

FLOWSCAPES

STUDIO

**TU DELFT
MASTER
LAND-**

**GRADUATION
WORK**

2018-2019

Delft University of Technology
Landscape Architecture Master Track
Flowscapes Studio 2018-2019

For further information

W: <https://www.tudelft.nl/en/architecture-and-the-built-environment/>

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FLOWSCAPES

STUDIO

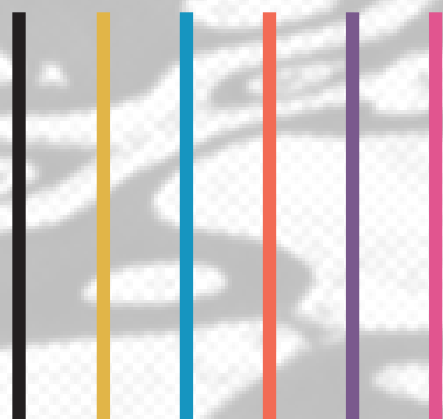
**TO DELETE
MASTER
LAND-
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ARCHI-
TECTURE**

**GRADUATION
WORK**

2018-2019







Flowscapes Studio

2018/2019

The graduation studio of the master track Landscape Architecture explores spatial, societal, and environmental issues by using design research and research-by-design approaches. Landscape architecture themes and projects are addressed from different perspectives and in various contexts. Within the FLOWSCAPES studio, we specifically discuss the topic of 'infrastructure as landscape' and 'landscape as infrastructure.' This overall topic addresses both: massive and minimal interventions that should interrelate and be part of significant current developments in the world. Flowscapes projects put Landscape Architecture education Delft at the interface of Urbanism, Architecture, Civil Engineering, Environmental, and Spatial Planning. Within the Flowscapes studio labs, based on the research agenda of the section Landscape Architecture, are formulated:

- Harvest Lab
- Landscape Approach Miami Lab
- Circular Water Stories Lab
- Neretve Rocollection Lab
- Individual Projects

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Team Member
(from top left)

Shuai Shao
Yajie Sun
Yueting Wang

Harvest Lab

Ir. Frits van Loon

Dr.Ir. Nico Tillie

In the former coal mine region of Parkstad, shrinkage is the challenge. Projects made in the HARVEST studio, design innovative changes in the urban metabolism to show the potential of shrinkage for a bright new future of the area of Parkstad and a new way of working and living in this future society.

The projects in the lab are as follow:

- Harvest the MineWater (Shuai Shao)
- The Green Loop for Active Ageing (Yajie Sun)
- Strategic planning of energy landscapes (Yueting Wang)

Harvest the MineWater

A sustainable metropolitan landscape in the post-industrial region-Parkstad

Shuai SHAO

Project location:

Parkstad, Zuid Limburg,
the Netherlands

Mentors:

Denise Piccinini
Annebregje Snijders

Keywords:

Park system, blue&green
structure, coal mine
water, renewable energy,
industrial heritage

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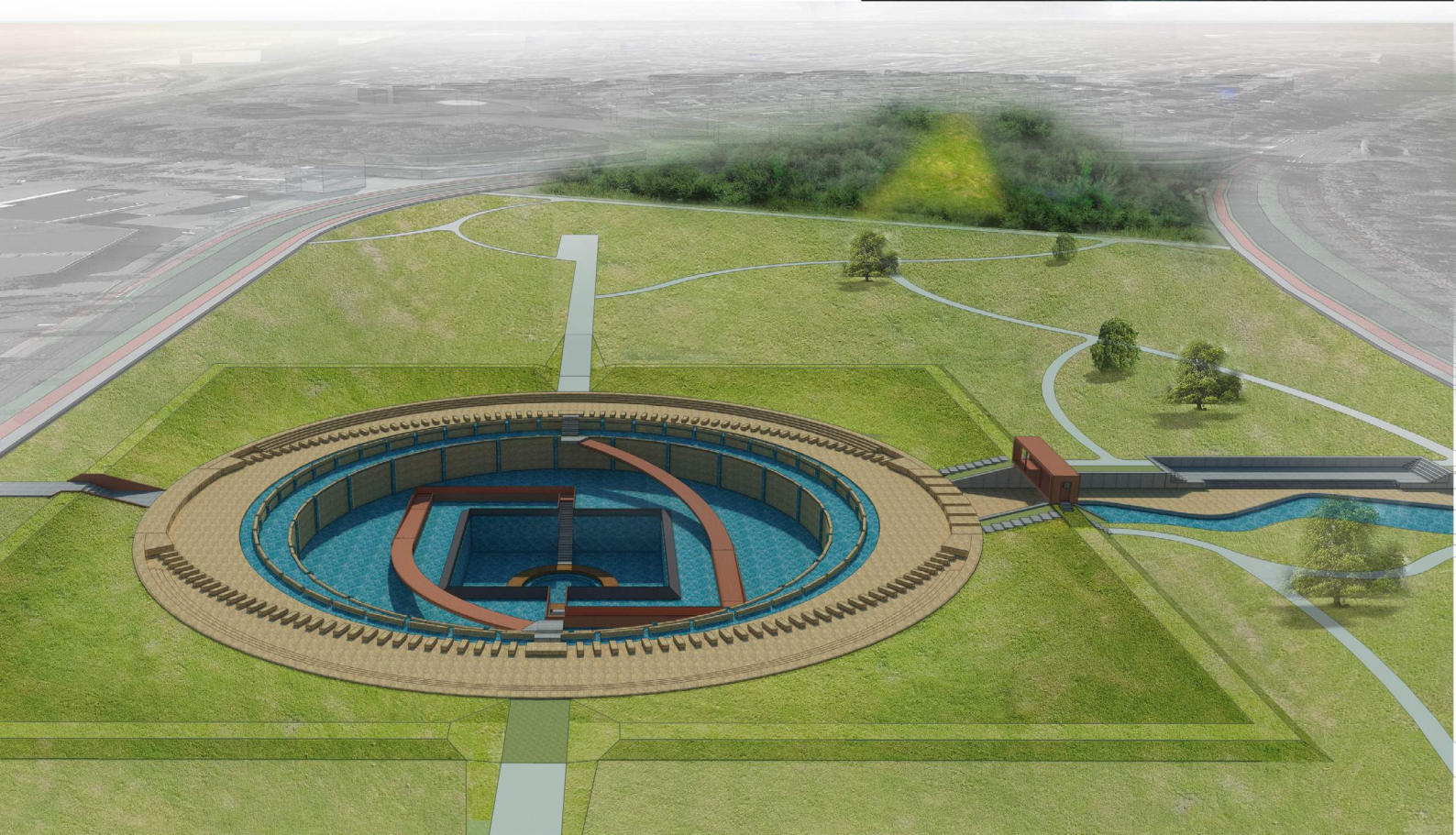
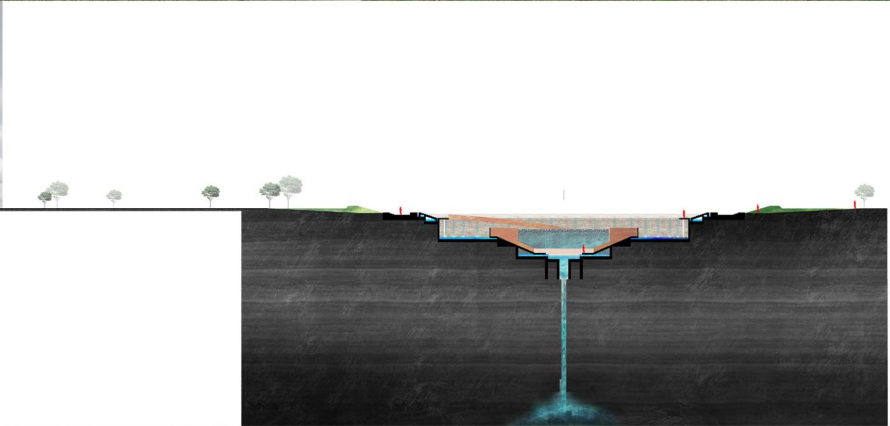
The relationship between the nature and the man-made space has always been a key issue of the landscape, especially of the metropolitan landscape. In recent decades, many parts of the world have encountered a new stage of development. After years' boom of industrialization and urbanization, many countries have entered the so-called post-industrial era. Many areas, especially those former industrial areas, which are lagged behind this transition of economy, are facing many challenges, such as lack of job opportunity, aging population, constant emigration of young people, resulting in a lot of social and economic problems, and also spatial problems in urban environment.

A question has been proposed in response to these challenges, that how the metropolitan landscape will change with this transition of urban development. The urban space needs to be reorganised. More values should be involved into consideration, such as ecological issues and the unique identity of the local region. And in all, a better living urban environment should be provided, benefiting the sustainable development of the future city. Now faced with this post-industrial situation, the new adoption of metropolitan landscape needs to be explored. And Parkstad provides a good opportunity to do this kind of research.

Parkstad is in the South Limburg. It used to be a coal mine industrial region. In the mid of 1970s, all the coal mines were closed. This has caused great impact on the region in many aspects. Now the whole Parkstad region is facing several challenges. The halt of the coal industry has caused the decline of economy and the shrinkage of the population. The rising mine water in the flooded coal mine threatens to contaminate the fresh water aquifer on the shallow layer. And since all the facilities of the past coal mines have been demolished and replaced by new urban development, this random urban sprawling has led to a fragmented metropolitan landscape and the lack of identity.

This research focuses on the landscape approach to help solving all these challenges. By studying the existing landscape and open space, create a new blue-and-green structure, from which a new landscape system or a park system can be generated, so that the whole fragmented urban region can be integrated into it. At the same time, this landscape system should have other benefits. It has its own ecologic and economic values. It can help maintain the rainwater in all the neighbourhood, creating micro climate and supplementing the groundwater. By reusing the shaft and the tunnels system underground left from the former coal mines, create a underground pumped hydropower system to store and regenerate renewable energy. The infrastructure of this technology can also be integrated into the new landscape system and bring about new kind of space and experience. In this way, the industrial heritage is reused. The hidden landscape is revealed. A new kind of identity can be created.

The research can be a relevant example for the development of other post-industrial cities. Many past coal regions can draw some strategy for the future sustainable development from it. And the basic principle to rethink the metropolitan landscape can also benefit for the further development of the concept of park city.



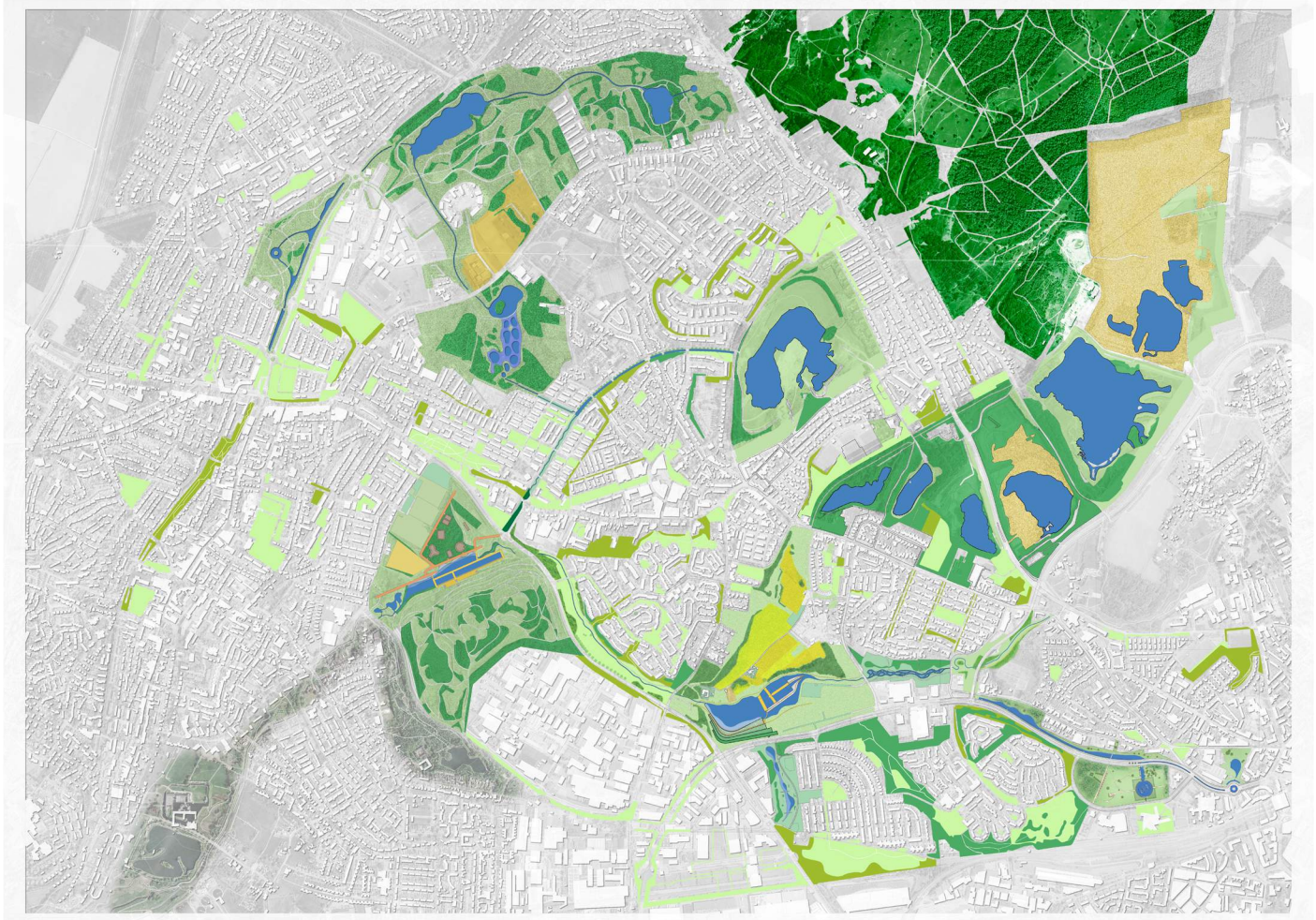


Fig. 1



Fig. 2

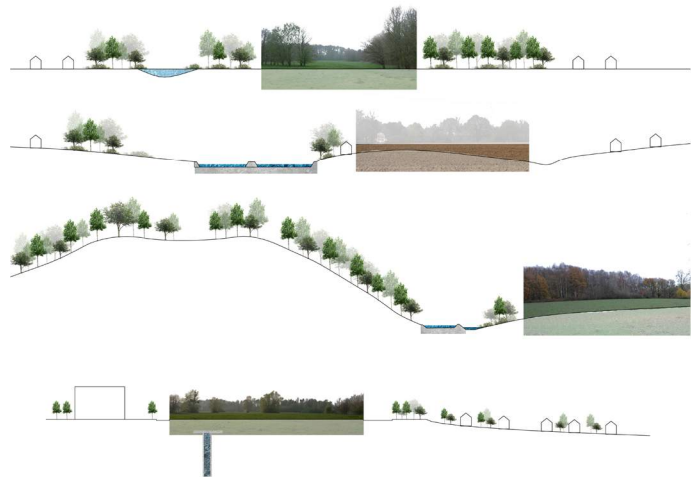


Fig. 3

Fig. 1-2 After decades of random sprawling, the current metropolitan landscape shows a state of fragmentation, both in built area, but also in the open space. To solve this problem, a new park system is created, integrating the fragmented urban places. This park system is based on the existing green space. By creating a new green&blue structure, this park system connects the former separated leftover lands or green parcels. It also extends into the neighbourhood communities, so that a comprehensive matrix of green space is created. And a clear hierarchy of green space is given, from the backyards to the neighbourhood gardens, and then through green corridors,

joining all the urban parks and nature reserves. This park system, at the same time, serves as the backbone of the urban space, integrating all the urban fragments.

Fig. 3 Another problem of the current situation is that many leftover green lands have a poor quality of space. The next step to form the park system is to redesign these urban parks as crussial junctures. Based on their own characteristics of each spot, their own value is preserved, their own features are enhanced, and various programmes, which are suitable for each site, will be added.

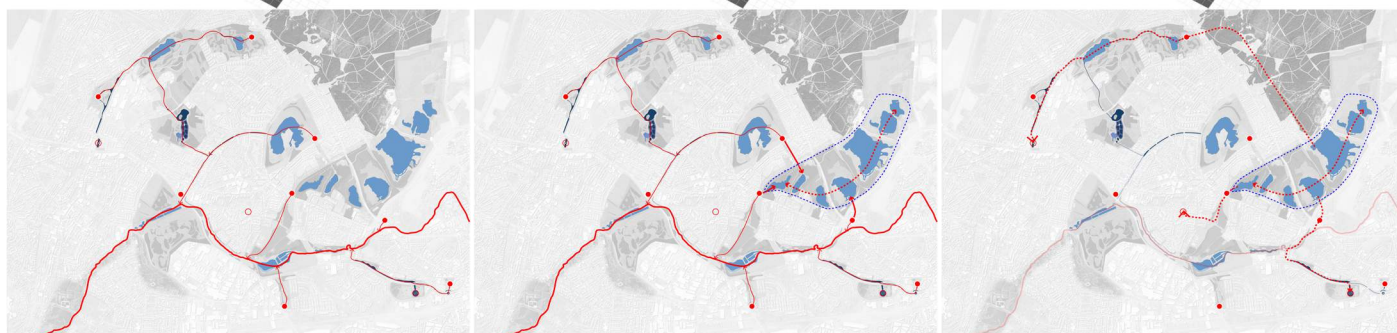
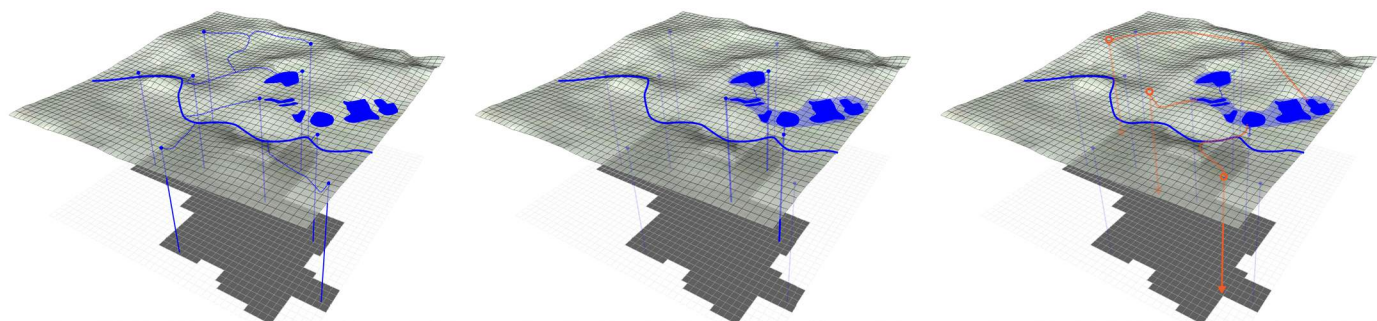
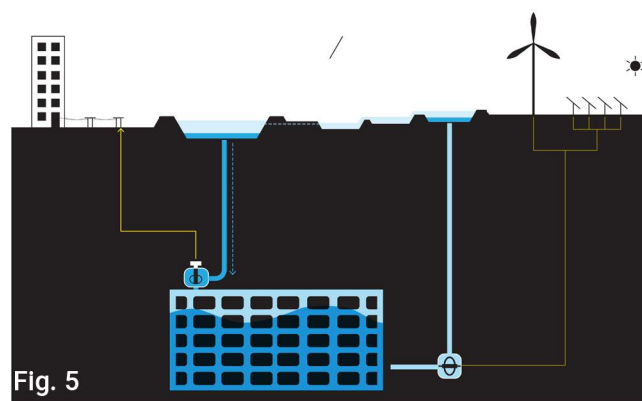
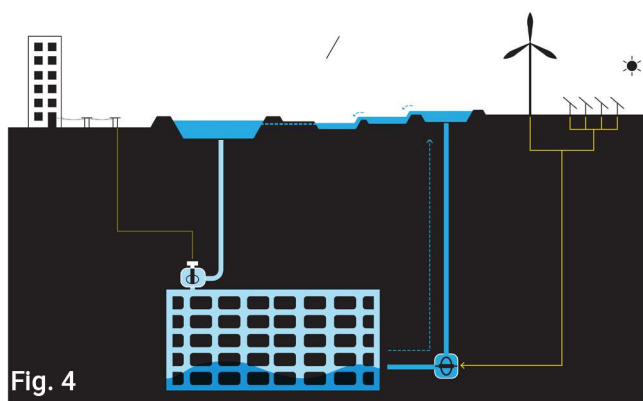


Fig. 6

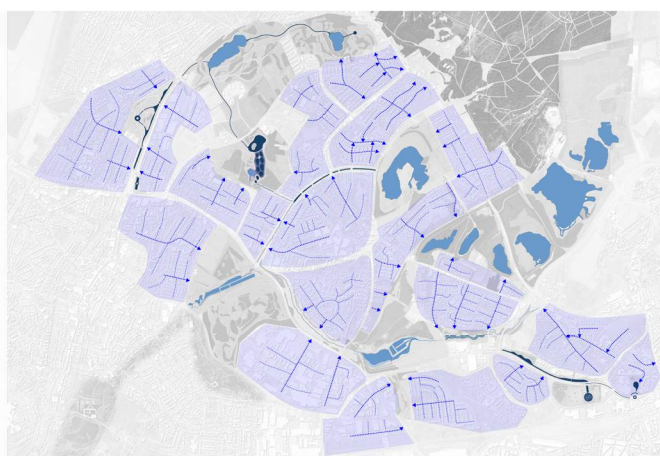


Fig. 4-5 At this former coal mine region, by reusing the former coal mine tunnels and shafts, there is the potential to apply a new kind of renewable technology - underground pumped hydro power station. The depth of the coal mines provides the possibility to store and regenerate electricity.

When the demand for energy is low, the surplus of produced electricity can be used to pump mine water from the tunnels to the up reservoir on the surface. Then the energy is stored. When the demand is high, the stored mine water can be released back into the underground tunnels via shafts. In this way the energy is regenerated to

supply the city.

Fig. 6-7 To apply this new energy technology, new infrastructure will be built and new water ways will be created. The water system will be reorganised, forming a new blue structure. It can also be extended into the neighbourhood areas, helping to manage the rain water. In this way, this new landscape system will acquire its values both in ecology and economy. A new urban metabolism can be created.

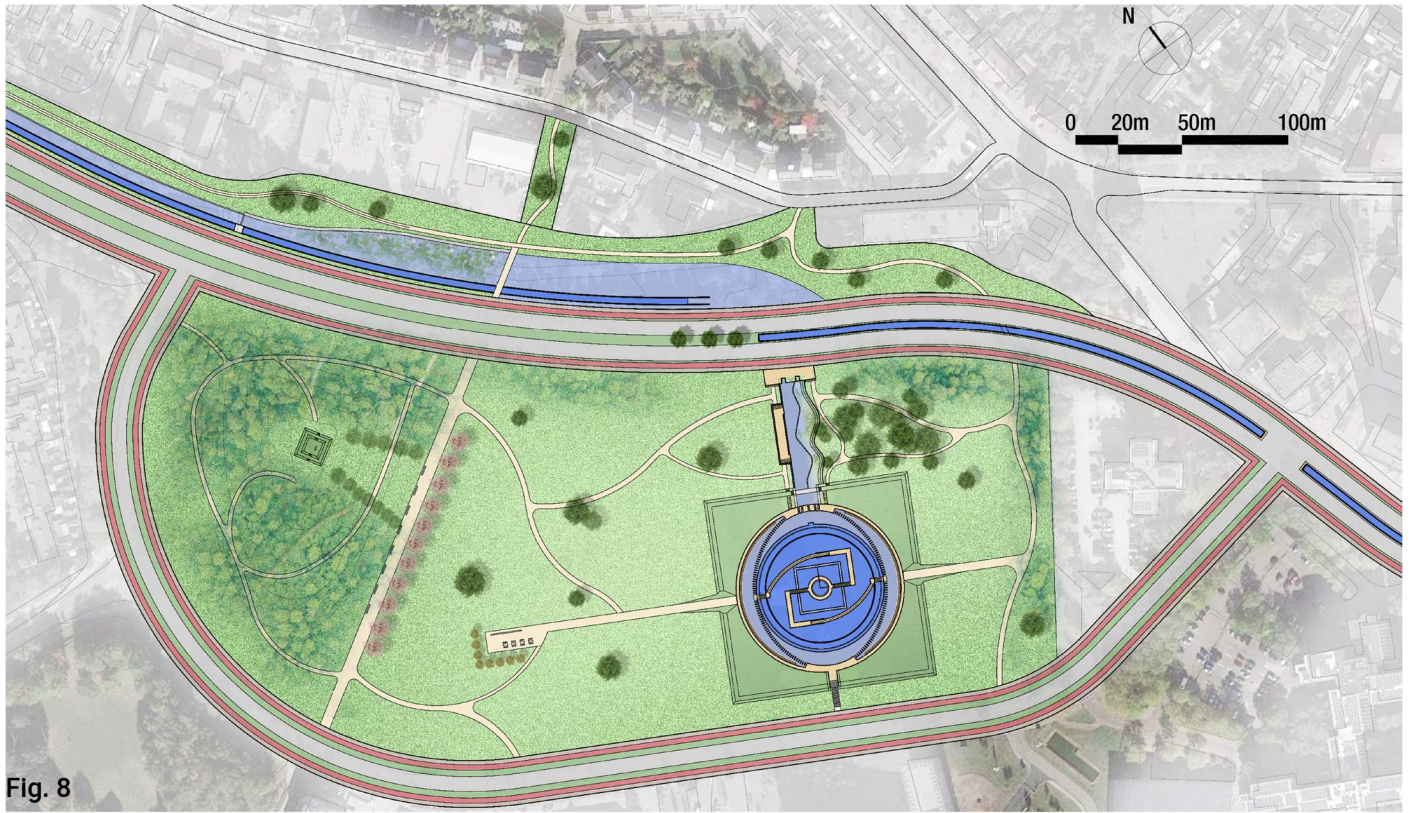


Fig. 8



Fig. 9

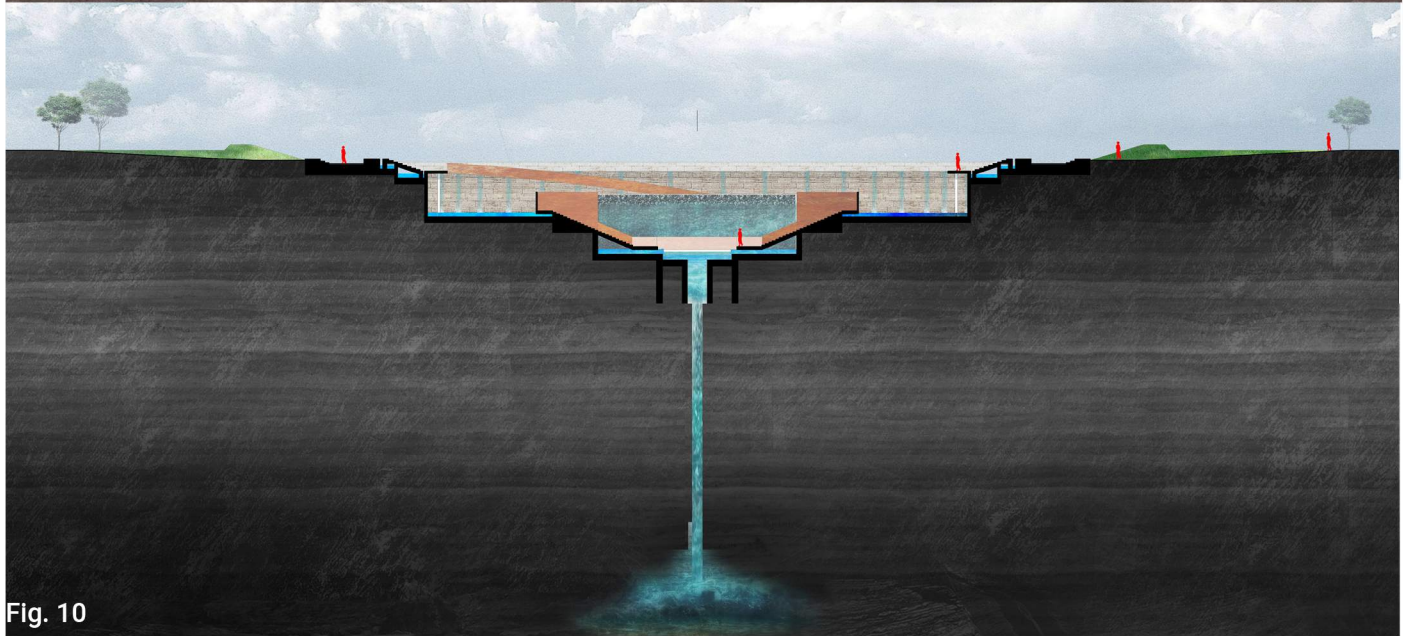


Fig. 10

Fig. 11



Fig. 8-10 The new water system will also play an important role in the design of urban parks. At one spot where a former shaft is located, a memorial park is proposed. Because of the shaft, this park is one part of the whole energy storage and regeneration system. At the same time, the now buried shaft is revealed and given new form and program, serving as a monument of the coal mining history in the past. A certain meaning is given to this spot. The hidden landscape is revealed to the public.

Fig. 12



Fig. 11-12 Different water flows have different functions. At normal time, small amount of water forms a tranquil atmosphere of waterscape. During the process of energy production, large amount of water rushes into the square. Raged torrents will submerge parts of it, creating another kind of space. By playing with the amount and the level of mine water, various experiences will be generated, enhanced by all sensory.

The Green Loop for Active Ageing

The Landscape-based Infrastructure Design in the Shrinking Parkstad

Yajie Sun

Project location:
Parkstad, Limburg
the Netherlands

Mentors:
Ir. Frits van Loon
Ir. Annebregje Snijders

Keywords:
Ageing Society,
Caring Landscape,
Ageing in Place,
Landscape-based
Infrastructure,
Shrinkage

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The emergent issue of Parkstad is shrinkage of the city in results of the transformation from an industry city to its new developments. In contrast to the economic downturn and the decline in total households, the growing number of older people is particularly conspicuous.

Aging society is remarked as a worldwide problem especially in Europe. There is 30% of the population in Parkstad is elders and it will grow and stay in 50% in the next coming 15-50 years. Most of the elders(94%) in the Netherlands lived without any caring helpers. Therefore, to explore what kind of place is more suitable for the elderly to become an important question. In the general stereotype of the public, the city is more suitable for youth rather than elders because of the fast lifestyle. As a shrinking city, Parkstad offered new possibilities of a place or lifestyle: lived between urban and rural. Actually, the ageing process is equal and natural for everyone. In 2060, there are 228 million (added 50m) European and 5 million Dutch people getting to be the elderly over 65 years old. What serious is that most of the new ageing elders are over 75 years old who have more physical and mental issues in life. How to care their life from the surrounding living environment is a challenge for us landscape architectures.

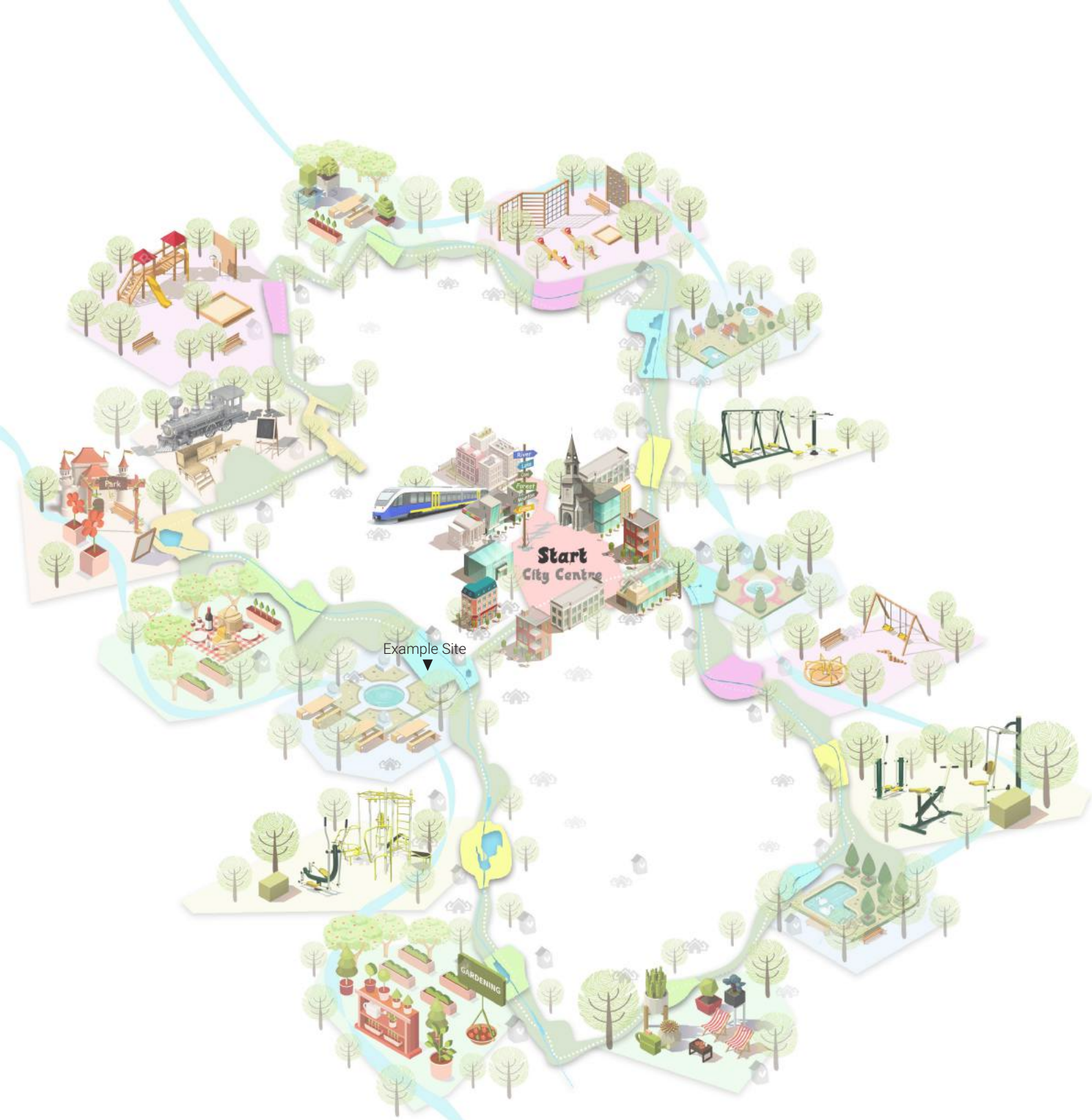
Parkstad as a shrinking area is facing the heavy economic pressure. The development of the caring green infrastructure will work together with the ageing economy to build the ageing market services for the demand from elders and attracts young generations by jobs and the healthy leisure lifestyle. This green infrastructure can give the structure to cheer up the empty houses resulting from the shrinkage and grow the ageing-friendly living environment of this promising future. Heerlen as the living center of this region have most elders with variety of facilities to support public life and biggest ageing market. Such a big plan should be organised by many small projects in phases together with the ageing process of heerlen. A good care of the ageing society is the care of the whole ageing process. In this case, I classify residents to three groups: ready to ageing(<65 years old), young ageing(65-75 years old) and senior ageing(>75 years). When we are ageing, the active range and healthy exercising distance is getting narrower and shorter. Before 75 years old, people are active on the urban scale. And senior elders are more limited in the community environment. In this project, I give the concept of the Caring Strategies which have two design layers: Caring landscape on site for senior elders living environment and a green infrastructure on the urban scale for the ageing process of all-ages residents.

Community Scale:

The caring landscape location are facing the emergency need from the ageing situation of the surrounding community and the nursing home institutions on site. This is also a part of the big plan to show an example to process it.

Urban Scale:

On this scale the goals are to develop the ageing market along the green infrastructure and improve the living quality of all the residents. Considering about the ready to ageing and young ageing people's healthy exercise distance and the senior elders' accessible range to define the pattern of the plan. And it will be organised by many projects like the example site design. In the Parkstad region, it can also fill in the blank of local living landscape and enhance the connection from the center city heerlen to surrounding cities.



Green Loop
towards Active Ageing

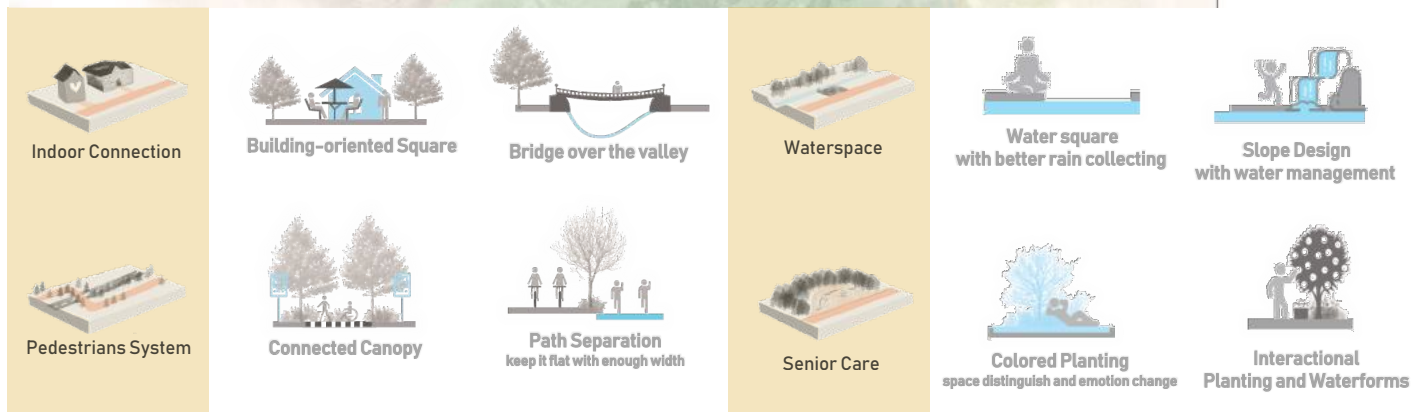
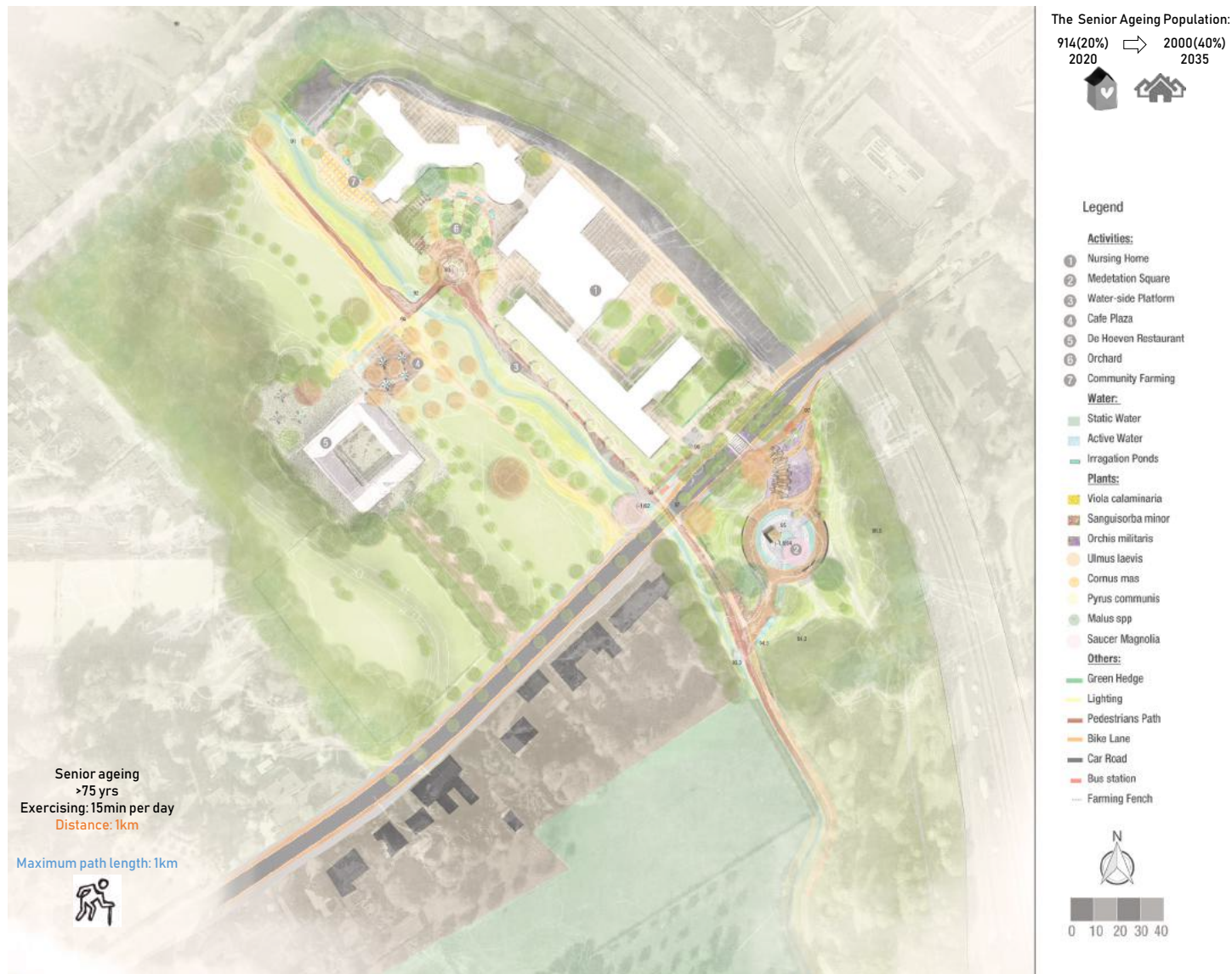


Fig. 1

Fig. 1 This is the project related to a social problem, so I apply the methodology which combine the general research and qualitative research. With the result from my interviews of the local elders living in the nursing home, these **four design aspects** could be found: indoor connection, pedestrians system, water space and senior care from the park.

The **site choice** is based on the needs of ageing-friendly environment and easier to get economic supports by caring institutions and government ageing-in-place projects. The size of this caring landscape is depended on the active distance of senior elders as one kilometer.

Indoor Connection: there are one nursing home building group and a dehoeven restaurant and both of them have a useless big yard. Between these yards is a valley terrain with a segregation.

Pedestrians System: mainly problem is the priority of walking experience in crossing and keep the path flat.

Waterspace: the rural pond design and water management to shape the waterline.

Senior Care: elders need a more interesting and memorable environment with participation. After analysis these four situation and design research, principles in landscape approaches can be found.



Fig. 2

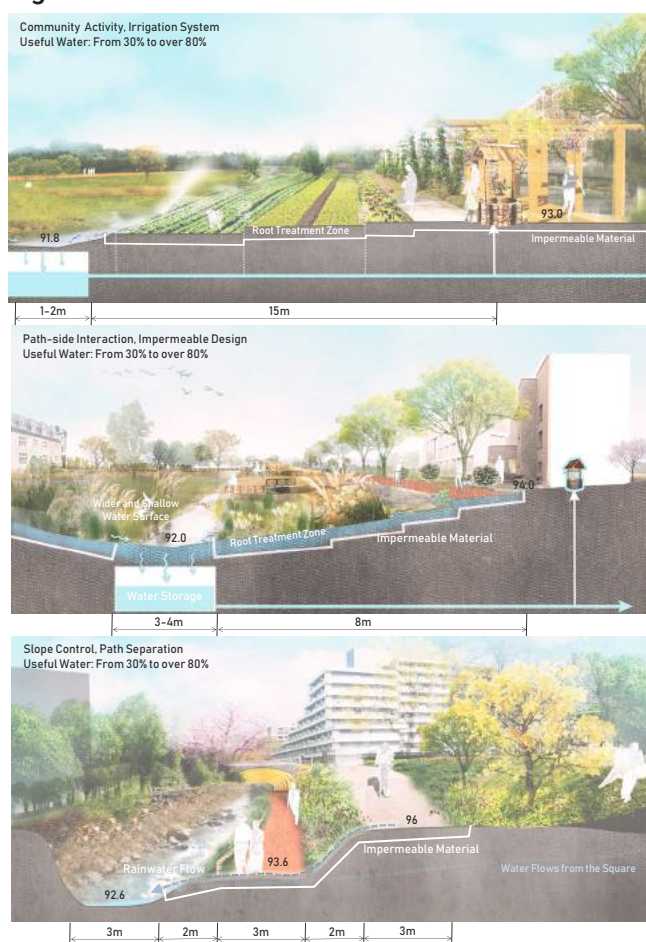


Fig. 3

Fig. 2 Based on the principles, the design is basically determined and it adjusts by the moving experience in space. Therefore, with a red line of pedestrians movement and blue line of water movement that use and connect the different experience and functions with a coherent feeling.

Fig. 3 The slope design is used to shape the valley system. Current water body is very shallow and seasonal. After my research, the main problem is from the rain water collection. On the one hand, the terrain changes is lack of design with a better rainline. On the other hand, there is all green along the valley, so there are more infiltration



Fig. 4

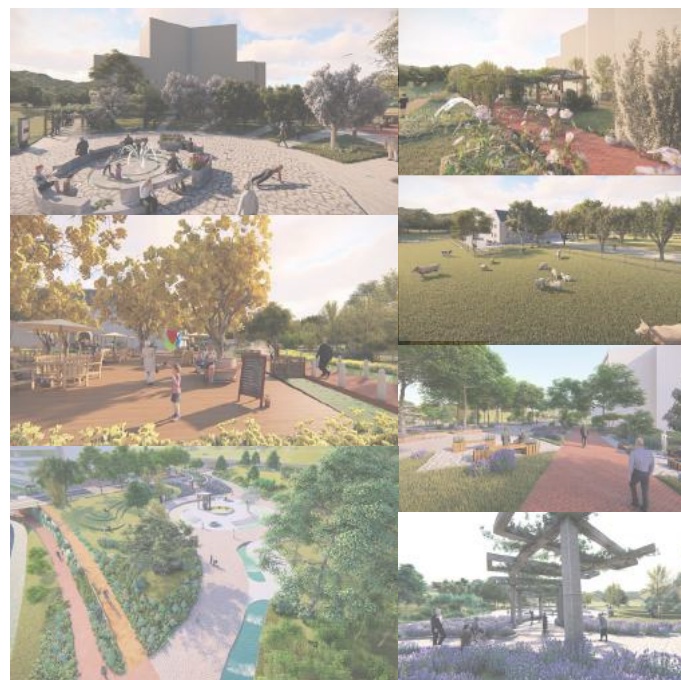


Fig. 5

to the soil which is the loam. Loam soil is different from the clay can get more run-off and the sand can get more underground storage. It locks the water inside. With the impermeable material and slope reshape, the better water management can be create with differnt functions.

Fig. 4 The vision of Pedestrians movement in crossing: crossing the main traffic, bridge over the valley, and a seperated path under the bridge.

Fig. 5 The vision of the orchard ground next to the nursing home, the plaza linked to the dehoeven backyard, and the water square renewal from the rural pond with tarrin design

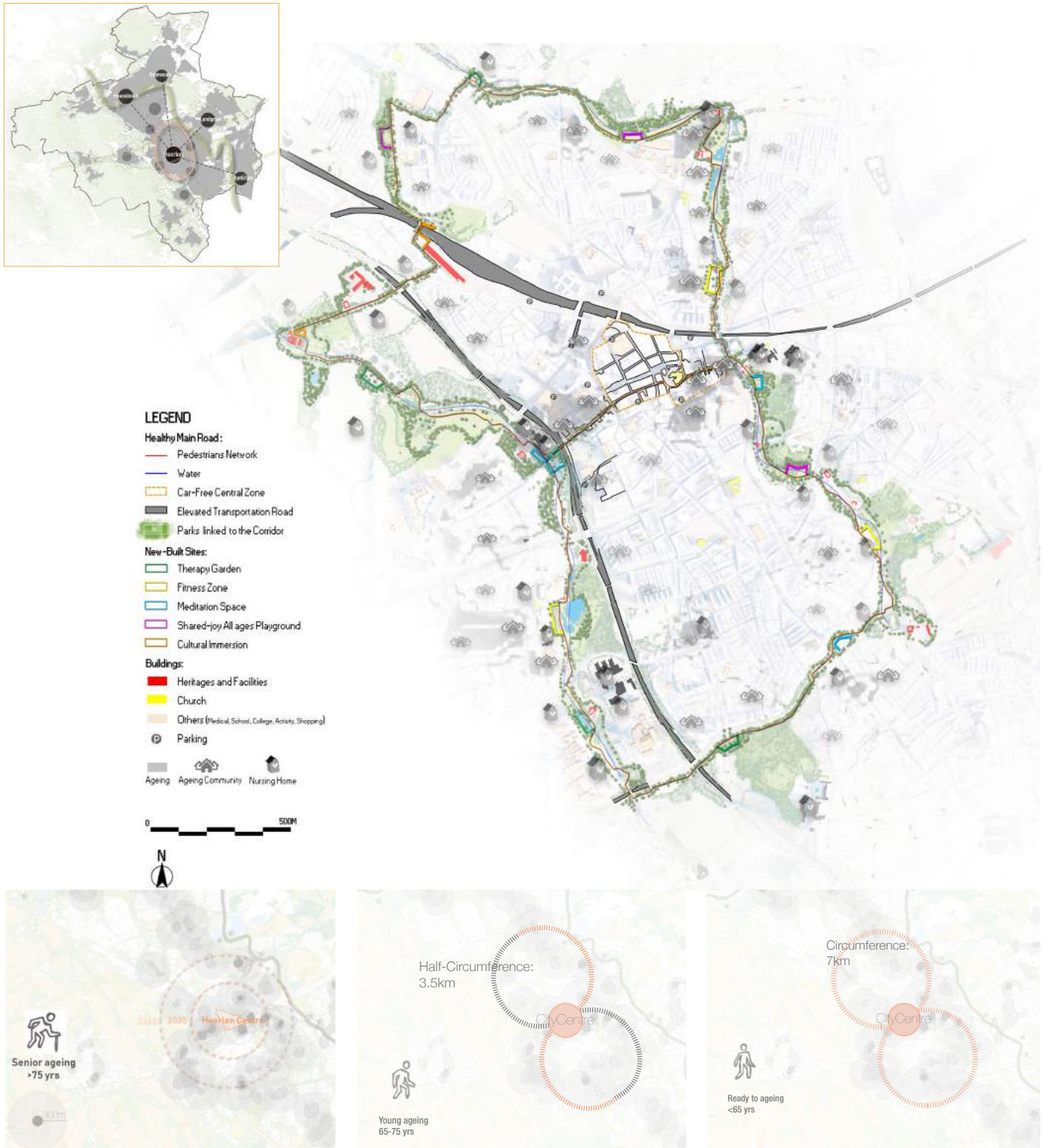


Fig. 7

Fig. 7 On the urban scale, the goal is to develop the infrastructure benefits from the senior care project as the site and ageing society process. To be brief, this green loop is organised by many senior parks depends on my **prediction growing** of the senior living place and the ageing market development track, and the size of the range is mainly determined by the **active distance and healthy exercising time** of the younger ageing groups. The living quality improvement is still about the four aspects on site which the elders need most, but the senior care should be changed to the **active-ageing care** about all ages residents.

For the active ageing care, there are mainly two tasks: one is the **scientific method of exercising**. Instead of walking or running for a long time, it is better for people especially the young ageing people to get stations on the way to take a rest, and the distance between these two stations could be 5 to 10 minutes- walking, around 500-700 meters from a scientific sports tip. Another is the **communication in activities** from all ages need. Thus, I get the concept to develop an **activity network** around the green loop. The site choice is depended on the surrounding ageing needs like the site. As for the other three are related to the route design.



Fig. 8

Indoor connection: the path will get through as many as possible the nursing home and public facilities hidden in the green pattern.

Pedestrians system: the route is little mixed with the busy traffic and I using the planting on the way to shape the walking experience with priority. As a project in the area with terrain changes, keep it flat all the way. In addition, the red and yellow color are used in the pavement to make it more memorable.

Water space: keep the route along the water to give a coherent feeling of space and way guidance. At the same time, develop the rural ponds and shape the slope with

a better water management. The useful water after the project can increase from 30% to over 80%.

Fig. 8 This big project on the urban scale will be developed in phases with the ageing society process and company the ageing of young generations. Firstly, we can get a green center. Several years later, the lifecircle can support residents healthy lifestyle. When it comes to the highest amount of elders, the activity network has been built. Before 2060 when the ageing society challenge comes to the europe, Parkstad can get the new identity: A **Caring City with high living quality** for everyone.

Strategic planning of energy landscapes:

Synergies and trade-offs in Parkstad

Yueting Wang

Project location:
Parkstad, Netherlands

Mentors:
Dr. René van der Velde
Dipl. Ing. A. (Alexander)
Wandl

Keywords:
integrated energy
landscape, energy-
conscious, energy
potential, green grid,
sustainable,
energy park, community
garden

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This research aims to test how energy could be used in landscape and then in which means energy landscape could solve the social and cultural issues.

The energy transition is a spatial issue because it is forms of sustainable energy inherently entail new demands on space. A regional spatial vision on energy, based on which issues like landscape integration can be coordinated shortly, is called for.

Parkstad Limburg currently is described as the fastest growing tourist destination in the Netherlands. It is a region full of contrasts and extremes. This place located in the southern part of the province of Limburg in the Netherlands, with an estimated 2017 population of 245109 and consists of eight municipalities. It covers a total area of 211 km², with a population density of 1,161 per square kilometers.

This region used to be known as the Eastern Mining Area. Around 1900, the formerly agricultural area rapidly developed as the epicenter of Dutch coal mining. In 1965, the Dutch national government decided to close the state mines. Most former mining complexes were demolished and replaced by natural areas, parks or housing areas, but the old miners hardly profited from those new jobs, so the city began to shrink.

It is fascinating when the landscape is a tool to deal with a social and economic problem. My main interest in this Lab is energy flow in a landscape. In a large scale perspective, shrinkage is an inevitable stage and does not mean passive; While in the sight of Parkstad scale, it is a shame to losing both the identity and population. It is thought-provoking as a landscape architect to rethink about what will landscape act in this procedure and what will Parkstad benefit from.

The energy transition is a spatial issue because it is forms of sustainable energy inherently entail new demands on space. To do energy-conscious spatial planning, and achieve synergies in such a complicated place, the questions are invited for: What are the energy-conscious spatial strategies, to integrate with energy sinks, urban green network, and differentiation of niches, to facilitate sustainable energy landscape design to improve environmental quality in Parkstad?

With this research question, I come up with three strategies for the whole Parkstad region, based on the existing problems in a big scale. They are green grid strategy, energy flow strategy and spatial composition strategy. These three strategies are parallel and correlated in some respects, for example the social and cultural activities. It is a challenge as the complexity of this area, but makes the intervention approach more interesting. And how to achieve a delicate balance between the synergistic effect and trade-off is my primary task and research orientation.



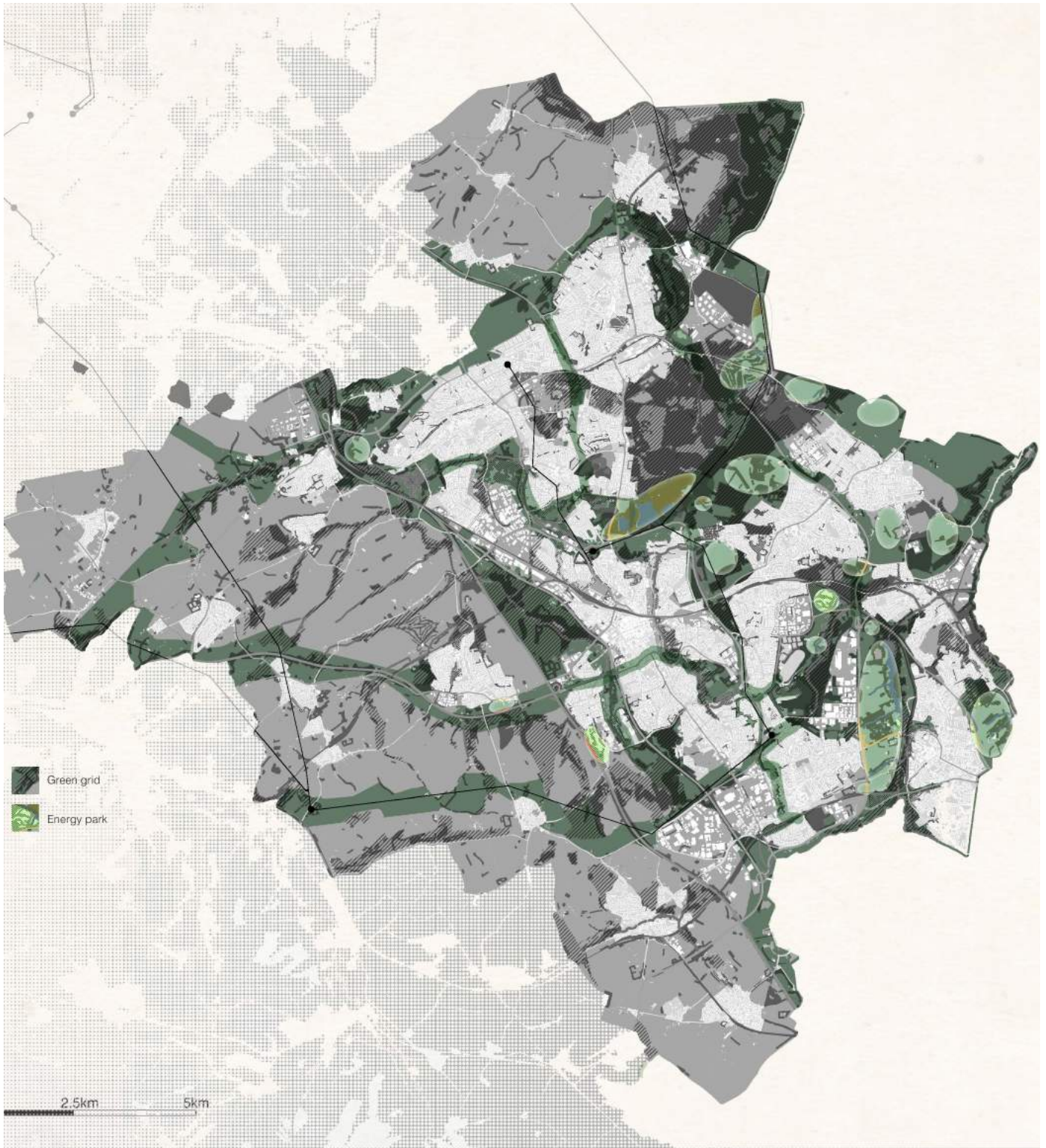


Fig. 1

Fig. 1 The outer ring road is a backbone of Parkstad. It connected the most important attractions and green patches. Along itr there are different types of buildings in different conditions. The sink and source concept helps to make the energy circulation strategy.

Cooperating with the physical ring, the energy ring helps to strengthen the circle and provide more possibilities.

The symbiotic network and green grid strategy is more ecology oriented. As the most significant part of a city's ecological environment, the green system acts as a

moderator and organizer. The current green network is unconnected and dispersed.

Reconnecting the green corridors, making more relations and knit them into a whole net, then the pattern of the symbiotic network has been settled. From the first and second strategy, the ring road are not only the transport ring but also the ecological corridor and energy flow circulation. It helps to reinforce structure of green grid.

The third strategy helps to make intervention on specific location.

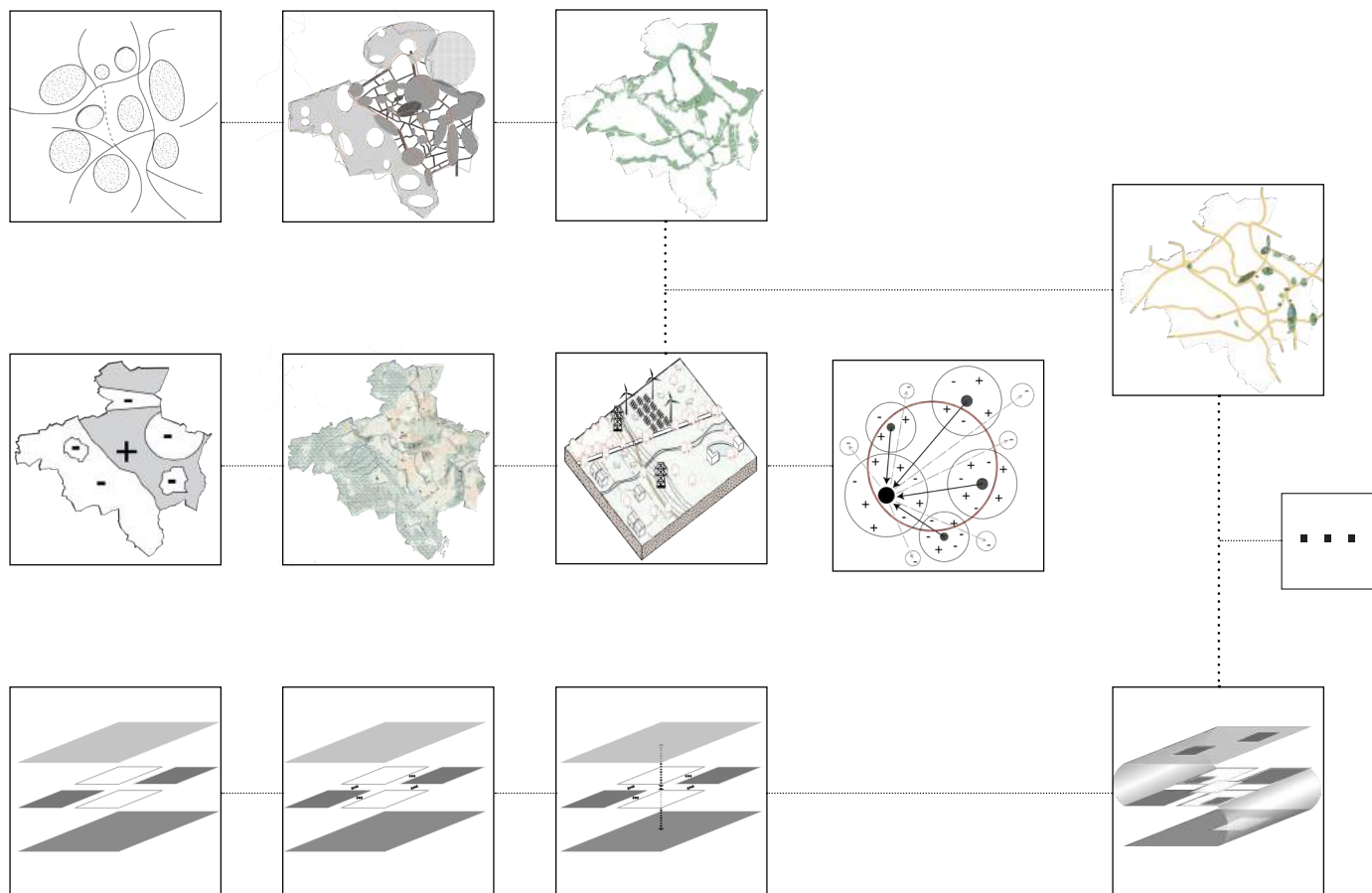


Fig. 2



Fig. 3

Fig. 2 - 3 The schematic diagram shows three strategies. The energy ring is the most complicated one. I proposed the energy plants in the ring structure, combine it with the sewage treatment plants, or the dumps. The sewage treatment plant can be seen as an energy roundabout. Energy sources and sinks are seen as the start and terminal of one loop. So it's the first circulation: the residual heat flow.

The second flow is the energy park flow, there are same energy parks which have the function of energy production, and recreational and ecological feature. They

are seen as the micro energy hubs which have a limitation of the radius effect but with a strong connection to the surrounding areas. So this flow is a supplement of the residual heat flow. Combining these two flows, the system of the ring is settled.

After overlapping the green grid and energy park, I get an integrated energy landscape network. Then combining it with the spatial composition strategy, a combination in three dimension is derived. A more concrete strategy for elaboration design is deduced from this e integrated strategies.



Fig. 4



Fig.5

Fig. 4 As energy is an engine in my design instead of only a representation of the landscape in such area, energy topic in my concept would not be a physical form or technical mean. It should be a language of the quarry.

There should be three forms of energy activities happening here: energy transition, energy saving, and energy redistribution. What the landscape can benefit from it is my first concern.

My concept is to make this place as a showing case of the trend of the energy transition. The synergy between landscape and energy provides a space for people to experience the energy transition, which means energy is a part of the landscape, and people could also appreciate it. By this way, people will also go through an emotional transition and be more sensitive to the new trend. Saving is another form of generation. Because of the energy shortage, the energy transition is also a way to help improve the efficiency of energy utilization; for examples, more energy saving buildings are needed in the long term.

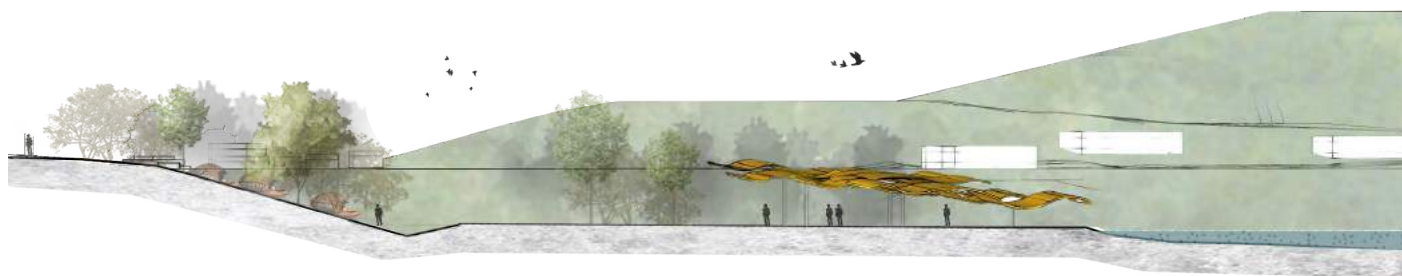


Fig. 6

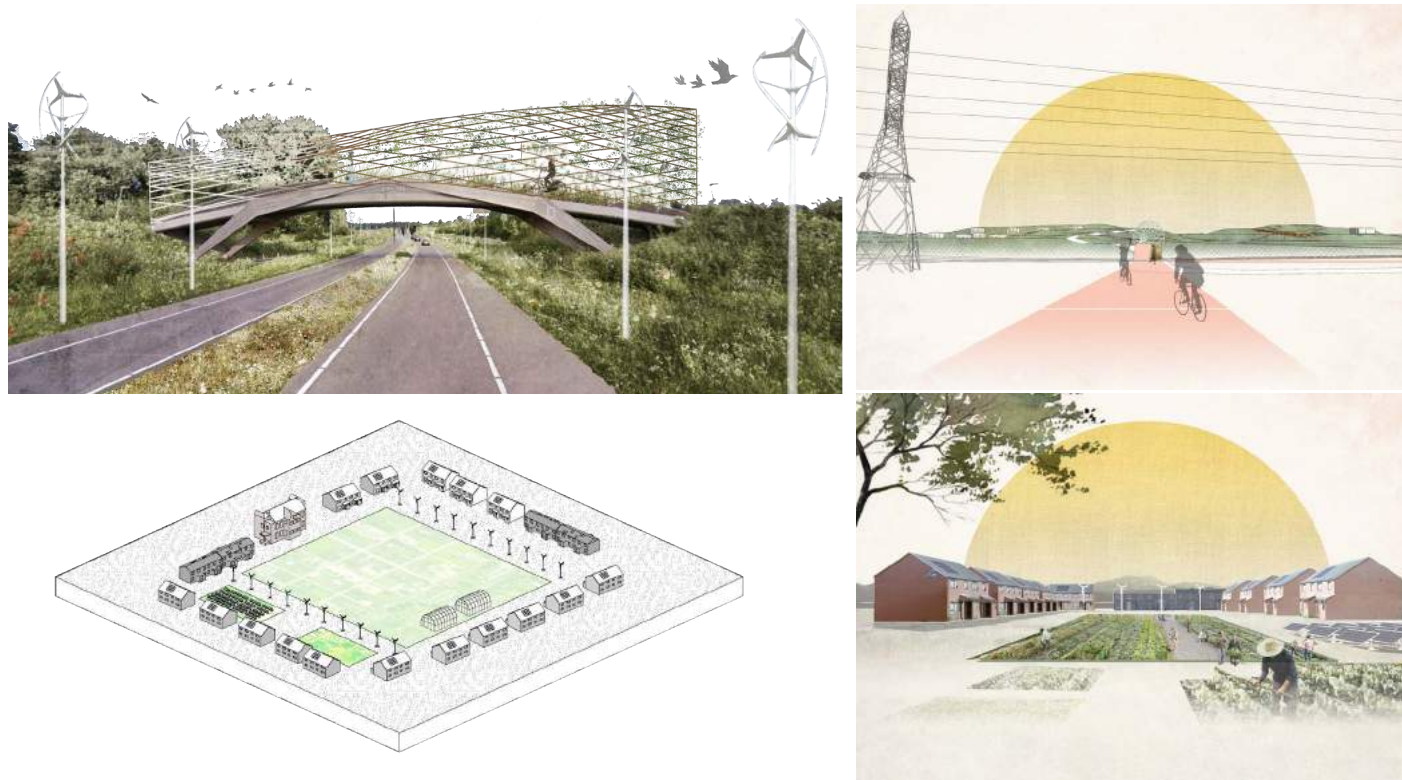


Fig. 7

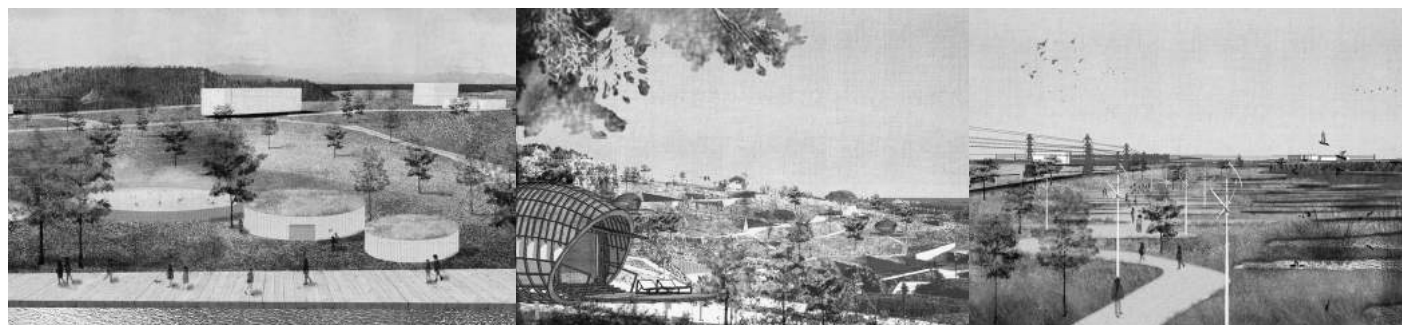


Fig. 8

Fig. 5 - 8 On elaboration design proposal, the mutual connection of energy infrastructure and landscape design are more visible and solid.

Energy is no longer merely a technical approach in this case, in terms of the generation and metabolism processes. Energy park is the nuclear of integrated energy landscape, while community gardens are the expansion of energy parks in urban areas, helping to permeate from green spaces to residential zones. These micro systems blur the boundary and help re-shape the function of the terrain-in-between.

Moreover, energy is also an important way to promote land value. For a shrinking place like Parkstad, there are more spare spaces for energy generation; if this case shows the energy harvest could be a normal part of our life, there would be more chances for the energy transition. On that time, more jobs related to energy are available, and more people would like to live here and even move here. Energy landscape gives a reason for people to raise their awareness and have a new experience of landscape. And people will have faith in the energy landscape could improve their life.



Team Member
(from top left)

Cai Huang
Iris van Driel
Jean Pierre
Xudong Zhang
Yilin Wang

Landscape Approach Miami

Dr.Ir. Steffen Nijhuis

The objective of this studio is to explore the possibilities of a regional landscape approach for the development of Florida Metropolitan Area that employs landscape-based systemic strategies and design interventions that facilitate ecological restoration of wetlands, flood protection, and increase urban resilience through the development of green-blue infrastructures.

Design projects include:

- From boundary to border (Cai Huang)
- Biscayne Bay. Turn the tide (Iris van Driel)
- forEVERglades City (Jean Pierre)
- From line to zone (Xudong Zhang)
- Return, keep and interweave (Yilin Wang)

From boundary to border

Toward a resilient, dynamic and interactive urban edge of Miami

Cai Huang

Project location:
Miami, Florida

Mentors:
Steffen. Nijhuis
Marco Lub

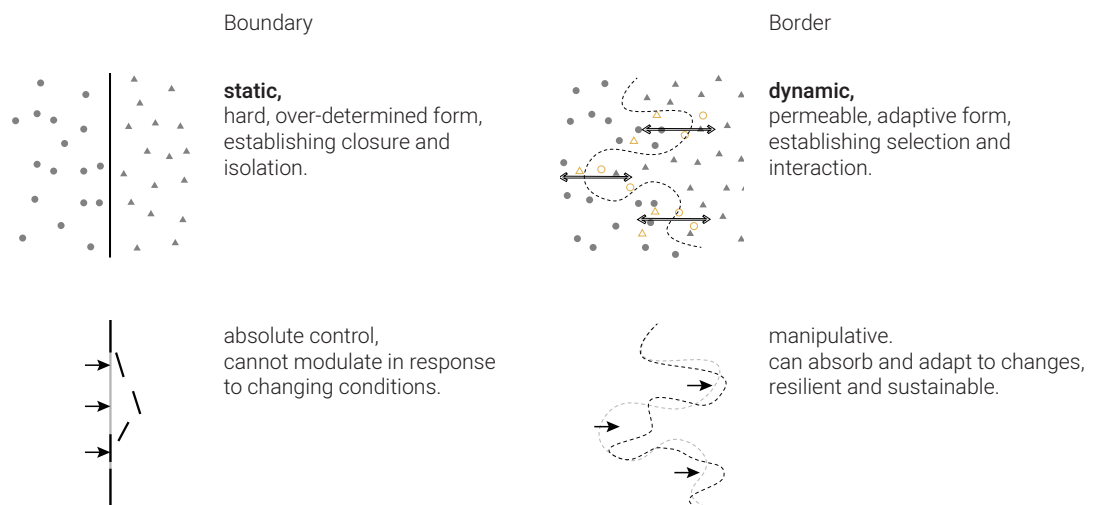
Keywords:
Landscape, urbanism,
nature, resilience,
dynamic, interaction,
edge.

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On the northwest urban edge of Miami Dade County, the mining industry of the largest scale in Florida has existed for over 60 years. However, it is estimated to stop by 2050 as the reserves decline. As a consequence of limestone mining, more than 10,000 hectares of abandoned lakes will be left on the landscape. This project proposes land and water strategies to guide the future development of this post-mining lake area (which is called Lake Belt Area or LBA). It starts from the analysis of the existing hydrological, ecological, urban and mining systems and defines the existing situation as “boundary” that tends to establish static binary opposition between the urban and nature. Based on the site context, it proposes and explores “border” as a new urban edge condition that presents a dynamic interactive process in time. This process not only provides the possibilities of regenerating potential of the post-mining area but also increases the resilience of the water system. What’s more, it creates conditions for the urban system and the natural system to interact with each other and develop over time into an integrated whole.

Boundary and Border

The notions of “boundary” and “border” were first used to describe cell wall and cell membrane in biology and then were applied in the public realm by Richard Sennett (Sennett, 2008). They represent two different edge conditions, and the border owns more potentials in resilience and sustainability. Here, the meanings of boundary and border are extended to the landscape field. “From boundary to border” is a transformation from “a static binary opposition” to “a dynamic interactive process”. And the project aims to explore the potentials of border through a landscape approach employing natural and urban processes on the post-mining sites. In the following, the three questions will be answered: how to read the boundary, how to transform boundary to border and what are the potentials of border.





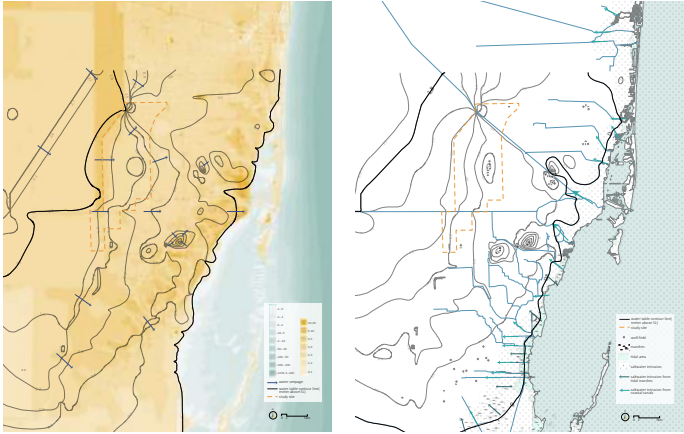


Fig. 1 water table contour line in wet(left) and dry(right) seasons.

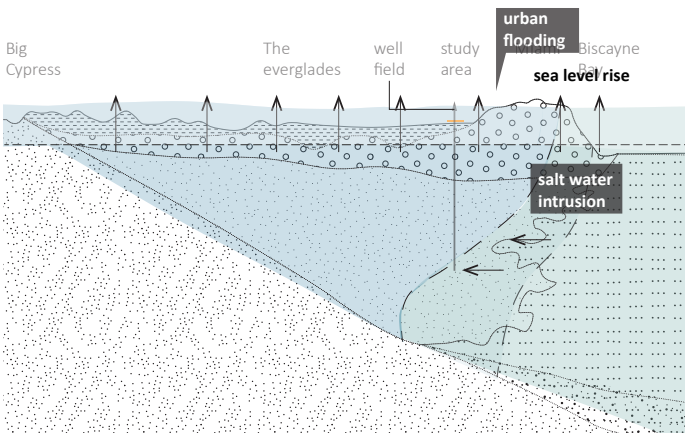


Fig. 2 west- east section across Biscayne Aquifer.

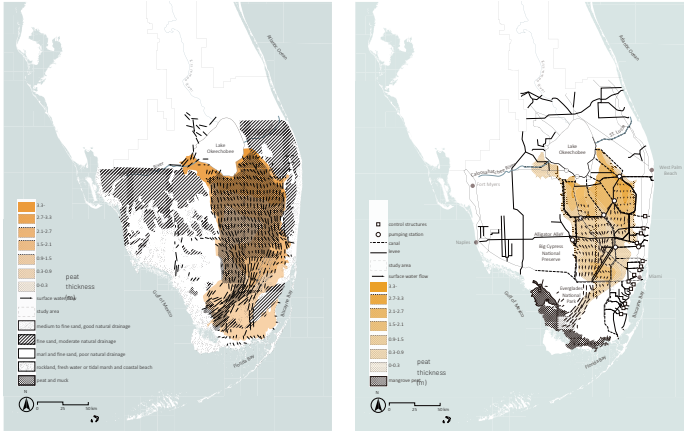


Fig. 3 peat and water conditions before(left) and after(right) drainage

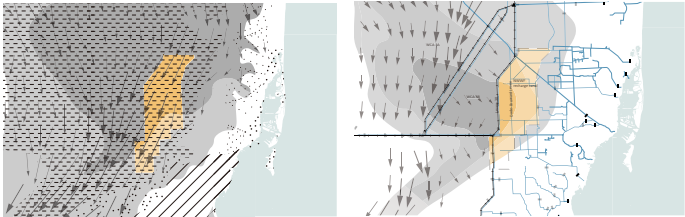


Fig. 4 the change of water and soil conditions in LBA.

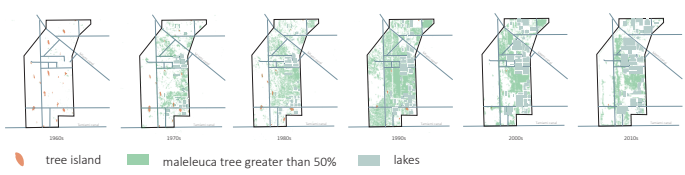


Fig. 5 land cover change in LBA.



Fig. 6 urban boundary



Fig. 7 urban boundary



Fig. 8 the existing landscape of mining lakes.

How to read the boundary?
Hydrology, ecology, urbanism, and mining are considered as four main driving forces in changing the landscape.

Fig.1-2 Hydrology. South Florida sits on the porous limestone which means the bedrock is permeable. When the water table is low, salt water may intrude from canals and salt marshes. When the water table is high, water rises up from the ground and the lower parts of the urban area may be flooded. What is worse is that the sea level rise will make both the problems more serious. In the future, the city needs to conserve more fresh water and

adapt to water.

Fig. 3-5 Ecology. After over one-hundred years of drainage, a flooding control system has been built across South Florida. This artificial water system has changed the natural water conditions and resulted in peat loss. The Everglades ecosystem is degrading. In LBA, the previous typical ridge and slough landscape now is occupied by invasive forests and lakes.

Fig. 6-7 Urbanism. The Urban Development Boundary was first put forward on the map as an explicit line to contain

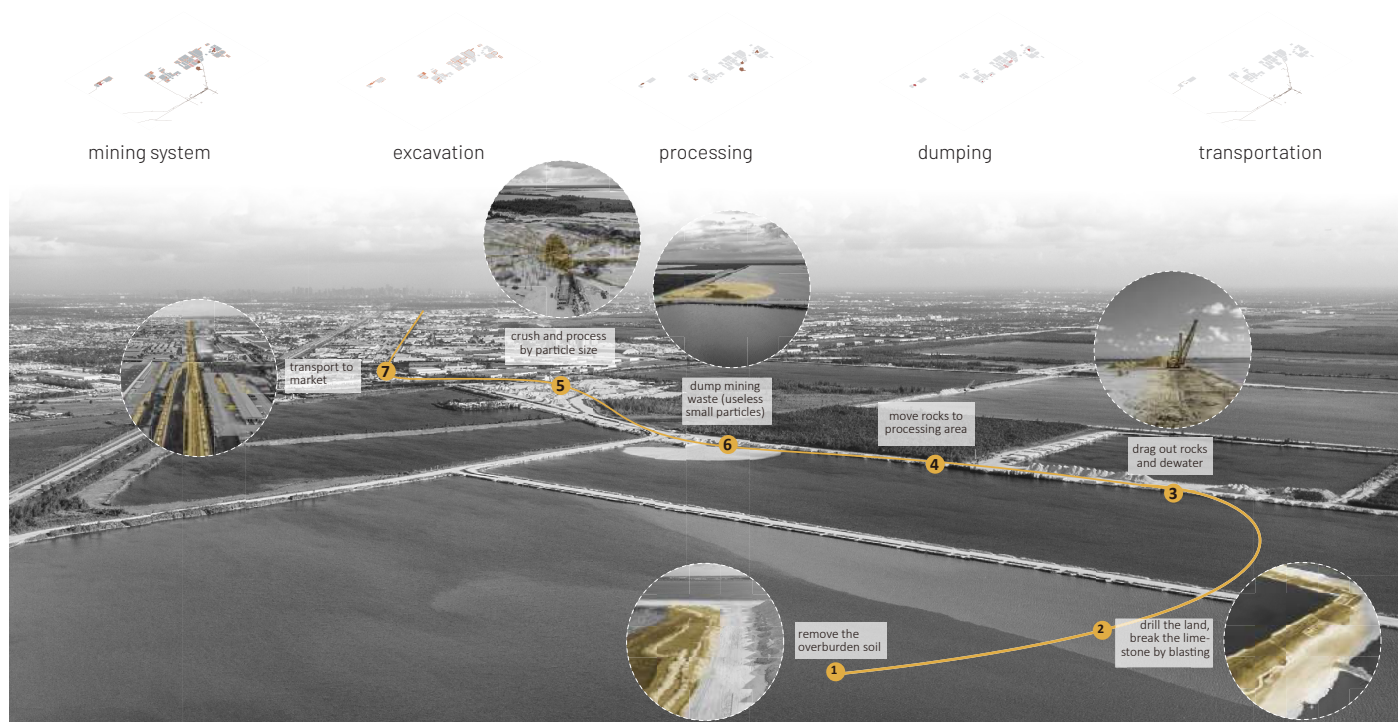
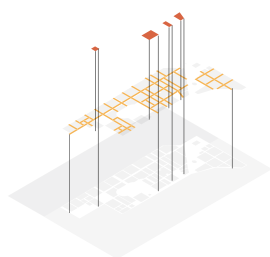


Fig. 9 mining process mapping

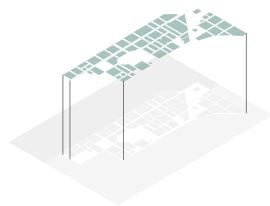
LAND STRATEGY:

PROTECT, PENETRATE AND



WATER STRATEGY:

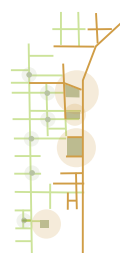
RESTORE, RETAIN AND RECHARGE



1
Grow the protected
landscape structure.
Create tree islands as
core habitats.



2
Guide the urban
penetration.
Regenerate post-mining patches
as primary recreational parks.



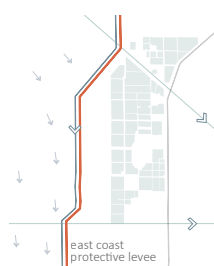
3
Connect, extend
and interpenetrate



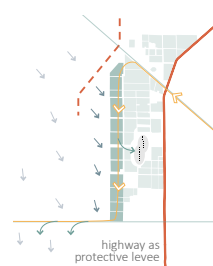
INTEGRATION
& INTERACTION



1
Existing water
management system



2
Restore sheetflow;
Use the lake corridor to
recharge water



3
Retain more water



Fig. 10 site deconstruction and strategies

rapid suburban sprawl. But now, this political boundary has become a spatial barrier. The mining area is just located outside the urban boundary,

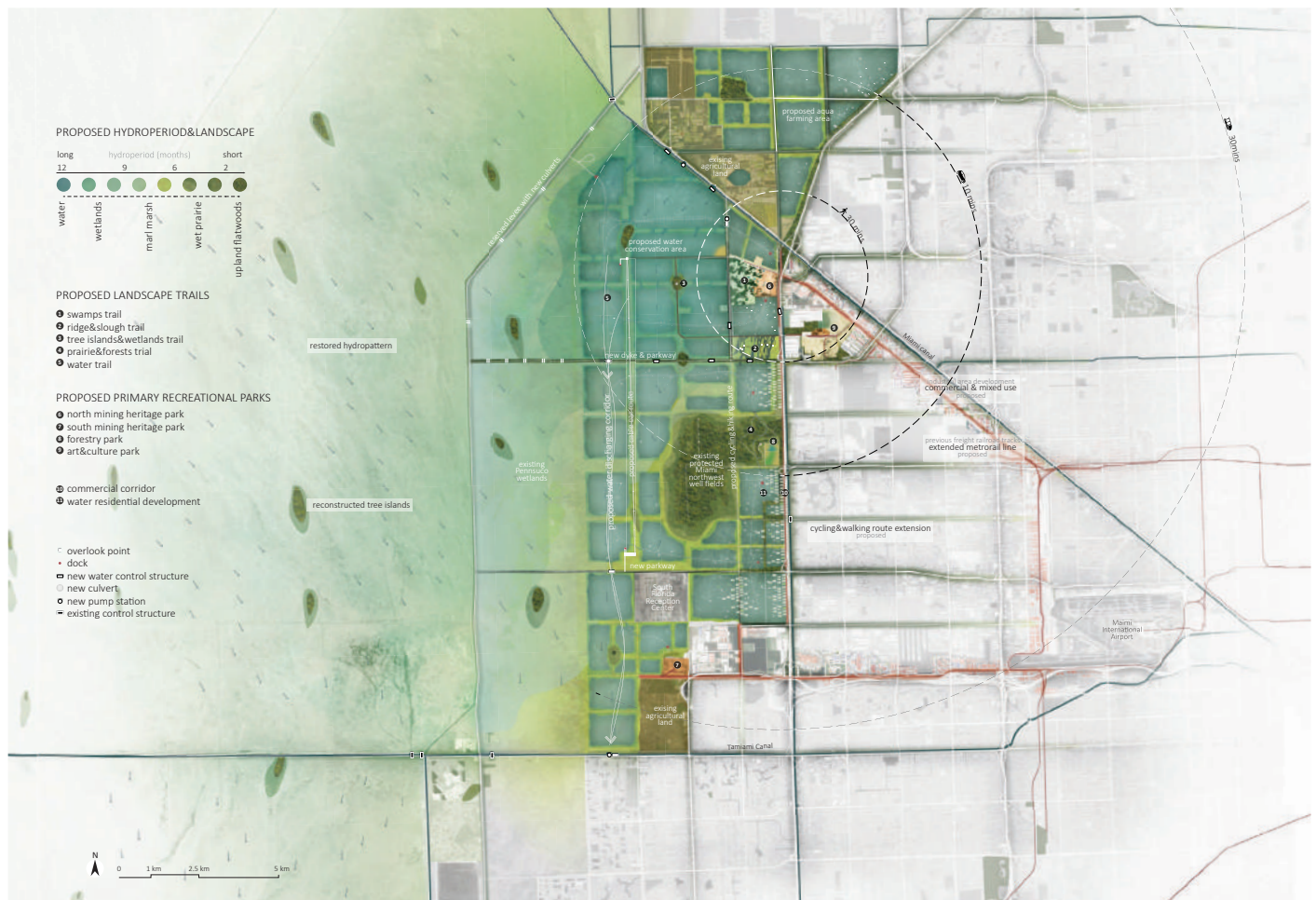
Fig. 9 Mining. The LBA produces nearly half of the limestone the whole state consumes. But it is going to stop within 30 years because of resource depletion. The mining processes in LBA are mapped as mainly four steps: excavation, processing, dumping, and transportation.

In conclusion, natural water flows have been excluded outside the urban area. Nature has been removed

from urban life. There exists the boundary between the natural and urban systems. Opposition and isolation are established.

How to transform boundary to border?
Landscape is employed as a process, a palimpsest and infrastructure.

Fig. 10 Site is decomposed into lakes and lands. And accordingly, water strategy and land strategy are proposed. Tree islands are created as main habitats and mining heritages are regenerated as core recreational parks.



What are the potentials of border?

Fig. 11-13 Different landscapes are created according to different hydroperiods. The old freight rail system is employed as public transportation to connect the post-mining area with the urban area and mix-use development is proposed in the industrial area. Over time, the green structure and the urban fabric will interpenetrate each other.

Fig. 14 Through a series of interventions, three processes over time are expected: ecological succession, urban development and water contribution. As the mining

activities decline, more and more new programs will be added.

Fig. 16 Ecological succession. As proper water condition is created, the peat soil accumulates again. The mining activities of overburden removal and waste dumping are utilized to reconstruct tree islands in the lakes and wetlands landscape. Diverse species grow and thrive.

Fig. 15 Urban development. New housing types are proposed to settle on the lakes. Under a set of landscape principles (open spaces reservation, density control and

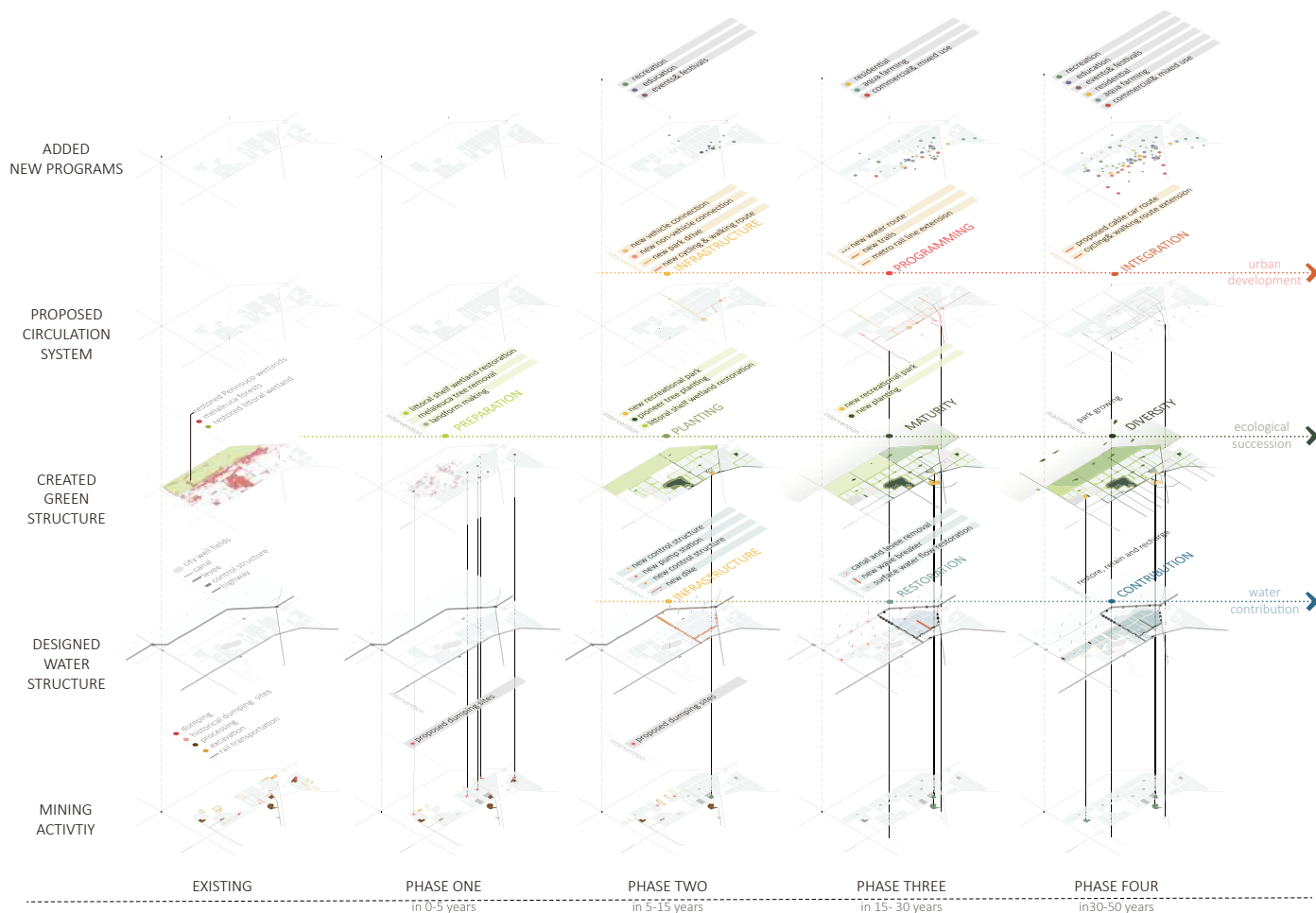


Fig. 14 phasing and development

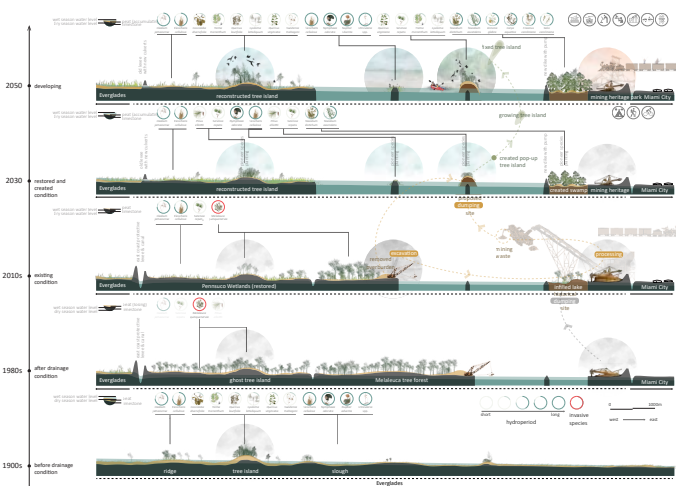


Fig. 16 ecological succession

distances between buildings), the urban development is guided into nature and to interact with water.

Fig. 16 Water contribution Through flooding the wetlands, more water will be retained in the ecosystem. And increasing the water level by building new water structures will add extra water storage in the lakes. The water stored and retained can offset the amount of water extracted by city wells.

Therefore, under the landscape framework, a series of interventions are proposed to create conditions for the

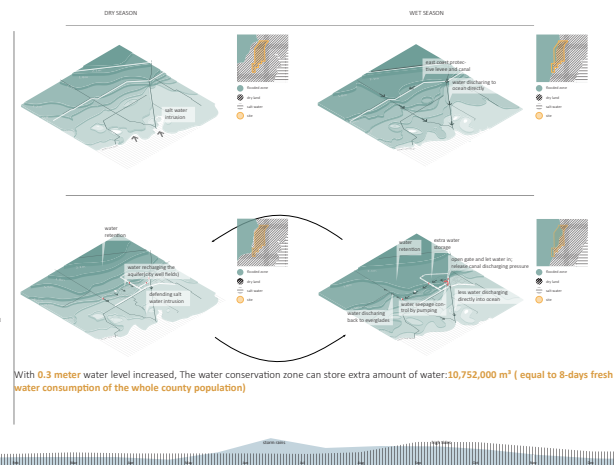


Fig. 17 water contribution

natural process and urban process to take place. These conditions absorb changes and encourage interactions that make the border adaptive and dynamic. Water is manipulated to nourish the ecosystem and replenish the aquifer to supply drinking water and resist saltwater intrusion. Water is not a burden anymore but a valuable resource. Diverse species can be brought back. Urban people can live together with nature and get educated. The land value is reclaimed, and the city is more resilient to climate change.

Ref: Sennett, R. (2008) The public realm [Blog post]. Retrieved from <https://www.richardsennett.com/site/senn/templates/general2.aspx?pageid=16&cc=gb>

Biscayne Bay: Turn the tide

An integrated landscape approach for coastal restoration in Biscayne Bay through spatial and ecological interventions

Iris van Driel

Project location:

Biscayne Bay, Florida
USA

Mentors:

Dr.ing. Steffen Nijhuis
Yuka Yoshida

Keywords:

mangrove landscape,
South Florida, Biscayne
Bay, flood protection,
ecological restoration,
social reconnection,
design with natural
processes, research by
design.

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The coastline of South Florida has undergone a drastic change in the last century and this has had a major impact on flood safety and natural resources of its inhabitants. Natural coastlines supporting mangrove and wetland have been transformed into seawalls with buildings. It is estimated that in the last 100 years, 40 percent of the mangrove coast and significant parts of wetland, pine forest and sea grass have disappeared.

Mangrove forests stand out to be a future-oriented way of natural coastal defense for South Florida. Although they mainly appear in calm tropical waters, they can withstand and recover from tropical storms. Their unique growth habit with a characteristic root system and branching forms a robust forest, that functions as a natural coastal defense. Also, marine life is dependent on the nursery grounds provided by the root system of the trees and maintaining a healthy fish stock.

We can learn from the past that this forest provides the land with a natural levee and protect against flooding. Also, this natural system has potential to adapt to the consequences of climate change that highly urbanized areas like Miami are already facing and which will increase rapidly in the future.

This research identifies and explores design strategies and principles for the mangrove landscape of Biscayne Bay in order to reduce the flood risk of Miami Metropolitan Area, as well as provides aesthetic, ecological and functional qualities that contributes to the identity and resilience of this coastal region. This is done through design-related-research, that divides this research in two domains. Design research, which consist of a system analysis and examination of best practices and research by design, which involves design experiments.

The result is a layered landscape strategy that contributes to the harmony of the natural coastal landscape of Biscayne Bay and thereby restores its functions. The systematic strategy is converted into a spatial design, applying principles gathered from best practices. This landscape architectural design adds an extra dimension to the mangrove landscape that will invite the residents of the Miami Metropolitan Area to experience through exposure to changes and value its aesthetic and ecological qualities and protective functions.

TURN THE TIDE:

"TO COMPLETELY CHANGE THE DIRECTION OF SOMETHING"

Cambridge dictionary of American idioms (2003)



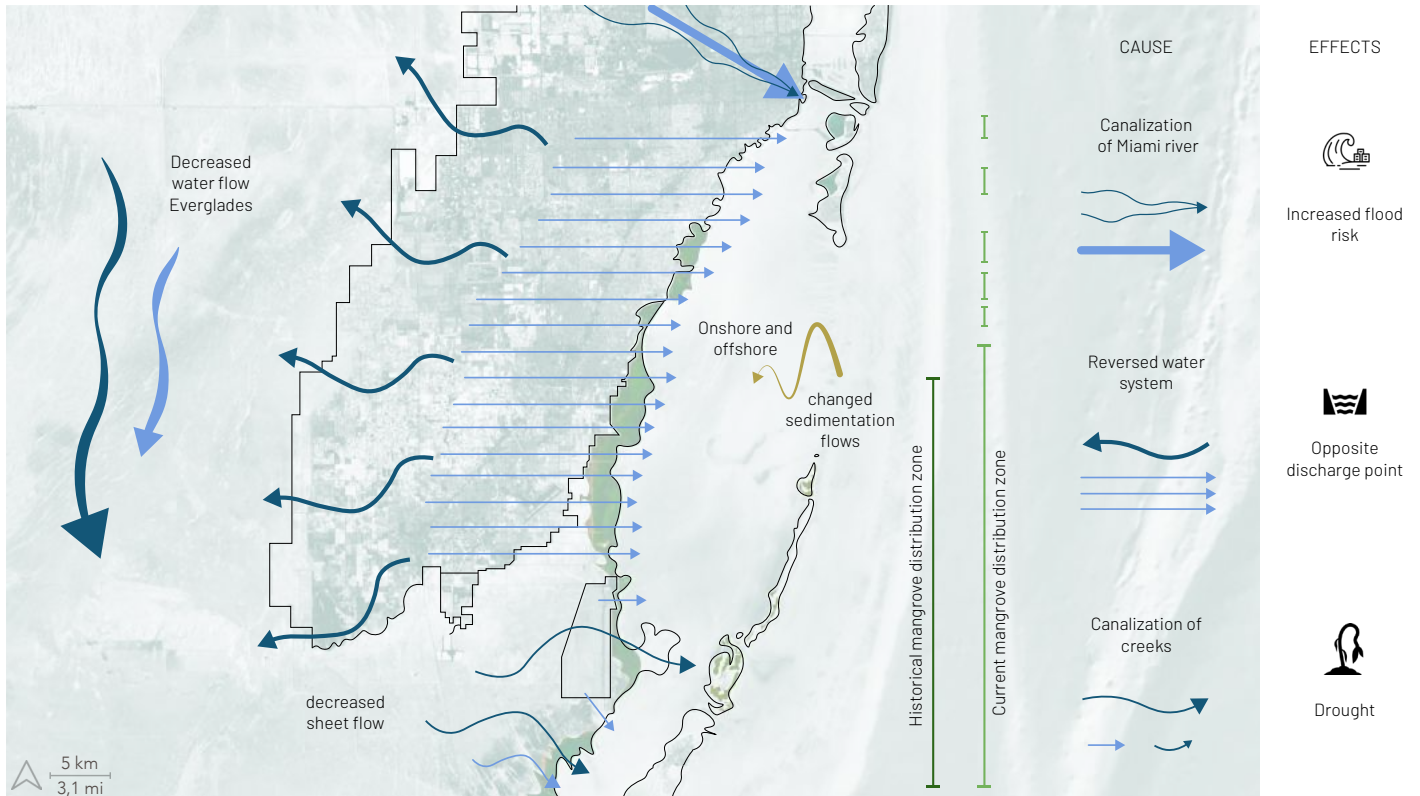


Fig. 1 Structure analysis map

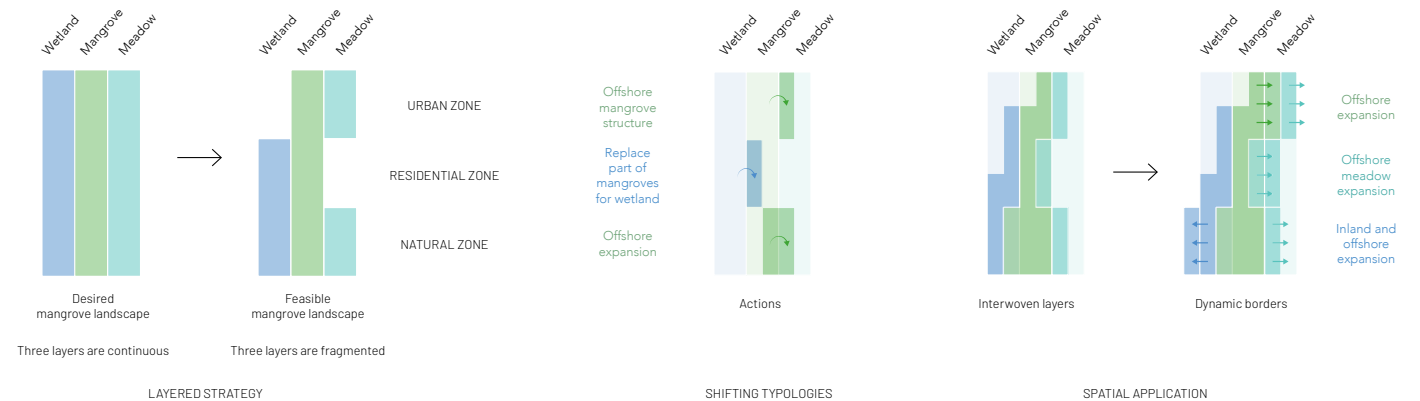


Fig. 2 Design strategy

THE MANGROVE LANDSCAPE

The desired coastline for Biscayne Bay is a continuous mangrove landscape, consisting of three layers: wetland, mangrove forest and sea grass meadow. In the current situation, the interrelation between the layers is interrupted by the spatial limitations of the built environment and the canalized water system. Mangroves along the coast are depleted and fragmented, but fig 1. also shows that the distribution area has increased because of the new growth opportunities due to reversing water flows on the ridge. Based on these challenges and opportunities, a feasible situation has been outlined.

This is a fragmented but continuous mangrove landscape, which contains at least one of the three layers. These existing layers and fragments offer the opportunity to restore the desired landscape. The strategy is therefore to preserve, restore and reintroduce the layers in a design for a continuous mangrove landscape with dynamic borders to enable expansion. If there is no space for one of the typologies in the original zone, which is defined by the topography of the landscape, it can be shifted to an adjacent zone and be interwoven with its context. Three zones are identified to develop an specific approach and design.

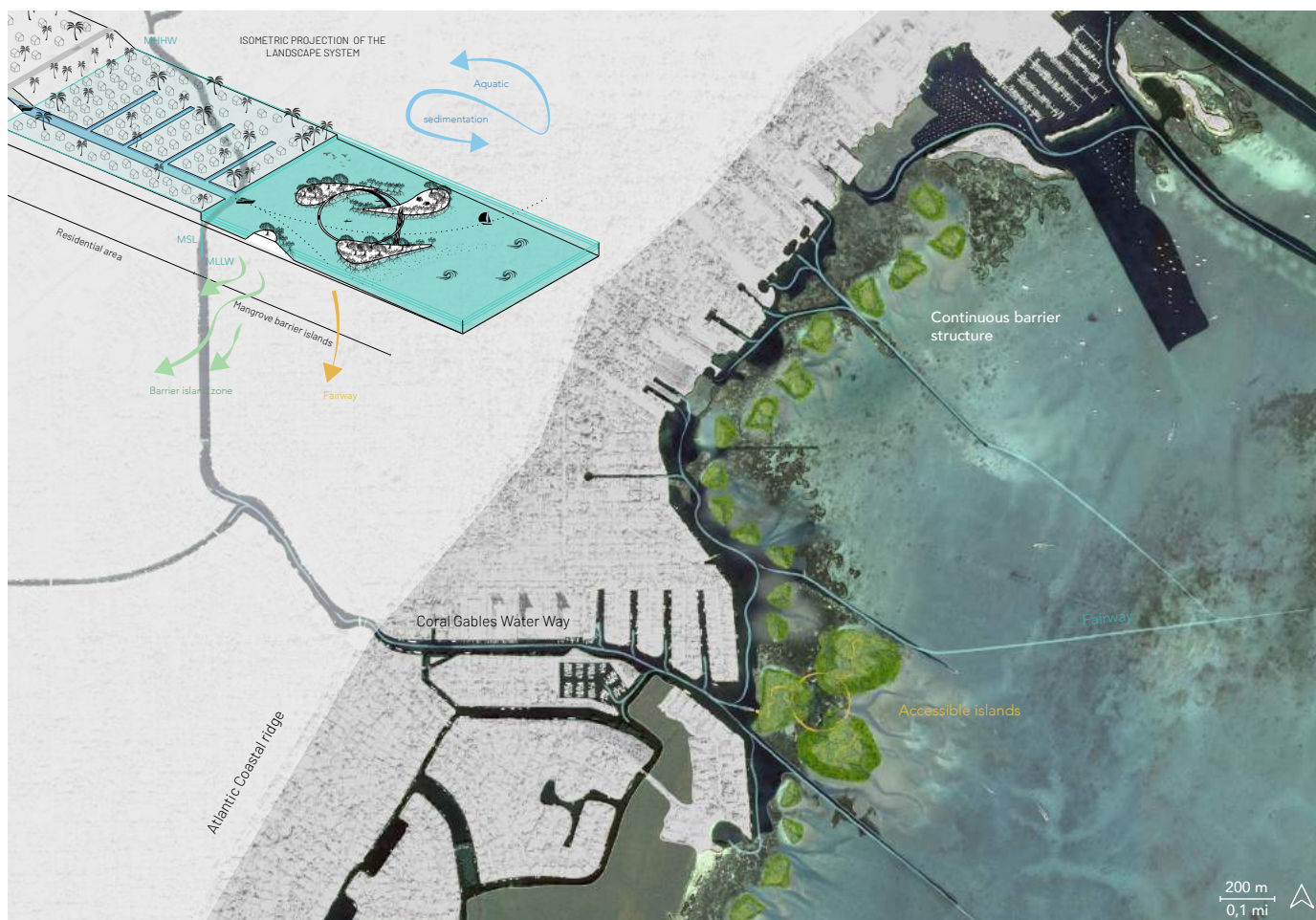
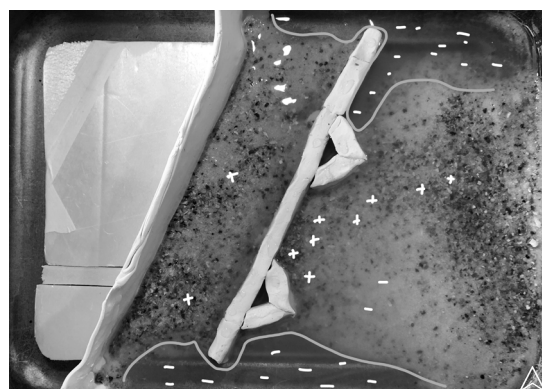


Fig. 3 Map of the barrier island structure



SEDIMENTATION DEVELOPMENT



MANGROVE DEVELOPMENT

Fig. 4 Sedimentation experiment

MANGROVE BARRIER ISLANDS

In the most northern part of the bay, the mangrove landscape barely exist anymore. Apart from a few small mangrove fragments and depleted meadow, there is no place for the landscape in this urbanized area. Shifting typologies of the mangrove landscape, forms the basis for the concept of this area. An island chain off the coast of Coral Gables offer space for the mangrove forest. This barrier structure can substantially lower the water level and the impact of waves of storm surges. The mangroves improve and hold sedimentation, but also add spatial quality and aesthetic value to the area.

The shape of the islands is based on a sedimentation experiment (fig. 4) and the pattern is defined by the bay's current and the topography and topology of the sea floor. The islands are situated in existing fairways or on the mudflat, to spare the sea grass meadow that supplies the islands with sediments so they can expand. Some of the island in front of the Coral Gables Waterway are bigger and accessible by boat. They mark and protect this historical waterway and are interconnected by a circular bridge which forms a calm zone for kayaking and fishing. The area between the shore is sheltered by the barriers islands and supports larger water based recreation.

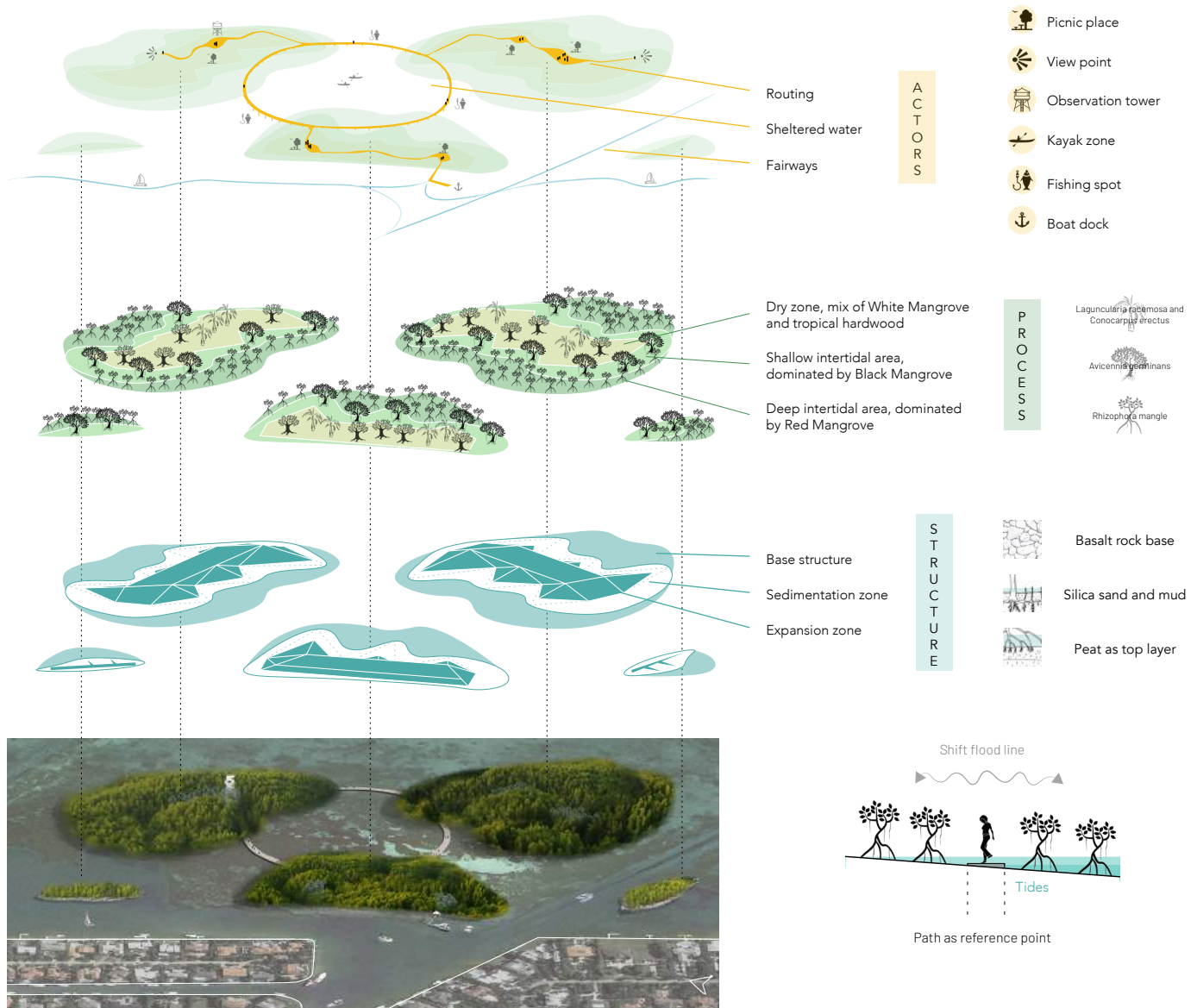


Fig. 5 Exploded view of accessible islands

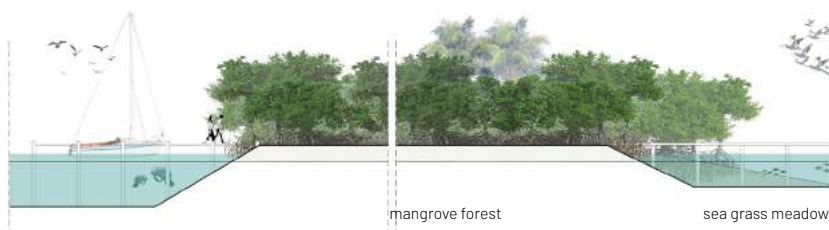


Fig. 6 Section of accessible barrier island

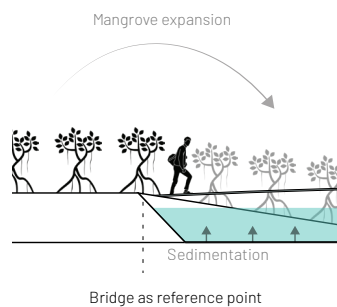
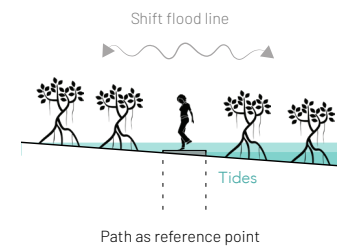


Fig. 7 Visualization of change

ACCESSIBLE ISLANDS

All islands are built up from a basalt rock structure. Their specific shape enables sedimentation and supports mangrove expansion. Not only sedimentation, but also peat formation between the mangroves root system will cause growth of the islands. The bigger accessible islands have a wider base that allows elements of the program, such as the routing, picnic places and a observation tower. This higher middle zone is mostly dry and vegetated by native tropical hardwood. Around it is a intertidal zone that, dependent on the water depth, dominated by different mangrove types.

The islands offer a new experience for the residents and local tourists in the northern part of the bay. The shape of the islands and their vegetation is constantly changing due to sedimentation and erosion. This form of diachronic change allows the user to experience the most important processes of the mangrove landscape. Paths and the circular bridge are a reference point to observe the development of the islands over time. Experiencing retreat and expansion of the vegetation, but also deviating high water levels, will make the user aware of the function of the mangrove landscape and value its role as a coastal defense system.

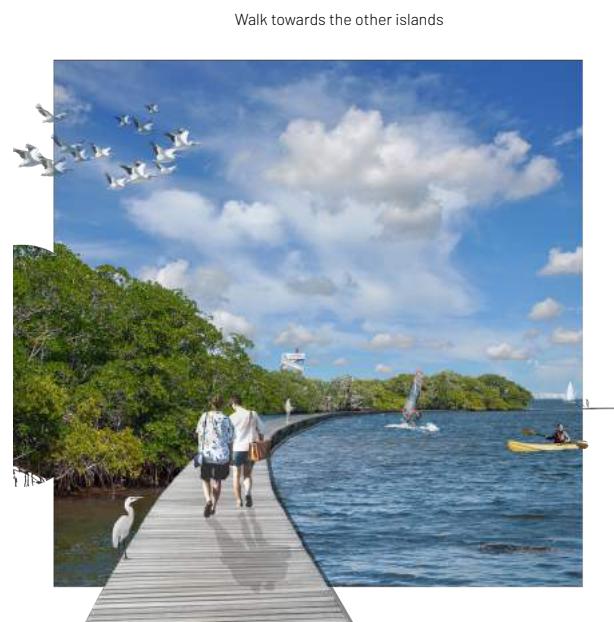


Fig. 8 Impressions

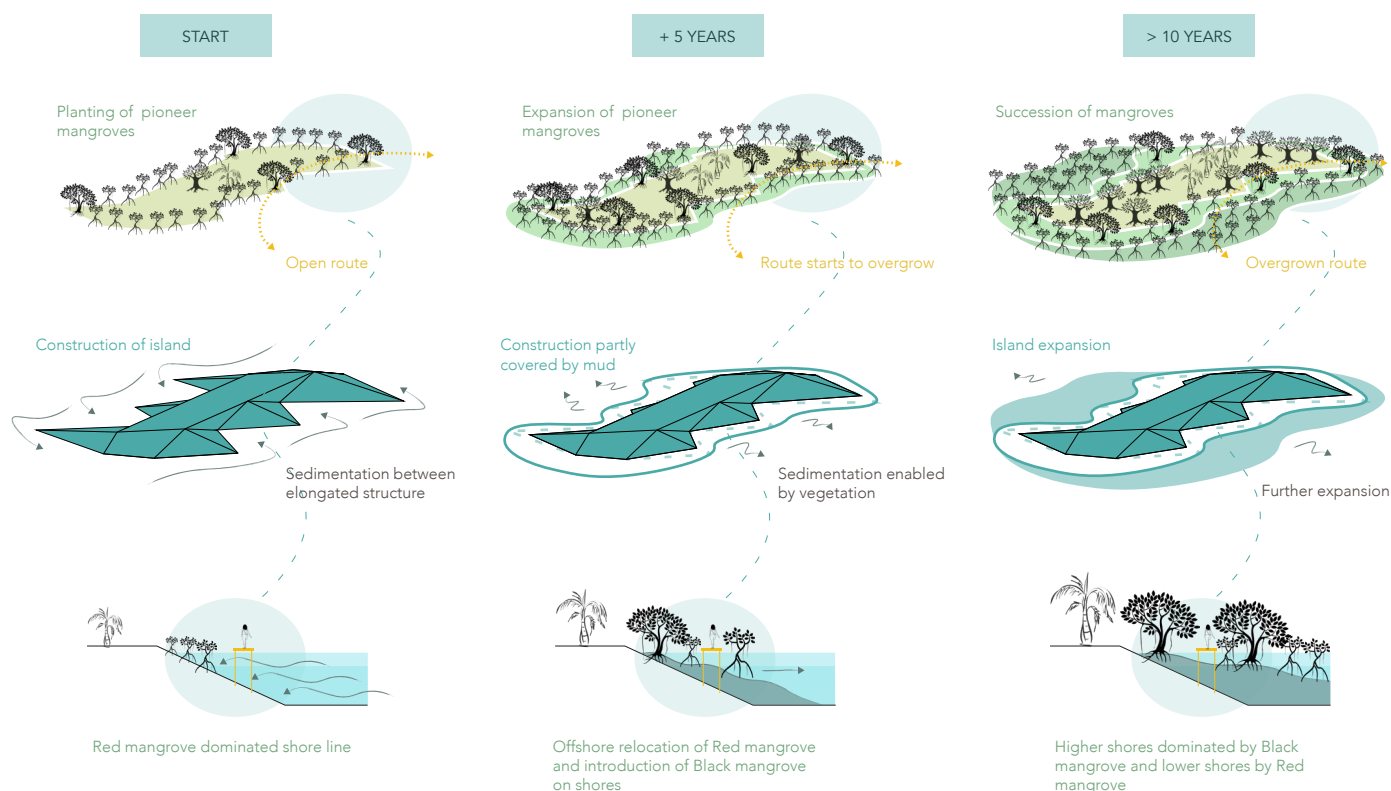


Fig. 9 Development of the islands

DEVELOPMENT AROUND THE RING

The scheme above illustrates the development of an accessible island. In the beginning, the base is constructed in the water and planted with different mangrove types. The ring shaped route goes mainly through the open water and along the island, but at one point it goes ashore on one of the elongated shapes, to allow users to enter the island. In the following years sedimentation will occur and the mangrove trees start to expand. Red Mangroves move seaward and the Black Mangrove strip increases on the higher shores. The relocation of the forest changes the experience of the route, which will partly overgrow close

to the slopes of the islands. After a decade, the slopes of the islands will be more elongated by sedimentation and peat formation. The circular route will become mainly overgrown and only in the middle between two islands be open to the bay. Eventually, several islands can expand towards each other and form one bigger island. Though, the expansion is not based on stable rock or solid ground and could be washed away during a heavy storm. The base of the island would continue to exist and the process of expansion can start again from the beginning.

forEverglades City

Interdisciplinary design approach for a resilient, adaptive and sustainable (re)development for of Everglades City.

Jean Pierre Droge

Project location:

Everglades City, Florida
United States of America

Mentors:

Dr. Ir. Nico Tillie
Dr. Roberto Rocco

Keywords:

ecosystem, hurricane,
sea-level rise, socio-
ecological development,
everglades, sustainable,
resilient, adaptive,
climate change, ecology,
governance, landscape
architecture

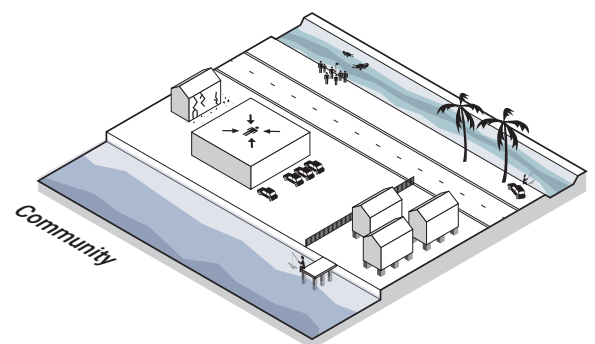
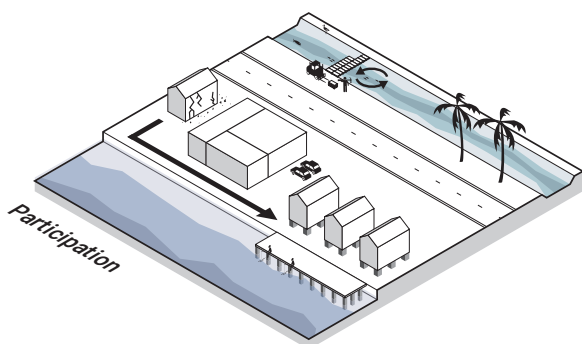
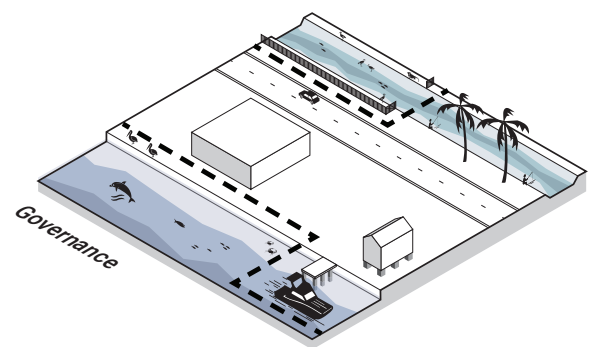
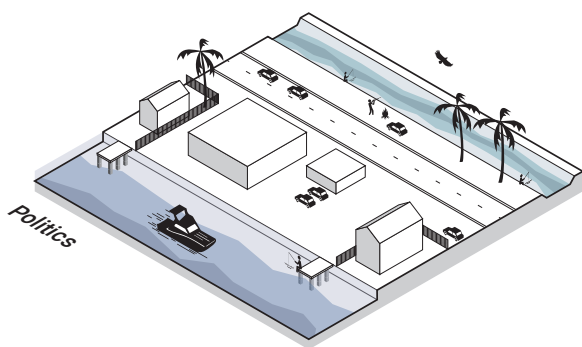
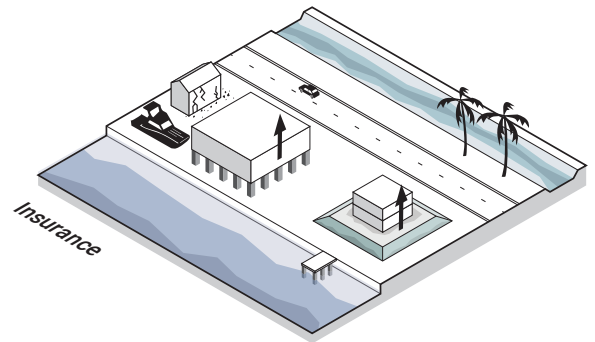
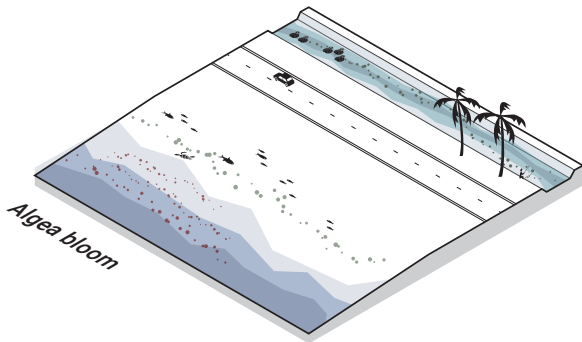
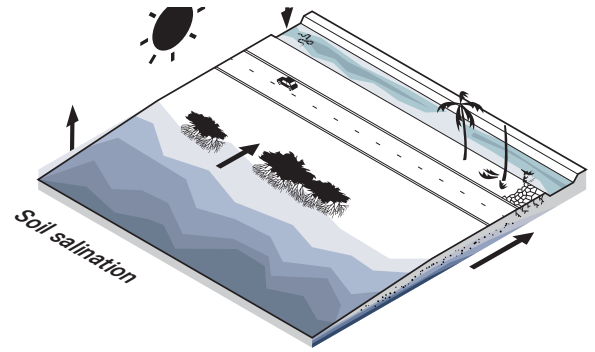
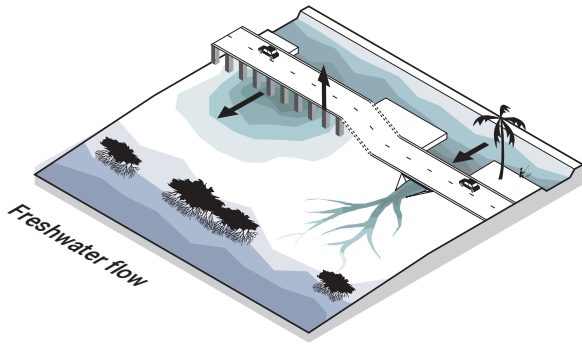
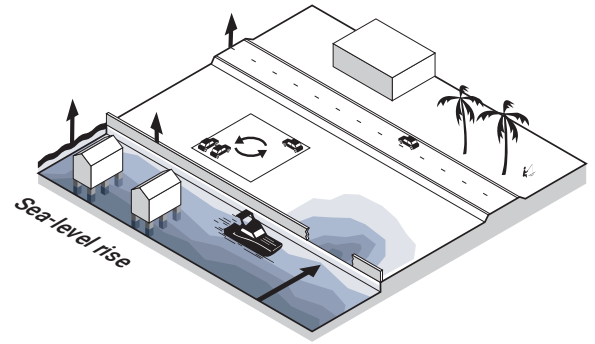
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This project describes the results of an interdisciplinary design research. It is based on the restorative ecological capacities and principles of Everglades National Park on the large scale and zooms in to the municipality of Everglades City. The project addresses a multitude of challenges that can be related to the environment, economy and the community in South-Florida. The Comprehensive Everglades Restoration Project (CERP), 'the largest hydrological restoration project ever undertaken in the United States', already deals with many of these challenges. However, as it mainly addresses environmental and economic aspects on a larger scale, there is little connection to the local community or with the large number of tourists who visit South-Florida every year. Design solutions at a local level such as in Everglades City are still to be developed. The interdisciplinary design approach creates the link with the community and integrates the social aspect with the environmental and economic.

Everglades City recently got destroyed by hurricane Irma and is threatened by sea level rise in the near future. Its economy is based on tourism solely depending on threatened ecosystems in its surroundings. By linking the fields of landscape architecture, ecology & governance through an integrated design strategy, a better understanding of the system, key components and aspects on different scales was accomplished. Ecological, hydrological and geological dynamics in South Florida were studied, and principles were derived and used in the urban set up of Everglades City. Conceptual design solutions and a conceptual master plan of Everglades City were the base to get in touch with local stakeholders and boost community participation. After aligning the stakeholder outcomes, with the urban environment and its surrounding ecosystems a regional vision was created which formed the context for local interventions in Everglades City.

The result of this interdisciplinary design approach can be an example for resilient, adaptive and sustainable development, which can make an impact on multiple scale levels as well as for similar coastal settlements in the area.



Problem field



Regional plan

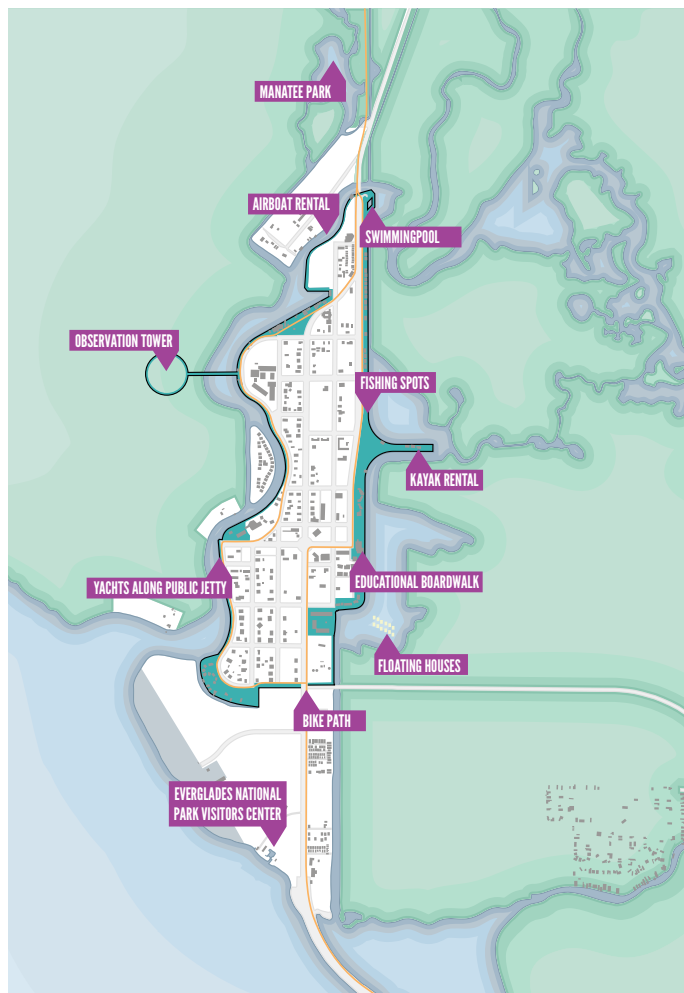
When linking the ecological dynamics to the urban context, a comparison can be made between the spatial characteristics of the Tropical Hardwood Hammock and Everglades City.

Just like a hardwood hammock, the city is surrounded by and slightly elevated above water. But the hammock is naturally protected from flooding and fire by the topography of the edge, which is shaped by the flow of water. The characteristic vegetation of the edge makes the hammock impenetrable.

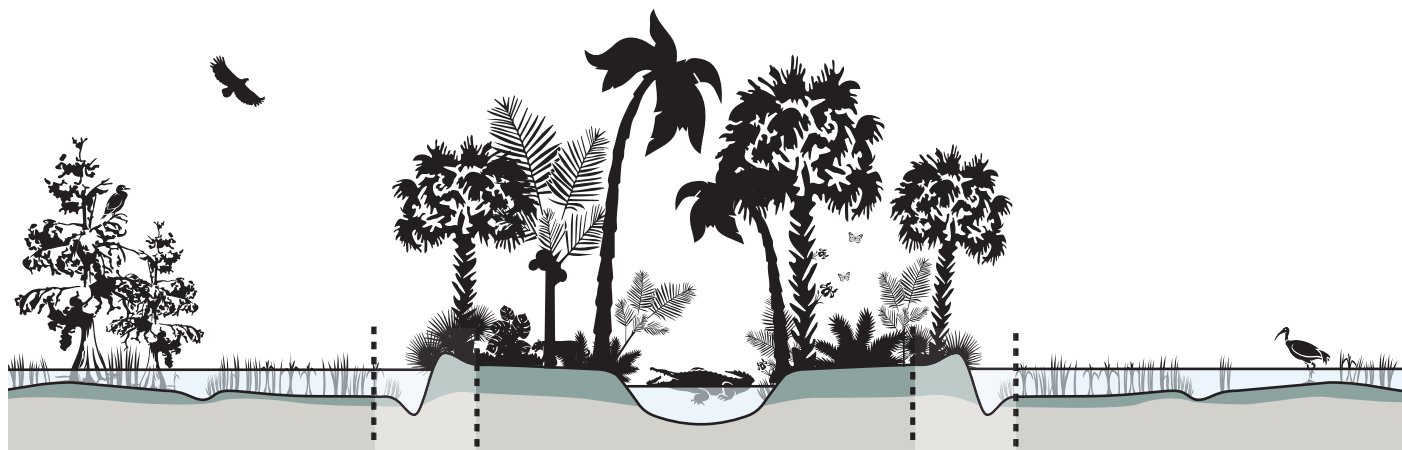
The principle of the edge, indicated by the dashed lines in the ecosystem section, can serve as a guiding metaphor to protect city against flooding. As the principle refers to the Tropical Hardwood Hammock ecosystem, it will connect the local scale of Everglades City to the regional scale of Everglades National Park. In the park, the ecosystem can be experienced in the Mahogany Hammock Trail. With the proposed principle, and the translation of the Tropical Hardwood Hammock in the urban environment, the people will get a better understanding of the ecosystem, as they experience the hammock in a new and different way.



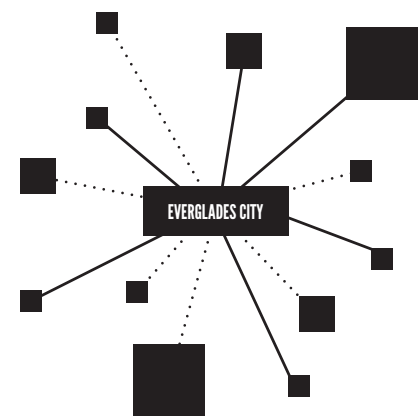
Everglades City Waterfront



Urban plan



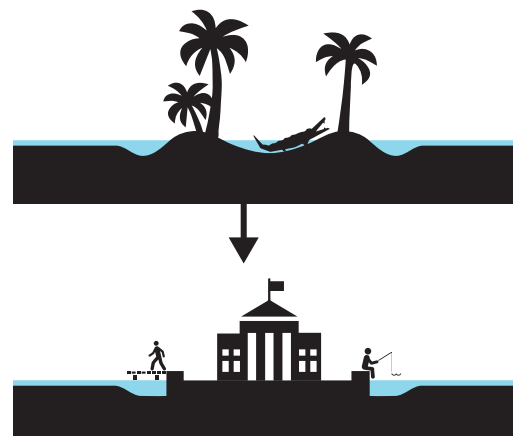
Ecosystem section - Tropical Hardwood Hammock



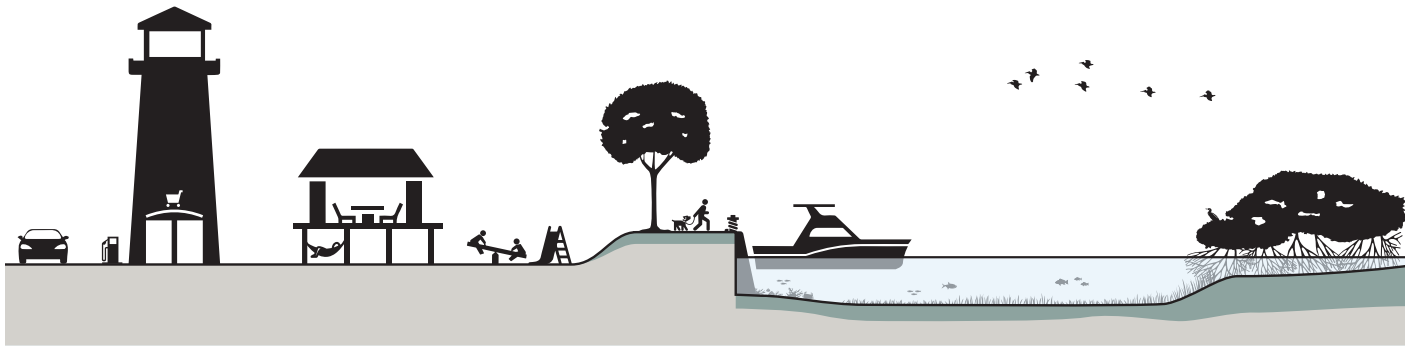
CERP education principle



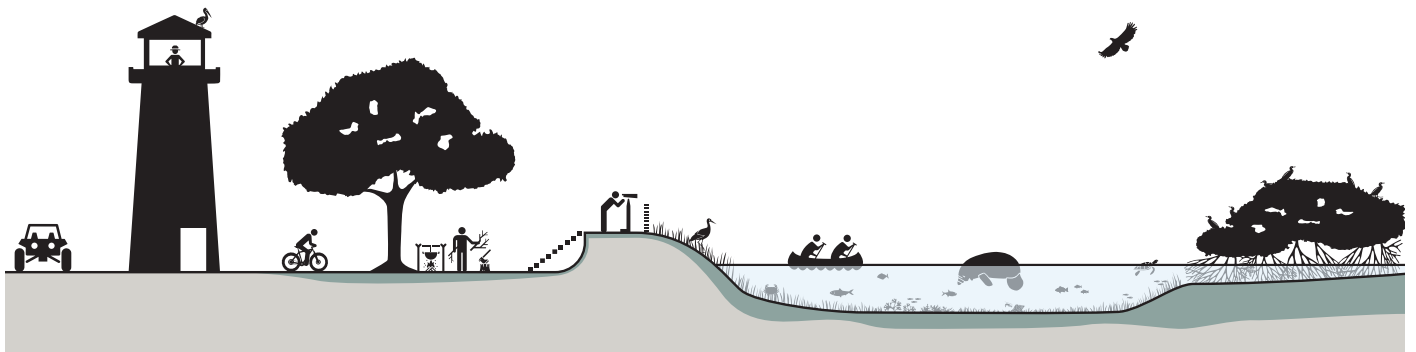
Stakeholder participation principle



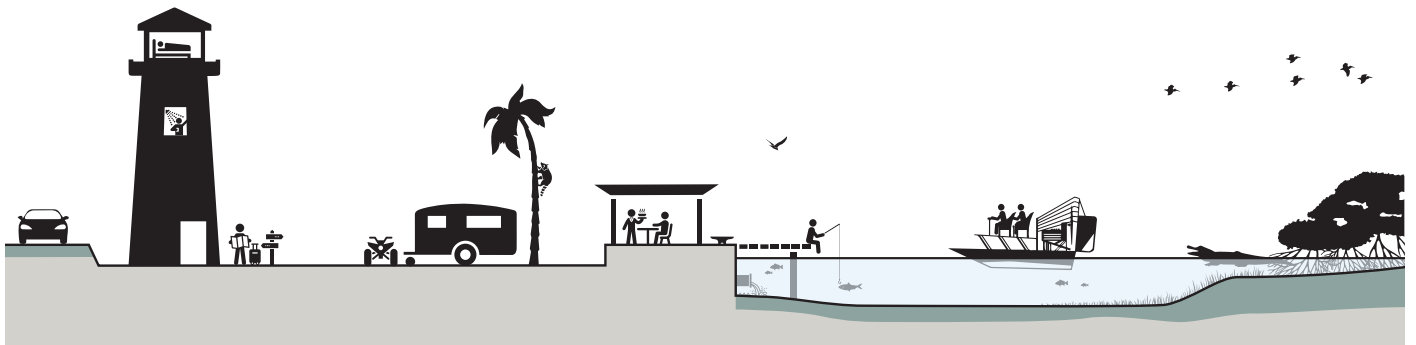
Hardwood Hammock Waterfront Principle



Citizen's Scenario



Biodiveristy Scenario

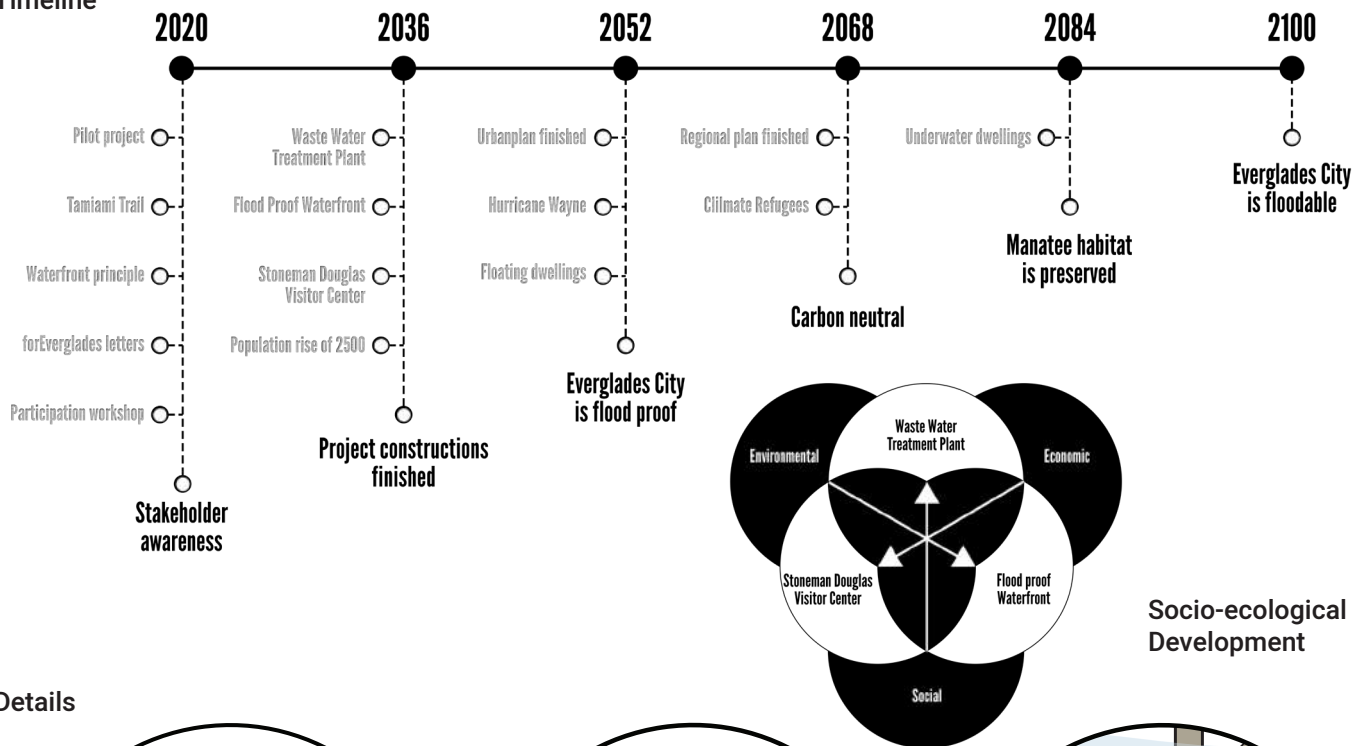


Recreation Scenario

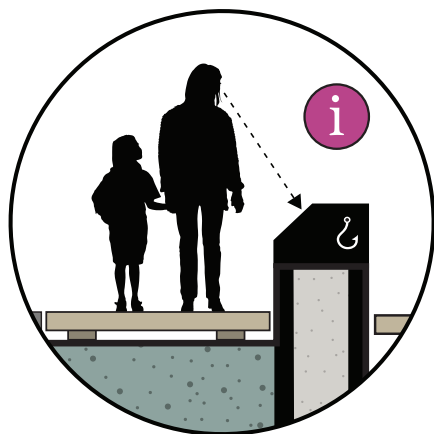
As a succession of the regional and urban plan, a design for a waterfront is proposed. The concept that will structure the development of the waterfront is derived from the ecosystem dynamics principle. The guiding metaphor of the edge of the Tropical Hardwood Hammock is spatially translated for the design of the waterfront.

Other design choices have been made according to the following waterfront design guidelines: For open spaces along a river, a buffer zone should include design and development techniques that will provide and enhance the following: provision of ecosystem services; ecological restoration; conservation and improvement of biodiversity; increased habitat corridor potential; improved public trail access; open-space amenities; and environmental education.

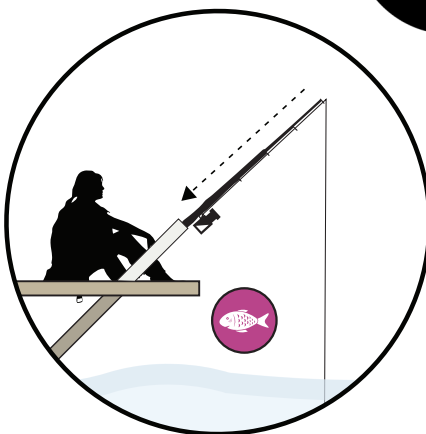
Timeline



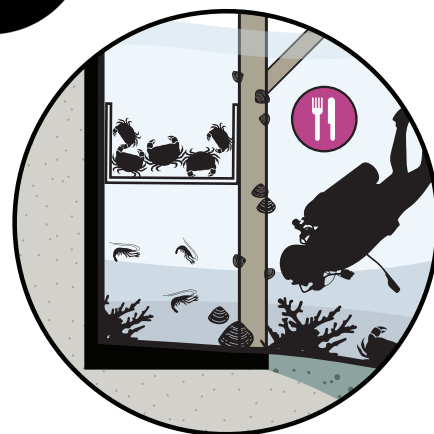
Details



CERP Education

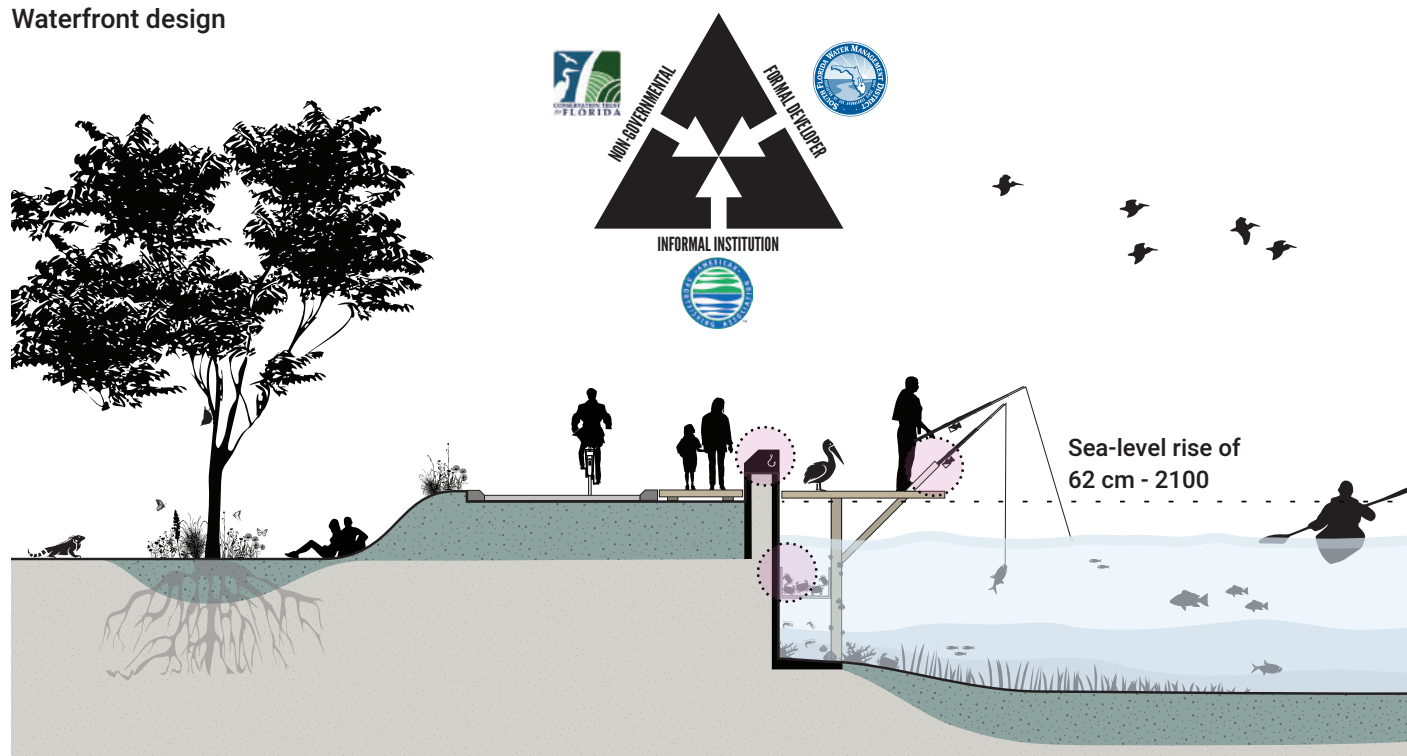


Participative Co-Design



Ecology Inclusive Construction

Waterfront design



From line to zone

Transforming the Miami River & Canal into urban landscape infrastructure

Xudong Zhang

Project location: Miami,
South Florida, USA

Mentors:
Dr. Steffen Nijhuis
Dr. Lei Qu

Keywords:
urban landscape
infrastructure,
ecosystem services,
urban river, urban
landscape systems

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The research context is based on the problematic situations of urban riparian area (Miami River & Canal). With research by design as the main method, the research aims to retransform the riparian area from an isolated line into a closely connected urban zone through designing the river & canal as urban landscape infrastructure and improving urban ecosystem services. By relieving the flooding pressure and improving water quality, it provides a healthier water system and new systematic green public space in the condition of complex riparian land use. The research supplies a framework transforming the waterline from an object into a system by organizing participation of diverse stakeholders, which has significant practical and academic relevance.

Having been losing the ancient environmental traditions of South Florida during the past century, the urbanized Miami is armed with heavy grey infrastructure, especially the Miami river waterfront. As a natural river with broad eco-flourishing land over a century ago, the current river is just a canalized hard line with few connection to surrounding land. The local industry and urban construction have been making Miami city isolated from the vast everglades and devouring its traditional city identity. The ecosystem memory is fading away from the city.

The strategic plan show the main planning and design spatial framework through dividing the whole region into five crucial areas driving the urban and natural processes.

Herein, the intervention of upstream located at northwest area concerns principally on ecological restoration and river water management by creating new flooding buffer zones and mining retention ponds. Then the vast canal part running through industrial and residential district is intervened by elevated green parks or bridges in order to eliminate the negative effect of the river boundary.

The water value of the future city center is increased to improve spatial quality and drive new urbanization. In downtown area which is also the historical part of the river and the city, the intervention focuses mainly on the public space connection along and across the river. In addition, the historical parks are optimized to provides more recreational activities. A new artificial manatee habitat combined with tidal park is built to protect native species.

The project is in a long-term strategy. The urban and natural processes take place during the next decades with interaction of each of the strategic areas. approach can be applied in other cities with similar challenges.

The "From Zone to Line" program includes 27 projects in total. The cooperation among private investors and governments of different levels is significant for financing so as to implement such an ambitious program. From the governance perspective, the environmental or ecological restoration and urban green space improvement present great social benefits to the public. From the perspective of other investors, the promoted spatial quality provides more commercial values and economic benefits. In this sense, defining appropriate common interests plays an essential role in integrating social capital and achieving the same goal. Private capital is still able to contribute tremendous benefits to public services and facilities in the condition of getting enough revenue.

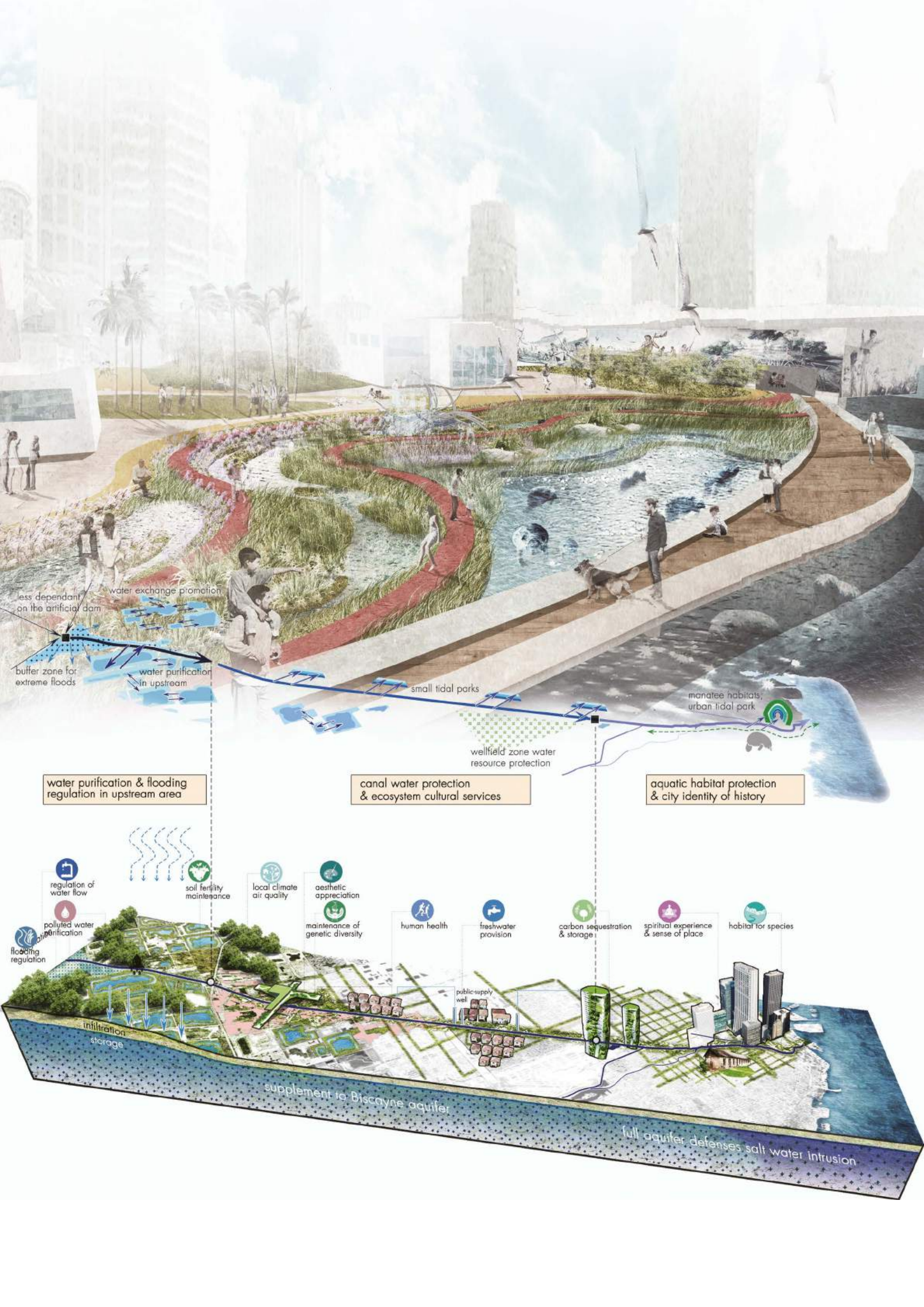




Fig. 1 Strategic Plan

Fig. 1 The strategic plan show the main planning and design spatial framework through dividing the whole region into five crucial areas driving the urban and natural processes.

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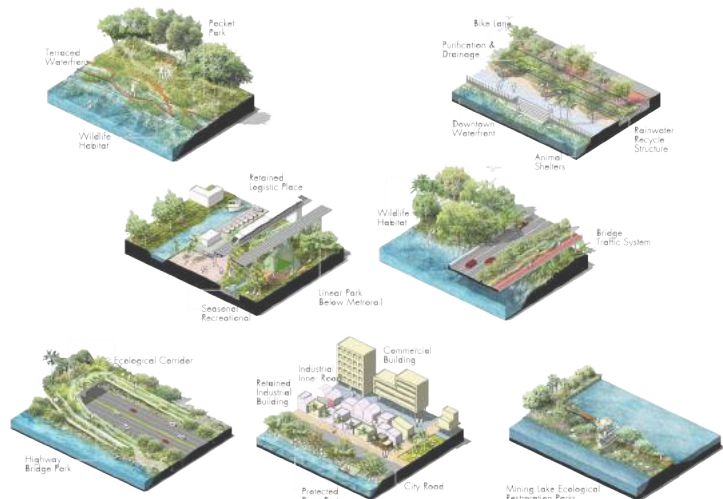


Fig. 2 Design Toolbox

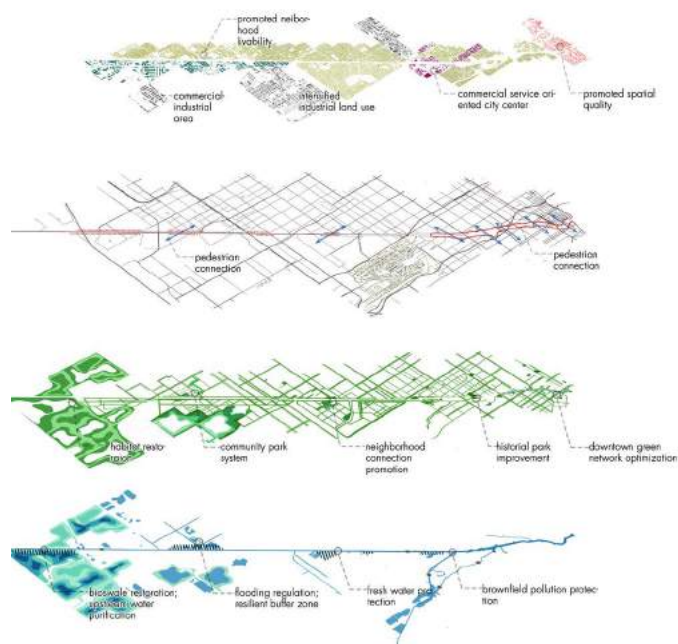


Fig. 3 Systemic Design

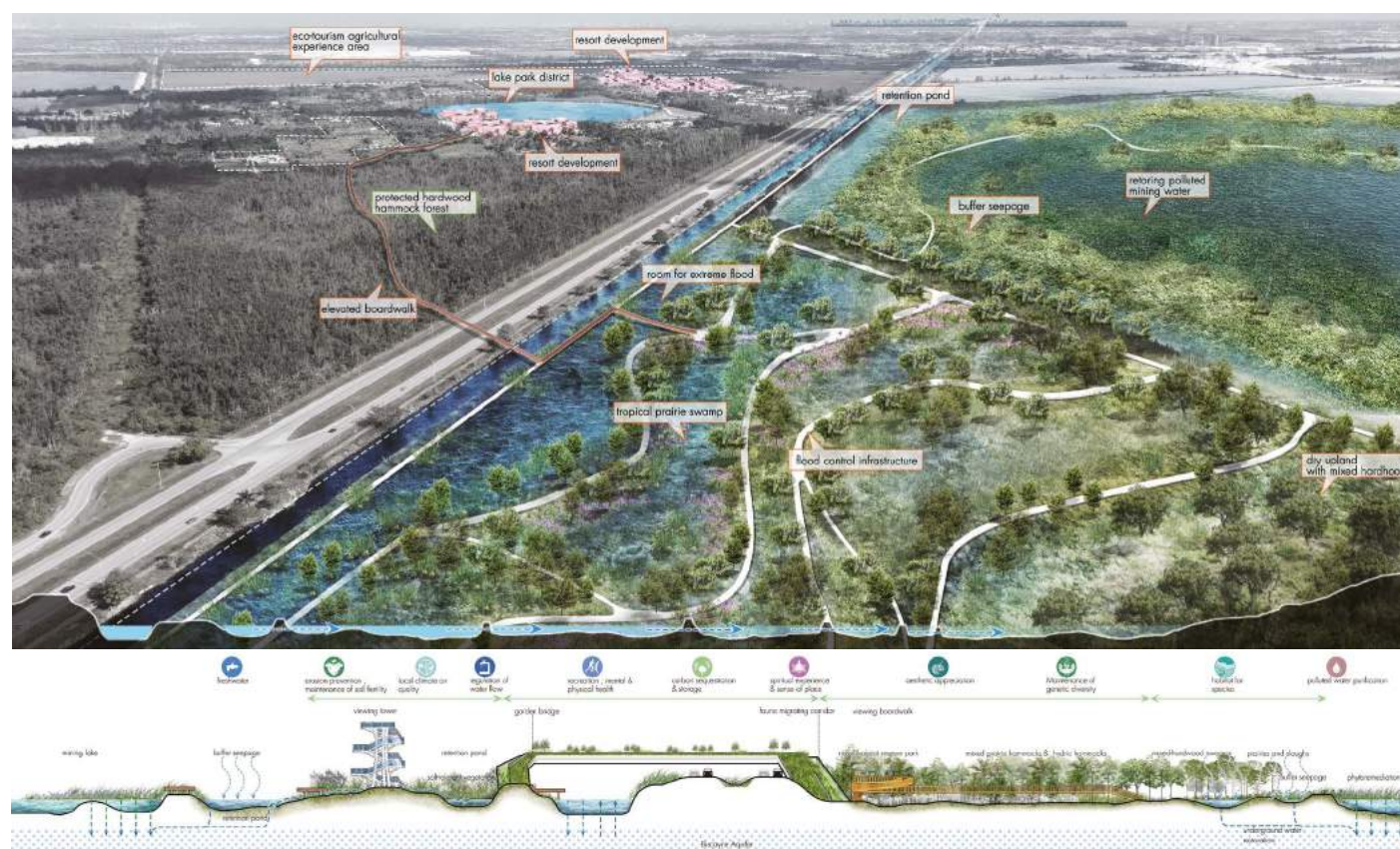


Fig. 4-5 Mining Lake Area

Fig. 2 - 5 After the analysis of possible extreme scenarios for the metropolitan area of Concepción in addition to the proposed adaptive void network, the first reflections reveal that there is a missing link between the voids and the urban and nature network.

Therefore, with a green and blue infrastructure that use and connect the identified voids, it is possible to develop a resilient backbone as a strategic plan and meaningful design for the city, rethinking the functions and land uses of the territory.

This green and blue infrastructure provides a series of principles and methods to adapt the human settlement for extreme scenarios and at the same time it gives a livability to the city, reformulating the urban fabric as a provider of nature.

Thus, the strategy not only works during times of risk and hazards, but also in stable faces of the territory giving to the inhabitants larger green spaces, landscape connectivity and protection of the ecological value of the existing landscape.



Fig. 7 Industrial Area



Fig. 8 Bridge Park

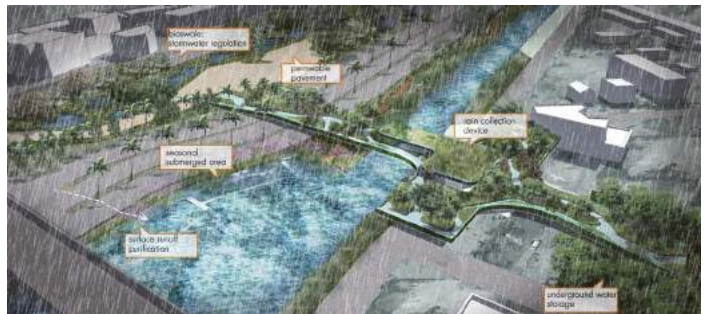


Fig. 9 Green Connection

Fig. 6 - 7 The intervention will be divided into two parts: basic intervention and developing scenarios. The basic intervention which is shown in the following drawing, indicating the necessary green structure and connection. They serve as the basic drive promoting the spatial quality to gain more developing opportunities.

At the next stage, different possibilities are discussed under the mentioned design principles exhibiting various spatial characteristics. The first scenario is that there would be successful negotiation among the stakeholders

agreeing on the land use adjustment. The ideal scheme of intensified industrial land use is accepted making more space for public use.

The section shows the coherent urban public space clearly. With green space in the industrial area, bridge park and the novel urban wetland park, the riparian zone is connected into a synthesis. The ecological succession happens in the human-intervened wetland park through the approach of terrain adjustment and phytoremediation.

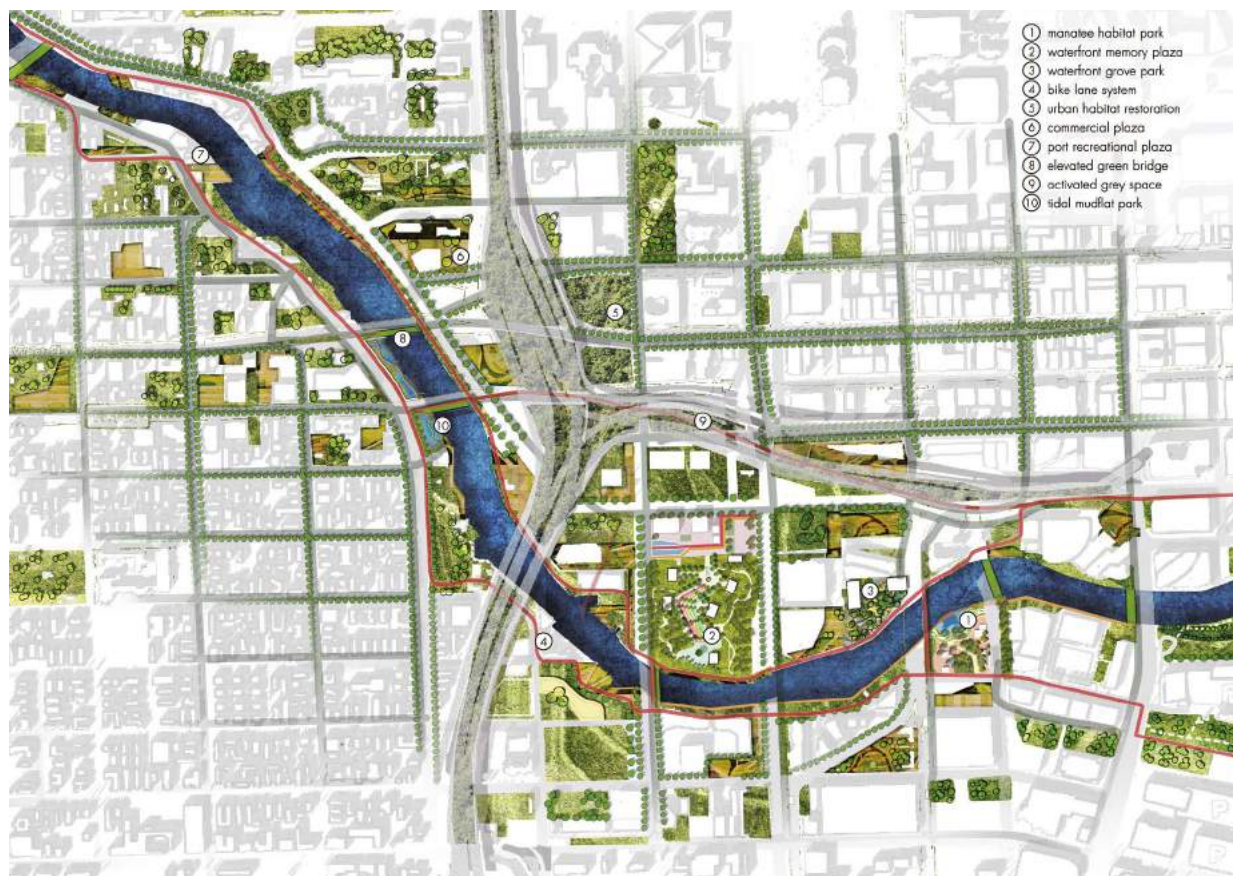


Fig. 10 Master Plan of Downtown Area

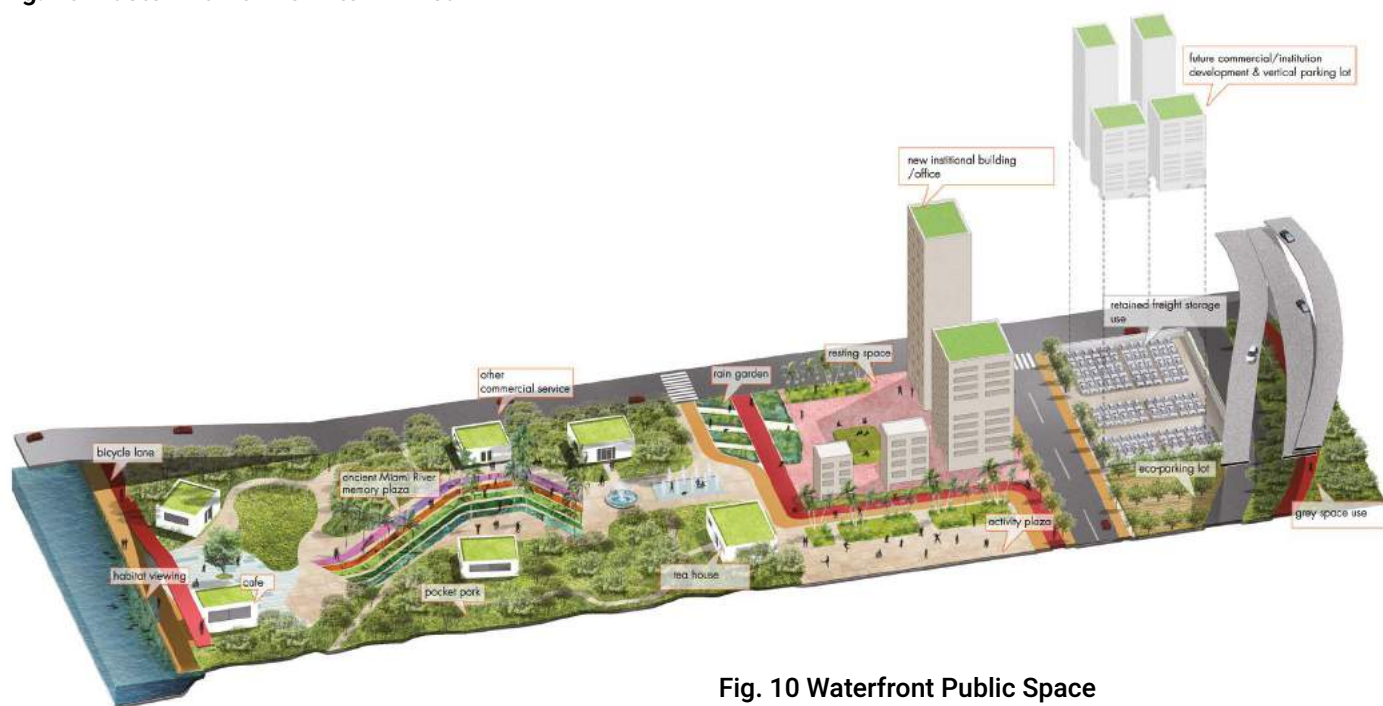


Fig. 10 Waterfront Public Space

The master plan of downtown area of Miami River shows the green networks and urban green space for activating the city. Memory elements of the ancient Miami are integrated with many parks and plazas. The riparian space is connected and composes a slow traffic system. Grey space under the viaducts is utilized properly.

The designed public green space is transformed from unutilized urban waste land and power plant. The new green connection integrates the area and makes use of the valuable riverfront. With improvement of the spatial quality, new commercial and institutional buildings will

present gradually with enjoyable urban landscape.

Return, Keep & Interweave

An adaptive landscape infrastructure system for the low-lying flooding zone in Miami-Dade County

Yilin Wang

Project location:
Miami-Dade County, USA

Mentors:
Denise Piccinini
Claudiu Forgaci

Keywords:
climate change
adaptation,
public spaces,
landscape infrastructure
flood impact mitigation,
environment
enhancement

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This research aims to explore long-term landscape-based solutions to increase the adaptation towards Climate Change for the low-lying area in Miami-Dade through the integration of flood impact mitigation and environment enhancement.

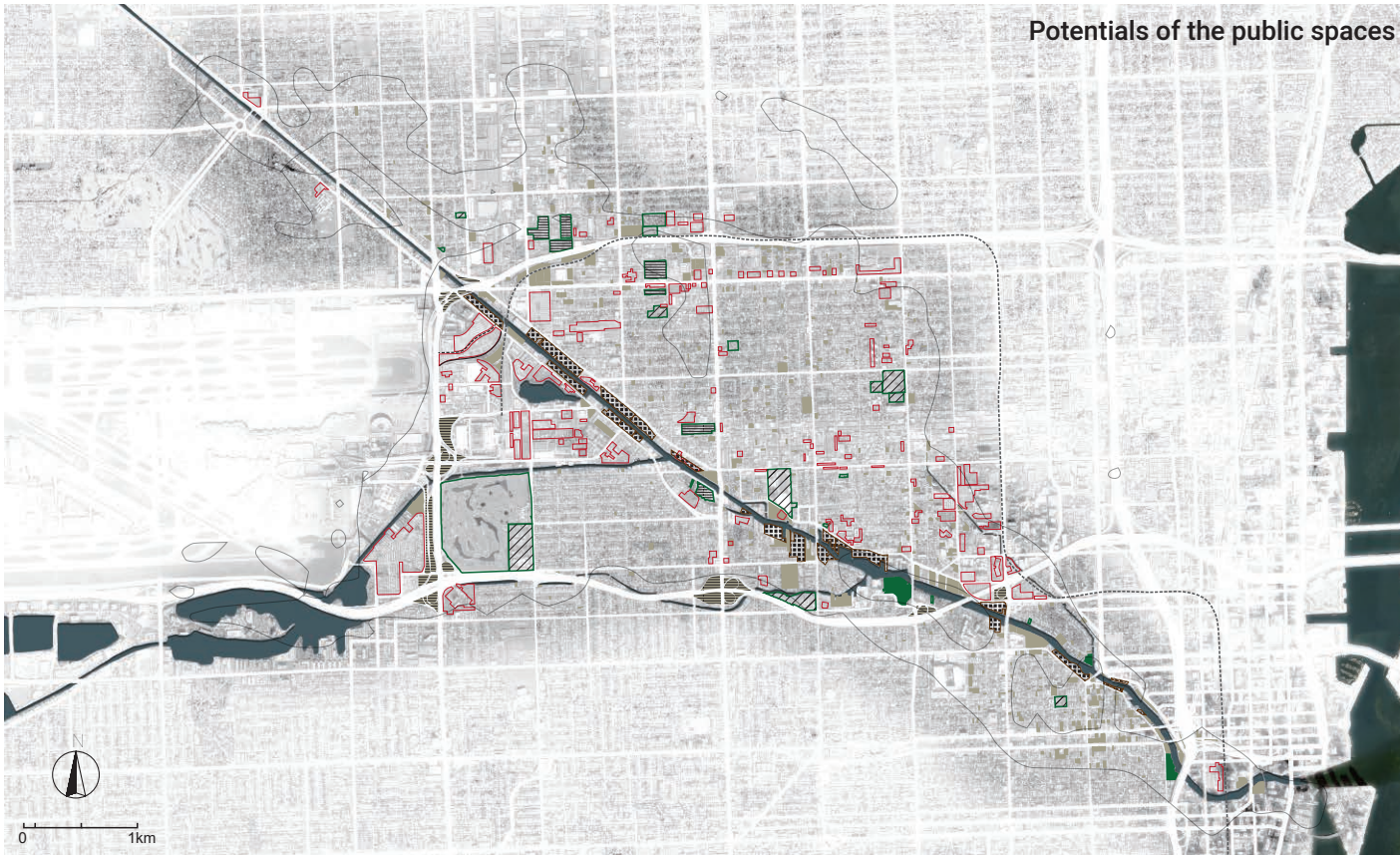
With the long and low-lying coastline, South Florida is considered one of the most vulnerable regions in the United States. Climate change is a great threat for this region as it also has high population density and high biodiversity. The sea level rise and flooding events brought by climate change are reshaping this region and make it uninhabitable.

Miami-Dade County and the local municipalities have been working for decades to reduce the impact of sea level rise and flooding events. The existing adaptation plans for coastal regions in the world often focus on solutions from the viewpoint of a particular sector, such as preventing flood damage by building dams or preventing loss of biodiversity by developing ecological networks. However, these solutions are not suitable for the vulnerable low-lying urban area which has porous limestone underneath and complex urban context. The long-term solutions for this area call for on-the-ground implementation of adaptation measures which integrate natural and human processes. The design interventions should be considered from a mixed-perspective providing different values for multiple purposes.

With the understanding that natural processes like sea level rise and storm surges can't be prevented, the low-lying flooding zone in Miami Dade calls for long-term adaptation solutions, requiring the adjustments of natural and human systems through time which are translated into flood impact mitigation and environment enhancement. In order to achieve this goal and consider the spatial and social qualities the public spaces have, I suppose an integrated approach that uses public spaces as armatures for the future development by transforming them into landscape infrastructure system which facilitates a multitude of relationships between natural and human systems.

In this project, public space refers to infrastructures like highways and vehicle roads; parks like sports parks, vegetated parks, mobile home parks and other parks; vacant land, and limited-use open spaces. These potentials can be used as a condition to build up the landscape infrastructure system, focusing on both flooding risk management and improvement of the living environment by bringing spatial-social-ecological values. The main interventions are transforming public spaces and building up the landscape infrastructure system.

Potentials of the public spaces



Surface Parking Lots



Vegetated Parks



Sports Parks



Mobilehome Parks



Other Parks



Marine Industry



Other Parks

Vision of the proposal landscape infrastructure



Permeable Parking Lot



Garage



Underground Parking



Multi-function Park



Waterfront



Soft Bank



Community Garden



Retention Basin



Urban Farming

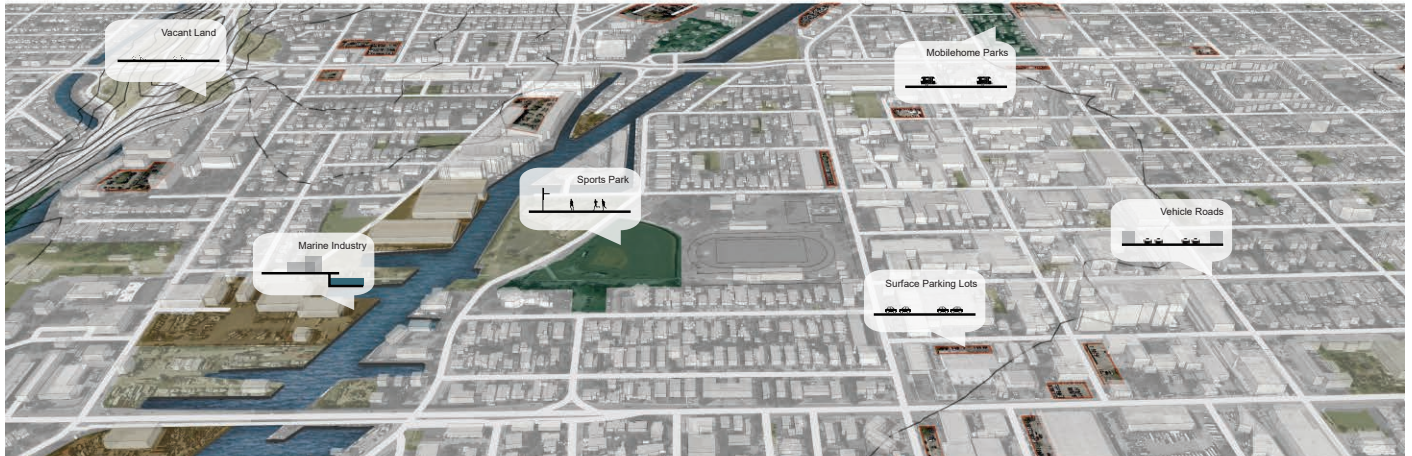


Fig. 1
Return the floodplain

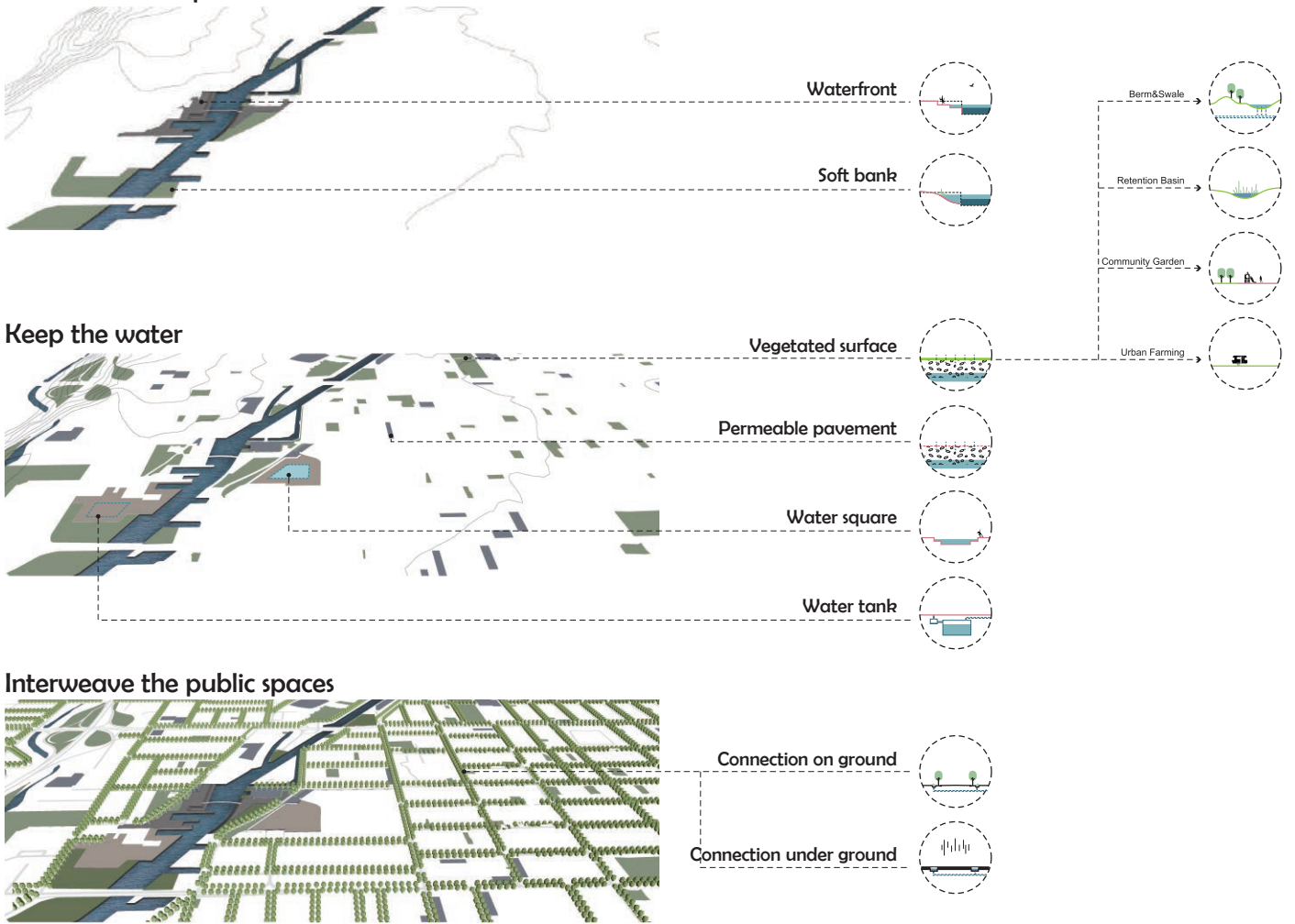


Fig. 2

According to the challenges and the potentials of the public spaces, design principles are proposed for establishing characteristics and functions to guide the design intervention through all scales. The principles could contribute to both flood risk management and environment improvement.

A specific site in the study area has been picked out for applying the design principles as it is an area which includes diverse public spaces with high potential to be transformed.

Fig. 1 shows the current situation of the chosen site and how the potentials are defined.

Fig. 2 shows how the potentials are transformed into landscape infrastructures under the guide of the principles. Principle 'Return the floodplain' aims for providing more space for the river; Principle 'Keep the water' employees strategies of water detention, retention , and treatment. Principle 'Interweave the public spaces' is to build up the landscape infrastructure system by connecting the public spaces on the base of the current road system.

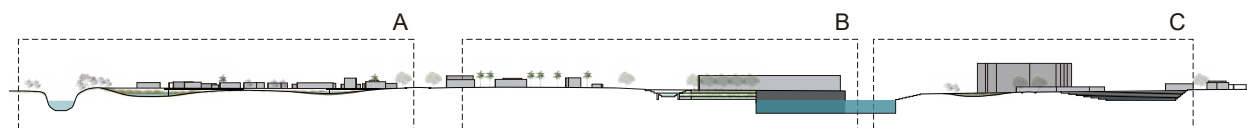


Fig.3

2020 High Tide

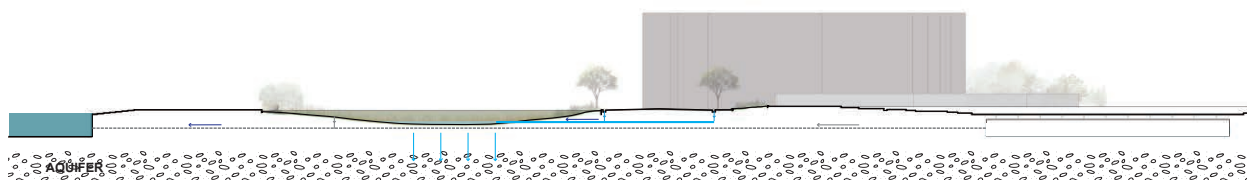
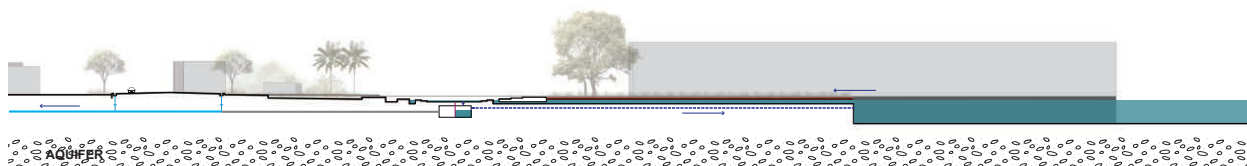
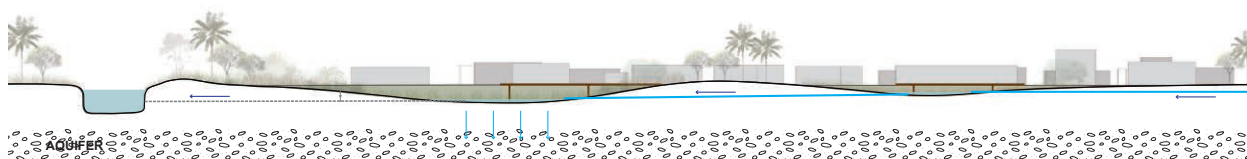


Fig.4

2040 Storm Flooding

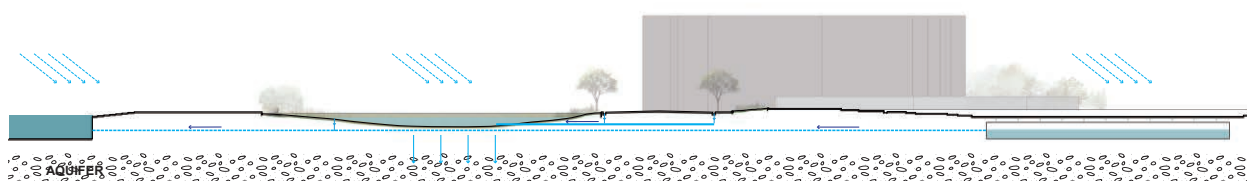
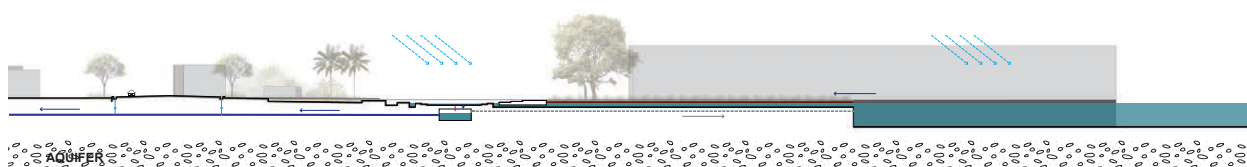
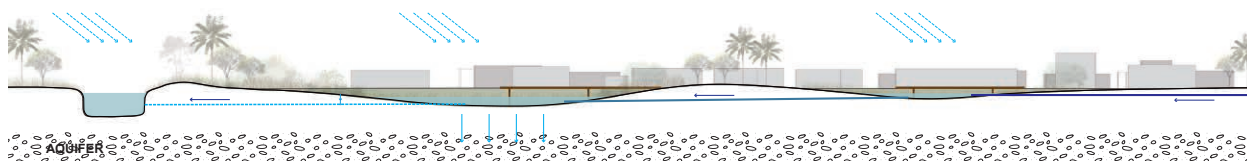


Fig. 5

Fig. 3 is the typical section of the chosen site after design interventions. It is divided into three parts with different landscape infrastructures, applying different strategies. From the perspective of water management, they are all connected and formulate part of the water system.

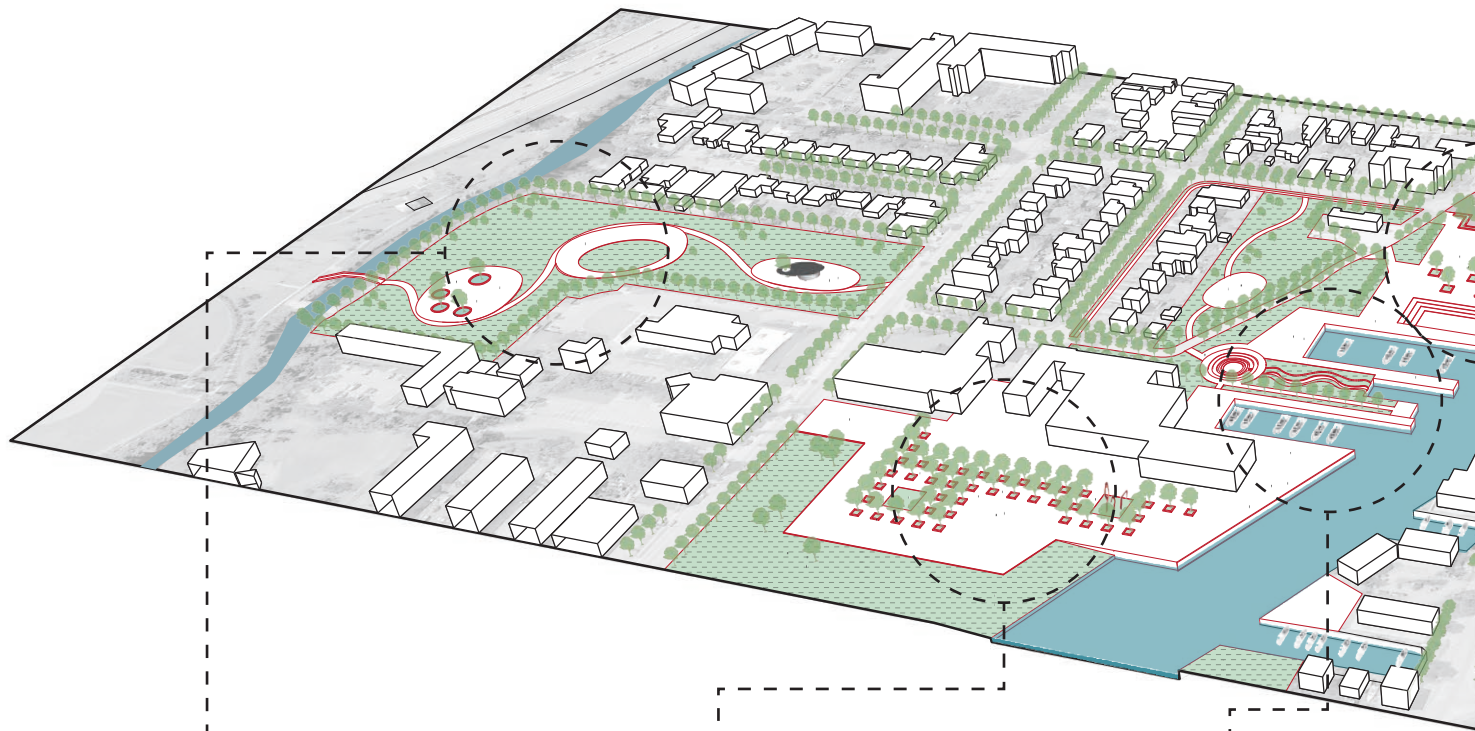
Fig. 4-5 shows the water management strategies of these three sections in different scenarios.

Section A illustrates how the artificial wetland contributes to the flood mitigation by behaving as a detention basin to deal with both salty water in high tide and stormwater

when flooding event happens.

Section B illustrates how this area is affected by the daily tidal changes and how the water from the river will be controlled when sea level rises and flooding comes.

Section C illustrates the function of the detention basin just the same as the wetland in section A, and the use of the water tank under the sinking square.



NATURE



BEAUTY



VITALITY

Fig. 6

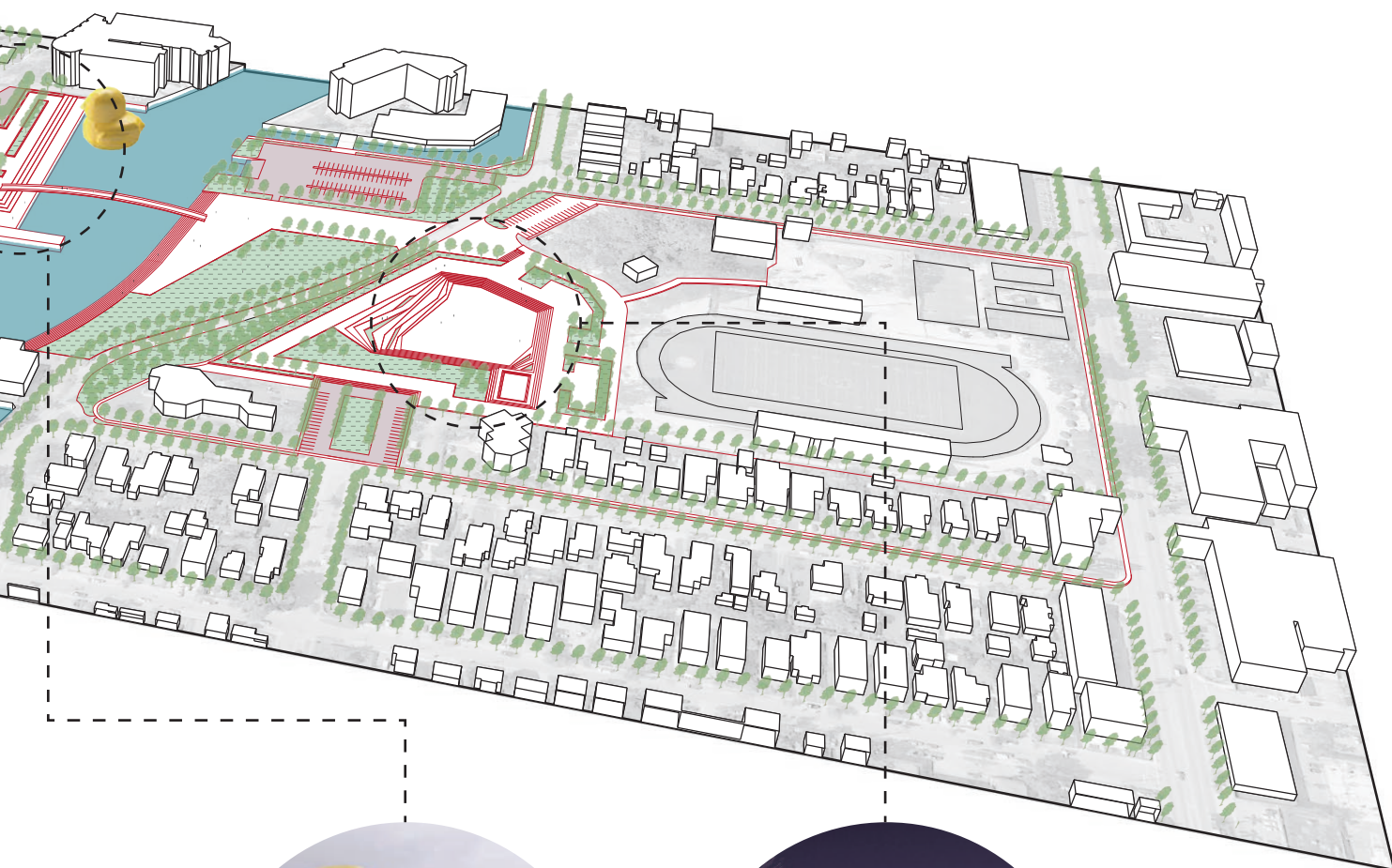
Fig. 6 illustrates the predicted results of the design interventions. A new relationship is established between the river and the city, incorporating the natural dynamics and production into the urban realm. In the urban context, river dynamics and floods can be seen as part of a public space providing various values.

Five locations are identified with one keyword for each, presenting different kinds of values the design interventions bring.

'Nature' is an artificial wetland which brings ecological values. The sense of belongings can also be created here as it evolves through time, letting people feel the changes of nearby nature.

'Beauty' is a tree array plaza designed for creating a sense of ceremony by the beauty of Jacaranda trees just like Japanese people appreciate sakura in the spring days. It provides shade for activities under the trees.

'Vitality' is a tidal park where people can experience the daily tidal changes. The natural dynamics may result in

**ART****AMUSEMENT**

different vegetation layers of different levels and provide water activities which are related to the tidal changes.

'Art' is a waterfront plaza that attracts people from different cultural backgrounds and ages. Public arts are used here to break the invisible barriers between different groups of people and strengthen social connections.

'Amusement' is a sinking square which facilitates different kinds of activities and people define this place by themselves. When storm surge is taking place, it becomes a water square for temporarily stormwater storage.



Team Member
(from top left)

Boomi Kim
Catalina Rey
Jui Vivek Deuskar
Krit Thienvutichai
MelindaMarján
Paan Rapa Surajaras

Circular Water Stories

Dr.Ir. Inge Bobbink

CIRCULARE WATER STORIES, worldwide

This graduation lab focuses on water systems and takes research into traditional water systems, waterscapes closely related to its landscape, as a starting point for design. Projects in the lab dealt with all kinds of water systems and water problematics related to social, economic and ecological processes.

Landscape architectonic circular water stories were created on projects

- Mosaic Garden City (Boomi Project)
- Rethinking the territory (Catalina Rey Hernández)
- Role of Water Matrix in Bandung (Jui Vivek Deuskar)
- Redefining Bangkok's Inclusive Water-Based Society (Krit Thienvutichai)
- Re-Connecting with water (Melinda Marján)
- Breathe (Paan Rapa Surajaras)

which at the end offer sustainable 'living landscapes'.

Mosaic Garden City

**Redefining the relation between people and nature
by structuring water management through landscape infrastructure
in an informal settlement, Kampung Tamansari in Bandung**

Boomi Kim

Project location:
Bandung, Indonesia

Mentors:
Dr. Ir. Nico Tillie
Ir. Mo Smit

Keywords:
Ecosystem service,
Informal Settlement,
Sustainability, Urban
Metabolism

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Slum population has increased continuously in global south. It expands onto precarious land such as floodplains, lagoon areas and so on leading to deficiency of basic facilities. Bandung is the third most populous city in Indonesia with around 26,000 slum dwellings. Kampung Tamansari in Bandung is the densest informal settlement located along the Cikapundung river. During the Dutch colonial era, this area was meant to be a part of the green corridor under the Garden city scheme. However, the concrete mass now uprooted the green. However, since the area is located at lower level than planned area, it is hard to expand existing infrastructure into the area.

Lack of infrastructure in informal settlements and densification have led to the environmental degradation and have disconnected people from nature. Treating the river as an open sewage, people directly discharge their waste into it. Clogged ditches with garbage as well as cemented pavements which restrains water from going into the soil results in flash floods. Therefore, nature and human activities enter a vicious cycle which requires the redefinition of this relationship.

This research aims to reconnect people and nature by improving their living quality through ecosystem service. It is based on two main research fields. First, Ecopolis gives a structure to create self-governing ecologically sustainable city. Tjallingi's Ecopolis strategy helps to look into the site based on three different perspectives: area, flow and participation. Kampung Naga is used as a case study to understand how Indonesian cultural landscape creates a circular water system. Next, Kampung Tamansari is used as a showcase to explore how the ecopolis strategy can be applied into the context of a developing country. It shows how people can change their recognition of the potential of nature and how can their activities positively influence in nature in a long-term.

The design strategy starts from place making for green spaces. Relocation is considered in this stage. Relocating houses are arranged in North Kampung as creating three types of enclosures (enclosure, semi-enclosure, expanded semi-enclosure). Each enclosures are transformed into different green patches to serve different ecosystem service and make people responsible to maintain the spaces.

Green patches consist of kitchen garden, pit-forest and riverfront park. Kitchen garden is built in enclosure space which offers basic facilities using dry-toilet module which can recycle human faeces, generate electricity and store rain water. It lets people create their own kitchen garden to overcome food insecurity. Pit-forest is permaculture system using plant-based ecosystem service combined with organic waste management. River front park is the most open space which connects people to the river. Furthermore, it shows users visible circular water system.

On the other hand, these three green patches work together as one stormwater management system. It links each other and create complementary network. Moreover, it transforms current highly linear water flow into circular water flow. This green patch strategy can be applied to other informal settlements in the similar contexts. When it is replicated, it will not only build rich ecosystem service in the informal settlement but also create mosaic garden city, Bandung in a city scale.

WELCOME TO KAMPUNG TAMANSARI

DRY TOILET DOES NOT NEED TO FLUSH, WE CAN USE WASTE AS FERTILIZER AFTER COMPOSTING

I AM A MICRO-URBAN FARMER AND SELL VEGETABLES TO MY SON'S SCHOOL

GREEN ROOFS MAKE THE KAMPUNG GREENER

THIS IS MY PLAYGROUND

IF PLOT IS SMALL, WHAT ABOUT VERTICAL GARDENS?

I CAN WALK ALONG THE RIVER!

RAIN WATER IS COLLECTED BY RECYCLED CLOTH

HOUSES ALONG THE RIVERS ARE HIGHER AFTER RELOCATION

CLEAN RIVER GENERATES ELECTRICITY

WE MEET AND TALK WHILE GROWING OUR KITCHEN GARDEN

I GET THE INGREDIENTS FROM THIS PIT FOREST TO SELL MY FOODS ON THE STREET

YOU CAN THROW ORGANIC WASTE IN THE PIT FOREST

FREE FROM CONCRETE BUILDINGS!

UNCOVERED CONCRETE GROUND

I GET BIOGAS FOR COOKING BY MAINTAINING THE CONSTRUCTED WETLAND!

REEDS CLEAN THE STORMWATER AS WELL AS ARE GOOD BIOMASS

WE EAT MOSQUITOES!

USING LOCAL AND RECYCLED MATERIAL IS REASONABLE :)

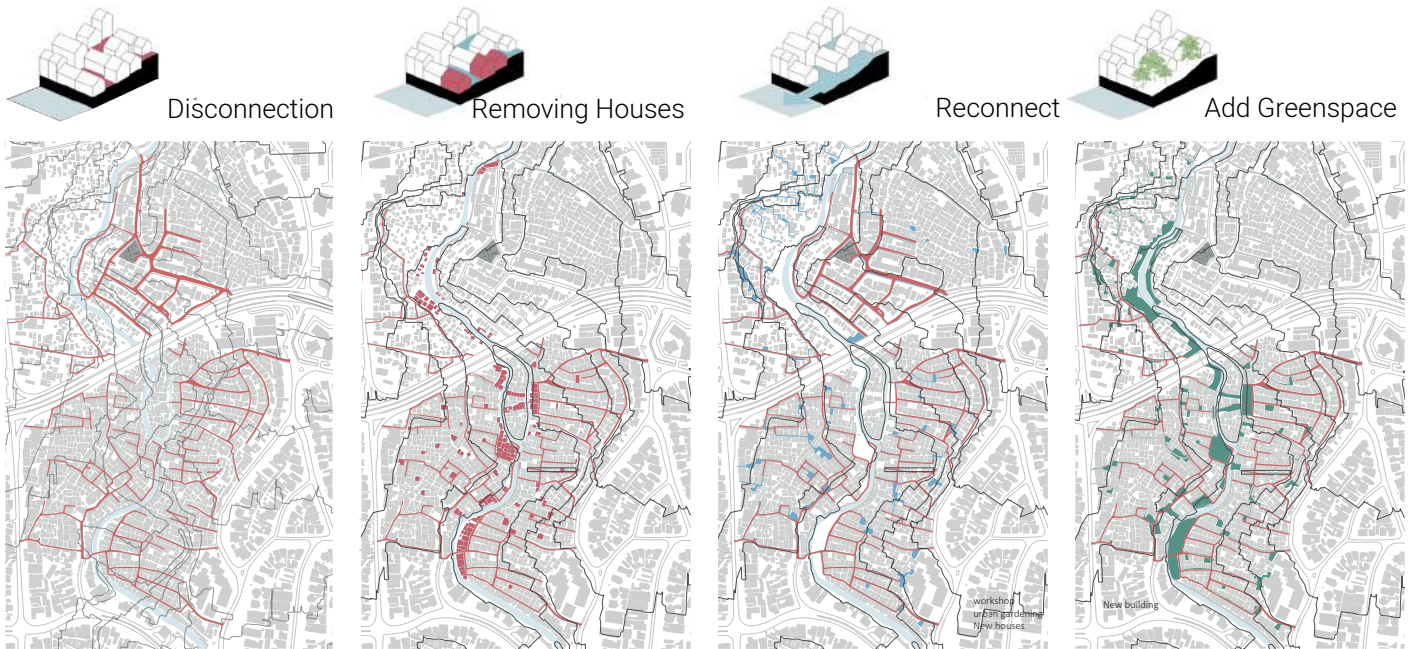


Fig. 1

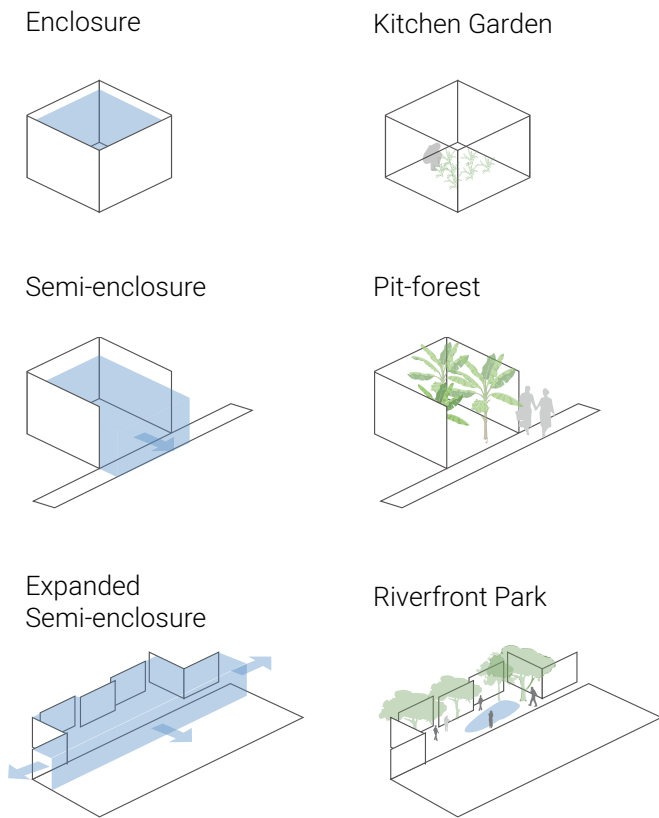


Fig. 2

Fig. 1 Strategy for reconnecting water network
This strategy opens the deadend of water network toward the river based on the topography in the site. Removed houses are relocated within the kampung (informal settlement). Created openspaces are divided into three types of enclosure (Fig. 2)

Fig. 2 Type of green patches by degree of enclosure
Each enclosure is represented into three types of green patches which has different range of private and public space. It creates different characteristics according to main users.

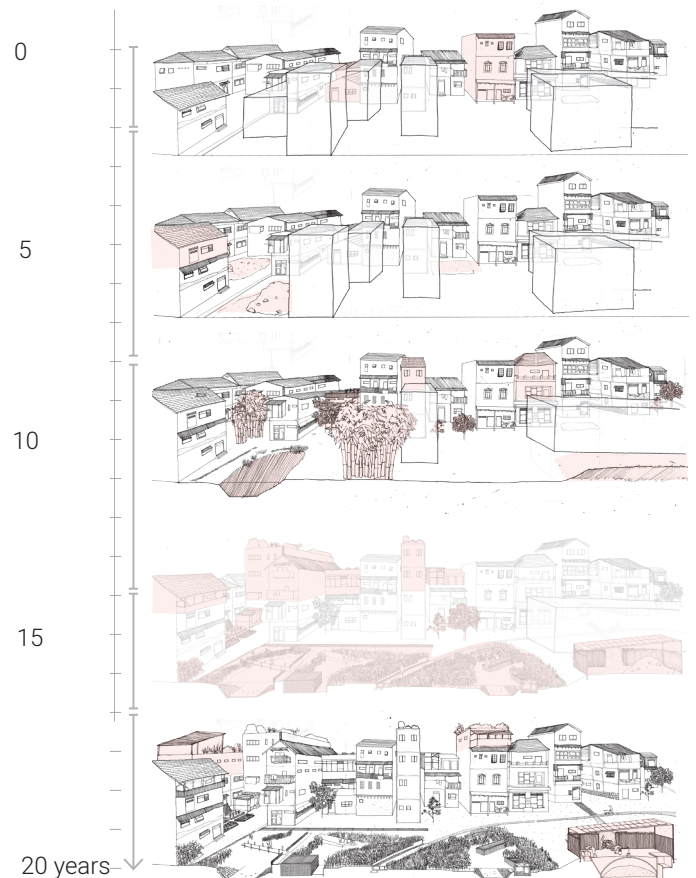


Fig. 3

Fig. 3 Incremental development through local participation
This project aims to bottom-up project. It starts with preparation step (phase 1) by collaboration with NGOs. Locals directly participate the work from the scratch. On the process, people - especially who relocated to new neighbourhood - could form place attachment.

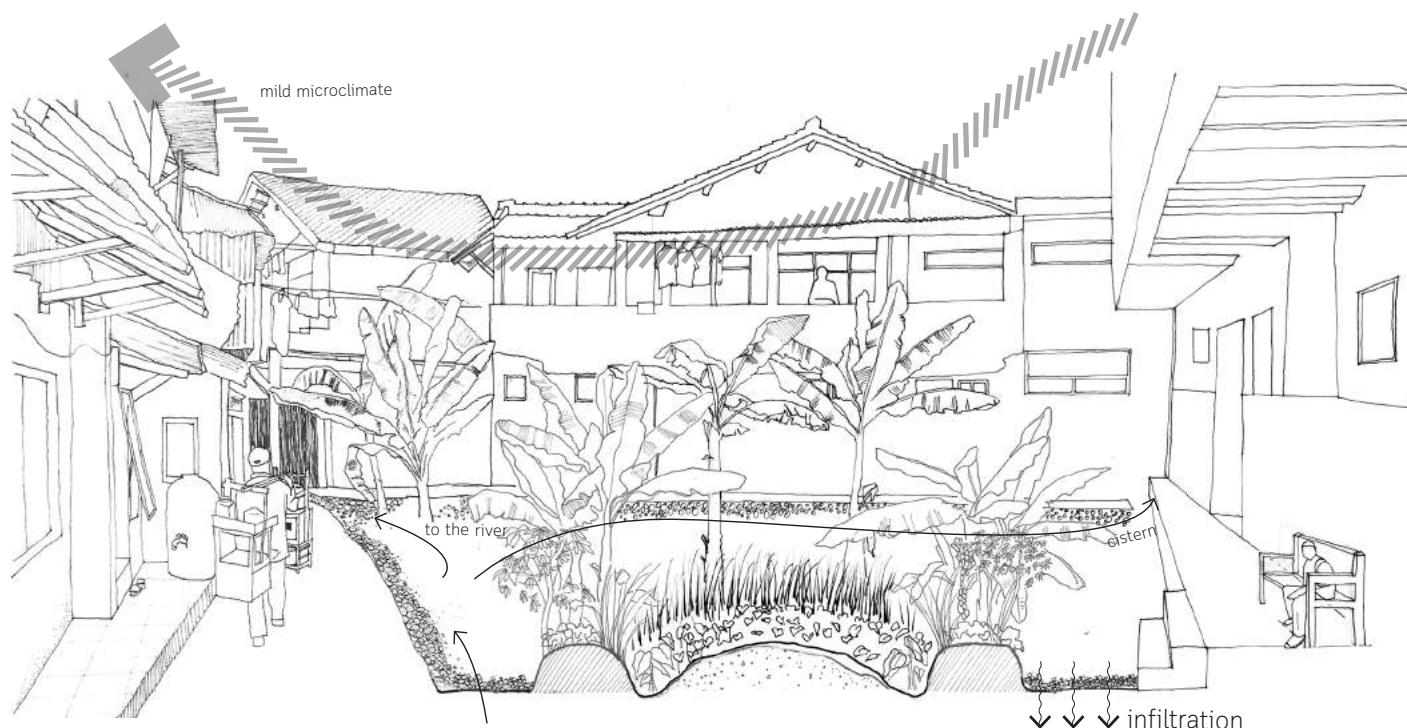


Fig. 4

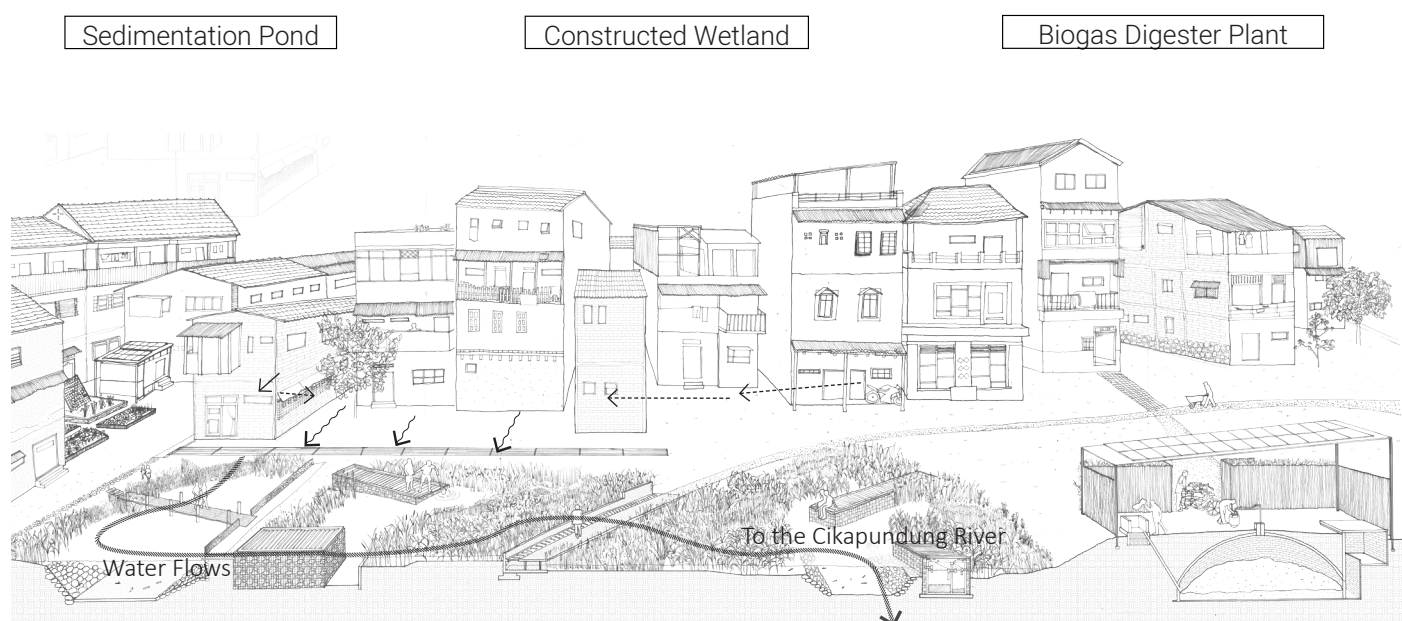


Fig. 5

Fig. 4 Banana fores(pit-forest)

Pit-forest is transformed from semi-enclosure. Pit-forest is located next to the alley so that people could experience open spaces along their route. It makes pleasant microclimate. Permaculture is applied for sustainable urban farming. One of representatives is banana circle, which digs pit and small mound. This shape creates different environment for various plants to grow. Products from here could be used for cooking for themselves as well as for economic activities. Besides, it works as a sponge when it is rainy: it infiltrates the water to the ground and stores rainwater in the cistern for kitchen garden.

Fig. 5 Riverfront Park

Riverfront park is the biggest scale of green patches. It is collecting point for stormwater. The park purifies water using bioremediation. Small landscape elements allows people to access to the wetland but also function as a water purification and control system. Biogas Digester Plant encourage people to maintain the green space by producing biogas.

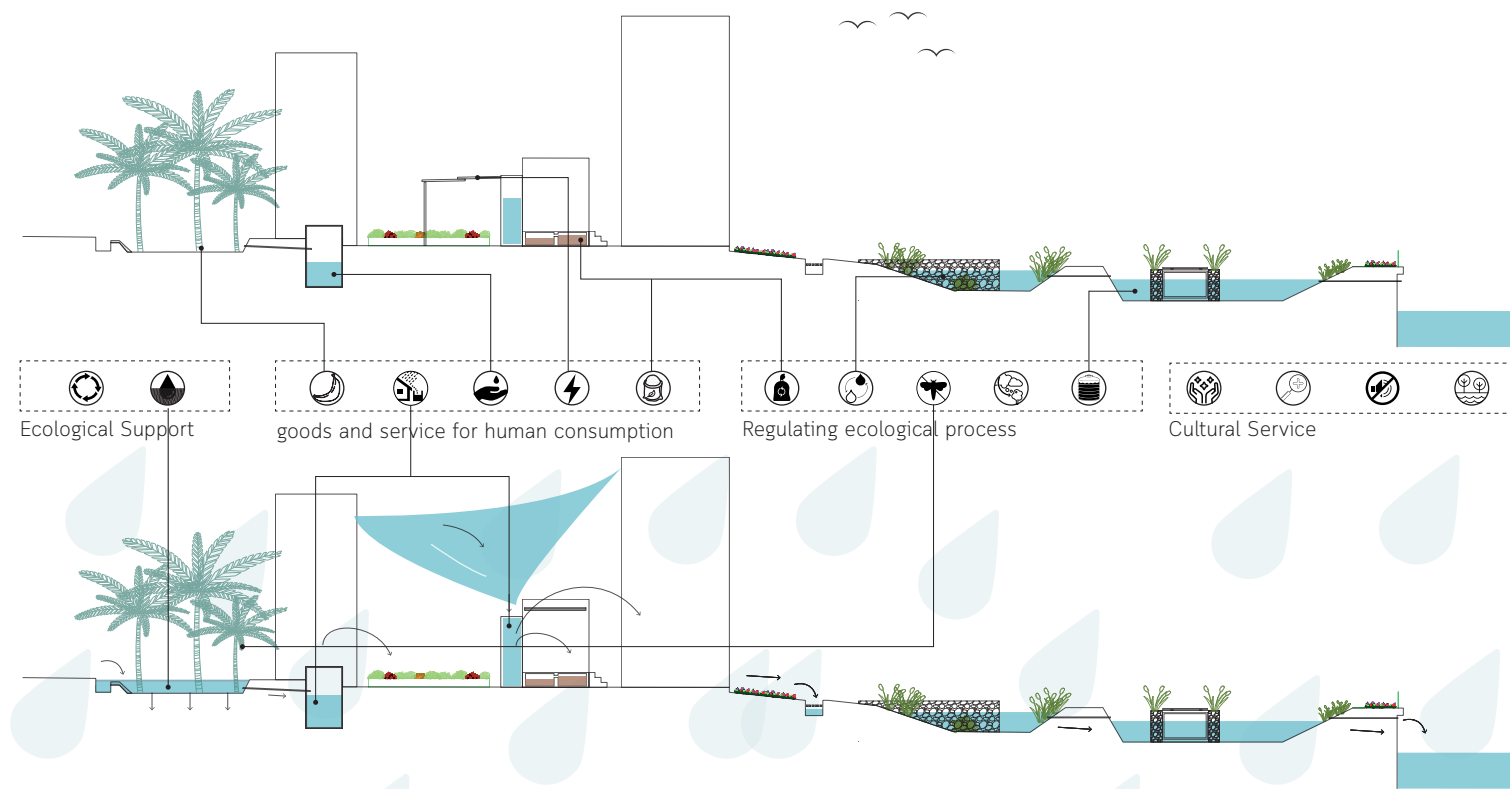


Fig. 6

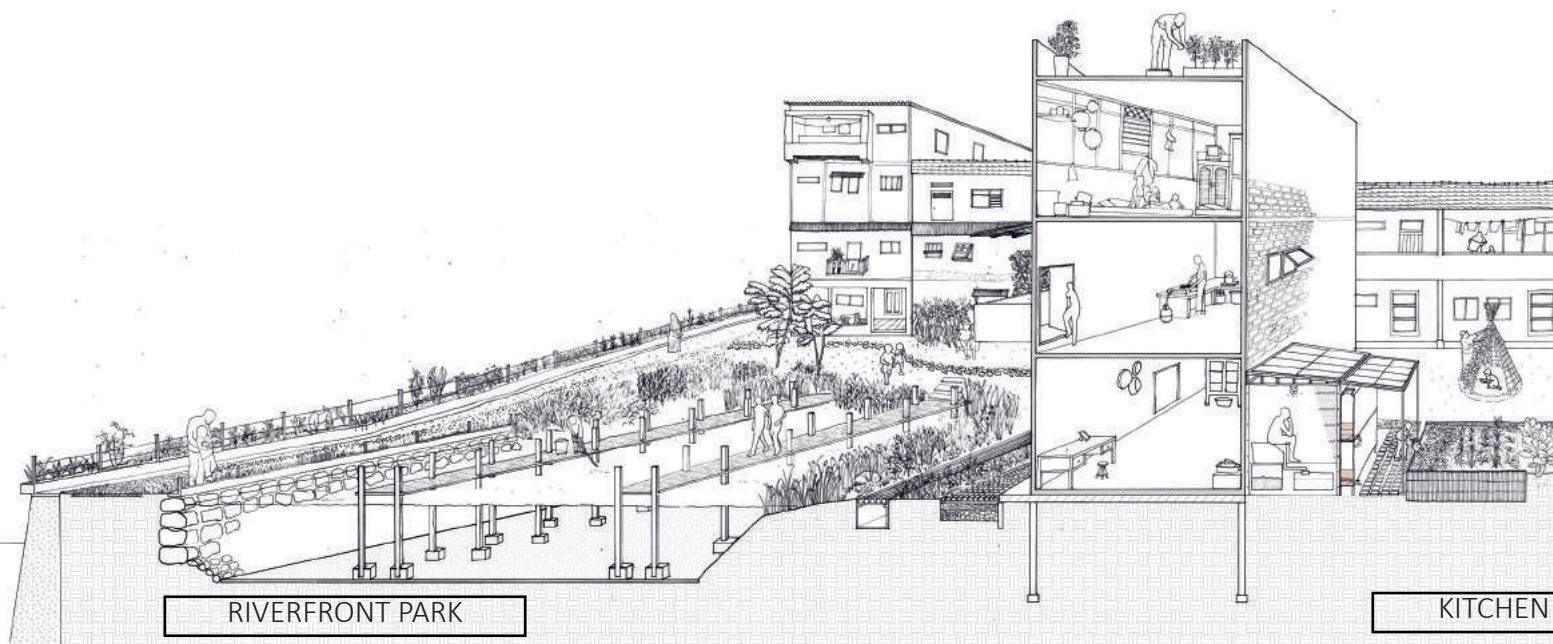


Fig. 7

Fig. 6 Ecosystem Service in Kampung Tamansari
Green patches in Kampung Tamansari brings four benefits from ecosystem service. It creates sustainable community and is able to maintain by people's participation.

Green patches work together as a stormwater network. When it rains, stormwater flows into the pit-forest. Stormwater slows down and infiltrates into the ground. The rest of the water will be stored in the cistern which is under the kitchen garden. When it rains harder, stormwater flows directly to the river through riverfront park since riverfront parks are connected to open ditches.

But, also a trench is aligned to contour lines next to the riverfront park. It collects the stormwater runs on the ground which cannot reach the ditches. In the riverfront park, water is purified using bioremediation before it flows into the Cikapundung river.

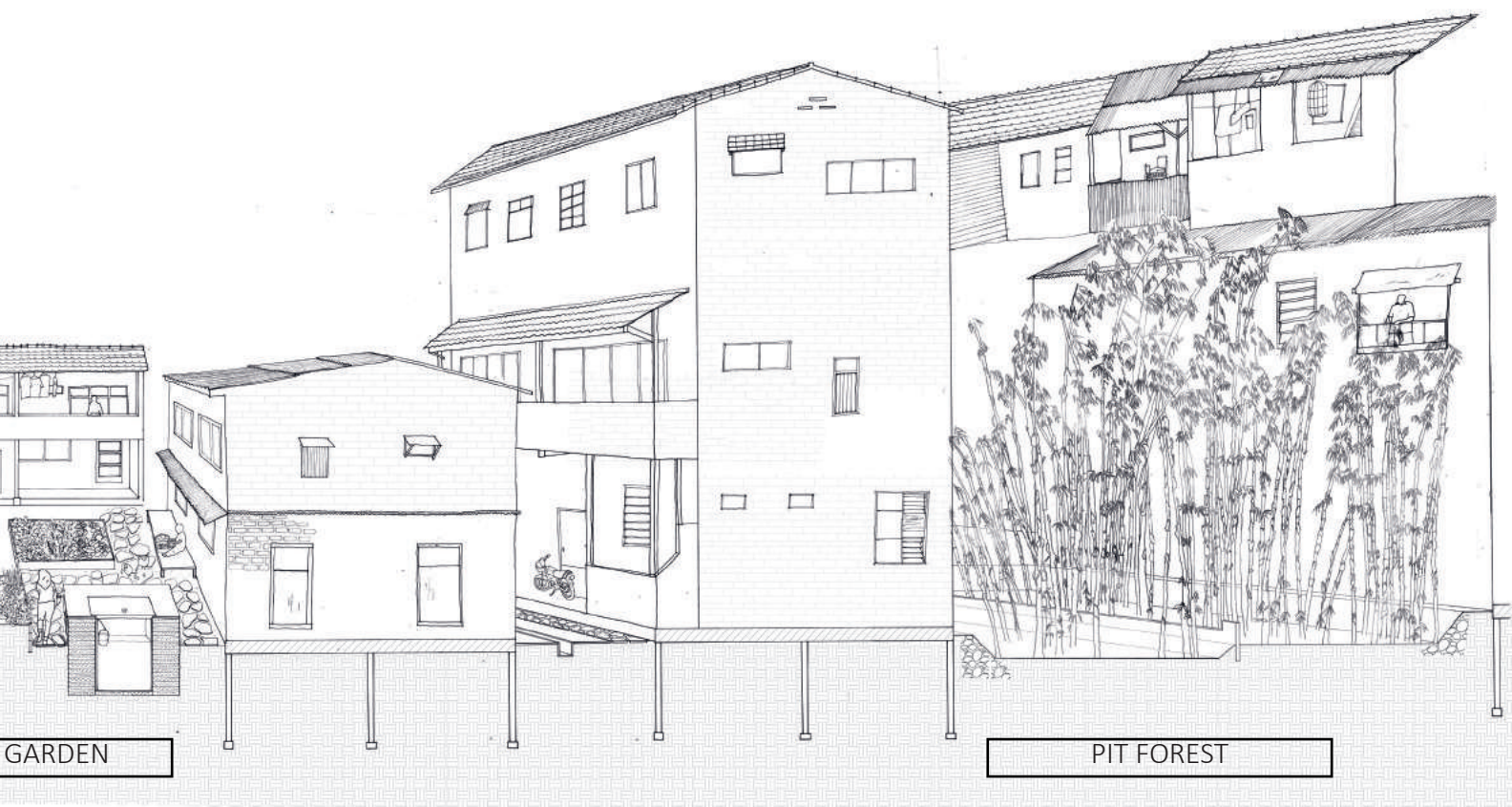


Fig. 7 Green Patches in Kampung Tamansari
Green patches consist of kitchen garden, pit-forest and riverfront park. Kitchen garden is built in enclosure space which offers basic facilities using dry-toilet module which can recycle human faeces, generate electricity and store rain water. It lets people create their own kitchen garden to overcome food insecurity. Pit-forest is permaculture system using plant-based ecosystem service combined with organic waste management. River front park is the most open

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This green patch strategy can be applied to other informal settlements in the similar contexts. When it is replicated, it will not only build rich ecosystem service in the informal settlement but also create mosaic garden city, Bandung in a city scale.

Rethinking the territory

A resilient and strategic planning for a vulnerable urban coastal system

Catalina Rey Hernández

Project location:
Concepción, Chile

Mentors:
Dr. Ir. Nico Tillie
Dr. Ir. Taneha Bacchin

Keywords:
resilience, adaptation,
appropriation, flexibility,
wetlands, natural
disasters, biodiversity,
ecological integrity.

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This research aims to re-envision the city, understanding it as a living system where change creates growth and renewal, and where uncertainty is our new normal.

The continuous struggle between cities and nature, forces human settlements to look for stability and safety, trying to control the dynamics and flows of underlying landscapes. In Chile, this tension is present in many urban settlements trying to deal with the natural dynamics.

Chile, as a territory, is exposed to multiple dynamic natural forces such as the Pacific. With a coast line of 6.435 km, that is defined by the collision of two tectonic plates in constant movement, this regularly triggers a series of natural disasters that affect cities in different ways and degrees in the country. Concepción has been affected severely during the last two decades. Concepción is a coastal urban area that has grown into the flood plain of two river mouths and an ecological important tidal coastal wetland landscape.

Although Concepción is built in a wet soil, city and water never meet; there is a dissociation where one is superimposed on the other. Furthermore, the whole system is increasingly at risk due to the urban pressure of the expanding city, resulting in degradation of ecosystems and natural infrastructure and with that exposing the coastal city to even more frequent and severe natural hazards.

The key opportunity to face the existing challenges does not lie in the primacy of one system upon the other. Both, city and landscape need to interact in a more redefined way, looking for multifunctional structures and a new awareness of the importance of the presently disrupted landscape. What is a new resilient urban landscape backbone?

The following research resulted in a void adaptive network based on design principles: 1. Value the natural system as the base infrastructure for the future city. 2. Use of voids (unplanned spaces) as an emergent, autonomous and self-organized network to create redundancy and multifunctional spaces for risk management. 3. Complete the void network using a green and blue infrastructure in order to provide a resilient backbone for the city. 4. Reformulate the resilient backbone as a provider of nature: larger green spaces, landscape connectivity and protection of the ecological values of the existing nature.

Applying these steps lead to a resilient spatial framework for the city of Concepción that can provide more stability and safety against natural disasters. The designed backbone was consequently tested in a few natural disaster scenarios and adapted where necessary. This approach can be applied in other cities with similar challenges.



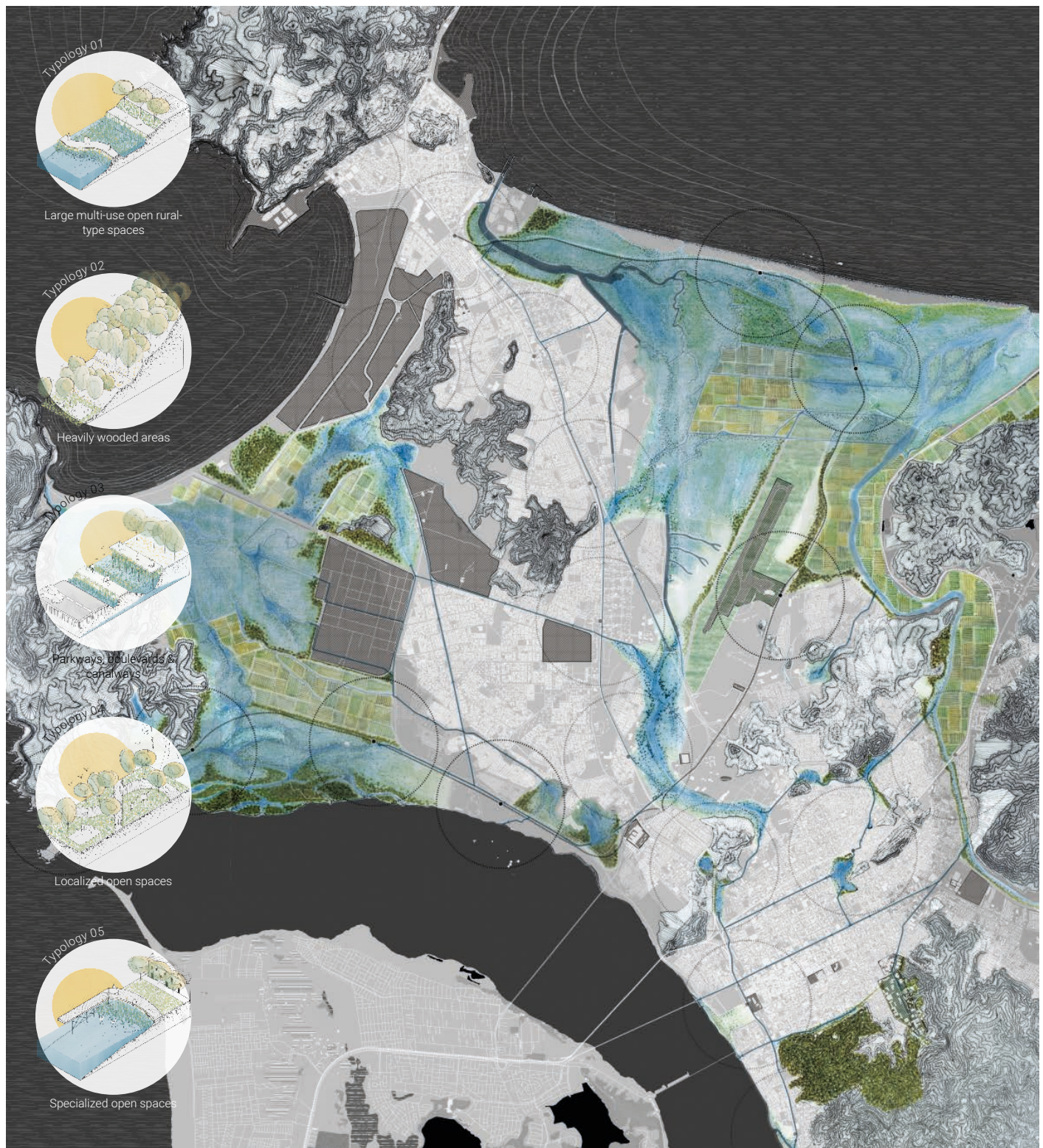


Fig. 1

Fig. 1 Because of its history of natural disasters -specially due to the last earthquake and following tsunami- the Metropolitan area of Concepción has multiple empty spaces where it used to be buildings, which –because of economic reasons– remain as voids within the urban fabric.

On the other hand, there are also wetland areas without any function, waiting to be urbanized and (for now) remaining as natural voids.

Instead of seeing these leftover spaces as a problematic

situation, the adaptive void framework proposes to work with them, not for building what there was before or to continue the urban process, but in order to create “unplanned spaces” defined as areas that remain free of specific functions but can be occupied in a sudden event (Roggema, 2012).

Therefore, these empty spaces act as highly dynamic zones that allow change during an extreme scenario when the area will absorb the shock of the hazards or will be used temporarily in a different way.

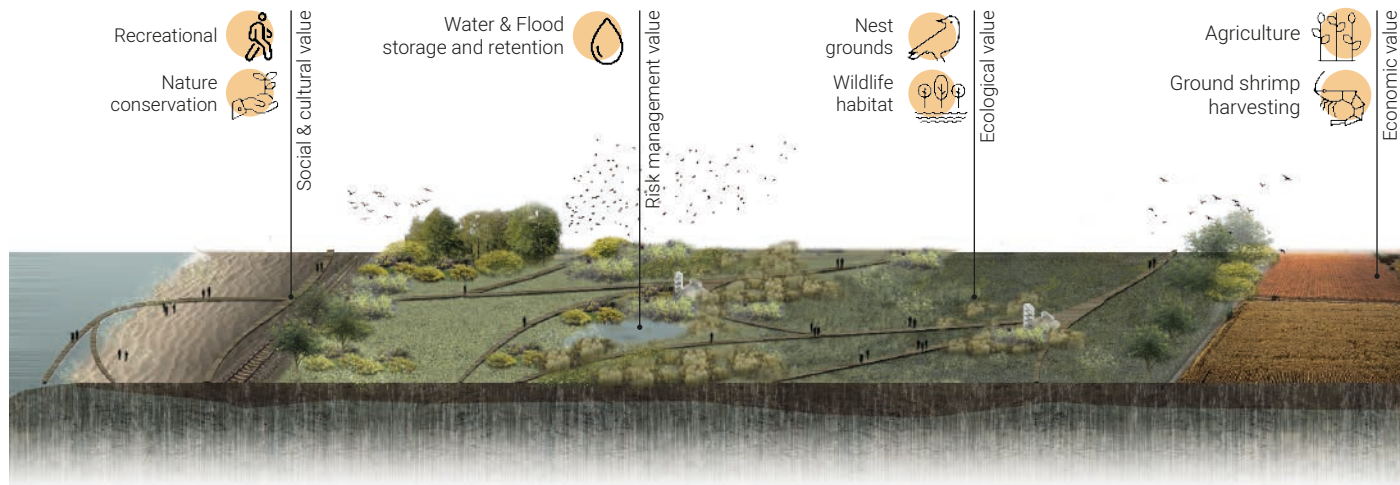


Fig. 2

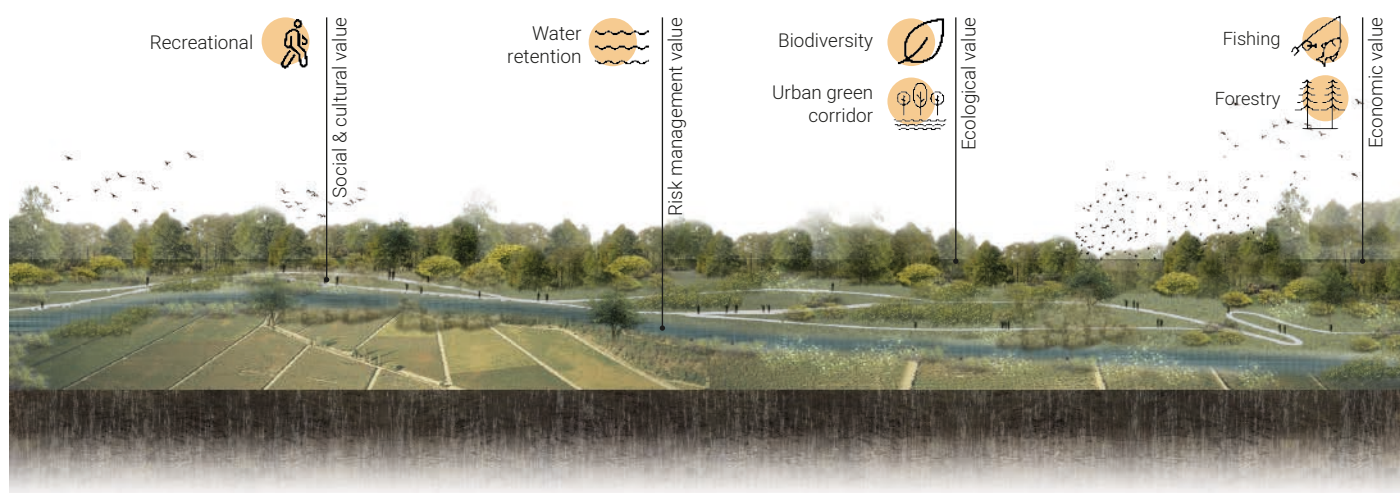


Fig. 3

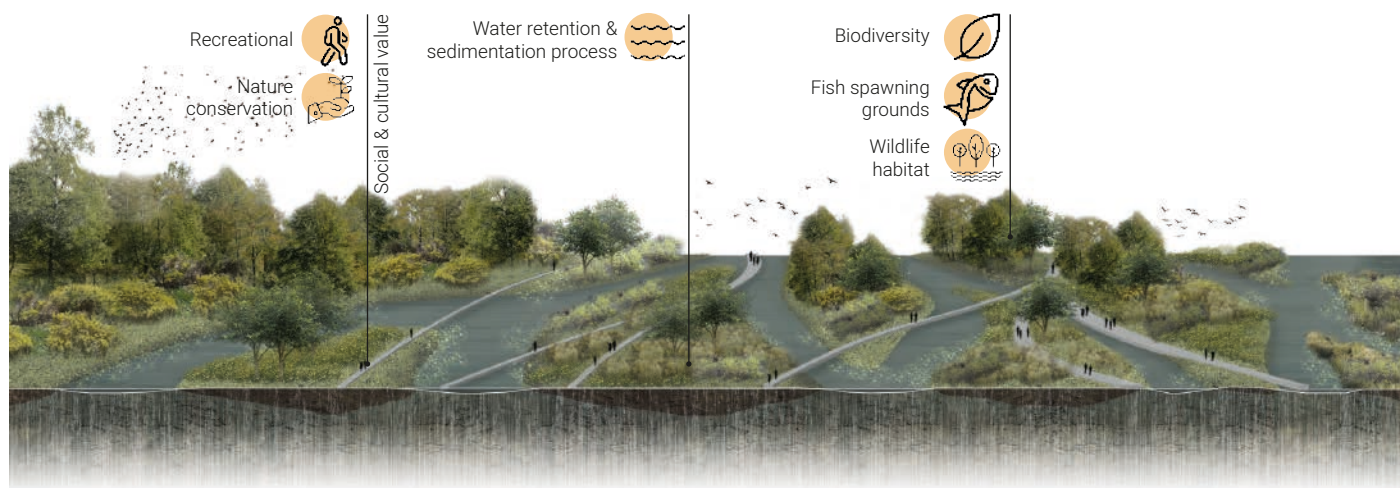


Fig. 4

Fig. 2 - 4 Once voids are mapped and identified it is clear that the adaptive void framework need to be adjusted and complemented in order to address resilience, because as it is now, the voids are not connected and it is necessary to overlap them with a potential resilient structure.

Therefore, with a green and blue infrastructure that use and connect the identified voids, it is possible to develop a resilient backbone as a strategic plan and meaningful design for the city, rethinking the functions and land uses of the territory.

This green and blue infrastructure provides a series of principles and methods to adapt the human settlement for extreme scenarios and at the same time it gives a livability to the city, reformulating the urban fabric as a provider of nature.

Thus, the strategy not only works during times of risk and hazards, but also in stables faces of the territory giving to the inhabitants larger green spaces, landscape connectivity and protection of the ecological value of the existing landscape.



Fig. 6



Fig. 7



Fig. 8

Fig. 6 - 8 Together, the adaptive void framework and the resilient backbone structure work as a whole system that incorporates a green and blue infrastructure that connects them with themselves and the urban and nature fabric.

This combination will create a more resilient and adaptive city in extreme scenarios, but also will provide livability and healthier open spaces for the inhabitant when the city is in a stable face.

The proposed design through voids framework allows to identify and plan for (in)visible voids in the urban

settlement to implement a bottom up building of the city, giving opportunities and potential for spatial adjustments.

It also allows present realities to be transformed and to create and imagine future potential. In that way the city can be seen as the provider of nature, in the sense that through this method the backbone of the urban fabric will be larger green spaces and connecting green grids, where speciality is building along with nature and including redundant unplanned space.



Fig. 9



Fig. 10



Fig. 11



Fig. 12

Fig. 9 - 12 Finally, designing with voids is a central step in allowing the city and its elements to become healthier for nature and humans in addition to adaptability to the different futures that may come.

Given the conceptualization of the Spatial Framework, it is possible to define strategies and measures for the landscape planning of the territory:

- Value the natural system (mainly wetlands & water bodies) as the base infrastructure for the future city.

- Use of voids (unplanned natural & urban spaces) as an emergent, autonomous and self-organized network to create redundancy and multifunctional spaces for risk management.

- Complete the void network using a green and blue infrastructure in order to provide a resilient backbone for the city

- Reformulate the resilient backbone as a provider of nature: larger green spaces, landscape connectivity and protection of the ecological value of the existing nature.

Role of Water Matrix in Bandung

Adaptive planning strategies on sponge ground concept

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Bandung, Indonesia

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Keywords:
catchment
rehabilitation, sponge
concept, integrated
landscape development,
water infrastructure,
sustainable real estate
expansion, in symbiosis
with nature

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The city of Bandung is representative of the destiny of many cities in the tropical developing world. Demand driven population influxes combined with a lack of planning and infrastructure leads to massive problems of sustainability. The city faces the twin paradoxical problems of flash floods and the chronic lack of access to drinking water.

The climate change dynamics only hasten the process of humanitarian disaster. Within this context, it is extremely important to find sustainable solutions that can alleviate these problems and enable human activity to sustain without suffering. Research suggests that spatial solutions with circular systems may allow for the appropriate channeling of rain water and use it for sustenance.

The application of the sponge concept whereby sustained efforts are made to convert hard surfaces resulting from unorganized growth into absorbing surfaces appear promising. Allied to the sponge concept is the installation of biophores on the outskirts of the city which further aid in water retention.

Besides water retention and prevention of floods, these strategies have aesthetic appeal and spatial relevance to intervention through landscape design. They also achieve goals of more sustainable agriculture that further contributes to the appeal of the city and its aesthetic aspects. The efforts have the possibility of promoting eco-tourism for a city that already has abundant natural beauty owing to a volcanic terrain and evergreen rainforest cover (albeit covered under a layer of pollution today). Thus proposed efforts through phased spatial interventions can create a positive circle of reinforcement where the benefits are much more far-reaching and sustainable beyond the primary goals of the project.

Strategies for living with water need great innovation in developing countries where the fast pace of city expansion and population growth cannot keep up with the very slow pace of infrastructure development.

Solving these issues also plays a vital role in poverty eradication and sustainable socio economic development.

The city can be restored to its former glory through a series of relatively cheap, nature oriented, macro and micro strategies in such challenging circumstances, creating case study is created for vulnerable catchments around the world. There is great promise that landscape infrastructural solutions and circular systems can transform the developing world.



People and water

0 | | | | 10 | | | | 20 | | | | 30 | | | | 40 km

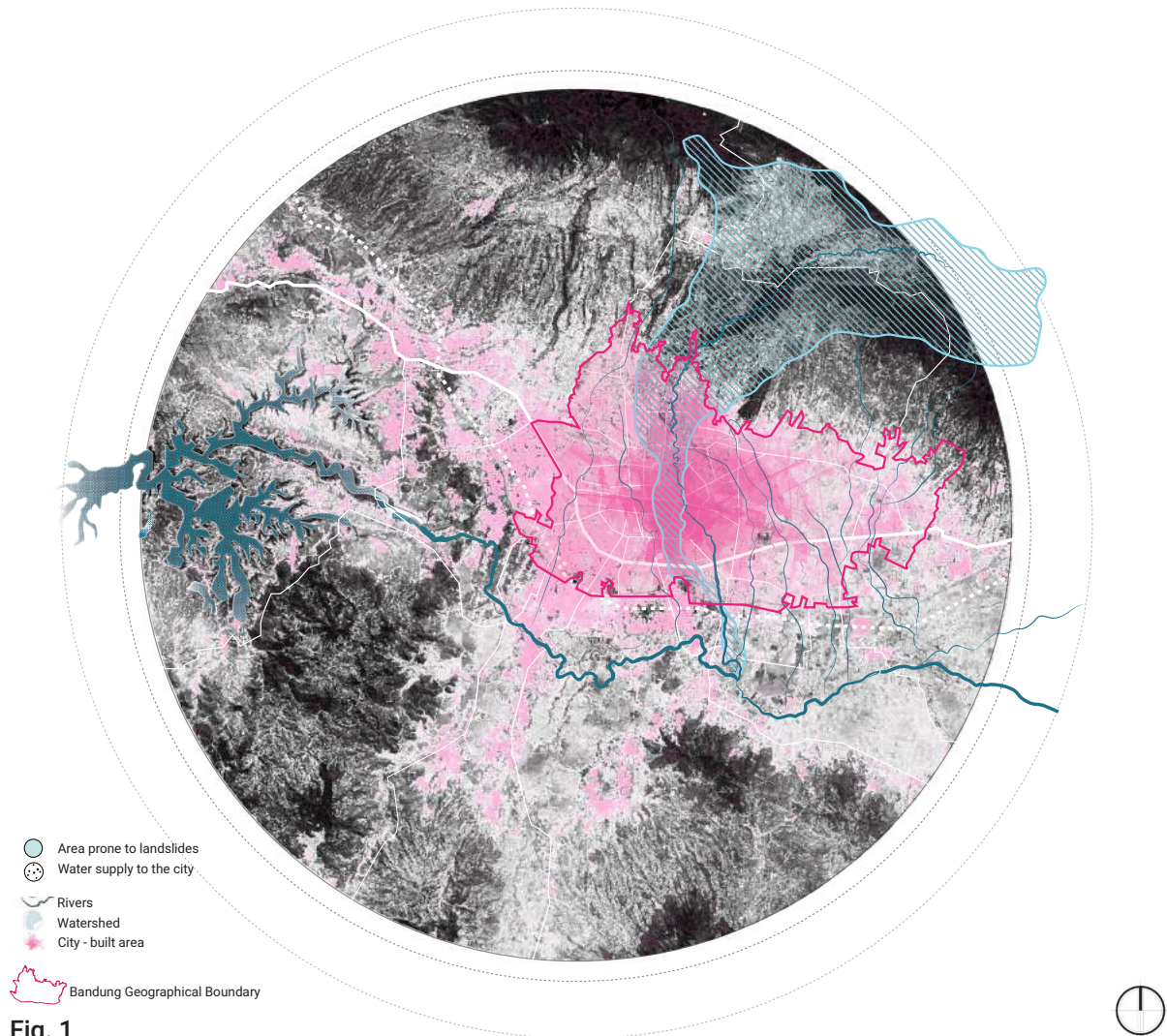


Fig. 1

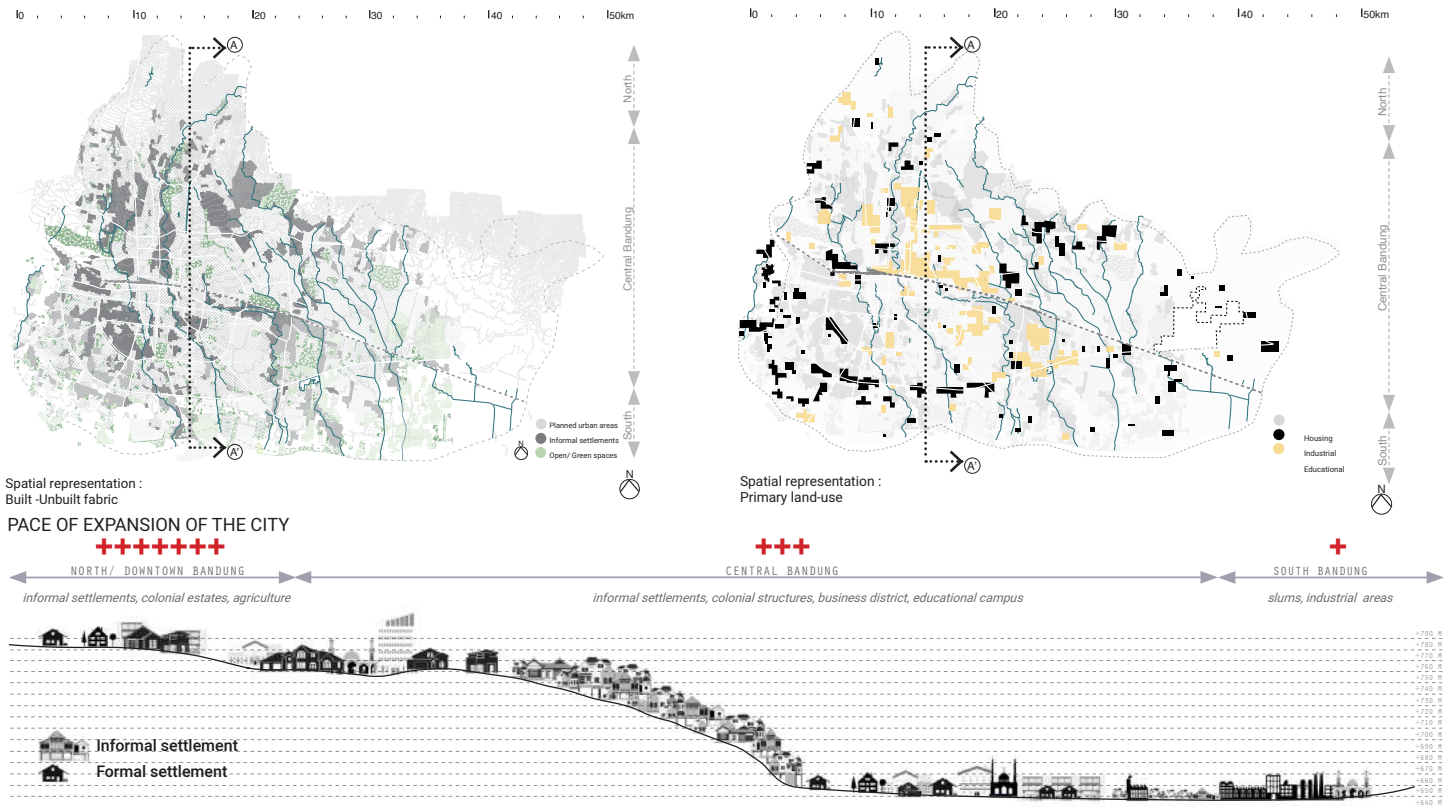


Fig. 2

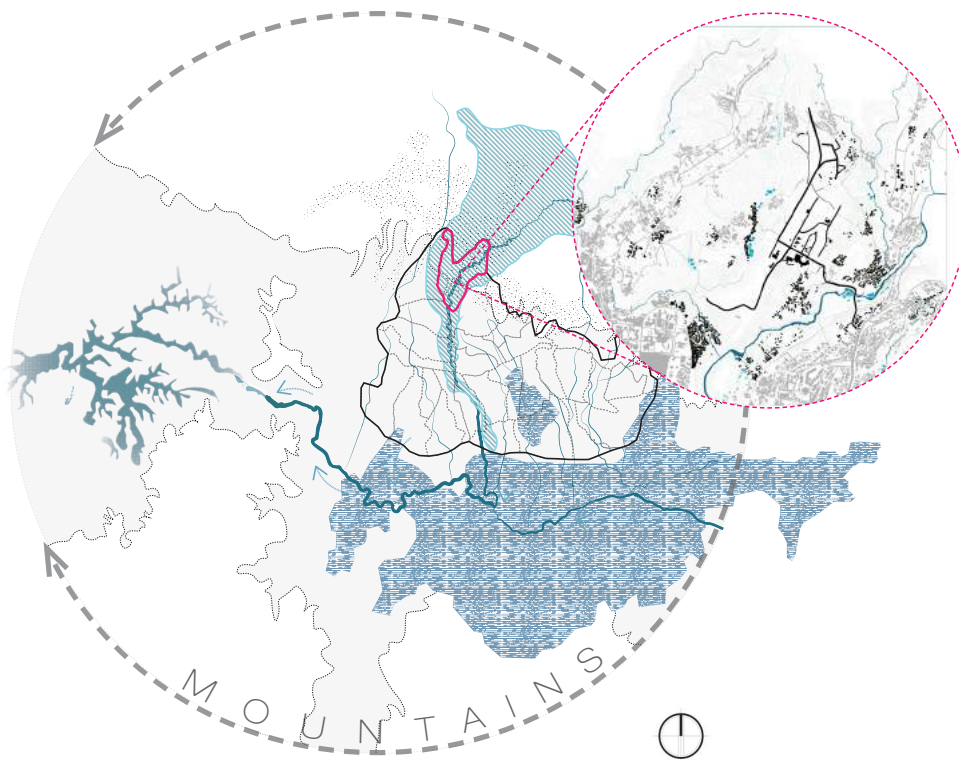


Fig. 3

Fig. 1 and 3. Problem scenario: 3 pressing issues related to water - flash floods due to excessive rainfall, drought due heavy groundwater abstraction, fluvial floods due to deforestation in catchment. The pace of growth of the city is fast compared to the slow pace of infrastructure development.

The difficult topography has made it a challenge to have a centralised water supply and sanitation system for the city

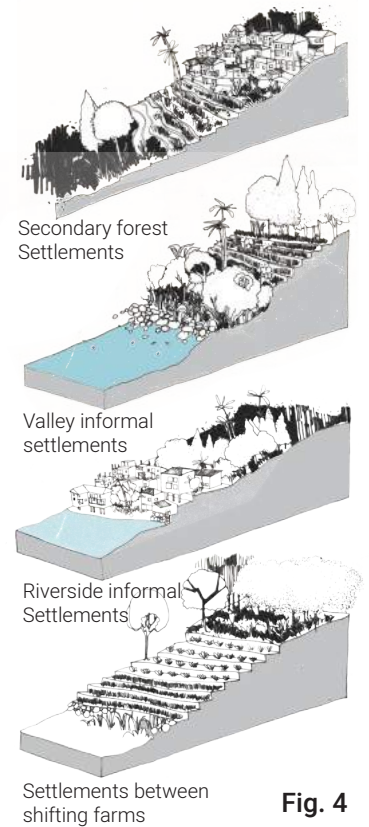


Fig. 4

since the beginning. The peri- urban area of the city that falls in the catchment, is now prone to heavy real estate expansion, with a large amount of informal settlements.

Fig. 2 indicates the Primary landuse and Formal vs informal settlements in the city. As shown in **Fig. 4**, the various type of settlements grown over the past 20 years has led to excessive deforestation and neglect of the sponge function of the catchment.



Fig. 5 (a,b,c)

Operative Landscape

SWC, Resource conservation, slope stabilisation, Integrated activities

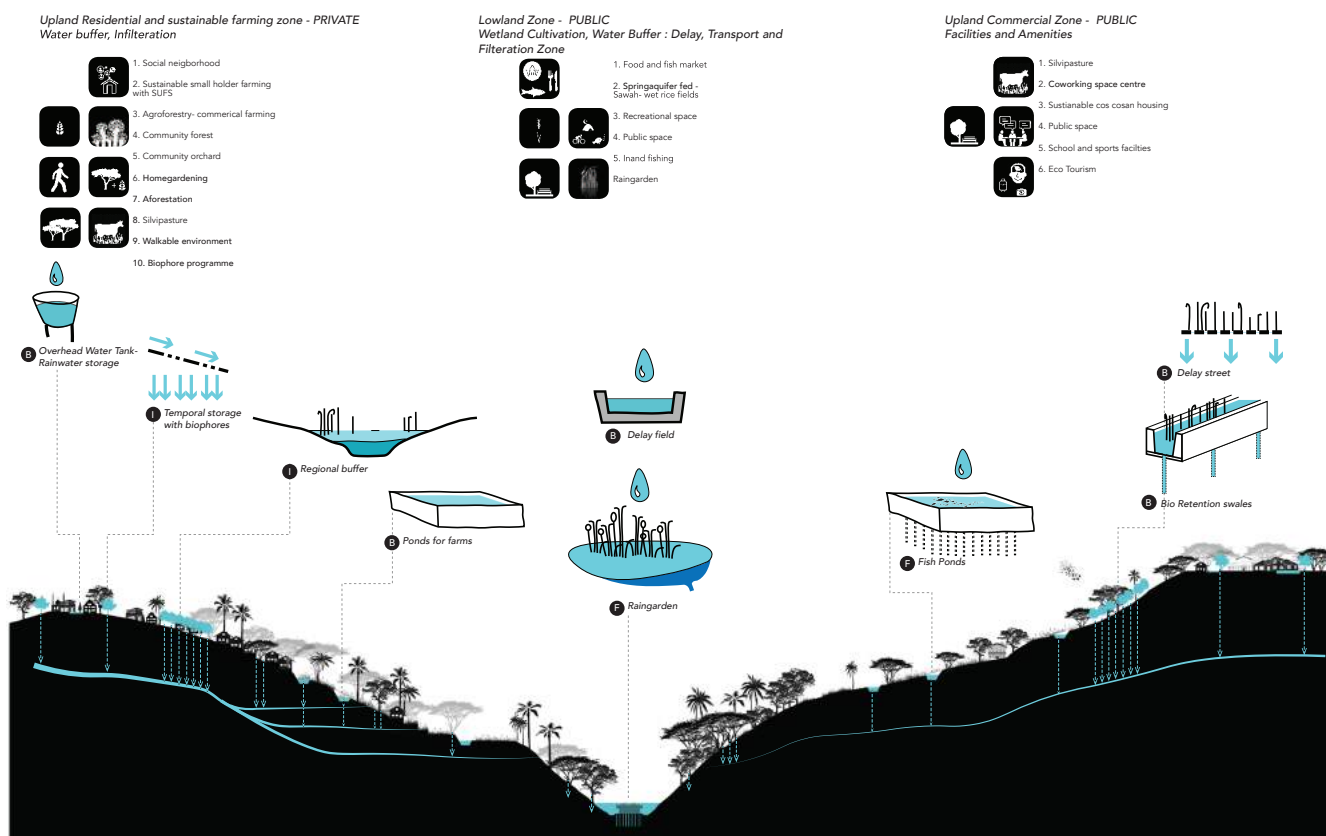


Fig. 6. Section CC'

Fig. 5 Unsustainable dryland farming practices in the upland areas of city, namely the Dago region, and their excessive dependence on shrinking spring water reserves, calls for a decentralised water supply and sanitation system.

Integrated land use to include agroforestry, grasslands, sawah rice system, replacing the conventional dry land agricultural system. To enable these functions, rainwater infrastructure is designed at regional and neighborhood

scale. This circular water management system coupled with afforestation techniques enables a sustainable expansion of the city, in symbiosis with nature.

Design for rainwater at the peri-urban areas in North help to recharge dried up aquifers, and the water buffers improve the sponge function of the catchment, to tackle floods in South Bandung.

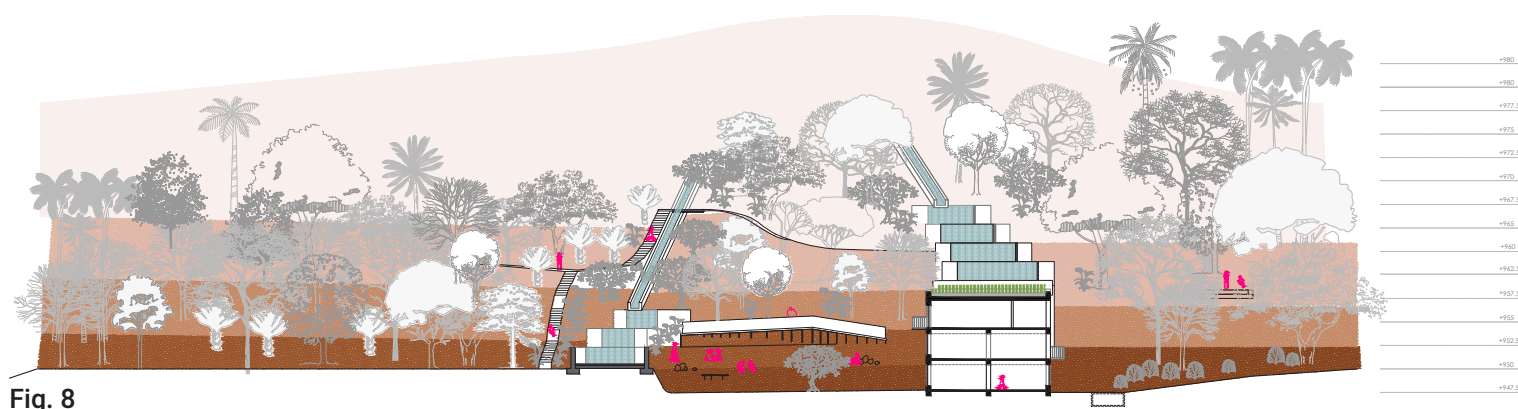
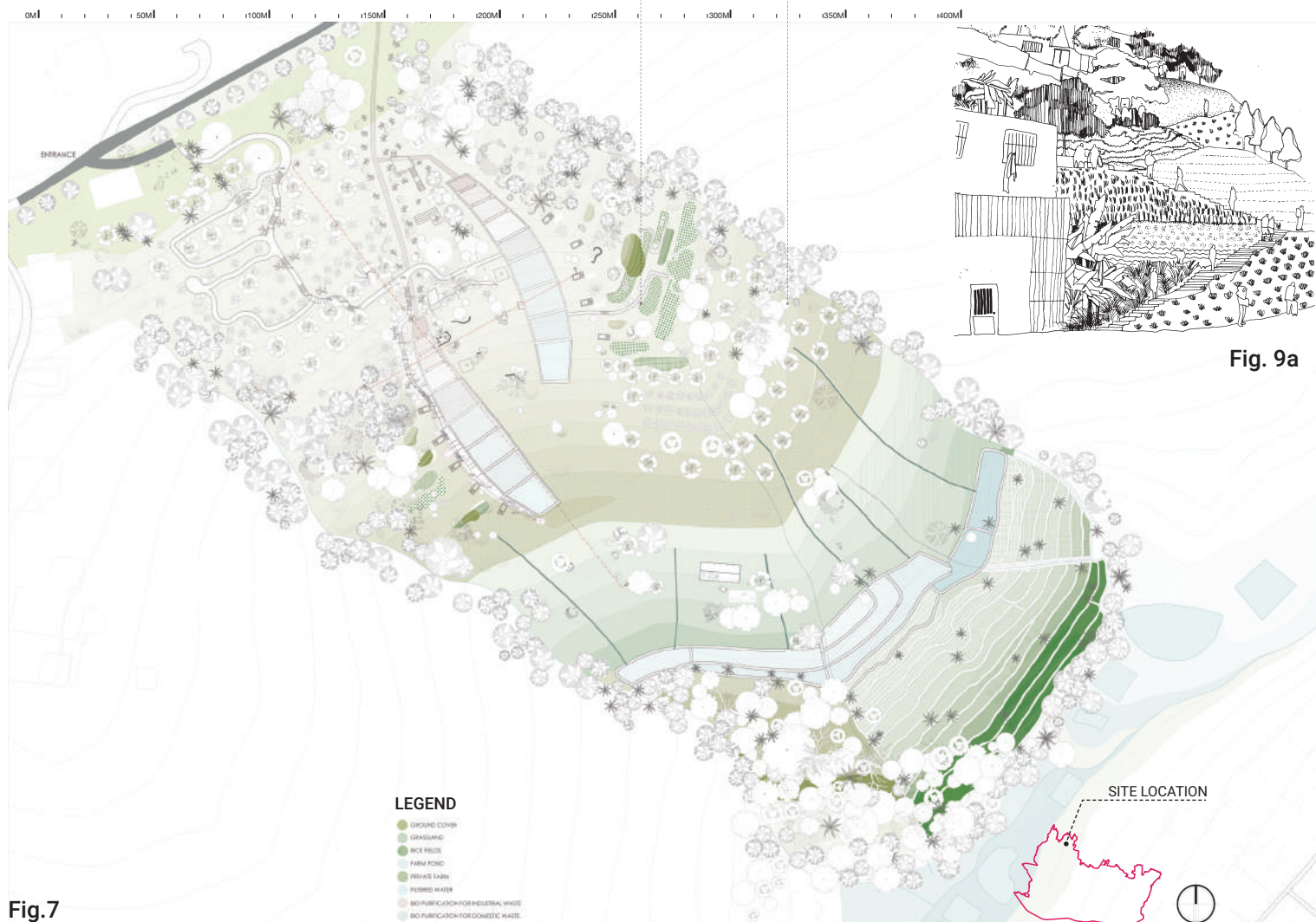


Fig. 7,8 Shows a part plan and section of the agro-forest community in Dago region. After the slope and soil analysis for landuse in lowland, midland and upland areas, few experimental scenarios were designed.

The idea behind this intervention is to help people realise the value of rainwater harvesting and aquifer recharge to tackle the drought and flood issue and hazards, but also giving to the inhabitants larger green spaces, landscape connectivity and protection of the ecological value of the existing landscape. A decentralised, community managed, relatively inexpensive water management system is

designed with the use of septic tanks, constructed wetlands, fishponds and water reservoirs. With this localised water supply and sanitation system, people are made aware of the possibility of a hygienic environment, respect for the natural resources, changing the way they perceive their surrounding and improve the relationship of people with water.

This new, agrarian, social, densified neighborhood is designed to be in symbiosis with nature, with communally managed orchards and terraced farmlands, nested within the forest.



Fig. 9b



Fig. 9c



Fig. 9d

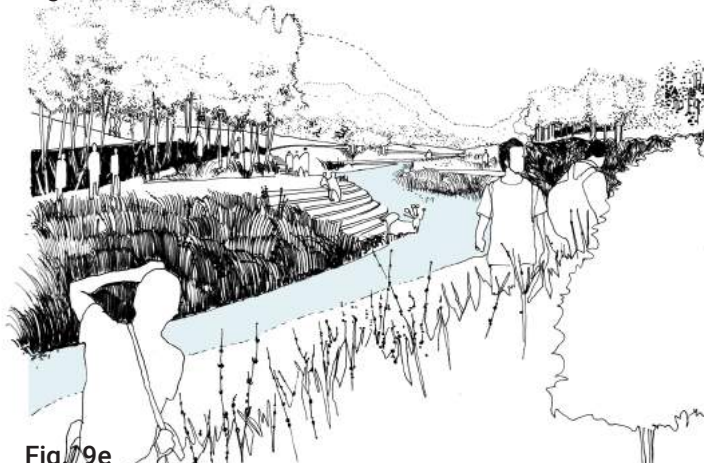


Fig. 9e

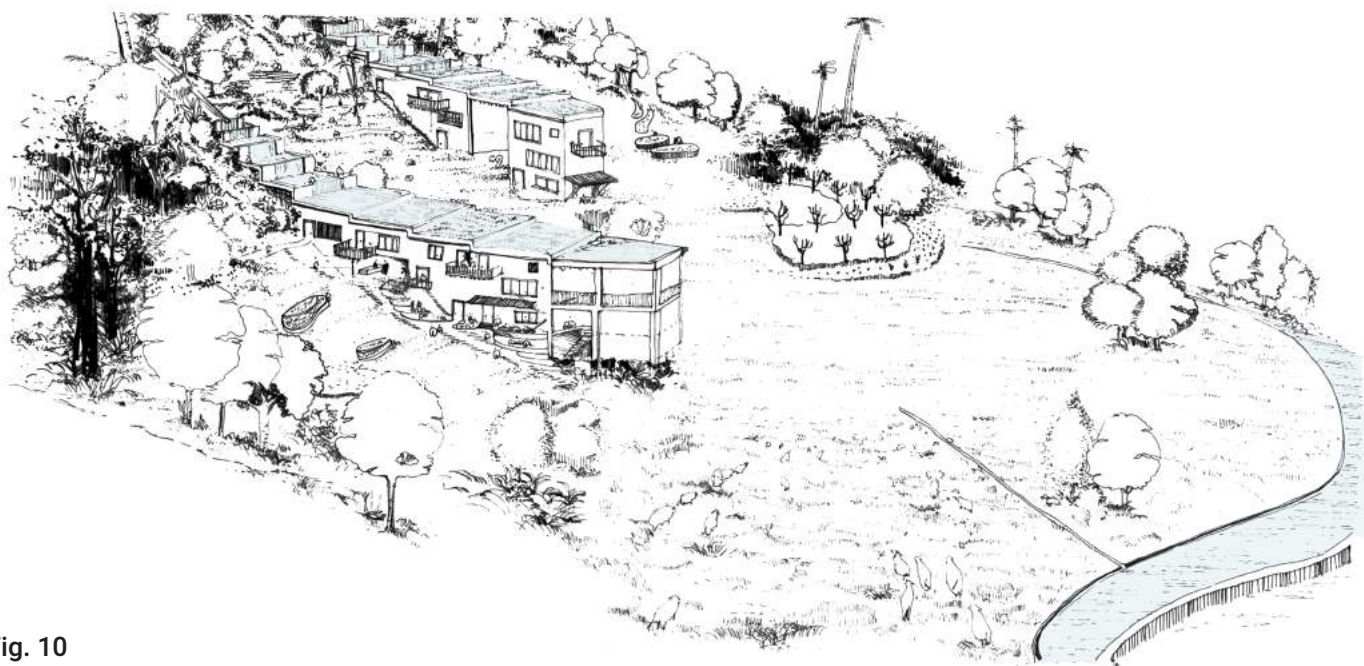



Fig. 10

Fig. 9-10 Show the impressions of the agroforest and silvipastoral community, with a decentralised water supply and sanitation system.

This neighborhood is connected to the larger water system of the Dago region, which consists of water buffers, water filters and infiltration infrastructure. Landscape Sponge ground interventions aim to address the issues of drought and flood by focusing on land degradation, soil degradation and soil erosion for catchment rehabilitation.

Measures for soil and Water conservation in the catchment area, enable sustainable upland agricultural systems. Coupled with aforestation methods, it also addresses the problems of deforestation and enable farming at private as well as commercial scale within the site itself.

The Mixed approach - top and bottom up solutions ensure the availability of drinking water and efficient management of the same leads to socio economic development and the landscape oriented approach helps its people connect with and value nature.



Redefining Bangkok's Inclusive Water-Based Society

Flood Resilience Planning of Adaptive and Performative Hybrid Infrastructure Network

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Carmona

Keywords:
Hybrid Infrastructure,
Flood Adaptation,
Evolutionary Resilience,
Socio-Ecological
Transformation, Water-
based Urbanization.

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Bangkok, the capital, traces its roots back to the heritage settlements of water-based urbanization along the course of the Chao Phraya River where four rivers of, Ping, Wang, Yom, and Nan from the mountain in the north merge together in the central floodplain of the old and young delta. Water and landscape played vital roles related to early urban settlement, economic and political management. Bangkok had been the site for Delta urban hydro-agricultural complex for centuries before it was influenced by European colonial powers and radically shifted to land-based urbanization.

By understanding climatic cycle together with landscape context, local water managements of agriculture complex could dispense water resources throughout the year, tolerating water inundation during heavy rainfall, while storing and providing water resources for irrigation during drought. To live with nature, people were adaptable and flexible with their lifestyle as seen by the vernacular elevated house design, which the semi-open space underneath has multi-purpose functions serving as living room for daily routines while occasionally allowed excessive flood to freely pass through.

Linear water infrastructures of canals and rivers were carrier of social and ecology system where large rivers were routes for trading between cities, inducing water market communities along the lines, meanwhile, water was used as natural supply for daily routines. Waterlines were considered also as public spaces, where diverse classes of people were capable of sharing and using from private purposes of bathing or fishing to official royal ceremonial activities.

With the influence of European colonial power, road system was promoted superimposed over canal which shifted the role of canal as parallel drainage. Land-based urbanization and grey infrastructure were developed as new urban form of modern road systems with engineering drainage and sewage networks. With this stage, water slowly became irrelevant for people life yet developed to be threat as Bangkok faced several floods over time. On-going land-based development inland led to the need of grey infrastructure approach for flood protection, promoting engineering management solutions. Flood dikes were built along both sides of Chao Phraya River as flood defensive system for the city.

Perception and relation of people towards water in Bangkok have changed through time, from a way of living to threat of lives. Growth of urbanization from adaptive water-based society to land-based mega-polis has led to a major shift of urban infrastructures changing lifestyle and perception of people. Water is currently perceived in form of flood threatening various land-based developments by the interruption of daily systems. To reinforce the growth of land-based urbanization, Grey infrastructure solutions are heavily promoted, protecting the city from flood, in the same time, water get devalued and separated from people life. The indigenous socio-ecological living with water is vanished from the urban society and water, as valuable natural asset, is in the stage of decaying socially and ecologically.

In the rapid climate change era, on behalf of continuing to avoid and live against nature, Bangkok and the inhabitants are challenged to adapt reliving with water once again. The paper mainly focuses to transform the existing grey infrastructures into hybrid flood adaptive and performative resilience system of Bangkok, reducing flood risks and provoking socio-ecological transformation with water-based identity.

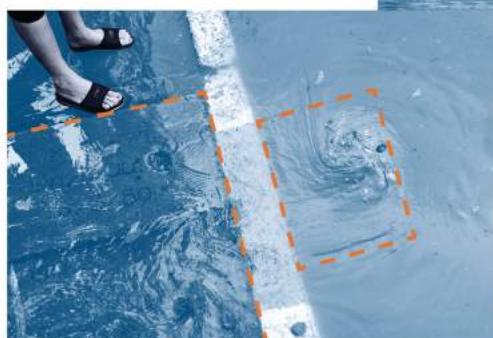
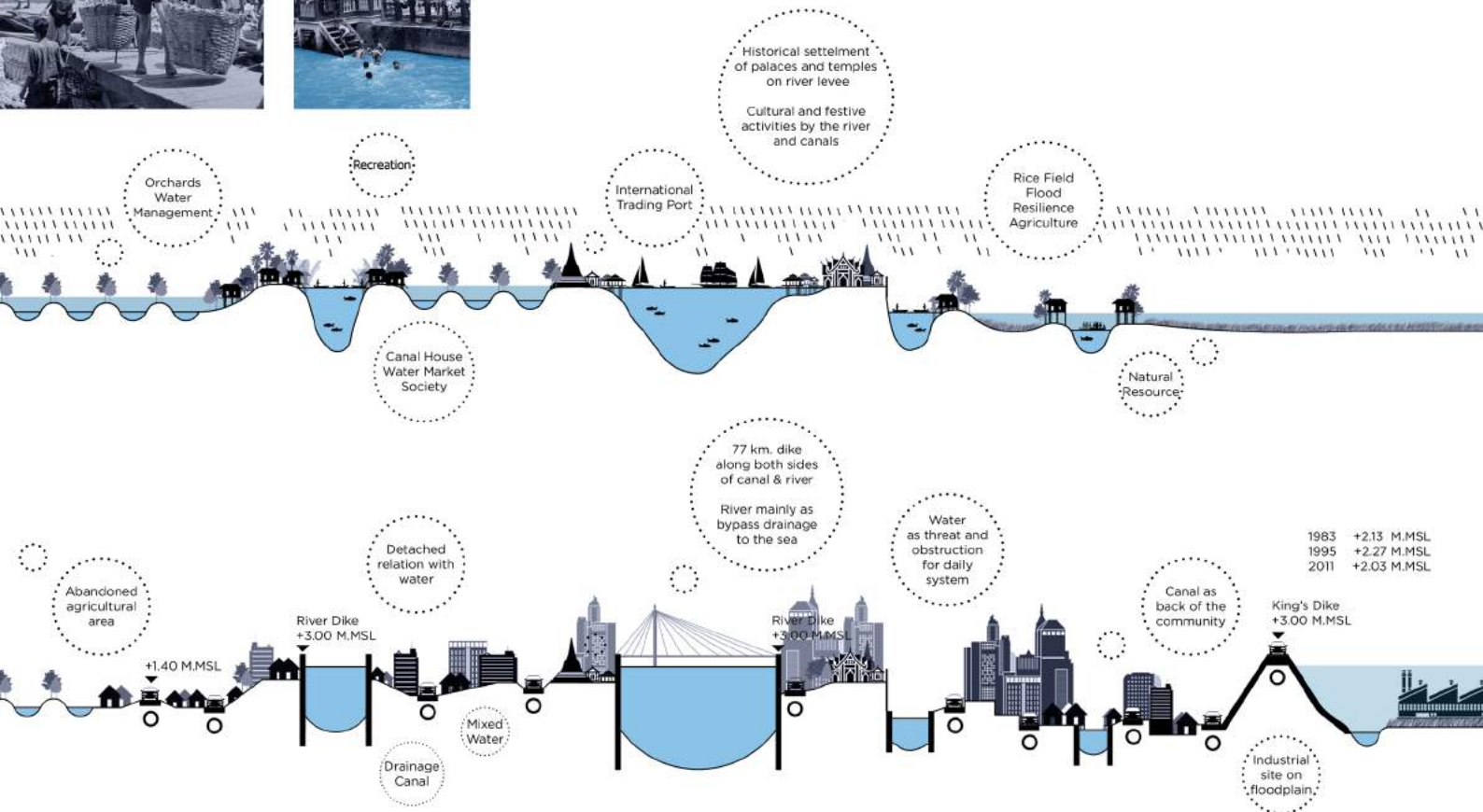




Fig. 1

Fig. 1-2 Currently, transportation Infrastructure of road system is considered as the major grey infrastructure development which conduct people lifestyle, separation of green & blue network along with future direction of urban expansion. The on-going development of grey infrastructure approaches could leads to the increase of flood risks in Bangkok across scales.

In this part, the hybrid resilience infrastructure strategy is implied to explore on the new relation of integrated eco-functions of green & blue network with the existing road and water management system, performing as

flood management network, where each individual infrastructures of existing transportation, water management, with green and blue network, functions and assists each other with interrelated roles of different flood management strategies. Meanwhile, social and ecology system are also improved along the network lines inducing socio-ecological transformation of lifestyles with new perception of living with environmental changes.

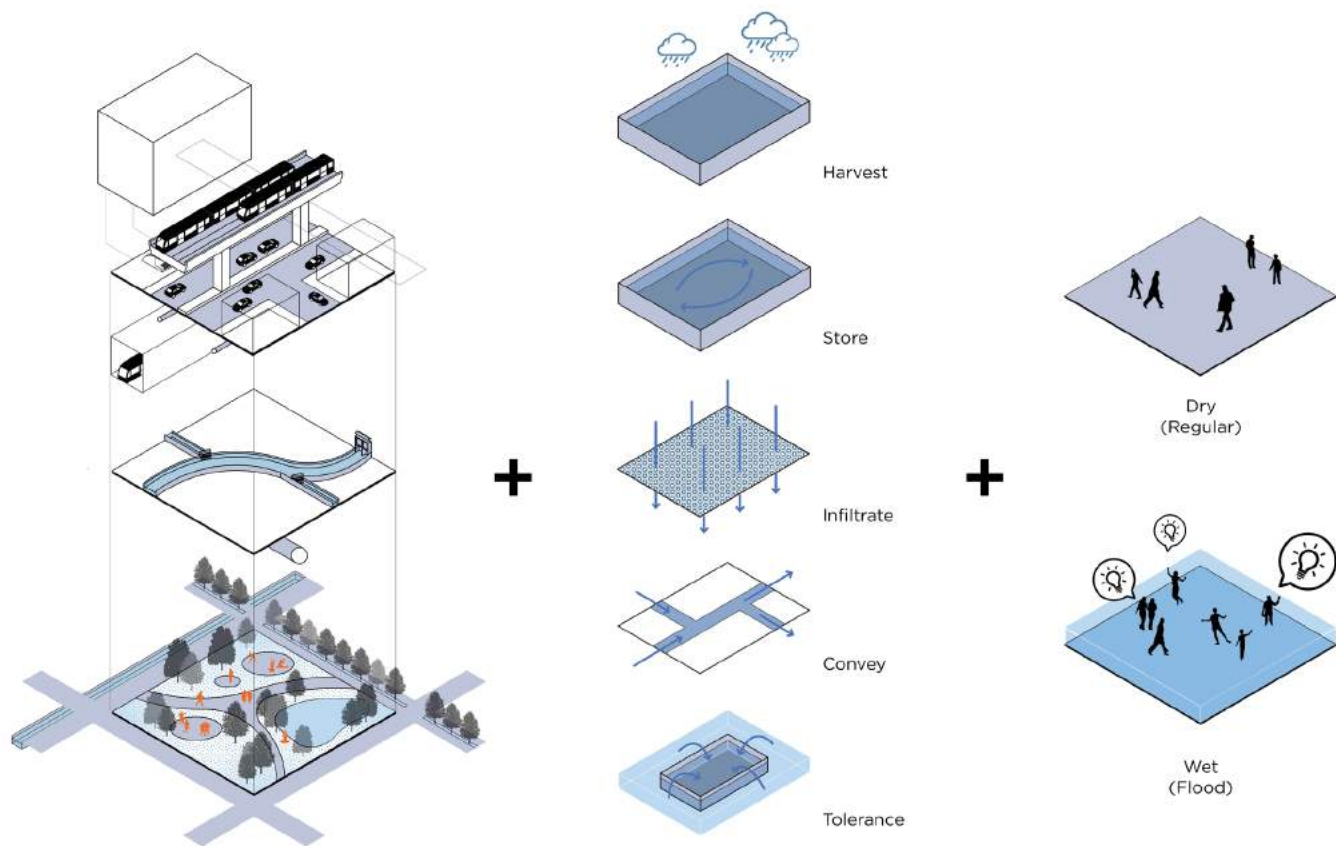


Fig. 2

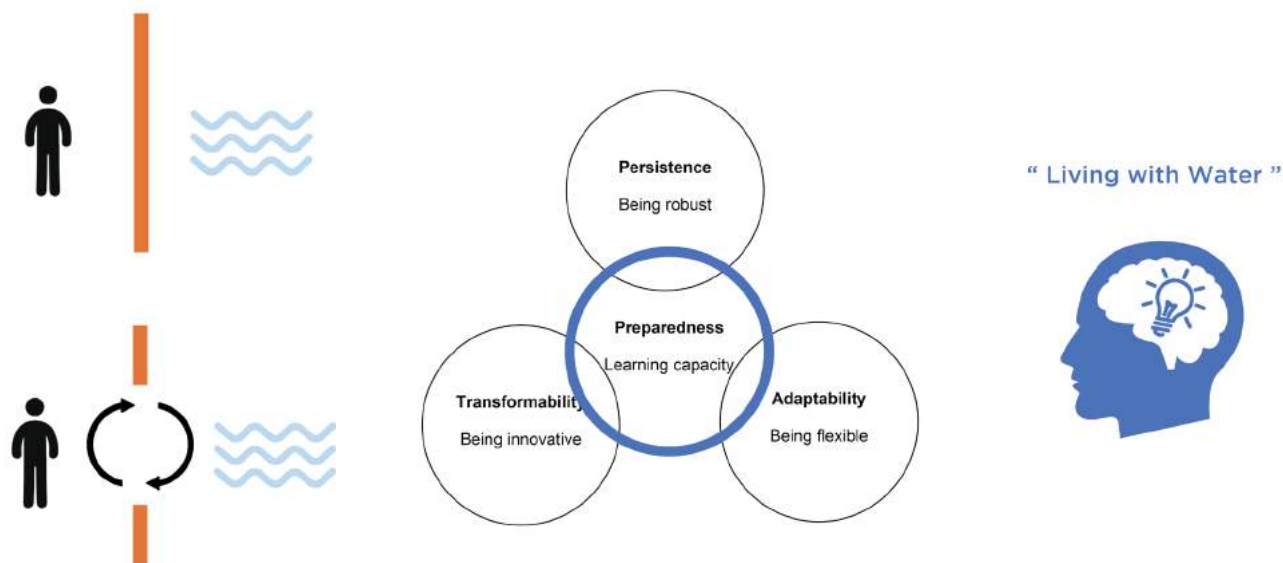


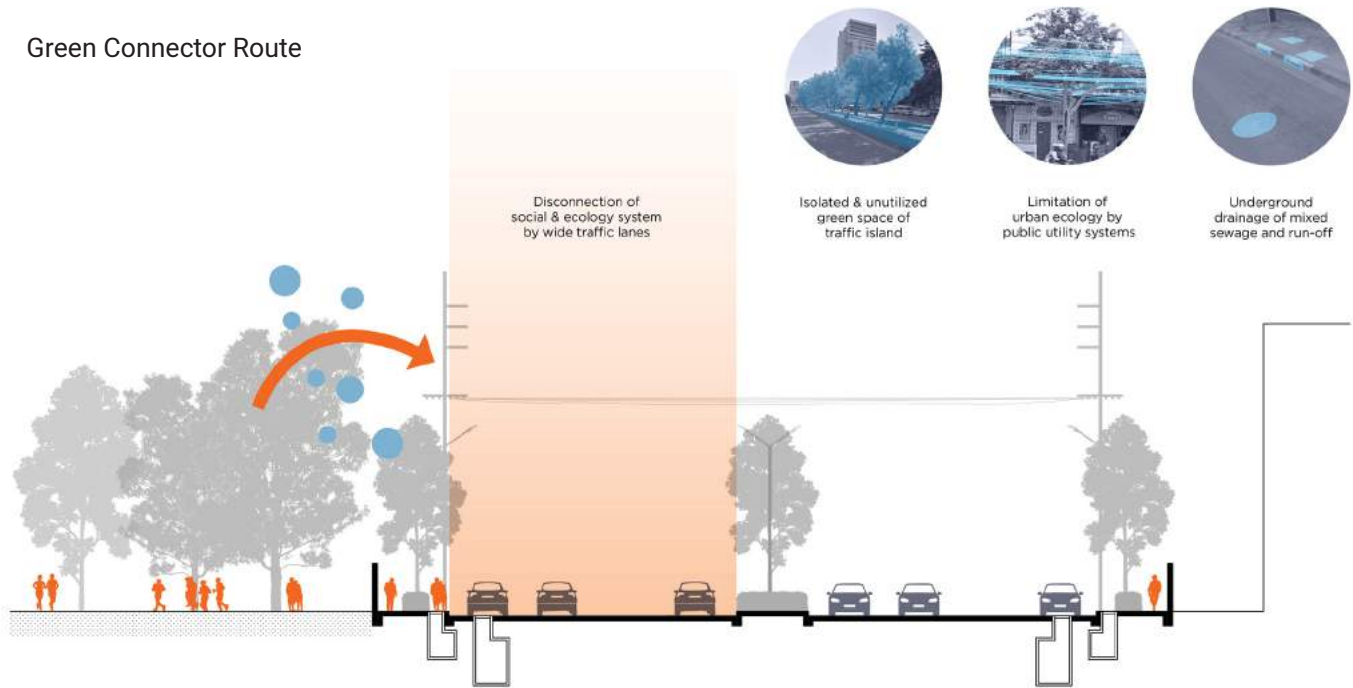
Fig. 3

Fig. 3 New urban form of land-based developments regulated and protected with grey infrastructure solutions represents the current identity of Bangkok as it is in the stage of engineering resilience. Engineering solutions are promoted for defensive purpose against flood maintaining the stage of stability inside the metropolitan area.

how to co-exist and evolve with water. The new stage of evolutionary resilience is proposed to seek for new flood management strategy which promote both social and ecology aspects as the interrelated system, forming new inclusive water-based society in the current urban form.

The concept of gaining control over nature has been proved unsustainable and inefficient coping with the unpredictable impact of climate change. To settle with future flood challenges, society can't any longer rely only on protective interventions but also need to relearn

Green Connector Route



Boulevard

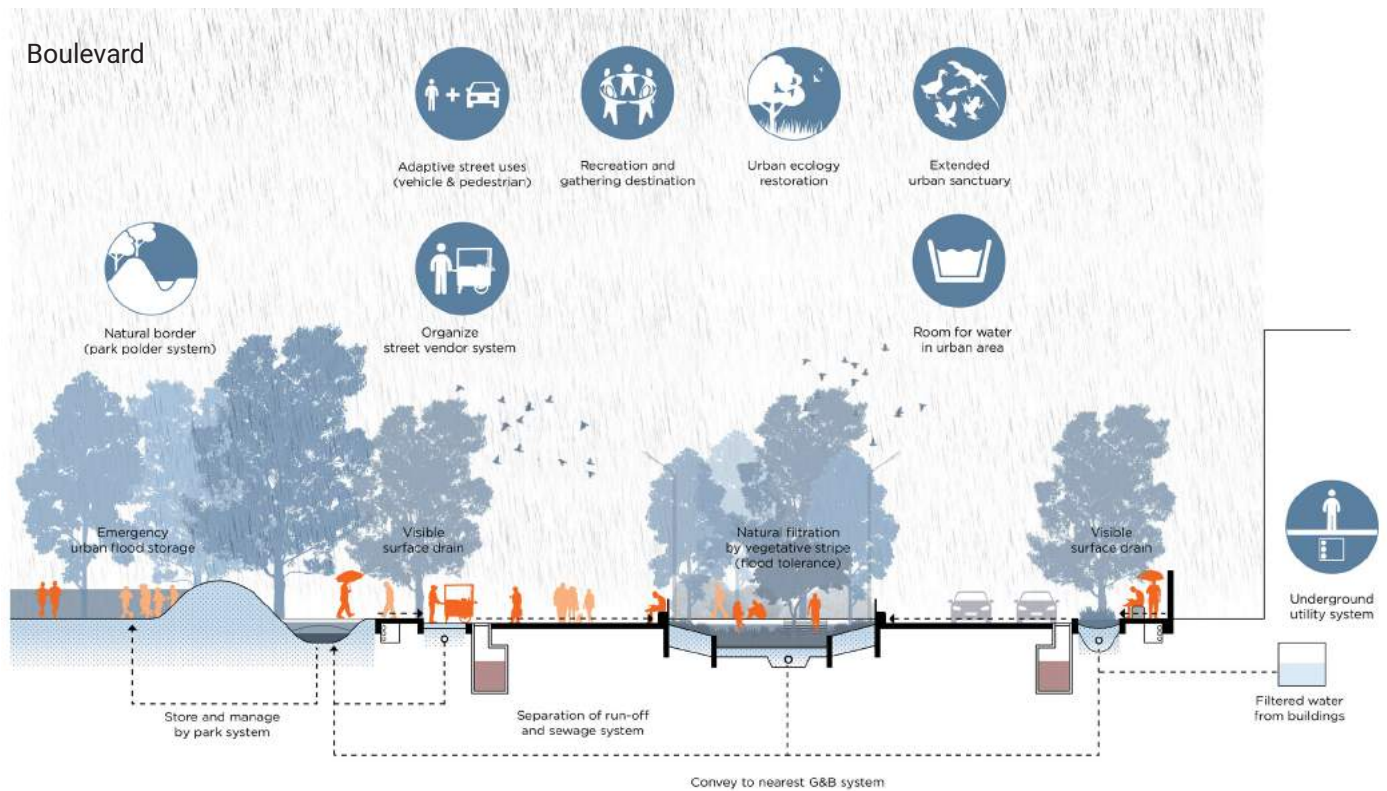


Fig. 4

Fig. 4-5 illustrate the following hybrid resilience infrastructure transformation with the implementation of the life corridor principle on the existing green connector route. The green connector routes are meant to extend the social and ecology system from green patches such as recreational park. With addition of avenues as the new green connectors extend the reach of connection forming a larger network. However, this extended connections are rarely seen because of the wide traffic road system. Fragments of small green spaces on both sidewalks and traffic island are more perceived as decorations without social or ecological benefits.

Boulevard, the modification of existing avenue is created enhancing livelihood on street for both people and nature. Excessive traffic lanes and traffic islands are transformed to a flood tolerance linear park where excessive run-off or flood could visibly see, infiltrated and channeled to nearby urban storage of public park system. Mixed of vegetation create urban forest as sanctuary attracting wildlife, providing biodiversity. Roads are redesigned with adaptable programs balancing uses between vehicle and people, creating public events or pedestrian street as new social platform. Food vendors are also allowed using the street in these occasions.



Fig. 5

The goal of revolutionary resilience could be achieved by expanding learning capacity of people, to have awareness and understanding of living with nature. For people to learn, they must have constant experience to cope with environmental changes as a habit.

With hybrid infrastructure transformation, eco-services from green and blue infrastructure is extended along with the daily grey infrastructure systems of transportation and water management, supporting flood events, improving social and ecology system of the inhabitants through public space in daily basis.

New water-based identity is created as water becomes part of daily living condition, inducing adaptation of lifestyle and change of perception towards water which could have influences for other flood management solutions across scales.



Re-Connecting with water

Creating spatial solutions for water collection and storage in rural areas of Morocco which suffer from water scarcity and loss of social and environmental cohesion

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drought, adaptation,
climate change,
water system, social
acceptance

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The Northern African region is facing serious consequences caused by climatic changes. While the area is already suffering from fresh water scarcity, the studies and calculations show in the upcoming years the precipitation will decrease while the temperatures are going to rise, and so will water demand. The countries often fail to provide sufficient portable water to many of their inhabitants therefore many people suffer absolute water scarcity.

The project is in Morocco, a settlement named Adassil, located in the Atlas mountains without any water or wastewater management system. The only sources of freshwater are being the Assif El Mal River and the unreliable rainwater that they are able to capture. The water captured for domestic use is not treated being the cause of many health related issues.

Although the country and its people created many spectacular water systems in the previous centuries, the traditional systems are often not used or in bad shape today. The people lost the once so important connection and respect to freshwater and the understanding of the importance of some of the traditional interventions.

The graduation project focuses on solving the above mentioned issues from a landscape architectural point of view. By educating the community and showing, how small scale interventions carved carefully into the topography can solve freshwater issues and bring the community close to and respect water again.

Working on three scales enables to show how elements can be placed into a certain area and make a difference in the everyday life. Showing the system in a Middle School located in Adassil, creates a learning environment for the community to understand the simple and effective interventions that together are able to provide freshwater for the students. Creating an expanded system in the village can create better living conditions, new community spaces and expand the inhabitants' income while providing freshwater to the people and let no wastewater out from the area. By creating a toolbox of interventions all the settlements along the Assif El Mal River or the country are going to be able to provide freshwater to the inhabitants without needing to rely on the government or having to use untreated water.





Fig. 1 Current landuse



Fig. 2 Erosion management



Fig. 3 Possible water storage



Fig. 4 Possible water purification area

Fig. 1- 4 One of the focus points of the thesis is education, therefore the project begins in the Middle school located in Adassil, the Atlas mountains. By developing a sustainable school that is able to provide fresh drinking water to the students and the community without needing to be connected to the national water system can provide a starting point for bigger changes in the area.

Using the Maximization method the current land use, possible erosion management, water storage and water purification areas were zoned. This method helps finding the possible land uses that can be implemented together

and the ones competing with each other.

After combining the layers and studying the topography, the best areas for each interventions were selected to create a sponge area that collects as much rainwater falling as possible and can act as an educational and inspirational place for students and the community.



Fig. 5 Garden plan for the middle school

Fig. 5 The garden plan and the elements used have two main functions. The first is to provide a safe, inspiring and educating environment for the students of the school and the visiting community. The different garden plots show the visitors several ways that can be used in a household to purify and store water. The outdoor classroom gives an interesting atmosphere and enables students and teachers to enjoy the elements of the garden protected from the sun. All the outdoor furnitures are designed to provide shade while collecting and storing rainwater.

The second function of the garden and the whole area

of the school is to act as a sponge and store rainwater and runoff water. For this reason the runoff water arriving from the hills is carefully navigated to enter the garden and flow into an underground storage through a canal. The garden plots, apart from being an educational and playful environment, are also placed in such a way that the walls and canals acting as separators also function as guides for the runoff water to arrive to the storage areas. By introducing the new water guidance system together with a new water purification system, the school is able to serve good quality drinking water to its students and visitors.

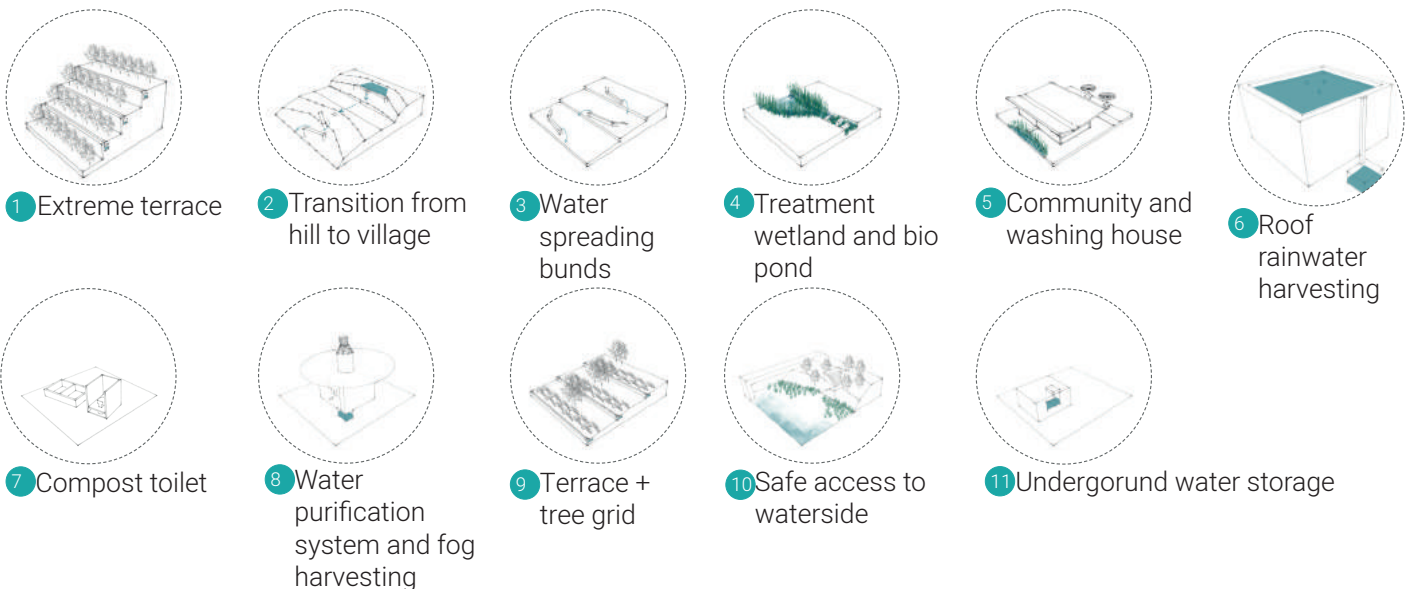
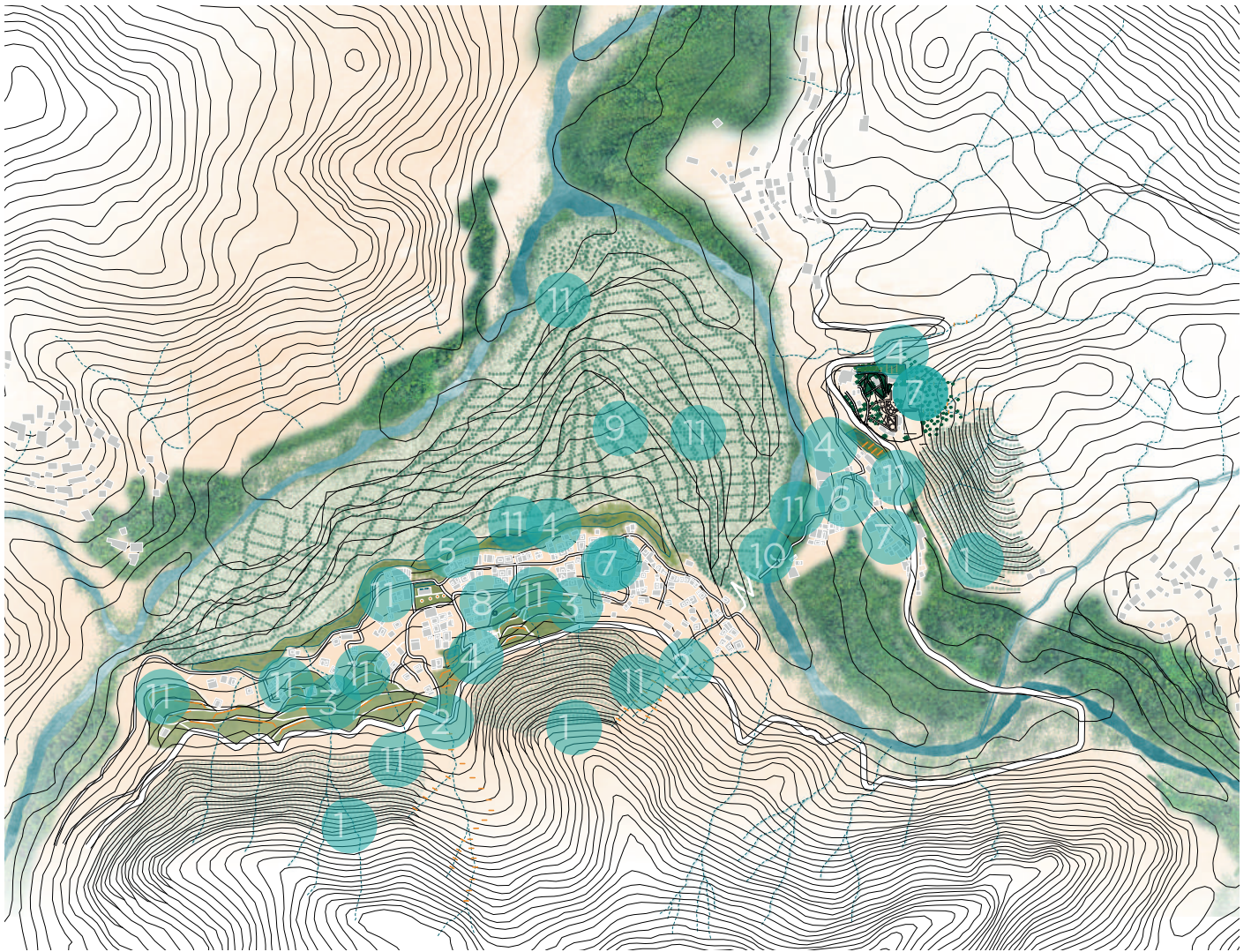


Fig. 6 Masterplan of Adassil + used elements from the toolbox

Fig. 6 After applying the maximalization method to the settlement, Adassil, I created the masterplan with similar principles as the school's garden plan. The elements support each other to create a well working system with special focus to the transitional zones. Different water related elements are placed to each zone for example water spreading walls and underground water storage

to the possible storage zone. The outcome is a sponge village that is able to sustain itself and produce enough drinking water to its inhabitants to create higher living qualities. The toolbox with possible elements can provide possibilities to improve the existing water systems in villages with different spatial conditions along the Assif El Mal River as well as in other parts of the area.



Fig. 7 Impression of the multi functional agricultural and community space

Fig. 7 By providing education for the community to understand how the land can be shaped and used to harvest rainwater. Involving them in the decision making, construction works as well as the maintenance the inhabitants are more willing to use and appreciate the system and have a deeper connection with it. The community spaces provide new alternatives to enjoy nature and practice the traditional activities that do not have a suitable ground at the moment. The alteration of the existing cultivated area provides more agricultural lands and orchards for the inhabitants to be able to earn an extra income.



Breathe

Redefining a zone of informal settlements for Ho Chi minh City

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Keywords:
informal settlement,
slum, flood, resilience,
adaptation, urban
acupuncture, vietnam

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The project has been created from a strong fascination of the author who came from the developing country in South East Asia. A rapid change of a city from urbanization and overgrowing population have somehow eradicated the traditional way of living. One of the best examples is in Ho Chi Minh City, in the South of Vietnam. The city is located in the prime location of the Saigon Delta, and it is the biggest city in Vietnam. Within the last 30 years, the population rose from 4 million people to 10 million people. This led to severe environmental problems and housing shortage. Consequently, local people began to settle their houses illegally along the canal to live with the water as their traditional way of living. This so-called informal settlement has expanded all over the water structure of the city, and they are continuing to grow. The current situation has triggered me to explore the potential of landscape architecture to create design interventions to redefine the zone of informal settlement as an opportunity for Ho Chi Minh City and the environment to 'breathe.'

The test site has been chosen in the area with the highest density of informal houses in Doi-Te Canal. The design strategies are composed of four layers which are Collect, Purify, Connect and Adapt. The first two layers are contributed to waste management and water purification. The floating waste on canal surface is captured and separated before transferred to the Biogas station which will be transformed into biogas for community cooking purposes. All of these procedures involved the design intervention which is operated by the community. At the same time, the polluted water is diverted to the purification park, it is directly delivered to 10 different biological ponds before released back to the canal. The third layer referred to the social aspect; the two sides of the canal are linked by the proposed pedestrian routes. The different experiences along the routes together with design interventions created interaction between a diverse group of people and brought the social space back to the Canalside. Lastly, the design also concerned about the adaptable ability to tackle with the unexpected future in the "Adapt" layer. The entire area has been studied to find the possible sponge surfaces to hold the water in case of excessive water. Furthermore, the zone of informal settlements also proposed to function as a low dike to protect the urban district come flooded.

Through the process of research by design, the zone of informal settlement is being redefined and integrated into the city. The project has revived the existing landscape and enhance the entire area into a living system which is not only created a better environment but also offered a better quality of life to community and Ho Chi Minh City inhabitants. Most importantly, the intangible quality as the culture of "life with water" is being represented and preserved for the future generation.





Fig. 1



Fig. 2

Fig. 1 The plan showed the strategy to improve water quality for Doi-Te canal. It is composed of 3 zones; Mangrove Forest Restoration Zone, Green Bank Zone, and Purification Park Zone. The water flows from the west before it reached the Saigon river, it will be delayed during flow through the mangrove forest and small green bank. The water will then be diverted to the purification park. The 3 kilometers long of the water channel is included 10 different water treatment ponds, it will purify the polluted water. At the end of the water route, the clean water will be retained in the huge lake which is surrounded by a public park. The water pump at the outlet of the park will release the fresh water back to the canal during low tide.

Fig. 2 By analyzing the complex mixture of land use in district 8 and nearby districts, the five different routes are proposed. Experiencing routes are created to allow the HCMC residents, Informal settler, or tourist to explore the city from the urban district through the informal settlement and rural district. The experiences from each route are different by programs of the area, different type of transportation, using the boat crossing or the bridge, and the different types of the community along the way. Within each route, there will be a stop to explore in every walking distance (400 meters) until it reached the canal.

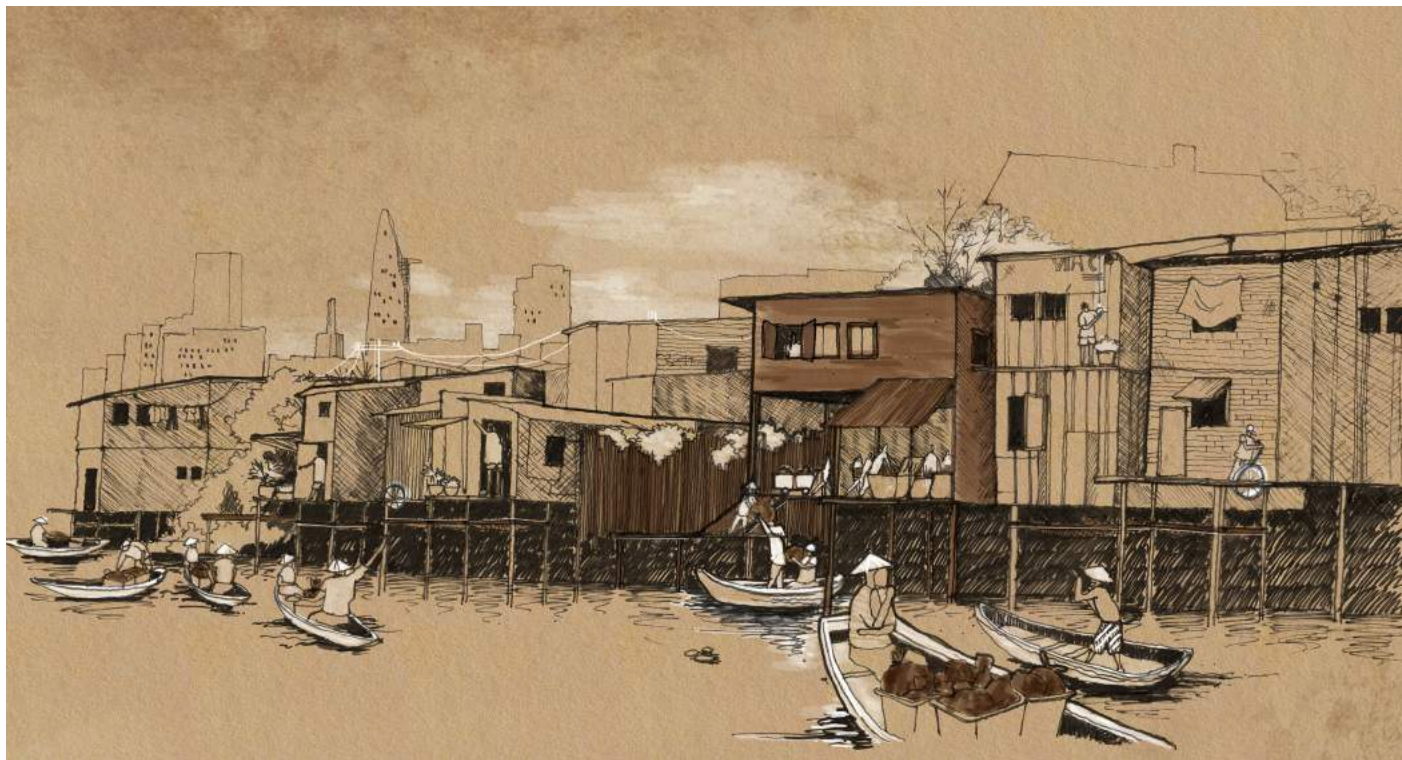


Fig. 3



Fig. 4

Fig. 3-4 In the present day, floating debris from Doi-Te and Ben Nghe-Tau Hu canals is accumulated up to 5 million to 10 million kilograms per year. All the waste flow directly to the Saigon River and the Eastern sea, respectively, without any treatment. The research showed that 86% of floating waste is an organic matter. Therefore, the design intends to collect waste and utilize them.

The design proposes to make use of the existing informal houses to be a waste collector or Intervention 01 (#1 Catcher). It will naturally collect the floating waste on the water surface by the design intervention. As the

inhabitants will be involved in collecting and transferring the waste to the delivery boat. The collected waste will be gathered and separated at the Intervention 02 (#2 Sorting House). Solid waste will be removed and given to the informal settler who work at the Sorting House. The new job opportunities from the project will provide not only stable income to the informal settler but also offered daily garbage for their personal business. On the other hand, organic waste will be packed and delivered to the Intervention 03 (#3 Power Hub). At this stage, the large amount of organic matter will be transformed into biogas for community kitchens.

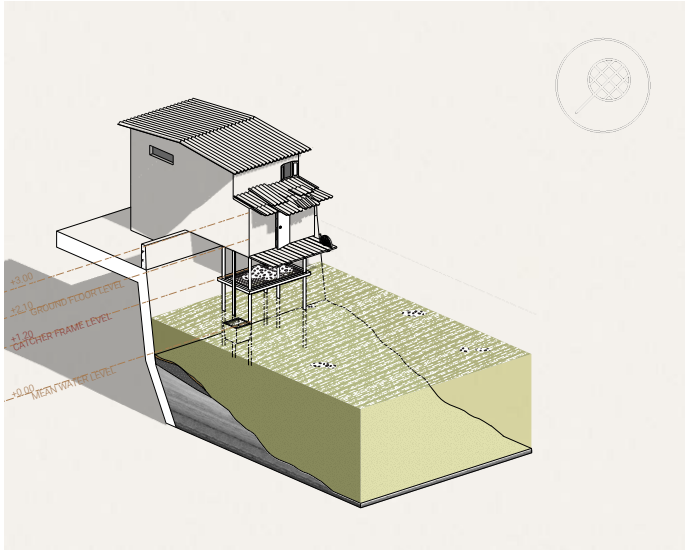


Fig. 5

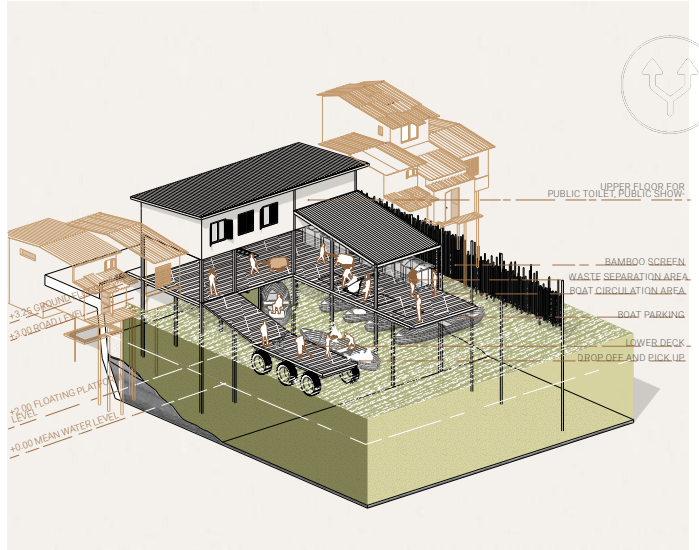


Fig. 6

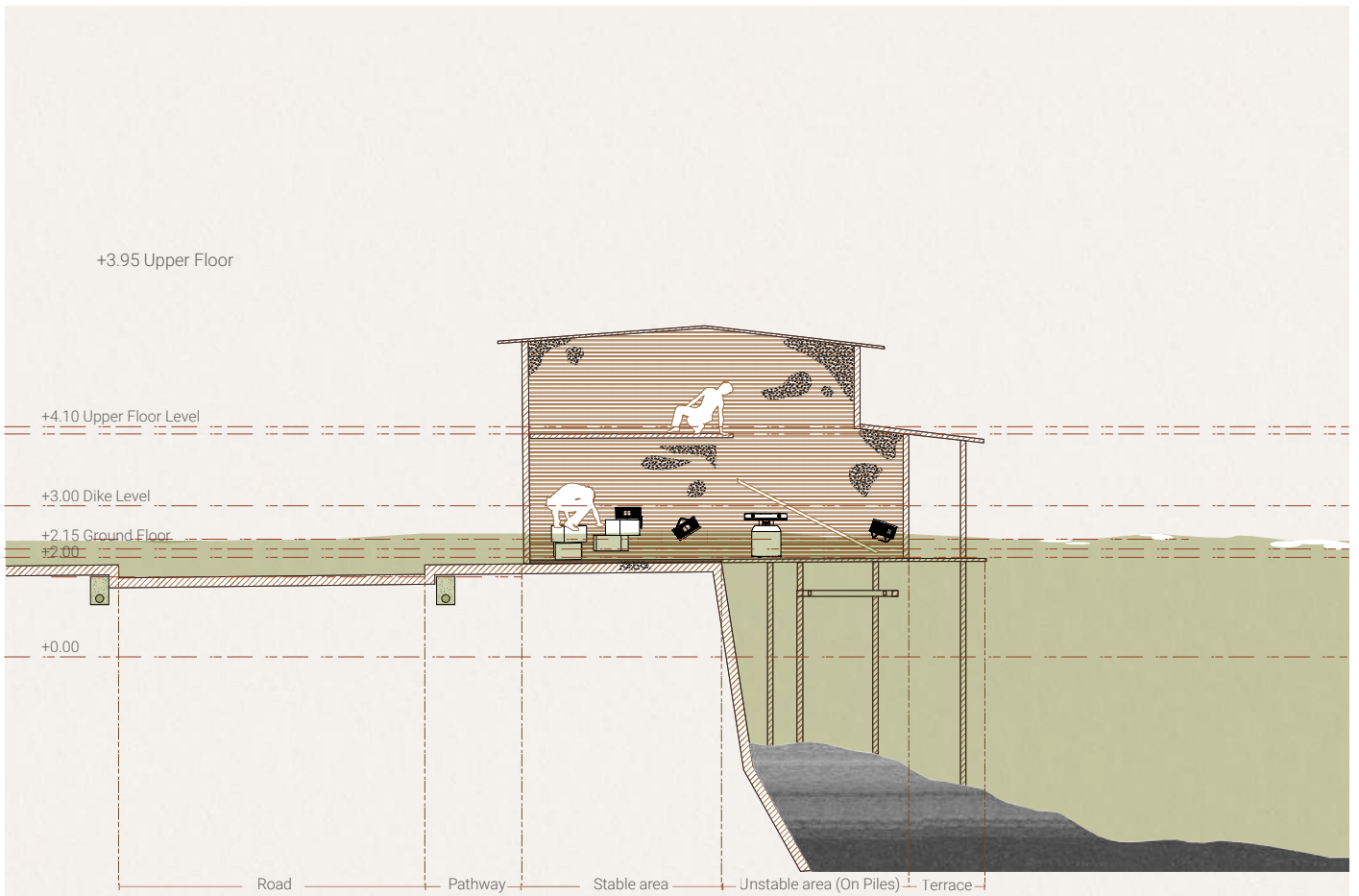


Fig. 9

Fig. 5-8 The four types of design interventions which are
 (Figure 5) Catcher #1 - Catch the floating waste,
 (Figure 6) Sorting House #2 - Waste separation area,
 (Figure 7) Gather #4 - Public space for Community and City people,
 (Figure 8) Pier #5 - Boat crossing spot.

They are all located along two sides of the canal as part of informal settlements. The entire appearance is attempted to harmonize with the existing informal houses. The choice of material will be limited by cost and locally harvested material. Hence the proposed design of all design interventions will share similar principles which are ease of construction, lightweight and minimal maintenance.

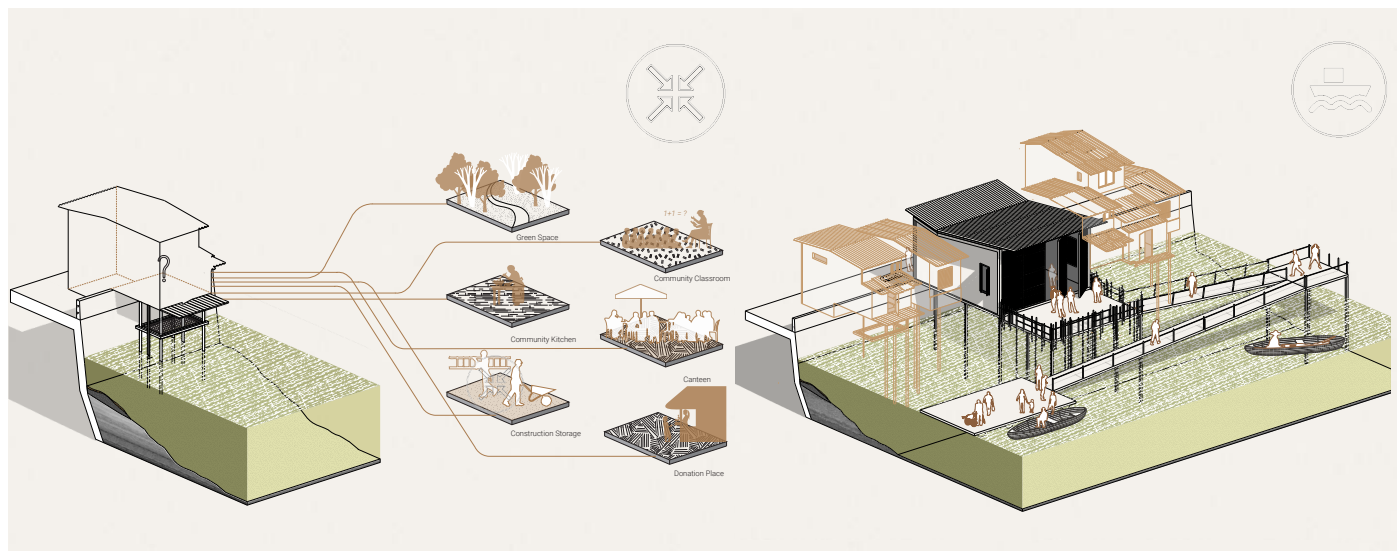


Fig. 7

Fig. 8

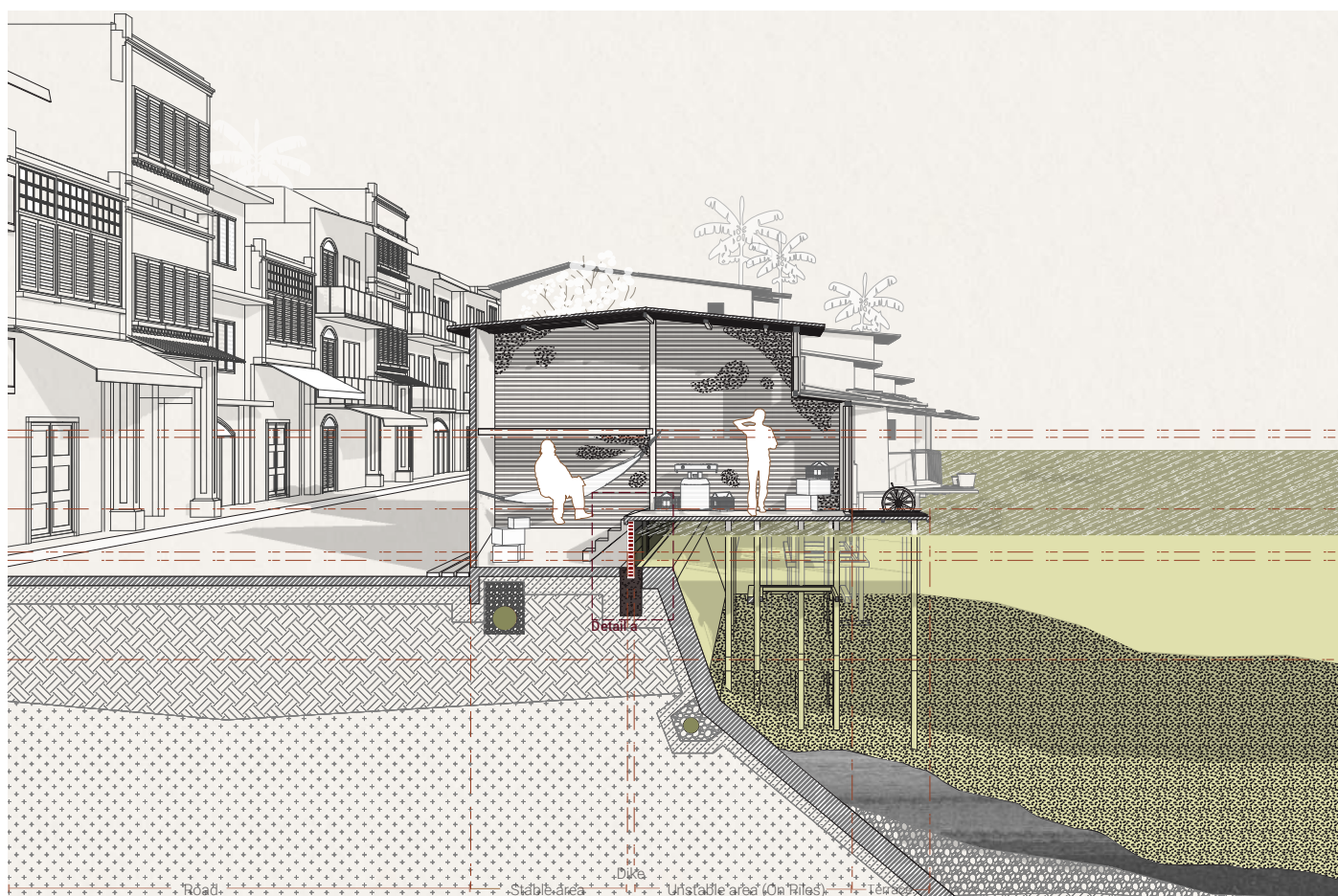


Fig. 10

Fig. 9-10 The existing informal house has been transformed to protect the upper part of the canal due to relatively high numbers of residents living in district 8. In the area where the elevation is low and insufficient of sponge area, the “dike house” will be implemented.

The existing typical floor plan of the informal house (Figure 9) can be divided into two part; the stable part and the vulnerable part. The main idea of the Dike house (Figure 10) is to make use of the vulnerable part by inserting a 75 centimeters low dike underneath the structure of the house. The existing sensitive part which is placed on piles will be elevated up. This created a new

module of the informal house that acted as a one and a half story house and a low dike simultaneously.

The implementation will require support from the government to construct low dike for its stability and continuity. Firstly, the concrete beam will be built beside the existing canal structure following by a precast concrete column, which will be located every 6 meters along the canal. Lastly, the stainless beam dike can be inserted in between the column. As a result, during the monsoon season, the zone of the informal settlement will be the protection of district 8 and contribute to the city's flood mitigation plan.



Team Member
(from top left)

Anna Saracco
Elissavet Markozani
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Neretva Recollection

Dr.Ir. Saskia de Wit

Neretva Recollection: materiality of war, flowing memories and living archive

The intention of the lab 'Neretva Recollections: materiality of war, flowing memories and living archive' was to explore the dramatic urban and landscape transformations of the Neretva River, the river banks and the city of Mostar that started in the wartime between 1992-1996. It looked at the transitional spaces between the military, violent destruction and un-war - the inhabitants' non-violent spatial reactions to it - and the material and immaterial residuals of these spaces today. These explorations were translated into imaginative landscape interventions aimed to evoke an affective and perceptual interrelation of people and place in order to overcome a one-dimensional interpretation of the trauma of war.

The projects in the lab are included:

- Re-connecting Mostar (Anna Saracco)
- Reclaiming the memory (Elissavet Markozani)
- Enhancing the survival landscape (Isabella Banfi)
- Garden as a microcosm of city (Minna Liu)
- Paradise lost? (Niels van Hasselt)
- Bordering Chaos - reinforcing productive relationships in eroding territories (Purvika Awasthi)
- Public space as a cohesive force (Shiqi Peng)

Re-connecting Mostar

Rethinking the East-West axis by using the Neretva's water as natural catalyser

Anna Saracco

Project location: Mostar,
Bosnia and Herzegovina

Mentors:

Ir. F.D. van Loon
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Keywords:

Memory, streetscape,
axis, leftover spaces,
ruins, no man's land,
reconnection, urban
acupuncture, war

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The city of Mostar, because of its recent war occurred from 1992 up to 1995, is still leaving a reality of division documented by the absence of a single administration.

Formally there is a single mayor but in reality the two communities (Bosnians and Croats) are self-administering, setting vetoes on the redevelopment of the so-called "central zone", i.e. where the front line passed.

However, this ethnic division is mainly desired on a political level and is not shared by most of the population; this means that there is a dichotomy between political representatives and the people.

The problem most perceived by the Mostarci, in addition to unemployment and corruption, is the lack of a shared social space where the ethnic, religious, or cultural identity does not play a predominant role.

Thus, this graduation thesis aims to reactivate an old axis, crossing the "central zone" and connecting two different parts of the city of Mostar.

The choice of this particular corridor has been adopted not just because of its strategic location - it crosses the city from East to West, two sides that have been rebuilt after the Bosnian war without a coherent urban strategy - but also because every street, square, park and building along it belong to a common heritage, which after the Bosnian war is lost.

Therefore, this axis (I will name it Axis Rondo-Old HIT Square-Musala Square, due to the main squares that it crosses) is ideal for a design strategy, which will have a dual nature: renewing three degraded areas facing the axis and, at the same time, introducing into those spaces one of the most important, natural and partially forgotten heritage: the Neretva River.

The use of a natural, dynamic and "memory keeper" element – the river - to connect those three spaces, in particular two squares and one ruin of a terrace garden, could represent the link missing in the Axis and create a new social use, enhancing a sense of responsibility for a common heritage that nowadays is mainly used as a public dump.





Fig. 1

Fig. 1 The results of the on site analysis have shown the necessity of reconnecting the Axis through a design strategy, which will have a dual nature: renewing three degraded areas facing the axis through pinpoint interventions and, at the same time, introducing into those spaces a shared unifying element, present in each intervention. Urban acupuncture promotes small scale interventions aimed to revitalize distincts parts of the city. What is new in my design concept compared with the traditional theoretical framework of this methodological approach is the insertion of a common symbolic catalyzer: the Neretva River, which is one of the most important,

natural and partially forgotten shared symbols of Mostar. In fact, while identifying Musala Park, the garden terraces ruins and The Old HIT Square as the crucial points to be revitalized, I felt a lack of a common thread able to provide the design with a logical continuity.



Thus, the main challenge is how to take the river in those spaces.

The solution is inside the spaces themselves: Musala Park and the Old HIT Square were very famous for their scenographic and refreshing fountains which contributed to make these areas the main urban oasis of Mostar.

They were a green and refreshing refuge for citizens who wanted to escape from daily life.

Currently these fountains are out of use and transformed in temporary storage areas or playgrounds.

Reactivating them by introducing the Neretva's water could represent not just the rebirth of these spots but of the whole Axis.



Fig. 2



Fig. 3

Fig. 2 The terraces gardens ruins have been transformed in a phytoremediation system made of 3 different flows: vertical subsurface flow, horizontal flow and free water surface. These three flows, combined together, are a natural and efficient way of cleaning the river water before getting fountains along the Axis.

Fig. 3 Reactivation of the fountain and the garden in front of the Hotel Neretva built during the Austro-Hungarian period. The red fishes in the fountain, called Gambusia, once grown up, were released in the low part of the Neretva River to eat the mosquito's larvs, fighting malaria.



Fig. 4



Fig. 5

Fig. 4 Interactive fountain: from the white cubes, made of Brac stone, the water flows in form of waterfalls. In this way a playful atmosphere shows the principle of oxygenating water, an ancient system to clean polluted water.

Fig. 5 The fountain of the Old HIT Square is restored, becoming again a landmark for the city of Mostar.

Reclaiming the memory

A memorial scape along Neretva River, Mostar

Elissavet Markozani

Project location:
Mostar, Bosnia &
Herzegovina

Mentors:
Dr. Denise Piccinini
Dr. Armina Pilav

Keywords:
memory, post-war
trauma, healing
process, confrontation,
mourning, acceptance,
reattachment, memorial
space, monument

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Divided cities are generally linked with civil wars in which group identity is threatened. This type of war dominated the late twentieth century, leaving many cities vulnerable. According to J. Calame and E. Chalesworth(2009) in *Divided Cities: Belfast, Beirut, Jerusalem, Mostar, and Nicosia*, since World War II there has been a marked shift in global warfare trends from inter - to intrastate conflict: of 64 wars between 1945 and 1988, 59 were intrastate or "civil" wars, and about 80 percent of those who perished were killed by someone of their own nationality.

Mostar can be added as one more case some years later. Because of the division these cities hypofunction spatially and socially. In the case of Mostar, Neretva River is used in the frame of the politics of division, providing mental and physical spaces of shame. More specifically, it forwards a surface common memory, as supposed effort of reconciliation of the past with scattered stones, calling them monuments, around the city, leaving the core of its identity, the river, as an abandoned area.

In order for the city to start functioning social normally again, it's necessary to be created a common space of history, which will produce common memories for the future generations. The thesis tries to give a new insight on how to deal with a landscape where ordinary pleasant memories replaced with memories of terror (Neretva), responding to the need of the city for a new memorial architecture. Even though, it addresses a specific area (Neretva), could be influence for many other cities which suffer from post-traumatic events, since it will propose a memorial, not as a spot but, as a system, taking into account the complexity of social, historical, religion, economical, morphological parameters.

The new memorial scape in Mostar will not represent a reason for being sad but rather a way to look and hope for the future, becoming with the river a symbol of the city. It is designed as part of the history, being a powerful reminder of society and how citizens of Mostar should stand together in the face of the tragedy of the war. It redefines the relationships between the local community helping the future generations to understand a bit of their history as well.

The memorial scape tries to become a part of the Mostar culture, being based on the powerful connection between man and nature. The idea is not only to create a space that stands as a symbol of memory but also to allow people the opportunity to relax and enjoy a new green space. It is just as important for the memorial scape to serve the collective memory as it was to have a high functionality level, providing residents of the area with a new space to enjoy the open outdoors.



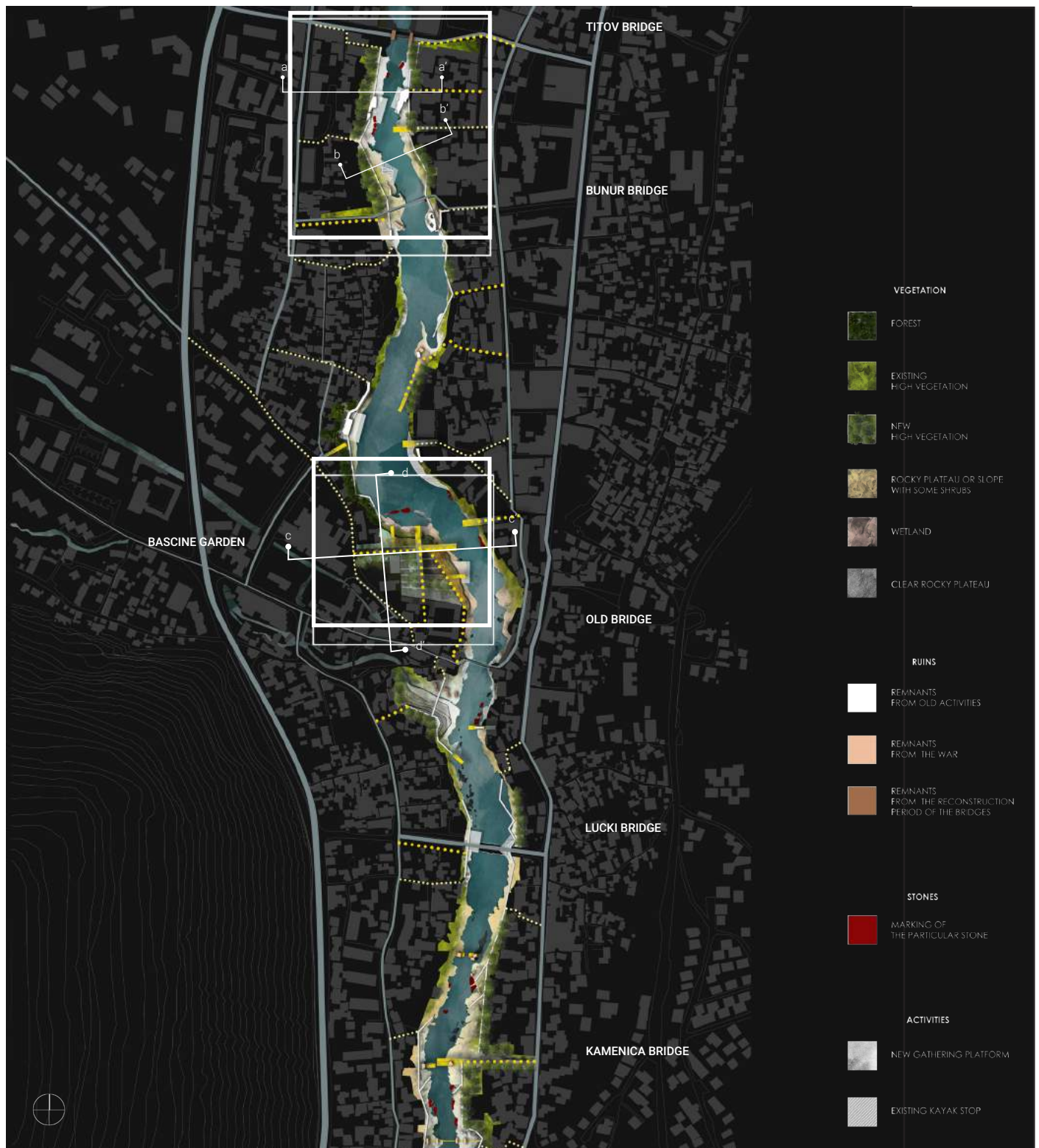


Fig. 1 masterplan

Fig. 1 In order Neretva to be transformed in a scape which will contribute to the mitigation of the post-war trauma, it was necessary the analysis in two axes, the memory and the nature. The big amount of stories and the remnants which are spread along the river, in combination of the particularity of the karst landscape led to the creation of three cores categories which are related with the stages of the healing process, confrontation, mourning, acceptance, and reattachment, based on the Theory of Mourning by P. Homans. Taking into consideration, the theoretical essential stages for overcoming a trauma, the masterplan is formed from the combination of nine

principles. The better connection with the city, with openness of the dead-ends, the extension of the bank paths, the removal of the big vegetation and reactivation of the plateaus, the creation of balconies in the higher levels and gathering points in the lower. This has as a result the creation of a visual connection system, which encourages the exploration and the walking. However, the movement isn't a continuous line. Someone can pass from the all stages only if he walk to the streets of the city. The interplay between the walking next to the water and in the city network is on purpose, in order the two elements, the river and the city to be one body.

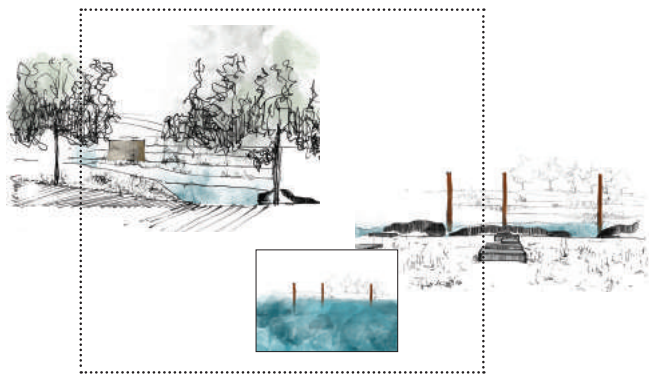


Fig. 2 walk of memories, west bank-from Titov until Bunur

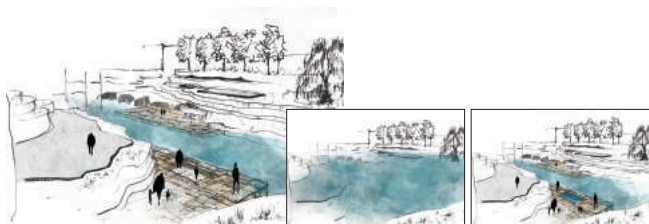


Fig. 3 walk of memories, east bank-from Titov until Bunur

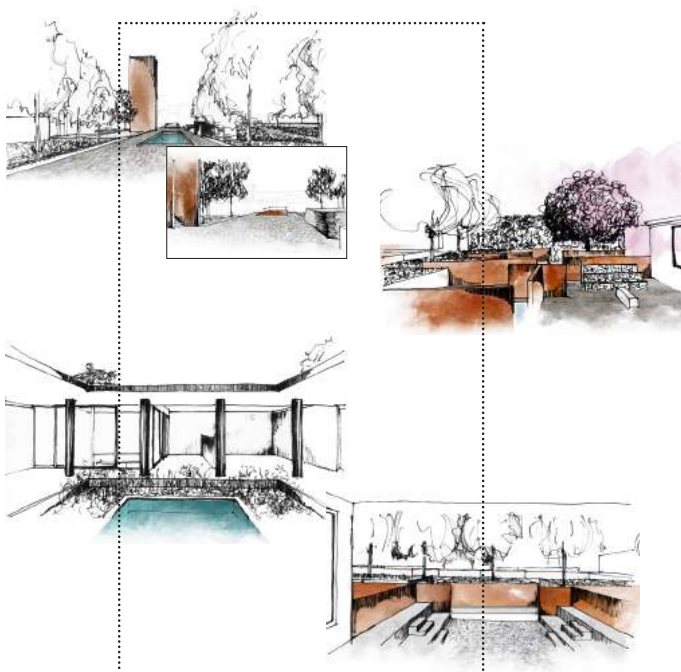
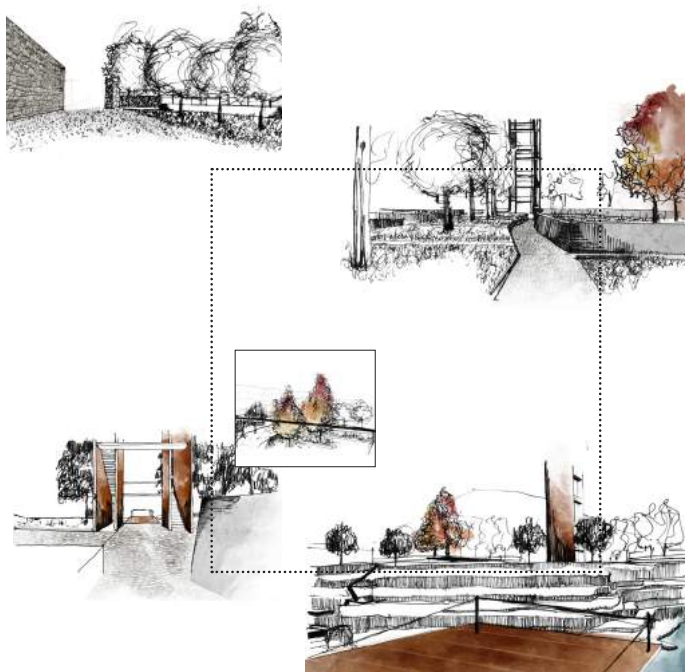


Fig. 4 garden of contemplation - old Bascine garden

Fig. 2 - 4 The detailed design is focused on two sites. The first from Titov Bridge until Bunur area and the second one in the Bascine garden. The choice of these sites occurred in order the design experiments cover the four stages of the healing process. Confrontation, mourning and acceptance are expressed mean the design from Bunur until Titov Bridge, while reattachment, which takes place in Bascine has to deal with a big abandoned green area in the junction of the two parts.

The project proposes a walk of memories from one bridge to the other accomplishing the three out of four stages



of healing. The routing starts with wide platforms next to Titov Bridge and acceptance stage, which are become narrow and difficult walk in Bunur area and the confrontation stage.

For the last stage, the reattachment, the new garden of peace, tranquillity and contemplation becomes part of the citizens' day to day experience. The two basic entrances of the garden connect it directly with the Old city and create different isolation zones for relaxing and thinking. In the intersection of the axes, a high observatory is placed, giving the chance of viewing the city and nature under.

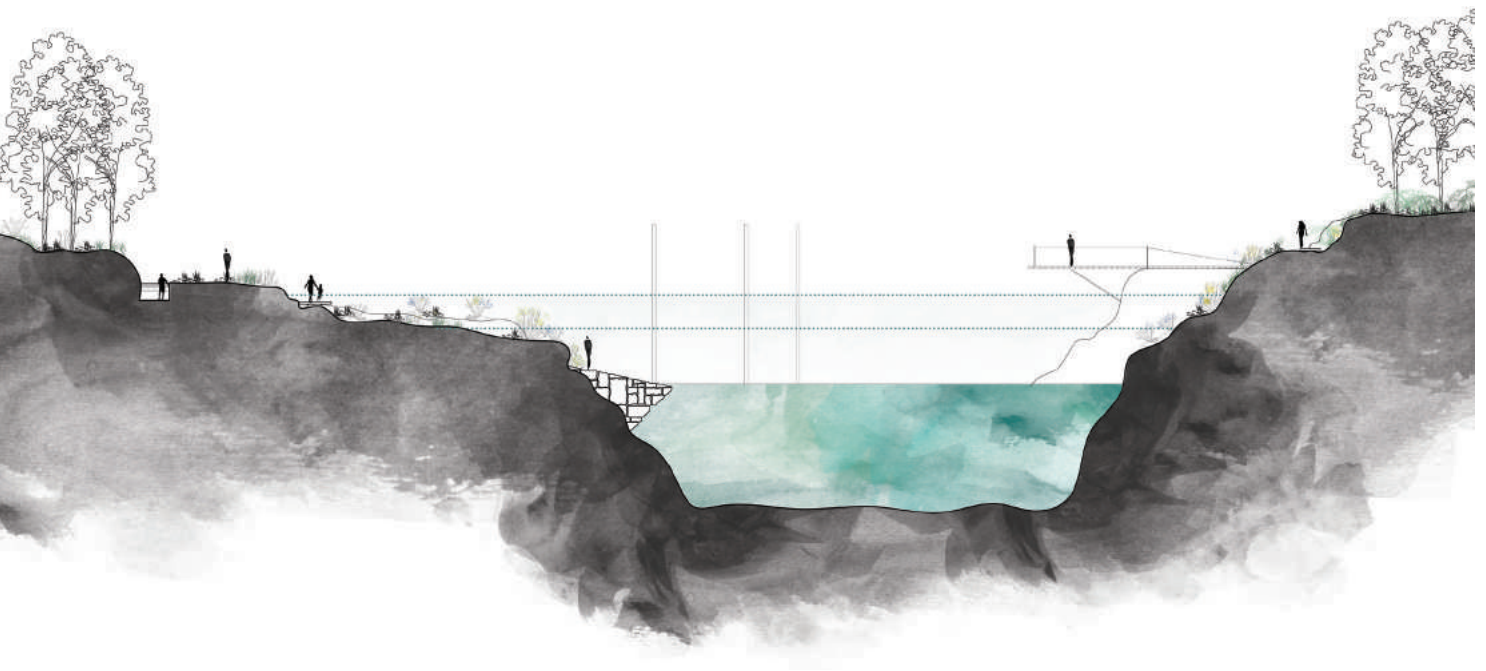


Fig. 5 section a-a'

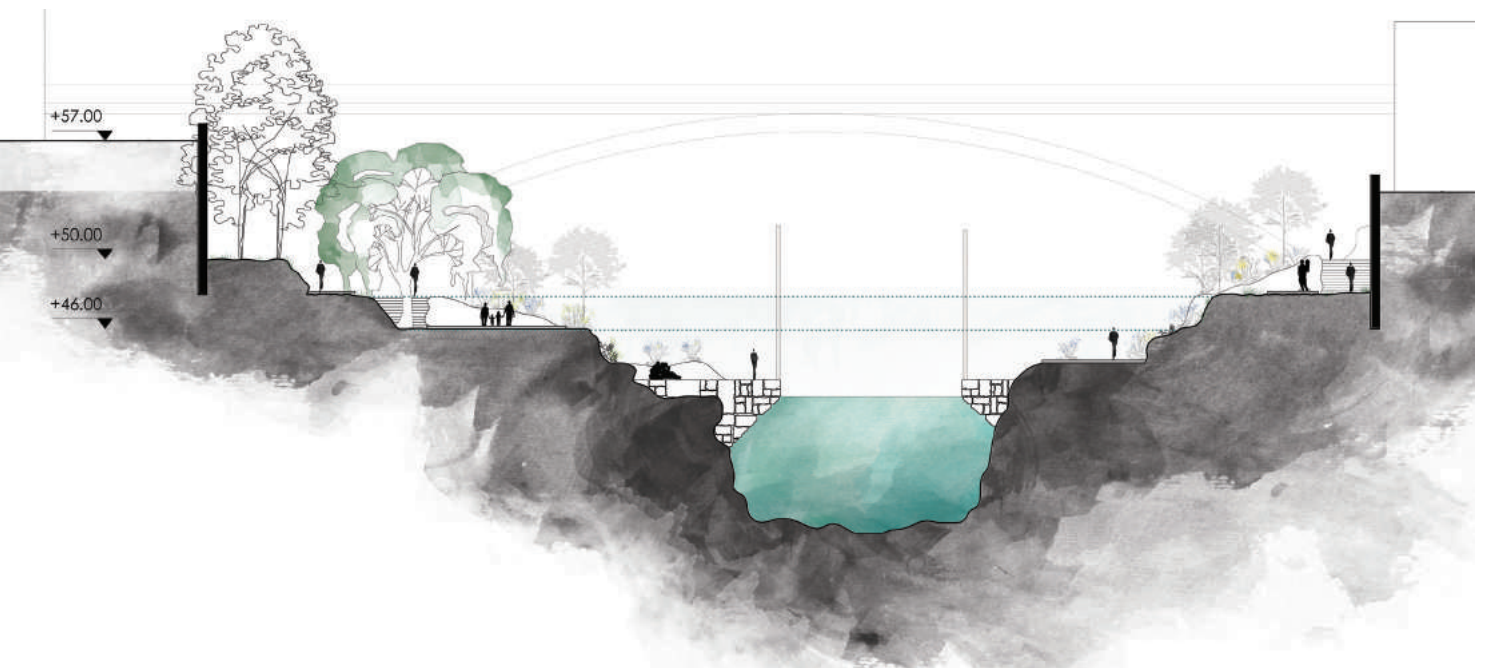


Fig. 6 section b-b'

Fig. 5 - 6

In the walk of memories, the visitor plays a different role in relationship with the ruins and the landscape. Close to Titov Bridge, he/she is basically an observer of the surroundings, while starting to the walking this experience is changed.

The new intervention functions as fill of the missing parts of the old ruins, where people can sit or lie down. Approaching to the confrontation stage and the memorial, the materials are harder as also the nature, locating the

visitor inside the landscape. In any case a series of trees are planted close to the basic platform, indicating the basic route and not influenced from the water and the lower levels.

Finally the verical corten elements, mark the particular stones, bringing their stories on the surface of the contemporary city.



Fig. 7 section c-c'

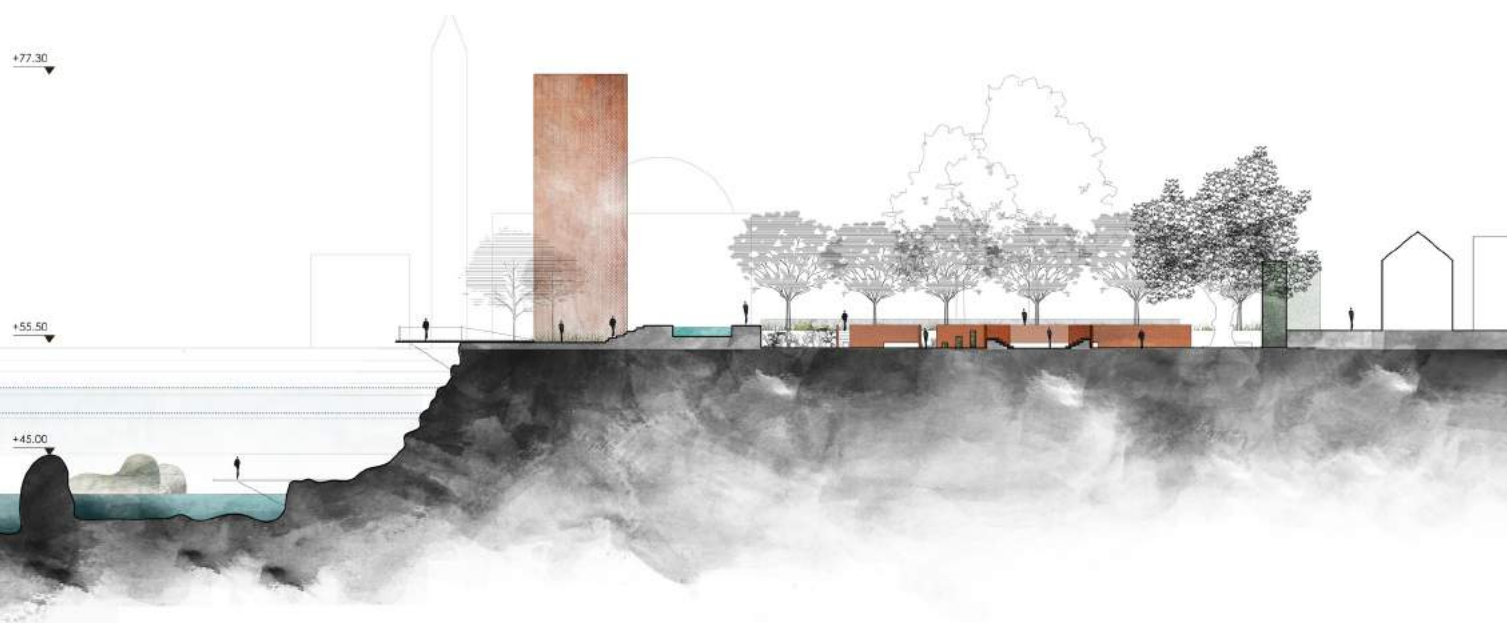


Fig. 8 section d-d'

Fig. 7 - 8 The paths consist of the transition among the more public and more isolation zones, which is actually a transition of memories, and they are in the middle high level. At the edge of the cliff the extro zone is the lowest, bleachers around attracting people to sit and gaze. In the middle of the garden one part is fenced keeping the current situation with the old canals and just two trees are planted in order to indicate the coexistence of two elements. This abandoned area is clearly visible only from the observatory. Semi-round the restricted area lemon trees are planted as remembrance of the old memories and are the spatial filter for the completely isolated area.

The last is excavated in order to reach the pure rock and releases the innate values of the area. It is separated in different rooms by corten panels and are characterized by diverse natural elements, creating different qualities like the reflection on the water, the sound of the gravels, the soft touch of the grass, the view of a Prunus' colors and the smell of bushes.

The garden can be regarded soulful or retreat for meditation, a place to celebrate earth in all of its majesty, or a source for and inspiration to healing. It is a place of peace, solace, healing, and inspiration.

Enhancing the survival landscape

Spaces of resilience as social catalyst

Isabella Banfi

Project location:
Mostar, Bosnia and Herzegovina

Mentors:
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Keywords:
resilience, survival landscape, spatial conditions, speculation, participation.

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We are nowadays constantly being confronted with images of conflicts from all over the world. It is a reality that seems far away from us, until we are not called to confront it closely. What happens when traumatic events unexpectedly not only change the environment, but erase entire cities? Throughout this research, it is questioned the role of landscape architects in post-war cities and how to intervene in a scarred territory.

Enhancing the survival landscape investigates the Siege of Mostar, Bosnia and Herzegovina (1993-1994) from a morphological point of view. The conditions of isolation imposed by the war forced the citizens to react, reorganising and reshaping the city in order to respond to the basic need of survival, exploiting the spatial conditions of the landscape.

All of this resulted in the creation of spaces of resilience, the starting point of this research. Structuring and visualising these notions, and developing a coherent project that deals with the survival landscape defined by citizens between 1993-1994 are the aim of this graduation project.

The research explores urban and landscape transformations of the city and the survival landscape, looking at the transitional spaces between military violent destruction and the spatial reactions of the inhabitants. Although the whole analysis is on war-space conditions, the design interventions do not enhance war-spatiality. They aim instead at switching citizens' attitude towards these areas, now abandoned due to the trauma caused. How can such spaces be redesigned in order to define new social connectors?

The design interventions can open up reinterpretation of the areas identified. The project is developed in three phases in order to enhance the spatial conditions of survival landscapes: (semi)enclosed, confined and impenetrable. In the first phase, these spatial conditions are exploited and enhanced through physical interventions, without defining functions, using the existing elements and the topography of the site.

In the second phase, it is defined the network that connects all the areas of intervention. The network is marked with biodegradable painting. It is a temporary intervention to attract and make citizens aware of the new spaces designed. Over time, the painting will fade away and eventually disappeared.

The third phase represents the ideal scenario: the design interventions provide space for a variety of activities, all directed towards a regeneration of a cultural heritage and a definition of a sense of community. The final proposal, enriched with speculative and participatory analysis, proves that the spatial conditions exploited still have a productive force.



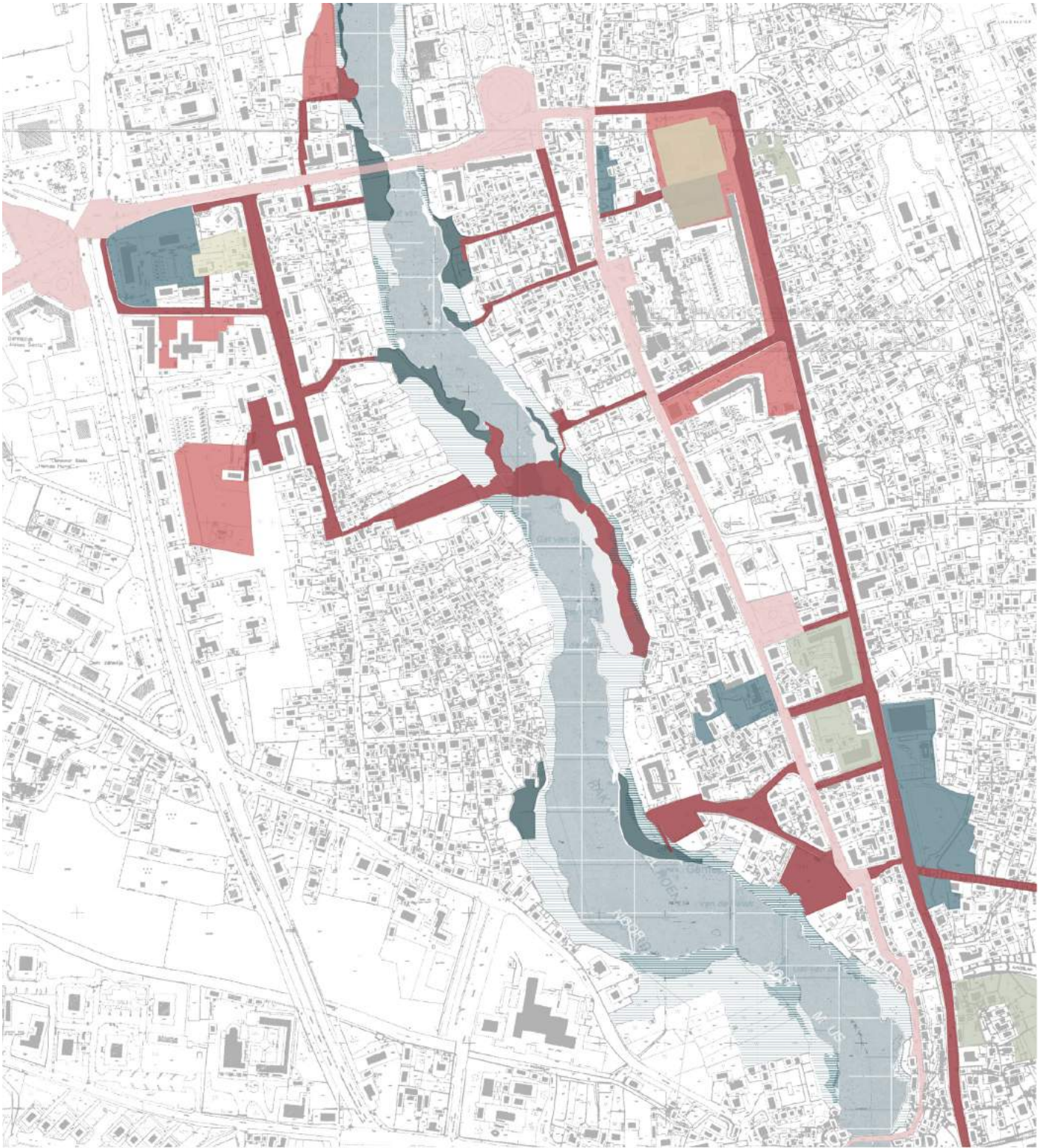


Fig. 1

Fig. 1 The specificity of the landscape created in Mostar great opportunities for warfare. However, it also triggered coping strategies and mode of resilience, exploiting the conditions of the landscape itself to define a protected, survival landscape. The spatial conditions of the survival landscape – enclosed, semi-enclosed, confined and impenetrable – are used as tool to investigate the residual and abandoned areas in Mostar that belonged to the survival landscape during war-time and that are now avoided by citizens.

conditions, making them visible through the design interventions. The areas will be connected by an active network, implemented when missing with a new one.

The survival landscape tool is therefore the base for the design, that will be implemented with participative and speculative approaches, to define the final proposal.

The main aim of the design is to exploit these spatial



Fig. 2



Fig. 3



Fig. 4



Fig. 5

Fig. 2 - 5 In order to understand how can such spatial conditions be exploited in order to switch citizens' attitude towards the residual hidden survival landscape, I explore different techniques. I chose to initially tackle the design with a provocative approach, heavily relying on speculation.

"Speculative design is a discursive practice, based on critical thinking and dialogue" (Mitrovic, I. 2016). Speculative fictional design has been chosen because it stimulates debate and discussion, as a starting point for a scenario of reactivation. It creates space for new

perspectives, with the purpose of understanding what is better for the future of Mostar.

These visions were presented to citizens during the one-day workshop in March 2019 as part of the games to open up a discussion, creating different narratives on how design interventions could influence the space. In this way, the landscape could be reinterpreted and newly understood, catalysing new, potential spatial relationships between citizens and their own environment.

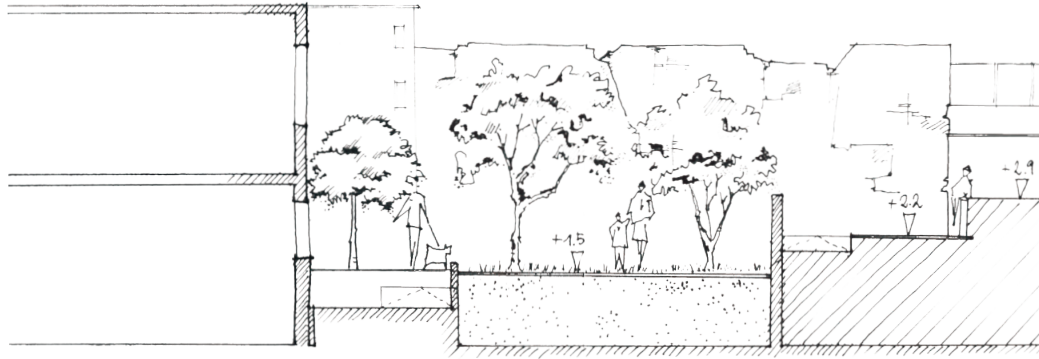


Fig. 6

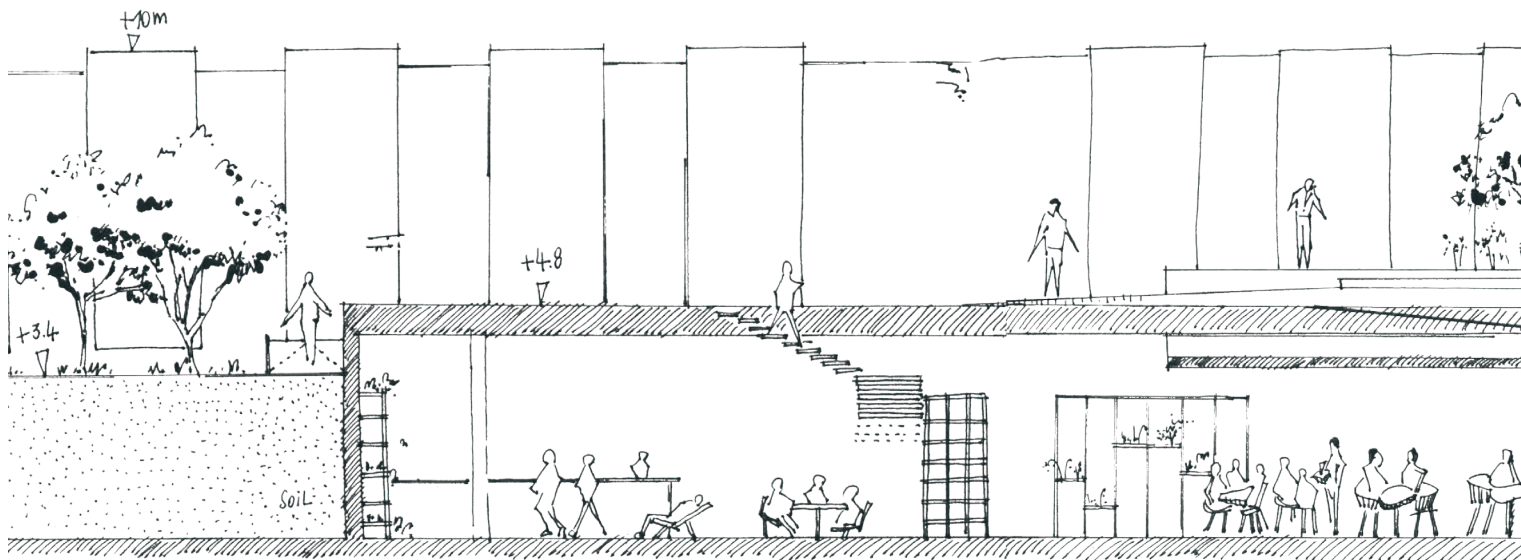


Fig. 7

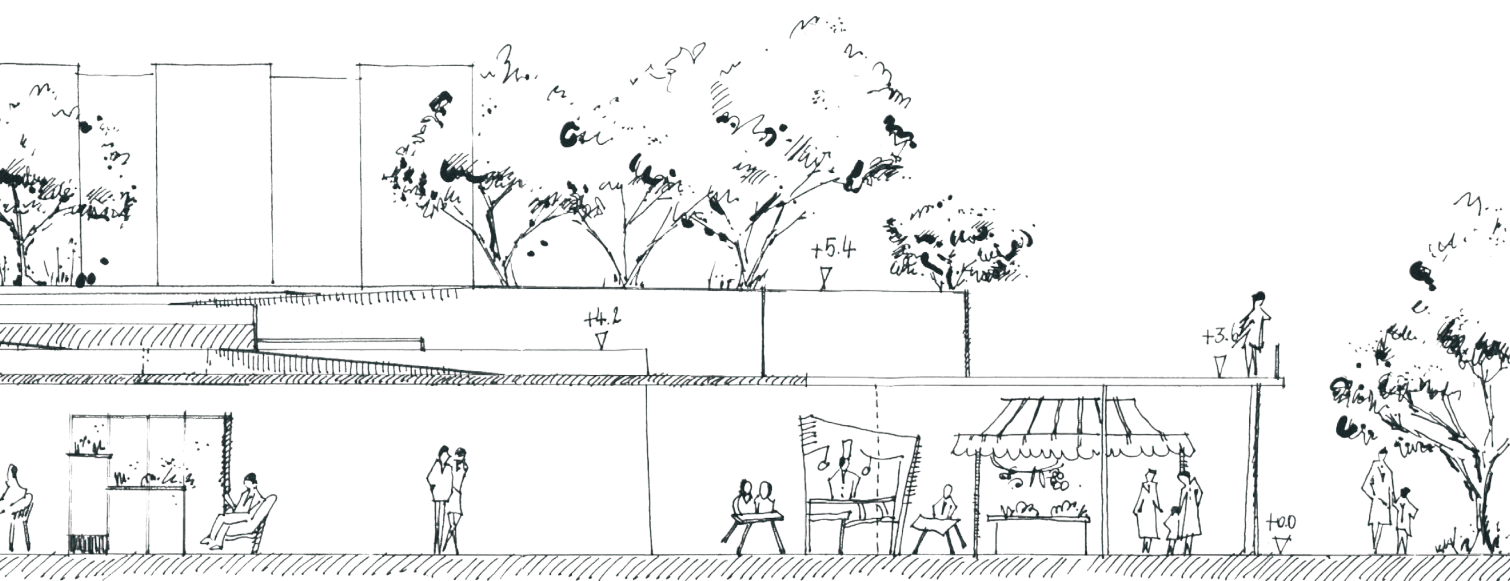
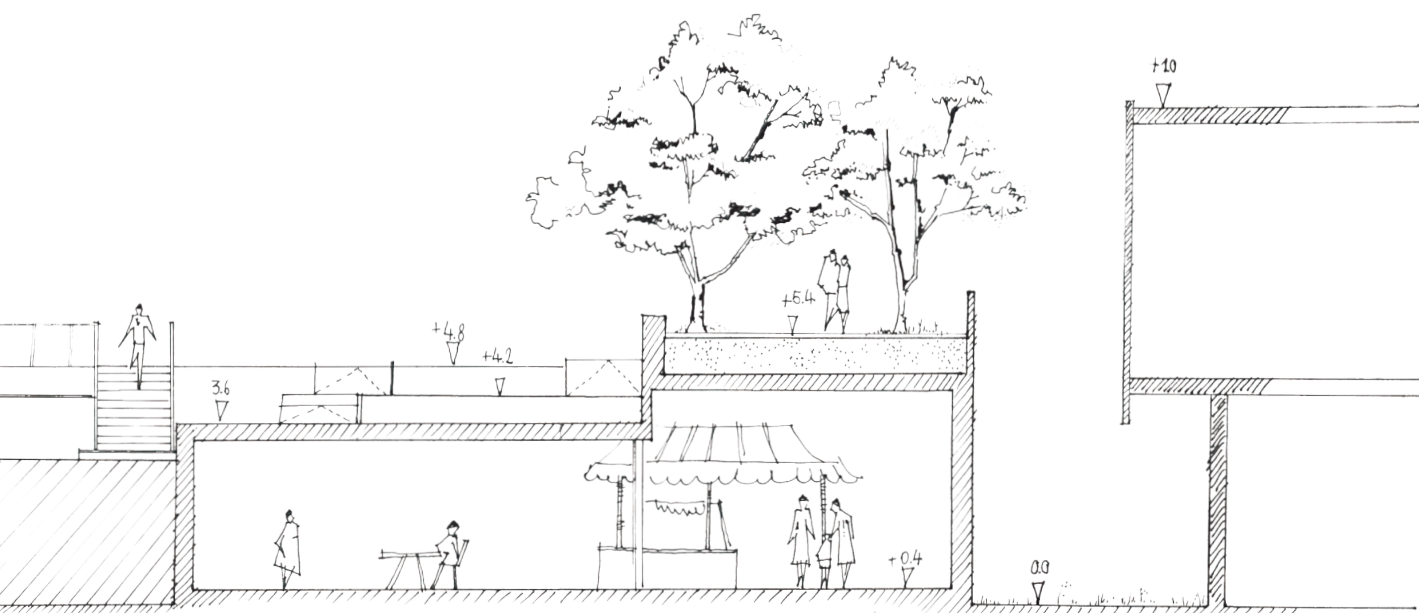
Fig. 6 - 7 One area — the former Razvitak department store — has been further developed in a detail design as example for the treatment of spatial conditions. Although there is a general strategy to deal with spatial conditions, each spot needs to be developed based on the existing elements and topography of the site.

This area is characterised by the former Razvitak department store, that now lie in ruins. The area surrounded is used as parking space.

The intervention enhances the characteristic of enclosure

of the site, embracing the Razvitak. A void surrounds the ruin, defining it as an inaccessible. The ruin has been celebrated by the design: a series of horizontal terraces at different levels provides continuous views on the Razvitak's facade, defining a journey around the narratives of the bas-reliefs, illustrating the stecci (human and animals stylized figures with symbolic ancient meanings).

The terraces are formed as plateaux ranging from paved to extensively planted. The series of steps, terraces and ramps are treated in brick stone as the pedestrian street Brace Fejica, giving continuity to the area.



Moreover, under the platforms there is space for cafès, tables to study and work together, but it is also possible to set up a local market where citizens can sell the vegetables produced in the community garden.

The higher platform at the level +5.4m presents light trees, which crowns allow to see through and look at the facade of the Razvitak. The fences are a continuation of the topography, rising up in concrete and defining at the same borders and seats.

The design intervention not only enhance the conditions

of the site but it also becomes part of the urban social areas along the city of Mostar. Hopefully, more and more people, citizens and tourists, will be attracted by the project, and the area will become a social catalyst for the whole city.

Garden as a microcosm of city

The post-war landscape of Mostar, Bosnia and Herzegovina

Minna Liu

Project location: Mostar,
Bosnia and Herzegovina

Mentors:

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Dr.ir. S. Kousoulas

Keywords:

microcosm, garden,
post-war, ruin, post-war,
memory, urban and
natural processes,
carriers

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Mostar, a city famous for its world-known Old Bridge built in the Ottoman period, has experienced the violent atrocities during the Bosnian conflict from 1992 to 1995.

After the war, despite its very mixed population, the city's urban space now is not shared by the different communities. Instead, It is fragmented and polarised by the two biggest national groups, leading to a Croat West bank and a Bosniac East bank. Whether physically or psychologically, the city Mostar is considered a divided city.

Under this extremely difficult and complex context in the post-war situation, any proposal is facing tough pressure to coordinate and implement. That's why transforming a place full of potential to a garden as a microcosm could be a good choice to first light the current situation.

In order to address the problems, a garden as a microcosm of the city Mostar is supposed to help to inspire how to re-introduce the river to the city again, improve the living quality of inhabitants and empower visitors to develop different perspectives related to the research objective. By gathering and expressing the features which reflect the history of the city's development and culture into one coherent, memorable and recognizable place. It also expresses the desire to re-create or to redefine what has been lost during the development of the city.

Visitors of this garden could experience directly the beauty of Mostar spatially but are also encouraged to empower different perspectives towards to city Mostar itself, to develop another version of what is possible in Mostar in future linking what happened before. That requires certain carriers on which the memory was shared, the history was carried. By re-interpreting these carriers, it allows a way to re-look at the events that have occurred in these places, creating the potentials for new stories in the future.

The research objective of this research is focused on the development of design strategies addressing not only to explore the spatial and cultural potential within the new garden, but also seeks to explore the relations of the affordances and expressive qualities combining with the use of technology and analysis of human's perception and reaction.





Fig. 1

Fig. 1 The site Luka area is one of the oldest and most famous neighborhoods in Mostar. During the war, the most temporary bridges are built here to connect the flows, which are unavailable nowadays. After the war, residents spontaneously raised funds to build a playground, placed a bench, with every way they tried to regain contact with the river. The aim of this proposal is to create such a continuous base for relation and interaction between the carriers in the riverscape area as well as present as a showcase to return the liveliness to the River Neretva, the city and the people.

One of the main characteristics of the proposal is the introduction and formulation of a new water flow taking advantage of the existing terrain and connecting to the river body, but showing a total brand new system involving the processed of purification, interaction, flooding management, and drainage control, with the cooperation of other two carriers.

Besides, the time development will be taken into account when the processes and changes will take place to ensure the garden developed dynamically along with the city.



Fig. 2



Fig. 3

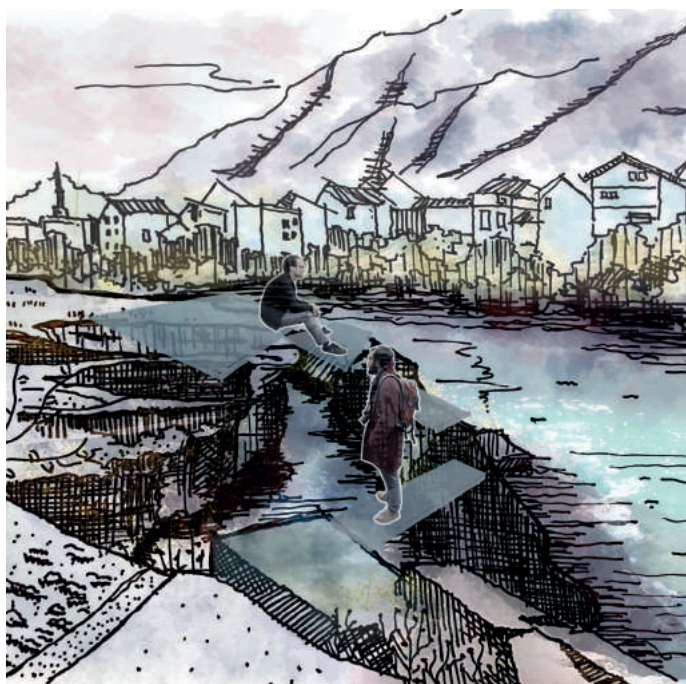


Fig. 4

Fig. 2 - 5 The application of the design principles results on the creation of a revived riverscape. By constructing platforms of different heights and setting up copper walls to guide and frame, the key points are emphasized along the river. In addition, the terrains are designed for activities along with dynamic water level changes. In this way, the river itself can be activated to a certain extent.

In the proposal, instead of a linear river waterway with limited interaction with visitors and surrounding landscape types, a broader dynamic zone with richer ecological value

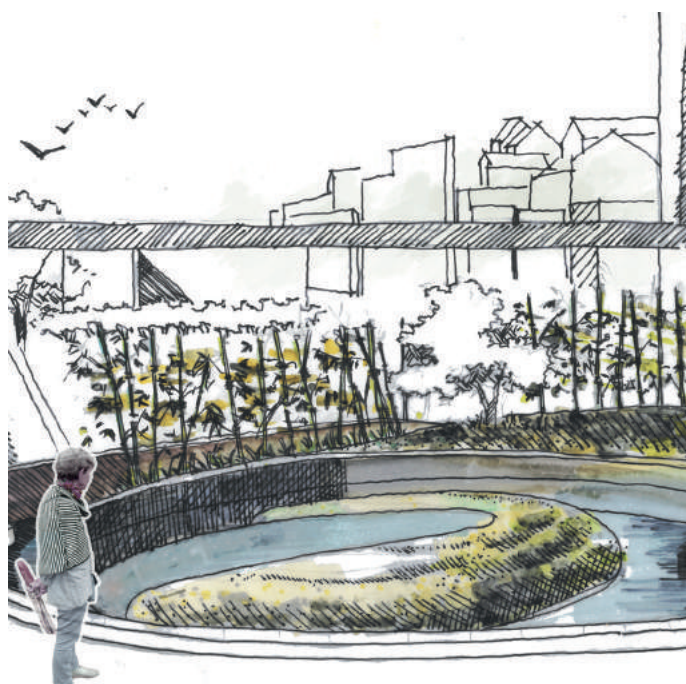


Fig. 5

for the area and more inspiring experimental landscape processes is formed. Therefore, the water edges are not presenting barriers, on contrast they are becoming gradients related with the surrounding landscape.

At the same time, the garden becomes a place where the three carriers of the city Mostar - the river, bridge, stone are interwoven richly again.

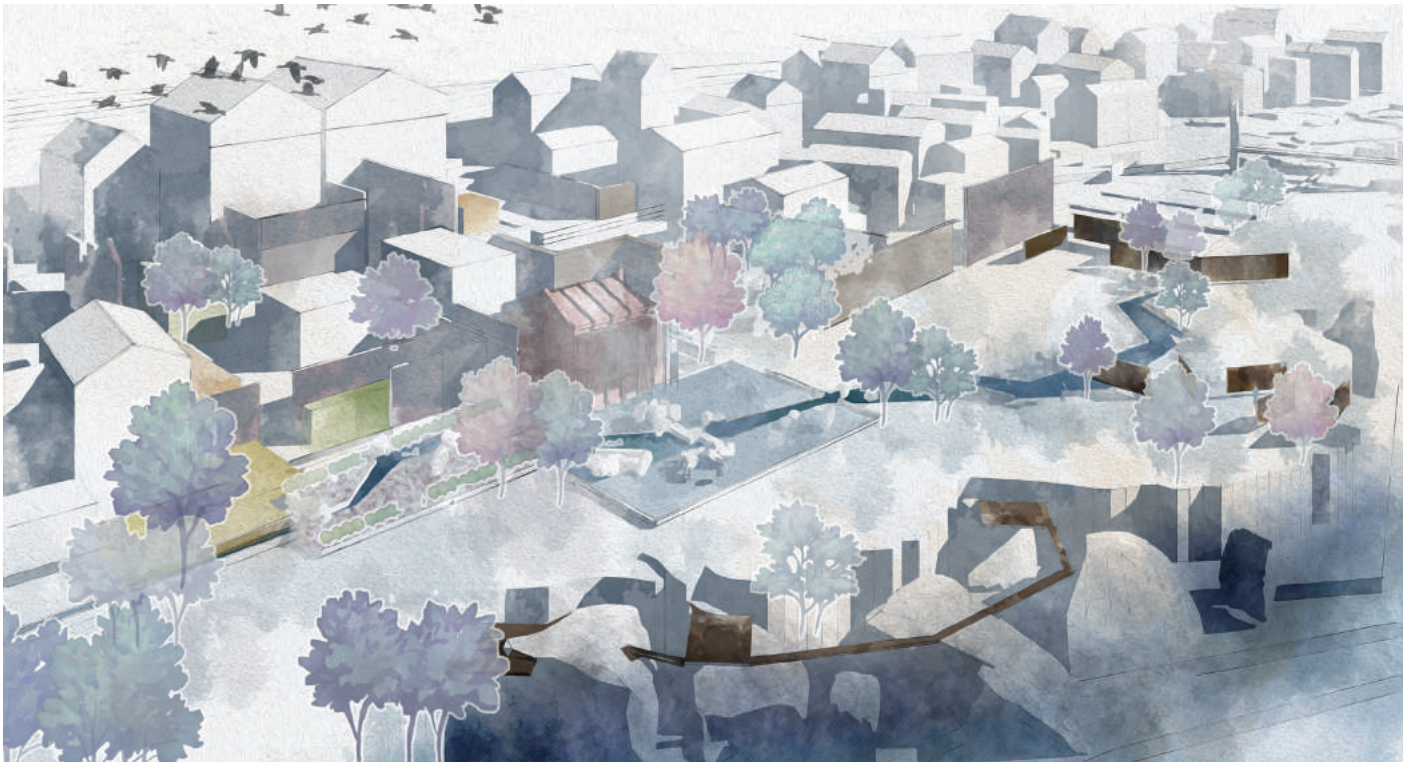


Fig. 6

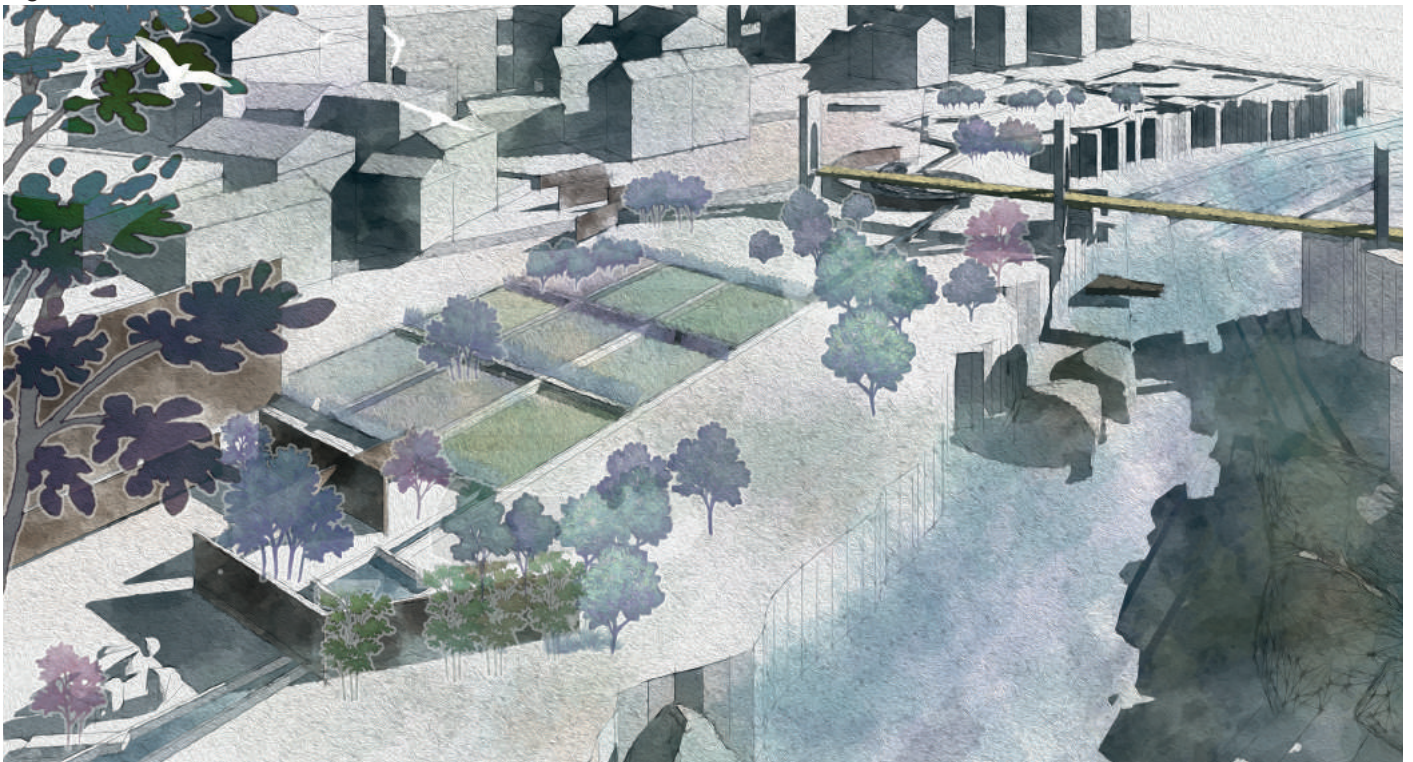


Fig.7

Fig. 6 - 7 Green and blue interactions penetrate into the site through the new creek shaping zones of processes translated into different places for social interaction. Also, the waterfront site becomes a zone of social and ecological relations as a pioneer affecting the whole city and the residents nearby. The riverside experience is extended beyond the limited space, triggered by certain elements on-site into personal and unbounded roaming.

According to the existing situation and the guidance by design principles, the four focus area where the

interventions are relatively denser and concentrated appear. In order to examine close there relations and new conditions of the masterplan, focusing on the atmospheres on the human scale, the focus will be in four areas. With its characteristic position and its unique relation with the element of the river, each of them functions on different emphasis.



Fig. 8



Fig. 9

Fig. 8 - 9 The aspect of time is a crucial factor for this thesis, which allows the natural processes of the garden in the riverscape to develop and react with the proposed interventions. Focusing on the interaction between landscape processes and typo-morphological aspects, this chapter works on exploring an outcome of smaller interventions realized in the different environments over the years.

The first aspect is the flooding issue. Without effective water management nowadays, flooding is one of the most serious issues facing Mostar. In the proposal, there

are several operations addressing this problem in order to keep the garden running in different circumstances, as well as bringing inspiration to other potential interventions in the city Mostar.

As a microcosm of the city, it's essential for this garden to interact with the urban fabric and urban processes. Therefore, other aspects such as plants, material and how the garden improves the public space network in the city are also taken into account.

Paradise lost?

Restoring urban river Radobolja

Niels van Hasselt

Project location:
Mostar, Bosnia and
Herzegovina

Mentors:
Dr. Ir. Saskia de Wit
Dr. Ir. Claudiu Forgaci

Keywords:
river restoration, lived
experience, post
traumatic landscape.

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This project is about the urban river Radobolja a tributary of Neretva located in the city of Mostar in Bosnia and Herzegovina. The Radobolja river is a river with a rich history value for the city. There was a rich flora and fauna, but during the last century through urban sprawl and war, Radobolja was neglected and is now heavy polluted. The river lost its identity and is cut in several sections with all a different character. Ecologists, fisherman and civilians are all worried about the river. The fish are gone and the river turned into a no-go area. The city of Mostar used to be in touch with nature, but seems to have lost this connection. Rivers and their landscape provide space for a wide range of natural, economic and social benefits.

The Radobolja is a typical urban river, with all the problems and possibilities. It will be used as a case study for an urban river restoration plan to uplift the connection with nature and make the river a go to place instead of a place to avoid. Because of its scale (only 5km long and entirely laying in the city), this restoration can have a big impact on the surrounding neighbourhoods and the rest of the city of Mostar.

The design use the lived experience of the river as a guidance to discover the already contained beauty of the river. This restoration plan with involves cleaning the river and adds aesthetic value to the river. This is done by implementing a path along the river which connects the three design locations. These design locations are connected with the three nature principle. One closely connected to the wilderness, one to the rich orchard history of Mostar and one paying honours to the once popular Ruza Hotel.





Fig. 1

Fig. 1 The Radobolja river is a river flowing through different neighbourhoods, Everywhere it has a different appearance. I use this together with a cleaning strategy to clean the river and add the lost aesthetic value to the river again. Here you see a section in the Orchard garden. The phytoremediation plants are cleaning the river and the concrete edge is removed. The fruit trees let the people relive the glory days of the Ottoman Empire with their orchards full of pomegranates. They colour bright orange in blossom time, and turn the neighbourhood into one big painting.



Fig. 2

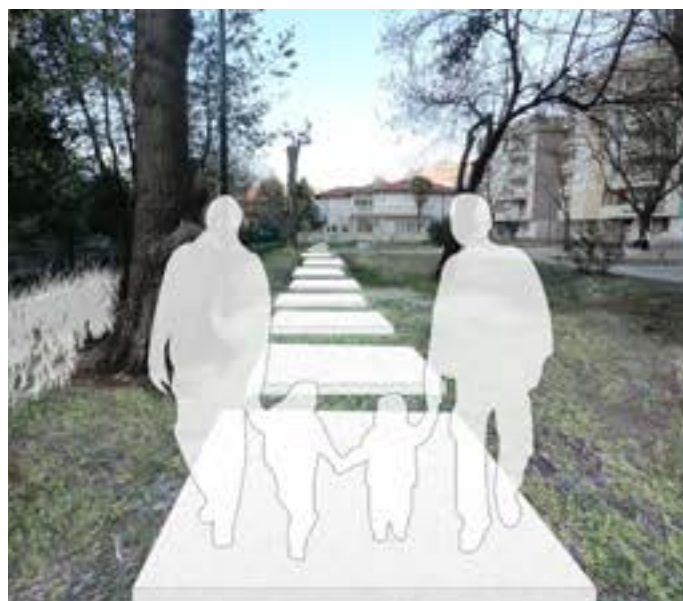


Fig. 3

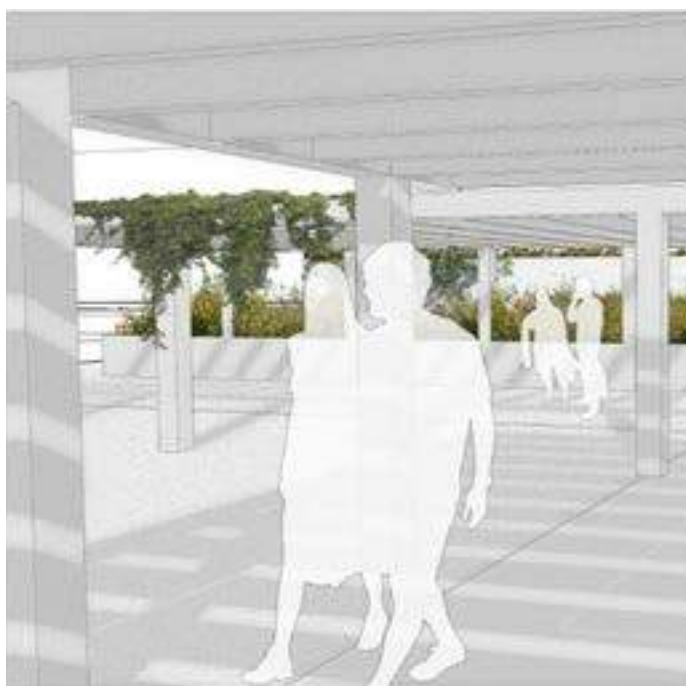


Fig. 4

Fig. 2 - 5 The experiential walk is adapting on the landscape typology. It is integrated in the existing street pattern where possible and introducing new roads where preferred. The walk follows the Radobolja stream but sometimes takes a detour because the urban tissue doesn't allow the path to follow the river in some places.

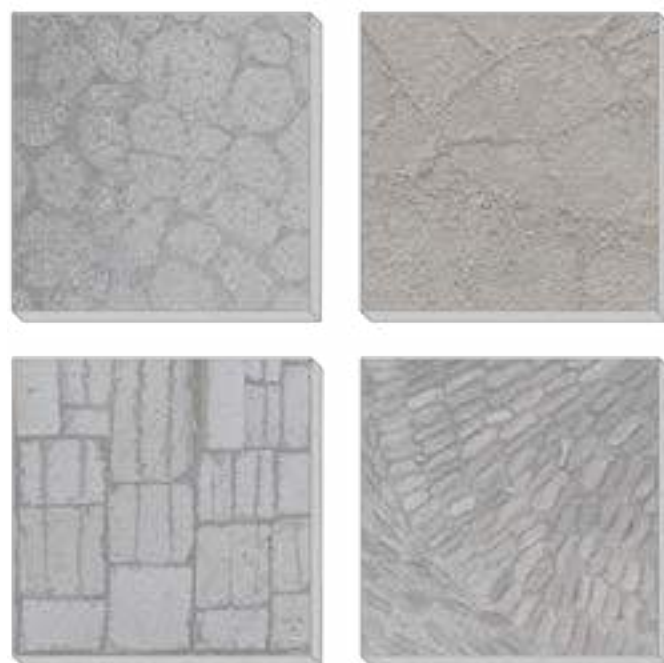


Fig. 5

I use the diversity of the different patterns as the guiding pattern of the walk. The material for the paths is concrete tiles. These are low key and easy to make and add in the existing landscape. The tiles have an imprint of the different textures found in the neighbourhoods where the river is flowing through.

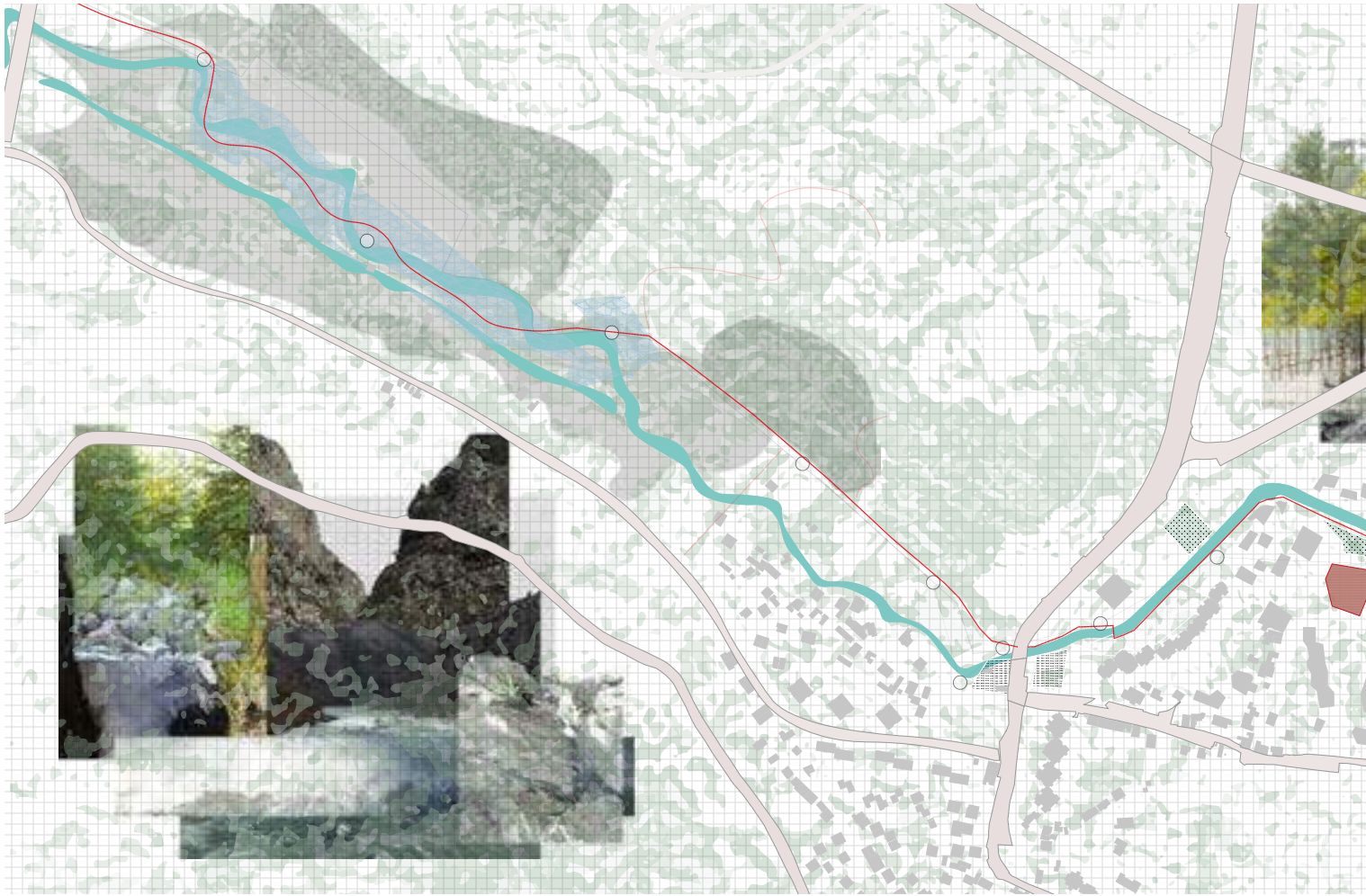


Fig. 6



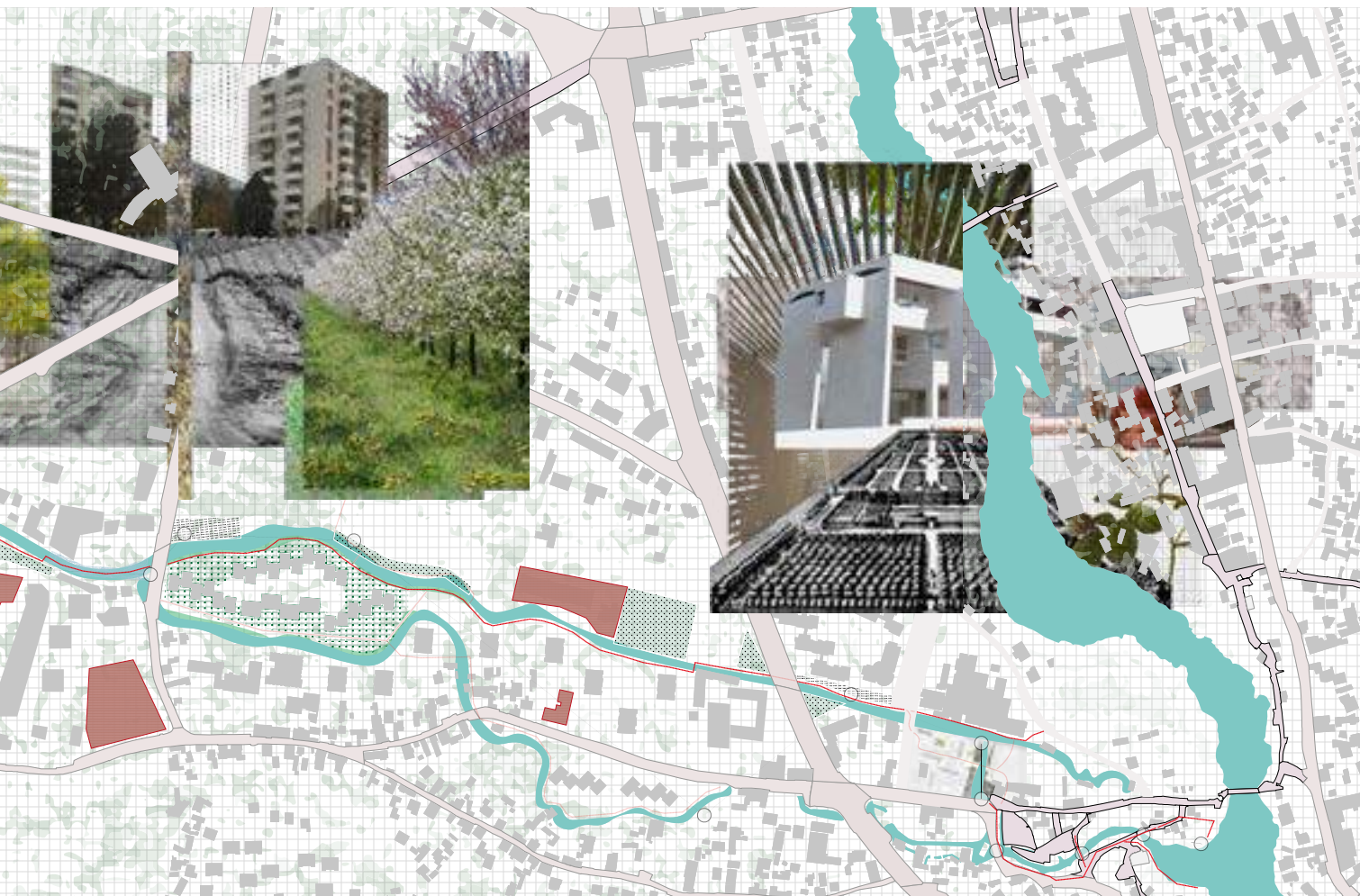
Fig. 7

Fig. 6 - 7 The research I did resulted in three design elements. The scenario creation method identified the three major design sites. The historic analysis together with the three nature principle was the basic for the meaning and themes for the three design sites and the experiential analysis is the mean for the connecting route along the Radobolja through these three design sites.

In the final design the social, ecology, functional, lived experience and history come together.

The three gardens located along the Radobolja river all have a close connection with the landscape and history of Mostar. They follow the principle of the three natures, the wilderness, the orchard and the garden. Each of them having a different character and feeling.

The first nature garden closely connected with the natural landscape of Mostar, the second nature garden located on the location where Mostar grew because of the production orchards around that place. And the third nature located in front of the Hotel Ruza a Hotel with a rich history for the locals of Mostar.



The project deals with the post traumatic landscape by showing this bigger history of Mostar through the radobolja river. By using for example the rich orchard history and historic importance of hotel Ruza it highlights the glory moments of Mostar instead of showing and trying to fix the reminders of the war. By using these strong memories in a design intervention along a river with a stretch through almost the entire city it can have a impact that touches a big part of Mostar. Especially in a city where the traces and scars from the war are still very visible and where it is very hard to develop these scared parts. The restoration of the Radobolja can be used as an example and stimuli for the

rest of the city.

I wanted to use the lived experience of the river because there was something about the river that had a certain beauty in it. I tried to find this beauty and use it as a tool to improve the quality of the river Radobolja. I analysed the different experiences you could encounter while following the river from where it feeds Neretva up to two kilometres upstream. I used the places with a strong experiential value as a guidance to discover the river.

Bordering Chaos

Reinforcing productive relationships in eroding territories

Purvika Awasthi

Project location:
Mostar, Bosnia & Herzegovina

Mentors:
Dr. Ir. Saskia de Wit
Dr. Ir. Stavros Kousoulas

Keywords:
affordance, urban
acupuncture,
heterogeneous, rhizome,
erosion, network,
territory, chaos.

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War renders the characteristic of a territory and over-shadows the affects and desires that have been always a part of it. The Bosnian genocide in the early 90's not only impacted the political and urban structure but also was a severe blow to the social structure. Mostar and Mostarki were synonymous to tolerant cohesive society. Neretva was one such important element of this society but over the years the people distanced itself from the river. The underlying effects of the war overpower the affordances and affects that are existing throughout the city and especially along Neretva. With these gradually decaying territories co-existing with rampant reconstruction to bring back the just image, a heterogeneity has resulted in present day Mostar. The urban transformations have also resulted in an overused and exploited river with increased erosion, sewage discharge and energy generation. In order to respond to the complex situation as experienced in Mostar, the project adopts a framework based on the theory of affects.

The lens enables to see this territory as a chaotic assemblage of affordances and potentials. Thereby, identifying & developing a relevant field of affordances in these chaotic slowly decaying natural and urban spaces. This leads to the development of a rhizomatic network of public spaces based on the strategy of urban acupuncture.

Fig. 1 explains the existing affects in the city which are both productive and non-productive.

The urban, social and natural transformations affecting Neretva -
Energy generation source
Landscape of waste
Mental divide
Flooding
Erosion
Affects of war -
Heterogeneous urban pattern
Decaying social spaces
Mental divide and spaces of trauma

Thereby, drawing parallels between these two scenarios both of these affects are leading to the loss of social space and tampering the legibility of the city.

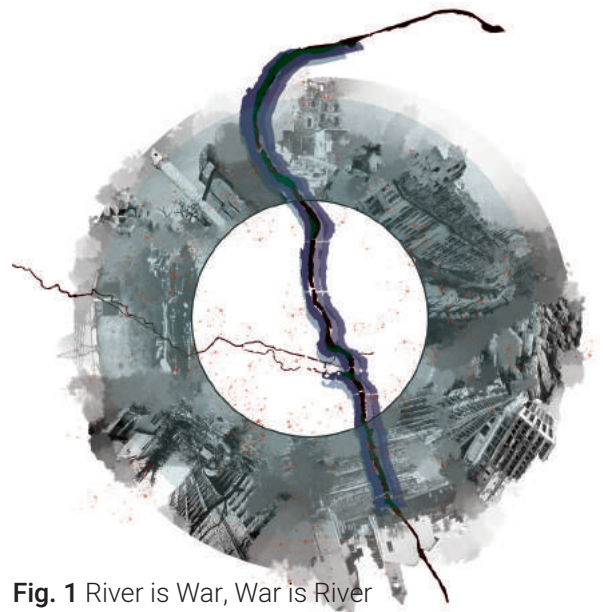


Fig. 1 River is War, War is River

In order to reinforce this lost relationship and to unearth the potential of these territories the project works at two major scales, first, the city scale network and second, object level sensory connection to the river.

The most vulnerable territories are within a limited boundary that is the former central zone. Also, this central area and the eastern part of the city lacks public space. Therefore, to initiate the process this area is selected as phase 01 and 11 sites are picked to create catalytic social spaces both along the river and in the city.

Fig. 2 on the right explains the area picked for phase 01 and the 11 sites chosen to initiate the rhizomatic network

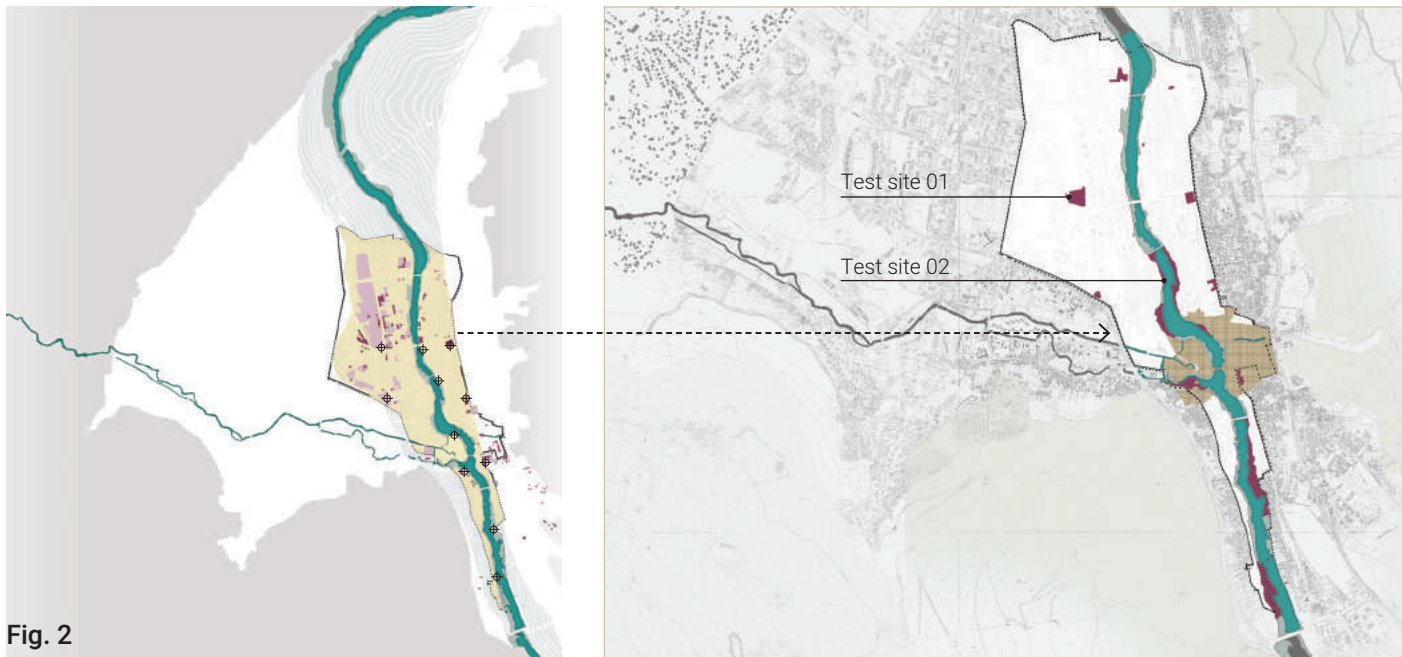


Fig. 2

Test Site 02 - Along the river

The area between Bunur and Stari Most was quite active both before and after the war. This particular stretch has a lot of duality in terms of affordances and the affects both humane and natural. The east bank being the one of the most heavily damaged spots during the siege to the west serving as a survival landscape with natural topography that aided in hiding. Neretva is also quite dynamic here - this is one of the most eroded stretch. The river banks become inaccessible with water just rising by 1-2 meters, also the river is extremely rocky here which leads to the formation whirlpools which makes it challenging to swim or dive (physically contact the river). Moreover, due to human activities it is highly contaminated as sewage pipes directly discharge into the river and a lot of inorganic waste is dumped on the banks due to the restaurants on the top.

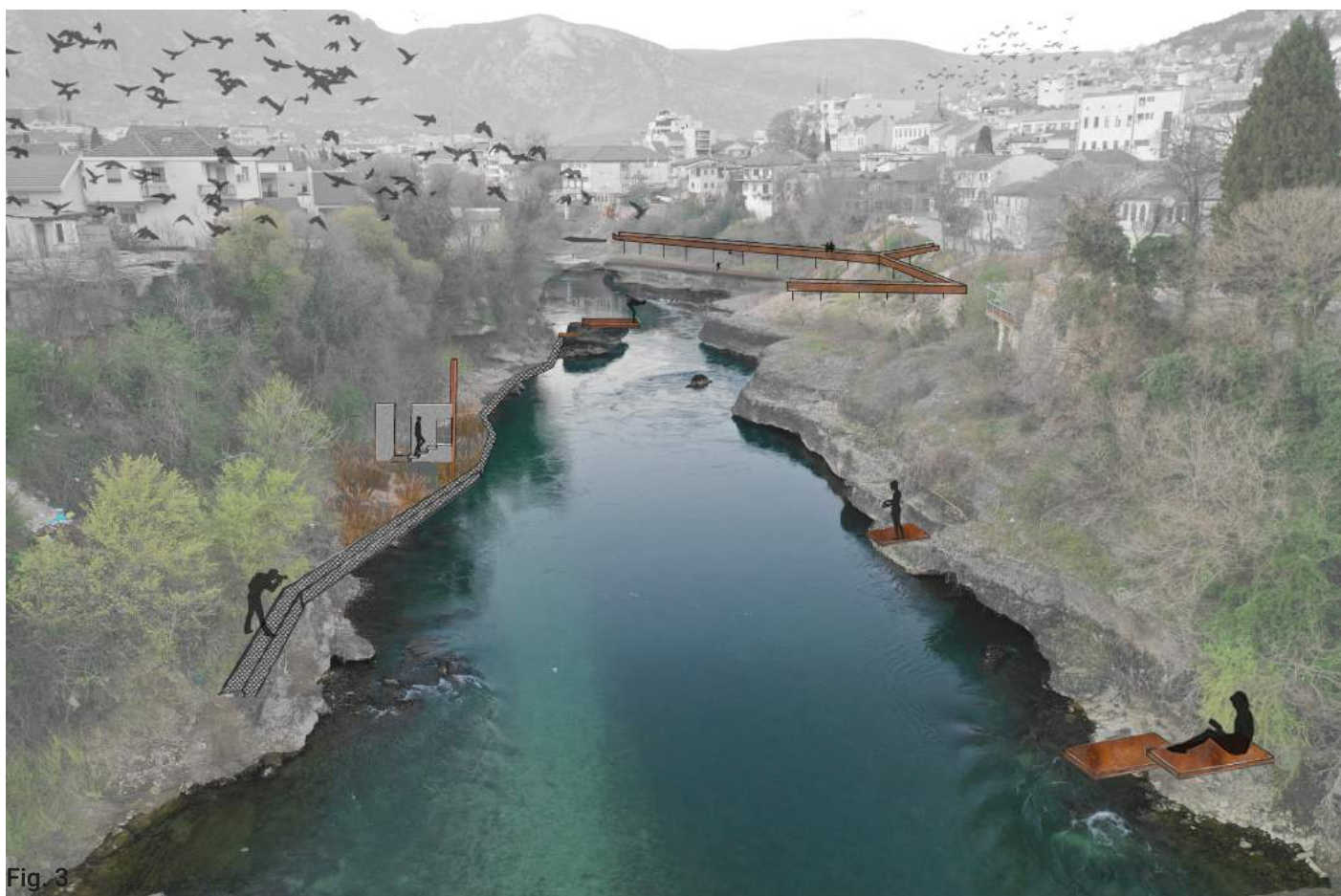


Fig. 3



Fig. 3 & 4 explain how the minimal intervention is adapted along the river to enhance the existing landscape affordances and qualities. The impression explains how the river banks adapt to the temporal dynamics of the river. The words for this part were *dominance* and *vulnerability*. The left bank responds to erosion by the erosion structures which also work as pathways. On the right, there are two pathways, during high tides they still keep the river bank accessible. These structures also trap sediments and create an environment for hydrophytes. The platforms create smaller territories within this landscape.

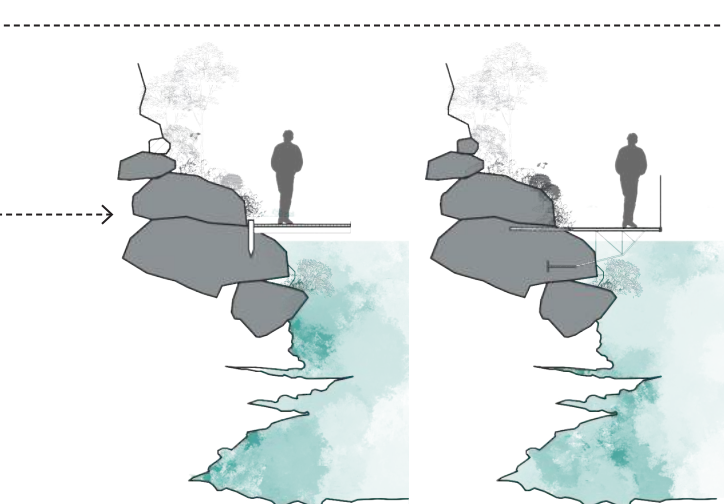
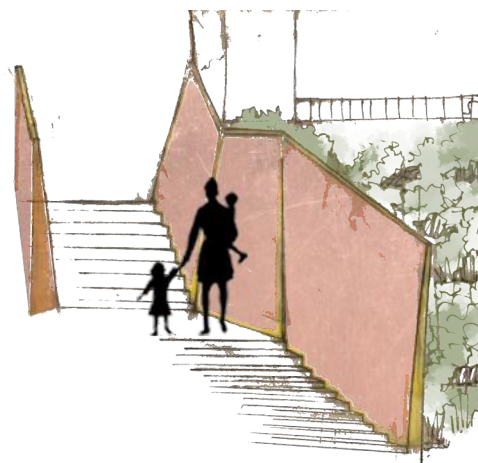


Fig. 5 Erosion control cum walkways



Access points directing the view and giving the idea of enclosure

Sensory Markers

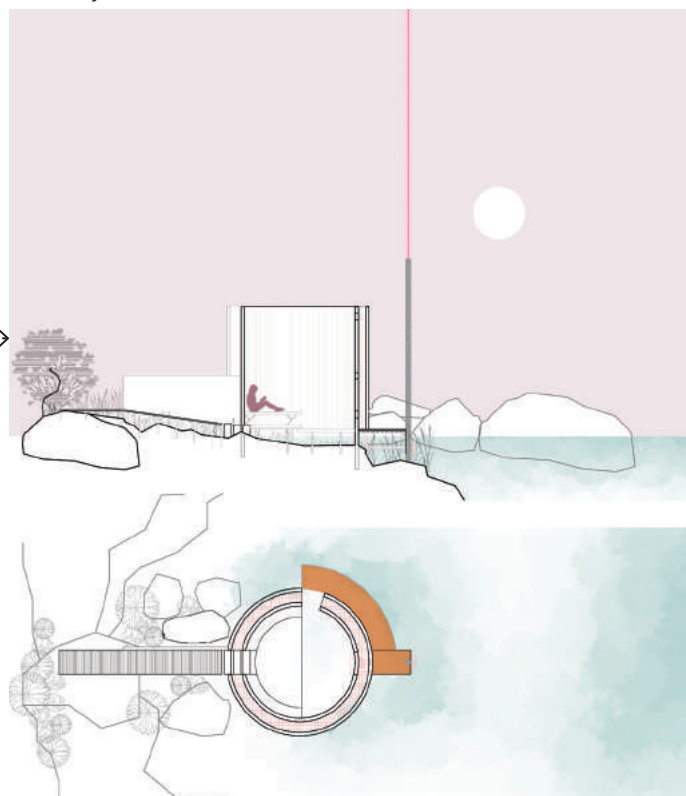
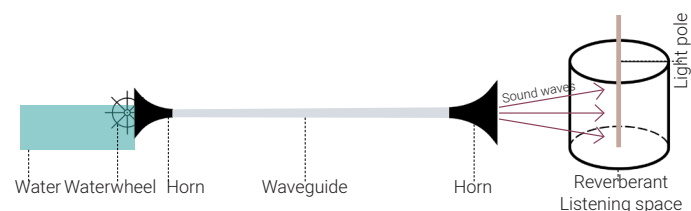


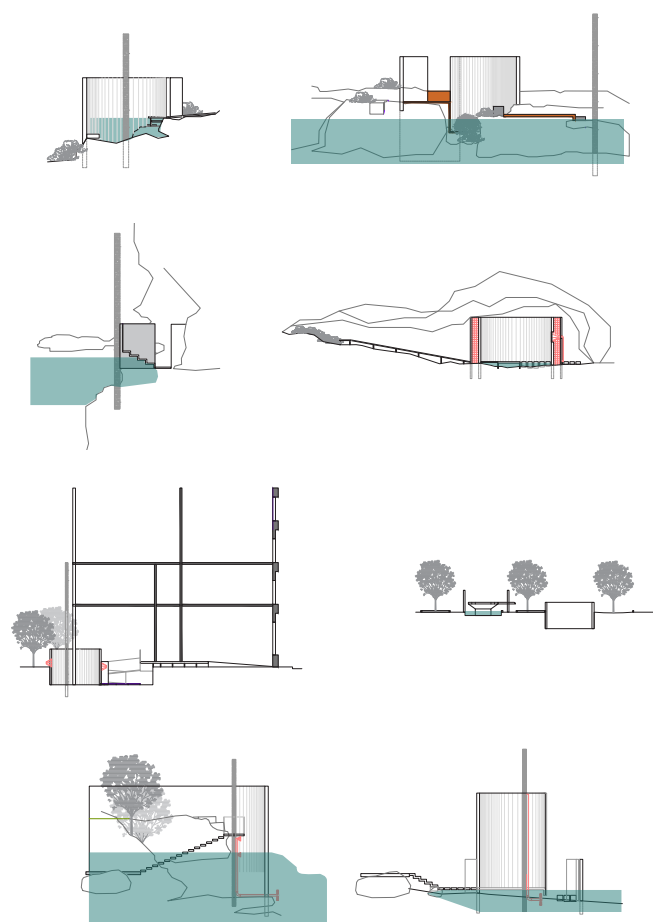
Fig. 6

This is one of the five elements designed along test site 02. This lies near the old pool and the area is characterized by numerous huge rocks forming smaller enclosed spaces. The element tries to capture the temporality of landscape as the water level fluctuates a lot here. It also has a variety of reeds and other marshy plant species. Platforms at different levels enable the use of it at different flooding levels. It only has single entry and exist, therefore it tries to keep the attention within the listening space where one can sit, view and hear Neretva. A narrow walkway leads to the light pole outside and can be used only by a single person. The element also marks the transition from the moss garden (old pool) which is more public to private space - element and

Sensory Markers at 11 sites



Principle of working



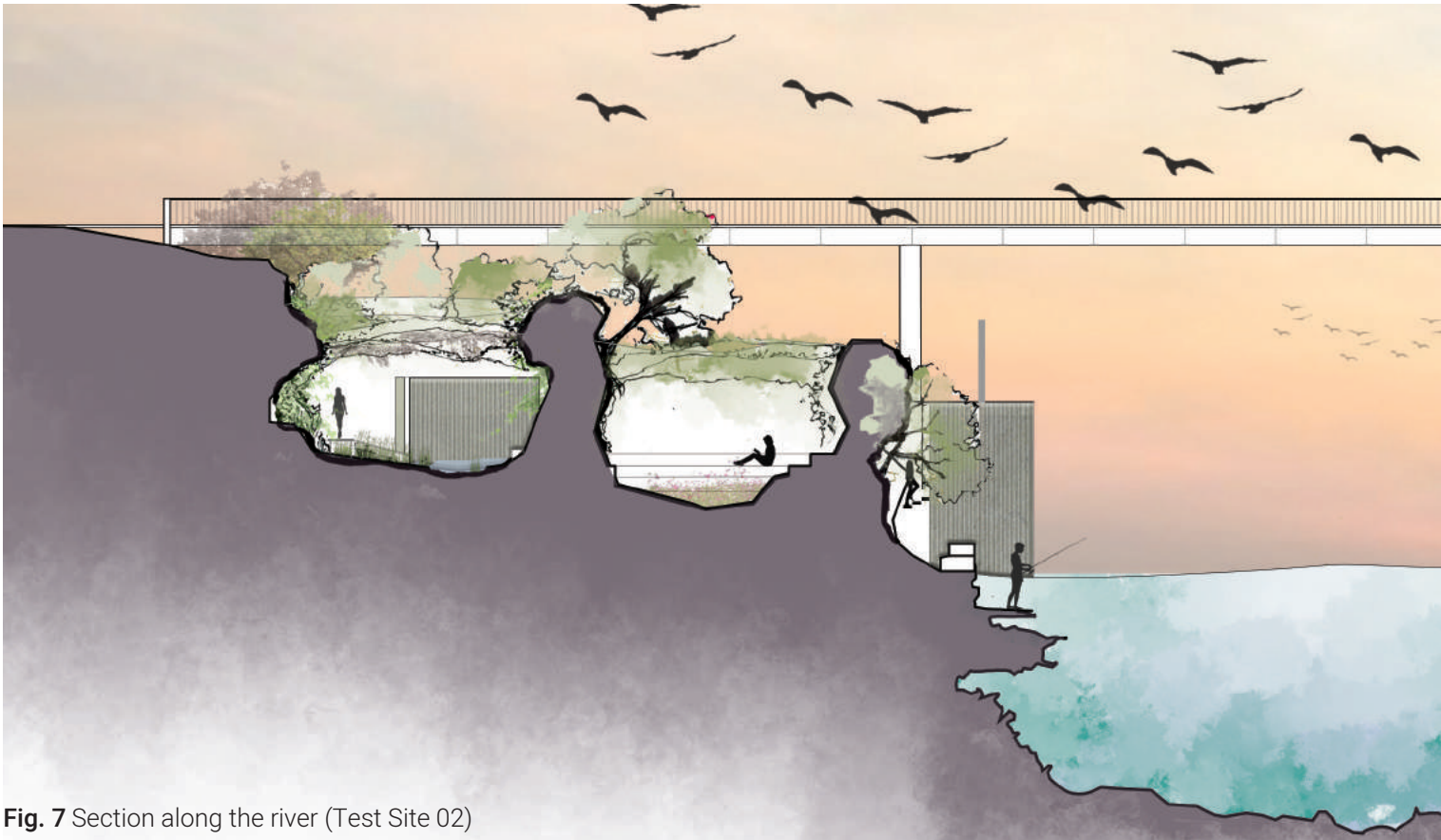


Fig. 7 Section along the river (Test Site 02)

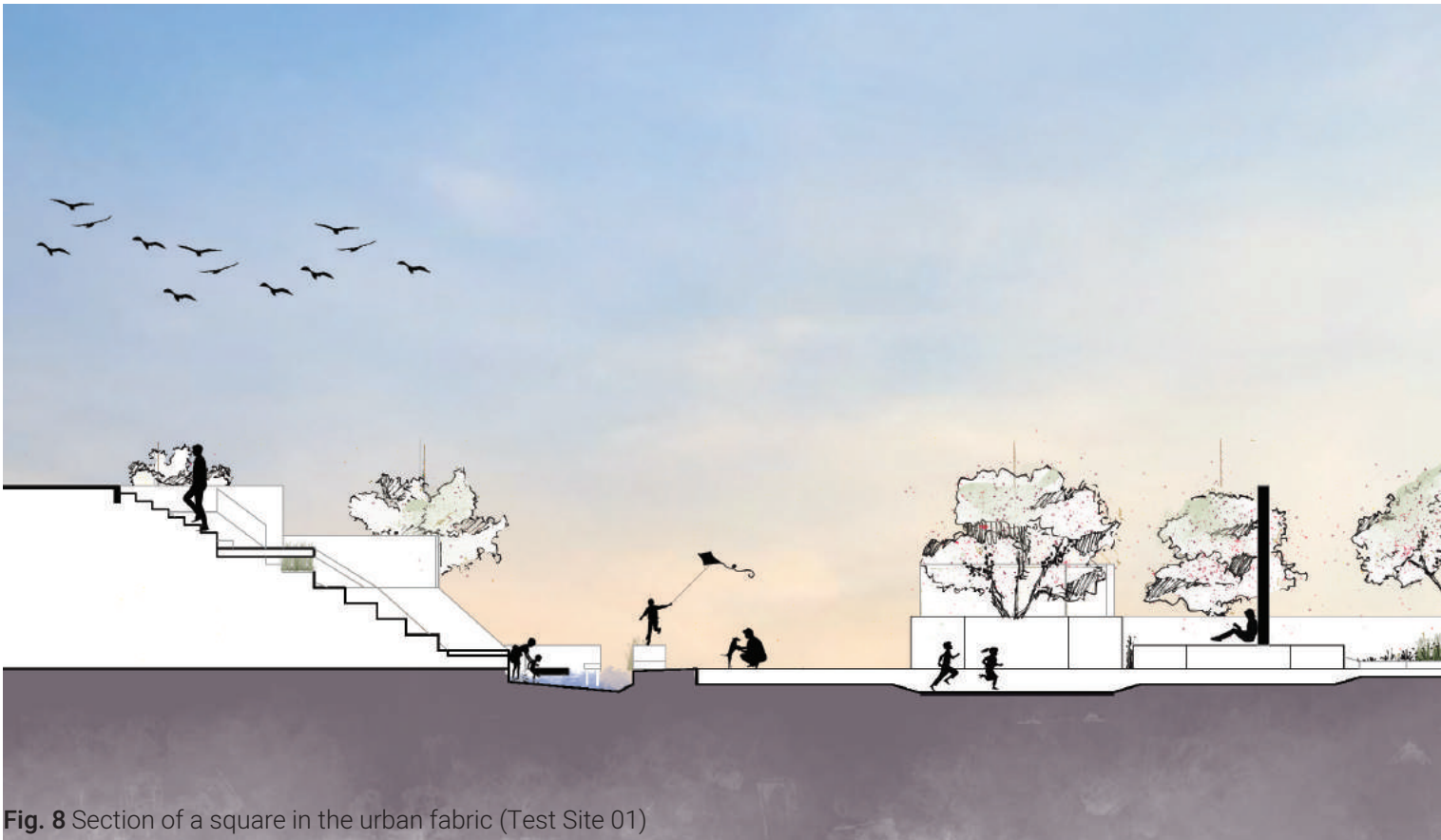


Fig. 8 Section of a square in the urban fabric (Test Site 01)

Fig. 7 elaborates how the interventions work along the river and as the project also involves feelings and experiences how they are paned out here. The design adapts to the dynamics of the river and enables different parts of the river to be active as per different seasons, water levels as well as it changes over time.

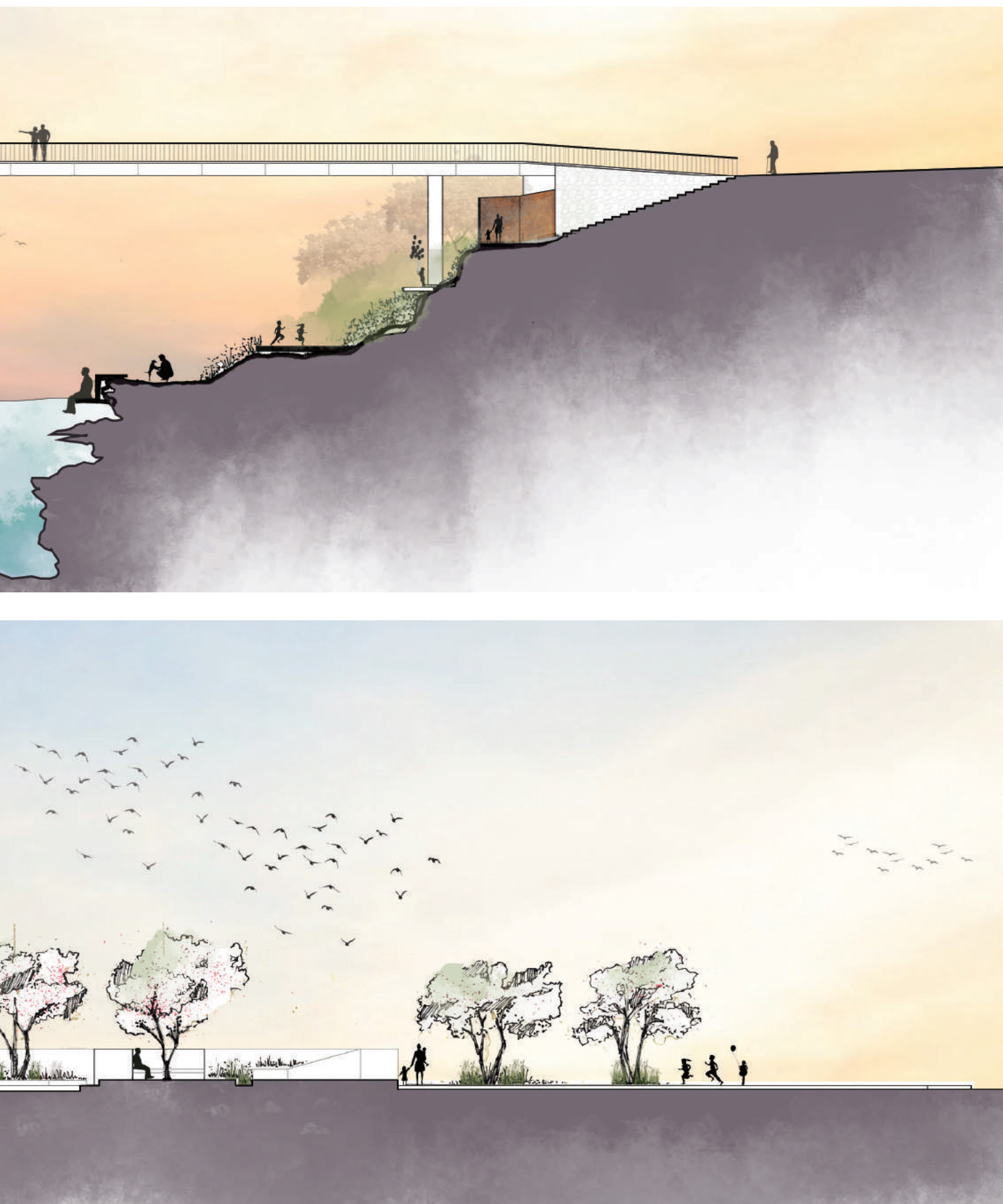


Fig. 8 Here in test site 02, Using the elements the square consists of smaller territories, thereby, theory of territorialisation and de-territorialisation (a.3, Pg.33) comes into play. The 3 major territories with their own set of affordances and making use of the temporality engage and influence users to deterritorialise find another territory. For example, the incomplete staircase now completed with wider steps and ramps not only gives it the power to be function as an amphitheater or for skateboarding or just sitting but also guides the rainwater which is then connected to the existing pre war fountain which then influences the sound heard in the acoustical chambers.

Public space as a cohesive force

The landscape intervention in post-conflict city, Mostar

Shiqi Peng

Project location:
Mostar,
Bosnia and Herzegovina

Mentors:
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Dr. A. Romein

Keywords:
public space, history and
collective memory, post-
conflict, mental division

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This project seeks to mitigate the mental division of the city and promote the construction of a cohesive society by redesigning and improving public spaces as landscape intervention.

Though we already reached the stage of general peace in contemporary society, there are still areas under conflicts. Rather than beginning and ending cleanly, side effects brought by the war would influence the area for a long time after the war. Today, many areas still suffer from the effects left by post-conflict situation, like Mostar in Bosnia and Herzegovina, a divided city caused by the Former Yugoslav civil war.

Now, Mostar was nonphysically divided into 3 zones: west Mostar (mostly for Croatian), east Mostar (for Bosnian) and neutral zone in between. The boundary is approximately the boulevard (former front line) and the Neretva river. More importantly, the pain brought to a place by the war is not only about the loss of property, the damage to facilities, the death of people, but also the ruin of the immaterial value owned by the city and its people. Along with the reduction of public space and the decline in quality, people lose their place of public life, where they used to meet with friends, entertain, hold activities, thus people lose the connection with people. Also the heritage in ruins are erased by the nature and people forget the history and memory about the city in the past.

This project looks backward to explore public space historical value that can bring back memory and also looks forward to explore the social value that can gather people again. It envisions a place where allows people to interact with their environment, the left heritage, and of course each other, creating new memories to coexist with past memory and experiences. Two border lines in the city hold double potential and can work together as one reunion, which also follows the original idea of establishing the central neutral zone as the shared space and physical starting point of reunion.

From mental aspects, the public landscape would involve the narrative reflecting to the city history and public memory to help public rebuilt the connection and memory of the city. Especially, when talking about the memorials and monuments, the language should be gentle and abstract to stimulate rethinking of the past and dialogue with a ideal future. From use aspects, various activities will keep attracting people and as these experiences are repeated, public spaces become vessels to carry positive communal meanings, the connections between individuals begin to be rebuilt again. From physical aspects, a better pedestrian network is needed and in a long run, the continuously connected public space network would gather and lead people to step over the mental division line.



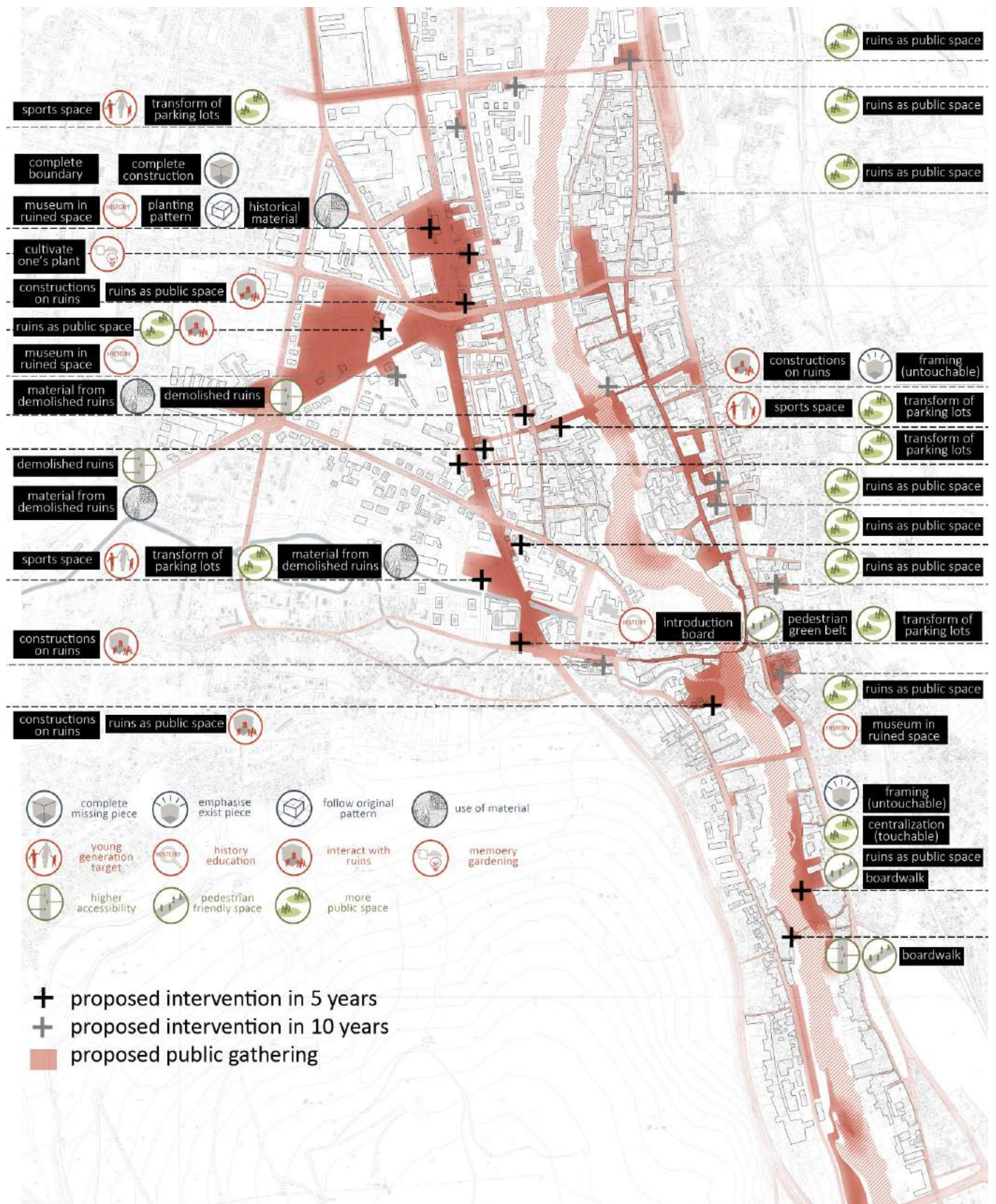


Fig. 1

Fig. 1 According to the conclusion drawn from the current condition analysis, high quality public spaces are very rare in the city. Some projects are planned by the government and already under construction, together with which, this project try to contribute to the current pulic space network from mental, use and physical aspects.

The figure can be used as a guide to understand the interventions in the city. It also shows the priority among all interventions as most spots on two border lines should be constructed in first step. Some of the interventions are applied with same principles, then spots constructed in 5 years are regarded as the test points and example for the other

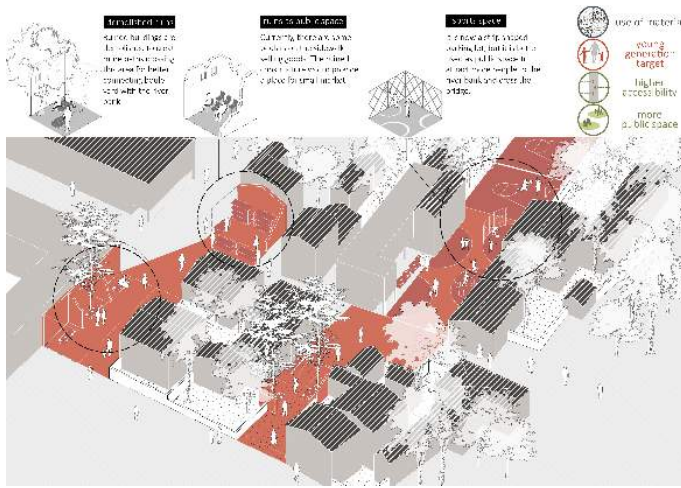


Fig. 2

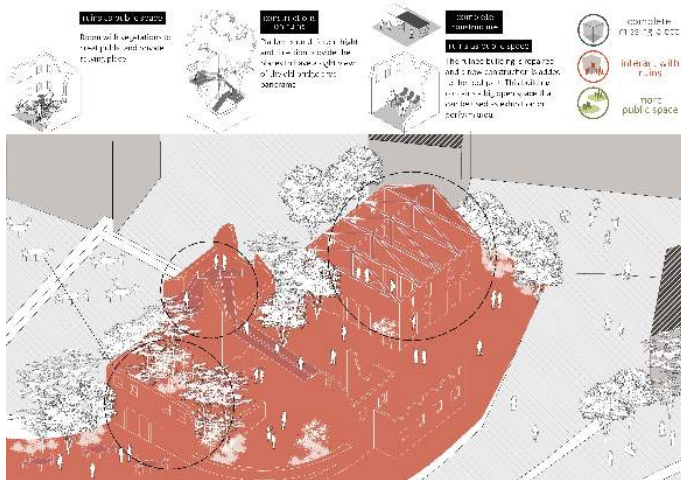


Fig. 3

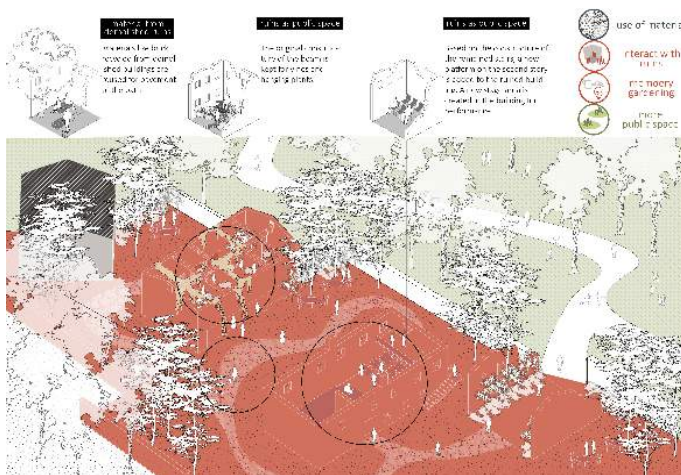


Fig. 4

Fig. 2 - 4 Three points are chosen from different public spaces groups as examples: one on boulevard, one on river bank and one in between. They are also chosen by different urban pattern: morden pattern, river bank pattern and mahala pattern. These drawings would present how would principles be applied to the ground. Different principles are chosen from the toolbox under three aspects based on site conditions to form different programs for each sites. Together with the spatial instruments to explain, the drawings depict the spatial transformation and its proposed influence to surroundings.



Fig. 5



Fig. 6

Fig. 5 - 6 The building is restored and keeps the original structure of the Old Train Station. As an important stop on the new CIRO cycling route, the station is proposed to be transformed into the museum of this railway. The building partly keeps the natural growing vegetations as a memory and the transition of indoors and nature. The museum consists of a series of continual rooms as the exhibition area and a long hall in middle as the nature area. As the roof of the station was destroyed during the war, the building now use a glass roof to cover the exhibition area.

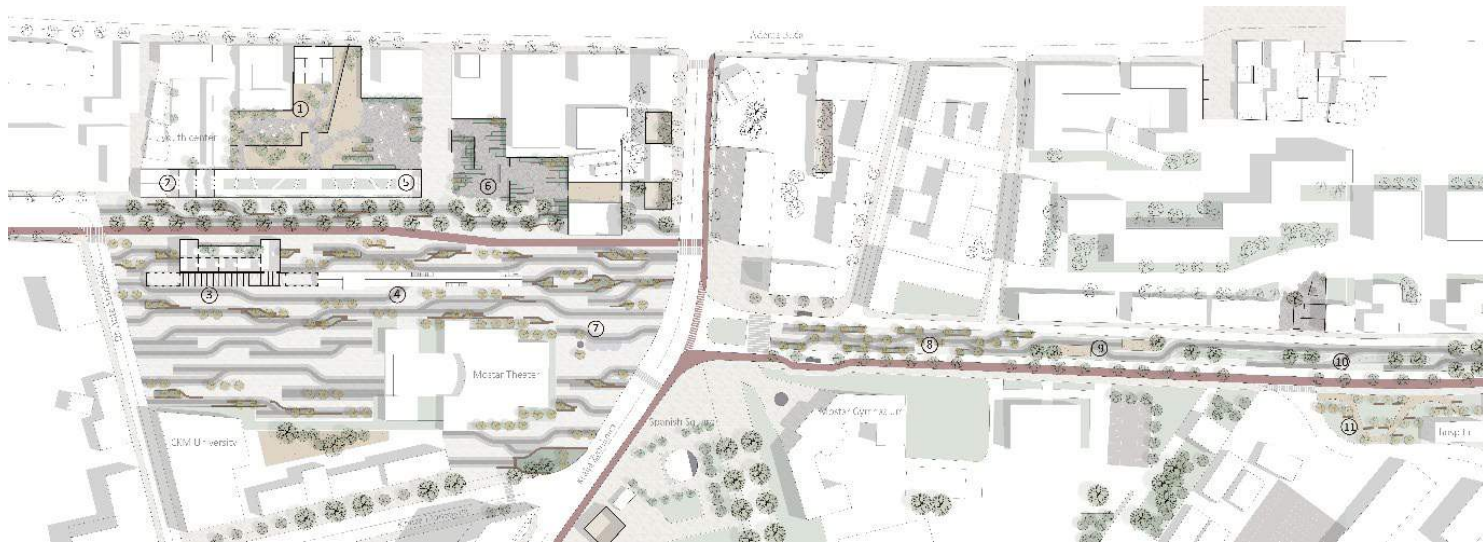
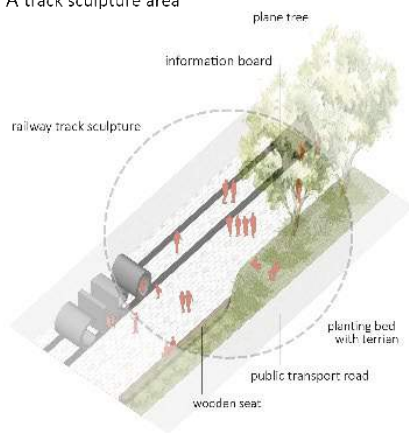
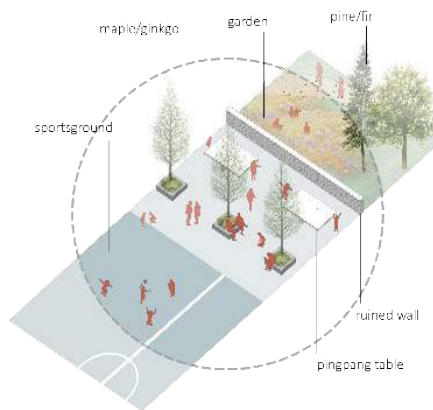


Fig. 7

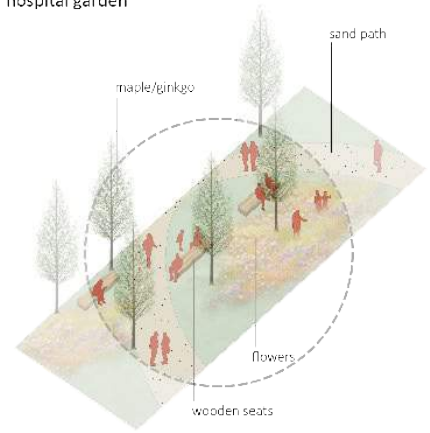
A track sculpture area



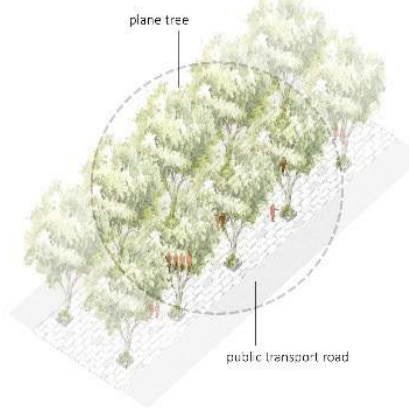
B sportsground



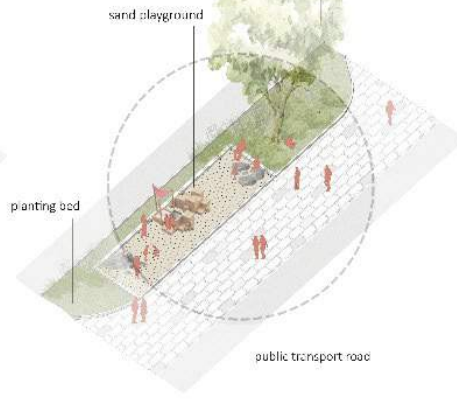
C hospital garden



D plane tree square



E kids playground



F maple square

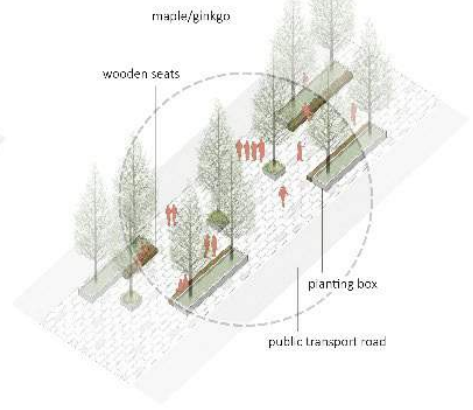
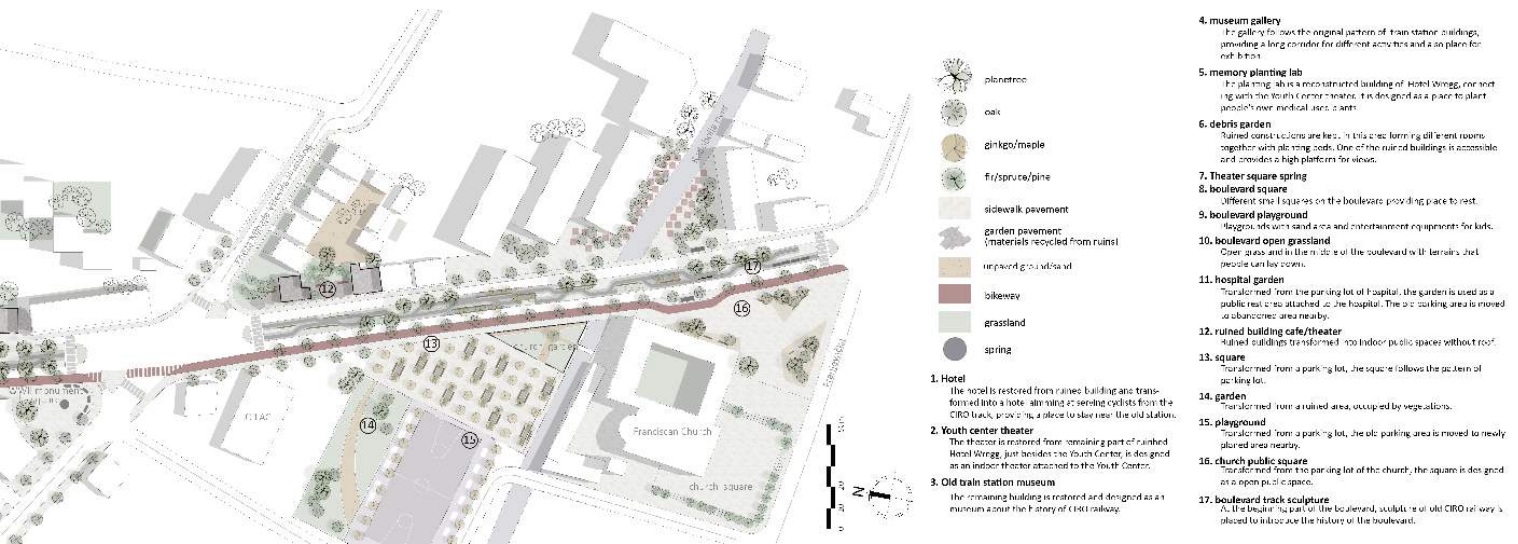


Fig. 8

Fig. 7 - 8 Transformed abandoned areas and ruined buildings creat new public space network. There are two important pattern reflect the related history. One is the new pavement pattern transformed from the original CIRO Railway track, another is the planetree line which is used at the beginning of last century to connect small public space points to the central public space area. These two patterns are used along the whole boulevard, leading people to move forward and experience more.



Memory Planting Step



Step1
Pick a seed ball from the marked seed box. The seed you choose might represent your emotion and memory during the past period: before the war till now.

Step2
Watering it and wait for its blossom. You can use the flower/leaf/fruit of your plant to make tea that treat with the memory emotion and feeling.

Step3
After the planting bed is full with plants you may chose to make your plant a hanging plant hanging on the steel structure of the wall, then more room in the planting bed for others' plants and also able to keep your memory and enjoy the tea from it.

LOVE -*Rosa rugosa*-

Generally, A red rose is an unmistakable expression of love. Florescence is in Summer May-June.



HAPPYNESS -*Tussilago Farfara*-

It's visited by honeybees, providing pollen and nectar. Florescence is in Spring February-May.



SORROW -*Calamintha officinalis*-

The Bosnian name for this plant comes from a Turkish word for sorrow and is traditionally used for treating the disease behind which lies depression. Florescence is in Summer July-September.



FEAR -*Glechoma hederacea*-

This plant was used in the ritual of fear elimination or another type of shock which appeared after a traumatic experience. Florescence is in Spring April-June.



Fig. 9

Fig. 9 The planting experience is both for encouraging people from different backgrounds to participate in the design of landscape and establishing a historical memory monument by abstrat symbolic language. People are invited to pick the seeds and grow their own flowers in the planting beds. All species are indigenous species used for emotion treatment from the old time. Each species represents an emotion based on the medical function of that species and all species are obviously different in figure. By planting the specific species in different beds, people also plant their precious memory in a specific period as different beds represent for different great

history periods. When the planting beds are filled with flowers, each flowers reflect an indivial memory and the overall flower landscape reflect the collective memory.



Team Member
(from top left)

Aditya Rao
 Alice Shuwen chen
 Chuanzhi Sun
 Florentine Collens
 Huadong Zhu
 Sebastian Gschanes
 Sindhuja Janakiraman

Individual Projects

The individual projects span across the world dealing with range of challenges, where some provide landscape infrastructural solutions, few look at integrating technology in their design process and interventions. By not getting limited by the constraints of a lab, these individual projects defined their own brief and process in approaching towards achieving socio-cultural and ecologically sound solutions.

- Stitches (Aditya Rao)
- SAFE LIVES (Alice Shuwen Chen)
- Resilience through aqua-agriculture transformation (Chuanzhi Sun)
- Death in the City (Florentine Collens)
- Narrative Infrastructure and Functional Heritage (Huadong Zhu)
- Emergent Natures (Sebastian Gschanes)
- Informal Natures (Sindhuja Janakiraman)



Stitches

Blending landscape fabric through the golden threads of spatial identity in San Riku coastline, Otsuchi, Iwate, Japan.

Aditya Athreya Rao

Project location:
Otsuchi, Iwate, Japan

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Dr. FL Hooimeijer

Keywords:
Redevelopment process, landscape architectonic structures, water structures, interdisciplinary approach

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Disaster prevention and coastal protection of Otsuchi have affected the livelihood and the daily pattern of lifestyle of the regular Otsuchian. This work represents the alternative to a typical top down prefectural level demand for a line based infrastructural solution to disaster prevention and creates the required importance of livelihood, culture and identity of a place over the protection structure.

While in the design of such critical areas it is important to place protection of the citizens at a high level, it is also a necessity to understand the situation of each city as different from each other. In this way, the genius loci of a place is founded.

Along the San Riku coastline where the tsunami and earthquake hit the hardest due to the landscape features and the proximity to the epicenter the government has set a list of top down governed structures that have impacted the urban fabric of the city,

This document looks at one of these towns “Otsuchi” and how alternate solutions based on the historical and landscape features of the district can help create landscapes of livelihood for the citizens.

Otsuchi among many other Japanese cities faces the issue of a shrinking population due to a lack of economy, a lack of education in the rural areas and a lack of opportunities. The design document also looks at how landscape can create a set of cyclical opportunities for the people to develop their town responsibly and sustainably as they see fit.

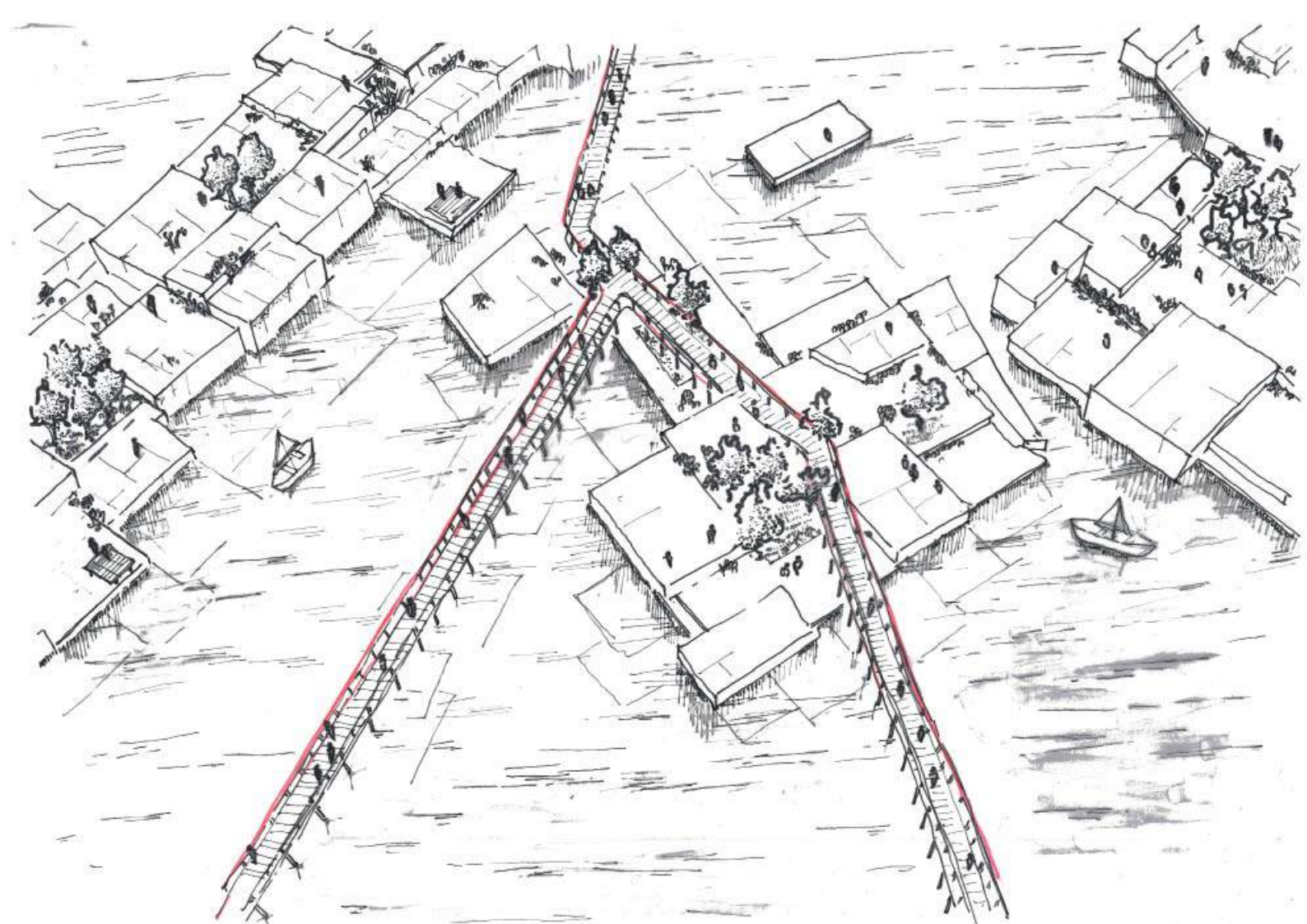
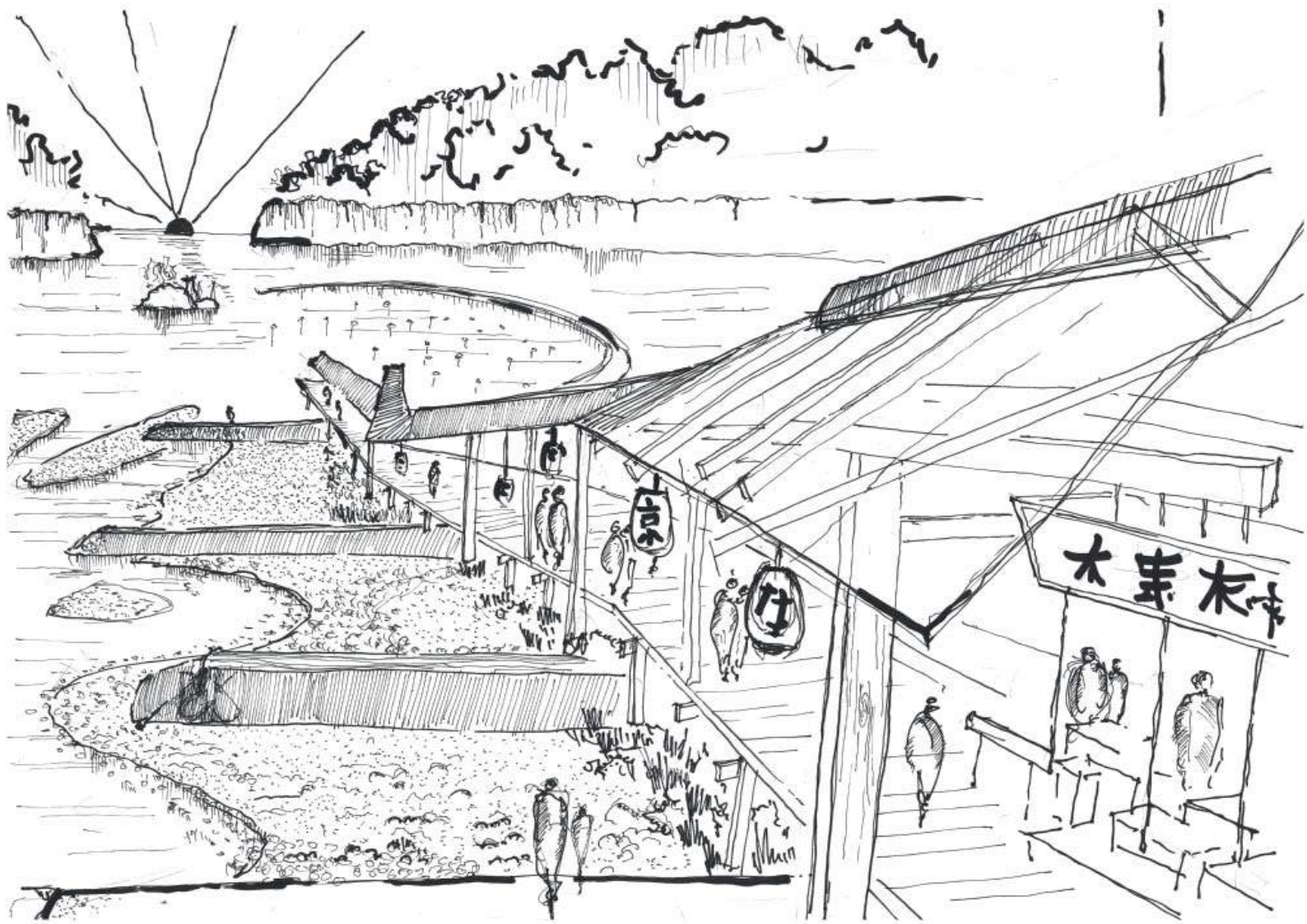
Otsuchi and the coastline of Japan in the prefecture of Iwate is dealing with the issue of a loss of spatial identity in its beautiful, vast and varied rias coastline. This has happened through repetitive engineered solutions over the coast at a prefectural level irrespective of contextual differences between various locations in this coastline.

These solutions, though planned with a lot of thought, are consecutively not dealing well with the other problems these sites face including a loss of economy, lack of living environment and livelihood for the citizens and a lack of differentiating identity between towns. They are primarily defense mechanisms that seek to protect against future impending disasters.

Through landscape and environmental design and multidisciplinary analysis we search for spatial and strategic ecological solutions that revive the coastline and develop landscape structures that deal with this regional level.

To thoroughly research this, an example design elaboration is made for the village of Otsuchi

Landscape design seeks to provide opportunity to the stakeholders to further create, it provides the platform for this creation and the thesis looks at ideas and solutions on ways this can be done.



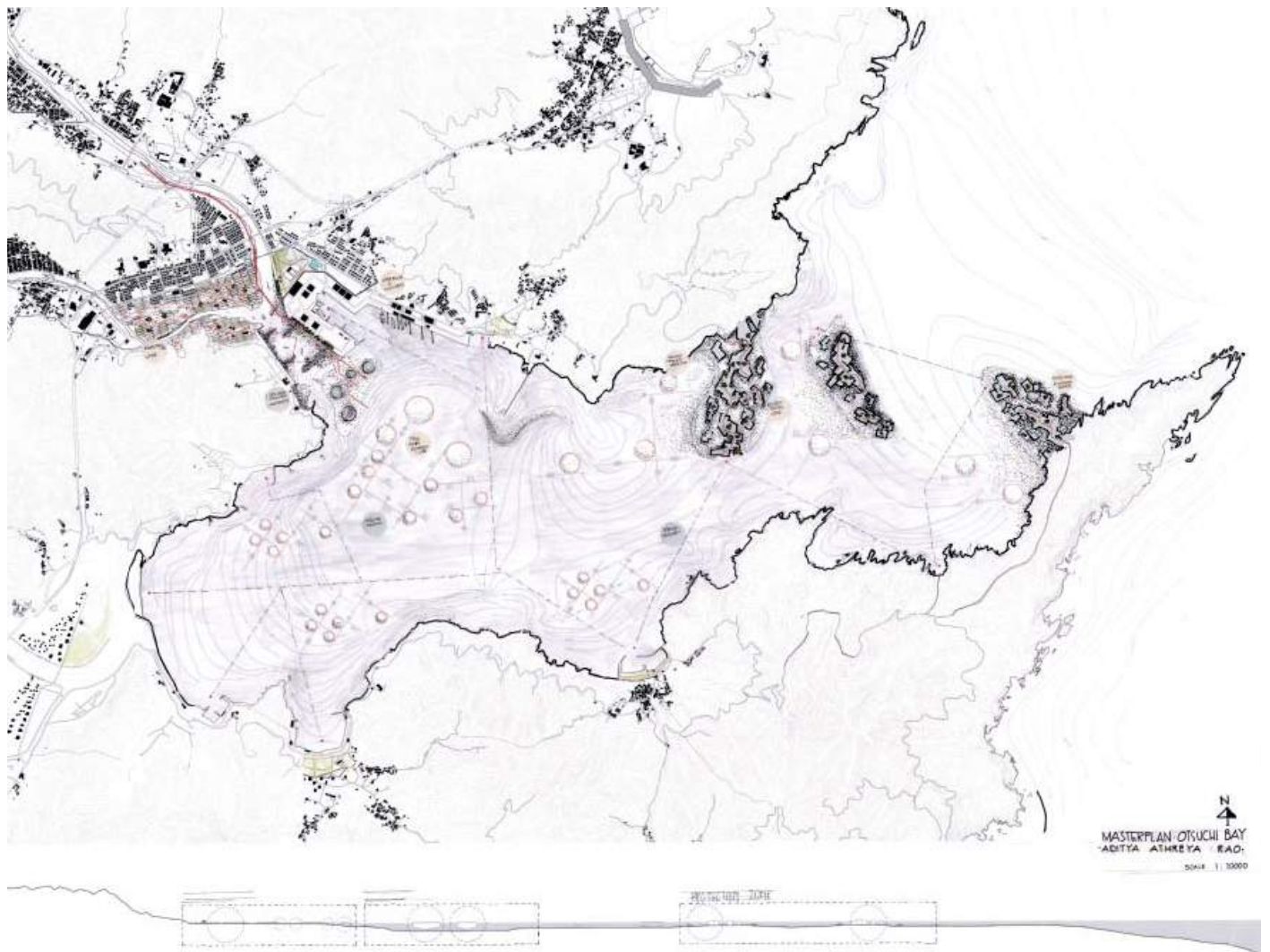


Fig. 1

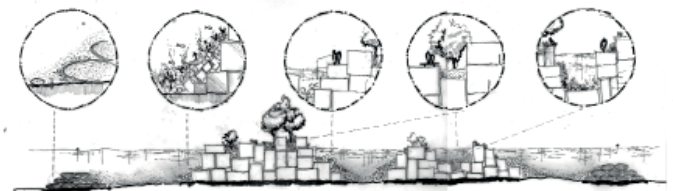
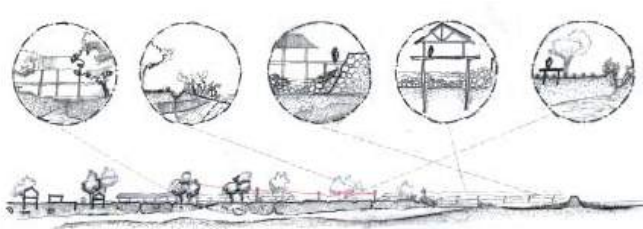


Fig. 2

Fig. 1 The project looks at this vision where a united bay forms a district instead of each city having its own individual protection and lifeline.

The design is formed from the analysis of bathymetry of the sea and a study of material and volumetric analysis of the current structure.

It forms a utopian situation of what could have been as a design thus. The vision is then divided into three areas. A PROTECTION STRUCTURE that captures sediments which in turn lead to the enrichment of the ECONOMICAL AREA.

This infrastructure then provides the livelihood for the citizens of the villages in the bay and allows them to design a landscape that is more connected to the immediate sea around it.

Also, a landscape of livelihood, an AGRICULTURAL LANDSCAPE

Fig. 2 The drawing shows the section for the agricultural landscape and one for the protection structures. It gives a basic idea of how these work as a system.

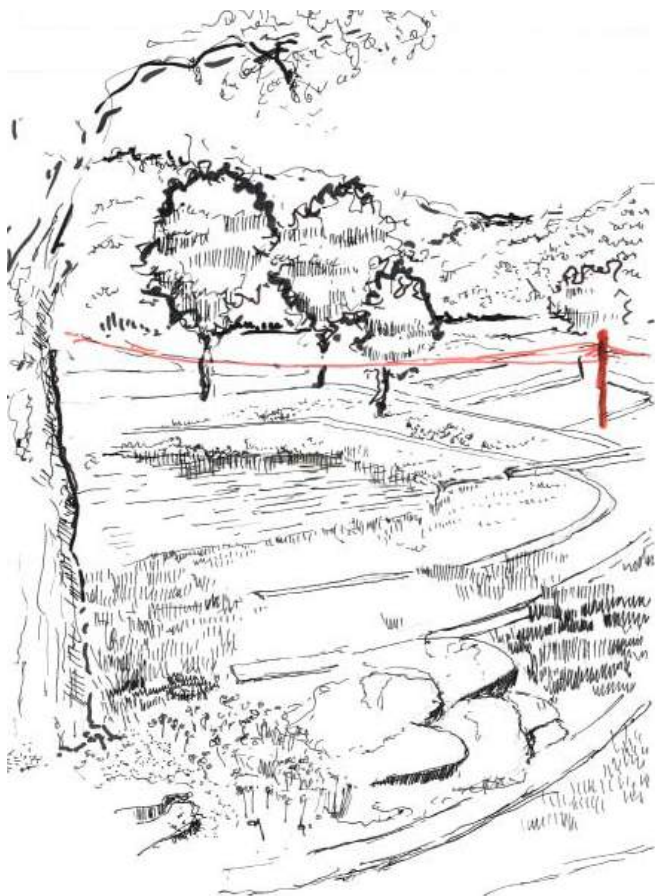


Fig. 3

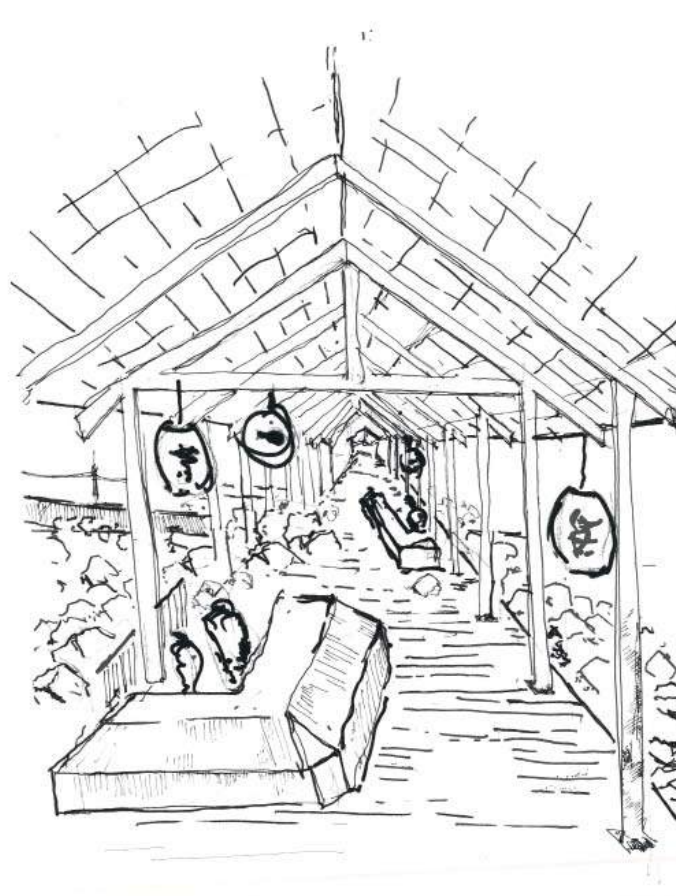


Fig. 4

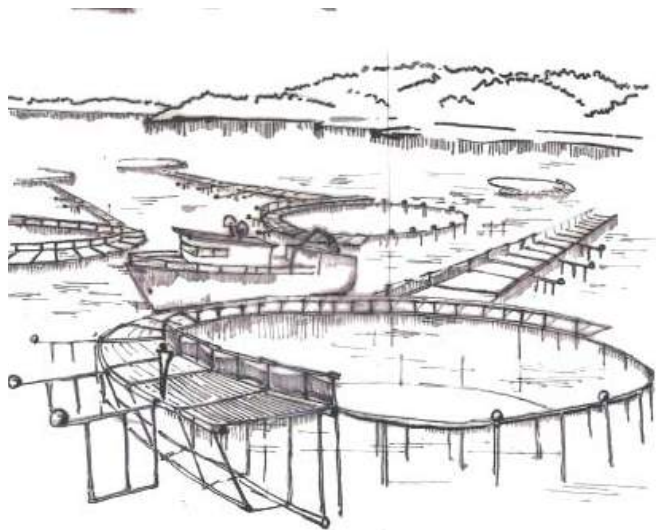


Fig. 5

Fig. 2 - 6 These are representative images of the type of landscape's in this vision. Fig 3 reveals a look into the agricultural landscape and more the spring wells that exist in this region. The design has tried to celebrate these unique elements of Otsuchi

Fig 4 The farmers market connects the town to the sea physically but acts as an economy generator. Individuals from the town and a certain amount of people from nearby towns are allowed to set up their small-scale shops in this market. It is also a representative architectural element in the town.

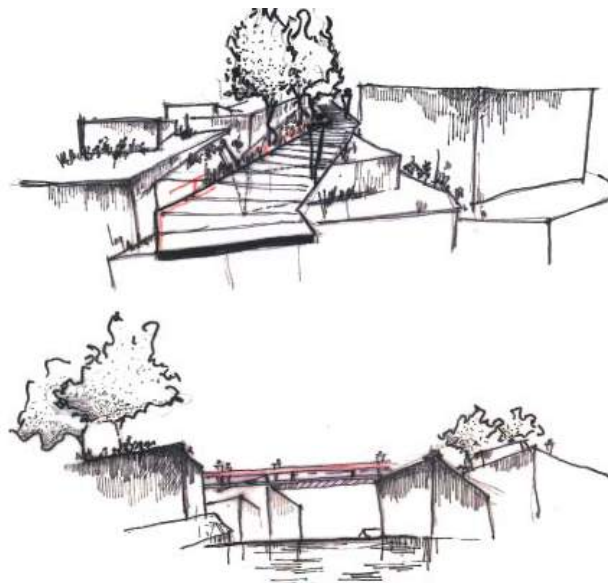


Fig. 6

Fig 5 represents the economic zone with its open ocean aquaculture and marine farms. The massive tanks are created to create a sustainable system by using the fish waste from the bottom for fertilizer in the agricultural area.

Fig 6 shows the islets as you walk through it and go in a boat thorough it. The kind of spaces that are formed by these massive rocks are the unique element of this landscape that has been formed by the necessity of infrastructure.

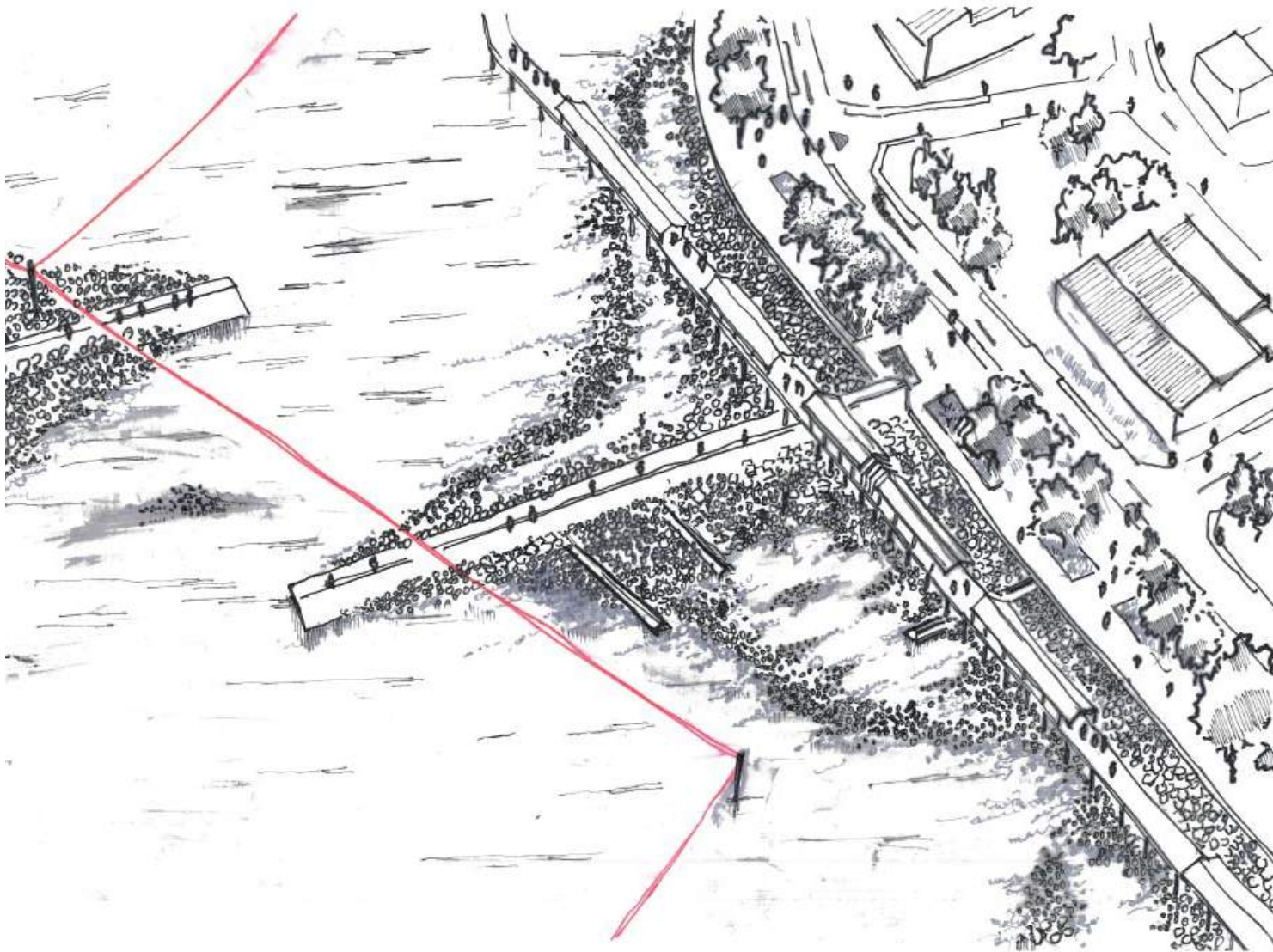


Fig. 7

Fig. 7 The image shows a lot of little details. Immediately seen are the numerous stones that have been sedimented by the downward flow of the river into the pacific. As Osuchi river is a braided river it drops a lot of sediments as it goes out to the pacific. The groins/ dykes that exist are the functional reason for this.

These sediments then create a brackish zone where sweet water mixes with salty waters especially in the smaller protected are between the rocks and there a large amount of sea weed grows which becomes a priority for citizens to collect maintain and shape as an economical element.

The other element is the linear fish market that goes out from the town to the sea. It is an activity generator but also a way for the city to purpose itself towards an activity.

The red line represents the shimanawa rope which is traditionally used in japan to marry rocks to each other or in temples as a symbol of strength and in this case it ties the agricultural landscape inside the village to the blue pacific and its activities.

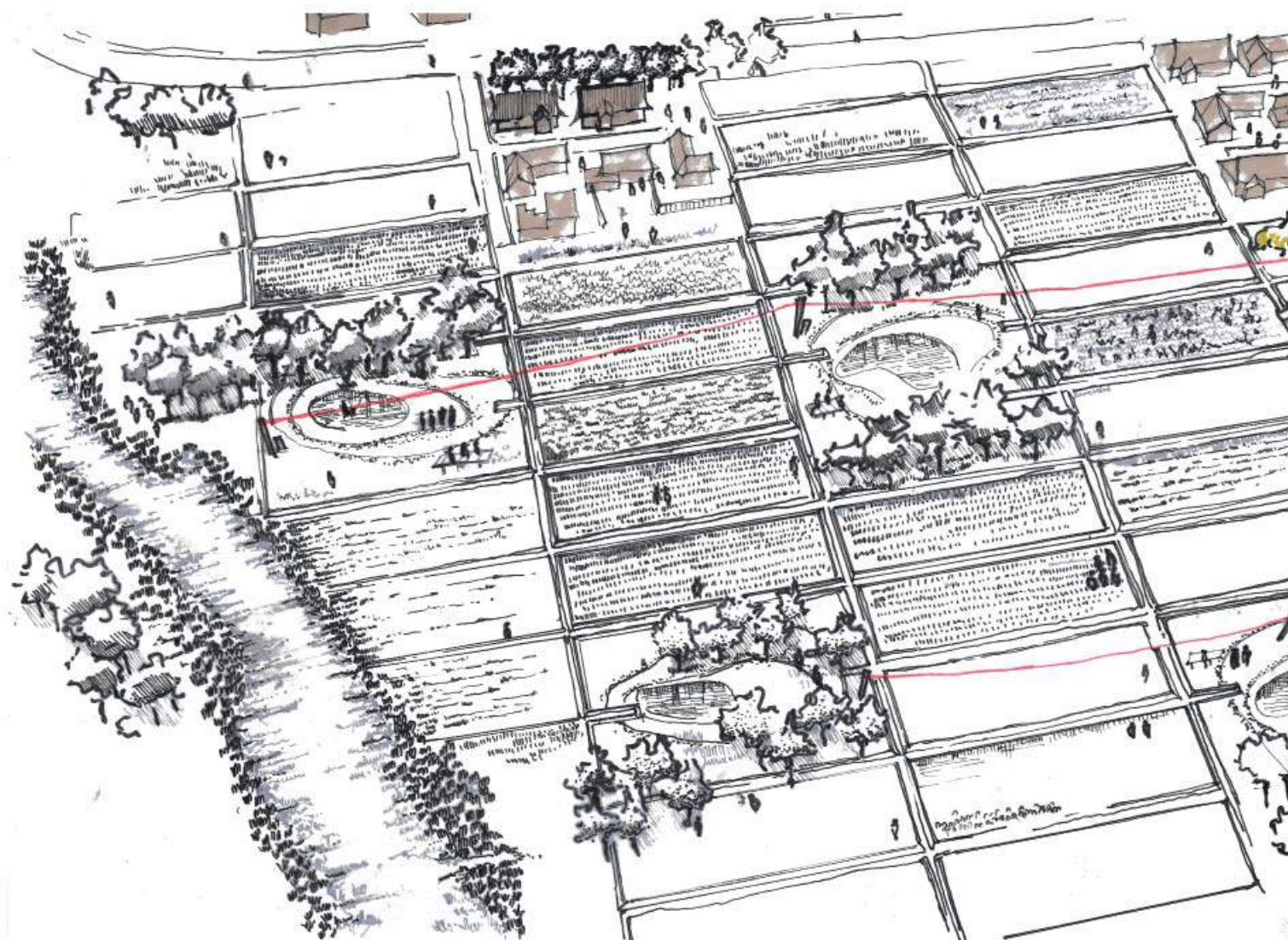


Fig. 8

Fig. 8 The image represents the agricultural landscape and the numerous details thought of in this area. The grid is something observed in the Japanese agricultural system where they divide their rice farms by 1060m*1060m which is then further divided into Kensis. Here the ken is represented by a grid of 60 m by 60m which have 3 20*60m grids.

It acts as a self-governed water system. Also noticed is the Kosuchi river going through it which has no hard borders unlike before. The reeds around it grow high acting as a buffer and in times of fluvial or pluvial floods

the rice fields are the buffer areas of water collection.

Dispersed through these fields are spring wells that used to exist before the land consolidation in this area. This is due to the presence of aquifers between the marine clay layers in the geological bed of Otsuchi.

It is a landscape born out of function, necessity and unique identity of Otsuchi's fauna and flora.

SAFE LIVES

Dealing with earthquakes by open space in Taipei, Taiwan

Alice Shu-Wen Chen

Project location:
Taipei. Taiwan

Mentors:
Ir. Frits van Loon
Dr. Ir. Lei Qu

Keywords:
evacuation system,
evacuation space, living
quality, natural disasters,
earthquake, multi-layers
design.

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Taiwan is located in the Circum-Pacific Seismic Zone; therefore, this island nation is destined to encounter recurrent cataclysmic earthquakes as what has been witnessed in the previous centuries. Taipei City, which is recognized as the most populous and densest city of Taiwan, has a series of push factors which lead herself standing with massive quakes. Besides, with old buildings, disordered urban pattern and lack of open space not only makes the city expose in an extremely dangerous situation but an uncomfortable living environment.

Based on the descriptions above, the research objective of this thesis is focused on the following main question:

“What are the landscape interventions that can create a safe and livable city?”

As a result, to explore this question, this research is based on a two-layers analysis: emergency layer and living quality layer. Afterwards, combine the layers together as a instruction for the city development. The working process is describe in short as below:

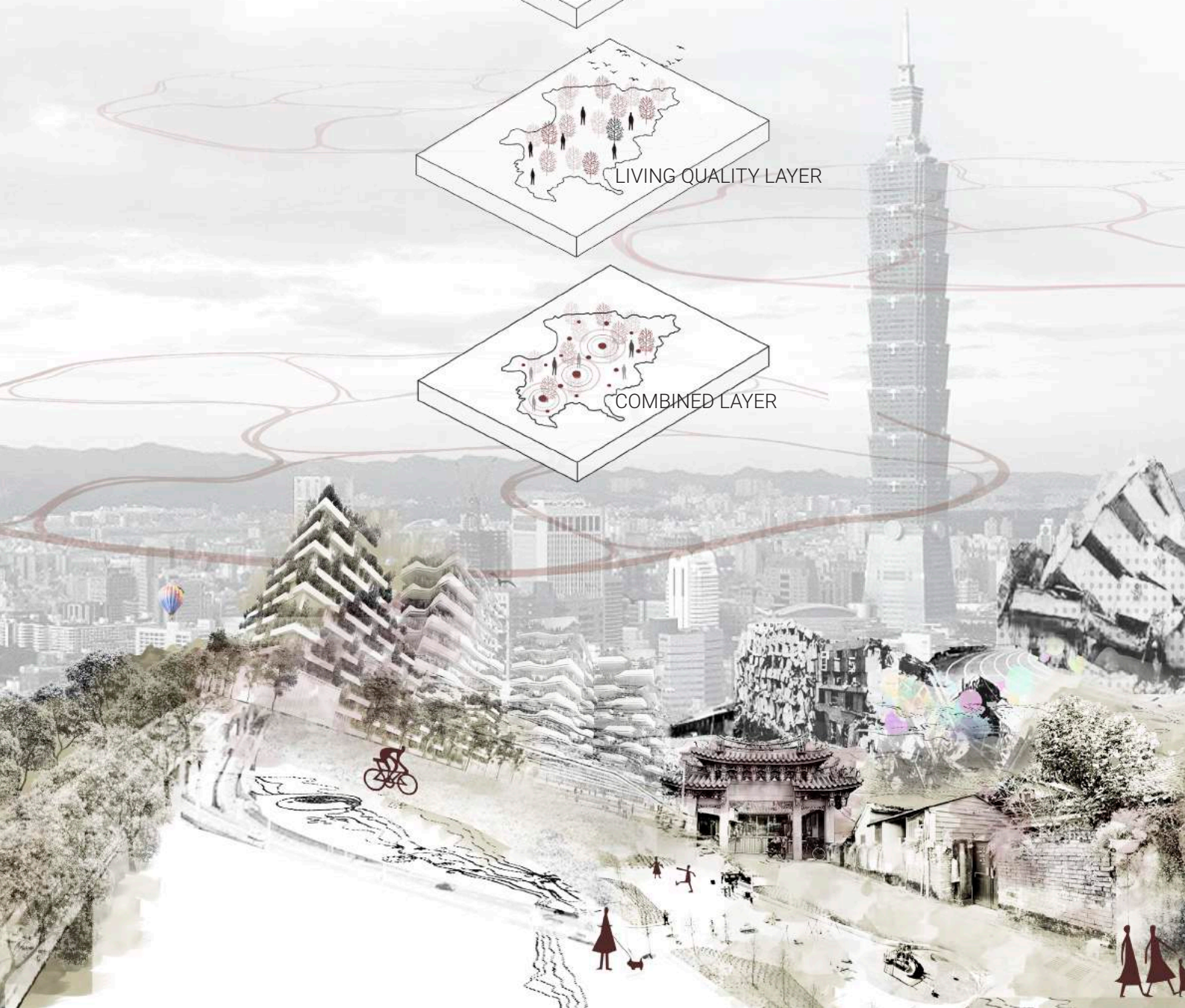
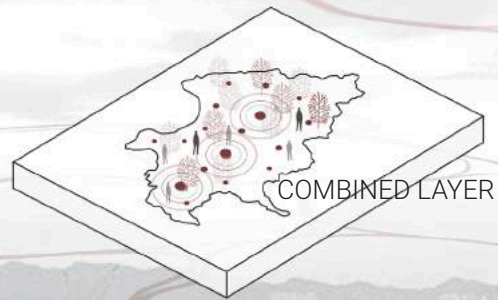
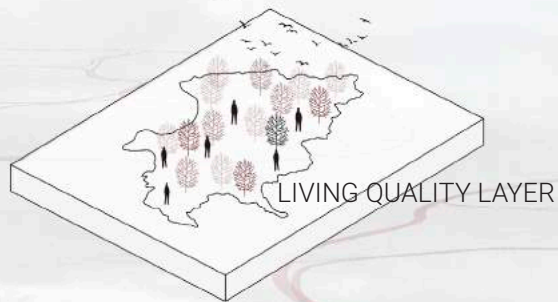
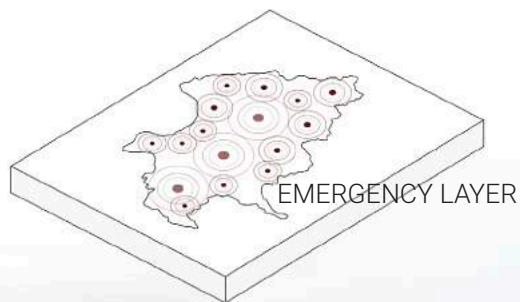
First, the thesis explores an open space system not only for emergencies but also for improving the living environment in Taipei by combining two situations: emergency (earthquake) and daily-life living quality:

- **Emergency layer:** In this layer, the open space of Taipei is analysed to identify the areas in the city where there is not enough open space in case of an emergency.
- **Living quality layer:** In this layer, the open space in Taipei is analyzed on the qualities for humans to live in the city and identify where public space fails to offer this in a proper way.

Secondly, for the overall framework, a design is made, which consists of a combination of both layers. The design proposals are approached on three different scales to explore how this open space system works in both emergency and daily life:

- The city scale: after combining those two layers, a city scale open space distribution is proposed. Then, based on it, a series of open space typologies are demonstrated.
- The neighborhood scale: zoom in to the priority area and visualize the open space system on the neighborhood scales.
- The spatial design: zoom in again to the open space and design those space for both emergency and daily life.

To sum up, Earthquakes always cause dramatic problems in cities in the earthquake zones; therefore, it is crucial to design these cities with this awareness in mind. This project explores a new design thinking of open space distribution for both emergency and in normal daily life. During the process, the thesis provides the possible ways to measure and analyze the current open space and design interventions to approach the goal.



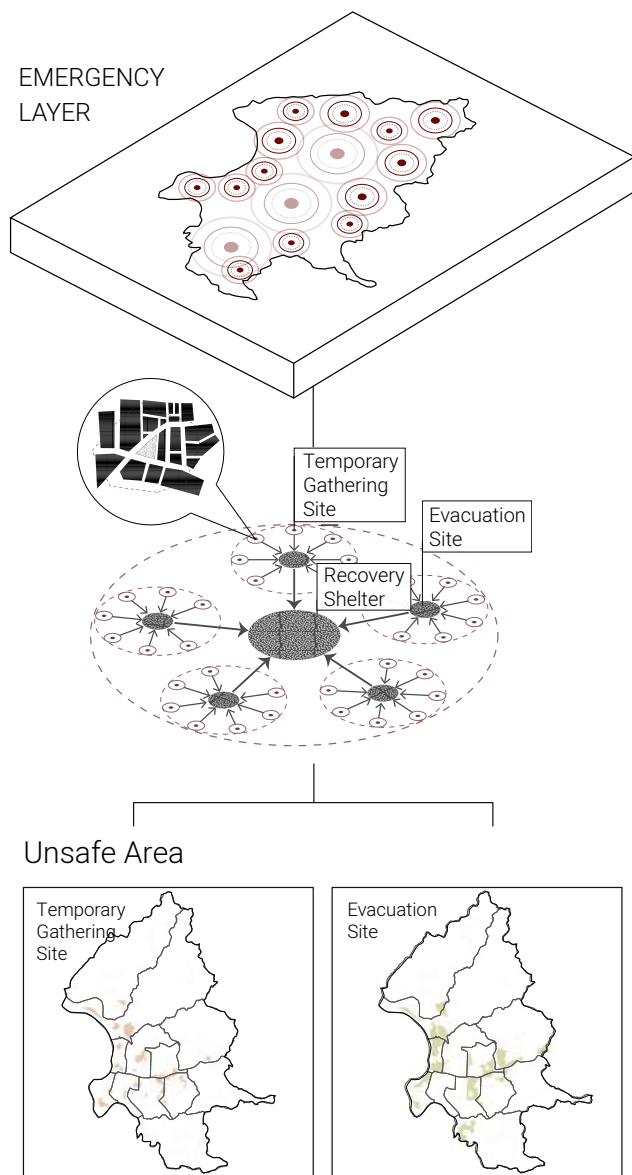


Fig. 1

Fig. 1 The result of the emergency layer is illustrated above. The process started with the history of earthquakes in Taipei to bring up the situations this city is facing. Later on, a series of the case studies and past experiences are adapted for solutions. On top of that, an emergency model of open space is built and applied in the city based on the analyses. Finally, an open space system proposal for evacuation during earthquakes is designed.

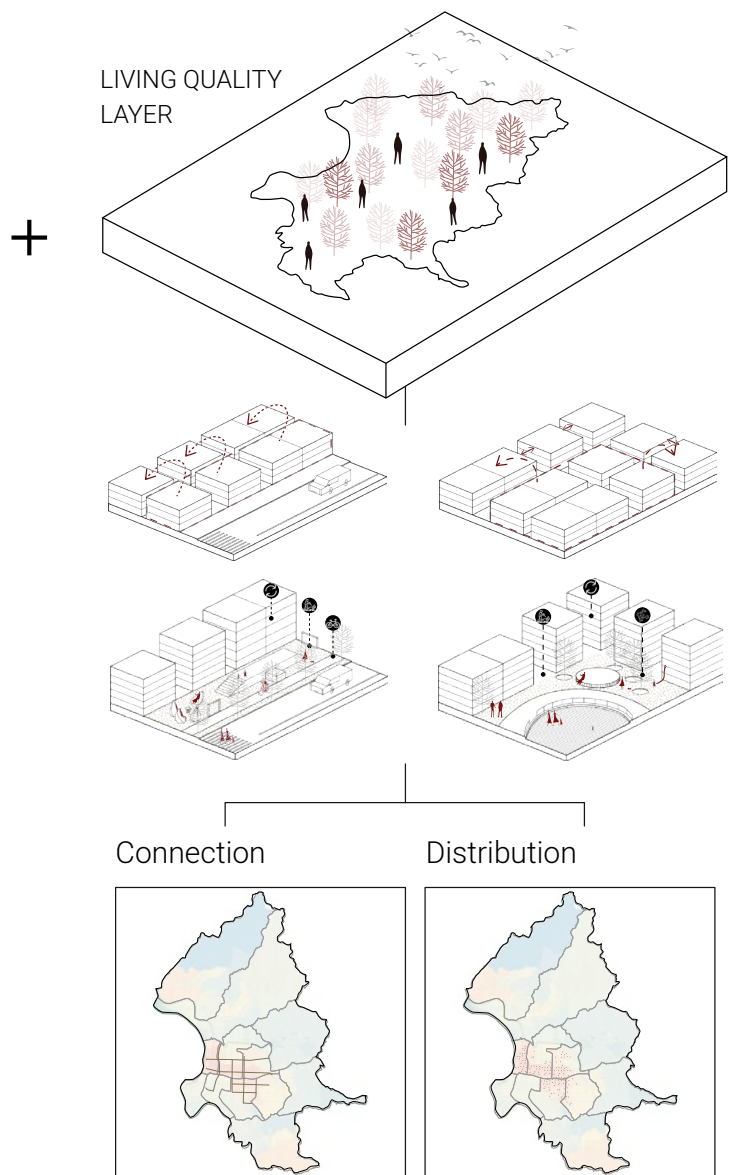


Fig. 2

Fig. 2 The goal in this layer is to develop the proposed open space system during daily life for improving citizens' living quality. First, a historical timeline of how the city has expanded is shown. Under the circumstances, it leads to negative spatial qualities in the city, as evaluated by literature reviews and a survey. Secondly, the strategies and approaches are established based on negative qualities. Finally, the layer ends with the open space system suggestions for living quality improvement.

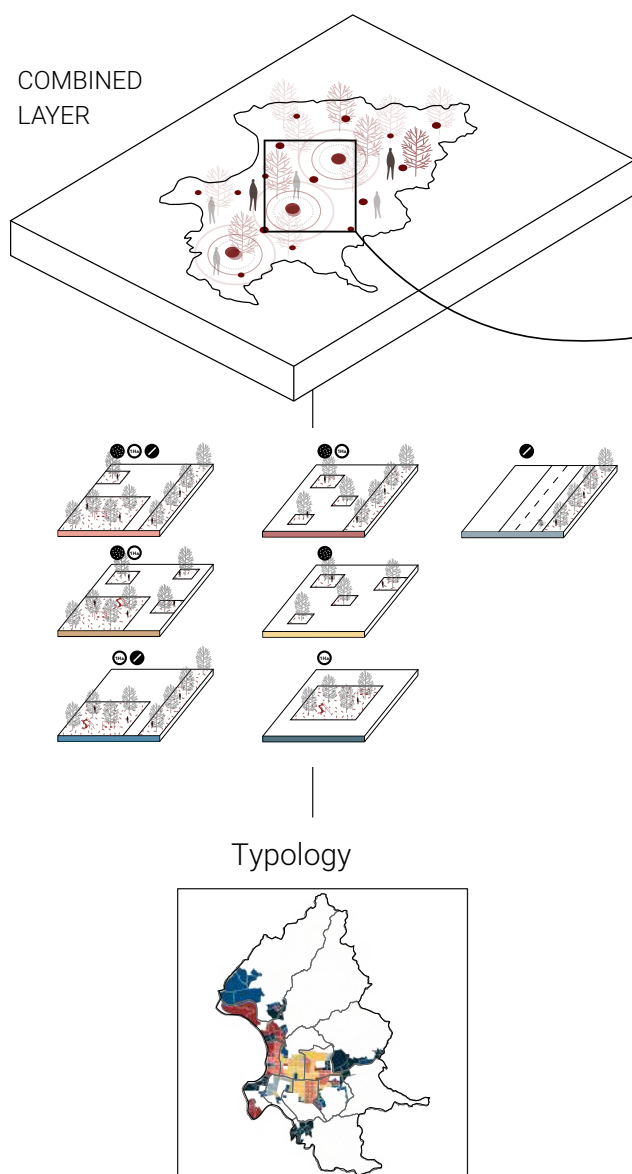


Fig. 3

Fig. 3 The design intervention aims to combine the emergency and living quality layers and develop open space system for both situations. As a result, a typology of the open space system based on the two layers is designed. Eventually, zoom in to the priority area for detail design in the next step.

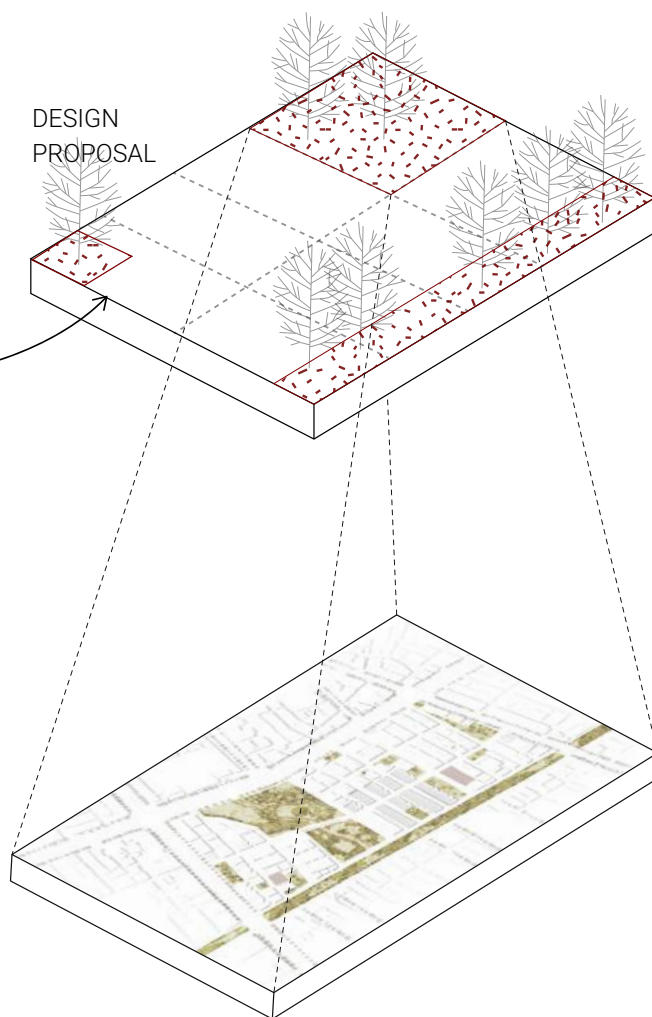


Fig. 4

Fig. 4 The design proposals are trying to deal with the issues during emergency and daily life. The proposal considered different aspects, including process, strategies, programs, etc. Afterward, zoom in to neighborhood scale to demonstrate the open space typology in the priority area. In the end, by combining the requirements of space during both situations, zoom in again for detailing of the open space, which provides for both better living quality and evacuation.

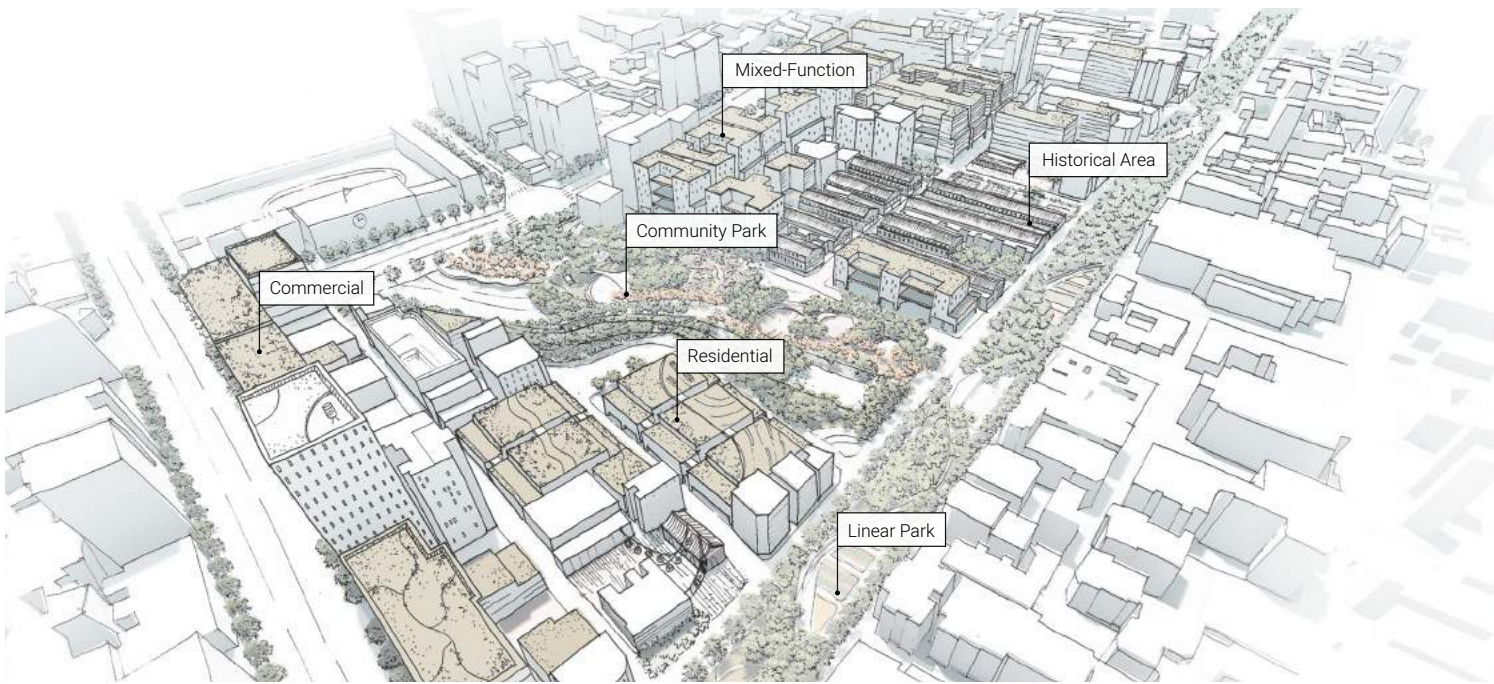


Fig. 5

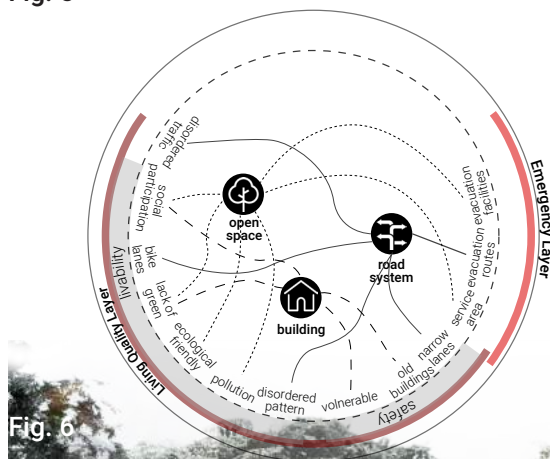
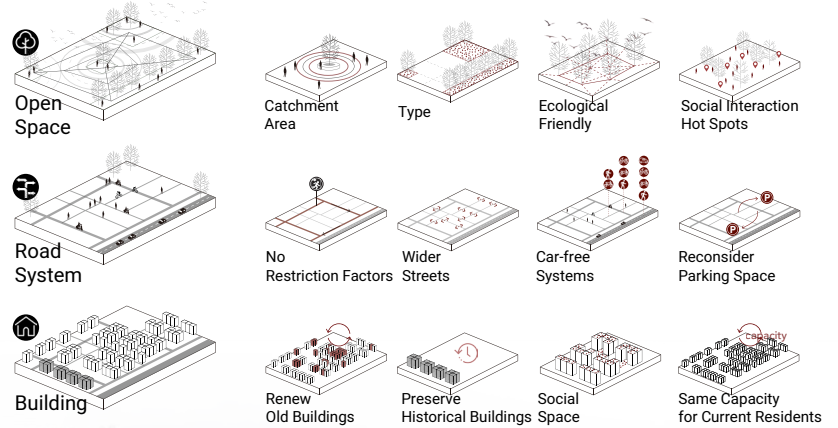


Fig. 6



Fig. 5-6 The design is based on two situations: emergency and daily life. Therefore, the required spatial conditions that were mentioned in the last chapters are showed on the right. These conditions are related to the spatial elements: open space, road systems, and buildings.



As a result, by listing all the requirements, the spatial design that can be considered as guidelines for the design elements are showed as the illustrations. Based on these guidelines, the design is made.



Fig. 7

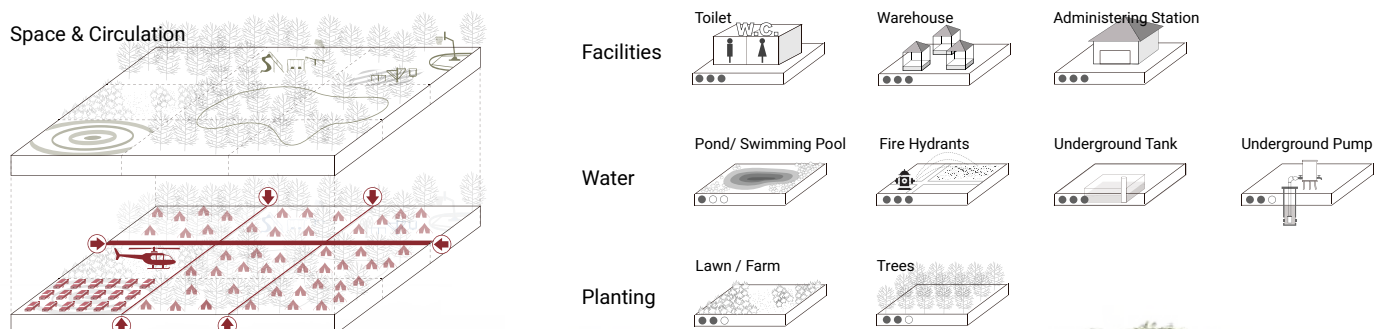


Fig. 8



Fig. 7-8 A series of reserches related to prevention parks was adopted, as well as the survey of park preference of Taipei citizens. Later, both the requirement types were translated into a series of design tools for practical design. The space is open from the front road and creates closer space in the middle provides different

experiences. As for the circulation, it leads people to the linear park on the east. If an emergency happens, the trees around create a fire barrier, space is organized with different functions, and the routes are wide enough for transportations.

Resilience through aqua-agriculture transformation

Towards a multiscale approach for adaptive landscape development in Pearl River Delta

Chuanzhi Sun

Project location:
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Mentors:
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Keywords:
Adaptive urban
transformation, Water
sensitive design,
Multiscale strategies,
Dyke-pond system,
Landscape design
principles

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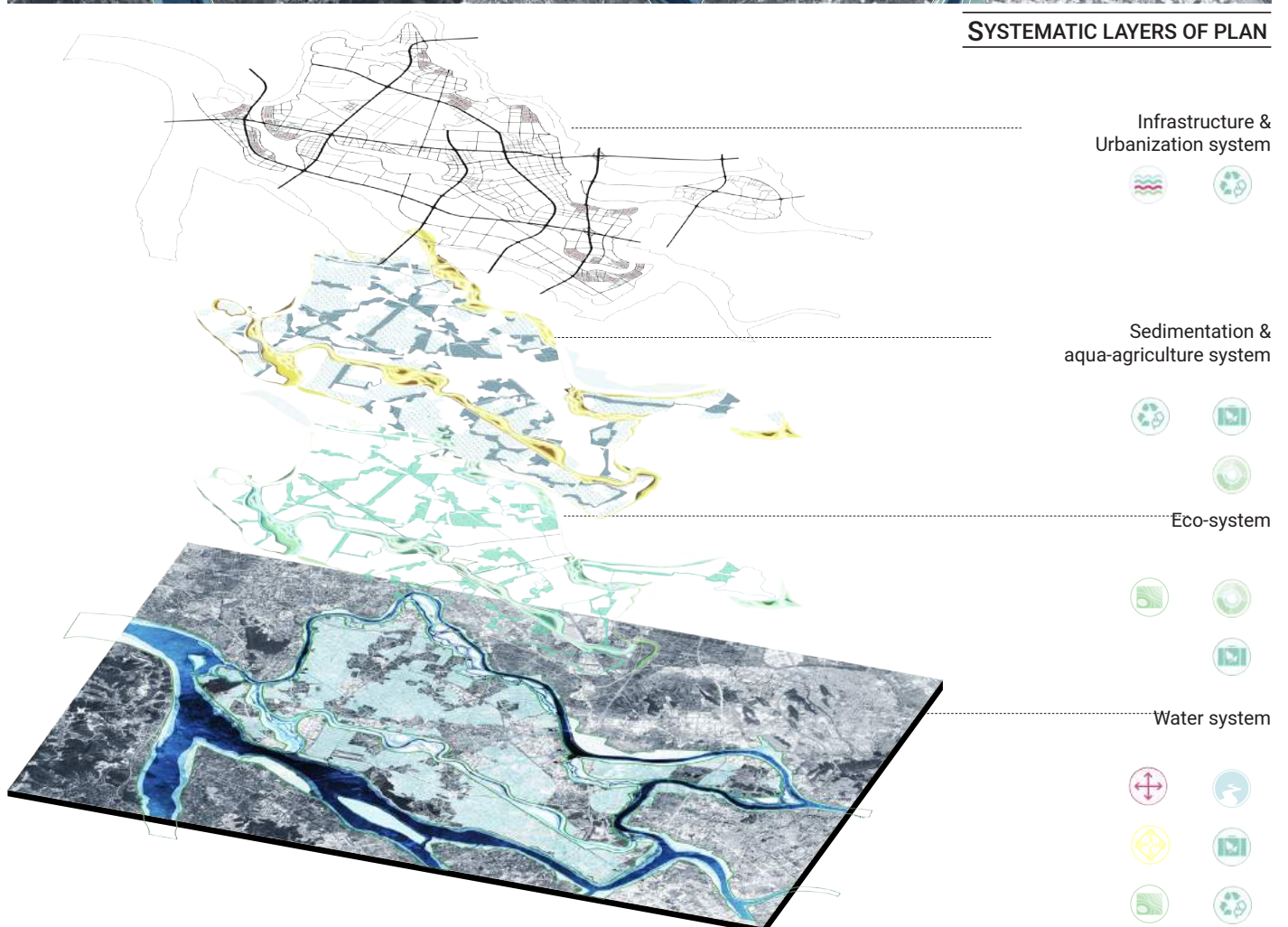
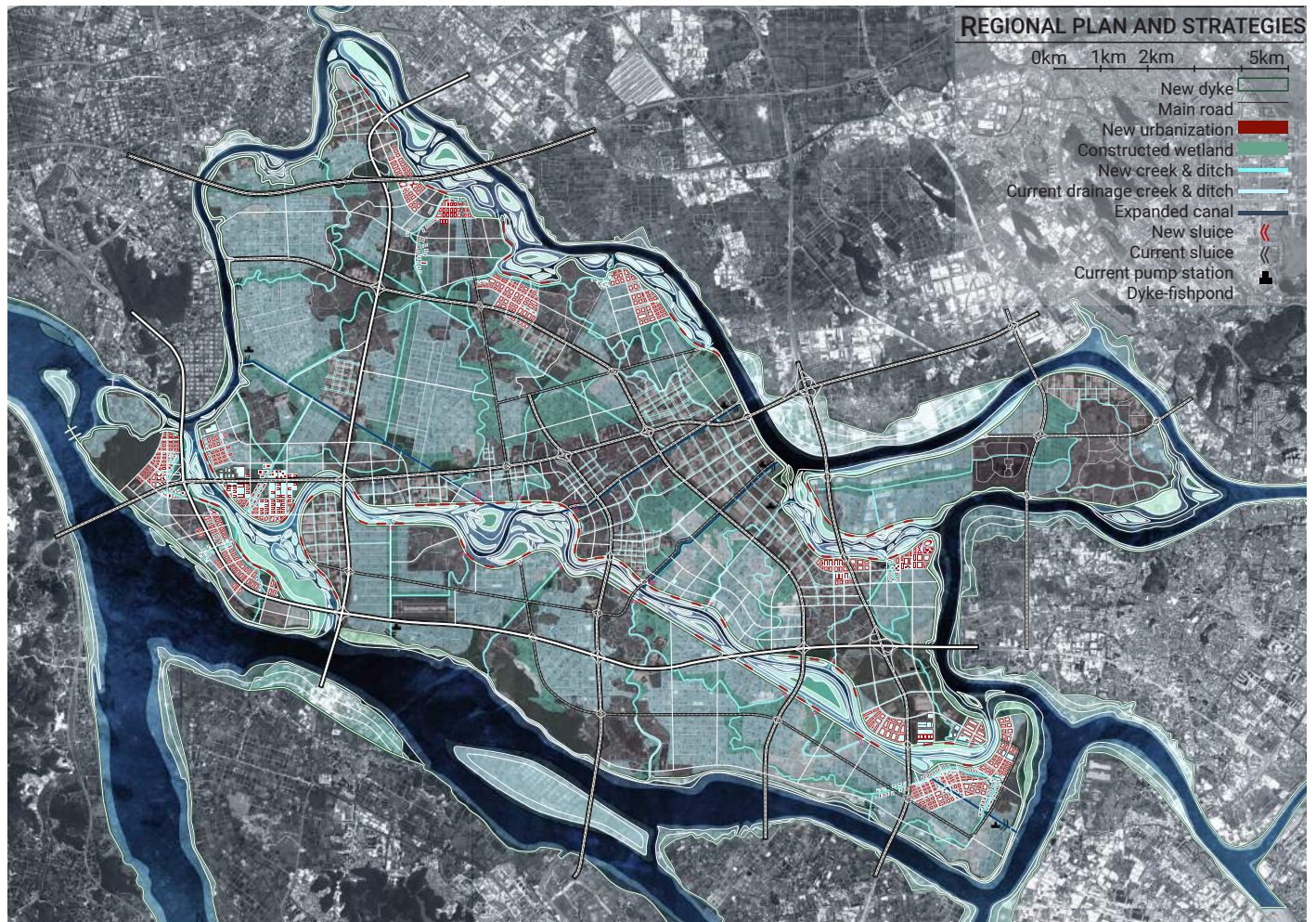
The objective of this research is to identify landscape architecture principles for multiscale water sensitive design based on traditional agri-aquacultural practice in this region. In Shunde district, a flood prone lowland located between the West and North rivers in the PRD, there is a century-old tradition in working with water via integrated agri-aquaculture systems. By learning from traditional agri-aquacultural practices, new design principles can be developed to mitigate flood risk while allowing for increased but sustainable urbanization, not just for the Shunde district, but also for the Pearl River Delta, so that they can be more resilient to flood risk in the future.

The Pearl River Delta (PRD) is a river dominated floodplain in southeast China. Long known as one of the country's richest agricultural regions, in recent years it has also become known as one of the world's most densely urbanized areas. However, decreasing space for water through dyke-ring construction, channelization and urbanization has led to increased flood risk from the river, rain, and the sea. These modern engineering solution and demolish-construction model have been proved a failure when faced with dramatic climate change. Thus, from the perspective of landscape as a process, a new approach would be required to understand the PRD as a result of long-term intervention by human and nature, to take a deep glimpse at the knowledge and experience that has been developed through adaptation to the water over millennium, and to offer a new insight towards the transformation of this region.

In order to protect residents from flood risk and to reserve the local identity, a more adaptive urbanization strategy is required, one that takes account of ecological agriculture (e.g. the traditional dyke-pond system) as well as historical water-management methods, which uses a multi-scalar approach. The dyke-pond system is an unique agri-aquaculture land use concentrated in Shunde district, a flood prone zone between West and North River. It is an integrated system that combines agricultural production, settlement construction and water management that has been developed since the 17th century and lasted till now. The water management of Shunde district is a multiscale system that connects flood control from regional level, county level to village level and building level. Because of the close connection between different water bodies from external river"大海", canal & ditch"渠·壑" to creek & rivulet "涌·濠", the water management system could positively react to water fluctuation daily and monthly. Along with other principles like multifunctional water management, collaborative effort, understanding terrain conditions, circulation, working with nature and more space for water, it offers a local intelligence that could be integrated into modern intervention.

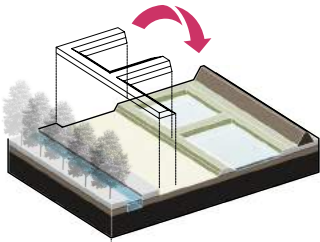
After the summary of principles learned towards a water-sensitive plan and design, the proposal explore the application of them in multiscale: the county scale(regional plan), the village scale(Node design) and the building scale(detail design). It puts forwards a sustainable framework based on a robust water network and infrastructure network, the one that takes dynamics of different layers(river morphology, soil condition, eco-system, road infrastructure, housing) into consideration and build up a flexible base for different developing scenario.

In conclusion, this proposal provides people with a new perspective and framework towards a more resilient and sustainable delta landscape in Shunde district, and offers new possibility of application of this framework through PRD and other places in the world.

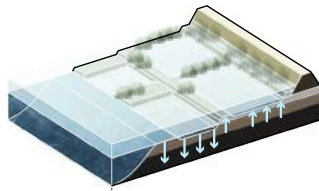




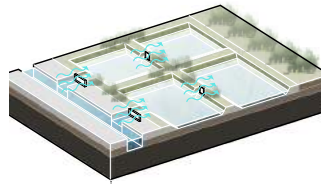
BASED ON HISTORICAL CREEK



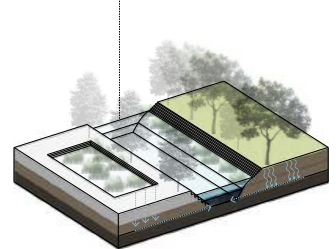
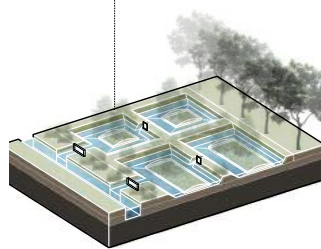
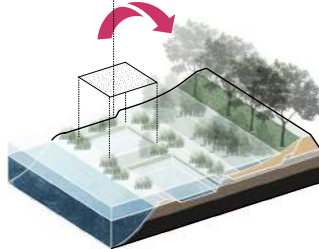
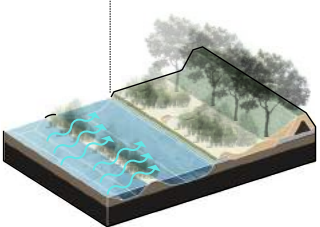
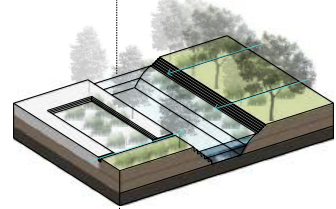
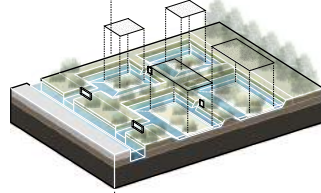
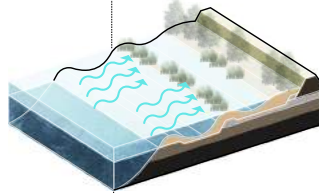
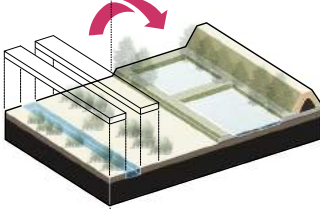
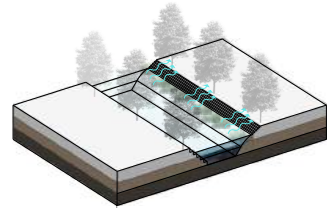
OUTSIDE THE DYKE



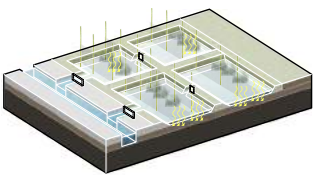
ALONG THE DITCH



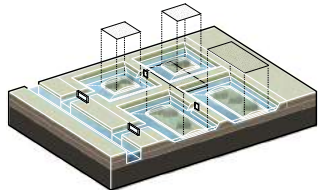
CITY CANAL



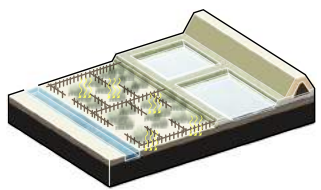
FISHPOND ECO-SYSTEM



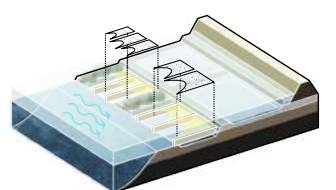
FISHPOND ECO-SYSTEM



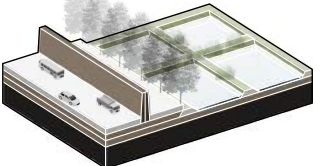
RIPARIAN ECO-SYSTEM



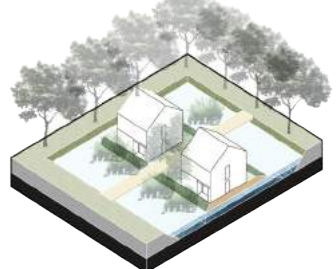
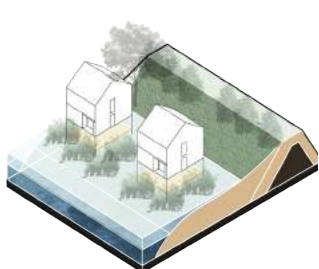
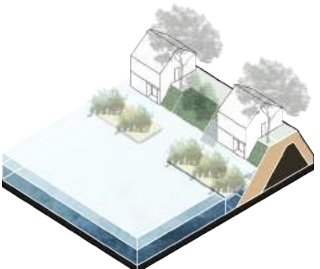
RIPARIAN ECO-SYSTEM

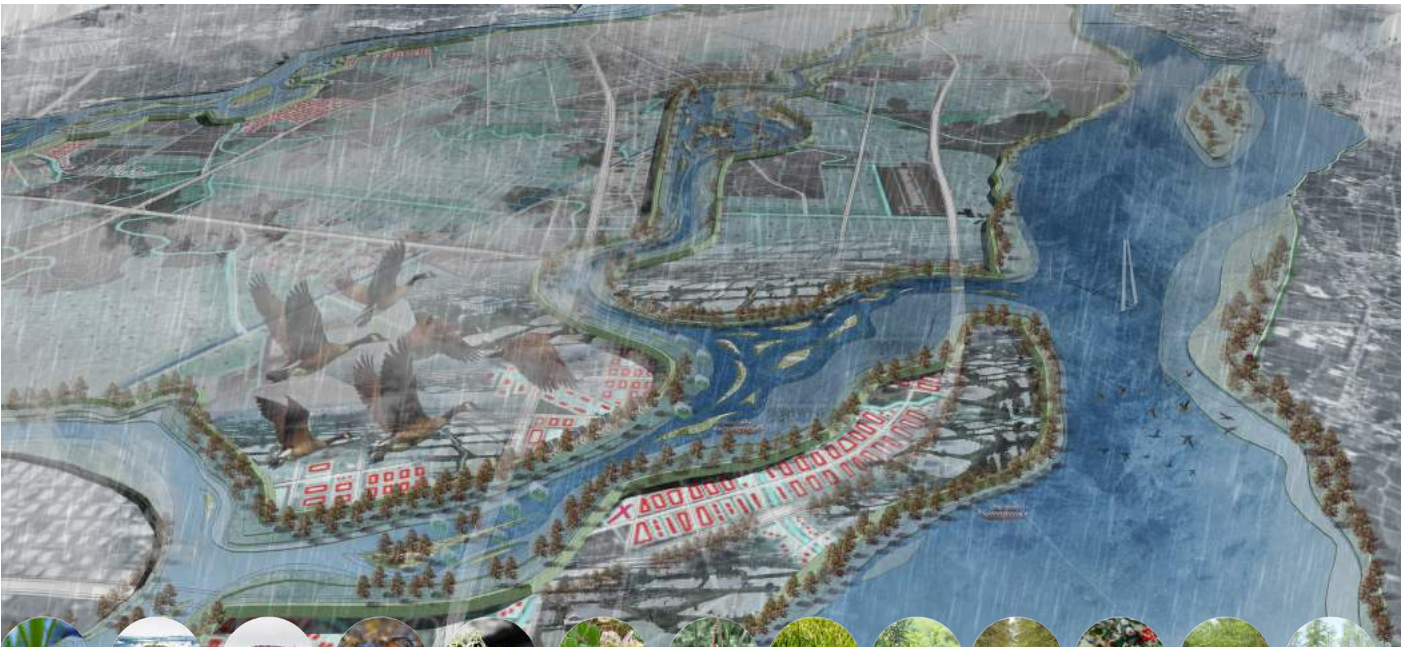


INTEGRATED DYKE WITH INFRASTRUCTURE

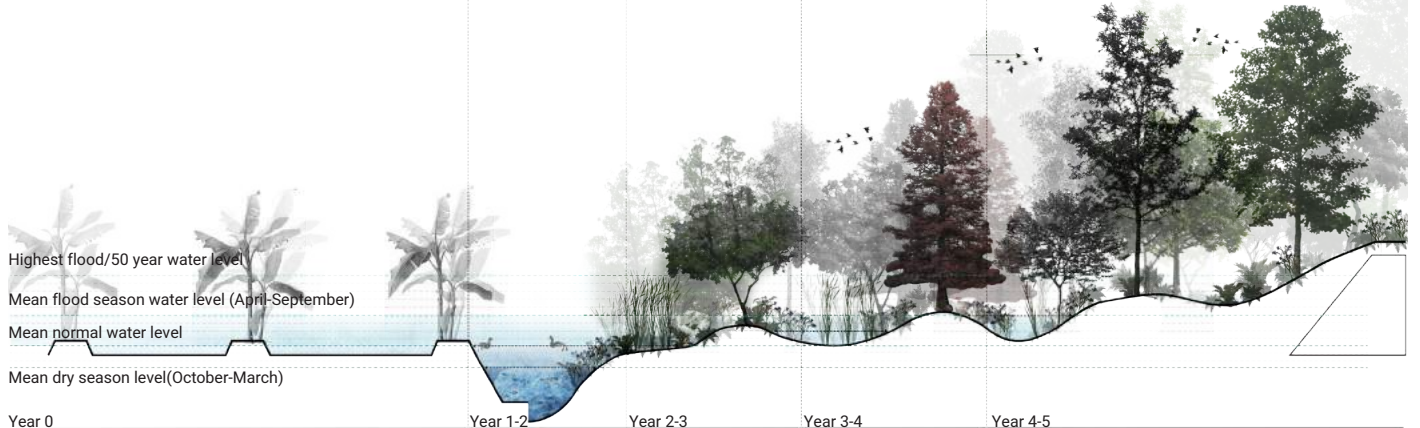


INTEGRATED HOUSING TYPOLOGY





0. Current dyke-fishpond 1. Pioneer aquatic and low marsh plants 2. Ground cover plants and high marsh plants 3. High marsh plants and aquatic (flood tolerant) trees 4. climax community



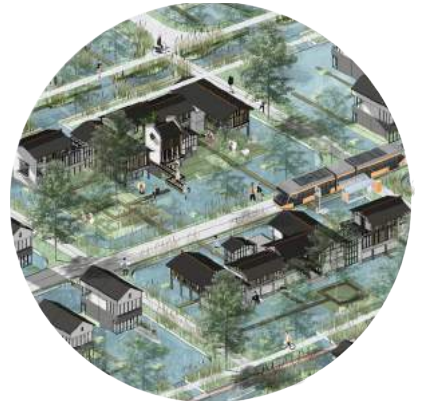
URBANIZATION IN FISHPOND



Terp house community with connected with drainage creek as public space and transportation.



Terp house community with tram and bike path



Public building like library and tea house on floating platform





Drainage creek with transformed fishponds via open connection



Dyke house with private piers, dyke path and bridge



Linear park with bridge



Death in the City

Integrating funerary places in the urban fabric

Florentine Collens

Project location:
The Hague

Mentors:
Dr. Ir. Inge Bobbink
Peter Koorstra

Keywords:
cemeteries, death,
landscape architecture,
urban, parks,
commemoration, garden

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This research aims to explore how our method of dealing with the dead in the city might change in the future. I researched three themes to develop a new concept of urban deathscapes. First the history of dealing with the dead is explored.

In ancient times the settlements were small dots in an all comprising landscape. Large monuments were built for the death in this wilderness. Death got a place outside of society, but clearly a man-made intervention. In Christian times a change took place. People lived to die and go to heaven; death was therefore quite justly placed at the centre of society. The deceased were buried on small pieces of sacred land.

In enlightened times we changed strategy and moved these continuously used grave fields outside of our settlements. Our cities were for living and the death had to be stored in a way that did not harm those left behind. This measure led to some of the most beautiful park like cemeteries. Maybe we could have continued this way if it was not for the mass graves required in the two world wars, the baby boom following.

Cremation was reintroduced and caused for the first time a clear disconnect between death and the landscape. No longer was the landscape an essential element in the disposal of the dead. The funerary industry answered by reconnecting through architectural means, but after the funeral the bereaved were left without a place to mourn if they did not choose to bury or store the remains at a cemetery.

We learned that corpses have an undeniable detrimental effect on our environments. This may be true now more than ever, due to the amount of medicine and medical devices placed into our bodies. Modern medicine aiming for people to have longer and healthier lives does no longer directly relate with living natural. New methods of bodily disposal try to achieve a most sustainable solution.

Would it be possible to honourably commemorate and mourn a lost human life, while rationally treating the corpse in a way that least harms our environment? Could we be sustainable in death: Meeting the needs of the present without compromising the ability of future generations to meet their own needs? To posit a question more related to the discipline of landscape architecture we might ponder how we can shape spaces for commemoration that are no longer tied to the limitations that the incorporation of the bodily remains brings.

Death and funeral customs are inherently defined by cultural norms and values. These norms and values are ever changing as our society develops. After the immediacy of the funeral the mourning process commences in full force. During this period of adaptation to the new situation social support is essential. This process has been explored through the different models of grief. The most recent ideologies embrace finding ways to incorporate the deceased being dead in our new situations and argue hereby that death is a part of life. Technological advancements have successfully reconnected humans in need in cyberspace. How could our environments assist in the fulfilment of these needs?

The act of commemorations opposes entropy, mitigating the effects of time. Commemoration stills time for the deceased. This view is opposite of death's role in nature, where it is a catalyst for the continuation of life. Ecological resilience ensures nature bounces back to an equilibrium after a disturbance. Now our technological advances have reached the point where nature does not need to take a role in the disposal of bodies anymore, we have come to realise that nature's role in the mourning process has been underestimated.

Contact with nature, through stimulation of the mind to wander, helps us deal with the stress that death causes. How could these powers be optimally utilised in order to aid the mourning? How can we define deathscapes without the dead? It might be time to develop a new kind of green typology; rather than deathscapes, we need commemorationscapes: green oases in the city where bereaved can meet each other or mourn alone while enjoying the benefits that nature offers.



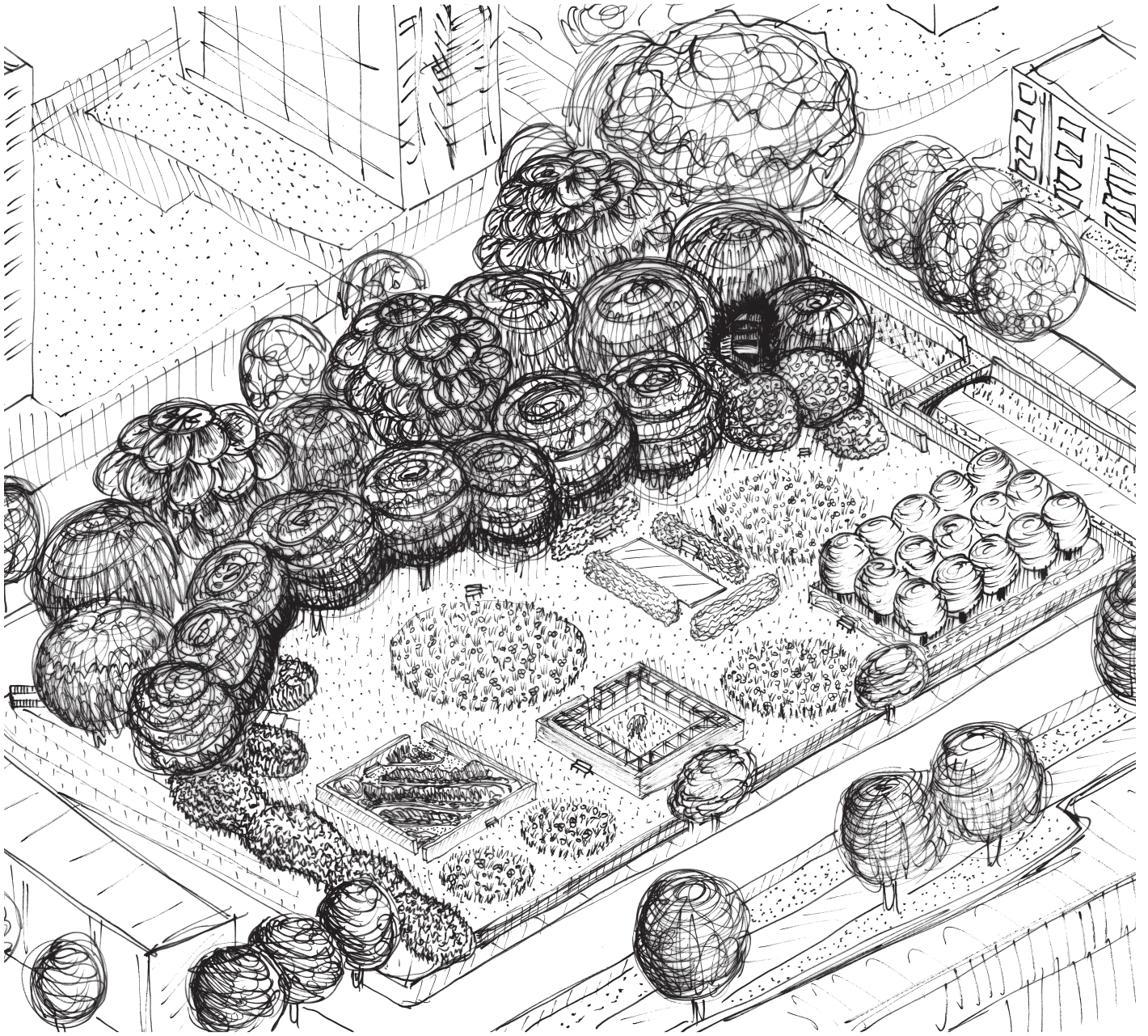


Fig. 1

It makes sense that we need material spaces of commemoration, but what should these spaces be like? The importance of nature as in healing process as a symbol of hope and continuation suggests some kind of green garden or park like setting as ideal place of commemoration.

While parks are generally more public and designed for recreative purposes, it might be more suited to call this new type of green space a garden, highlighting the more enclosed character, and almost sacred atmosphere. These gardens will aim to accentuate nature's vulnerability.

They function as metaphors for resilience. The transience of plant life and nature symbolises both decay as a part of life as well as continuous rejuvenation.

Hereby nature offers the bereaved a sympathy for their loss in this fragile world, while at the same time offering a consolidation in its seasonal renewal and regeneration.

The principles of healing gardens are turned into a toolbox comprised of three zones: the meadow the forest and the garden. Alongside urban guidelines. This toolbox is tested on two sites in The Hague.



Fig. 2



Fig. 3

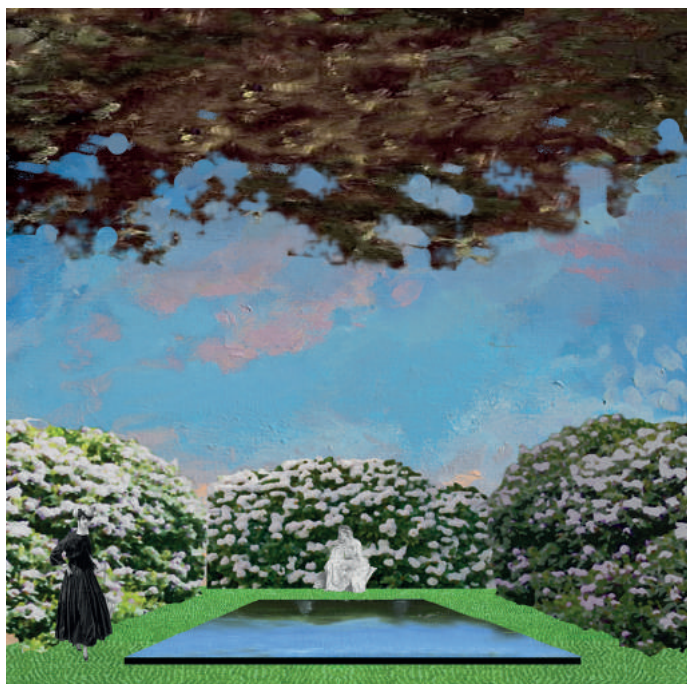


Fig. 4



Fig. 5

Fig. 1 - 5 The garden is located in a post-war district of The Hague. This area is characterised by the modern apartment blocks in airy compositions placed on grass planes that are rarely functional. The open spaces here is defined by the negative space of these volumes. On one side of the commemoration garden the buildings are higher, this is put in balance by placing the forest zone on this side.

The rest of the meadow zone is split up in separate spaces by the positioning of the garden zones. The gardens follow the course of human life as symbolised

by plants. There is a orchard reflecting the fertile and productive parts of life, There is a cloister-like garden with a rectangular walkway surrounding a weeping Morus tree, and a general garden of reflection featuring a mirror pool surrounded by wild rhododendron shrubs.

Lastly there is a garden dedicated to children. This garden is filled with flowers that bloom one after each other. The species selection focusses on plants that are highly attracted to insects and the garden is surrounded by a glaucous californian cypress to provide a fairytale like atmosphere.



Fig. 6

Fig. 6 - 7 An elevated pathway through the forest leads the visitor to the watchtower in the beginning of the forest. This is another distinguishing characteristic of this neighbourhood: a landmark/ height accent. The tower leads to a viewing platform 12 meters high. (As high as the middle high apartment buildings surrounding two sized of the plot.

The tower is placed against the existing full grown populus tree that blocks the view outward of the garden. Higher trees on both sides of the tower frame the panoramic view into the over several garden zones inside the garden.

The viewing platform is oriented to the south and will be a bright lit sunny place. The stairs towards the platform are hidden behind the trees to further enhance the achievement of reaching the top when breaching through the upper dense canopy.

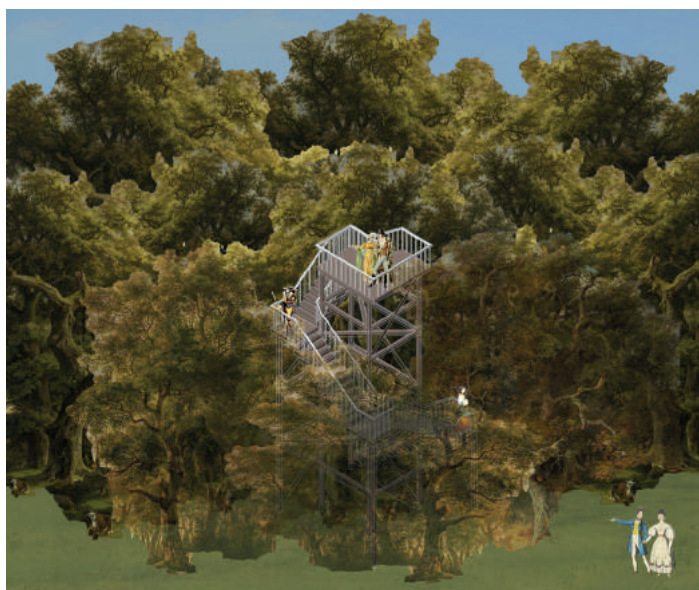


Fig. 7

Narrative Infrastructure and Functional Heritage

The Renovation of the New Dutch Waterline around Utrecht

Huadong zhu

Project location:
Utrecht, Netherland

Mentors:
Dr. René van der Velde
Prof.ir. R.J. Dijkstra

Keywords:
heritage, infrastructure,
flexibility, urbanization,
water management,
narrative landscape.

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The New Dutch Waterline was built to defend Holland. It comprised of a system of waterworks for inundating and military elements for troops. This study will focus on the part around Utrecht of the New Dutch Waterline, one which is in urban fringe and faces urbanization. The main research question is whether it is possible to transform the language (historical image, the composition grammar and spatial features) of the New Dutch Waterline into a functional and narrative framework of urbanization. Specifically, the design is aimed to provide a framework for the urbanization, which can make the visible and invisible heritage legible (represent historical stories and the new characters of heritage colored by the complex environments) and solve the urban problems (de-fragment and resilient water management). In this case, landscape plays the role as language and machine at the same time.

BACKGROUND

The NDW is a defense line and works based on the boezem-polder system. During the war period, the traditional drainage system of the polder landscape is transformed into a 3-4 km wide defense line. Therefore, the inundation fields formed the invisible part of the defense line. Pumps and sluices guide the water out of the deep lying polders, but in war-time the water could be directed into the polder. This water system works based on boezem-polder system. The boezem system is the discharge water network which brings the polder water into the outer water. The whole water system can be set in motion by switching the pumping stations on and off or changing the direction of the water flow. In a normal situation the water table is higher during winter.

ISSUES

The urbanization happening in this area brings three problems, water management challenge, fragment and illegible heritage. The defensive line was separated by the heavy infrastructure and urban fabric. It is becoming harder to read the waterline as linear landscape and inundation area. At the same time, traditional water management brings some problems. With the climate change, the pump station and the boezem with the limited capacity become the bottleneck of the drainage system. Also, the water full of phosphorus in the agriculture area is pumped into the cleaner boezem.

STRATEGY

Two strategies are proposed to repair the functional infrastructure and represent the narrative heritage. A territorial park system is proposed to de-fragment and represent the new spatial character of the heritage elements colored by different surroundings. The narrative water infrastructures aim to provide resilient wetland for the boezem-polder system and represent the history of the inundation. Both provide a flexible framework, ensures the spatial entity of the NDW and leave enough space for future urban expansion.

Case: Fort Lunet Park

The experience path around the Fort Lunet expands as a park to cross heavy infrastructure, connect fragmented green space and provide rich programs for the citizen. The forgot urban green space will be transformed into seasonal wetland. In the future, the water from town and green space will be held and stored in the green space. More importantly, the seasonal flooding will represent the inundation basin, the water flow direction and inundation in different time. The narrative framework provides flexible scenarios for future NDW. Urban forest, seasonal wetland and infrastructure shape the basic framework. This area could be transformed into sport park, neighborhood and urban farm.



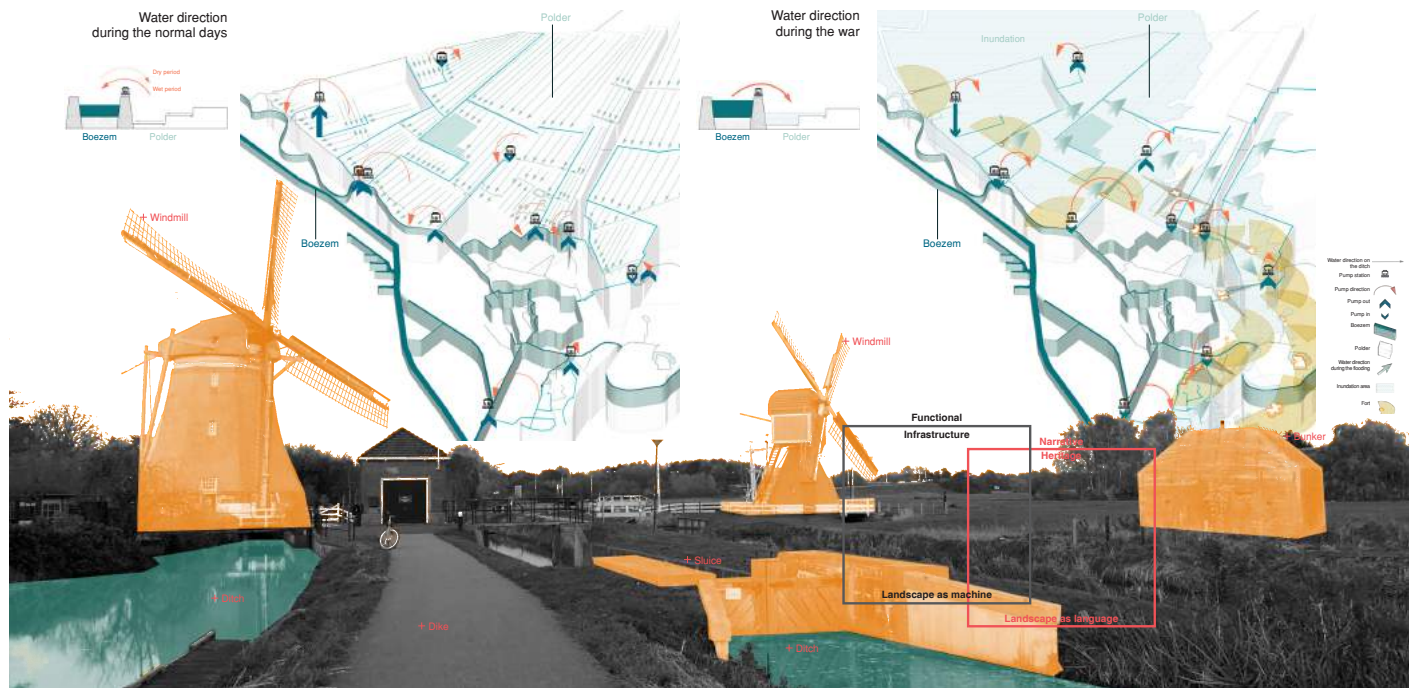


Fig. 1

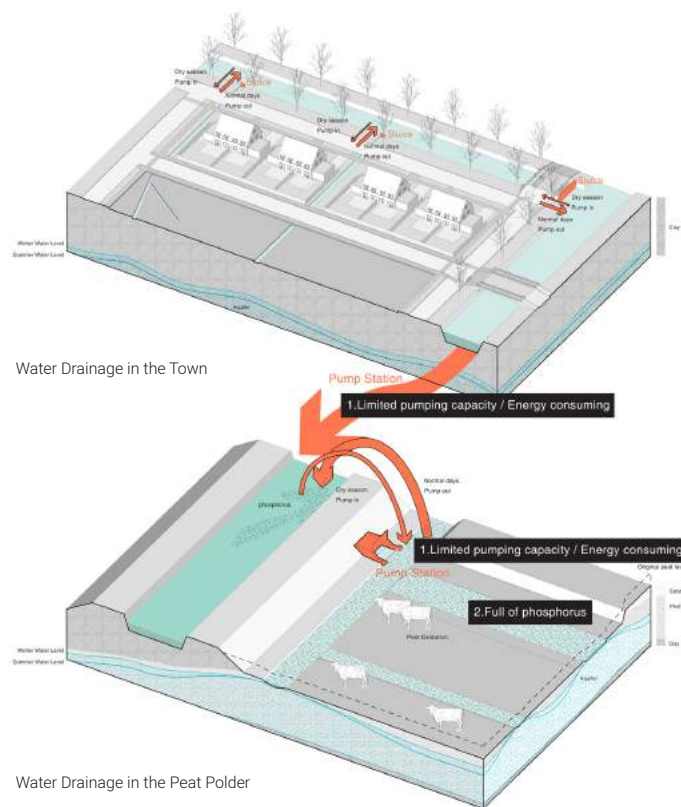


Fig. 2

Fig. 1 - 3 Pumps and sluices guide the water out of the deep lying polders, but in war-time the water could be directed into the polder. In a normal situation the water table is higher during winter. During a dry summer, water needs to be taken in from the boezem-system.

The urbanization happening in this area brings three problems: water management challenge, fragment and illegible heritage.

With climate change, the pump station and the boezem with the limited capacity of are becoming the

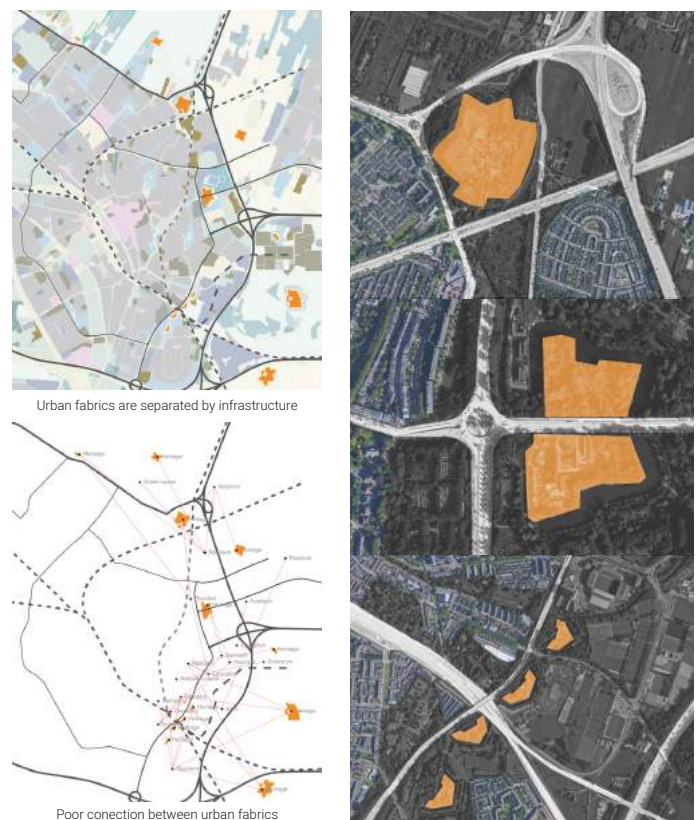


Fig. 3

bottleneck of the drainage system. Also, the water full of phosphorus in the agriculture area is pumped into the cleaner boezem.

With the expansion of city, heavy infrastructure is currently blocking the movements of people and turning the city into fragments. A lot of space including the heritage is less accessible. The experience and representation of the NDW as linear cultural heritage is harmed by the urban fragment. The connections between urban pieces and heritage should be strengthened.

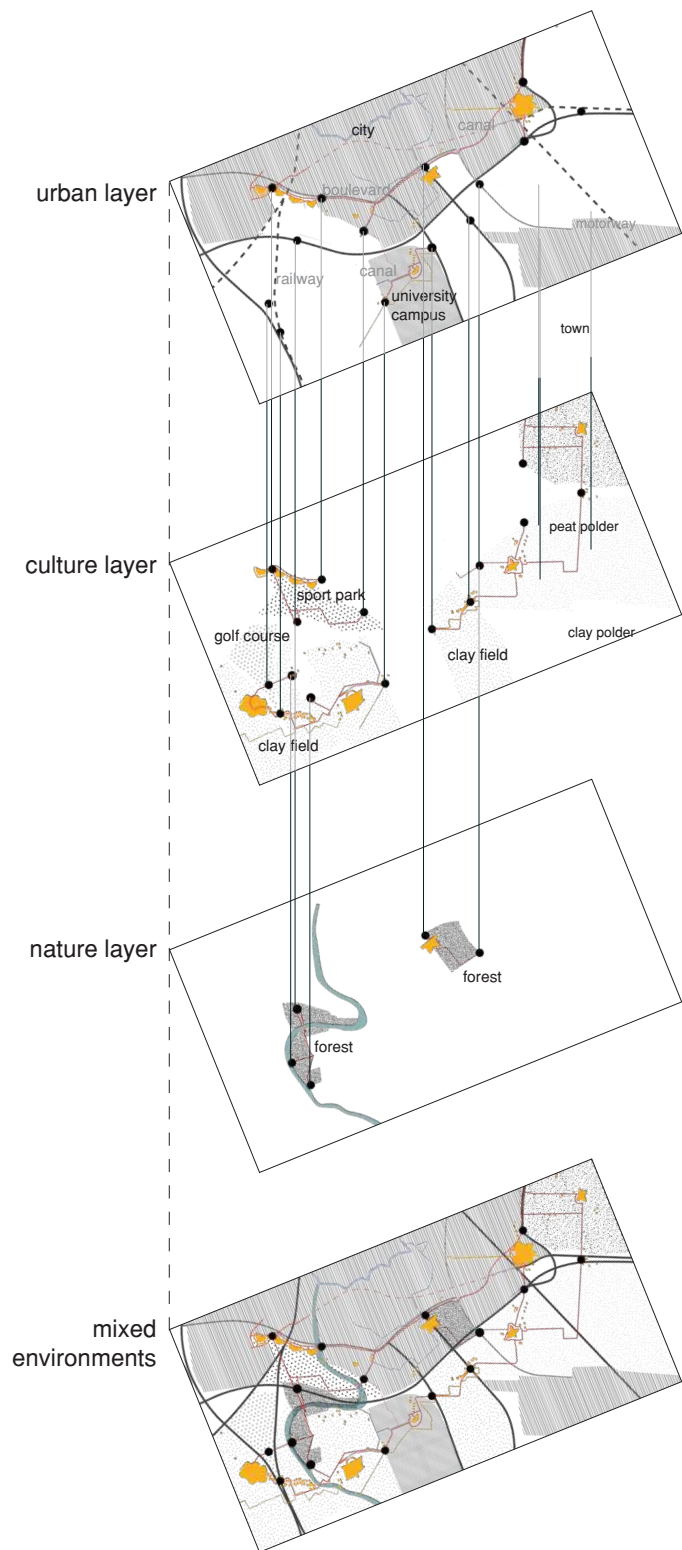


Fig. 4

Fig. 4 - 6 Two strategies are proposed to repair the functional infrastructure and represent the narrative heritage: territorial park system and narrative water infrastructure

Expect defragmenting, the different spatial characters are strengthened in the territorial park system. The heritage elements are colored by different surroundings. These elements are like scattered in different space-time. Some of them are in nature, some in cultural landscape and some in urban landscape. When traveling along the path, heritage elements in different space-time are represented.



Fig. 4



Fig. 6

Two of the transition nodes are shown above. Sound of poplar leaves which is typical in the clay polder, tactile impression of water in the canal, sound of cars and typical paving are mixed at the transition node. Therefore, people can feel the transform of environments and notice the different character of heritage.

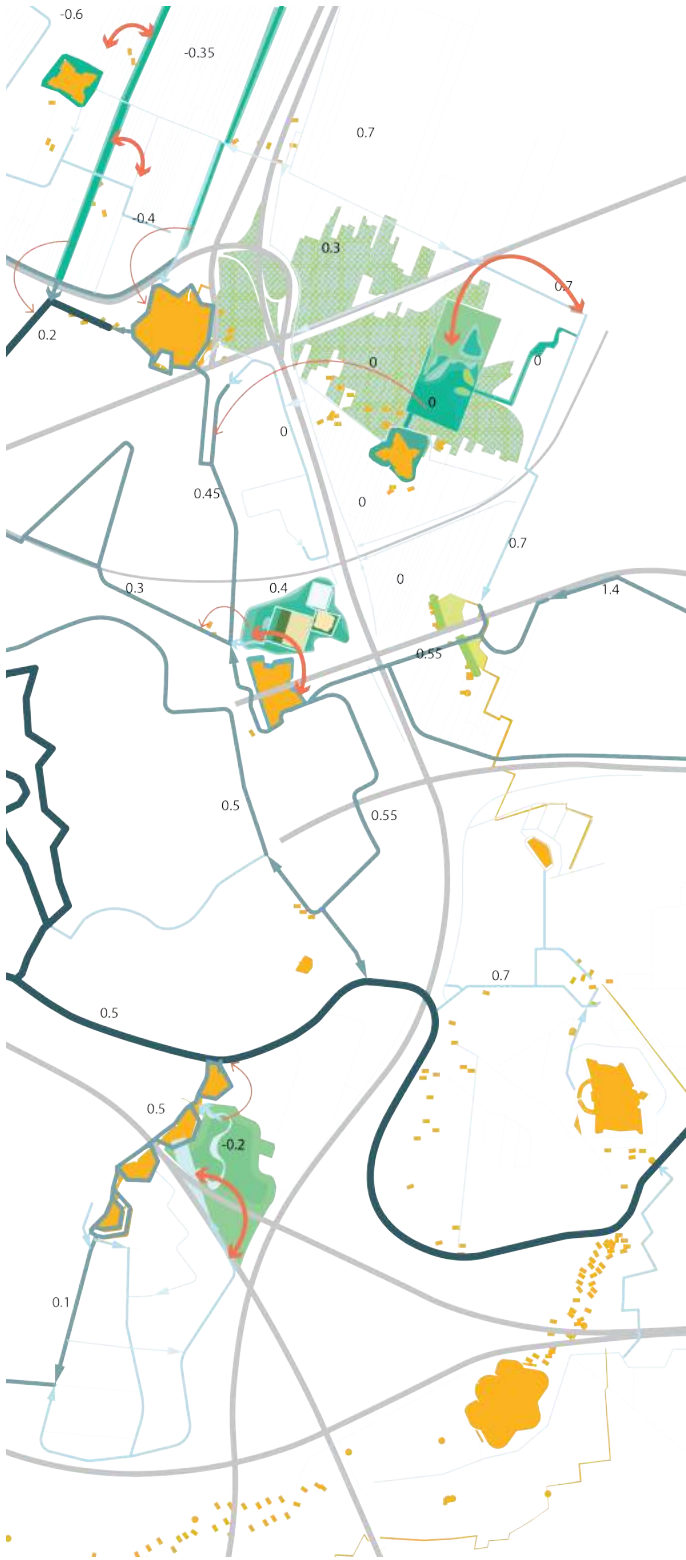


Fig. 7

Fig. 7 - 9 New water infrastructure changes the water management from rapid drainage to hold and store and also represent the inundation image. Seasonal wetlands are set at the edge of boezem to be adaptive for a role in rainwater storage. At the same time, the seasonal flooding can represent the inundation image.

seasonal wetland for cultural narrative and resilient water management. Vegetation absorbs the nitrogen and phosphate among the water from agriculture area. These substances act as nutrients and help the vegetation to grow. The purified water is discharged to the water



Fig. 8



Fig. 9

system. Vegetation can be harvested as biomass.

In some area which cannot be seasonal flooded can be transformed into solar panel field, sometimes combining with farm. The shining image of solar panel field remind people of the water easily. Therefore, it is also used as a tool to represent the inundation.

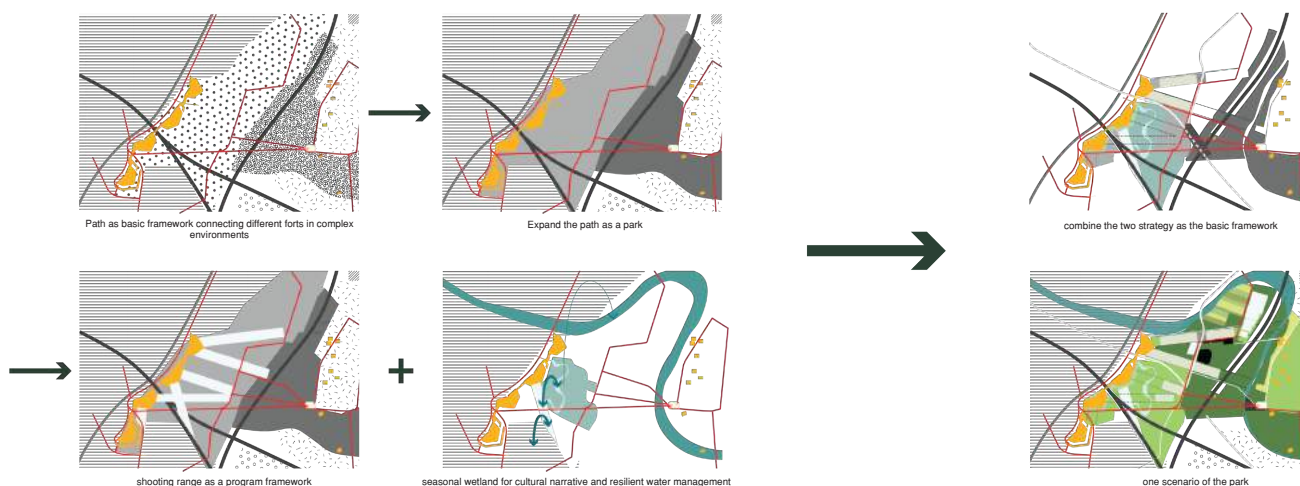
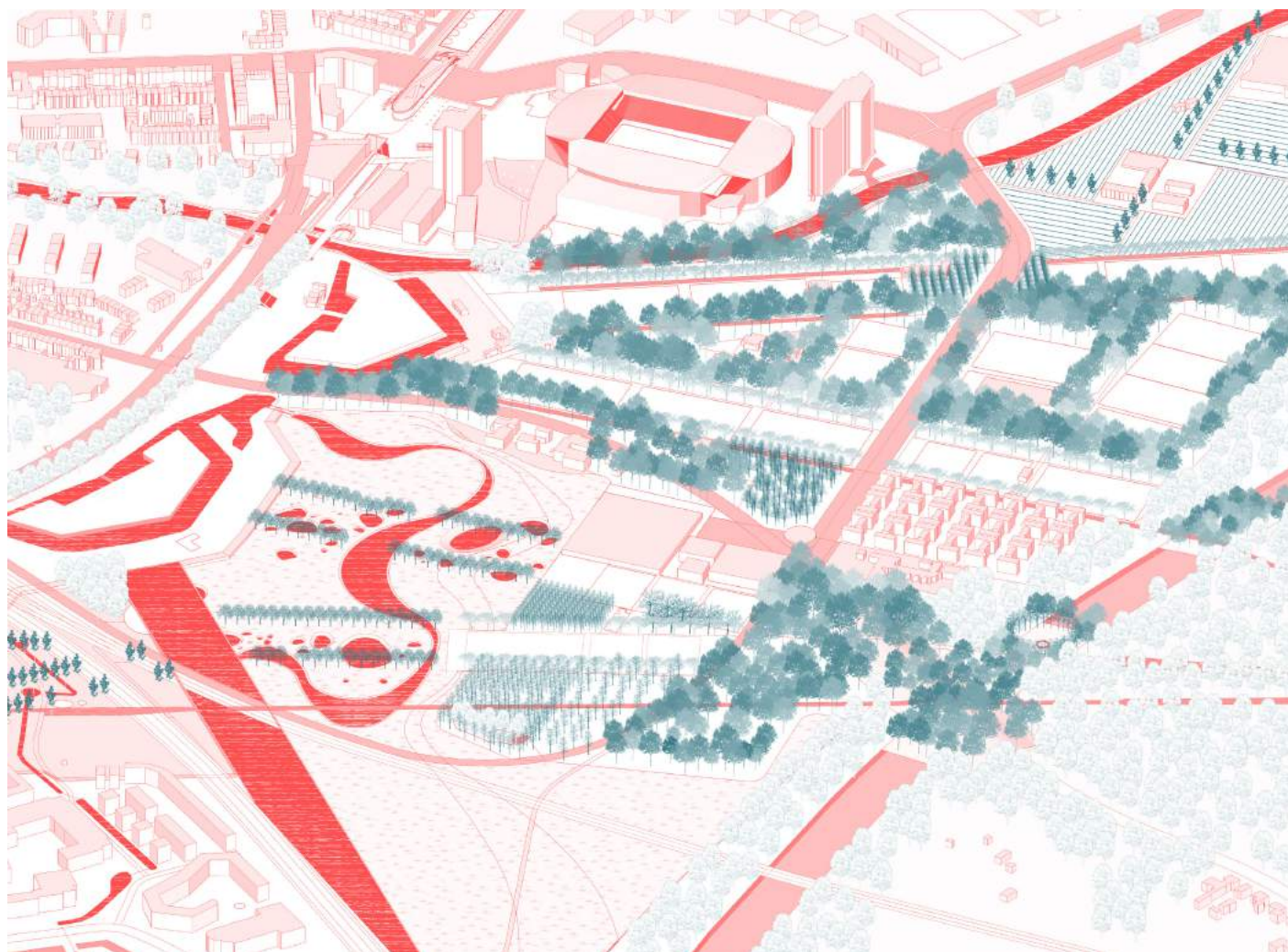


Fig. 10

Fig. 10 The heritage experience path around the Fort Lunet expands as a park to cross heavy infrastructure, connect fragmented green space and provide rich programs for the citizen. The forgot urban green space will be transformed into seasonal wetland. Now the water from this green space will be pumped into the town and then boezem. In contrast, in the future, the water from town and green space will be held and stored in the green space.

More importantly, the seasonal flooding will represent the inundation basin, the water flow direction and inundation

in different time.

The narrative framework provides flexible scenarios for future NDW. Urban forest, seasonal wetland and infrastructure shape the basic framework. This area could be transformed into sport park, neighborhood and urban farm.

Emergent Natures

Interactive Botanical Attraction in Vienna

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Project location:
Prater, Vienna (A)

Mentors:
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Keywords:
botanical garden,
attraction, interaction,
nature, themepark

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We are facing a special point in history, the era of industrialisation is over soon and we are at the beginning of the Post-Anthropocene. Emerging technologies, virtual realities and automated industries are shaping our environment and landscapes, radically. Our understanding must follow up. I would like to make people aware of the continuously changing environment.

Botanical gardens should be the place to present and forecast these changes. However, the design of botanical gardens remained undeveloped. My project is looking into the essence of botanical gardens and questions the operation mode in order to deliver a diverse understanding of nature.

In the context of emerging environmental issues, how can botany take a leading role in developing a common understanding of the different kinds of natures we inhabit today?

I would like to bring back pleasure to botanical gardens, through challenging its design and display methods. Furthermore, I would like to reach diverse audience, also non-experts, and I would like to question how we understand nature.

I decided to remove botanical gardens from their original context, freeing them up from the design constraints. As an experiment I designed a botanical attraction in the middle of an amusement park in Vienna. The site of the project is the Prater, one of the oldest theme parks located in a green recreational area. The area of the Prater is a very inspiring location, there you can find shiny plastic landscapes, fictional vegetations and fantastic fibreglass flora. Specifically designed in an abstracted version for non-experts.

How can we implement a botanical space in a form of an informative attraction to the established theme park of Vienna, in order to introduce new understanding of nature to the visitors through presenting diverse display methods?

I would like to develop the design of botanical gardens, through combining the original ideology of Botanical Gardens with the spatial theory of landscape architecture. I rethought the theory of 3 natures, reflecting on the new era, the Post-Anthropocene. I call my theory EMERGENT NATURES. I explore nature from 3 different perspectives.

I call the first nature, Virtual Memories of the Wild. There is no wilderness anymore, humanity has taken it all. Technology is the new religion. Through its eyes we can dream and shape with our imagination.

The second nature turns into the Machine Landscapes. Endless landscapes accurately measured, systemised and subdivided into productive units. Controlled and maintained by artificial intelligence.

The third nature is called Speculative Cultivars. The city as largest human habitat is forced to adapt, through releasing unseen species from far-away-places. These strange newcomers will contribute to the culture of the city.



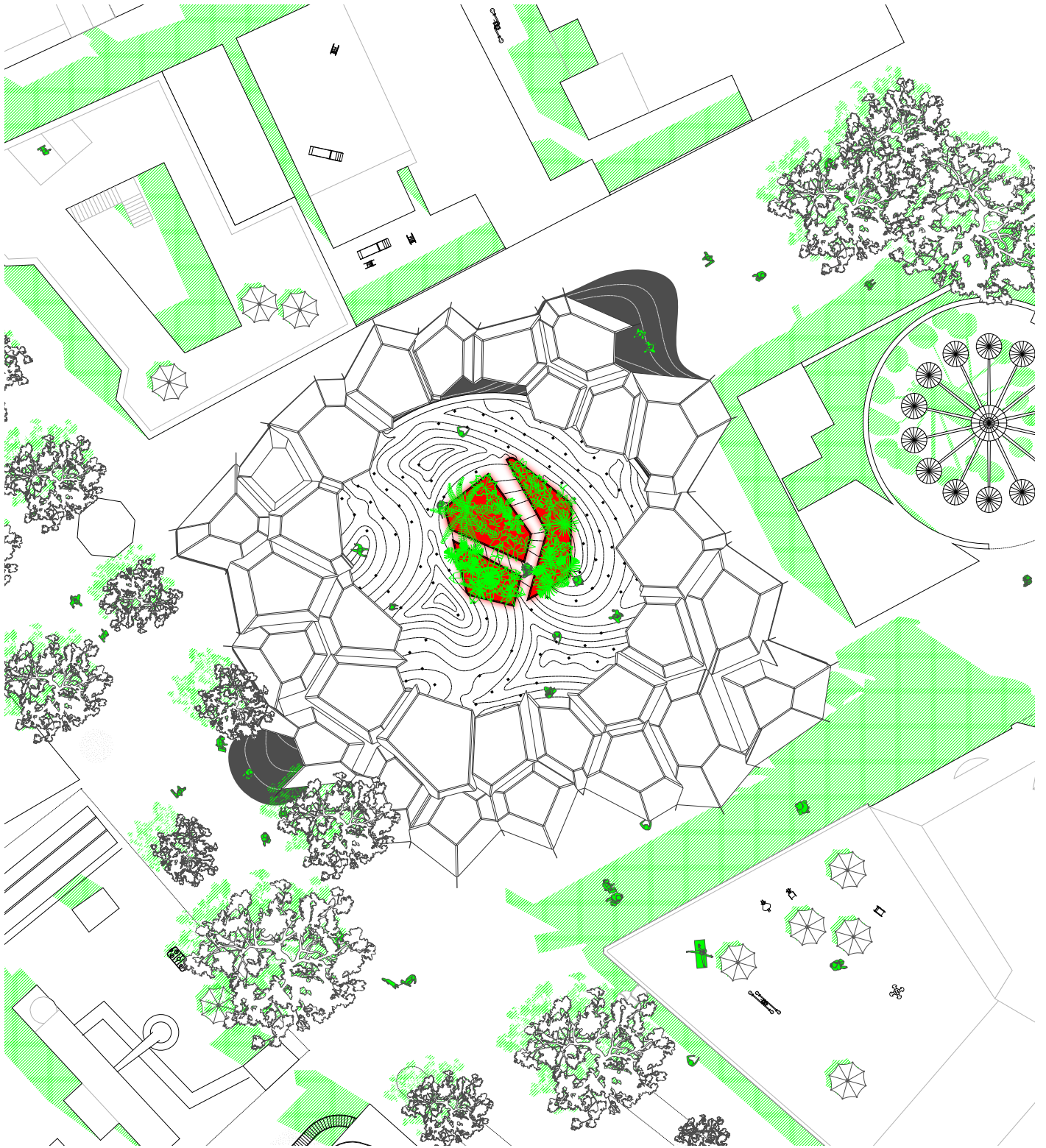


Fig. 1

Fig. 1 I created three territories of the three natures, which are organised concentrically. I imagine Speculative Cultivars in the center, in the most protected position. Surrounded by the industrial machine landscapes in a strict grid system. And the outside areas, the Virtual memories of the wild are fading.

Inside the attraction you can see the differentiation between the territories of Emergent Natures. The Virtual memories of the wild are laid out as corridor, equipped with screens facing the inside, lighting up the dark space. The Machine Landscapes are strictly organised in an open

white floating field. The Speculative Cultivars are presented on elevated red planters only reachable through narrow gaps, allowing the explorer a face-to-face meeting with the ecology of the future.



Fig. 2

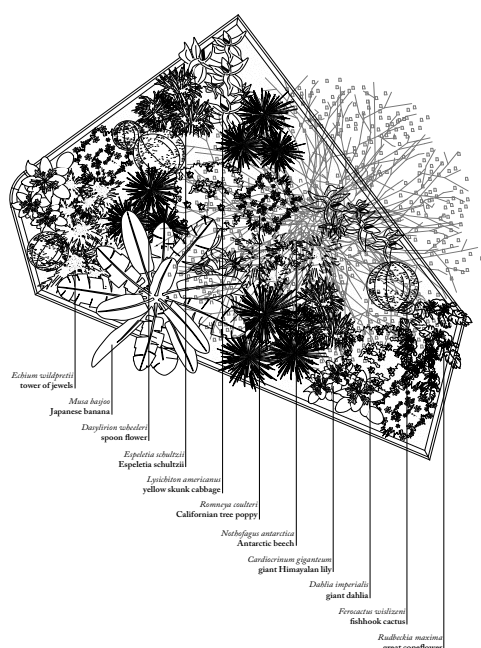


Fig. 3

Fig. 2 - 4

VIRTUAL MEMORIES OF THE WILD

The role of this territory is to represent a wilderness which is lost, through using digital technologies. Using Virtual Reality as a tool to recreate and engage with individual memories of a botanical wilderness. LED screens mounted on the inside of the fibreglass shell, live streaming the creations of the VR users.

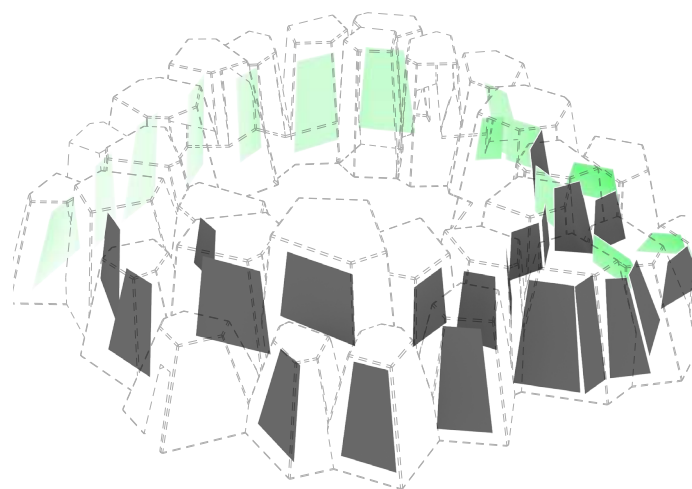


Fig. 4

MACHINE LANDSCAPES

The ideology of this automated landscape is presented through a field of three different columns. Different heights indicate different functions. They respond to divers sensorial experiences, such as smelling, hearing and seeing. The space's white colour indicates a clean and sterile environment, where every unpredictability is disabled.

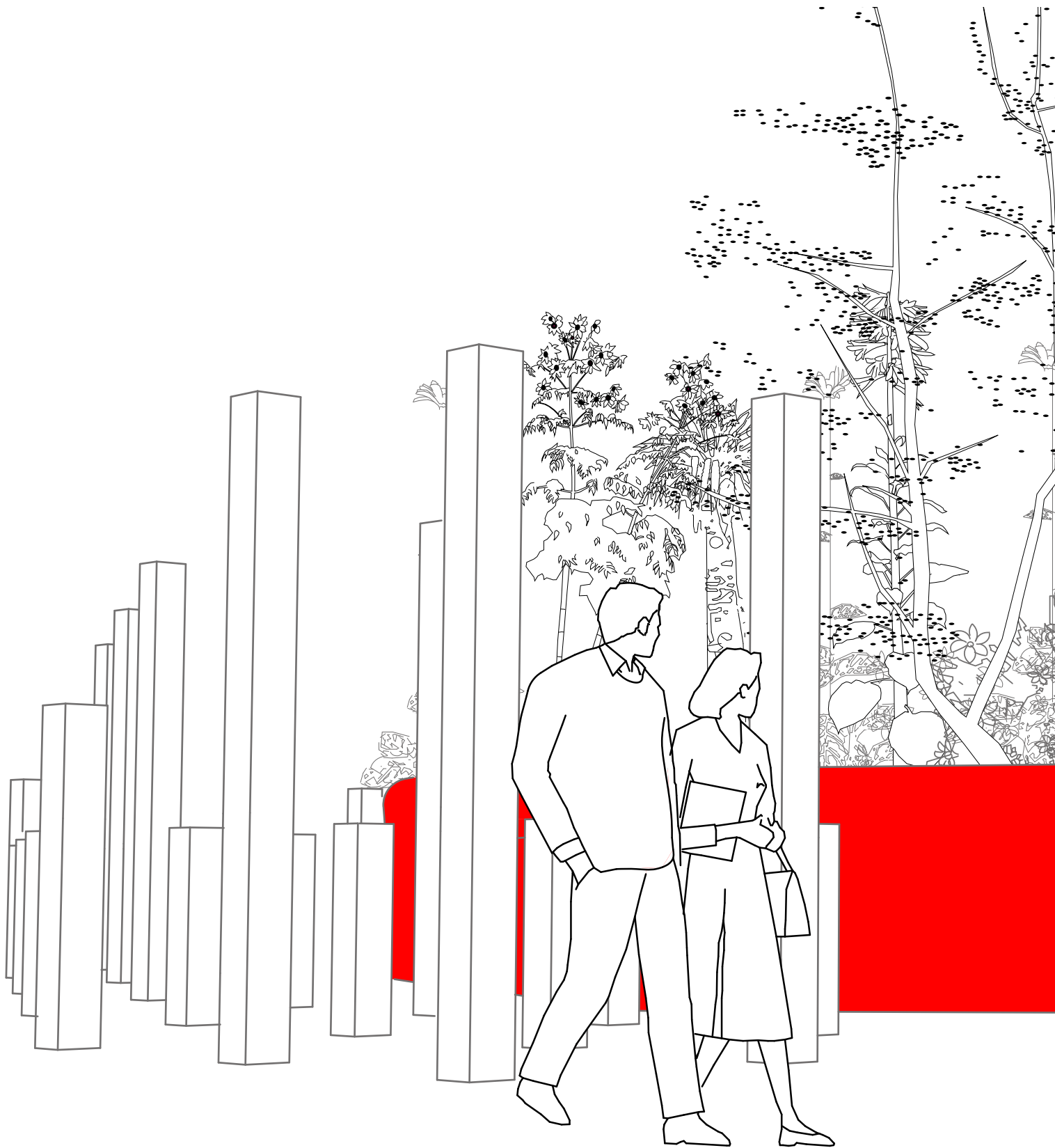
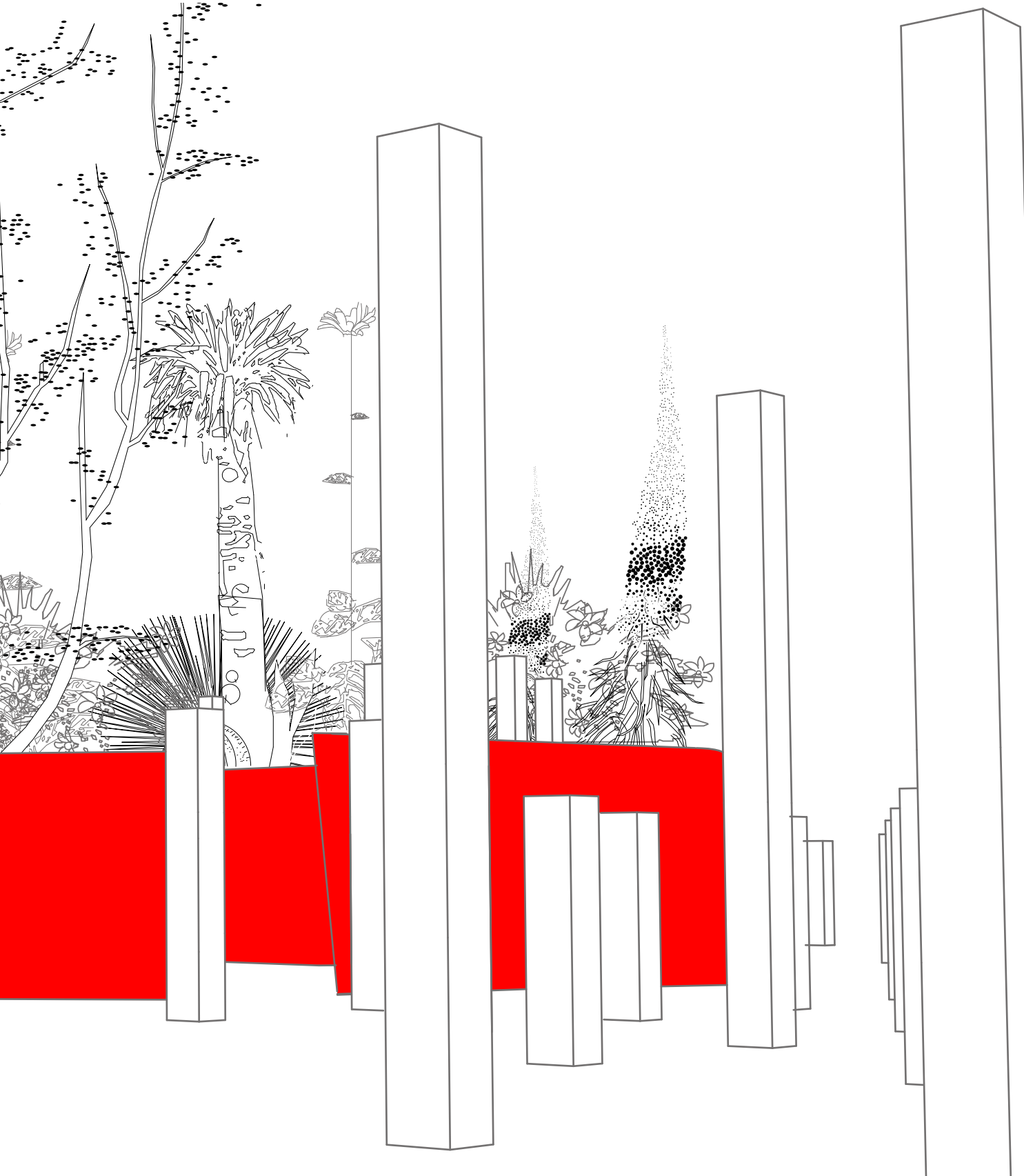


Fig. 7

SPECULATIVE CULTIVARS

The selected species appear in a never seen composition, aiming to attract and entertain people. They are potential examples for the city's future public spaces. A vegetation which can hardly survive the climatic and harsh urban microclimatic conditions of the present, can be the perfect arrangement for the city of the Post-Anthropocene. It





Informal Natures

Landscape Infrastructure design for resilient, equitable and adaptable socio-ecological systems in Cape town

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Project location:

Cape Town, South Africa

Mentors:

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Keywords:

drought, township, informality, landscape infrastructure, water equity infrastructure, water equity.

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Cape town stands at top of the most “water stressed cities” list in the world, like the other global south cities, it has disregarded its natural systems in its spatial planning and water management. This pushed the city to a Day Zero situation in 2018 implementing water restrictions on all residents of the city. But the scenario in the townships are different, these service and infrastructure deficit spaces are always and constantly in ‘drought’ like environment with limited water usage and informal areas within them with no access to water. In many ways, it can be defined as two parallel worlds. The spatial development of the city much dictated by its past apartheid mechanism has led to development of townships on the periphery and on vulnerable landscapes. These landscapes fall under the biodiversity hotspots of the city which are inaccessible, abused or undervalued.

The lack of addressing socio-ecological systems in the city’s water management has further increased the inequality in townships, therefore, requiring an integrated engagement of social, hydrological and landscape processes in disaster risk reduction and in building resilience for the city, townships and biota. The research question of the project investigates on how landscape-based strategies and design principles can be applied to mitigate the drought and social inequity in townships by reinforcing inter-scalar spatial planning toward water resilience & ecosystems restoration in Cape town. Three main lenses of landscape, water and townships are used in project elaboration with theoretical underpinnings that account for resilience, socio-ecological systems, operationalizing landscapes and considering townships as ethnic enclaves. Key conclusions to frame a vision for the city through in-depth spatial analysis of the natural & social systems of the city, followed by narrowing of micro scale locations – Kuils river and Khayelitsha township.

Systems interaction between the river and township are explored to design a landscape infrastructure to increase water resilience and local adaptation measures to capture, purify and reuse, to attain circularity by involving the community. The project further explains ways to spatialize and implement such ideas at neighbourhood level through two zones at Khayelitsha wetlands and Dunes at Enkanini informal settlement to create new socio-ecological possibilities and water security. Therefore, through multi-scalar and systems approach the landscape infrastructure design addresses the questions of social inequity, drought and environmental degradation to create an inclusive and resilient city.

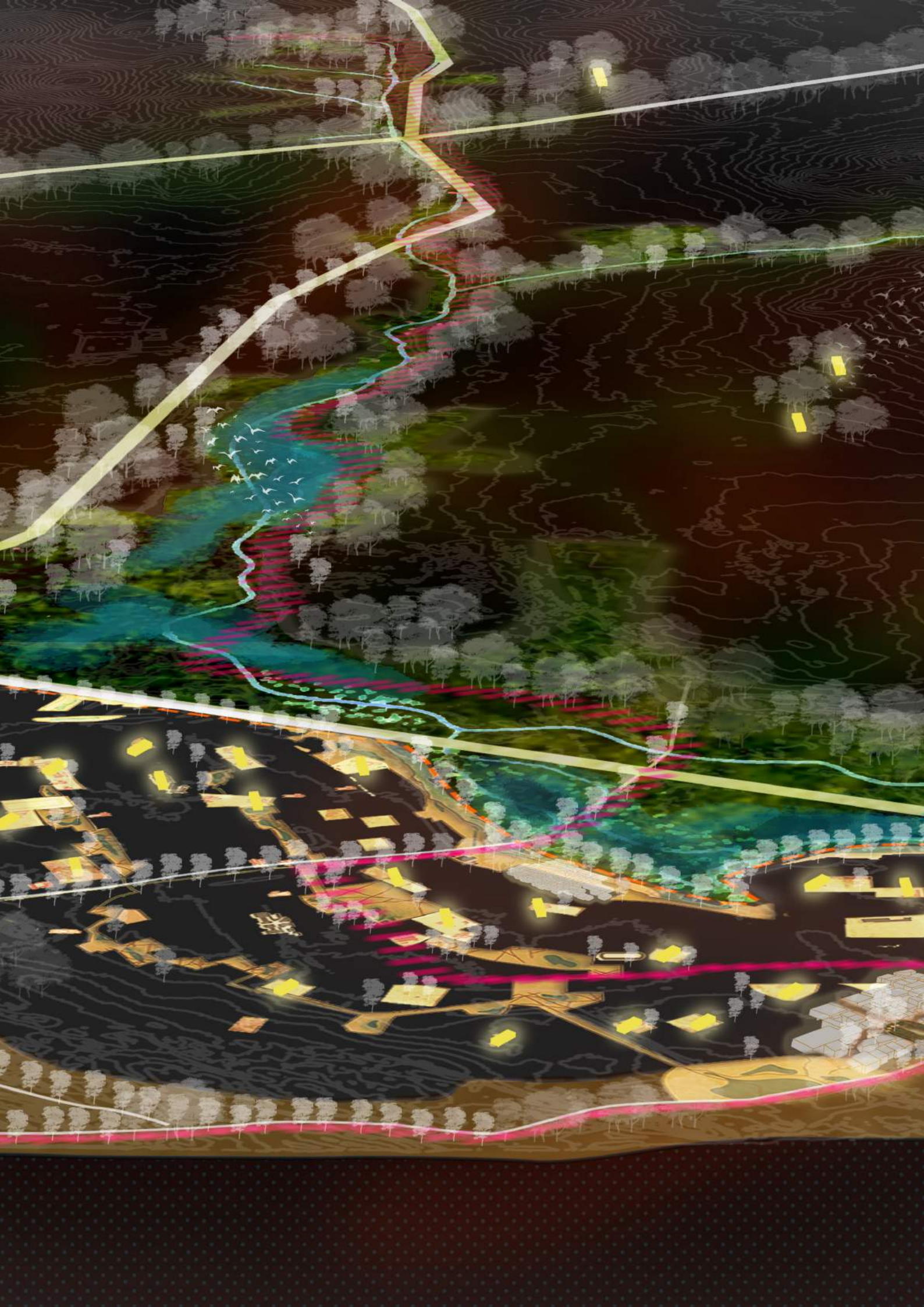




Fig. 1

Fig. 1 The design visions Khayelitsha as a dynamic system with landscapes performing different operations, mainly for the production of water that acts as conditions for new economic activities and landscape restoration. The landscape infrastructure design, therefore propose to be,

1. Restorative
Enabling the recharge of aquifer and biodiversity conservation
2. Capture
Capturing and storing of rainwater along the SWDs,
3. Purify

Captured water is purified through sand dunes

4. Engineered
Sewage water purification through ponds purification system as part of the waste water treatment plant.
5. Productive
Community based economies such as farming, weaving by setting key socio-ecological processes in place. It is approached by considering three main spatial elements to act as activators of aforementioned functions

- a. Open lands along the existing storm water drain lines
- b. Roads and informal pathways
- c. Open space in schools

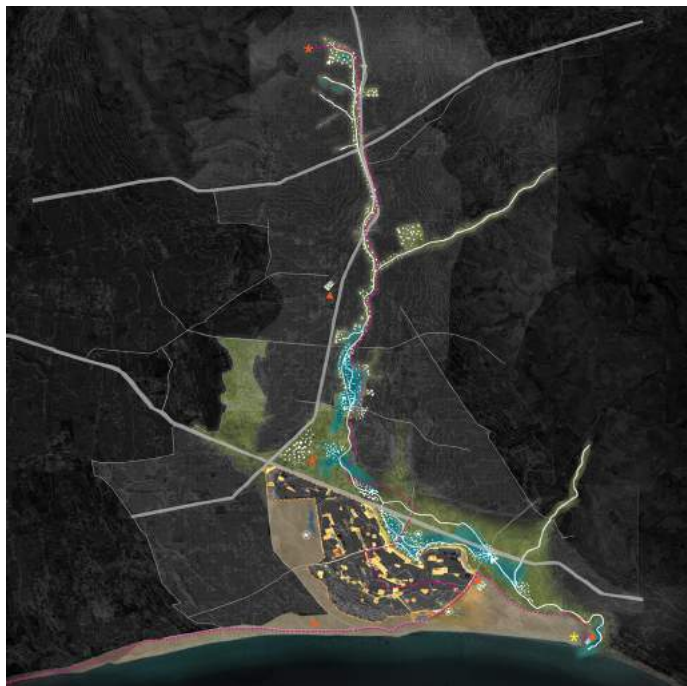


Fig. 2



Fig. 3



Fig. 4

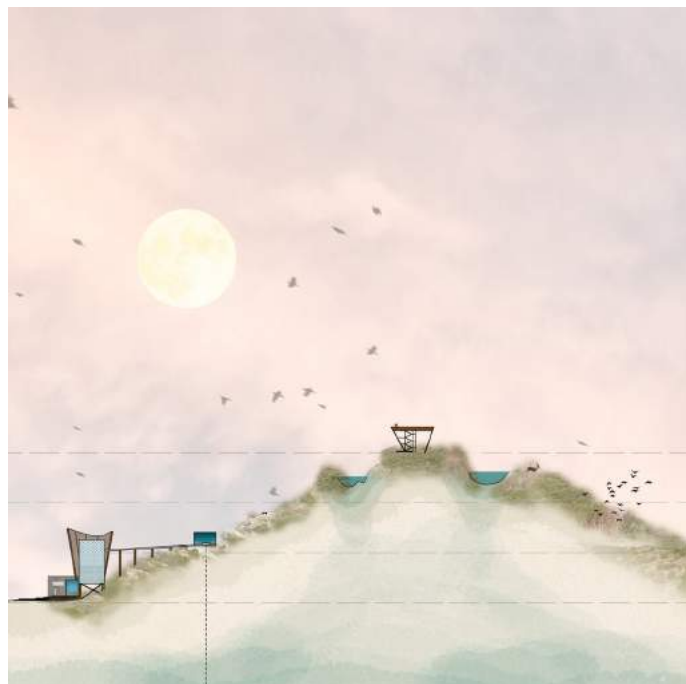


Fig. 5

Fig. 2 - 5 The vision for Khayelitsha township stand intermediate across scales beginning from the Kuils river setting framework for design principles for township. It acts an ecological corridor to recharge the aquifer.

Natural Landscapes creates spaces within the township that restores the original nature of the Kuils river with wetlands spreading across the dunes. These spaces allow social interaction and allow the growth of the indigenous vegetation.

Productive Landscapes are spaces created within the

school plots forming a cohesive area for new housing development for the relocated settlements within the township as well as promote urban farming to increase equity in township.

Dune purification systems allows new interaction between the informal settlement along Enkanini to allow for new development. The activation of dunes allow upgradation of houses by the community triggered by the provisioning of water through newly laid streets.



Fig. 6



Fig. 7

Fig. 6 - 7 Khayelitsha Wetlands Development:

This chosen site is situated along the wetlands, which at present are used by the community for various cultural, religious, recreational and economic purposes. It is also home to the most endangered endemic vegetation, dune strandveld which over years has been destroyed due to development of the township. Many informal settlers line these wetlands therefore facing risk of flooding but also becoming source of pollution to the wetlands. Therefore the design incorporates the challenges and potentials of this particular area with regards to socio-ecological

systems but also adhering to the regional plan to conserve the seasonal characteristics of the wetlands. The design measures taken are also to increase the sponge capacity of the wetlands and new conditions created to mitigate risks and provide water to the local settlers.



Enkanini Dunes Development

Enkanini is a high density informal settlement spread across the undulating sand dunes developed in the last few years. The haphazard construction makes the settlement extremely vulnerable to climate risks. Like the design strategy for Zone A, this zone incorporates larger principles by creating conditions for future development and resilient towards any impending danger. The design objective is to condition for future development provisioning of water which can be collected from water collection points that adjoin main street networks. These

identified main streets are taken as development lines connecting the dune extraction point to delivering it to people. In this case the open spaces are used for farming and recreational activities for the people.





