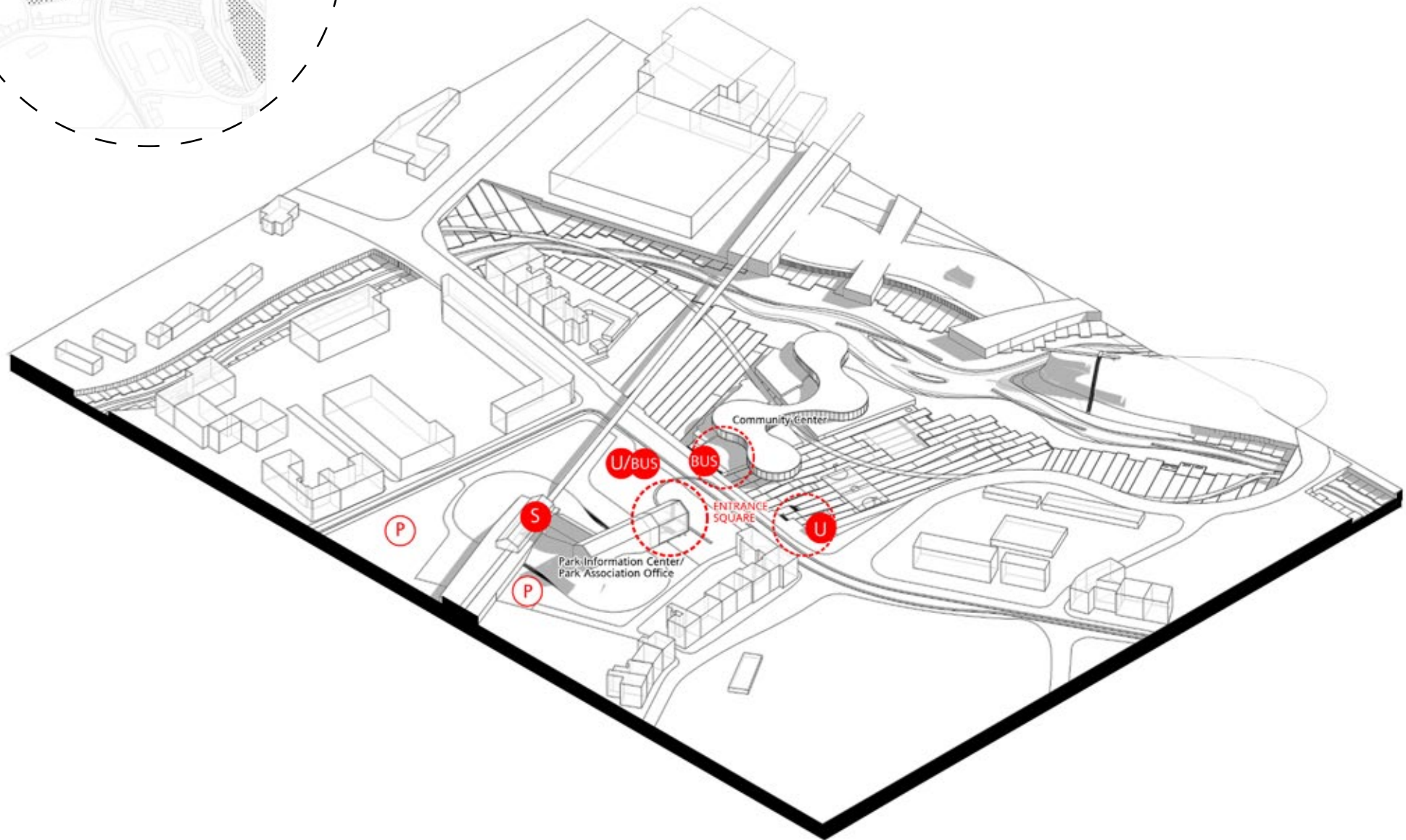
Urban Layer
(Urban Route)

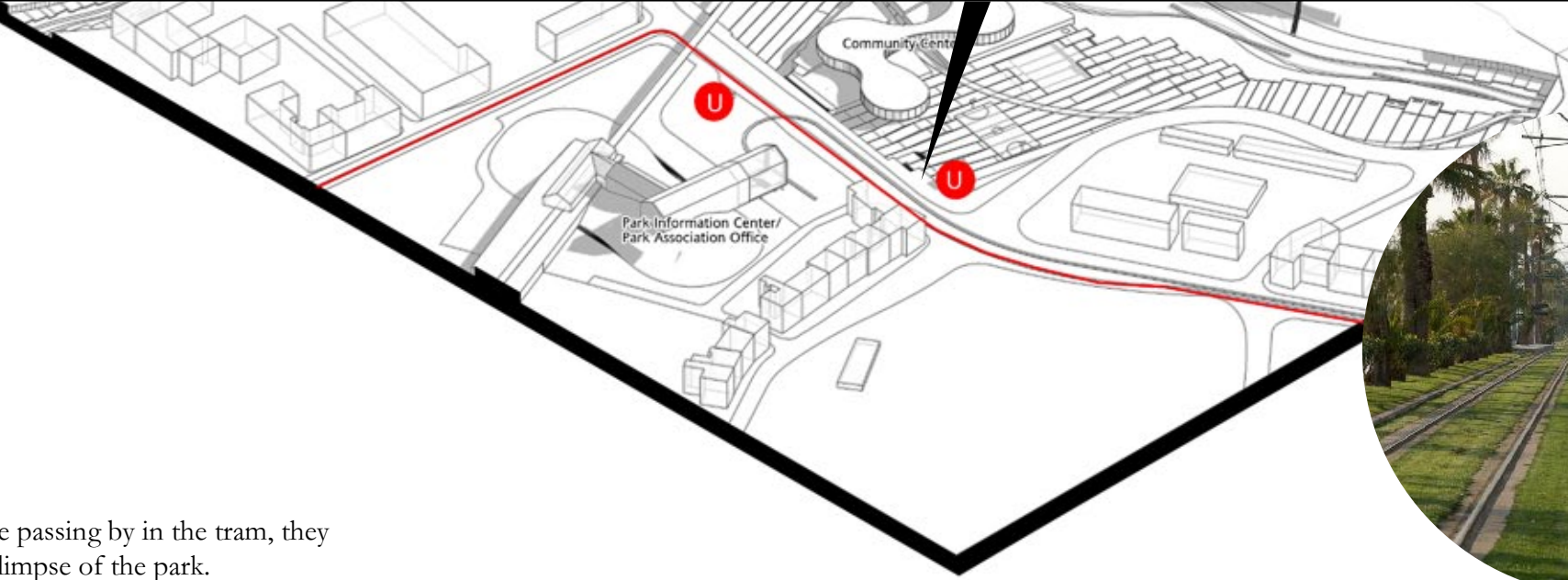
Because of the good transportation location, the park association centre and the information office of the park is planned here.





Three entrance squares are designed near the tram/ bus stations for visitors to gathering.

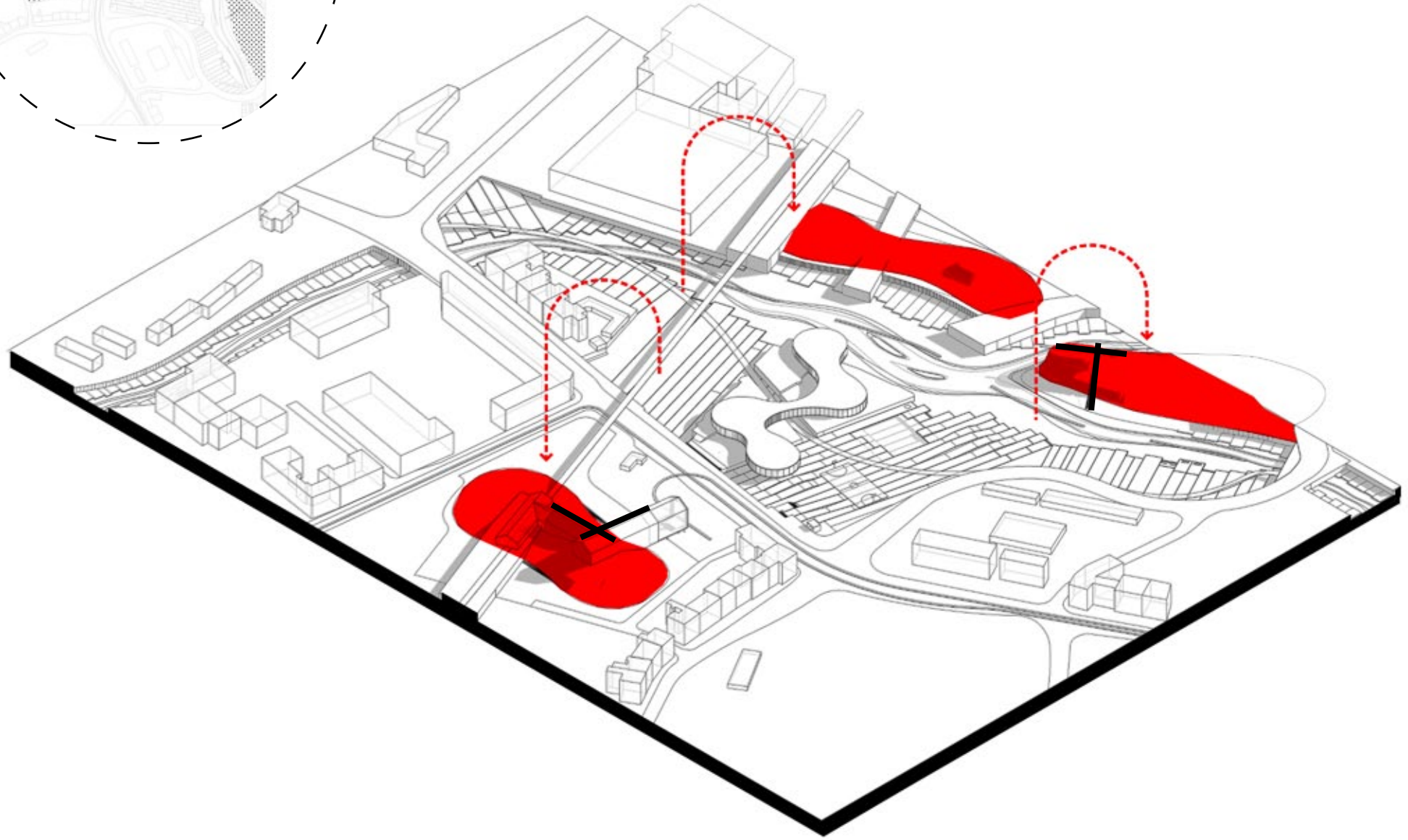


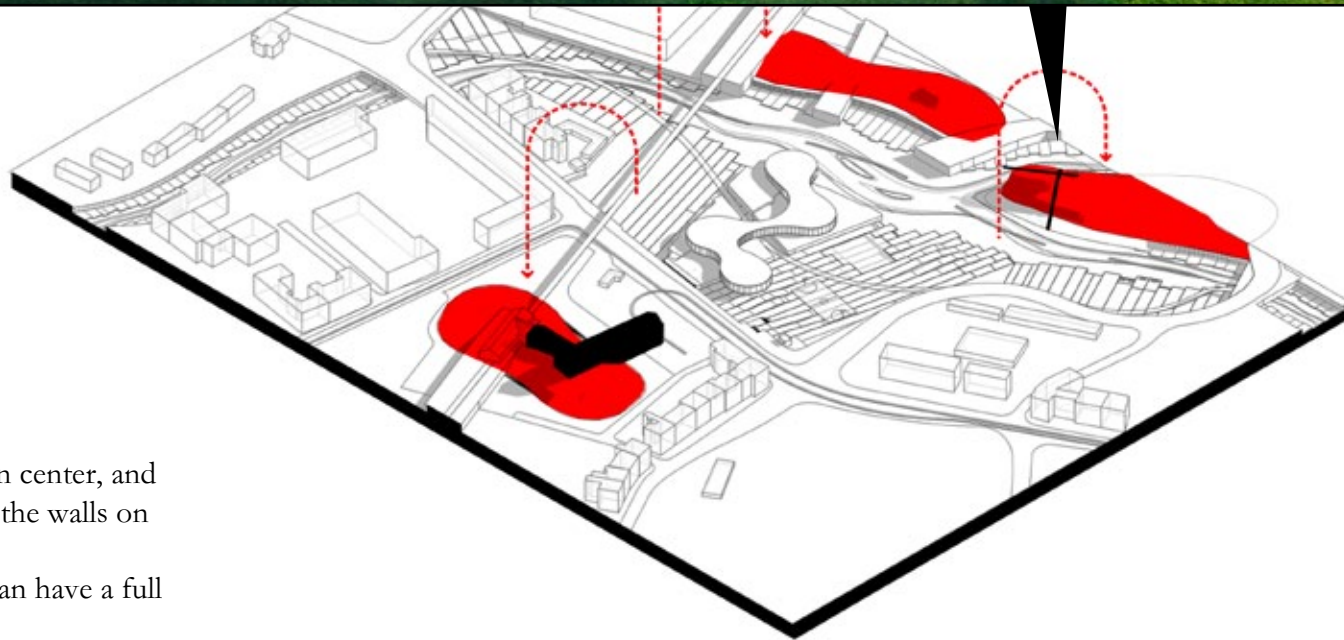
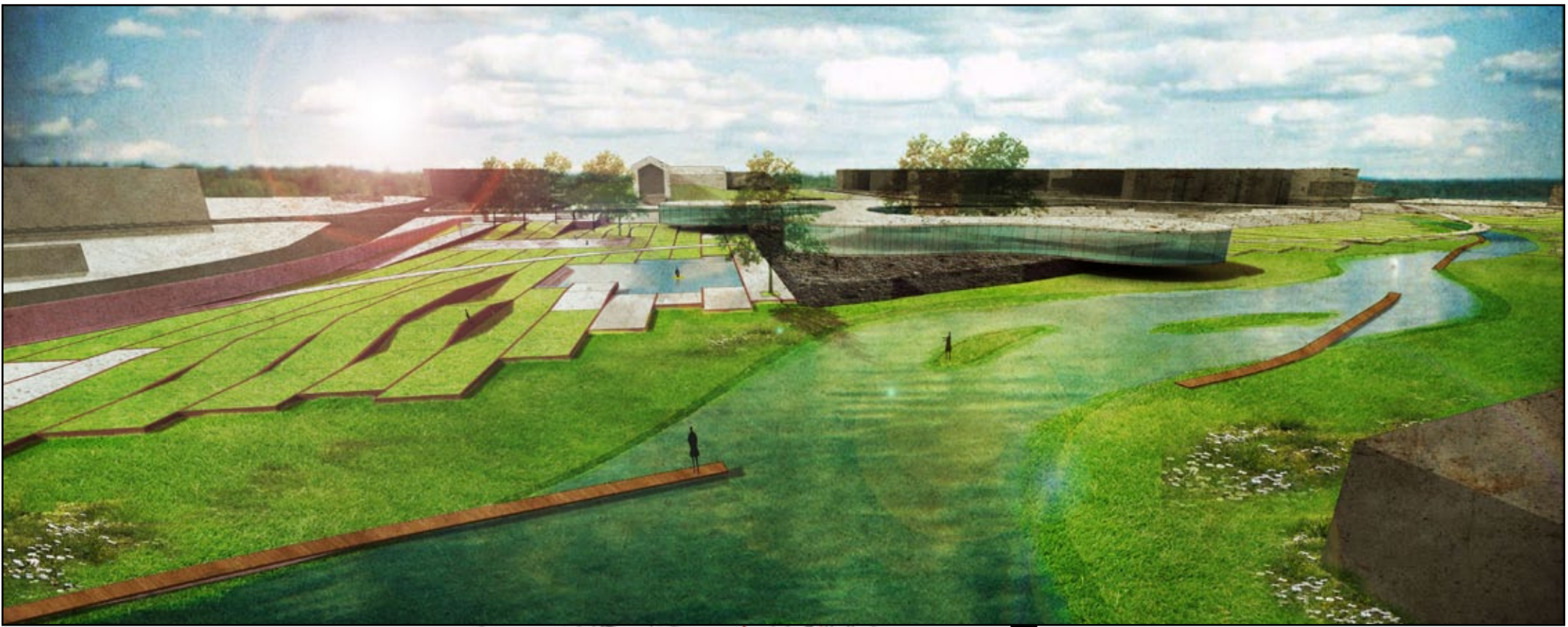


When people passing by in the tram, they can have a glimpse of the park.



Earth from the regeneration of the canal accumulate along the cross walls in the urban layer.



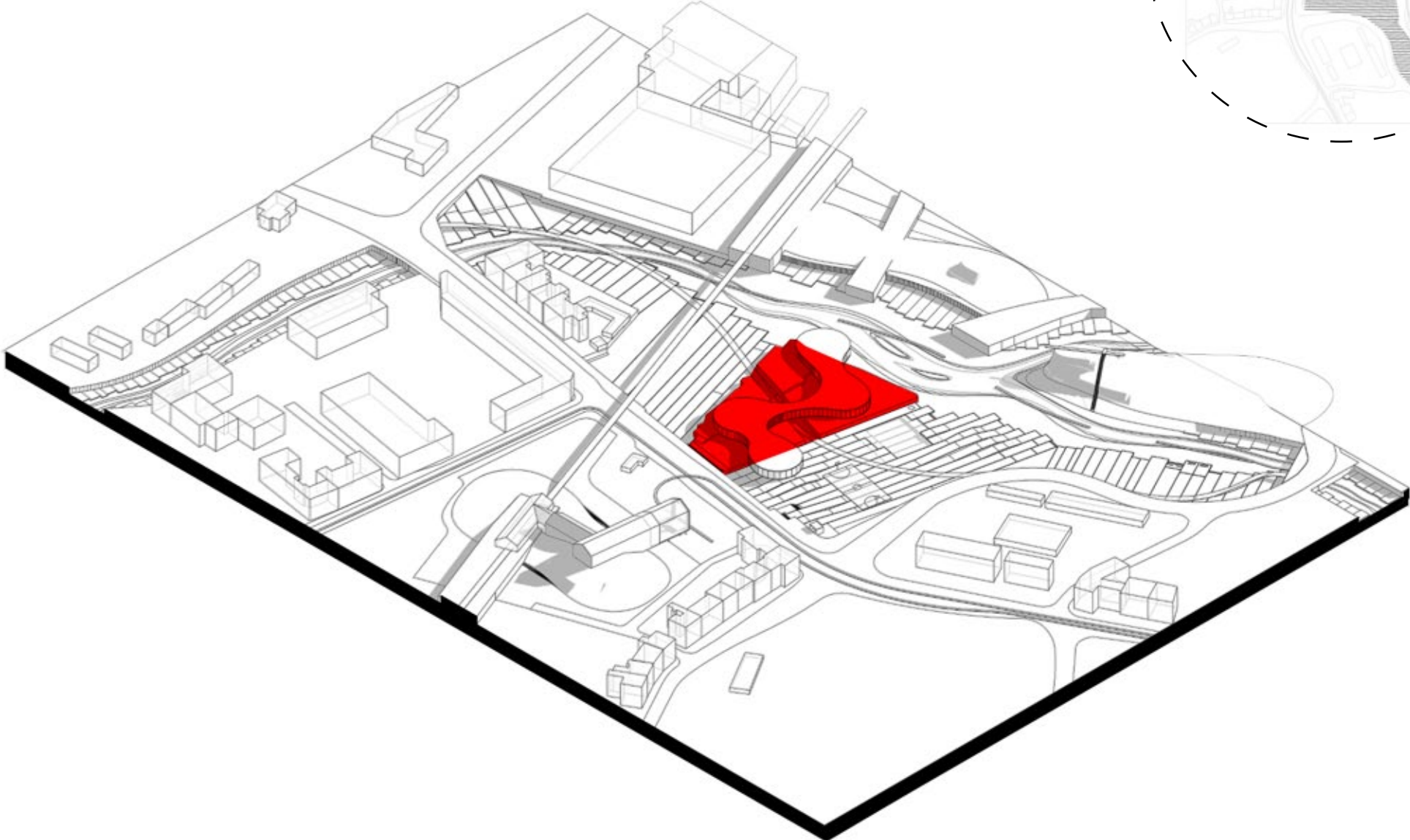


New building, park association center, and climbing path is planned along the walls on the hills.
Standing on the hill, visitors can have a full view of the park.



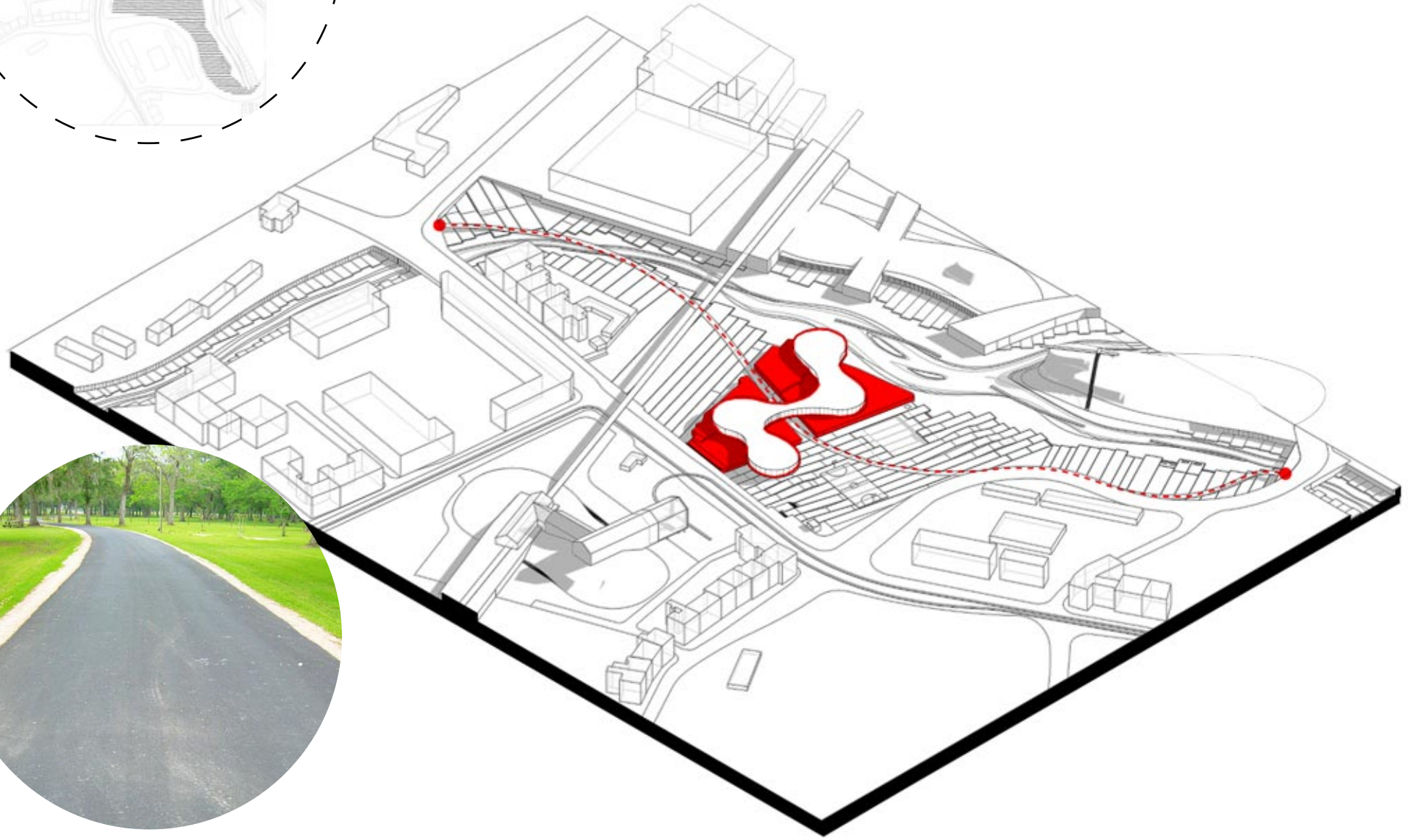
Floodplain Layer
(Culture Route)

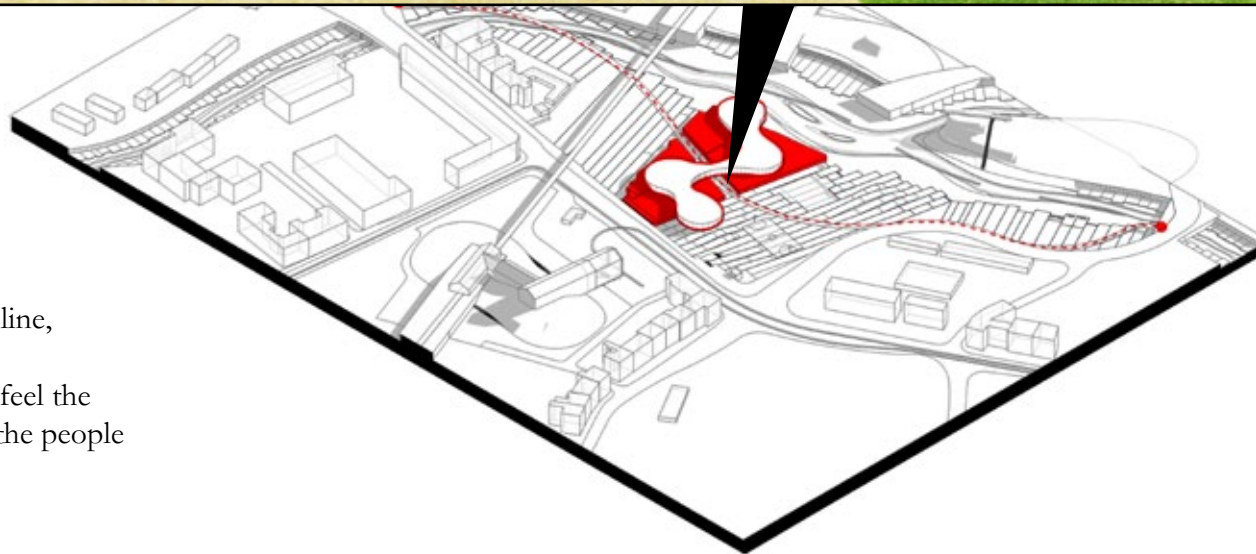
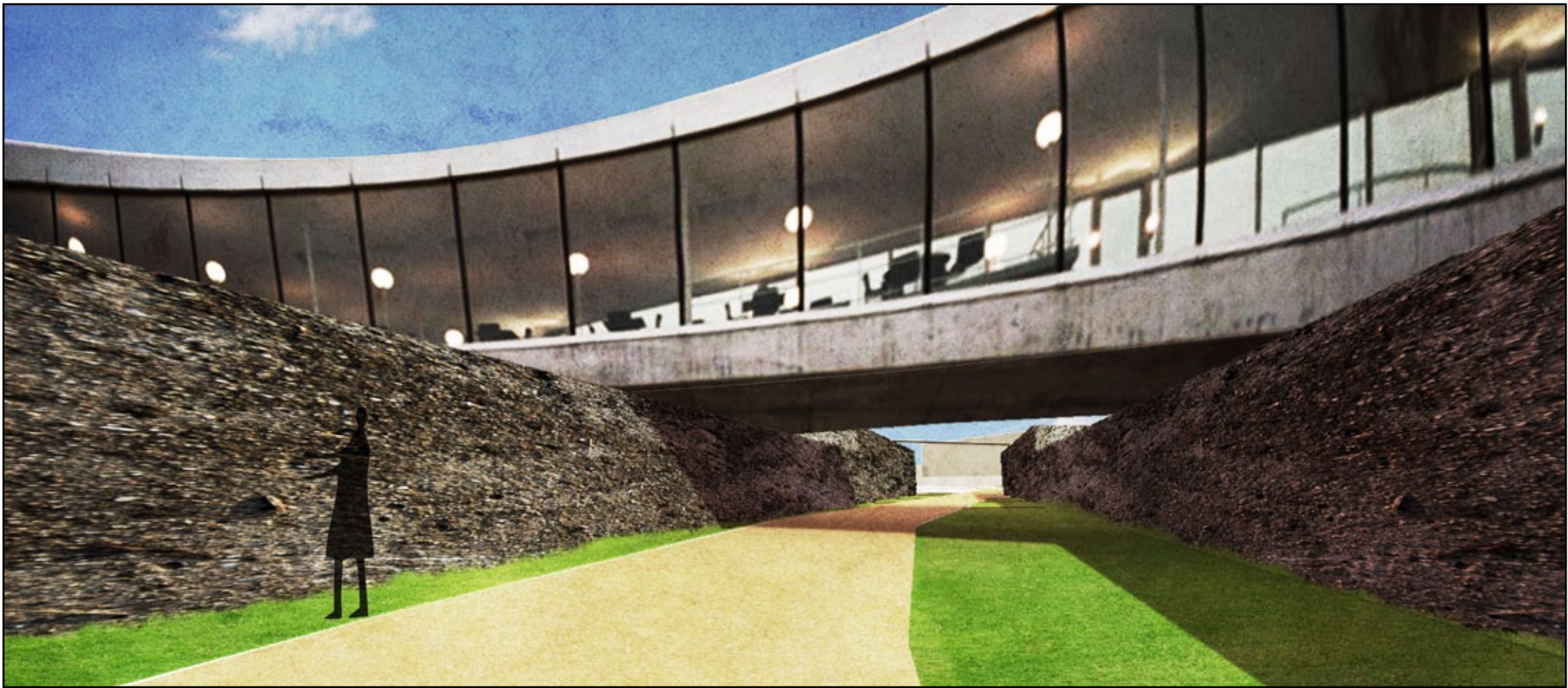
In the transformation of the canal, the base of abandoned train line have been preserved and exposed.





I design the main path of the section cut cross the train line and design the community center on it.

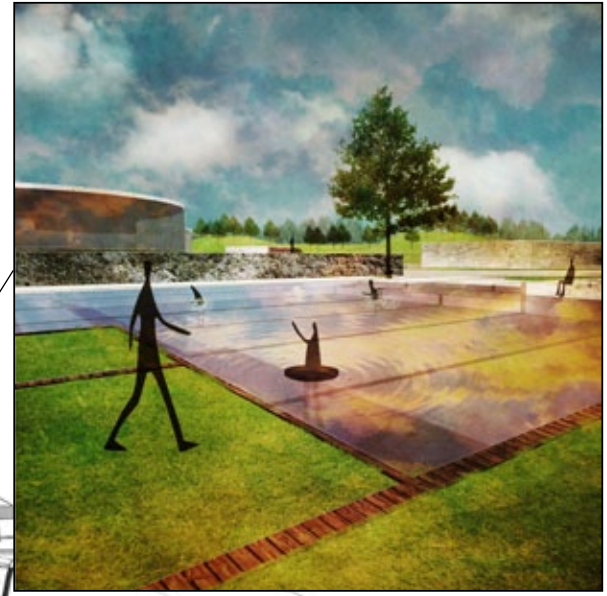
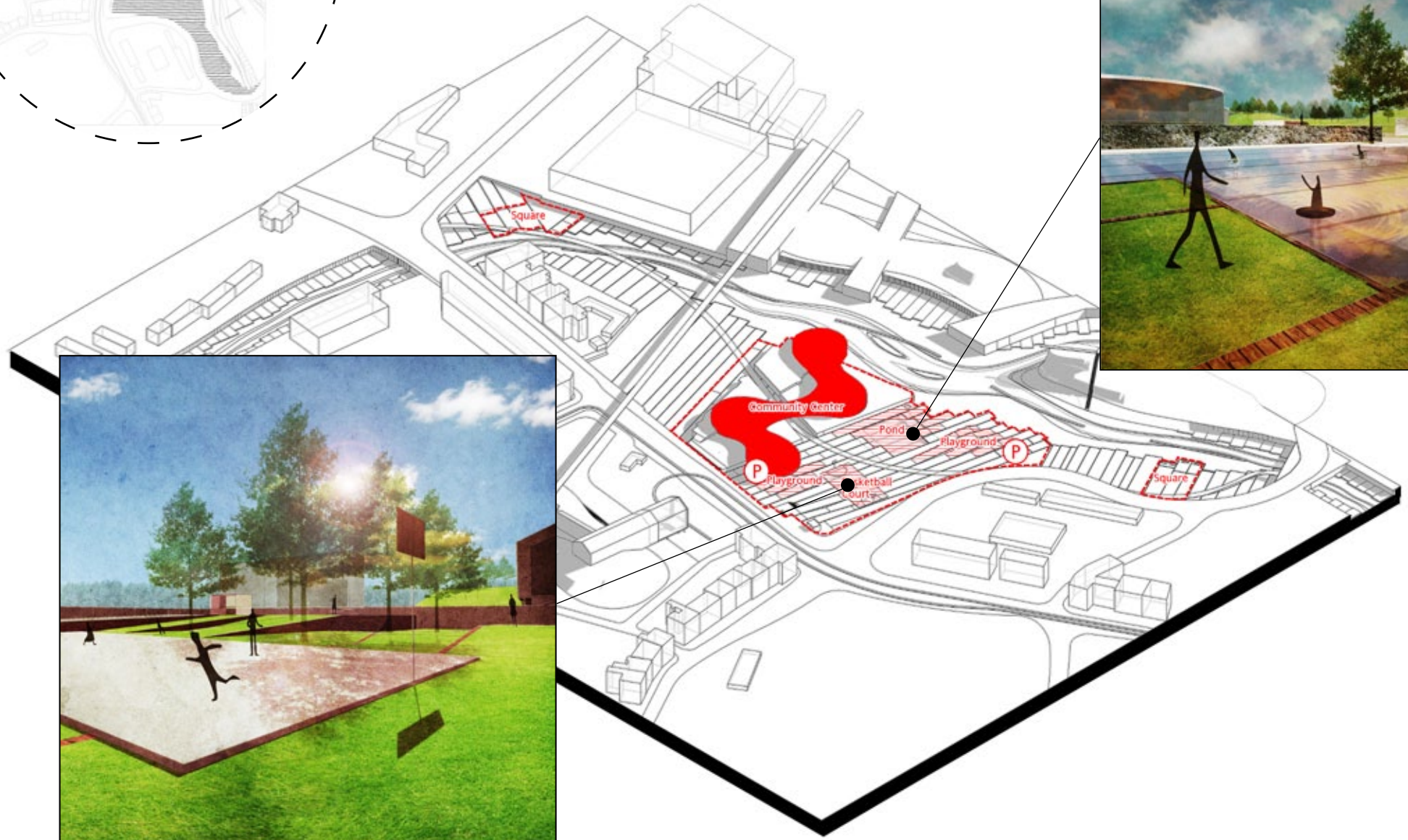


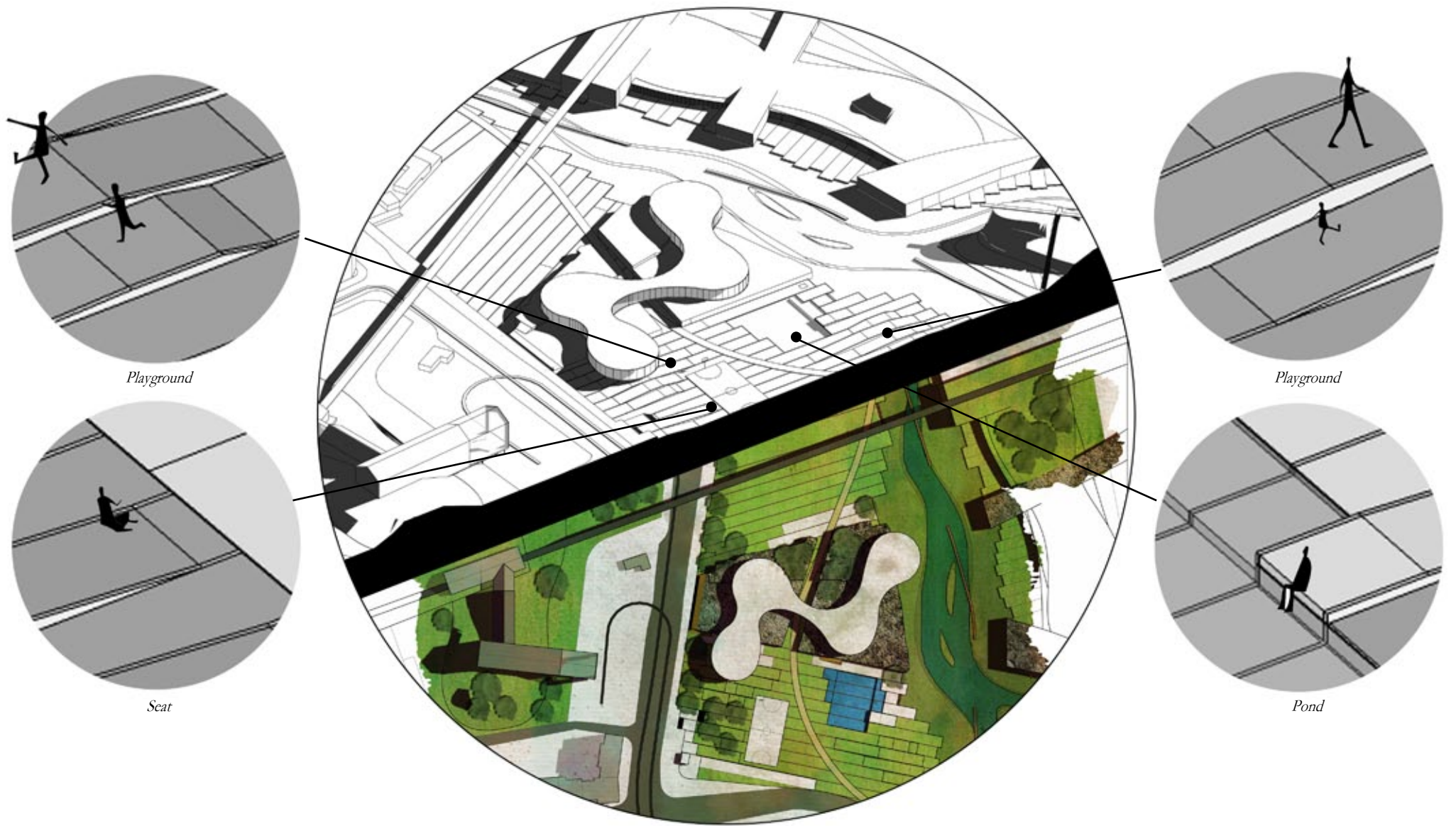


Passing through the base of train line, visitors can get really close to the abandoned train line and see and feel the texture, the historical left. So are the people in the community center.



Public activity spaces are planned along the road



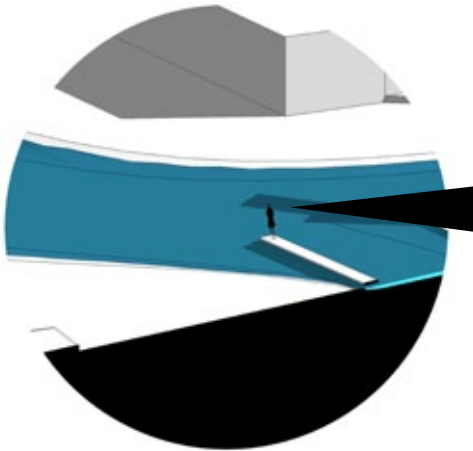


The fluctuation of the rectangular arrays become the playground, the pond, the seat.

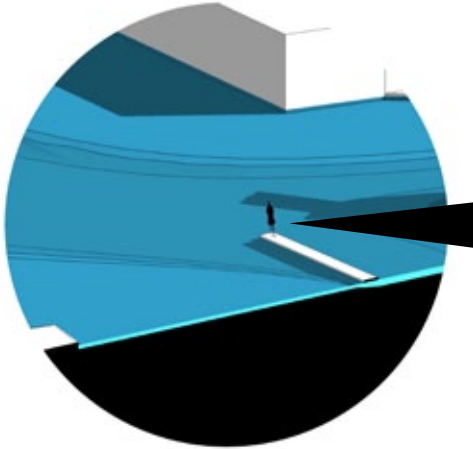


Waterway Layer
(Nature Route)

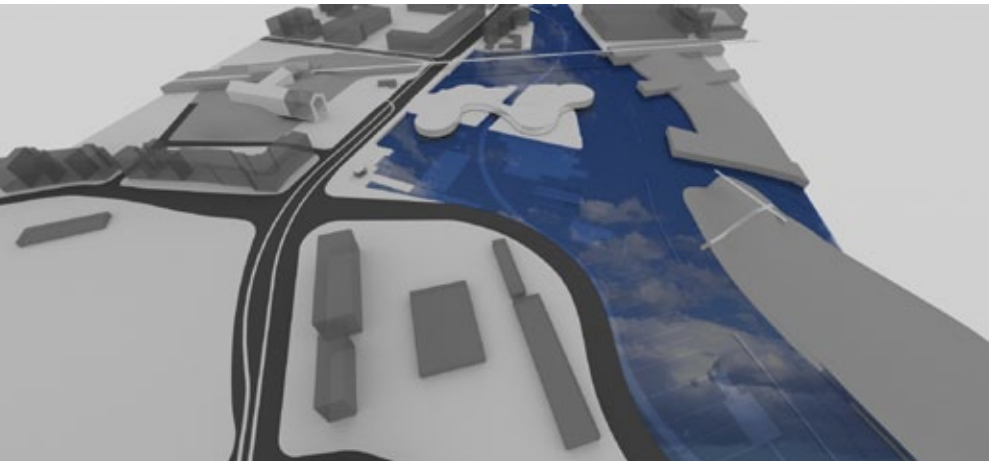
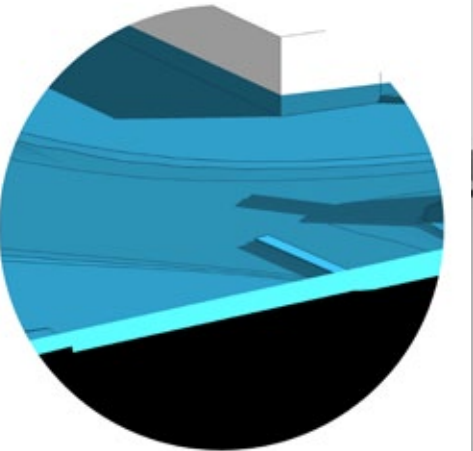
This section is a water confluenting area. The water level change is clear to be noticed here.



Sunny day



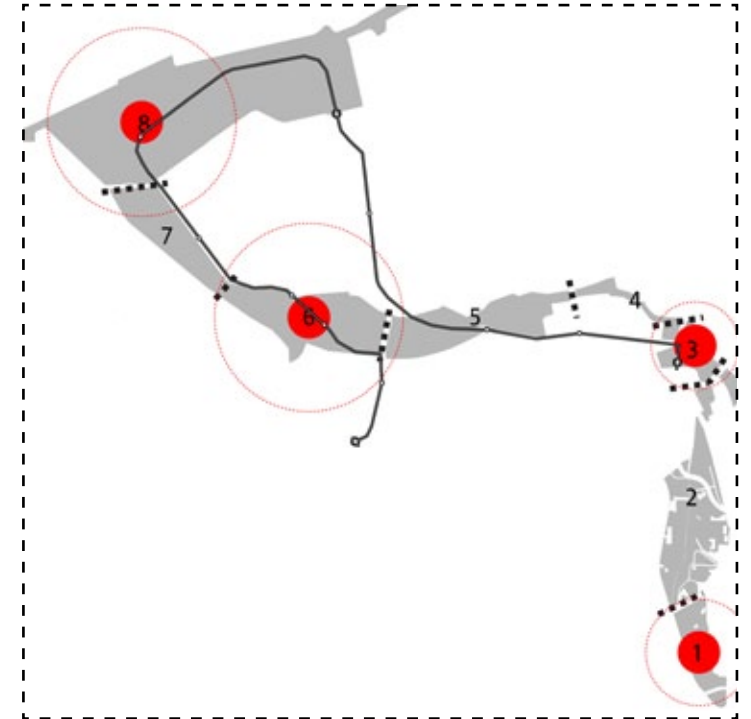
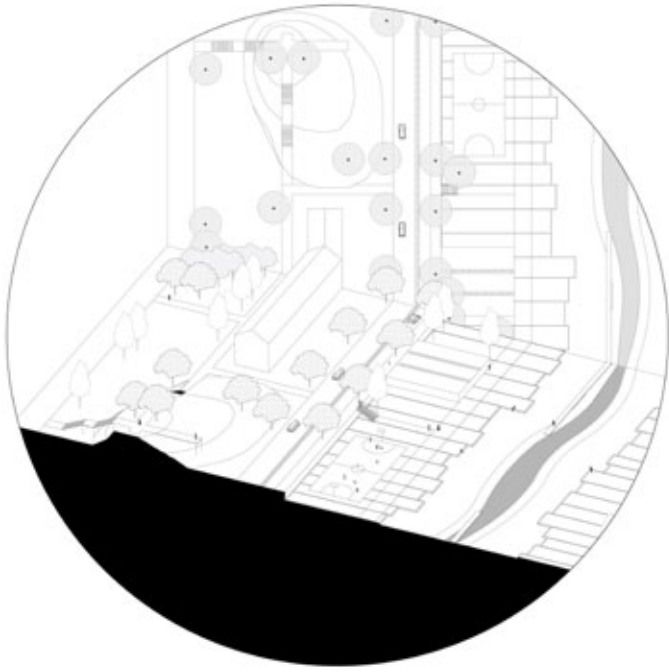
Rainy day



Extremely Rainy day

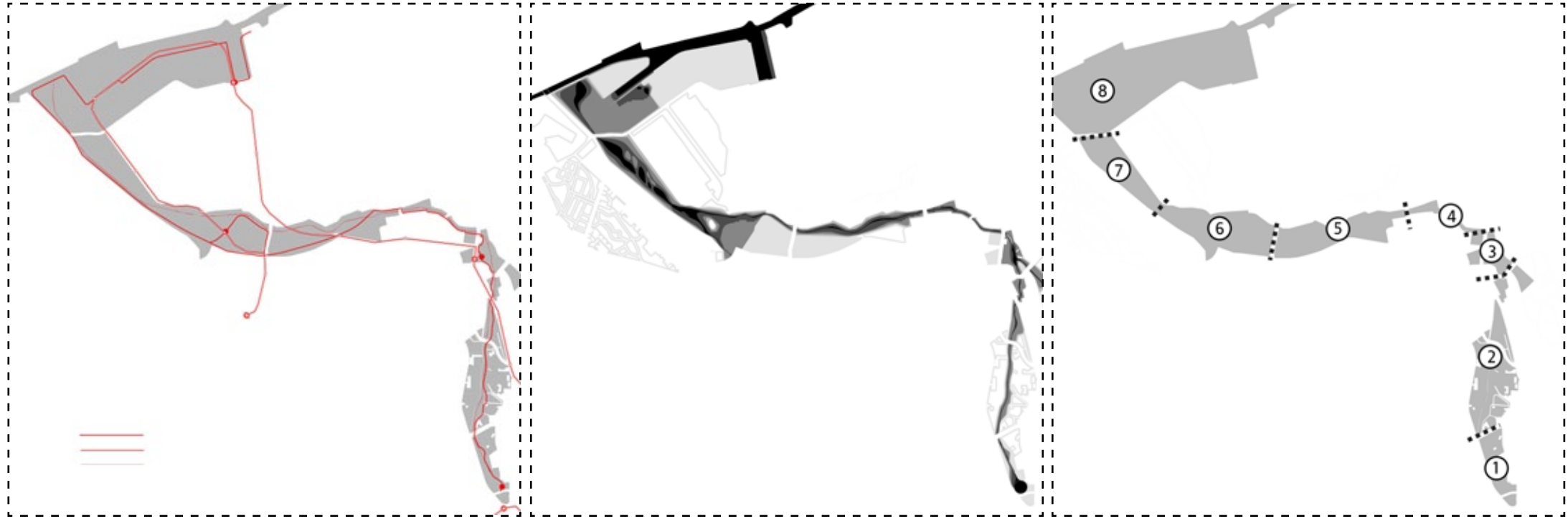
4.5 DESIGN OF PARK

Following the plan of the park, using the concept of three experiment toue in whole park design



Plan (basic structure)

The composition of the three lines, the proportion of three layers in the park and the different expression of design strategy creat different confitin in the park



The composition of three pathes

The proportion of three layers

The different expression of design strategy

4.5.1 THREE PATHES

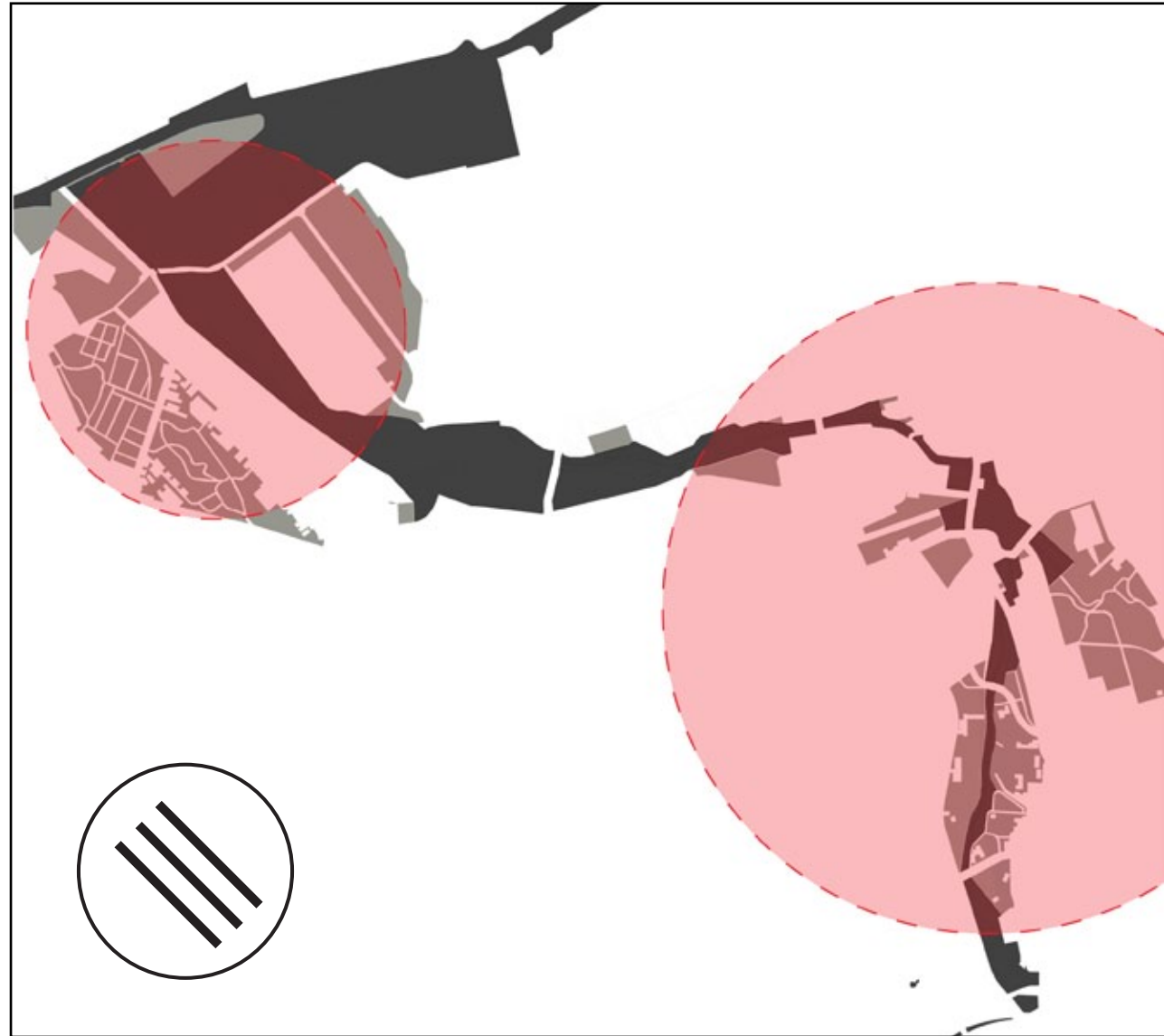
The paths are the center of the three experiment route. The cooperation of the three pathes define different perspective in landscape.



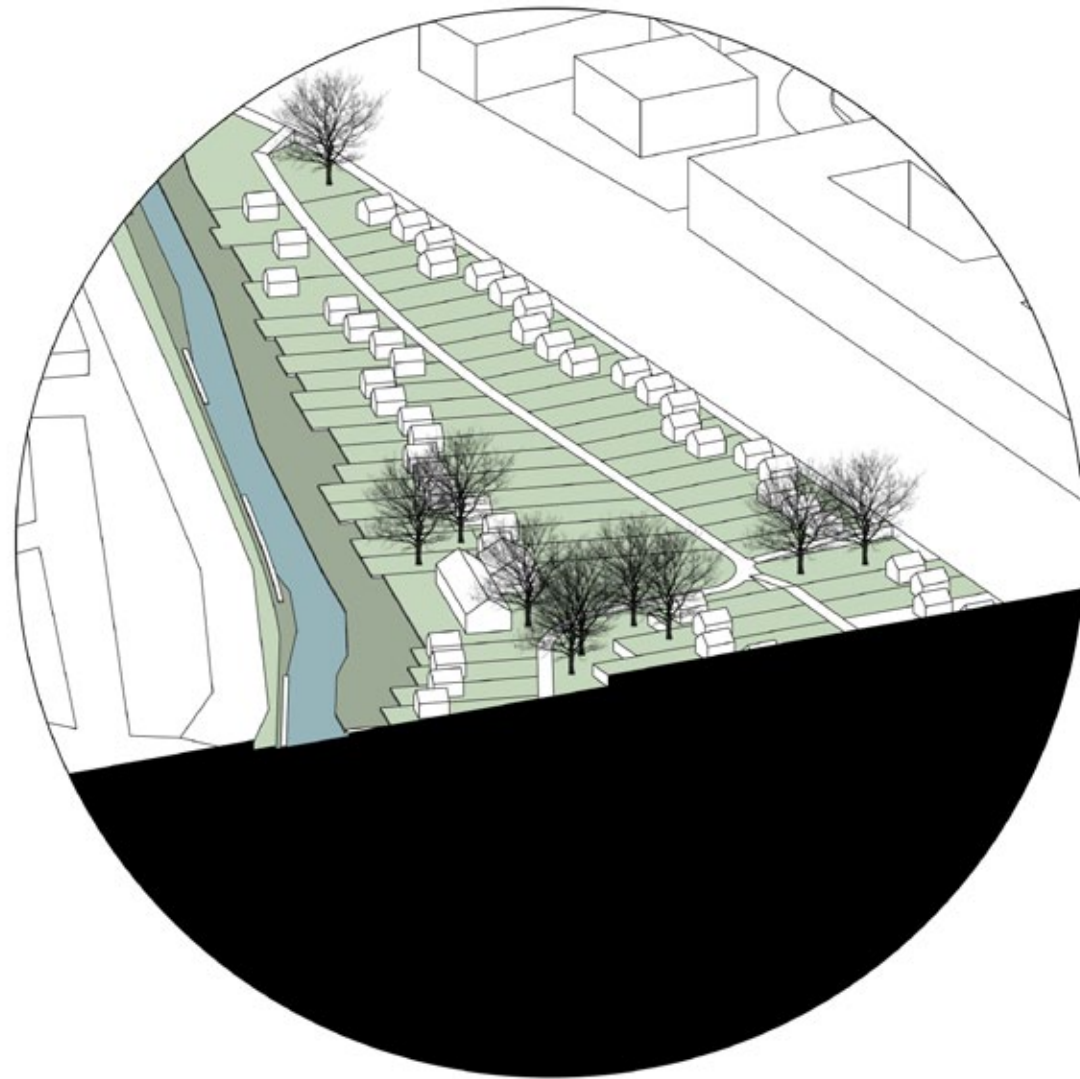
1.Parallel

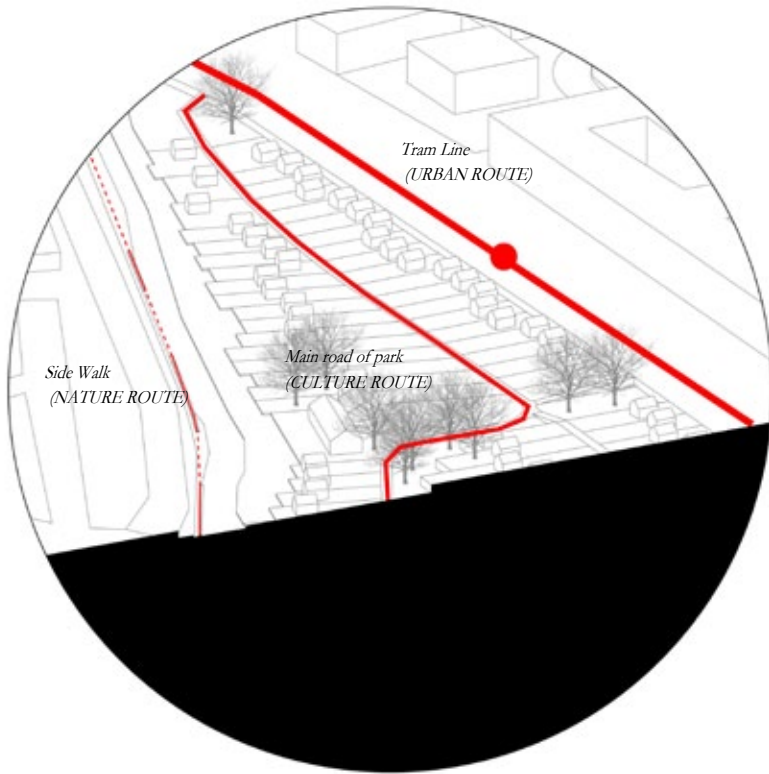
In most part of the park, the three pathes are parallel.
In thses cases, on differen routes, people experience
the similar landscape from different perspective.

This is the main character of the park.



Example: Residential Park Section





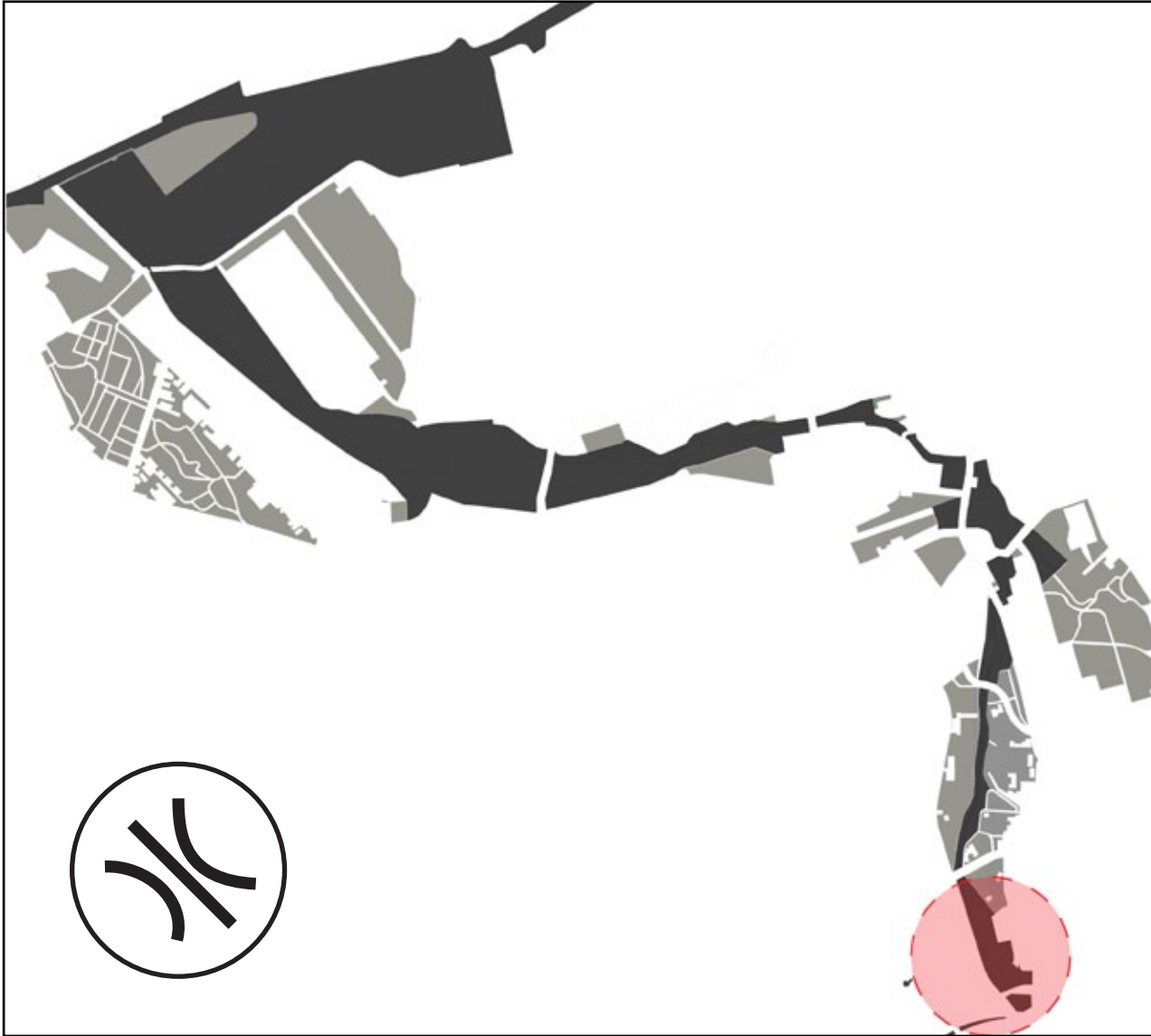
In this section, visitors experiment allotment garden landscape from different perspective

In Nature Route, you stand along the water below the layer of the gardens, you can smell the flowers, hear the flow of water and enjoy the reflection of the gardens in the water. You are embraced by the atmosphere of pastoral poetry.

In Culture Route, you pass between the allotment gardens, you see people, neighbourhood, gardening and hear them talking to each other, exchanging experiment.

In Urban Route, you see a lot allotment gardens between urban buildings. The conflict between green and grey.





2. Apart

In entrance park, the three pathes are apart.
In this case, on differen routes, people experience
totaly different landscape

It seduce people from city center with different need
go into the park

Example: Entrance Park Section



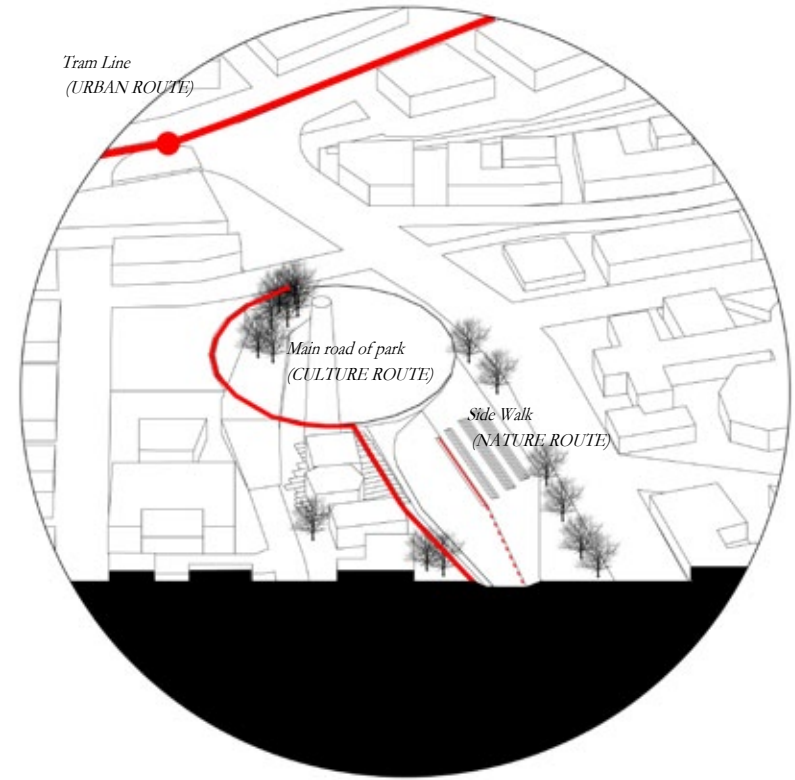
Side Walk
(NATURE ROUTE)



Main road of park
(CULTURE ROUTE)



Tram Line
(URBAN ROUTE)



In this section, visitors from different part of city with different need can find their space in the park

In Nature Route, you stand in a quiet grass land in the waterway valley. The city is out of the sight.

In Culture Route, you can see graffitists working on the walls of the abandoned train line. See the alive street art.

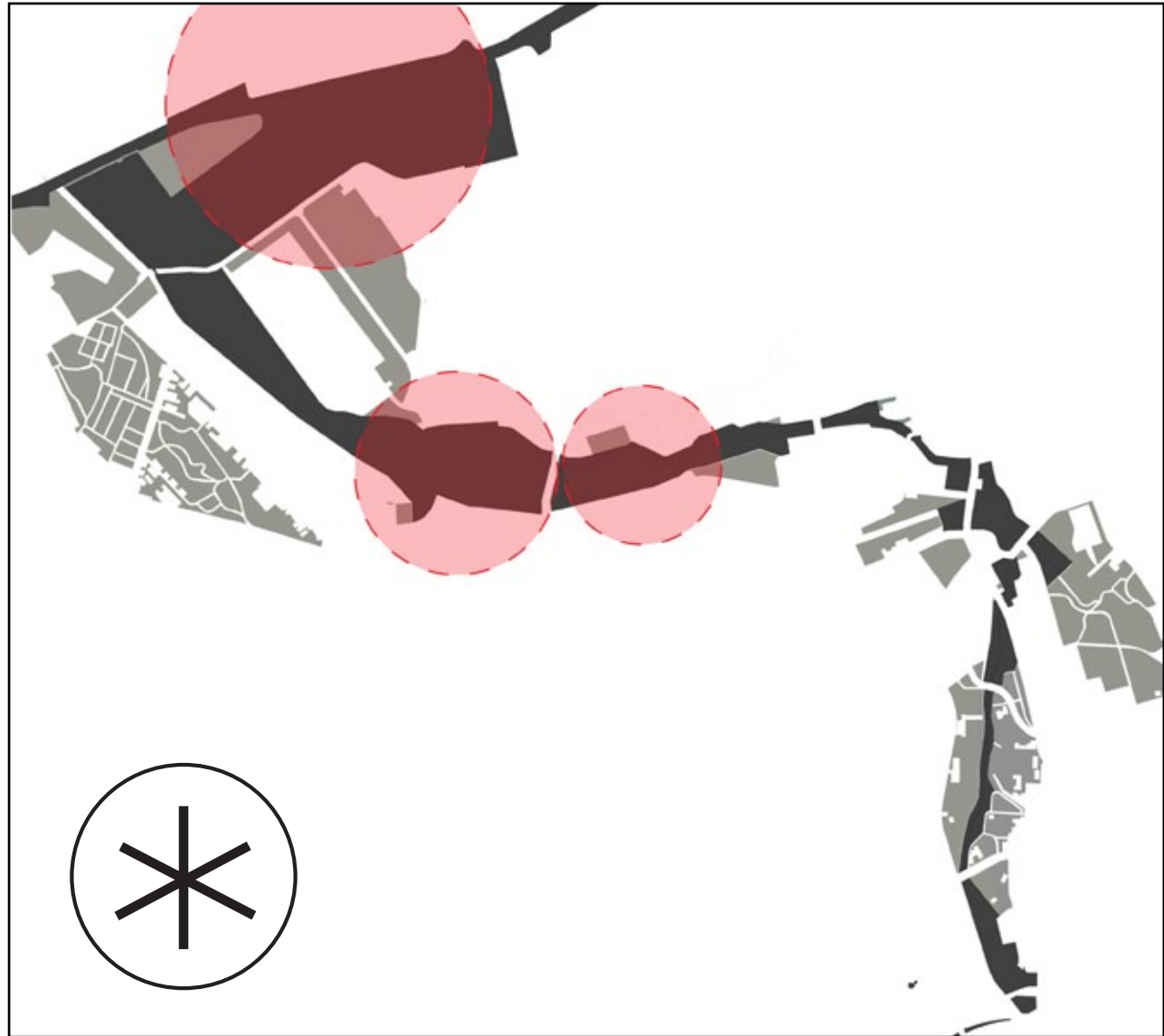
In Urban Route, the park is a glimpse of green in the city.

1. Intersection

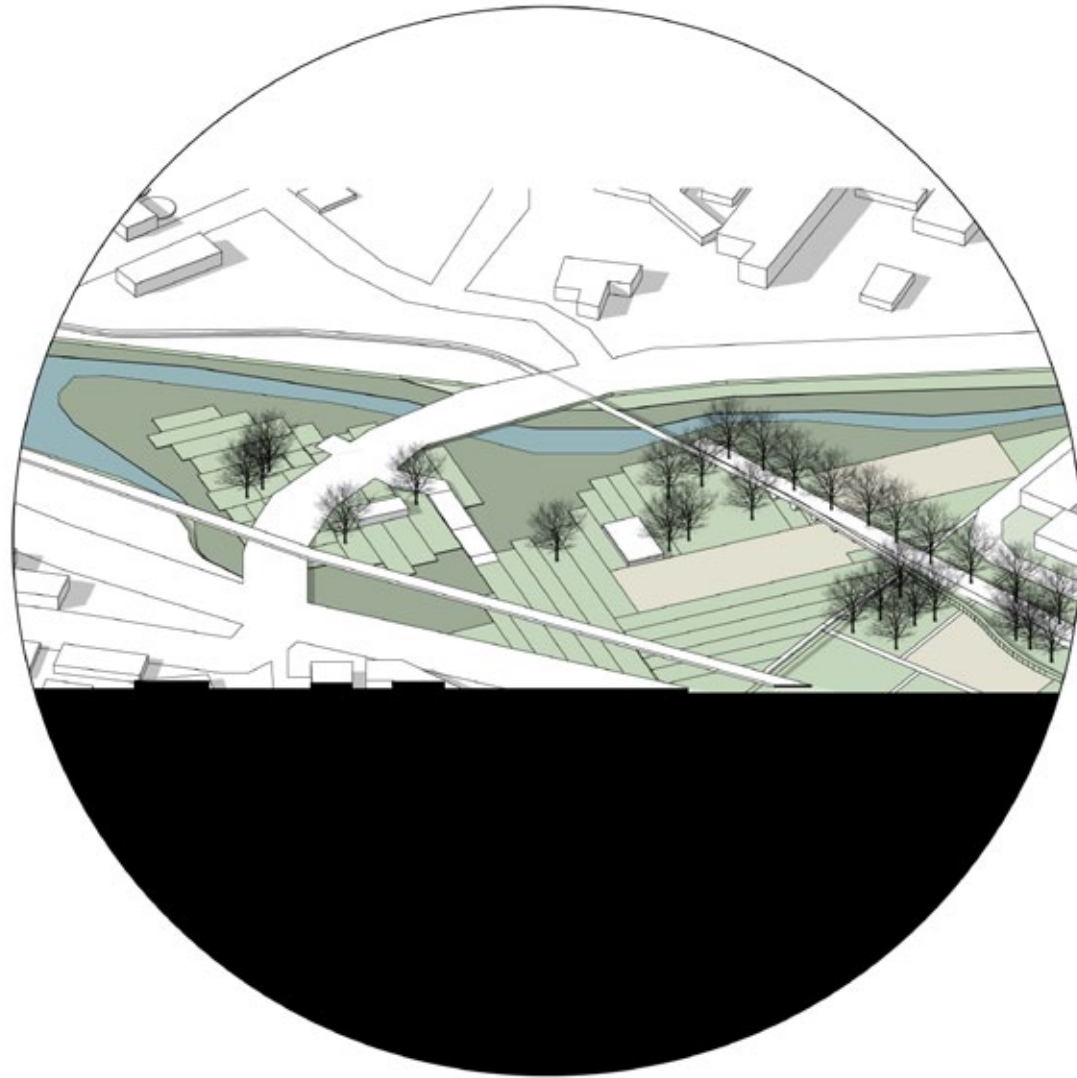
Sometimes, the three routes are intersect.

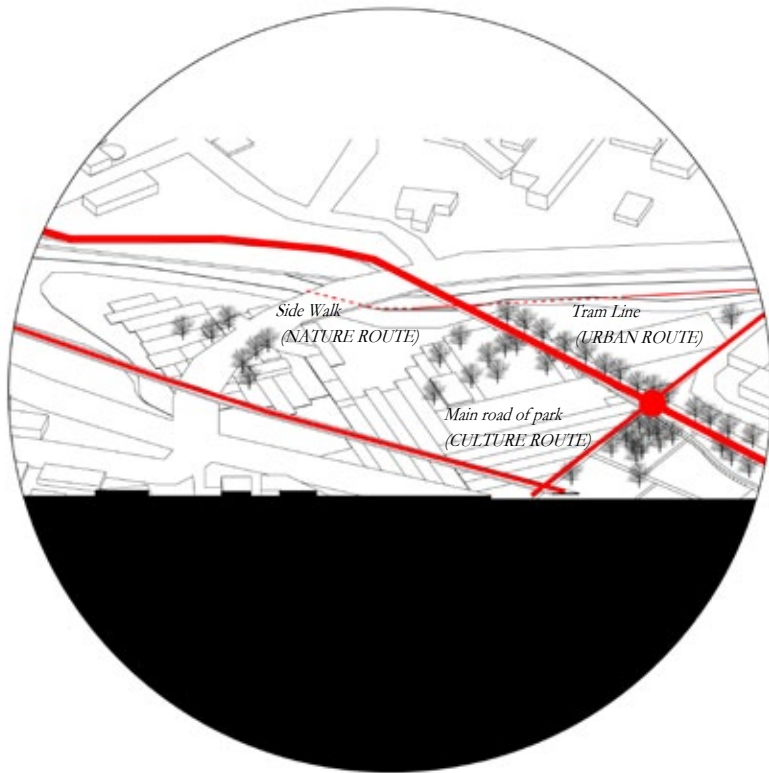
In these cases, people on different routes go together. The experiment on different routes is similar, but it's the most exciting and open part of the park.

These sections attract people from city center go to the Emscher river.



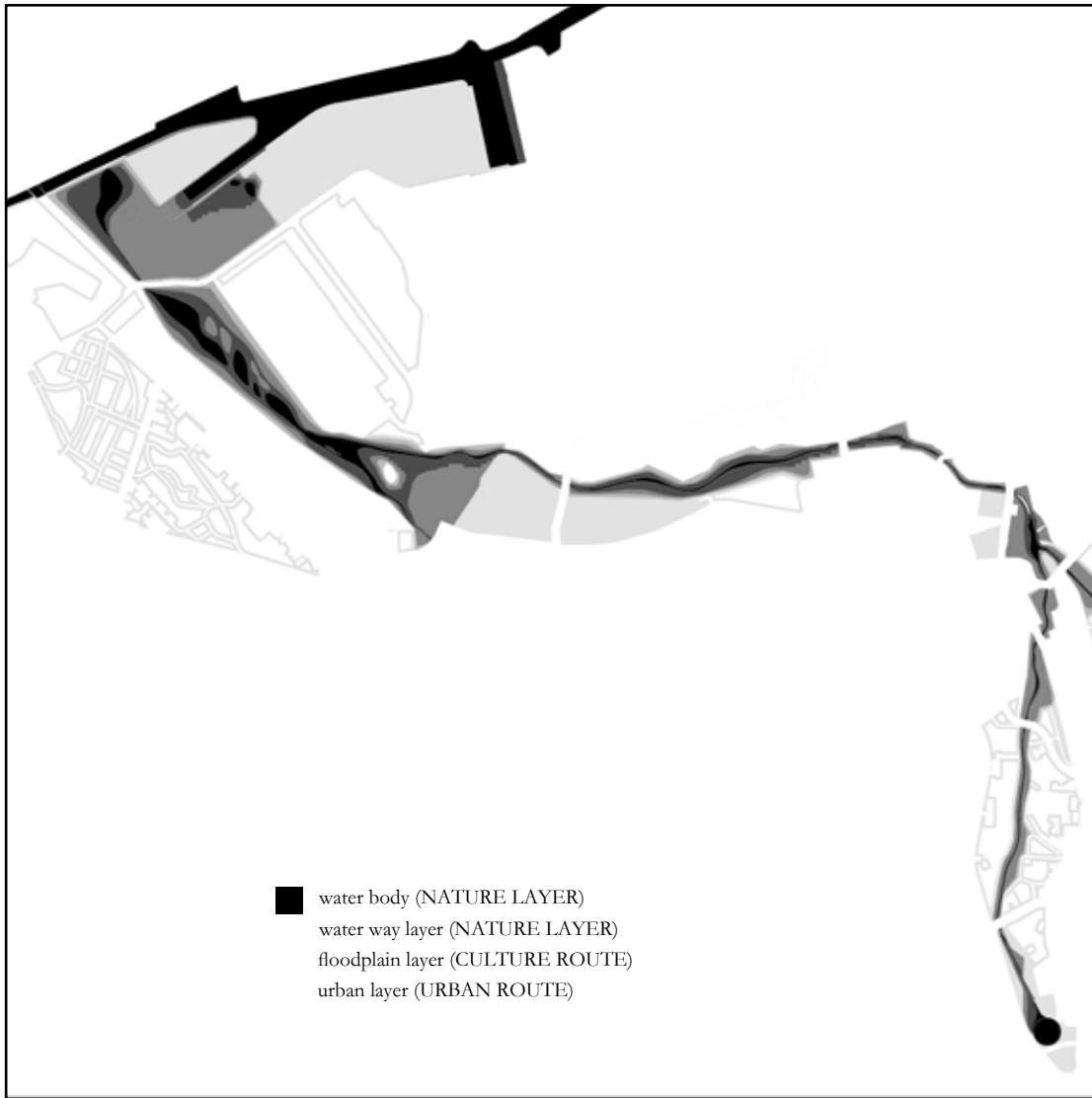
Example: Sports and performance park





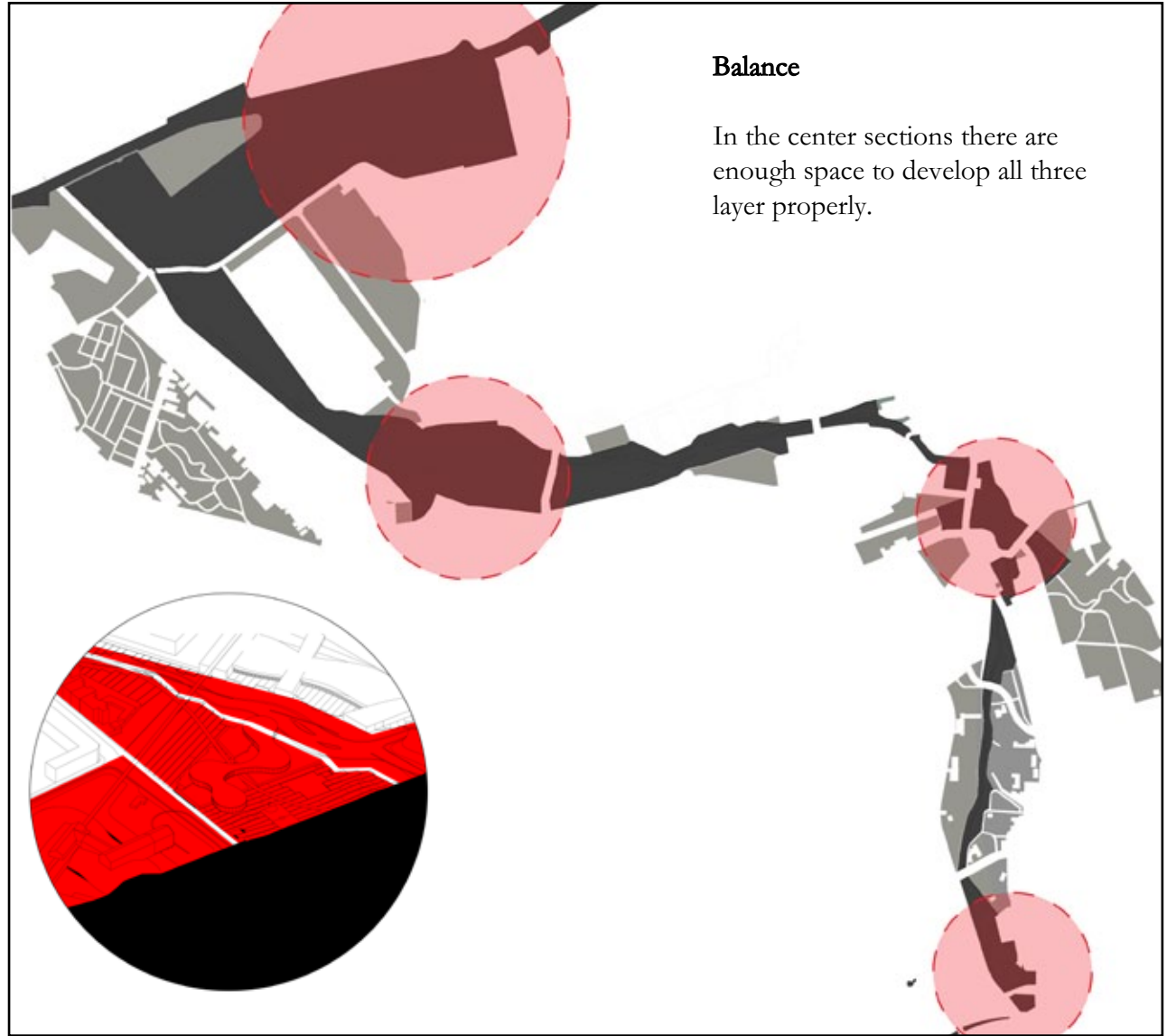
In this section, visitors are gathering for big events or sport games. Its alive, crowd and excited here. People are gathering here from all over the city.

It drives the development of the new urban quarter.



4.5.2 THREE LAYERS

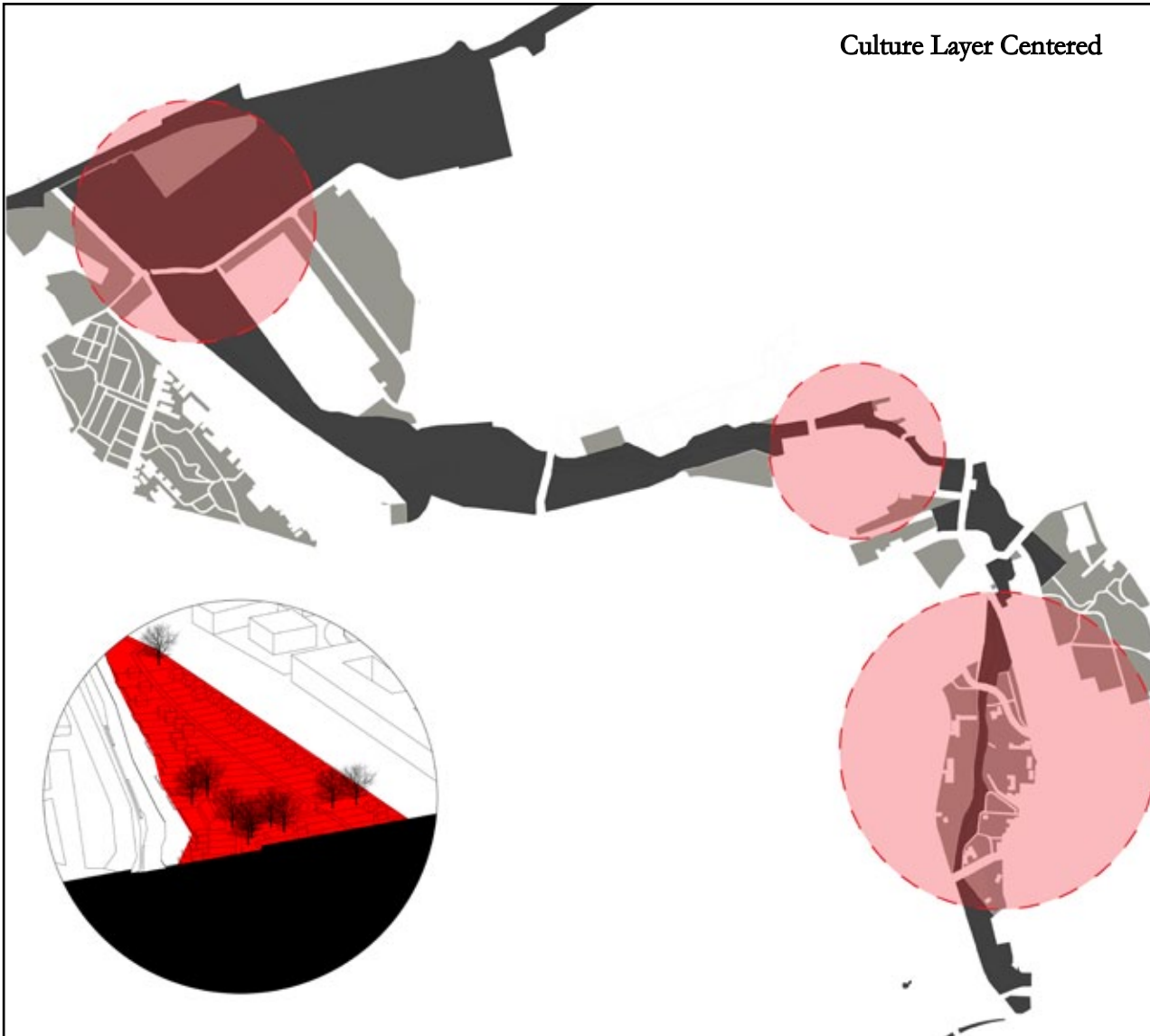
The topic of the site influence the proportion of the three layers in the site.



Balance

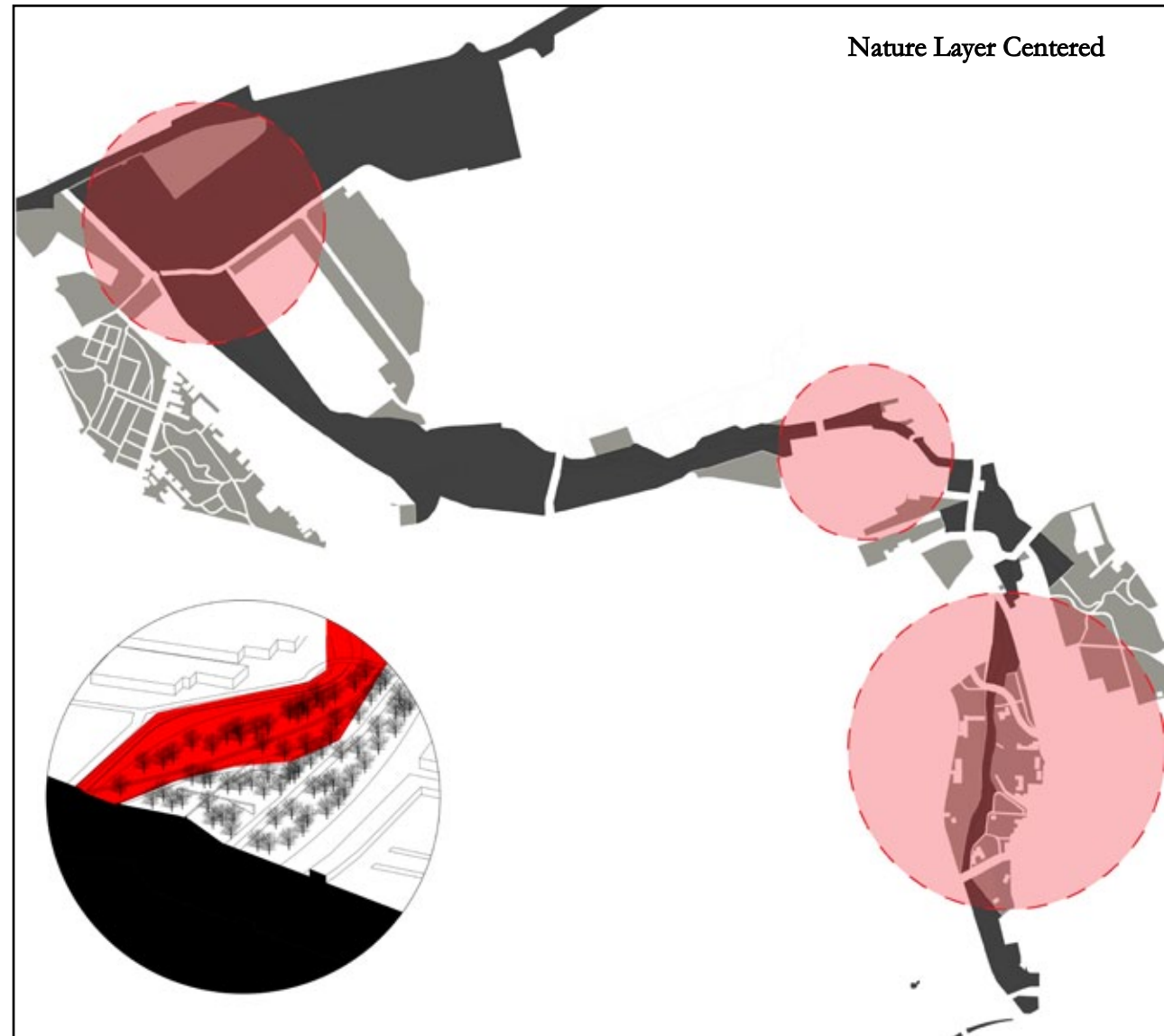
In the center sections there are enough space to develop all three layer properly.

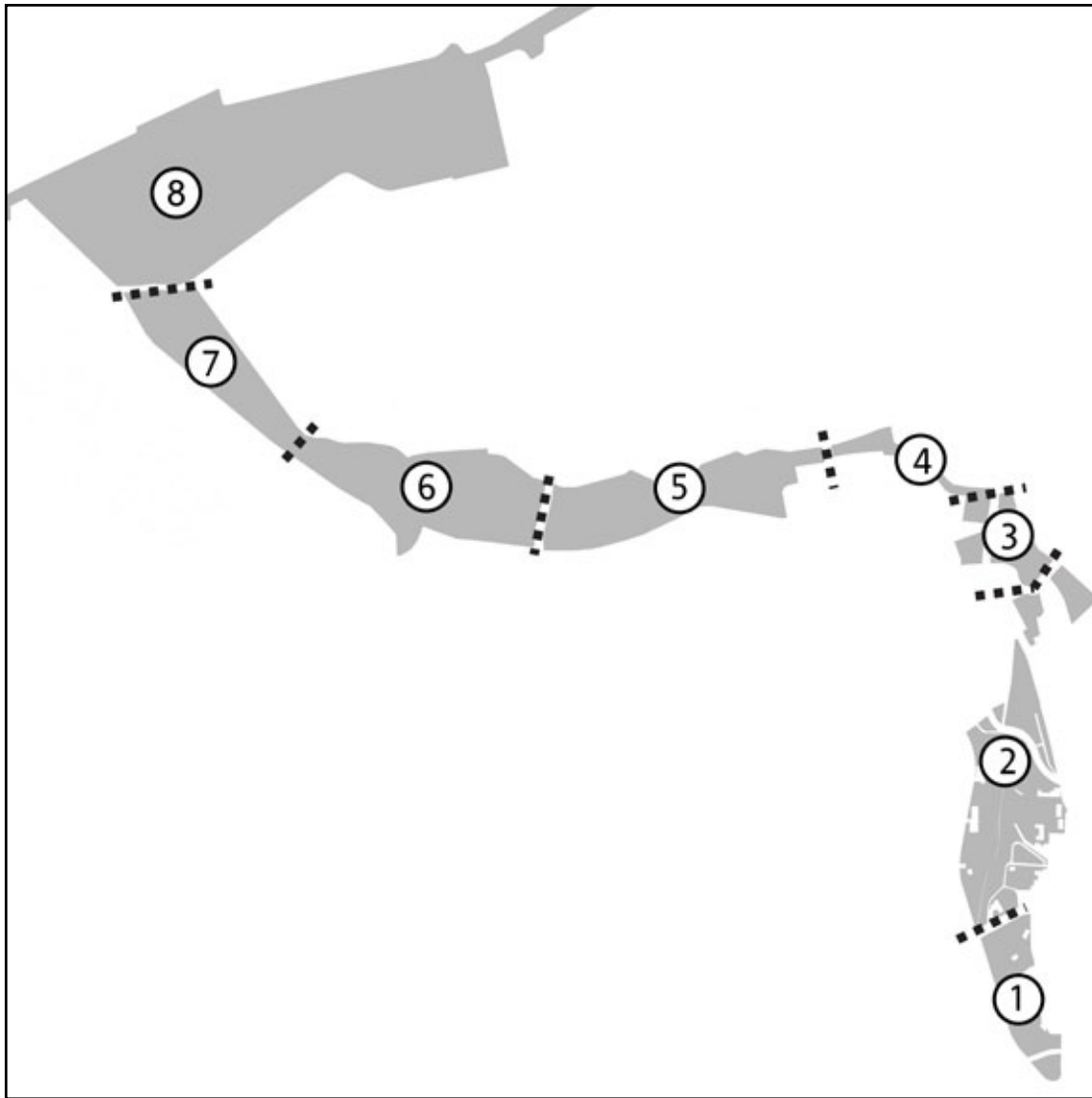
Culture Layer Centered



In the rest part of the park, due to the linear character of the park. These section are centered on one layer and the other two layers are subsidiary following in the center layer.

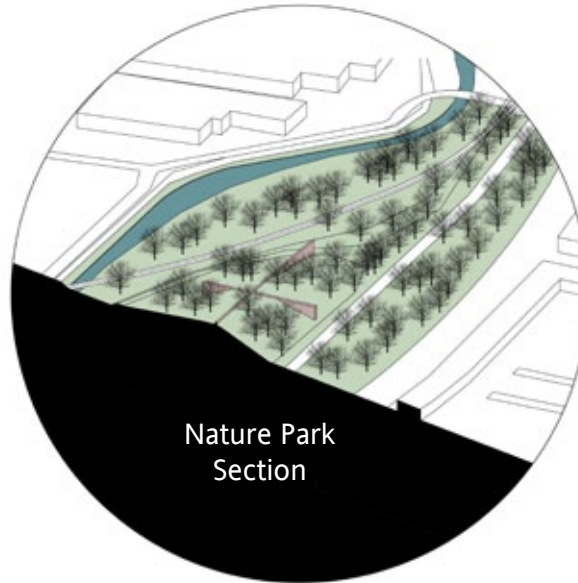
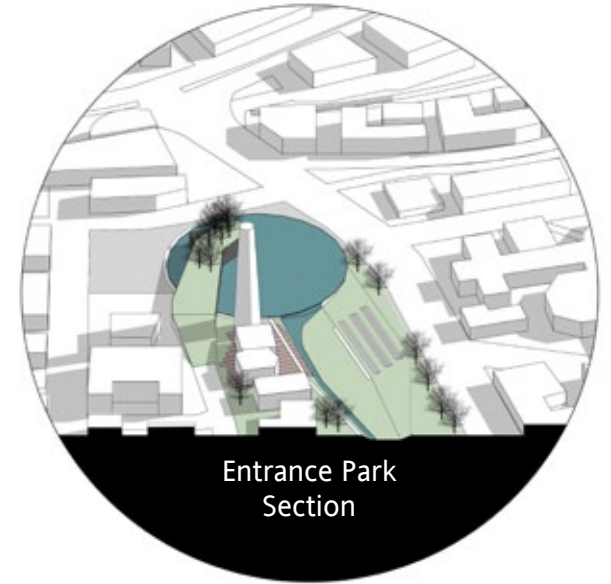
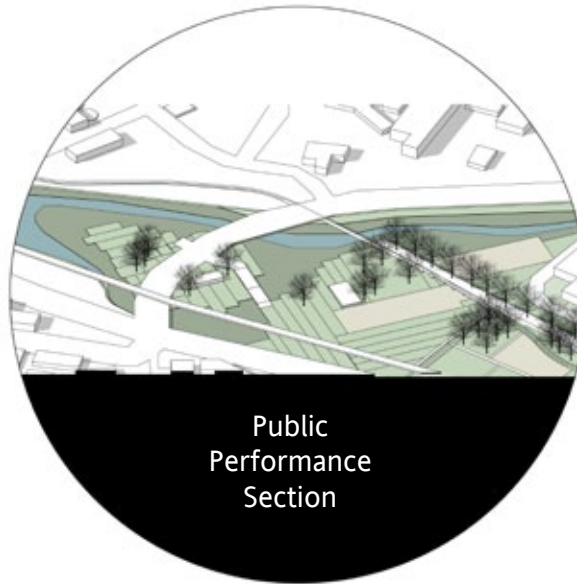


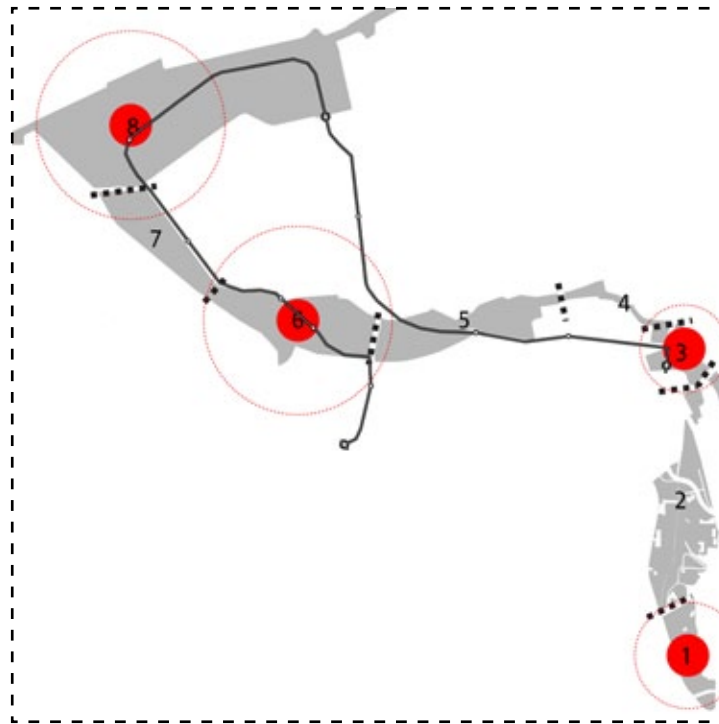




4.5.3 SECTIONS

The expression of design strategy on different sections are different , following the tops.





4.5.4 MASTER PLAN

Considering the plan of the park, together I have the design of the park

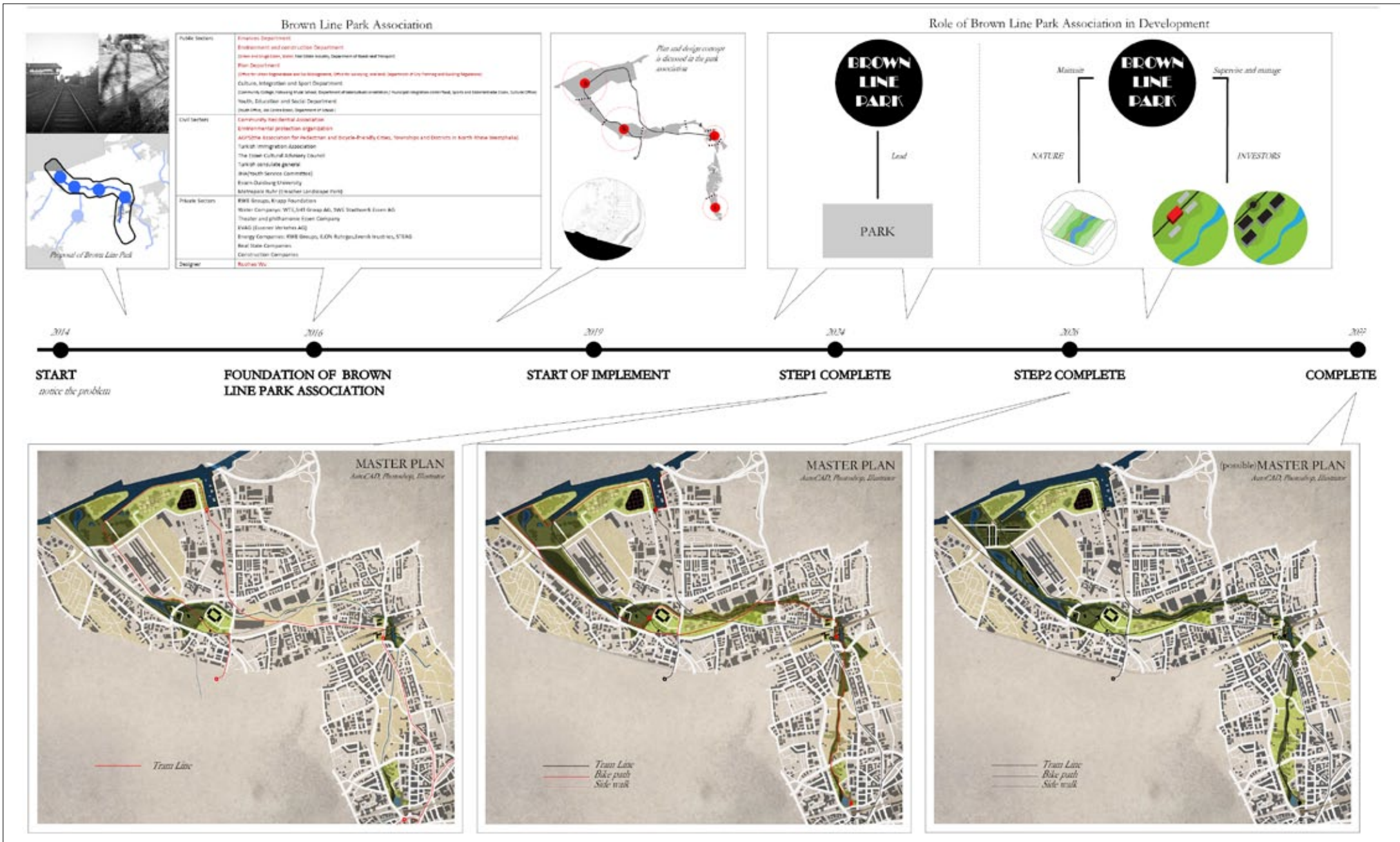


- *Tram Line (URBAN ROUTE)*
- *Main road of park (CULTURE ROUTE)*
- *Side Walk (NATURE ROUTE)*

DEVELOPMENT PLAN

5

DEVELOPMENT IS A PROCESS



5.1 START (2014)

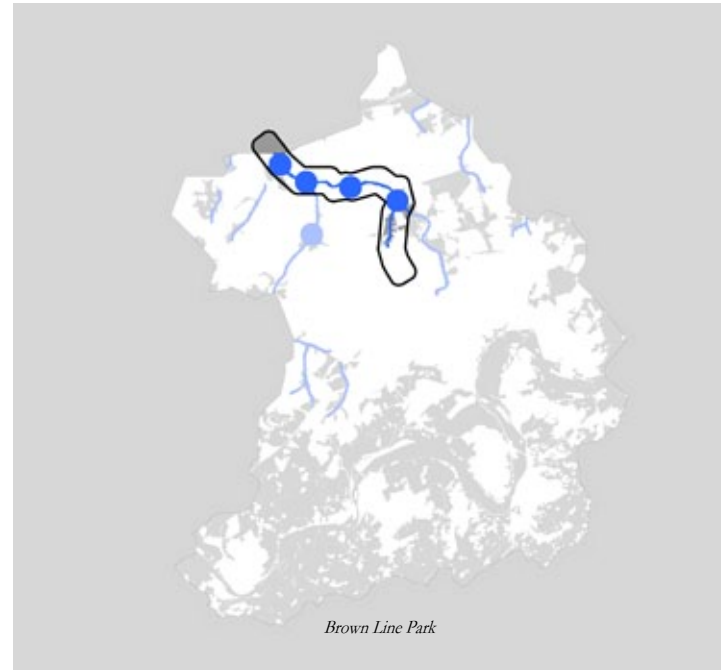
The project start with noticing the problem and possibility of the brownlines, I come up with the proposal of brown line park.



Abandoned train lines



Abandoned canals



Brown Line Park

5.2 FOUNDATION OF BROWN LINE PARK ASSOCIATION (2014-2016)

Taking the proposal with me and look for the public or civil or private groups that are interested or related to the project.



Members

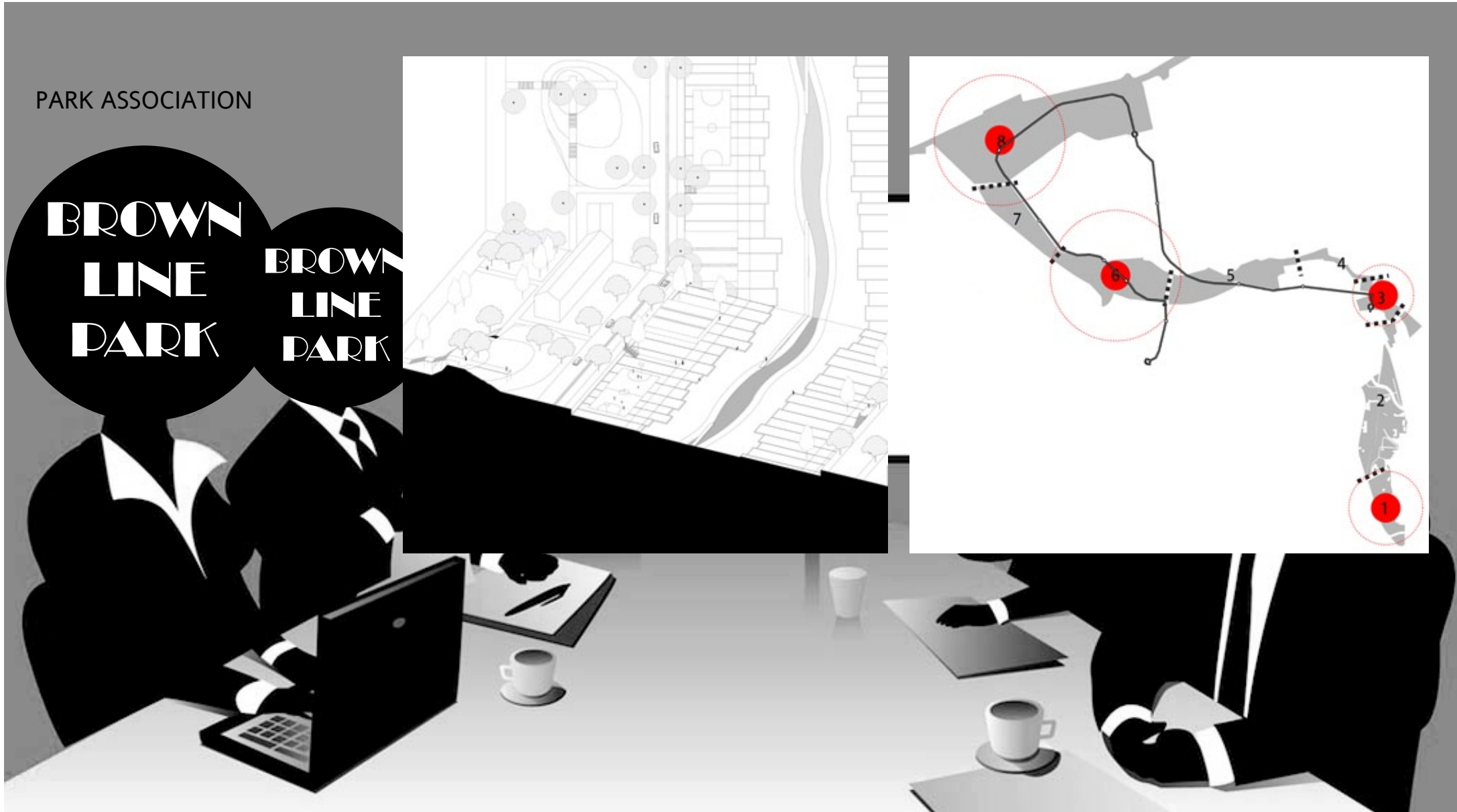
<p>Public Sectors</p>	<p>Finances Department Environment and construction Department (Green and Gruga Essen, Water, Real Estate Industry, Department of Roads and Transport) Plan Department (Office for Urban Regeneration and Soil Management, Office for surveying, and land, Department of City Planning and Building Regulations) Culture, Integration and Sport Department (Community College, Folkwang Music School, Department of Intercultural orientation / municipal integration center food, Sports and Bäderbetriebe Essen, Cultural Office) Youth, Education and Social Department (Youth Office, Job Centre Essen, Department of School)</p>
<p>Civil Sectors</p>	<p>Community Residential Association Environmental protection organization AGFS(the Association for Pedestrian and Bicycle-friendly Cities, Townships and Districts in North Rhine Westphalia) Turkish Immigration Association The Essen Cultural Advisory Council Turkish consulate general JHA(Youth Service Committee) Essen-Duisburg University Metropole Ruhr (Emscher Landscape Park)</p>
<p>Private Sectors</p>	<p>RWE Groups, Krupp Foundation Water Companys: WTE,SHT Group AG, SWE Stadtwerk Essen AG Theater and philhamonie Essen Company EVAG (Essener Verkehrs AG) Energy Companies: RWE Groups, E.ON Ruhrgas,Evonik Inustries, STEAG Real State Companies Construction Companies</p> <p style="text-align: right;"><i>The Brown Line Park Association (some take part in the whole process of the development, some are in part of it)</i></p>
<p>Designer</p>	<p>Ruohao Wu</p>

5.3 DESIGN PROCESS (2016-2019)

The concept and design of the park will be discussed in the association.

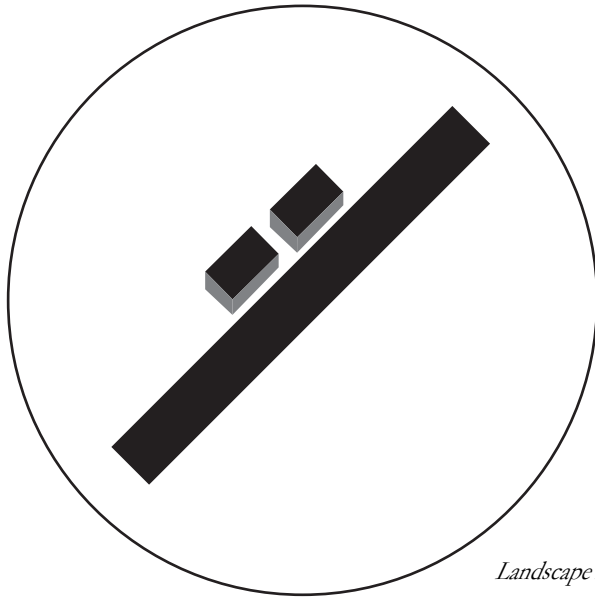
When the Brown Line Park Association approves the design of the park, the park will be developed gradually.

During the development, the design will always change and grow based on the experiments the people gain from the already developed part.

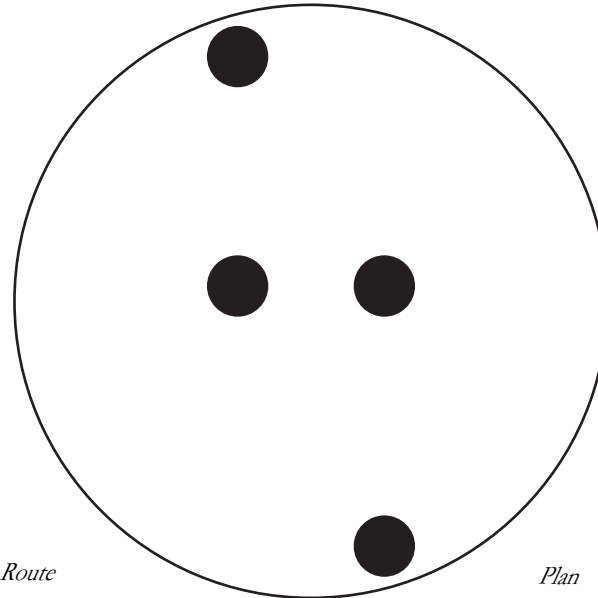


5.4 STEP 1. START ((2019-2024))

In this phase, the brown line association leads the development in which a new tram line and four center sectors will be constructed as test projects. For the core role of the centers in both water management and transportation network, the effect of the park on ecological improvement and urban development will be test in reality. So are the concept of the three landscape routes.



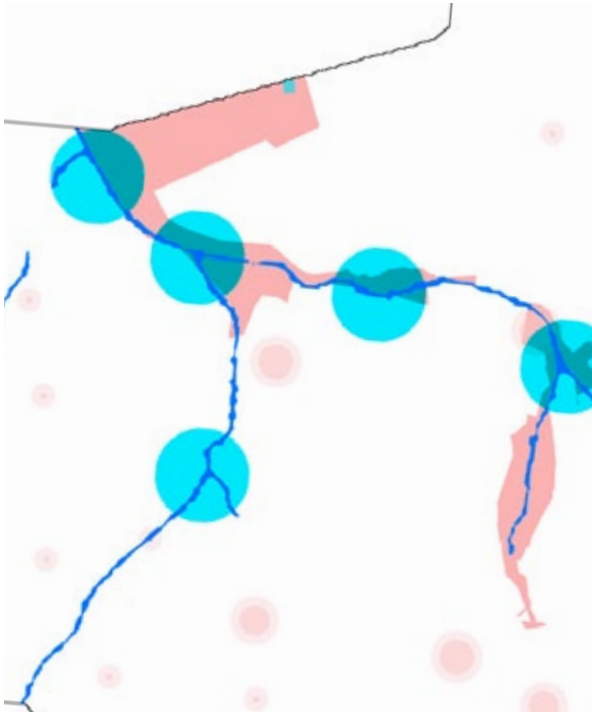
Landscape Architecture: Urban Route



Plan



Step 1: four center sectors and new tram



Ecological

Confluent area

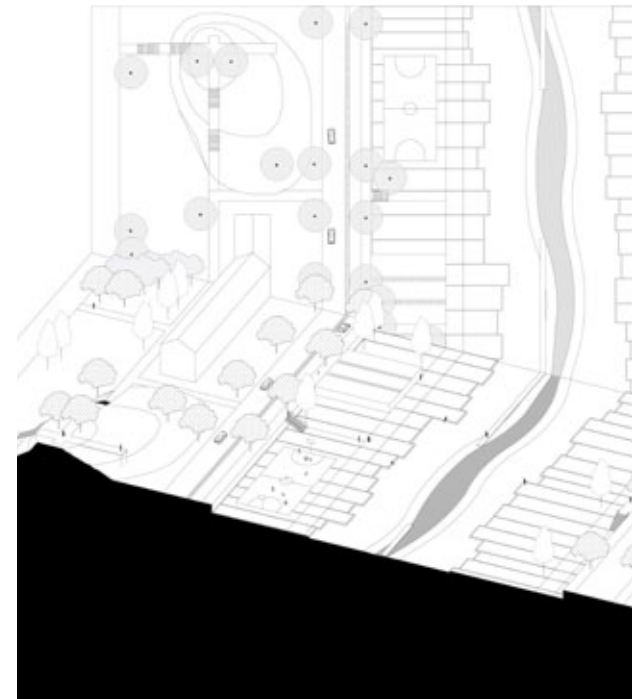
Flood prevention



Urban development aspect

Node of multi-mobility

Engine of Urban development



Landscape architecture

Three Routes

1.nature route, 2.culture route,3.urban route

New Energy Produce and Research Center



Sport & performance Park

Community Center

Entrance Park

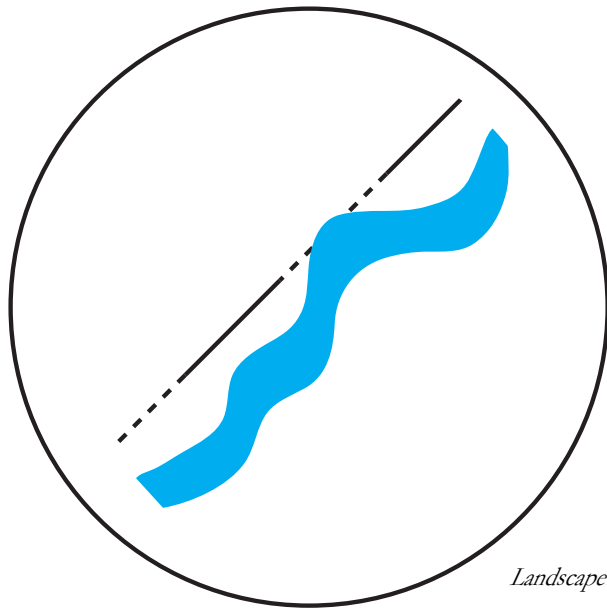
5.3 STEP 2. PARK

Learning from the test projects, in this phase, the brown line association leads the development in which whole waterway generation will be done.

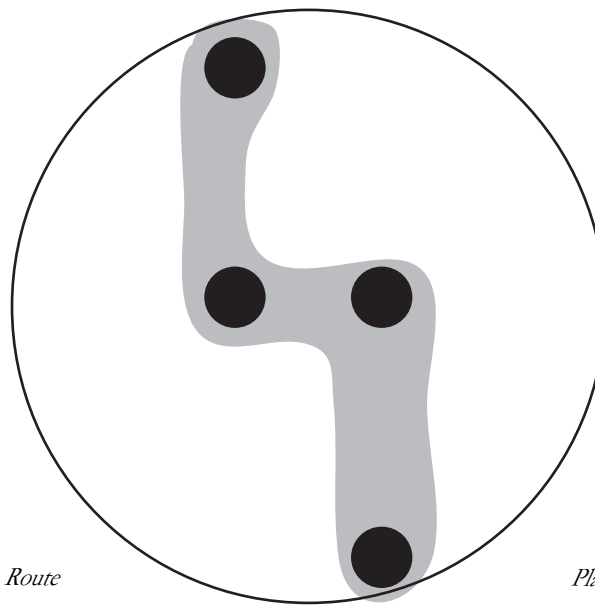
Develop from upstream to downstream of the waterway, the nature route will be developed together with the water way

The finished part will be open for public use.

When the whole water way regeneration is finished, the park is basically complete.



Landscape Architecture: Urban Route

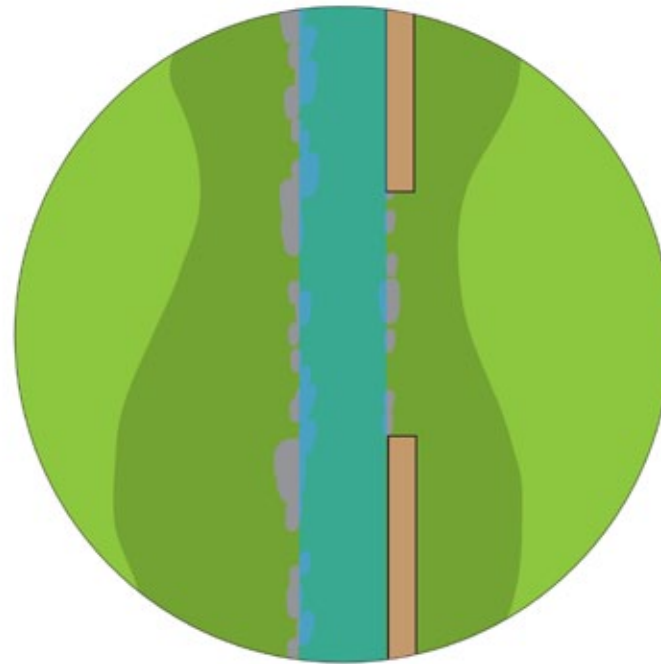
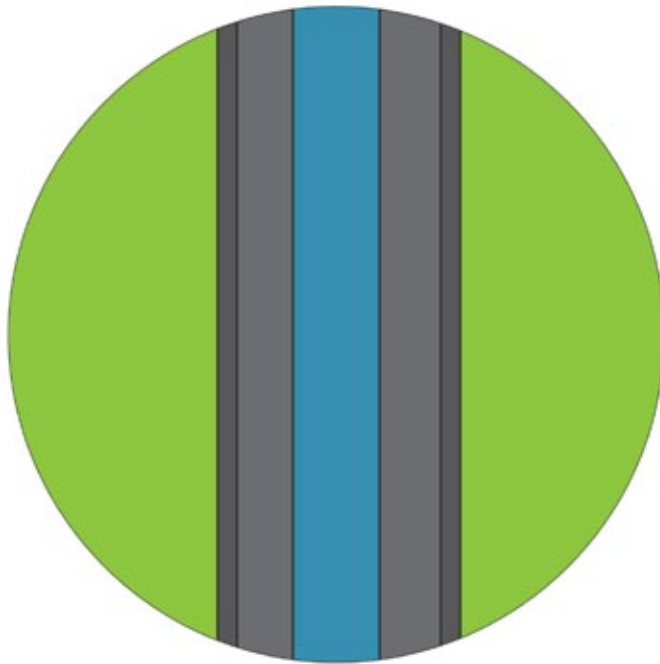
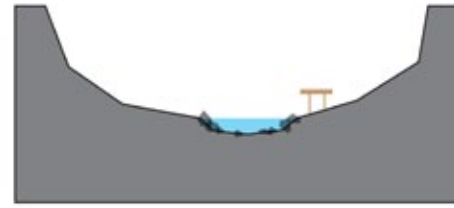
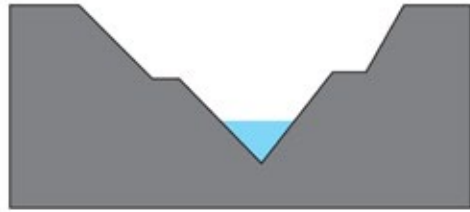


Plan



Public Sectors	<p>Finances Department</p> <p>Environment and construction Department (Green and Gruga Essen, Water, Real Estate Industry, Department of Roads and Transport)</p> <p>Plan Department (Office for Urban Regeneration and Soil Management, Office for surveying, and land, Department of City Planning and Building Regulations)</p>
Civil Sectors	<p>Community Residential Association</p> <p>Environmental protection organization</p> <p>AGFS(the Association for Pedestrian and Bicycle-friendly Cities, Townships and Districts in North Rhine Westphalia)</p> <p>Metropole Ruhr (Emscher Landscape Park)</p>
Private Sectors	<p>RWE Groups, Krupp Foundation</p> <p>Water Companys: WTE,SHT Group AG, SWE Stadtwerk Essen AG</p> <p>Construction Companies</p>
Designer	Ruohao Wu

Step2: water way regeneration and Nature Route



water way regeneration and construction of Nature Route



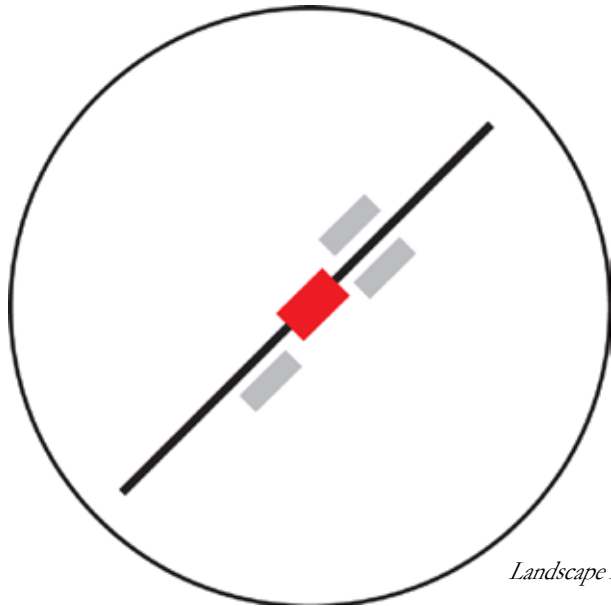
5.4 STEP 3. MANAGEMENT

When the step 2 is finish and the park is open for public, the park will open for market and public investors.

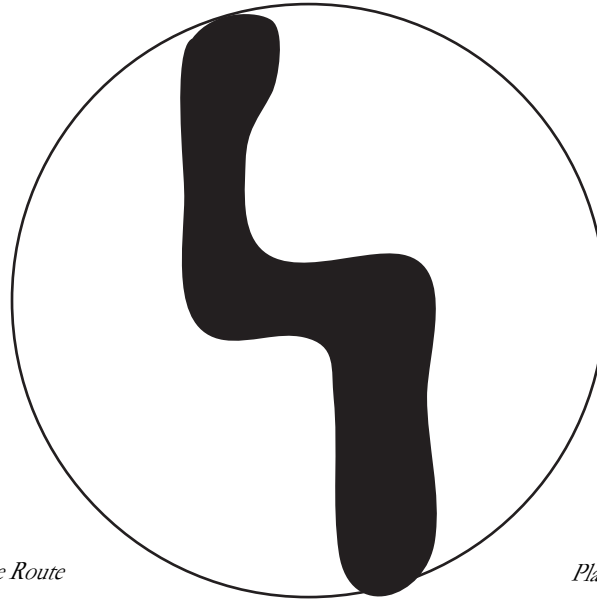
In this phaze, the brown line association will supervise and manage the self growing of the Brown Line Park.

On one hand, with the natuarlise of the waterway, the plants along the water will grow much faster and the Brown Line association will need to maintain it.

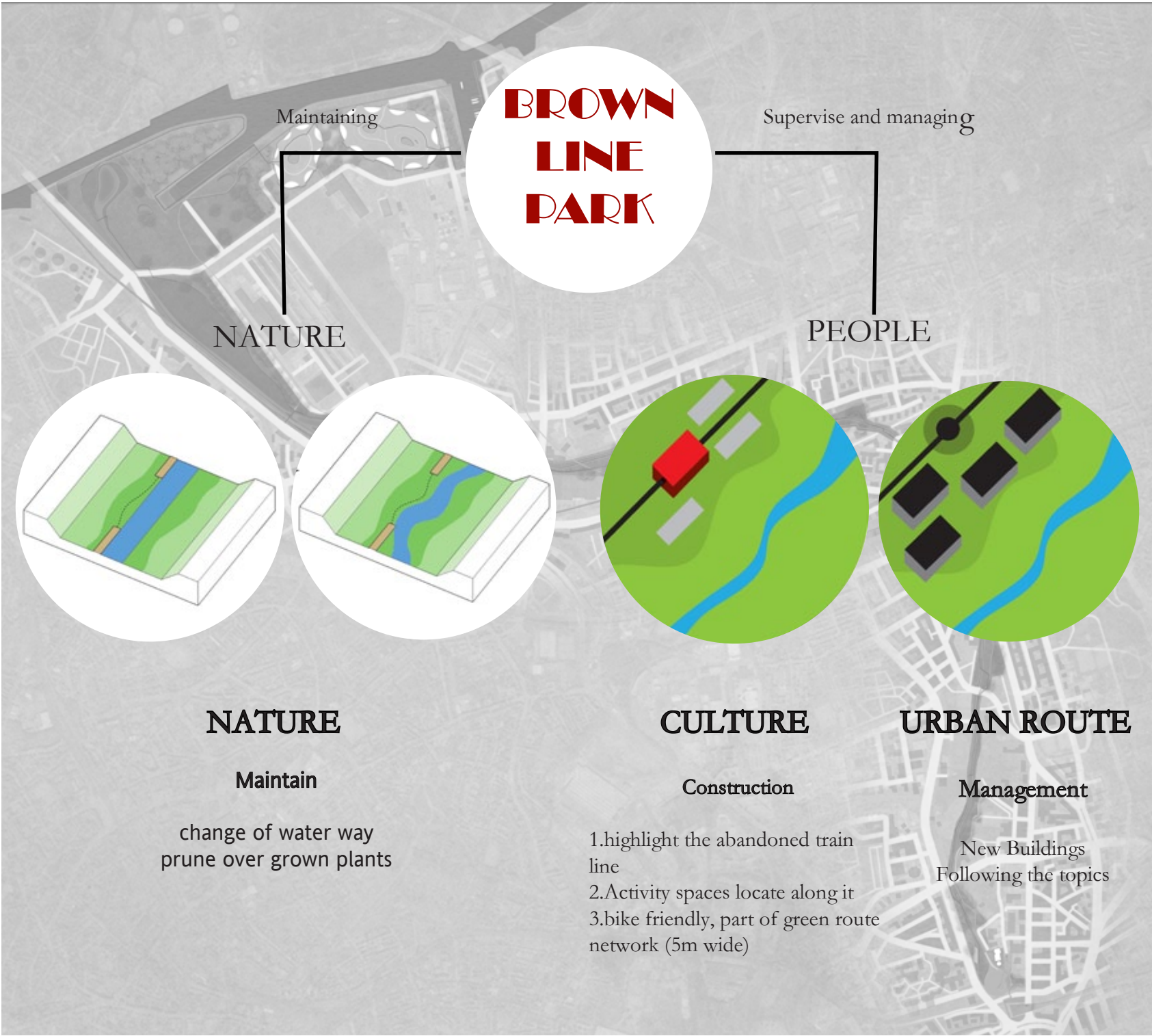
On other hand, more actors, companies, groups or individuals, will get involve in the park. The Brown Line Association would supervise the development. In which, the culture route will be developed by the outside investors.

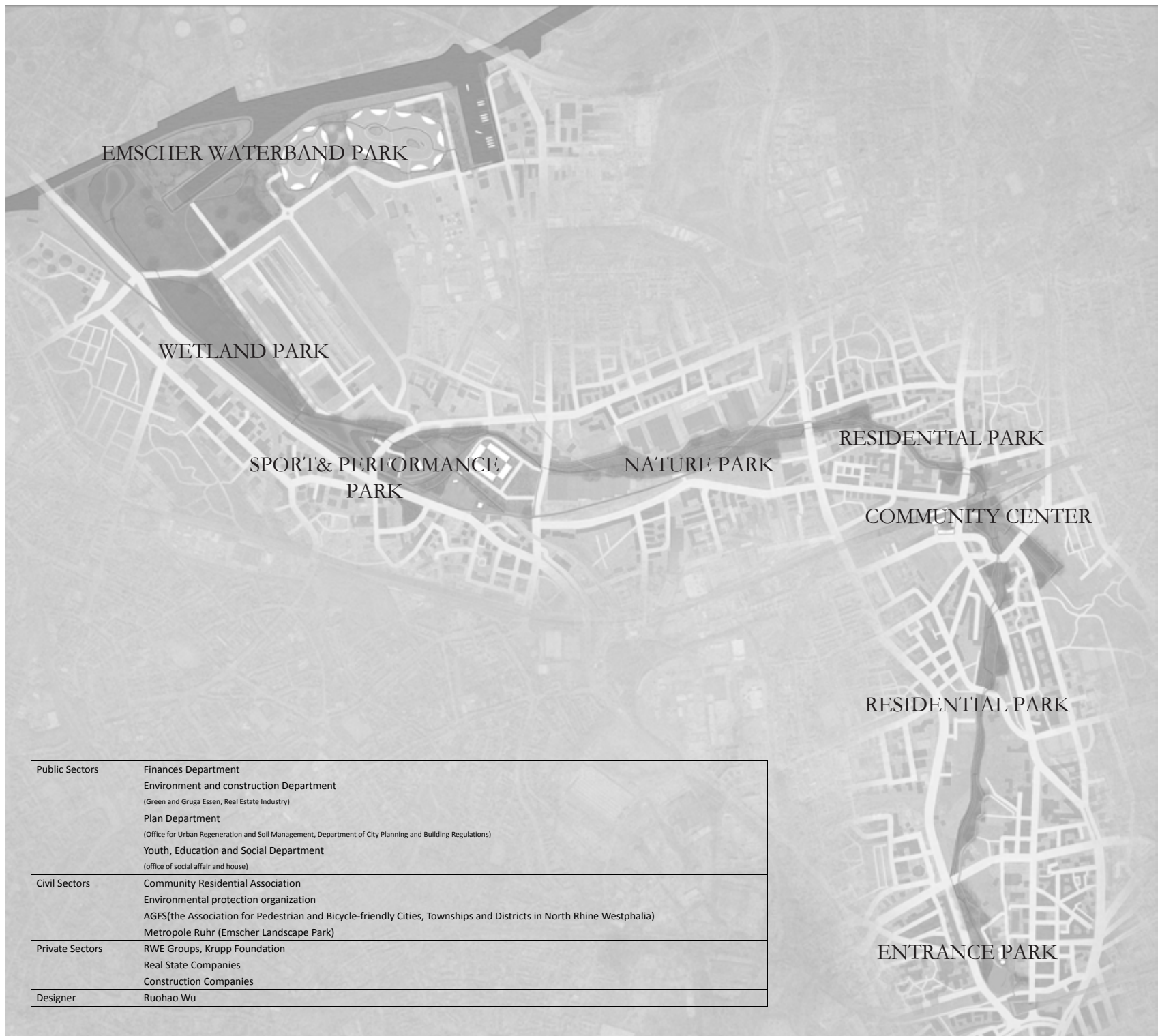


Landscape Architecture: Culture Route



Plan





Public Sectors	<p>Finances Department</p> <p>Environment and construction Department (Green and Gruga Essen, Real Estate Industry)</p> <p>Plan Department (Office for Urban Regeneration and Soil Management, Department of City Planning and Building Regulations)</p> <p>Youth, Education and Social Department (office of social affair and house)</p>
Civil Sectors	<p>Community Residential Association</p> <p>Environmental protection organization</p> <p>AGFS(the Association for Pedestrian and Bicycle-friendly Cities, Townships and Districts in North Rhine Westphalia)</p> <p>Metropole Ruhr (Emscher Landscape Park)</p>
Private Sectors	<p>RWE Groups, Krupp Foundation</p> <p>Real State Companies</p> <p>Construction Companies</p>
Designer	Ruohao Wu

Possible topics of the park



Possible Master Plan in Step 3

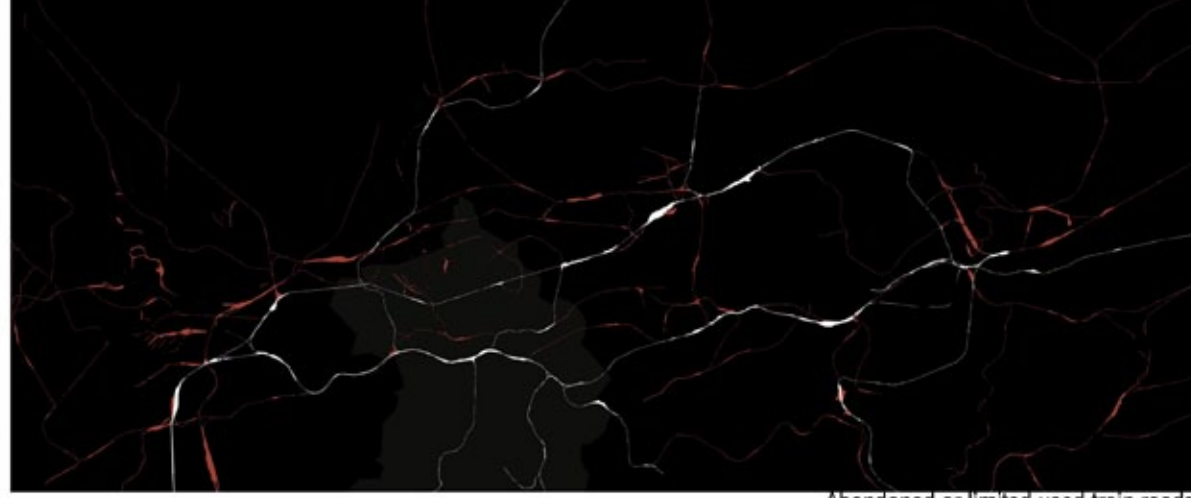
CONCLUSION
& REFLECTION

6

6.1 REFLECTION ON RUHR AREA

Brown Lines in Ruhr area

As introduced in the chapter 1, there are a lot of brown lines left in Ruhr area

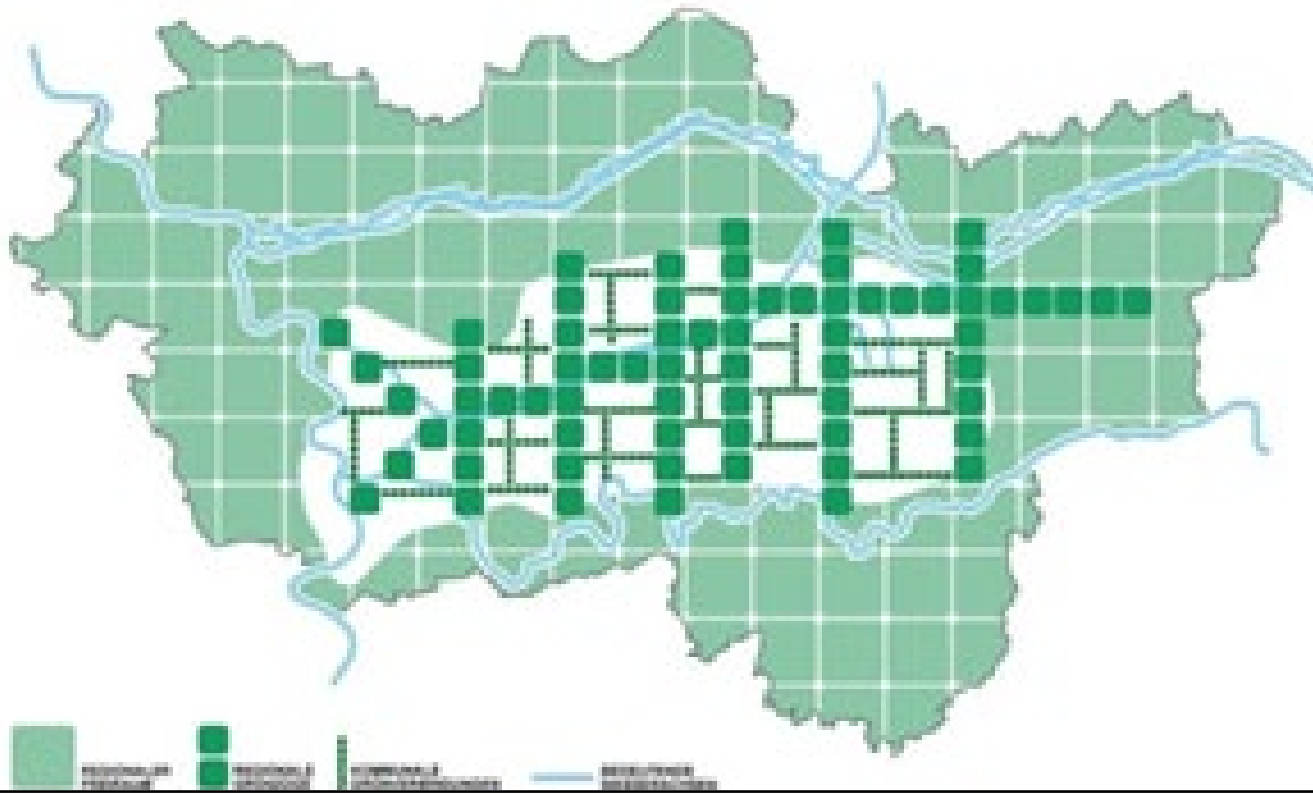


Abandoned or limited used train roads



Sewage treatment system

LEITBILD FREIRAUMSTRATEGIE



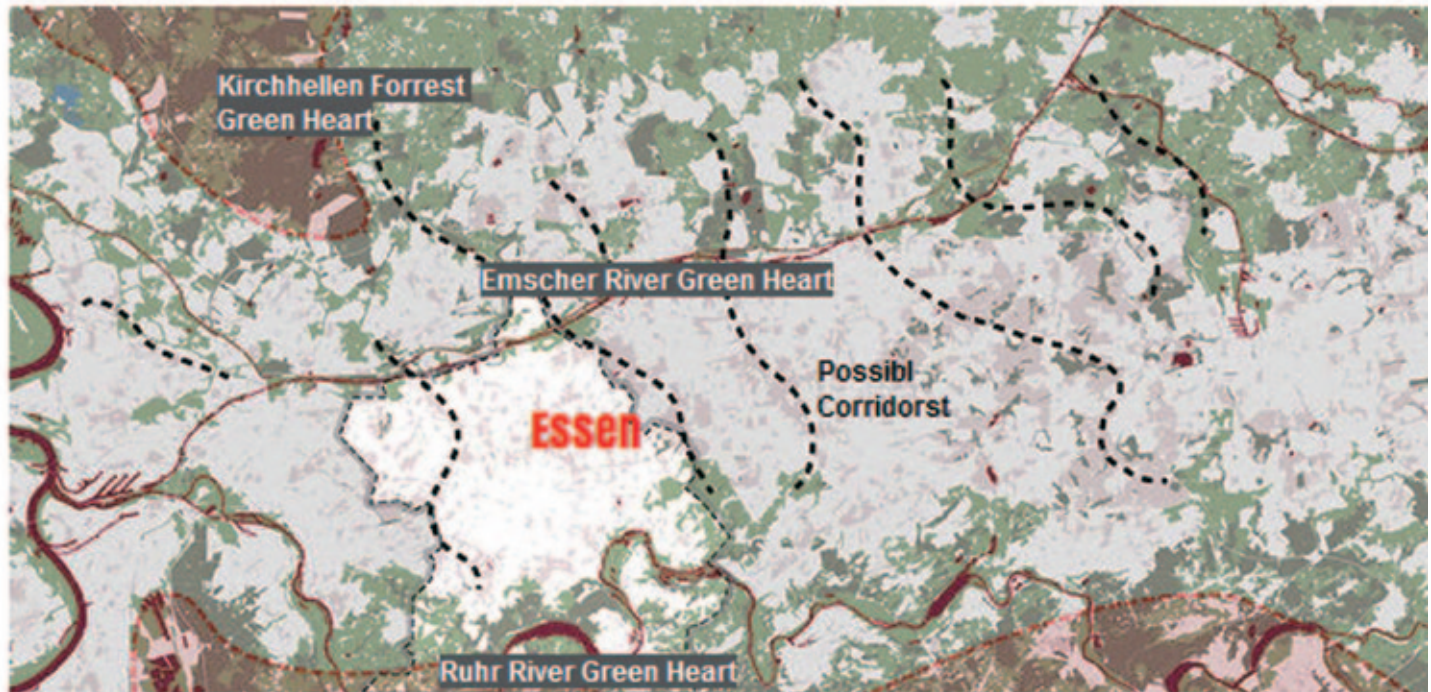
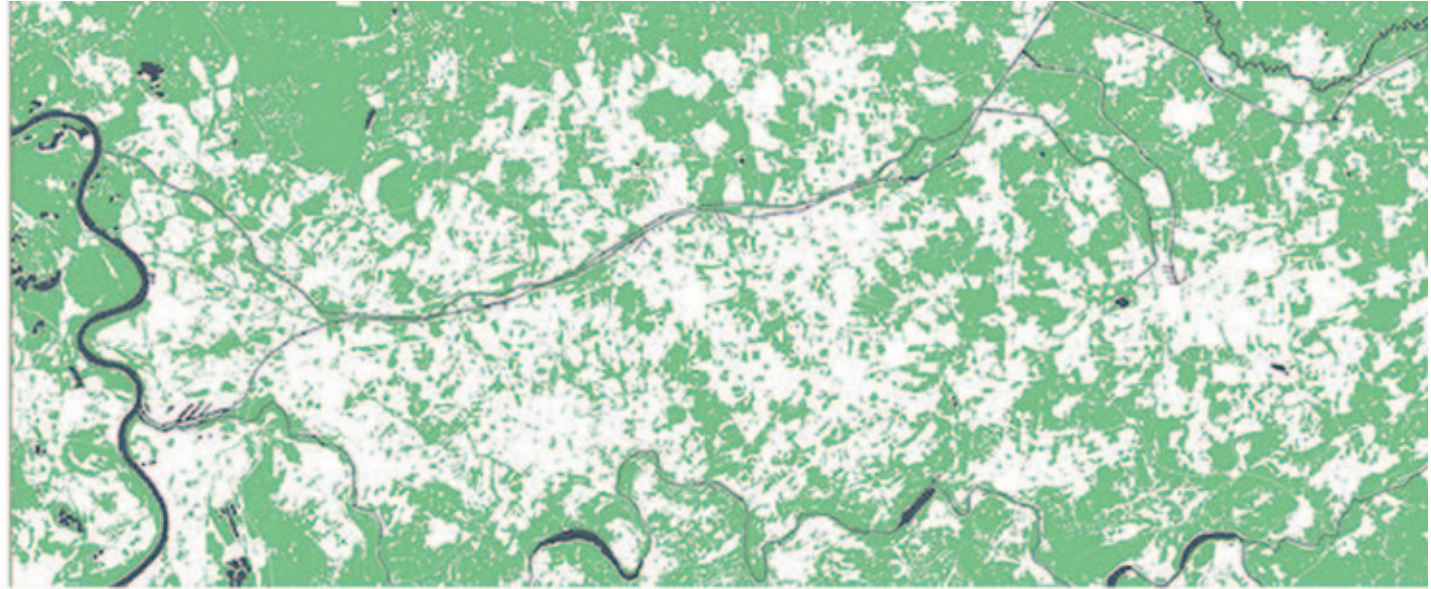
The need to reactive the brown lines

From public open space network aspect, the current develop goal in regional public open space development is to be integrated and connected.

From Ecological system aspect

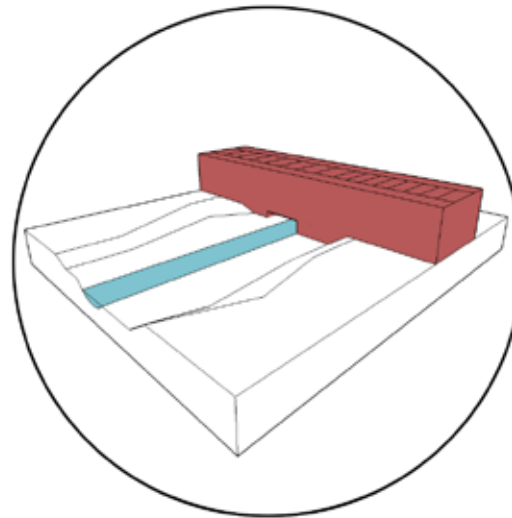
With the landscape regeneration of Ruhr area in the past 30 years, the greening rate has greatly improved here. However, many urban green spaces are not connected to green heart and green hearts are not well connected.

The landscape regeneration of the canals could be the corridors to connect green spaces



Design as learning

The whole process of using landscape infrastructure concept in the design and development plan of the brown line reactivation project in Essen could be adapted in the whole Ruhr area

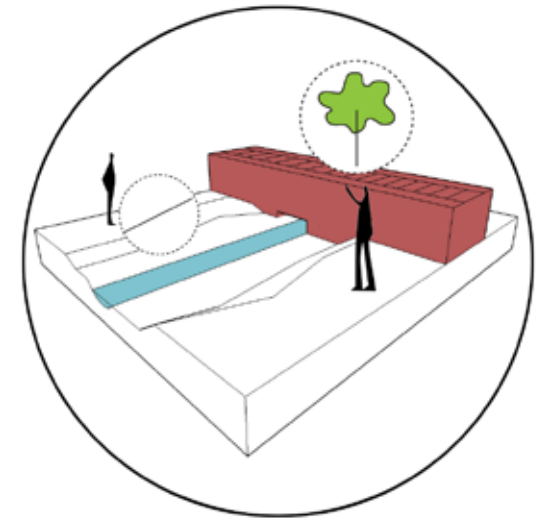


Design Process

Define design task

Plan of the Park

Design of the Park



Development Plan

Step1: Start

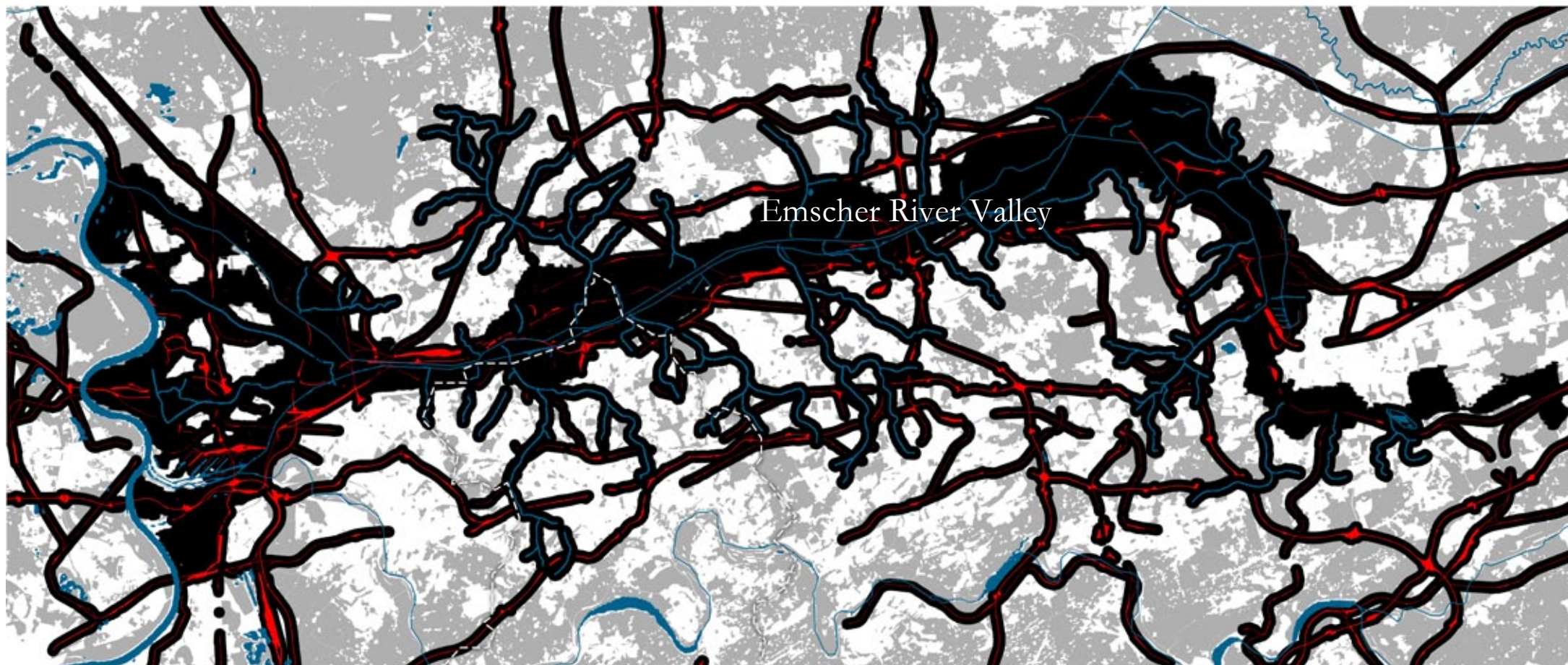
Step2: Park

Step3: Manage



*Case Study:
Brown Line Park in Essen*

More brown line park could be developed along the Emscher river, and eventually could become a Emscher river centered "brown line park" system to achieve a sustainable, connected, livable, green urban region.



6.2 REFLECTION IN WIDER CONTECT

In wider context, the need of new public open space, urban regeneration and ecological restoration is faced by many post-industrial cities all over the world. The process could be used as an example of using landscape infrastructure concept to reactive post-industrial infrastructures and bring good influences to all those aspects.



6.2 REFLECTION IN GENERAL

In general, in landscape practices, the concept of landscape infrastructure could help designers understand the structure of human living environment from an across discipline, systematic aspect. The principles from study of landscape infrastructure are quite important in, especially, dealing with complex urban context.



landscape
infrastructure

BROWN LINE
REVOLUTION
