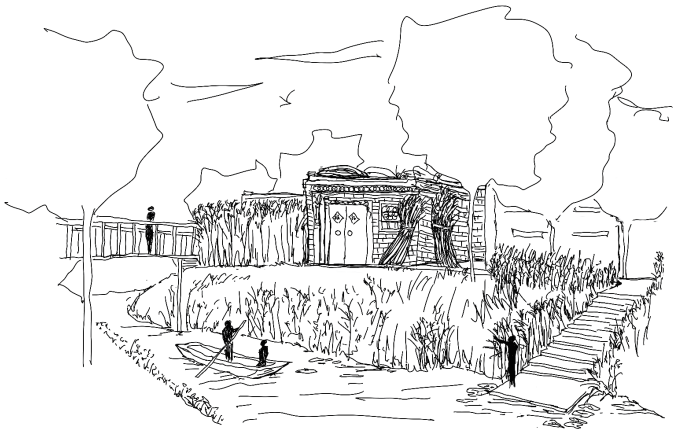

Symbiosis:
Renovating Traditional Cultural Landscape of Baiyangdian Lake-Wetland System, Hebei Province, China

COLOPHON

Symbiosis:
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P5 report
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ACKNOWLEDGEMENT

Although I can't believe, the 2 years study in TU Delft is coming to an end. It's been a difficult journey, with many tears, difficulties and loneliness. It was not perfect, but it's also the best journey - with countless growths, gains and realizations. There are so many people I want to thank for walking me through this difficult journey.

I want to thank my mentors, Inge and Lei. Having you as mentors was the best decision for me. Thank you for your knowledge and patience, I have learned so much from you whether on studying or on life. And Olga, thank you for your warmth and sincerity! I want to thank my family for always supporting me and loving me. And my friends, thanks for the time we spent together.

There's so much I want to say, but it's hard to express here. Let all the love and gratitude be remembered, and they will surely translate into actions in the future. Finally, to all of you and myself - thank you for being in my life! Let's welcome the new life that we never know what gonna happen.

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Abstract

This project is about Baiyangdian lake-wetland system, the largest freshwater lake in the Hebei region, which has developed a productive cultural landscape of lake-village-reed symbiosis under long-term human modification, which is adaptive and resilient to floods.

However, after 1960s, when China entered the modern era with fast industrialization and urbanization, the symbioses of humans and the lake landscape got out of balance. Baiyangdian has been hit hard by drought, industrialisation, pollution, village expansion and over-fishing, which have brought a series of ecological disasters. In 2017, the government placed Baiyangdian within Xiong'an New Area. The establishment of this new city brings opportunities and challenges to Baiyangdian. The government began to treat Baiyangdian with measures. The ecology of Baiyangdian has improved, but the livelihoods of locals have been restricted and the traditional way of life is disappearing.

As for the government to restore the ecosystem of the lake they want to relocation the villages, restrict the industry and fishery, take over the maintenance and so on. Based on the study of the ecological system, the water management, and livelihood of Baiyangdian, this thesis researches from the perspective of landscape design and urban planning if it is possible to keep the island villages in the area as part of a renewed healthy lake landscape. The aim is, by utilising the rich natural landscape resources of Baiyangdian, to provide new vitality for local people and create a new chapter in the era of human-water symbiosis.



"She sat on reeds, like sitting on a clean white snow, or on a clean white cloud. She sometimes looked into the reed lake, which was also a silver-white world, with a thin mist shrouding the surface of the water, and the wind blowing over, carrying with the fresh fragrance of lotus leaves and flowers."

--SUN Li, The Stories in Baiyangdian

Figure 1: Baiyangdian in past
Resource: Xinhuashe

1.1 Introduction

I've been living in large cities on the North China Plain and water is not common in my living environment. It appears only during summer rainstorms and when people mention the water shortage crisis here. So, when I came to the Netherlands, I was surprised by the environment and history of water and human symbiosis. I enjoy this beautiful environment and want to explore more about the relationship between people and water, so I chose CWS Studio.

The Lab encouraged me to find Baiyangdian lake-wetland system. It is surprising that the most water-scarce region in China use to have a large and unique human-water symbiosis system. As a person from Hebei Province, where Baiyangdian is located, I often heard few words about it when I was growing up. However, by researching on it I realized that this system is a cultivated natural landscape that has been modicated by man over time. It was a human-water symbiosis with a unique circularity. But the big changes in modern time lead to changes of Baiyangdian's landscape, ecology, and circularity. For now, the landscape is no longer sustainable as past. How did this system work in past? What happened to the lake in modern time? How do we live with water in the modern time? I try to use this thesis as an possible answer.

1.2 Research Question

How can landscape design help the Baiyangdian area to reestablish a new relationship between human and lake in a resilient and sustainable way?

How did village and water coexist harmoniously in the Baiyangdian area in the past? What problems have they suffered in modern times?

In the process of transformation, which characteristics of the past can be retained, which need to be transformed, and what new characteristics can be added?

How to achieve these goal by means of landscape design, and what kind of spatial quality can these villages present in the future?

4.3 Research Method

Mapping
I will be researching traditional water systems through a variety of methods. This includes using GIS to organize and analyze the topography, soils, climate, and hydrology of the site. In addition, I will gain insight into the spatial patterns, residential life, culture, historical changes, and current issues of the system through historical photographs, documents, news, articles, documentaries, and other materials.

I will visualize the structure and changes in the region's water system by redrawing historical satellite maps and translating textual information into diagrams. The mapping will demonstrate the spatial characteristics and circulation patterns of the system.

Develop an understanding of the site through fieldwork and living in a traditional village.

Literature research
Through reading the thesis research on the history, geographic information and hydrology of Baiyangdian, as well as learning and summarizing the relevant theoretical knowledge, possible design strategies will be developed.

Field work
Through site research and communication with local people, I will understand the problems and actual spatial quality of the area, which will assist me in better understanding the system, drawing the map and propose design.

Case study
Through the study of similar cases, I can obtain the successful experience of strategy selection and design.



Figure 19: Baiyangdian in past
Resource: Xinhuashe

1 Before 1963: Symbiosis of Human and Water

"People are like birds living in reeds, which keep going through the reed field all day long."
--SUN Li, The Stories in Baiyangdian

“人好像寄生在苇里的鸟儿，整天不停地在苇里穿来穿去”
——孙犁《白洋淀纪事》

1.1 Background

1.1.1 location

Located in Xiongan New Area, Hebei Province, China, Baiyangdian wetland-lake system is the largest natural freshwater lake on the North China Plain.

After a long period of human modification, Baiyangdian wetland-lake system presents itself as a cluster of 146 large and small lakes connected by more than 3,700 ditches and rivers, with a total area of 366 square kilometers (1960), a water storage capacity of 1.32 billion cubic meters in an average year, and boundaries delineated by dykes. There are 40 villages distributed among the islands in lake and on the shores of the lake. Up to 2019, these villages is home to over 90,000 people.

The Baiyangdian wetland-lake system is shallow, with an average water level of 3.6 meters and a maximum depth of 6.0 meters.

There are many waterways in Baiyangdian where boats can travel.

The lake is covered with reeds, as it's most famous character. Reed, as well as fishery and aqua crop, are the long-term sources of production for the inhabitants of Baiyangdian.

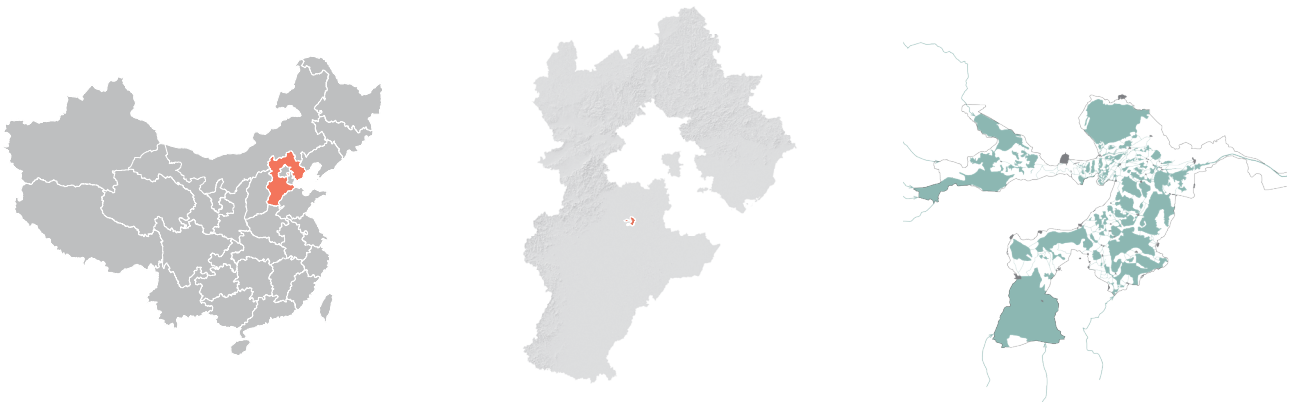


Figure 1: Location of Baiyangdian in country, region and lake scale
Resource: Drawned by author



Figure 2: landscape in Baiyangdian
Resource: Xinhuashe

366 km^2

area of lake

40

villages in lake area

3.6m

average water evel

90, 000

people living in the lake

1.1.2 Origin and Evolution

Baiyangdian wetland-lake system was formed from the late Tertiary period to the Quaternary period. Due to the growth and development of alluvial fan and delta of the Yellow River and Hai River system, the Hebei plain gradually exposed the water surface, the slope flow and diversion on the alluvial fan and delta, converge with each other on the edge of the alluvial fan or delta, so that the flood water diffused in the low-lying water storage becomes a lake.

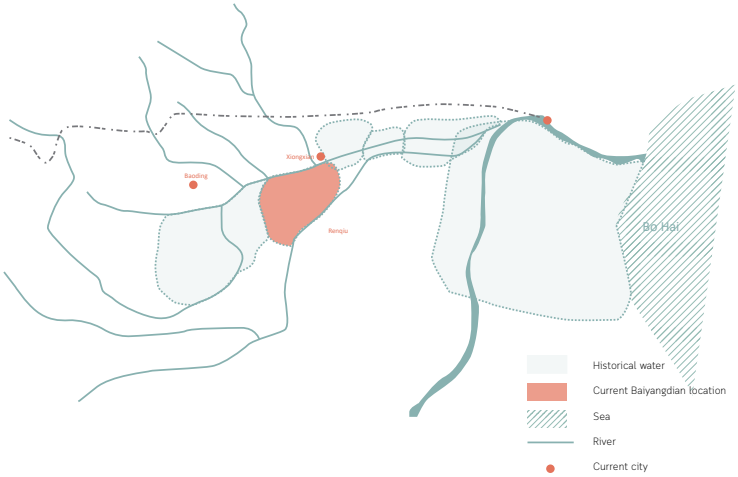


Figure 3: Origin lake group in Baiyangdian Area
Resource: Huichang Wang, 1983

After the formation of Baiyangdian, due to hydrological and climatic changes, the alternation of land and sea, human development and utilization, resulting in the ancient Baiyangdian experienced sometimes expansion, sometimes contraction of the evolutionary process. Bedore Tang (910s) dynasty, human influence on Baiyangdian was small.

Formulation (960s-1360s)

Since located on the boundary of Song and Liao, Baiyangdian was seen

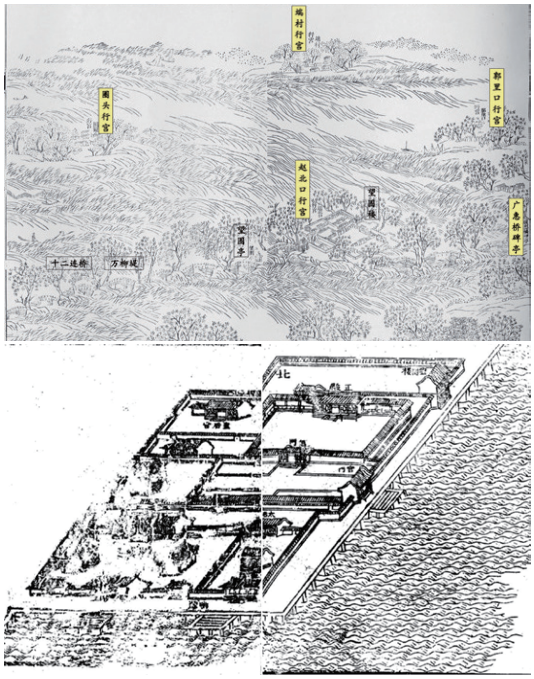


Fig. 4 The four palaces within Baiyangdian
Resource: The Great Moments of South Patrol
Fig. 5 Juantou Palace map
Resource: Renqiu County Chronicles

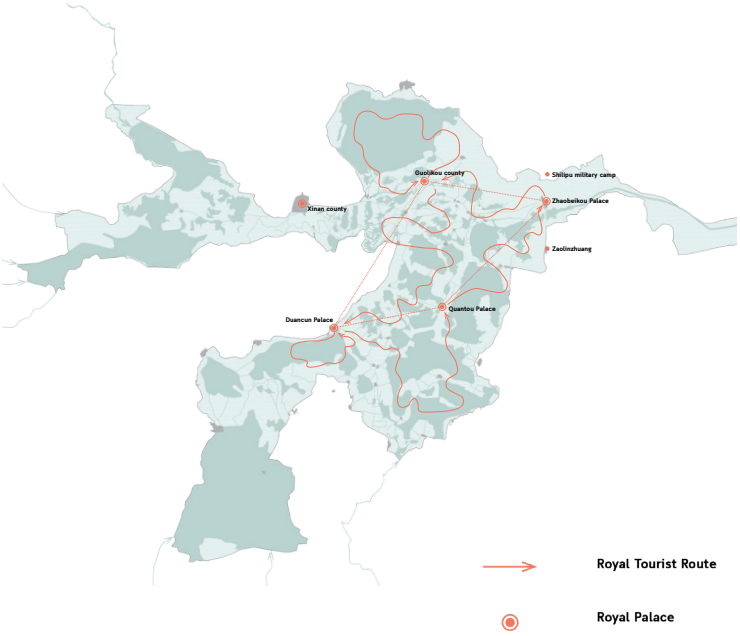


Figure 6 Royal palace and tourism route
Resource: The Royal Water Hunting Landscape Construction of Qing Dynasty in Xiong'an Area,Chenggang Xia, 2018

as a natural defense line. Government started Tun tian(屯 田), which is collective migration and agricultural activities organized directly by the government, for obtaining taxation and food for army.

Royal Palace (1360s-1846)

During the Ming and Qing dynasties (1368-1670s), immigration to the area intensified. The government continually

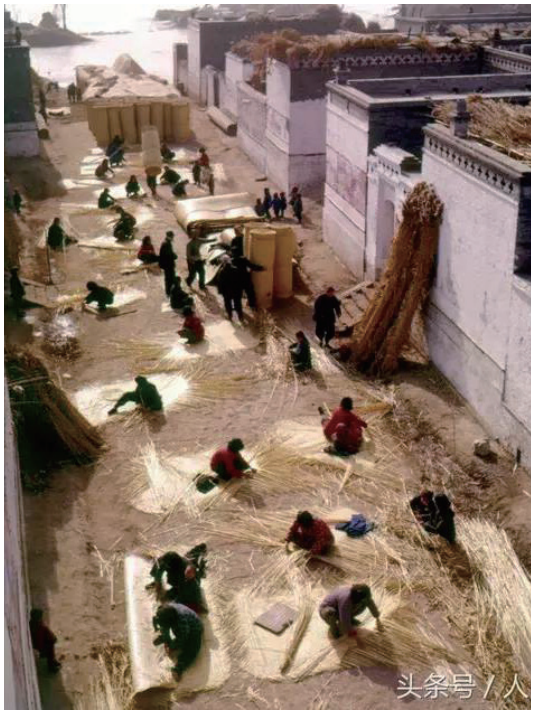


Figure 7: traditional settlement in 1961
Resource: People's daily

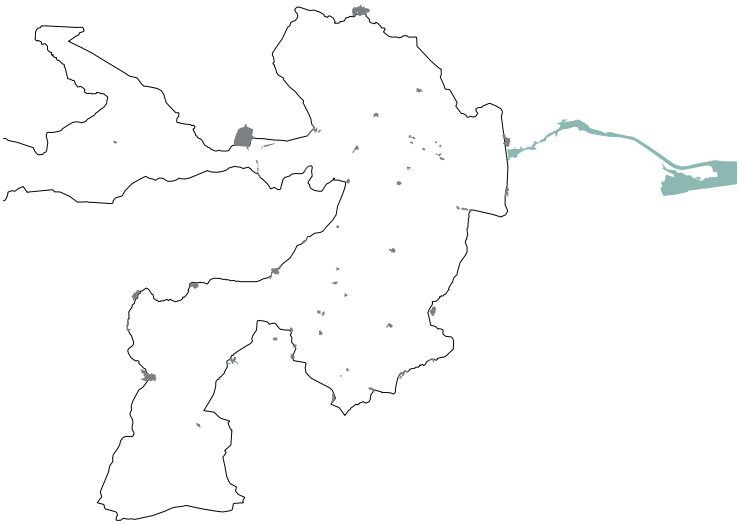


Figure 7: Baiyangdian 1961
Resource: keyhole satillite

built water works-dykes, to define the existing pattern.

The Qing government used the area as a holiday resort, built palaces and continued large-scale management.

Traditional Settlement (1846-1963)

At this stage, the country is withering, neither the emperor's recreation nor the government's management was stopped. The relationship of human and people in Baiyangdian remains stable.





Figure 9: Current condition of villages in Baiyangdian
Resource: Xinhuashe

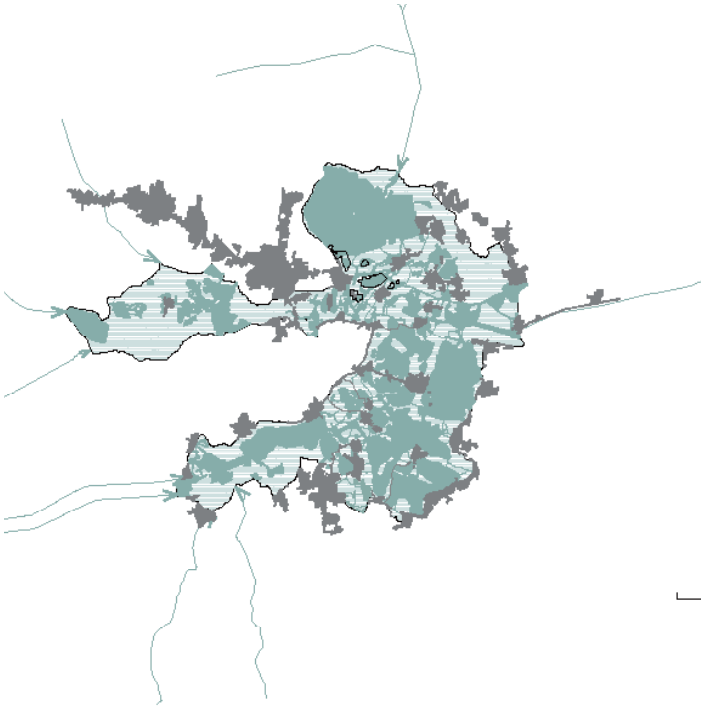


Figure 10: Baiyangdian 2023
Resource: google satillite

Changing period (1963-now)

After 1960, due to the construction of the reservoir upstream and modernization, the water here shrunk, the village expanded and the shape of the lake changed a lot.

1.2 Lake Analysis
1.2.1 water retention

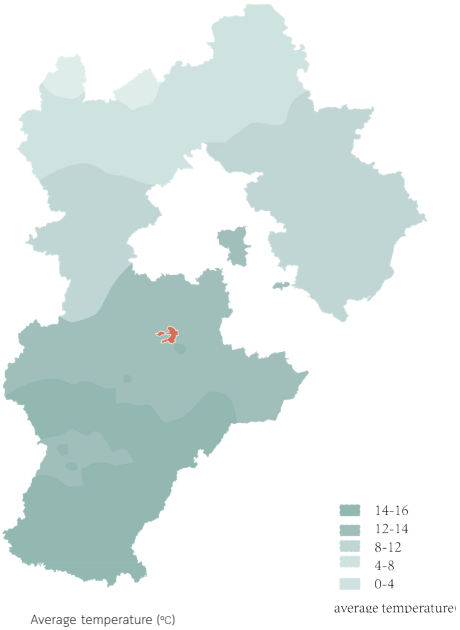


Figure 11 Average temperature (℃)

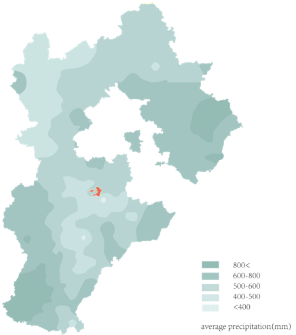


Figure 12 Average rainfall (mm)

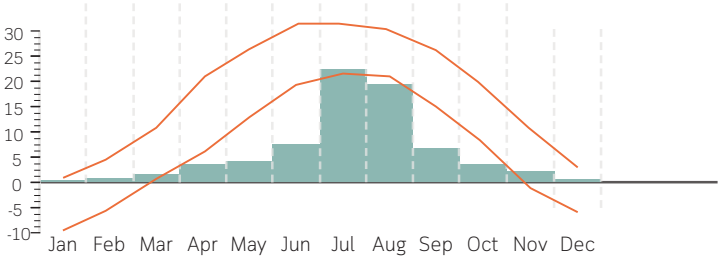


Figure 13: annually pricipitation and temperature
Resource: Yi Yujun

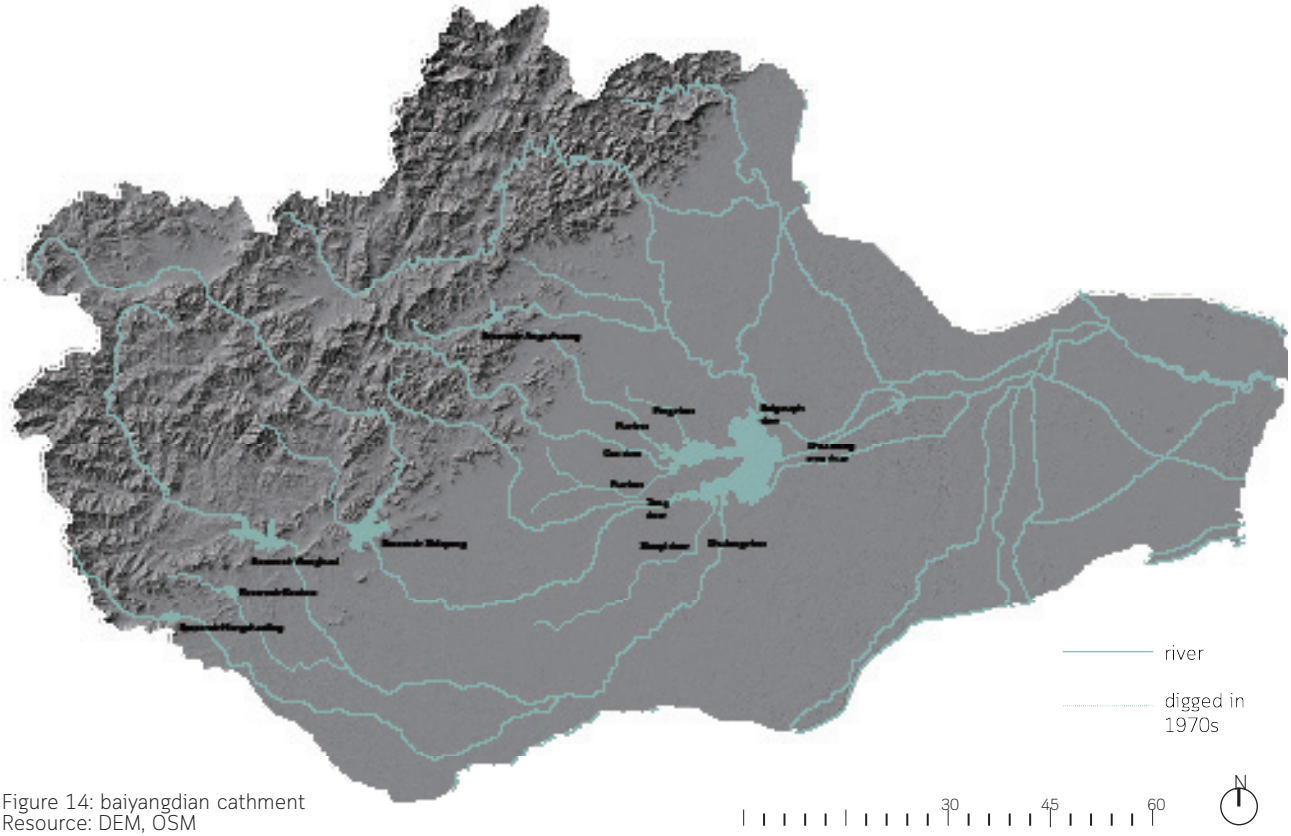
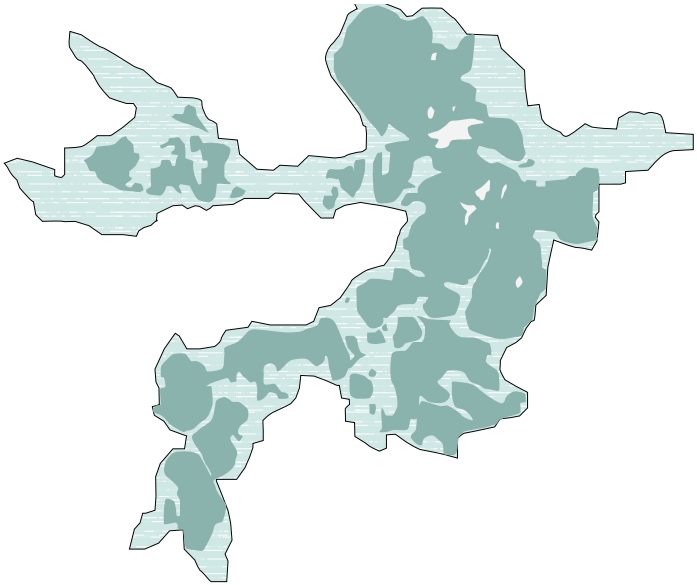


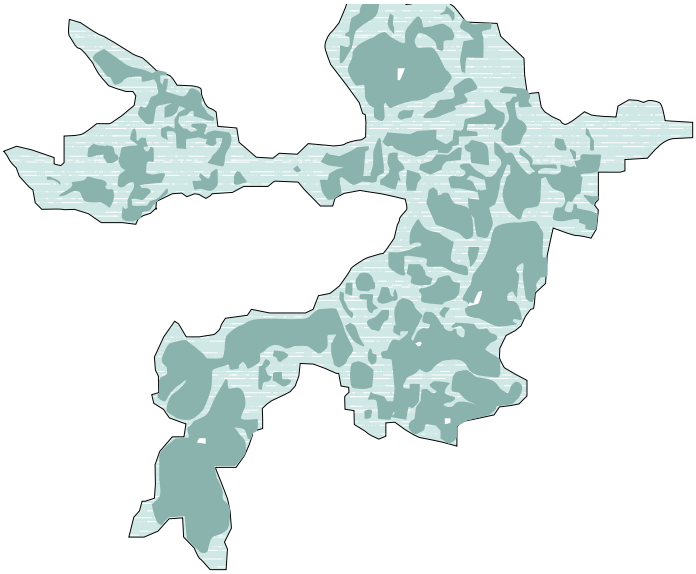
Figure 14: baiyangdian cathment
Resource: DEM, OSM

Baiyangdian wetland-lake system is located at the confluence of nine rivers, eight in the upper reaches, respectively are River Tang, Zhulong, Ping, Pu, Cao, Fu and Xiaoyi. The Baigouyin River was reclaimed in 1980s to introduce water from Juma River. Only one river down streams, which is Zhaowang New River.

The climate is seasonal, with short spring and fall, and the rainfall is mainly concentrated in the hot summer, with high evaporation; the winter is cold and dry, and the lake freezes over.



Spring



Summer

Figure 15: Seasonal water surface change
Resource: Xiaoya Wang, 2018

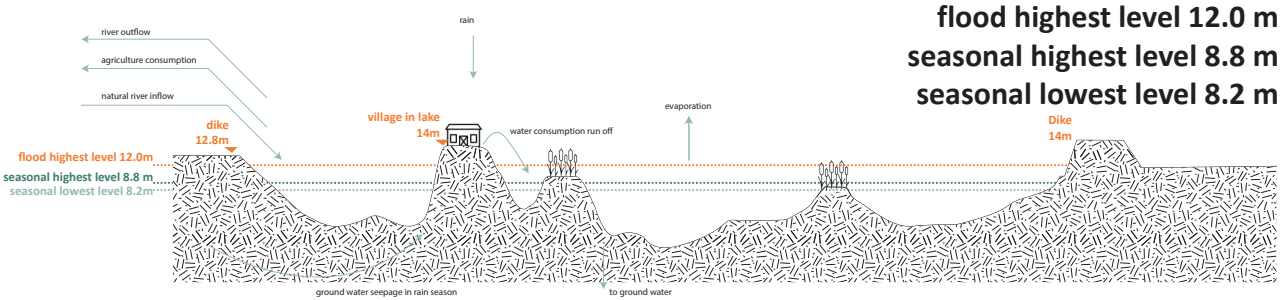
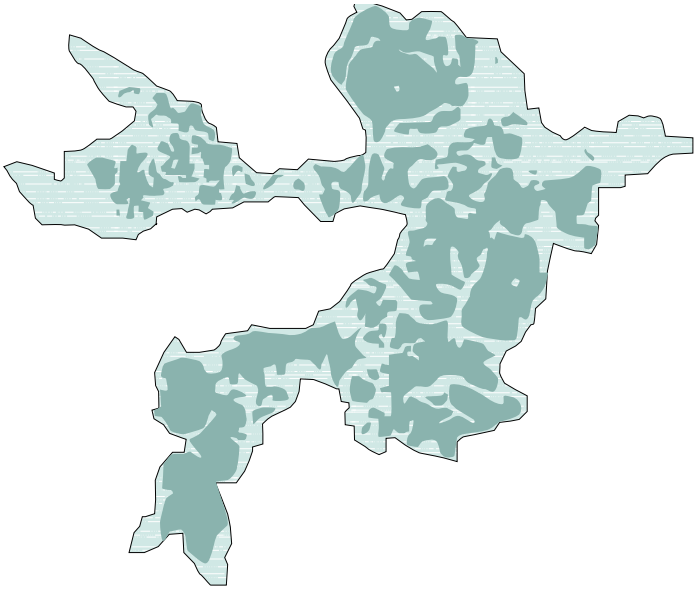
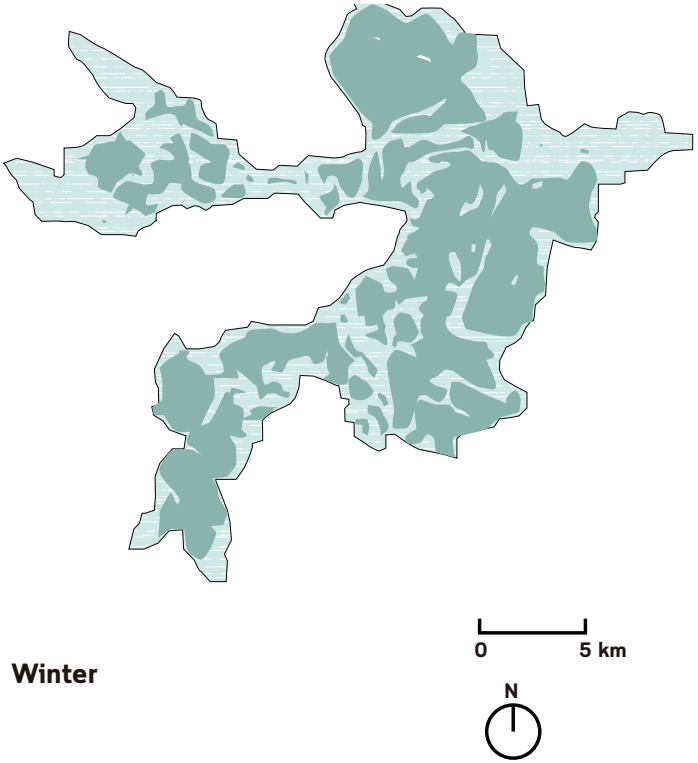


Figure 16: Flood and Seasonal water level change
Resource: Drawn based on Chunlei Zhao(2019), Yinghua Li (2004), Kailin Wang(2018)



Autumn



Winter

Due to this climate characteristic of concentrated precipitation and high evaporation, and the inequality between the number of rivers entering the precipitation and the number of rivers leaving the precipitation, Baiyangdian is prone to floods in summer, and the seasonal changes in water surface and level are significant, and it is extremely dependent on seasonal replenishment of water to replenish the loss of water due to large amounts of evaporation.

The historical water level was at arond 8m as the regular water level, and 10 m as the high water level.

1.1.2 Ecological Biodiversity

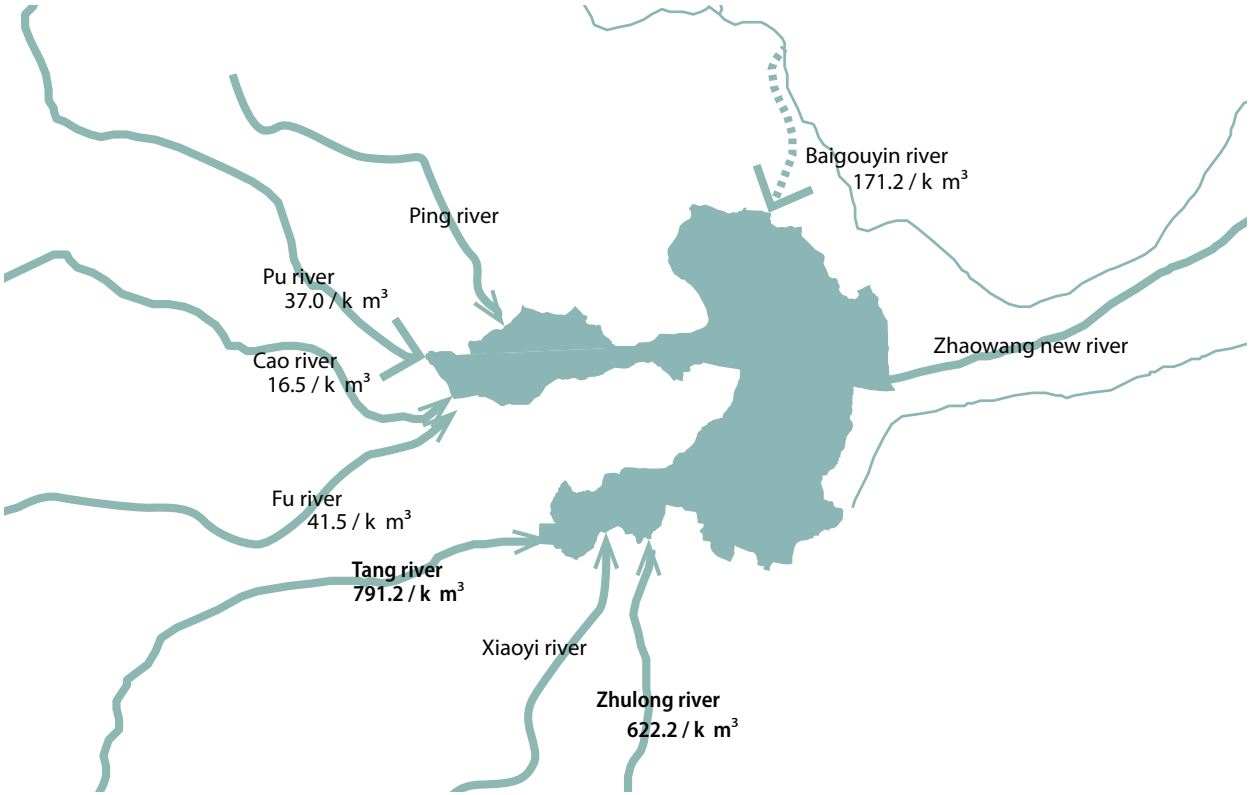


Fig. Multi-year sand and soil input by rivers upstream of Baiyangdian

River	Observation time	Total sand input /k m³	Average sand input /k m³
Zhulong	1951-1989	24265.3	622.2
Tang	1954-1989	28482.9	791.2
Baigou yin	1970-1989	3423.3	171.2
Cao	1953-1989	610.6	16.5
Pu	1959-1969	370.0	37.0
Fu	1952-1966	581.4	41.5
All		58710.2	1731.0

Figure 17: Sand and soil broght by rivers
Resource: Zhenqing Li, 2002

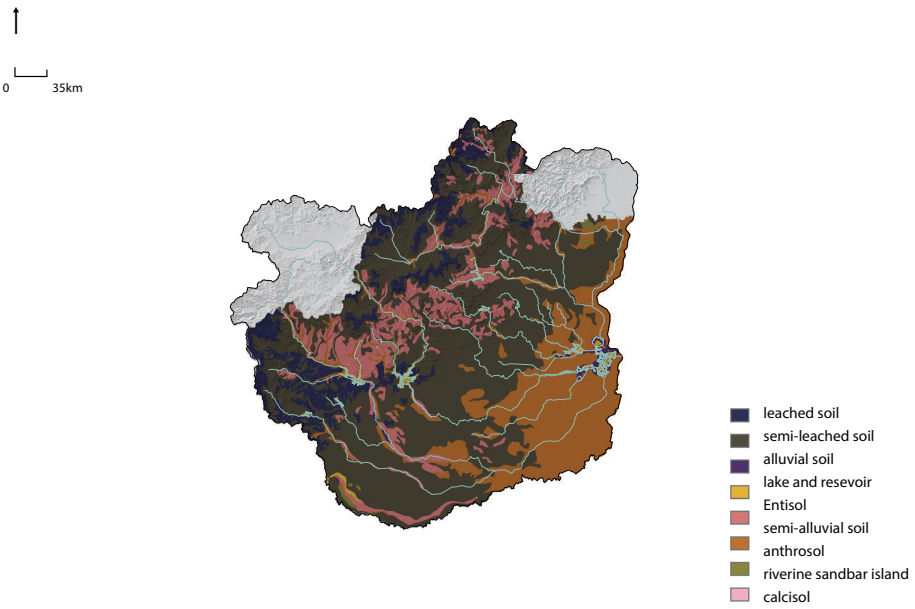
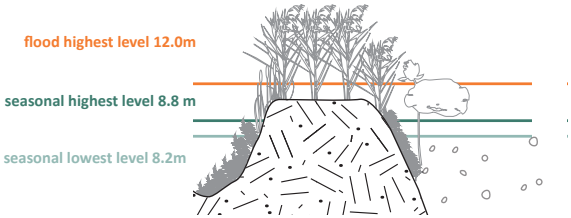


Figure 18: soil type in catchment area
Resource: Zhenqing Li, 2002

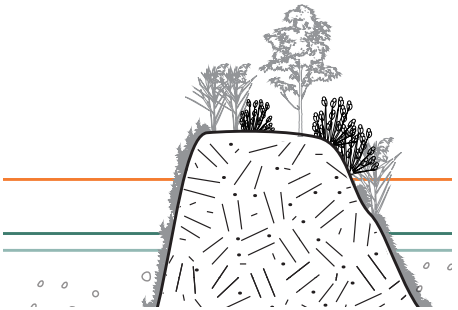
Eight upstream rivers bring a large amount of sediment into Baiyangdian.

Baiyangdian lake's bottom silt is rich in nutrients and suitable for the growth of organisms. It supported the ecological biodiversity in Baiyangdian.

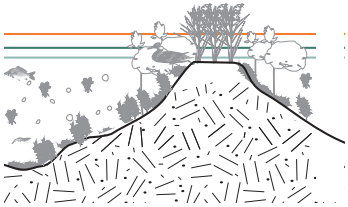
Although These deposits may bring about blockage of estuaries and siltation of lakes, it also brought rich material for local people to apply modifications to the lake. The dredging and reclaim traditions of local people maintaned Baiyangdian.



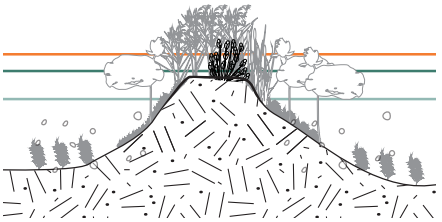
flood season under water



always higher than water



always under water



seasonally under water

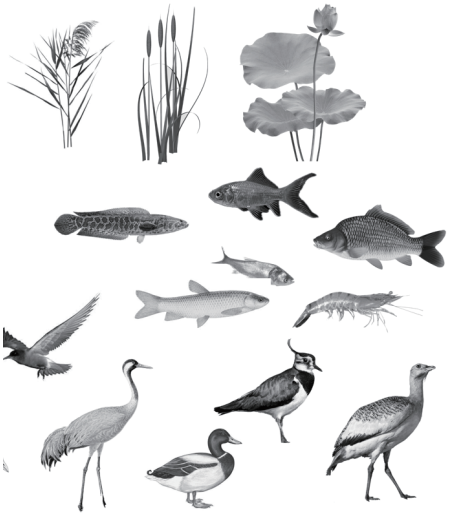
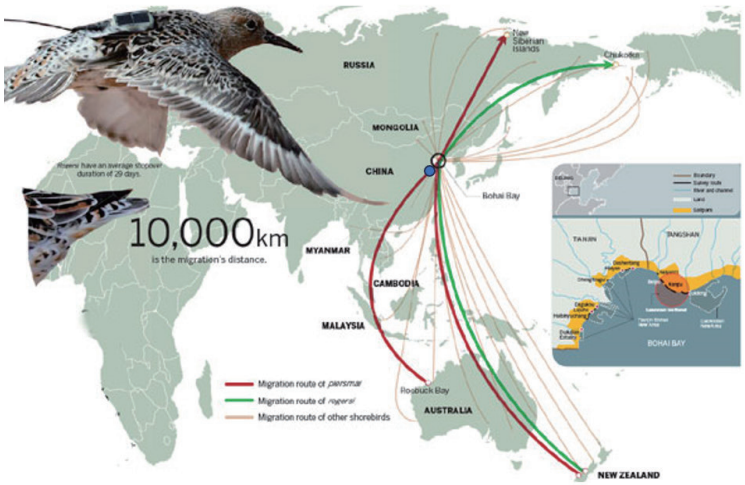


Figure 19: different habitat type in Baiyangdian
Resource: Coupling Mechanism of Eco-hydrological Processes and integrated regulation in Baiyangdian Wetland, Zhixuan Zhao, 2012

Figure 20: biodiversity in Baiyangdian
Resource: Coupling Mechanism of Eco-hydrological Processes and integrated regulation in Baiyangdian Wetland, Zhixuan Zhao, 2012



itat of bird

Figure 21: Baiyangdian on Bird migration route
Resource: People's daily



As shown in the drawing, the long-term modification by local residents has resulted in the formation of a variety of habitat types that are adaptable to flooding.

Reeds, as an important landscape feature of Baiyangdian, have excellent varieties and become the habitat of many plants and can purify the water.

Thus Baiyangdian is extremely rich in ecological diversity.

In addition, localized on the East Asia - Australia migration route of birds, with rich species resources, Baiyangdian is an important habitat for birds. It also support the ecological biodiversity in a lager scale.

1.2.3 Human activity and modification



Figure 22: Fishery
Resource: Zhang Fan



Figure 23: Aqua crop
Resource: anonymous



Figure 24: Reed harvest
Resource: Zhang Fan



Figure 25: Bird fishery
Resource: Xinhuashe



Figure 26: Lutous harvest
Resource: Zhang Fan



Figure 27: aquaculture
Resource: Zhang Fan



Figure 28: Build dike
Resource: Jin Jie



Figure 29: Dredge
Resource: anonymous



Figure 30: Reclaim new land
Resource: anonymous

Relying on the excellent biodiversity of Baiyangdian, local residents have long made a living from fishing, aquatic crops, reed harvesting and handicrafts, which you can see in these historical pictures. In their long-term production practices, local residents have adapted to the flood-prone characteristics of Baiyangdian and formed a well-circulated symbiotic system, which is shown in the circular drawing nest page.

The cycle begins with dredging. The local people would regularly dredge the lake by boat and use the silt to build dikes or pile it up in the water to form terraces above the water surface. These terraces are either part of villages or reed fields.

The reed fields are able to cutivate water quality, serve as a habitat for living organisms, are adaptable to seasonal flooding, serve as a protective buffer against flooding for the settlements, and form the characteristic landscape features of Baiyangdian. Residents harvest reeds every year from late fall to early winter to make reed mats and other reed handicrafts, which is not only an important economic source for local residents, but also prevents the reeds from rotting in the lake and polluting the lake water.

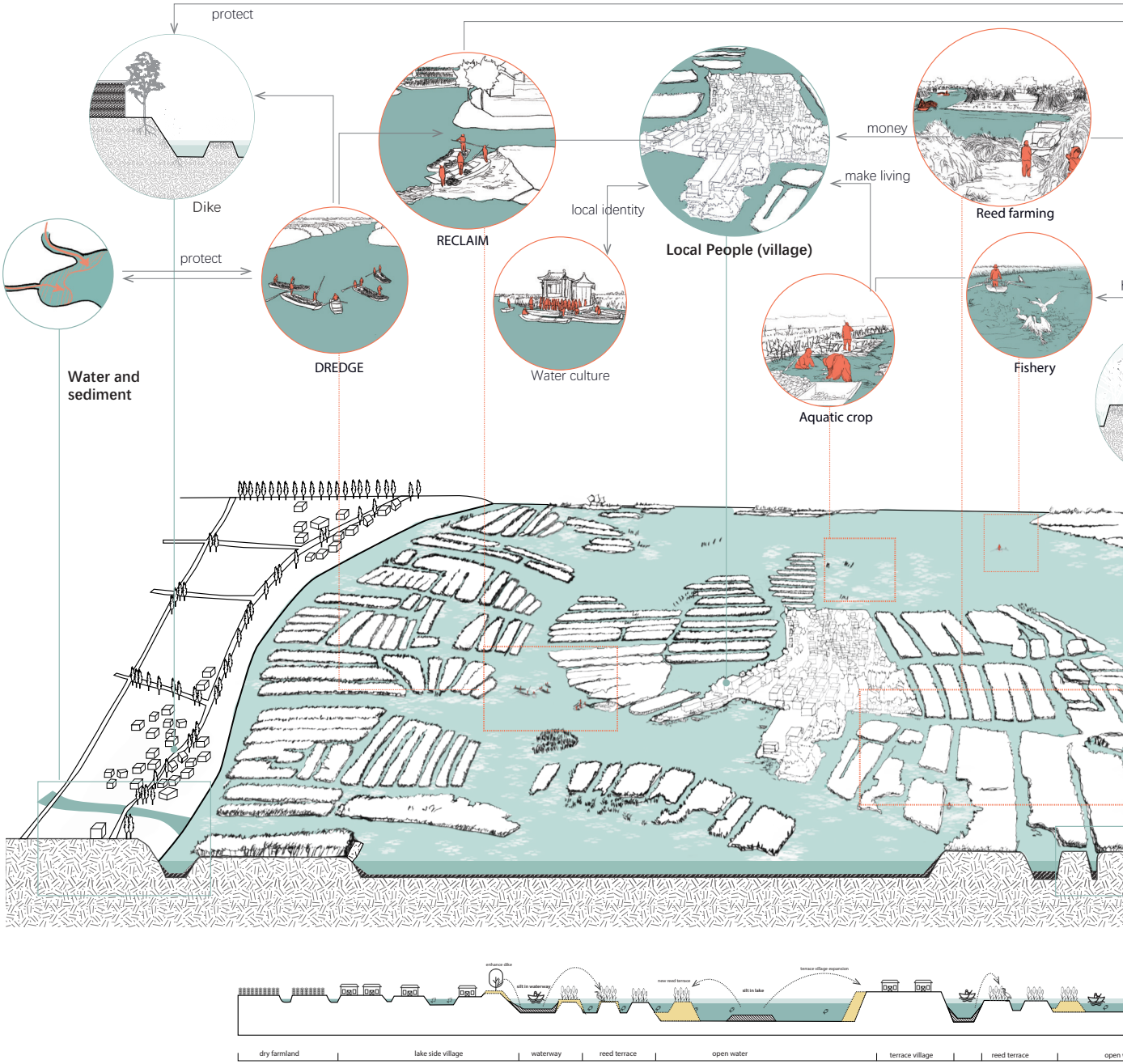
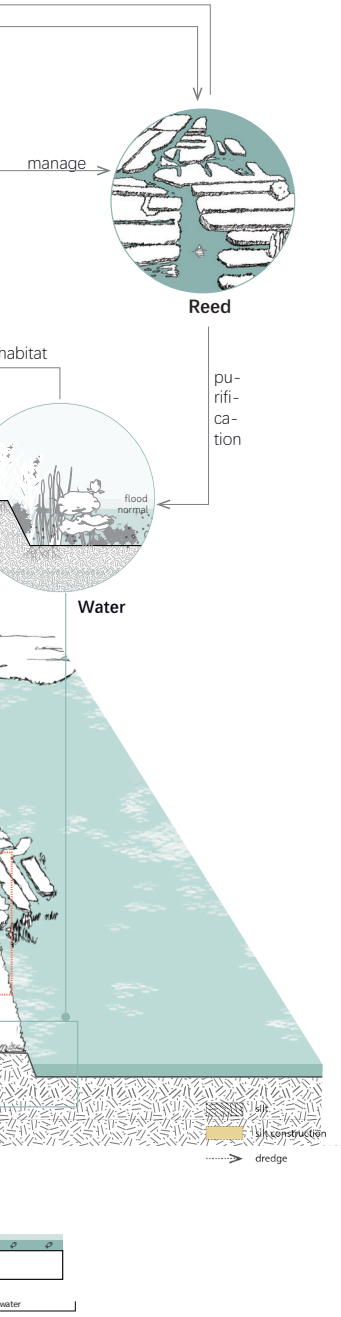


Figure 31 cirlucation in Baiyangdian system
Resource: Author



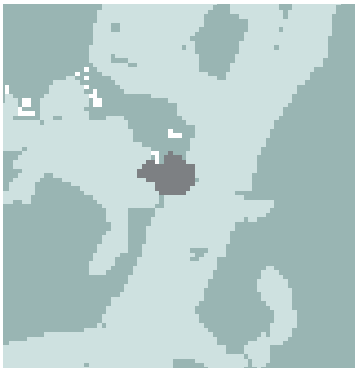


Figure 32: Island village
Resource: Google satillite, Author

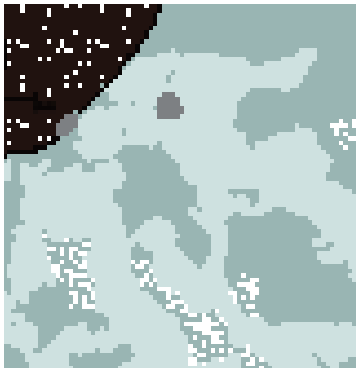


Figure 33: Lakeside village
Resource: Google satillite, Author

Reed swamp
Village
Water
Dike

In this adaptive cycle, two typical village settlement models were formed in Baiyangdian area, which is shown in the drawings, namely, the island village and the lakeside village. The island villages exist in the form of islands in the lake, and for a long time in the past, boats were used as the only means of transportation.

1.2.4 Cultivated cultural Landscape



Figure 34: reed waterway
Resource: Xinhuashe



Figure 35: planted dike
Resource: Xinhuashe



Figure 36: Villages in lake
Resource: Zhangfan



Figure 37 open water
Resource: Xinhuashe

Cultural landscapes are those where human interaction with natural systems has, over a long period, formed a distinctive landscape. These interactions arise from, and cause, cultural values to develop(UNESCO, 2010). Therefore, Baiyangdian is considered to meet this definition and is a typical cultural landscape.

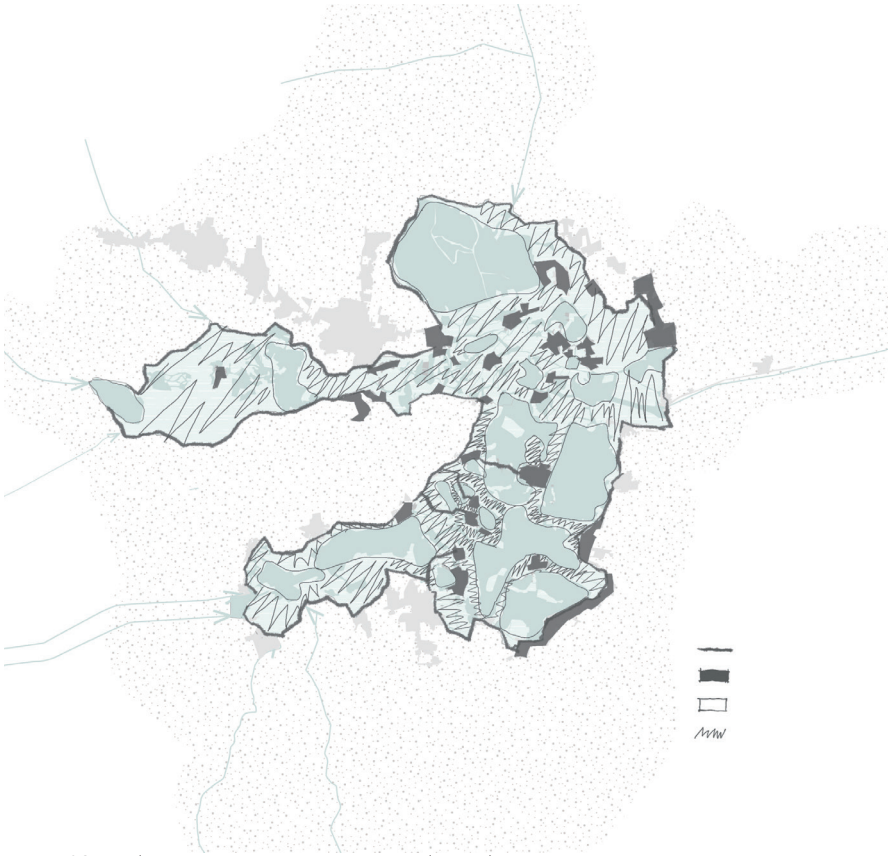


Figure 38 Landscape composition in Baiyangdian Lake
Resource: Author

In the production and life of the local people and the long-term transformation of Baiyangdian, the vast water surface of Baiyangdian has formed a mosaic landscape pattern, in which tree-planted dams, dense and deep reed waterways, open lakes, and villages in the water are its typical landscape types. Various landscape elements are intertwined, forming a complex and unique landscape pattern of Baiyangdian with local characteristics.



Figure 39: Modelling mosaic landscape
Resource: Author

By using models, the mosiac composition of landscape is more clear in large and smaller scales. This composition bring enriched spatial experience in Baiyangdian Lake.

The seasonal change of climate also bring distinct landscape change to the lake, as well as diverse activities to local people. The color, flora and fauna, spatial structure, texture and feeling all differ.



Figure 40: Seasonal change landscape in Baiyangdian
Resource: Zhang Fan

1.2.5 Local culture



Figure 41: Losting local culture
Resource: People's daily

The lifestyle of living in symbiosis with the water has also enabled the residents of Baiyangdian to develop a local culture that is closely related to the water and varies from season to season. Production is characterized by a fishing and hunting culture, including a variety of fishing methods and reed handicrafts. As waterways are the main means of transportation, recreational activities such as water weddings and water concerts have been formed. Local residents make river lanterns from lotus leaves and release them into the lake at night as a ritual for praying for blessings or offering sacrifices.



Figure 42: Battle in Baiyangdian
Resource: Xinhuashe

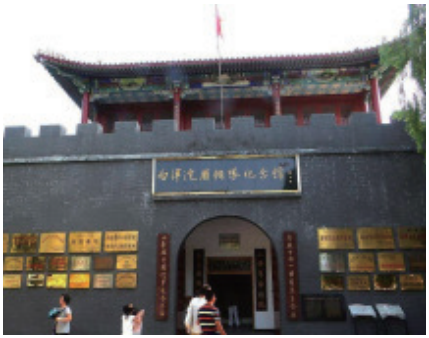


Figure 43: Museum in Baiyangdian for WW II
Resource: Baiyangdian Tourism Bureau



Figure 44: books about Baiyangdian
Resource: Amazon

During the Second World War, relying on the complex topography of the area, it provided a natural position for local residents to fight against the Japanese invaders, and gave rise to related cultural and literary works.

The landscape of Baiyangdian has inspired and enlightened literary creators.

SUN Li, a local Baiyangdian writer, known for his works depicting the landscape and customs of the Baiyangdian area.

The Baiyangdian Poetry Group, which appeared in the 1970s, was initiated by a group of Zhiqing (Young intellectuals) who were sent down to the Baiyangdian area, and who organized folk poetry and literary activities on their own initiative, gradually forming the Baiyangdian Poetry Group. The purely modernist character of their poetry directly foreshadowed and influenced the modernist exploration in the field of poetry.



Figure 45: reed drawing
Resource: Baiyangdian Tourism Bureau

1.3 Conclusion

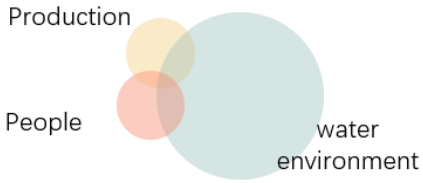


Figure 46 past relationship in Baiyangdian
Resource: author

The Baiyangdian wetland-lake system has a long history and important values, providing important ecosystem services at the lake scale, regional scale, and even larger scales, including water retention, biodiversity, production value, landscape value, cultural value, and so on.

The local residents have formed an adapted production and living style and local culture in response to the geographic and climatic characteristics of the Baiyangdian area, and this production and living style has also maintained and shaped the local landscape of Baiyangdian. As the material brought by production satisfied the needs of people at that time, production, people and water could maintain a balanced relationship in the past, which was reflected in the moderate scale of human settlements and beautiful natural environment, combining to become a rural landscape with unique local identity.

Baiyangdian lake-wetland system is a symbiosis of harmonious coexistence of people and water in long-term human modification.This model of circulation and dynamic adaptation still has reference value today. It can be said that people are a important part of the landscape, both as builder and manager of the landscape, and their production and living activities are also part of the landscape.

In addition, the spiritual and cultural values of the Baiyangdian area are also of value, including the unique local rural culture formed in long-term practice, as well as the potential inspirational effect of the beautiful natural environment and local people on cultural creators. Part of these cultures, which are closely integrated with productive life, is gradually disappearing.



Figure 47 old people in lake
Resource: People's daily

2 Changes in Modern Time: Save the Dying Baiyangdian

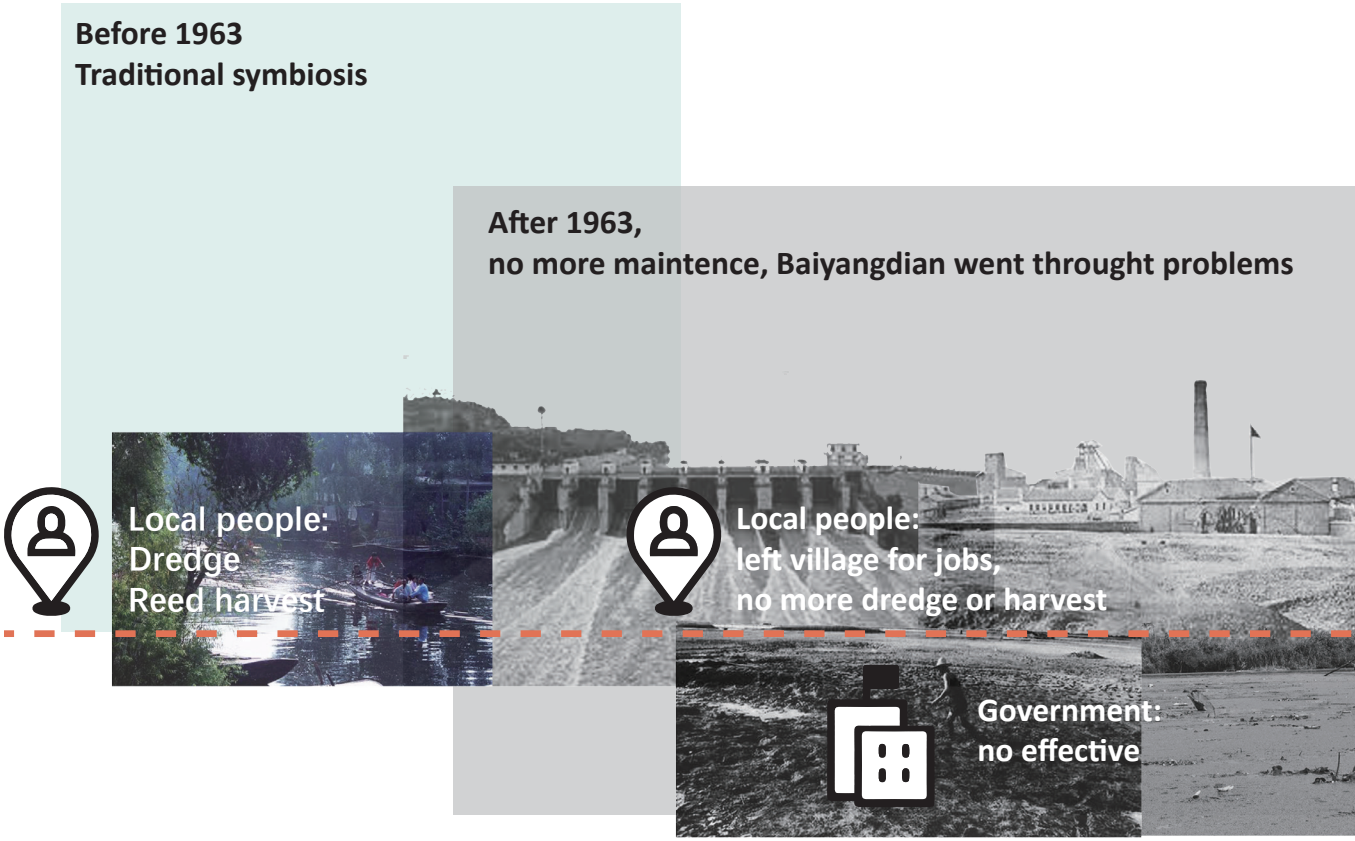


Figure 48: overall problem in Baiyangdian
Resource: author

Since 1980s
Government gradually taken over maintenance



Local people:
to be removed from Baiyangdian

Government:
taken over maintenance

2.1 Society Development and Ecology Crisis

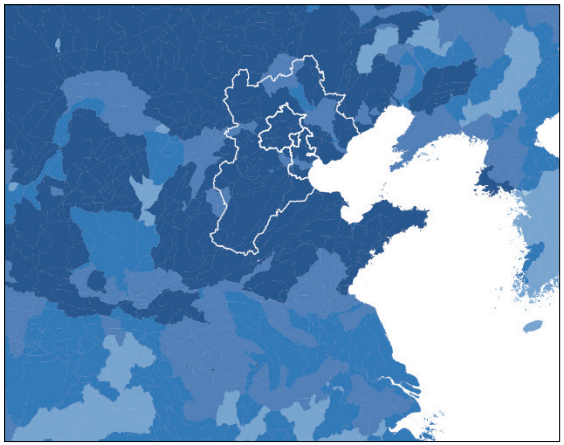


Figure 49: Water shortage condition in north China
Resource: Yueqi Zhang



Figure 50: Baiyangdian, flood in 1963
Resource: Xin Hua She

2.1.1 Dring up trend: 1963-1980

Hebei Province has severe water shortage problem, while Baiyangdian is always confused with water problem. In 1963, another severe flood attacked Baiyangdian and made government decided to build resevoir upstream.

However, they underestimated Baiyangdian's dependence on upstream water inflow and did not foresee the rapid development of society and climate change in the future, which led to a series of subsequent problems in Baiyangdian.

At this stage, the water surface of Baiyangdian had already begun to shrink due to insufficient water input, but because human society had not yet developed rapidly at this time, extremely serious ecological problems had not yet arisen.



Figure 51: Village in Anxin supported by feather processing
Resource: Xinhuashe



Figure 52: feather factory in Anxin
Resource: 安新县雁翎东路零点羽绒制品厂

2.1.2 1980s-2010s: Severe problem

2.1.2.1 Industrialization

In 1978, China implemented reform and opening up, announcing the beginning of rapid economic development.In 1980, the Chinese government began to encourage the development of village enterprises and promote the industrialization of villages. The rapid development in Baiyangdian catchment increased water consumption rapidly and over-exploited groundwater, making the amount of water in Baiyangdian even more dangerous.

In this wave, Baiyangdian area developed three important industries: feather processing, non-ferrous metal processing and shoe manufacturing. While bringing employment opportunities to local people, these rural industries often developed in an unorganized and informal way with insufficiently advanced facilities and technology. They caused environmental burdens through the arbitrary exploitation of groundwater and the discharge of garbage and sewage.

The economic benefits of traditional farming life no longer meet the needs of the villagers. As reeds no longer have enough economic value, villagers have left villages to work in cities, leaving reeds unharvested, and changes in water levels have caused them to rot in the water and pollute the water.



Figure 53: modernised Beijing
Resource: N509FZ, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=109791131



Figure 54: old people in villages in Hebei
Resource: Xinhuashe

2.1.2.2 Urbanization and Urban-rural Dichotomy

China's rapid development has also brought about an imbalance between urban and rural development. Prioritizing the development of cities provides more jobs and higher economic benefits, and the rural young and middle-aged labor force goes to the cities to work, leaving only the elderly and children in the villages, and reducing the number of people working in agriculture.

With more wealth, villagers will seek a higher quality of life. They abandon their old houses in the village and turn to occupy the land at the edge of the village to build new houses. This has resulted in the unorganized expansion of the village. For the island villages in Baiyangdian, this phenomenon is reflected in the rapid expansion of villages by occupying reed fields and water surface.

Changes in lifestyles also mean the consumption of more resources, more sewage, garbage and hard surfaces. In the absence of facilities, sewage and garbage are discharged directly into the lake.

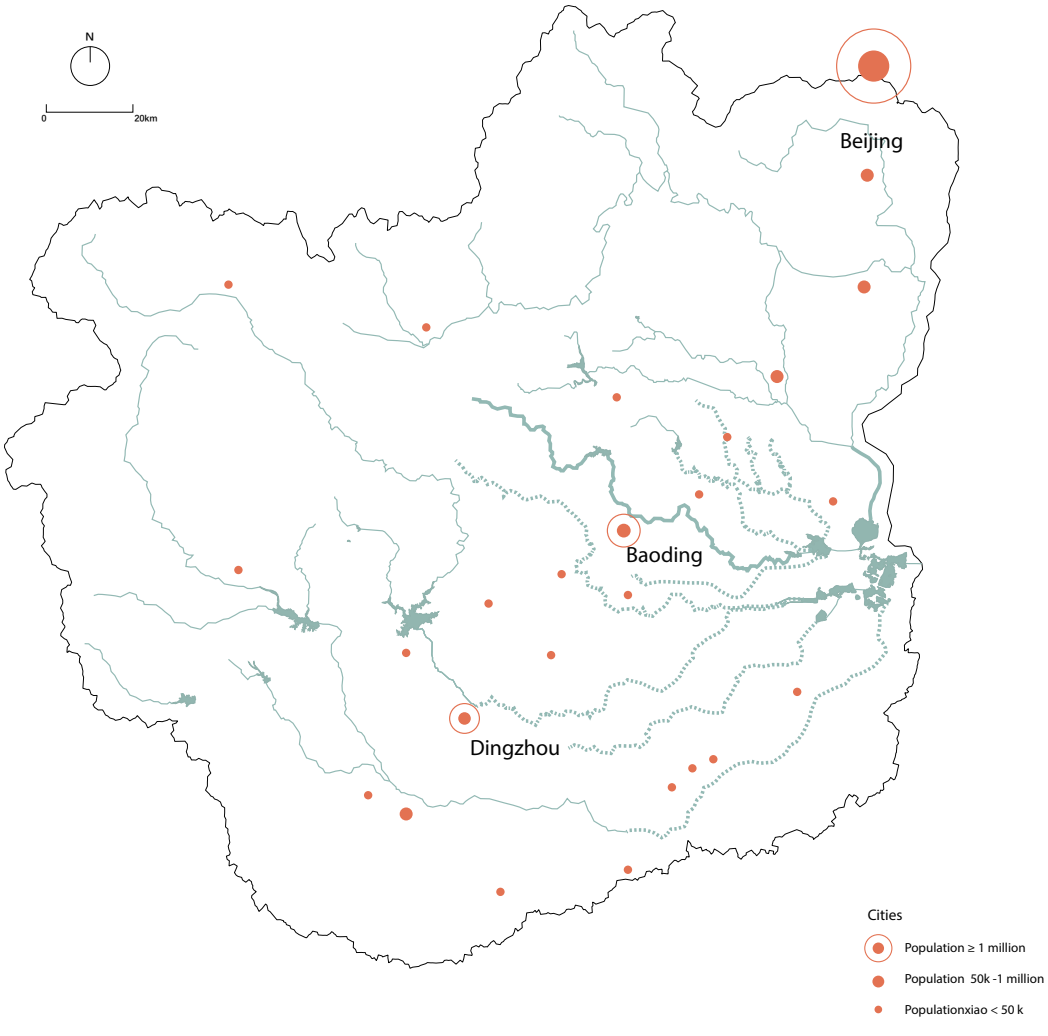


Figure 55: upstream reservoirs and cities
Resource: Landsat

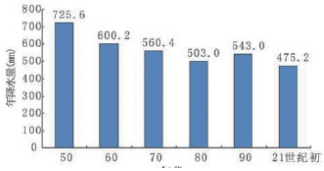


Figure 56: precipitation reduce in modern time
Resource: YANG Chunxiao, 2010

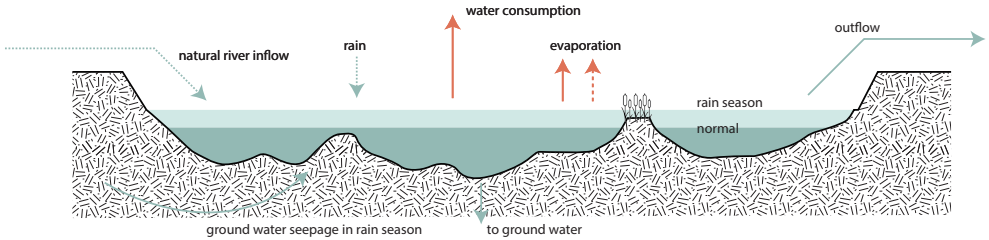


Figure 57: water balance change in Baiyangdian
Resource: YANG Chunxiao, 2010

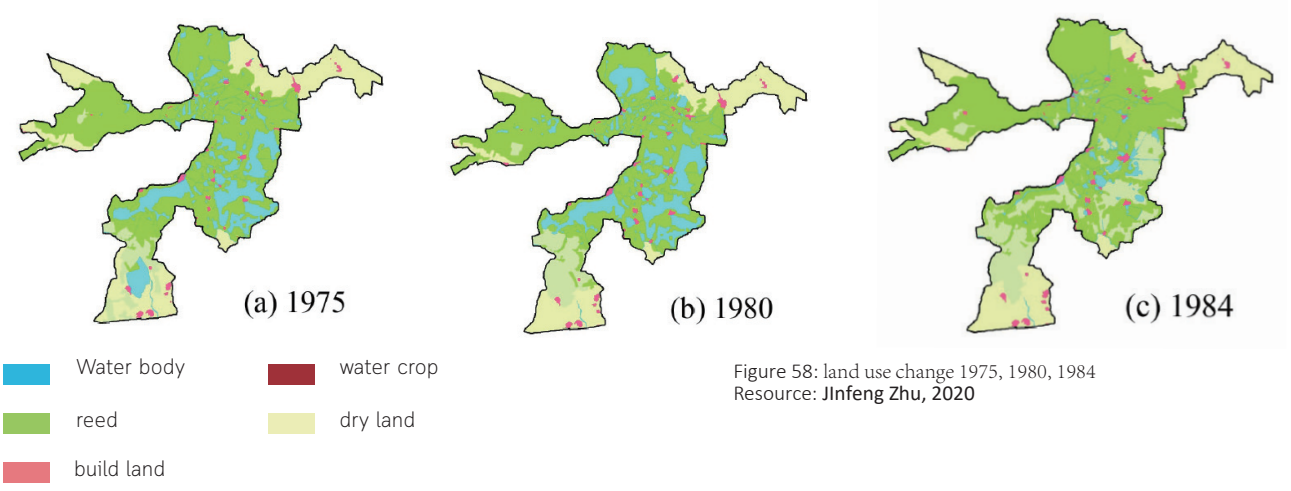


Figure 58: land use change 1975, 1980, 1984
Resource: JInfeng Zhu, 2020



Figure 59: Baiyangdian, drought in 1986
Resource: Xin Hua She



Figure 60: Water pollution in Baiyangdian
Resource: Xinhuashe

2.1.2.3 The dying lake: dry up, pollution and ecological damage

Beginning in the 1980s, Chinese society entered a fast developing period and all the hidden dangers of the previous period came out as a result of serious ecological problems.

Due to the rapid development of the upstream cities and villages, water consumption and sewage and garbage discharge rose a lot, further burdening Baiyangdian. The climate became drier, precipitation dropped and evaporation rose. The water input and output is no longer balanced.

The first one is drying up. *(When the surface water level is lower than 5.3 m, Baiyangdian becomes one small independent lakes, defined as dry up.)* Among them, Baiyangdian was in state of dry up for a long time from June 1983 to July 1988 and from May 2001 to February 2003; in addition, short periods of dry up also occurred in 1982, 1994, 2006-2008(Wang, 2018).

The second is the severe pollution of the lake due to sewage and the sharp decline in water quality. The third is the destruction of habitats resulting in a serious decline in biodiversity.

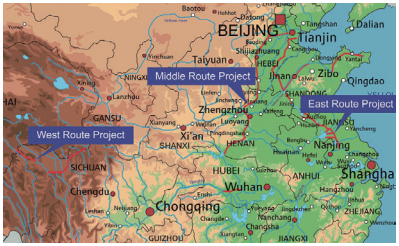
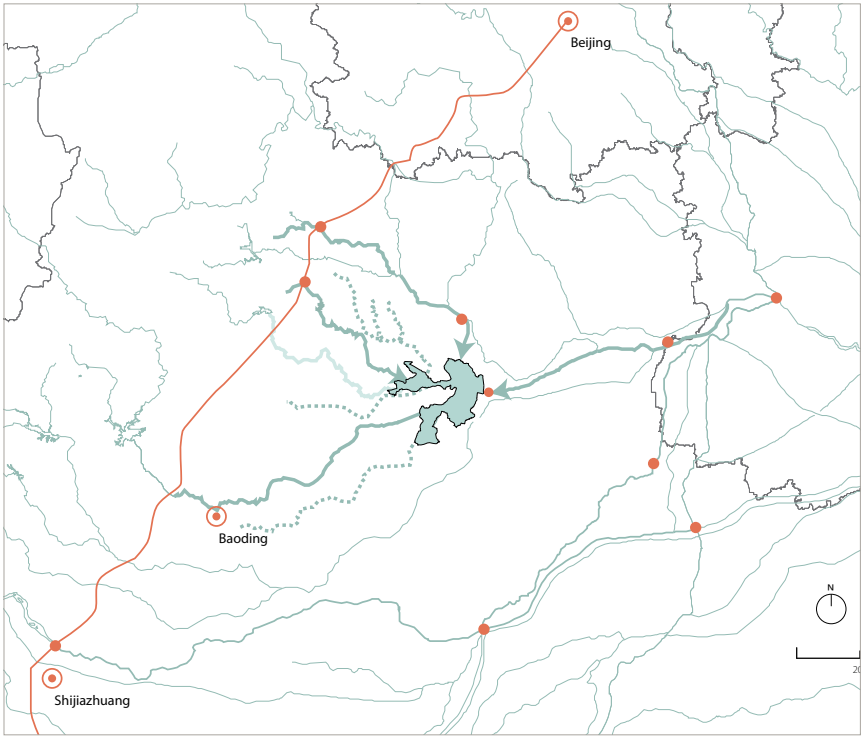


Figure 61: South-north water transfer project
Source: Office of the South-to-North Water Diversion Project Construction Committee, State Council, PRC.The South-to-North Water Diversion Project[J]. Engineering,2016,2(3):265-267.



large city
sluice
South–North Water Transfer Project
water recharge route
River with natural inflow
River without natural inflow

Figure 62: water recharge route
Resource: Xinhuashe

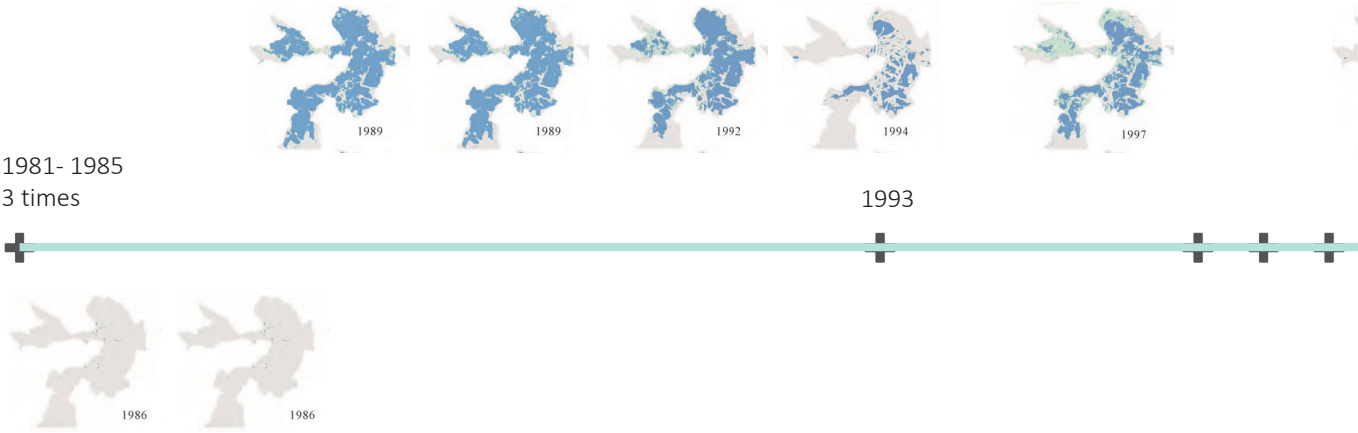
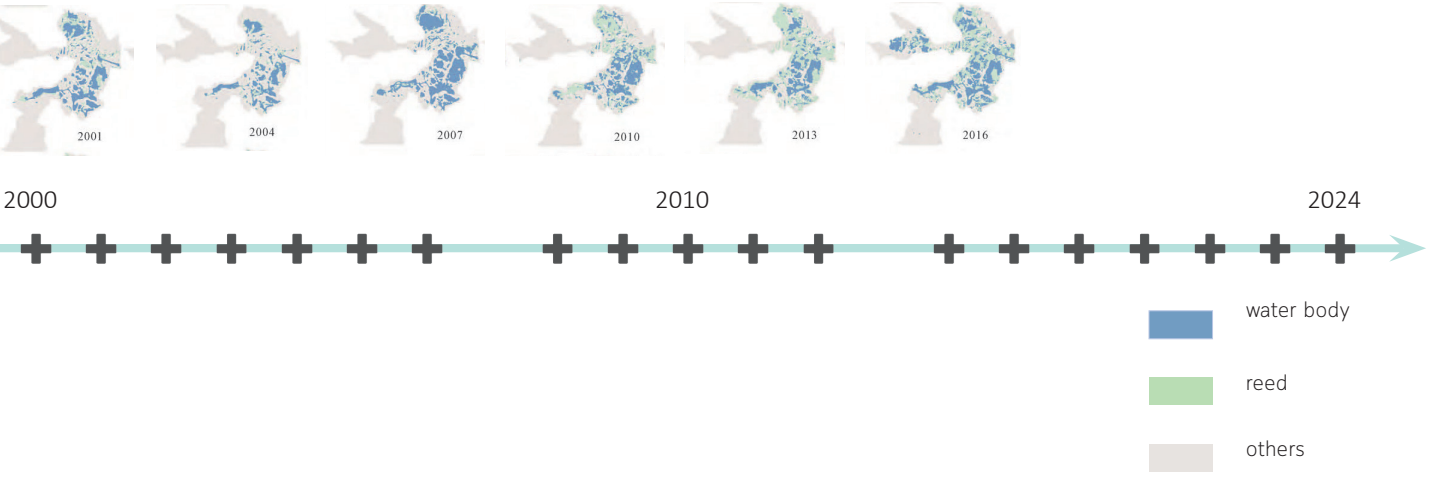


Figure63: water recharge timeline
Resource: An Analysis of the Evolution of Baiyangdian Wetlands in Hebei Province with Artificial Recharge, Kailin Wang, 2018

2.1.2.4 Artifitial Water recharge

Since the 1980s, in order to solve the situation of water shortage and ecosystem problem in Baiyangdian wetland, Hebei Province has been conducted more than 30 times artifitial water recharging project to protect Baiyangdian.

As can be seen from the changes in the water surface, recharge plays an important role in maintaining the morphology of Baiyangdian. However, the role of this strategy is limited and we can see that the frequency of recharge is becoming more and more. The maintenance of Baiyangdian is highly dependent on the recharge taking place.
The government is quite determined to maintain Baiyangdian. However, artificial recharge is not sustainable and Baiyangdian needs to be restored to its natural ecological processes, starting with the cyclical processes of the water system.

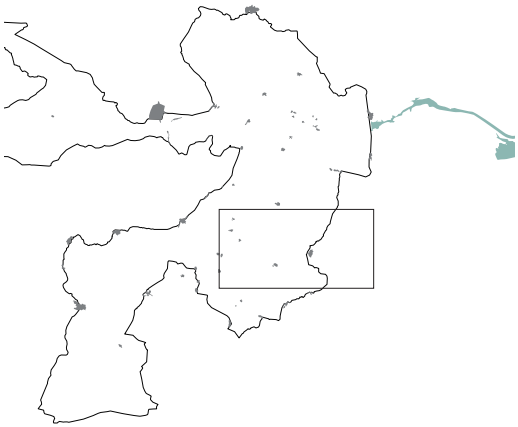


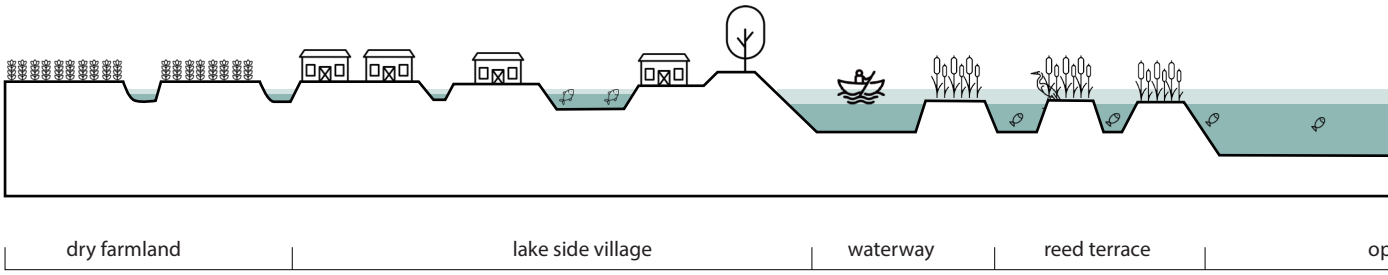
2.1.2.5 Occupation in Baiyangdian

For losing one of it's most important character-flood, the lake‘s landscape also changed. The shrinkage of landscape is reflected in the loss of the water surface and the occupation of the reed terraces into built-up land.

With the development society, people are no longer satisfied with the traditional life. For higher economic benefits, people began to build dikes on the water surface for fish ponds. This led to the fragmentation of Baiyangdian's water surface and the decline of connectivity.

As the economic benefits of reeds declined and the flooding ceased, the importance of reeds lost. The local people started to cut down the reeds and transformed the reed terrace into construction land to expand the village area. However, the land converted from reed terraces is often far below the height of the original





landscape module change 1963

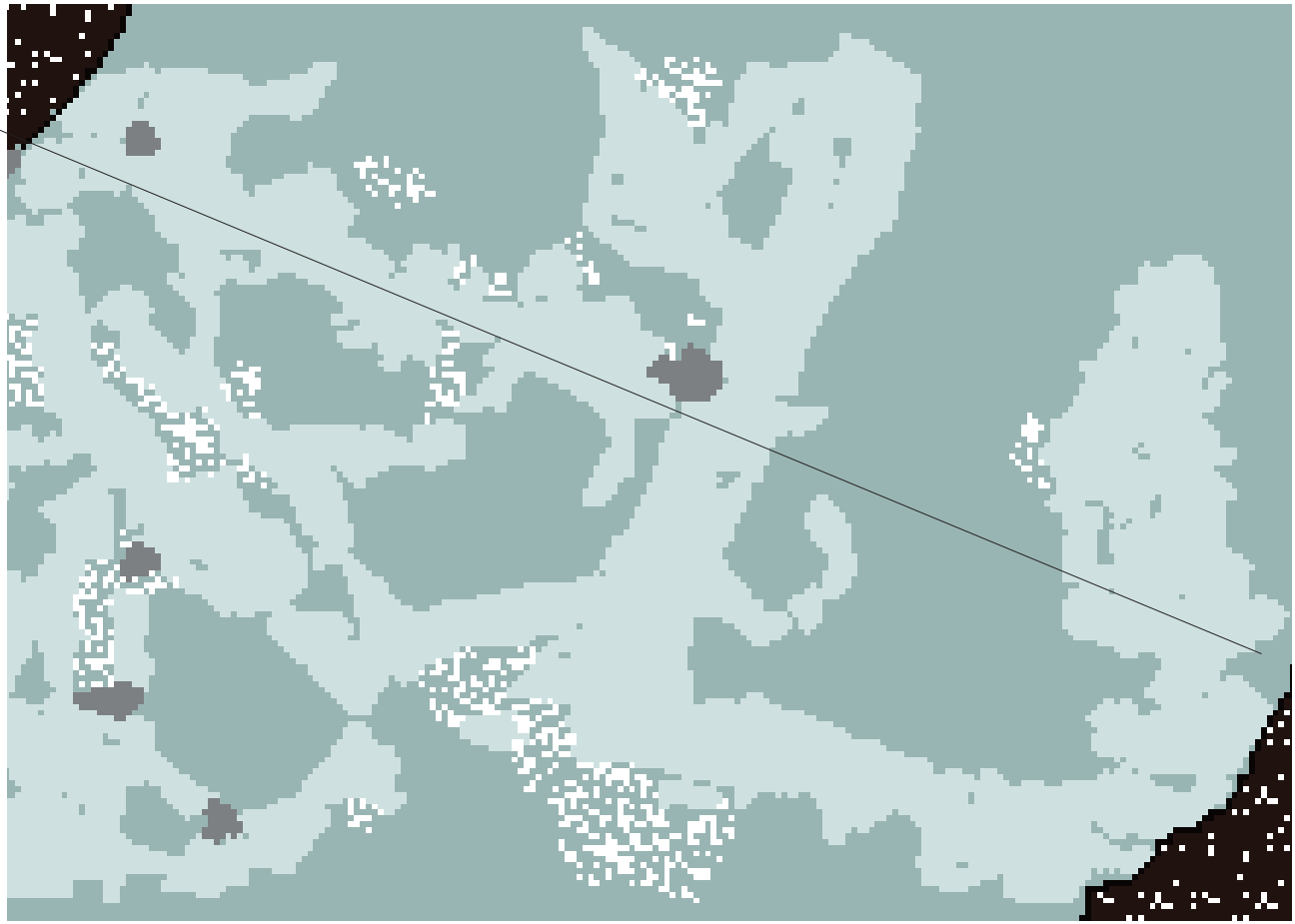
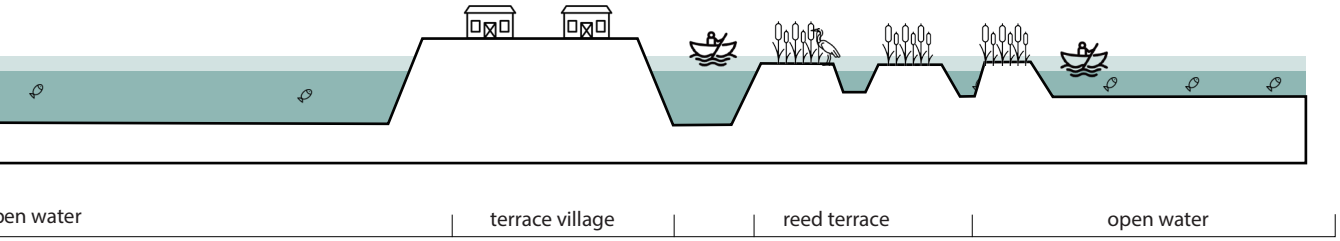


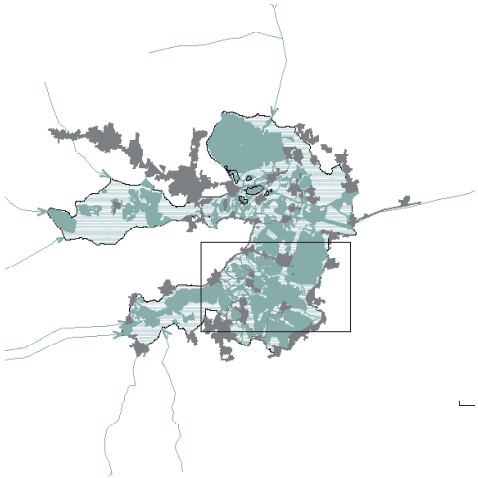
Figure 64: Baiyangdian in 1963
Resource: Keyhole satillite

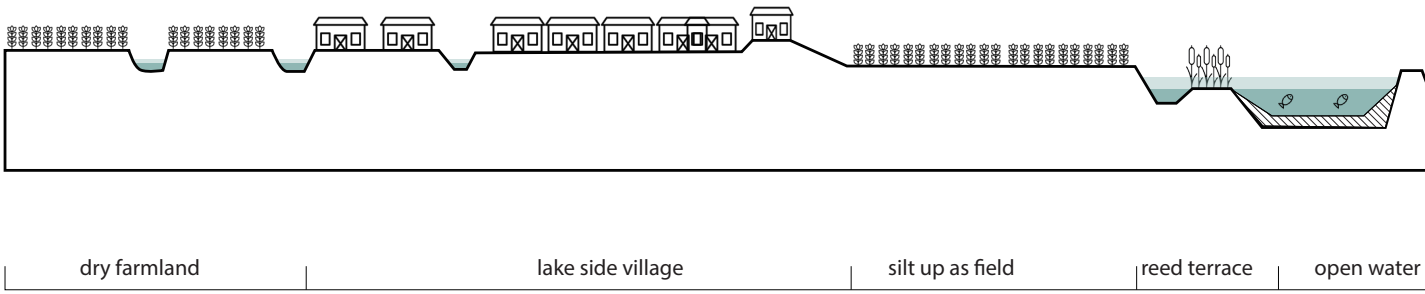


village and below the historical water level.

Since there is no longer a need for reed production, people do not build new reed terraces. Moreover, the tradition of dredging was gradually lost due to successive droughts, the leaving of villagers and the pollution of the lake. This resulted in part of the lake silting up as dry land, which was used by residents to grow food, and part of the lake disappearing.

The area of Baiyangdian has shrunk and the original landscape has been destroyed under the irrational, informal and unregulated development adopted by local residents for economic benefits in the modern world.

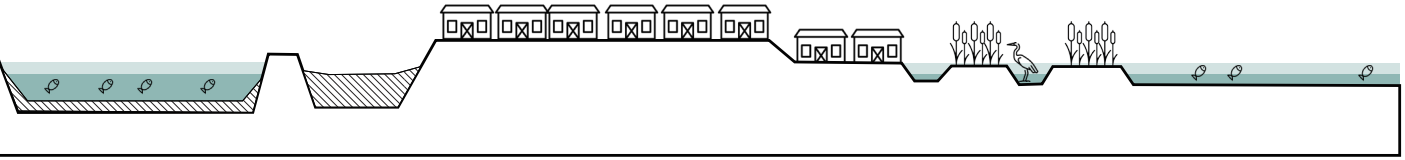




landscape module change 2023



Figure 65: Baiyangdian in 2023
Resource: Google satilite



occupied by private dike | water surface silt to land | island village expansion | reed terrace | open water

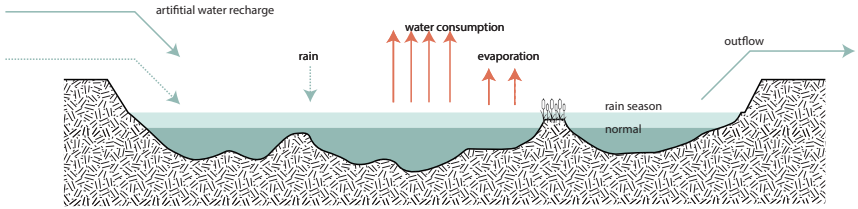
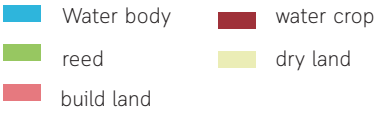
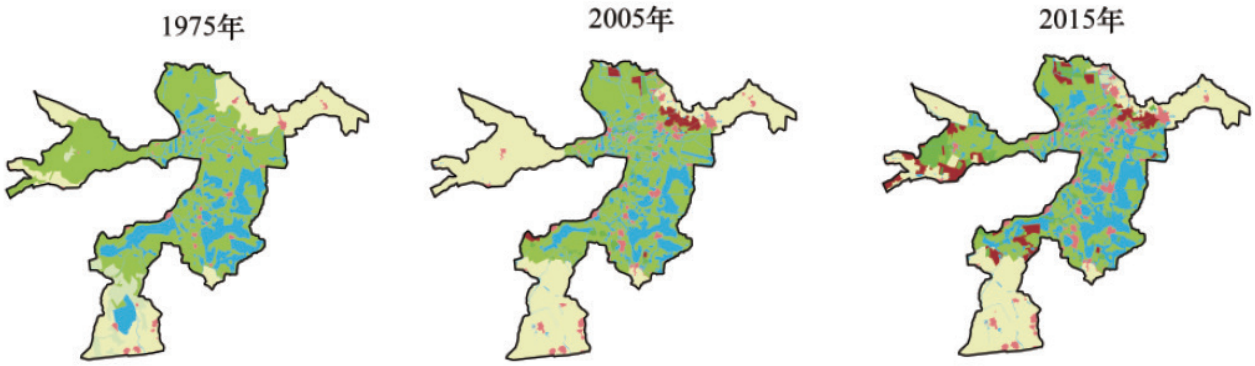


Figure 66: water balance change in Baiyangdian
Resource: YANG Chunxiao, 2010

Figure67: land use change 1975, 2005, 2015
Resource: JInfeng Zhu, 2020





Combining the above human activities and climate change impacts: decreased water input, increased water use, sewage and garbage discharge, artificial water recharge, and occupation in Baiyangdian, the land use type of Baiyangdian has gone through repeated changes.

From the land use change, we can tell how the over-reclaim of local people influence the lake in a lager scale. From 1975-2005, the uncontrolled reclaimation and ignorance of dredging has caused the shrink of water body and reed field.

After the government has taken actions to protect the lake, the shrinkage of lake is somewhat under control. However, some of the lost water body is still to be recovered.

Between 1986 and 1989, the wetland area increased by 253.29 km2 ; between 1989 and 1994, it decreased by 181.61 km2 ; between 1994 and 1997, it increased by 158.17 km2 ; between 1997 and 2004, it decreased by 170.37 km2 ; and between 2004 and 2016, it increased by 106.09 km2 (Wang, 2018).

2.2 Changes brought by Xiong'an New Area Proposal (2017)

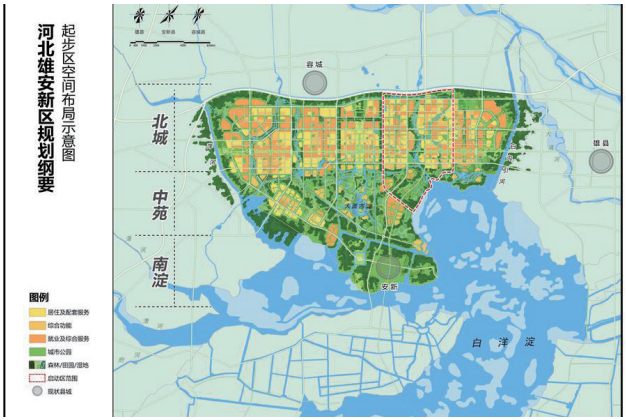


Figure68: Xiong'an New Area Planning
Resource: Xiong'an official

2002: set Baiyangdian as ecological reservation

2012: enlarge the size of ecological reservation

2015: Officials approve funds ￥32.000.000 for Baiyangdian treatment

2019: Baiyangdian Ecological Environment Management and Protection Plan (2018-2035)

2021: Regulations on the Management and Protection of the Baiyangdian Ecological Environment (2021)

2022: Notice on Strengthening the Management of Bird Habitat in Baiyangdian (2022)

2.2.1 Conditions before 2017

Since 2002, the government has designated Baiyangdian as an ecological reserve. However, during the period 2002-2015, the protection effect was not obvious.

2.2.2 Xiong'an New area

The government's plan is to transfer some of the functions of the capital, Beijing, to the northern part of Baiyangdian and to develop a new city based on the natural resources of Baiyangdian.

The establishment of the new city kicks off a series of government initiatives to strongly manage Baiyangdian, raise profile of Baiyangdian, and brings potential opportunities such as the demand for tourism and vacations for city dwellers.

Development also comes with challenges. Public data show that Shenzhen, which has same administrative rank as Xiong'an New Area, has a resident population of 12 million and an annual water consumption of 2.35 billion cubic meters. Baiyangdian average annual water storage capacity of 1.32 billion cubic meters, obviously not enough to support the future water demand of the new area.







Common tourism

Current common tourism atrracts people, but appear to be totally differrent landscape from original Baiayangdian landscape.

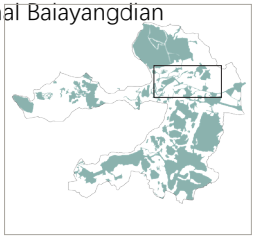


Figure 69: The new landscape of tourism is different from old landscape.
Resource: Xinhuashe, author



Figure 70: Common tourism map
Resource: Author

2.2.3 Governance brought by Xiong'an New Area

2.2.3.1 Common tourism

The tourism in Baiyangdian Area can be traced back to 1991, but for ecological problems, it was not in good condition. After the announcement of the Xiongan New Area plan, the government updated the Baiyangdian scenic spot in order to increase its popularity. It was rated as the highest rated scenic spot in China

Tourist areas concludes local and non-local landscape and activities, which to a certain extent, isolated from the original landscape. It have led to the development of catering and accommodation in the surrounding villages. However, the villages concerned have poor spatial quality, lack of local character, informal private tourism and poor tourism experience.

2.2.3.2 Lake protection governance

The Government has taken a variety of measures and has indeed been effective in ecological restoration, with the spatial quality of Baiyangdian's natural landscape markedly improved, water quality restored, species diversity rebounded and villages under control.

The governance concludes:

1). water recharge;

2). develpe policy on protection and restoration of wetland and lake, guiding and regulate human activities in Baiyangdian area;

3). regulate upstream and local industry, and



Figure 71 The new landscape of tourism is different from old landscape.
Resource: People's daily, author

4). limit fishery, which protect ecology effectively but also influenced local livelihood;
5). develope common tourism;
6). maintenance, include dredge, reed harvest, build seapage treatment facilities in villages;
7). develope new industry based on reed; and 8). relocate locals in island villages to near by cities in future, only preserve Quantuo Village as an historical spot.

2.2.3.3 Stakeholder and maintenance change from 1963 till now
The governance has been rapid and effective in restoring the ecological

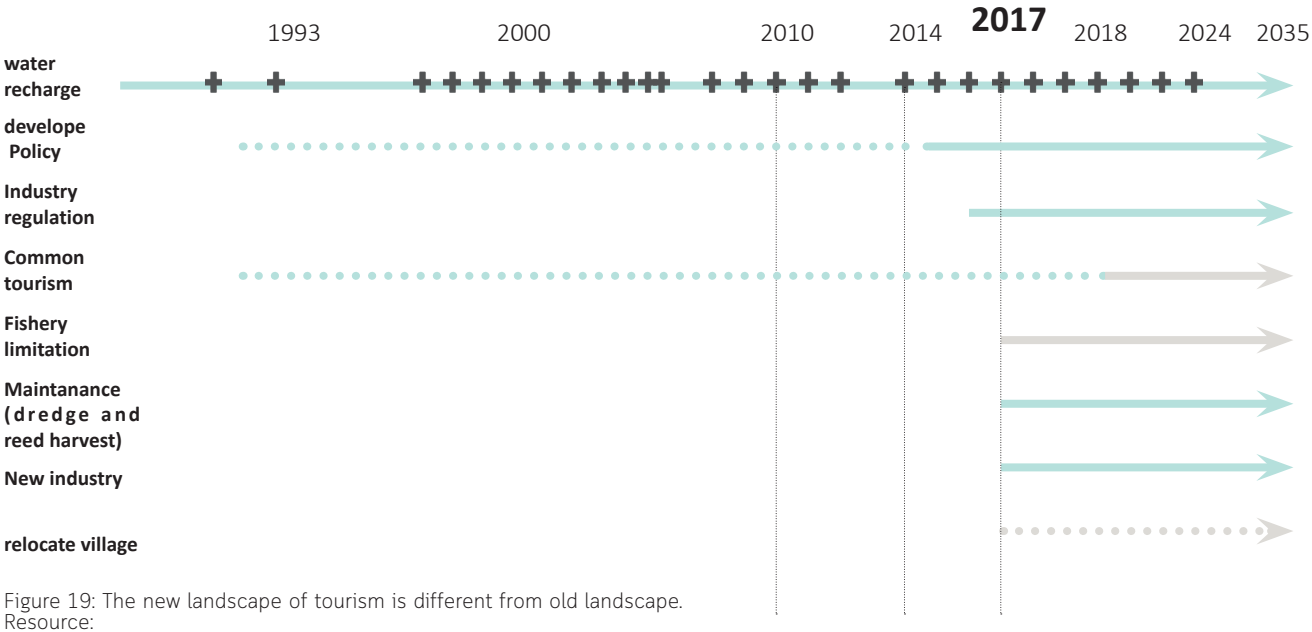


Figure 19: The new landscape of tourism is different from old landscape.
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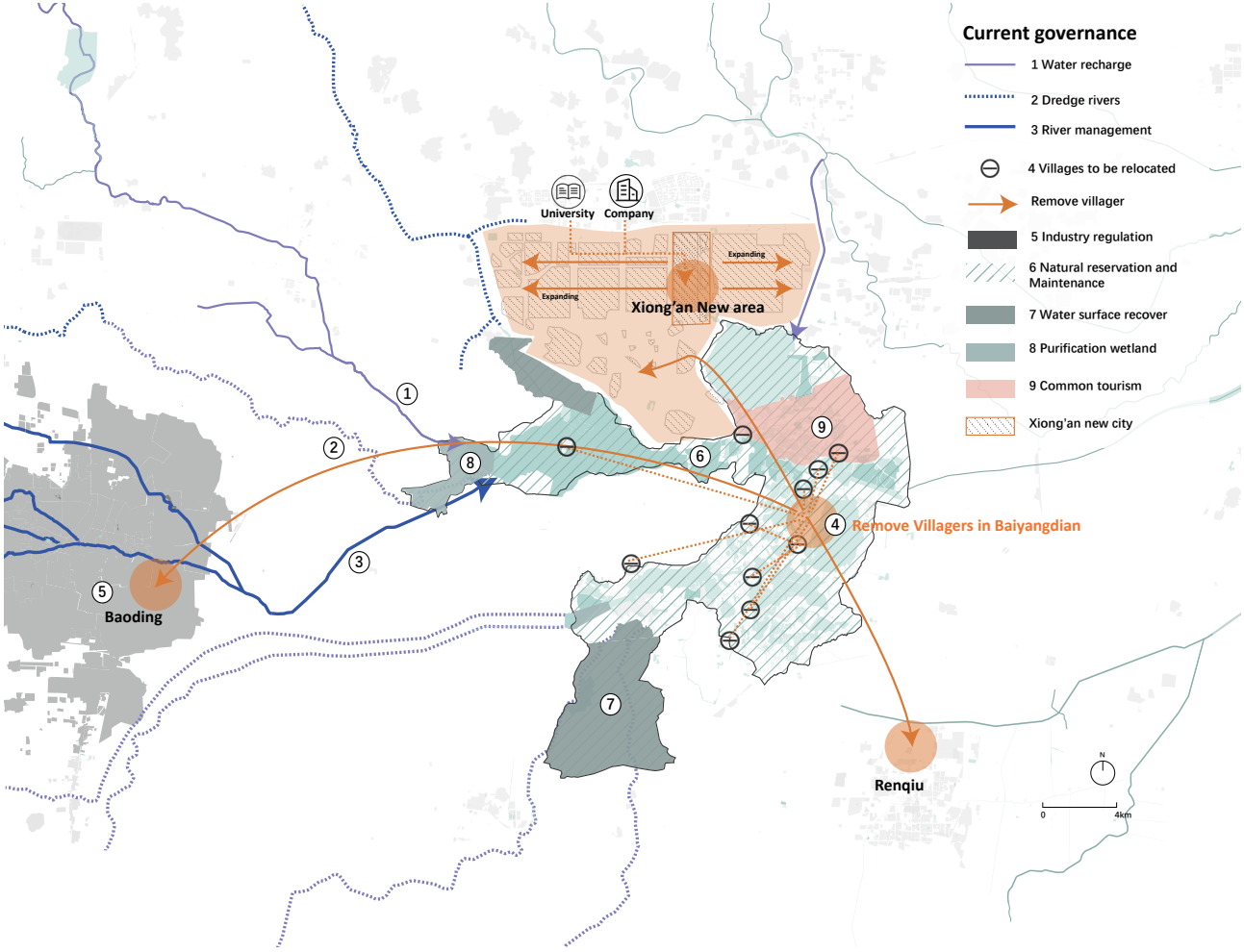


Figure 72: Current governance condition in Baiyangdian
Resource: author

	Demands	Responsiblities
 **Local villager**	Ecosystem related job Good living quality and Adequate public facility Local rural living style	*Maintenance of Baiyangdian*
 **Tourist**	Pleasant sightseeing and activities with local identity Convenient tourism related facility	*Come from surrounding area (short stay)* *or other province (long stay)*
 **Government**	Baiyangdian natural environment preservation Xiong'an New area development	*Maintenance of the lake* *People's livelihood*
 **Baiyangdian**	Protect ecology Renovate the traditional water system with circularity	*Provide ecosystem services*

Figure 73: Stakeholder in Baiyangdian
Resource: author

environment and natural spatial quality, and has increased the popularity of Baiyangdian.

However, based on studies of historical water systems, it has been found that governance ignores the important role of local people in the water system cycle. They are the historical and potential future maintainers of the system. Removing local people from the system and reducing human contact with Baiyangdian would transform the dynamic Baiyangdian lake-wetland system into a static landscape, losing its local attributes and cultural connotations.



Figure 73: Maintenance change from 1963 till now
Resource: author

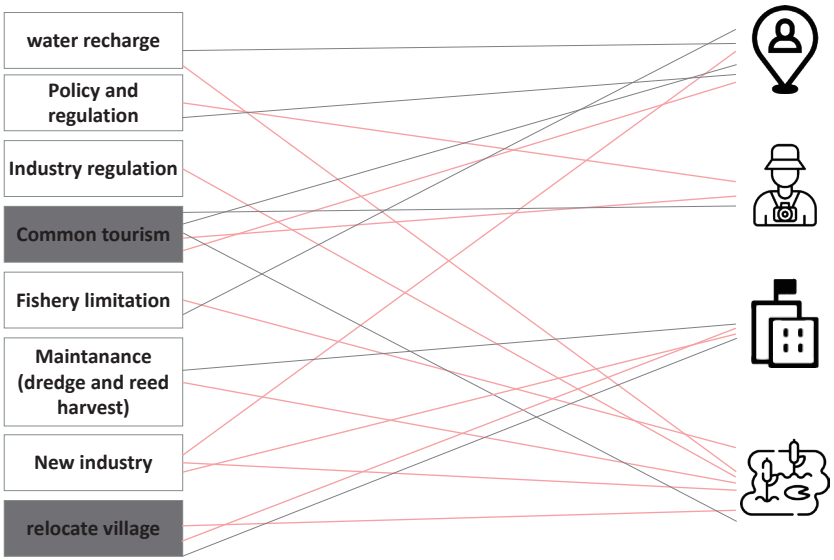


Figure 19: Current governance and influence on stakeholders
Resource:

On regional scale, lakeside villages and island villages are unique types of settlement landscapes in the Baiyangdian area and even in the Hebei region, with preserved significance and potential for tourism value. If they are removed, the local spatial framework will be affected.

At the local scale, the familiar life and livelihood patterns of the local people will be lost.

"We knew we had to move.
We just hope that when all the research institutes and companies move in, we'll still have access to the water.
Please let us stay close to the water."

——local villager

2.3 Conclusion

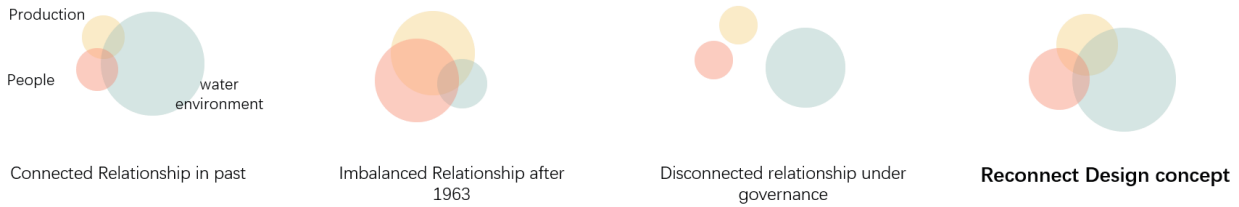


Figure 74: water and human relationship change
Resource: author

The changes in the Baiyangdian lake-wetland system are a specific case of the impact of modern social development on the traditional environment. In modern society, due to changes in the social environment brought about by industrialization and urbanization, changes in the production and lifestyle of locals and governance, Baiyangdian's original circulatory system is out of balance, and is in a state of transformation from a dynamically balanced symbiosis to a static landscape that requires artificial maintenance.

Through the analysis of the current governance, I believe that the government's water recharge, the development of environmental protection policies and protection zones, the control of industry and fisheries, the development of tourism and new industries, and maintenance, are all effective means of ecological restoration, but common tourism and relocation of villages still have other possibilities.

From the perspective of climate change and water system condition, artificial control is necessary for Baiyangdian. However, at the same time, Baiyangdian is a symbiosis of people and water with high value, a home for local people, and people are an important part of the Baiyangdian system. Is

it possible in the future to preserve Baiyangdian while preserving its identity as a dynamically balanced symbiosis, to utilize its potential tourism and cultural values, and to establish a new relationship between people and water?

Common tourism burdens the environment, isolates itself in the original landscape, and fails to bring more benefits to the surrounding villages' environment and its inhabitants.

Relocating the villages is a long-term and huge project that currently lacks feasibility and diminishes the local identity of the Baiyangdian system. Although the government planned to preserve Quantou Village, the village will turn to another common tourism spot without practical activities and daily life.

Island villages still have the potential for tourism and maintenance, and that a phased landscape transformation design can be developed to adapt to Baiyangdian's current situation and future development, and to experiment with new types of possibilities for the symbiosis of people and water.



4 Theoretical framework

4.1 Theoretical framework

4.1.1 Ecosystem service

Ecosystem Services are the direct and indirect contributions ecosystems (known as natural capital) provide for human wellbeing and quality of life. It concludes 4 perspectives:

Provisioning – these are tangible goods that people can harvest from the environment such as food, wood and fibre, water and fuel.

Regulating – these are regulating services that occur in the ecosystem that lead to benefits such as climate regulation, flood management, and water filtration.

Cultural – these include ways in which nature impacts people's health and wellbeing through recreational and education benefits as well as improving mental health and building spiritual connections.

Supporting – ecosystems could not function without supporting services, such as the nutrient cycle, soil formation and habitat provision for biodiversity, forming the basis for the other three types of services.

The Baiyangdian system has a long history of providing diverse ecosystem services at the local and watershed scales, including flood mitigation and leaching, water storage and irrigation, regulation of local climate, improvement of the ecological environment, groundwater recharge, and protection of biodiversity. However, the Baiyangdian wetland has been experiencing water shortage for a long time due to the combined effects of human activities and climate change, Wetland shrinkage, water pollution, siltation, biodiversity reduction and other problems. In recent years, the Government has taken a series of measures to restore the ecological environment of Baiyangdian. Tthe Baiyangdian system still have ecosystem service values such as reed production, tourism and science popularization.

4.1.2 Landscape Identity

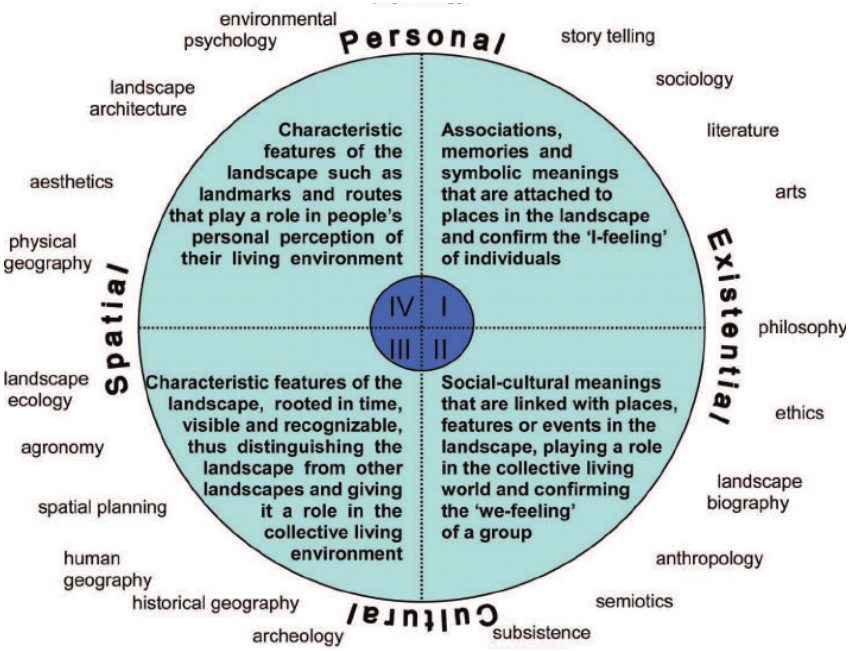


Figure 75: The Landscape Identity Circle
Resource: Stobbelaar & Pedroli, 2011

4.1.1 Landscape identity

Traditionally, "landscape" refers to the visible features of a piece of land, i.e., a specific space, usually considered in terms of its aesthetic appeal and often associated with natural scenery. Further, landscape is the visualization of the interplay of natural and unnatural factors at a given moment in time and place. At a more metaphorical and abstract level, landscape can refer to something intangible. For example, when someone talks about 'cultural landscape' or 'spiritual landscape', they are usually referring to the general character, values and identity of a particular cultural or spiritual context.

Landscape identity is the unique psychosociological perception of places defined in spatial-cultural spaces (Stobbelaar & Pedroli, 2011) in terms of space, person, presence, and culture. Landscape identity can create attachment to their area as well as subconsciously shaping its inhabitants; people's identities are largely derived from the environments in which they grew up or lived, and an individual's identity of a landscape often coincides with that of their social/ cultural environment (Buijs et al., 2006). It both shapes and is shaped by people.

The relationship between people and their environment is changing under the trend of rapid global economic development and

urbanization. The traditional human-nature relationship no longer meets people's needs, and the discourse of modernity gives prospects for development and promises of progress at the cost of ecological deterioration and interpersonal alienation (Huang, 2020). The economic and function-led development model has led to the homogenization and deterioration of urban landscapes and the demise of rural landscapes. The balance between human and nature that once existed has been broken, human development and the natural environment tend to confront each other, and the connection between human and landscape is interrupted.

In China, for example, this has resulted in city dwellers sinking into consumerism and the steel jungle, rural youth flocking to the big cities, and rural elders staying behind in decaying villages. Physical contact is being replaced by virtual contact, deep contact with others and the world around us is losing its value (Walls, 2020), and people, especially the youth, lack connection with their surroundings and tend to become disorganized and suspended in their sense of self. Individual qualities are gradually weakened by their insignificance in a huge and chaotic environment, the process of establishing a specific identity becomes difficult, and the person becomes a drifter in the environment. Correspondingly, due to the globalization of the world and the homogenization of cultures, the role of the individual is gradually dissolved, and the landscape is no longer alive, losing the self-identity and the possibility of evolution that it possessed in the past.

In this fluid and dematerialized environment, it becomes increasingly important to restore and maintain the identity and character of places (Walls, 2020). Dealing with the gradually alienating relationship between people and their environment is the responsibility of landscape architects in modern society. How to find and establish the identity of people and landscapes, protect the unique qualities that people and landscapes possess, rebuild the connection between people and landscapes, and establish healthy habitats and patterns in this complex?

The establishment and realization of site qualities

by the landscape architect begins with the perception, analysis and understanding of the site. It starts with the knowledge of the physical environment, including its climatic evolution, topography, hydrology, soils, flora and fauna and their succession, as well as the material and energy cycles of the site, which is then combined with the social conditions and human activities, history and culture to get the uniqueness of the site, and to save, restore and protect the best qualities of the space (whether natural or urban), reconnecting them with inhabitants.

In general, humans are indifferent perceivers of landscape (Walls, 2020) . This refers to the fact that the human experience of the landscape and the landscape to the human tend to be passive, subliminal and different from person to person. However, it is that which penetrates the spirit without reason and touches the most sensitive fibers of the senses that enables the connection between the individual and his or her life space; what we call identity.
For current habitat landscapes, local identity is identified and emphasized through a process of restoration or revitalization of heritage, or the construction of iconic buildings in featureless spaces, in order to create urban spaces with coherence, to form a “mosaic city”, a perceptible network at the level of the urban space, and to form the identity of the city through its specificity. new identities have to be linked to the history of the city, to the values of the place and character, and must also be associated with the particular elements that gave birth to human settlements before they were established.

Another possibility is to make landscape design a long-term process, introducing inhabitants into the landscape through phases of design, or through the involvement of construction and management of activities, so that they actually interact with the landscape, for example by introducing community farms or gardens and inviting residents to participate in the creation of the landscape. Using space, not just passing through it.

The identity of the landscape is not isolated. Landscapes are interconnected on a scale, and the landscape of any one location cannot be transcended to a larger scale; therefore, the formation of landscape and human identity

4.1.3 Ecotourism

Ecotourism is now defined as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education" (TIES, 2015). Education is meant to be inclusive of both staff and guests.

Ecotourism is about uniting conservation, communities, and sustainable travel. This means that those who implement, participate in and market ecotourism activities should adopt the following ecotourism principles:

Minimize physical, social, behavioral, and psychological impacts.

Build environmental and cultural awareness and respect.

Provide positive experiences for both visitors and hosts.

Provide direct financial benefits for conservation.

Generate financial benefits for both local people and private industry.

Deliver memorable interpretative experiences to visitors that help raise sensitivity to host countries' political, environmental, and social climates.

Design, construct and operate low-impact facilities.

Recognize the rights and spiritual beliefs of the Indigenous People in your community and work in partnership with them to create empowerment.



Figure 76: tourism plan in Giethoorn
Resource: Boat rental Giethoorn

4.2 Case study: Giethoorn, the Netherlands

Giethoorn is a famous attraction in the Netherlands and bears a striking resemblance to Baiyangdian, including the lake area, reeds, traveling by boat and living with water. The area is still inhabited by local people, but at the same time has become a success story in ecotourism. The case provides important reference for strategy and spatial design.



Figure 77: landscape in Githoorn
Resource: google satilite



4 Zoom in to Quantou: a typical village in Baiyangdian

3.1 The expansion of Quantou Village: under flood risk

3.1 The expansion of Quantou Village: under flood risk

The villages in the lake was originally the unfloodable high land in the lake.

In the modern time, local villagers transformed the reed bed into build area to expand the village. The new part of the village is mostly lower than the historical water level since the decrease in water level of Baiyangdian. If the government want to restore the water level of Baiyangdian, part of the villages are under the risk of flooding.

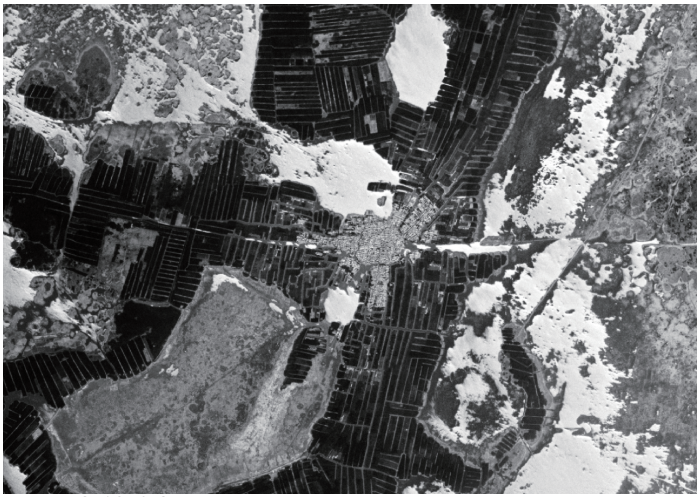
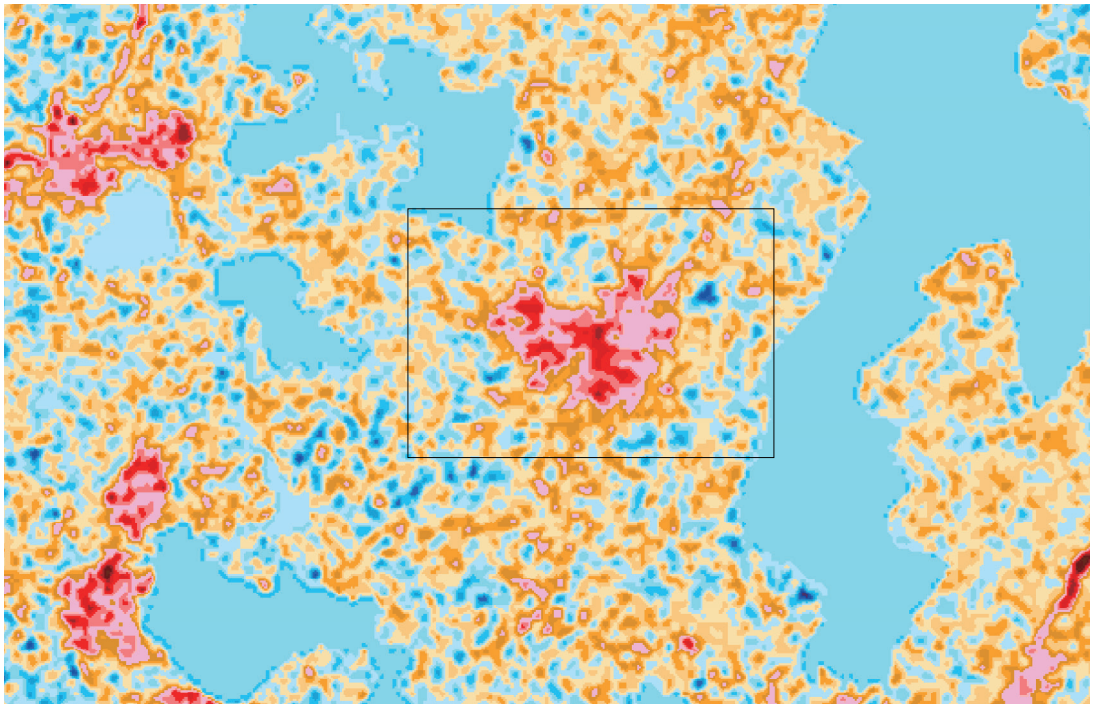


Figure 78: 1972 Quantou
Resource: keyhole satilite



Figure 79: 2023 Quantou
Resource: google satilite



15m

14m (highest historical flood level)

12m (historical flood level)

11m (hisotorical water level)

10m

9m

8m

Figure 80: height map of Quantou
Resource: DEM

Fragment and low quality green-blue area



Figure 81: current green land
Resource: google satilite

3.2 Fragment and low quality green-blue area

For eating up the reed bed in process and informally, some of the reed fields and water structure was left inside the villages. The green places are fragmented and with low quality. Since no use or design does these green-blue structures have, they are commonly occupied by local people and animals.



Figure 82:occupied green place
Resource: author



Figure 83:garbage
Resource: author



Figure 84: no maintenance
Resource:author



Figure 85: reed left in village
Resource:author

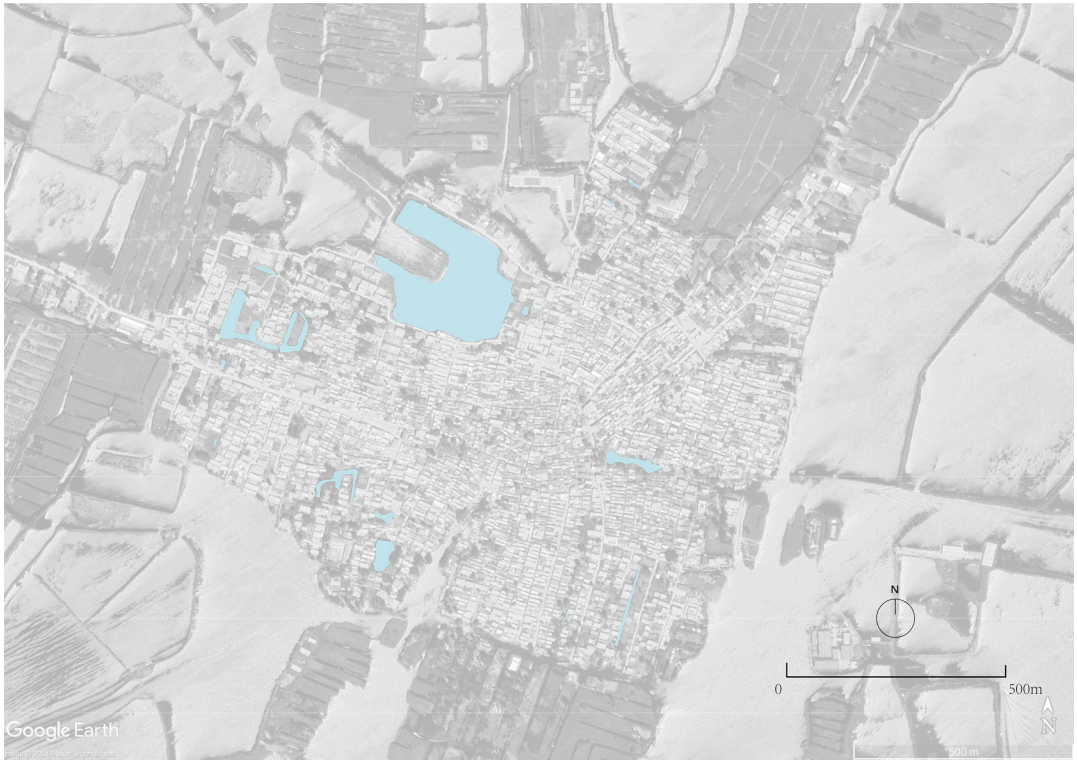


Figure 86: current water system
Resource: google satilite





Figure 87: Influenced embankment
Resource:author, WeChat public account@京津雄城市群

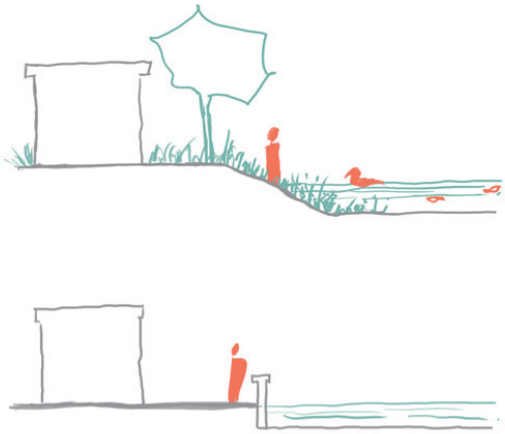


Figure 88: Influenced embankment
Resource: author

The water area, generally, provide neither good spatial quality nor ecological value. Most of the embankments are diked and only used as piers for local people.

However, the embankment area are important ecological buffer between human and water. It can work as important connection to larger system. Also it has most landscape design potential to improve the physical landscape identity of living with water.

3.3 Private industry: shutted down for environment protection

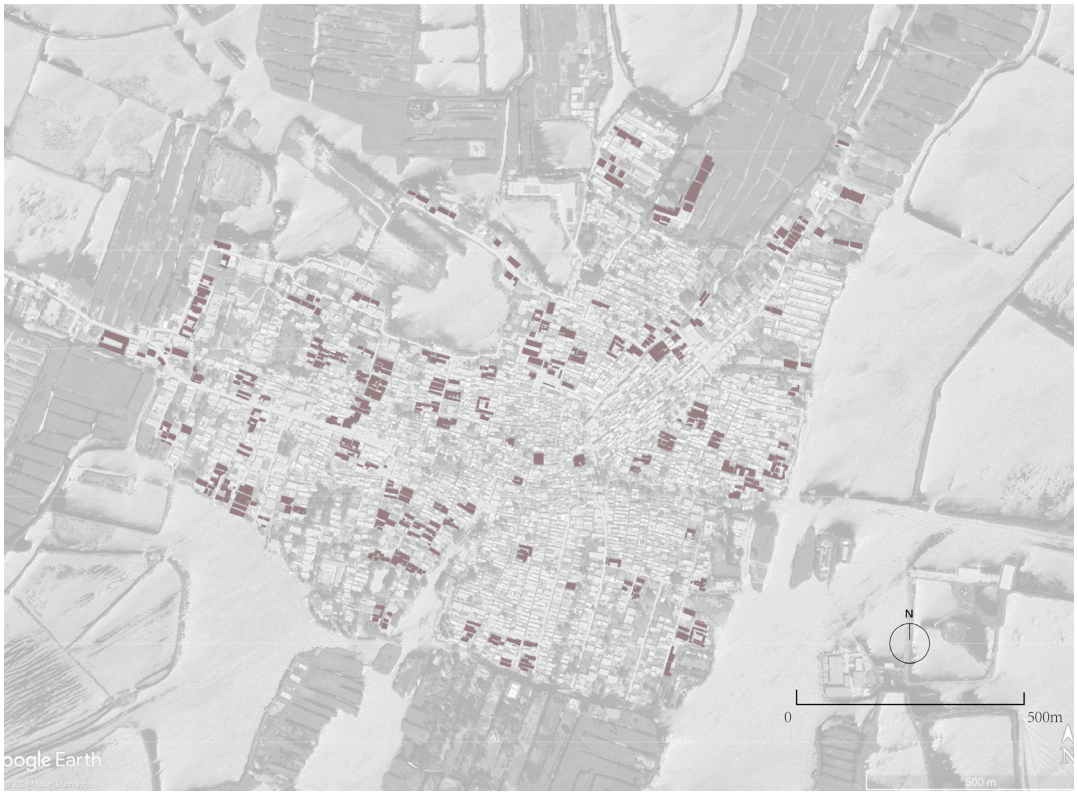


Figure : current industry
Resource: google satilite

local income

80%

comes from private industry

Occupy land

25%

of village

3.3 **Private industry shutted down for environment protection**
The reason why the footwear industry is the mainstay of Quantou Village cannot be ascertained for the time being. However, as of today, there are 46 privately owned shoe factories in the village, providing about 80% of the jobs for local residents. The local factories extract groundwater for industrial use, and due to a lack of control, industrial wastewater is discharged into the precipitation, polluting the lake.

The factories are currently closed due to environmental



Figure : current layout
Resource: google satilite



Figure 19: Baiyangdian, drought in 1986
Resource: Xin Hua She

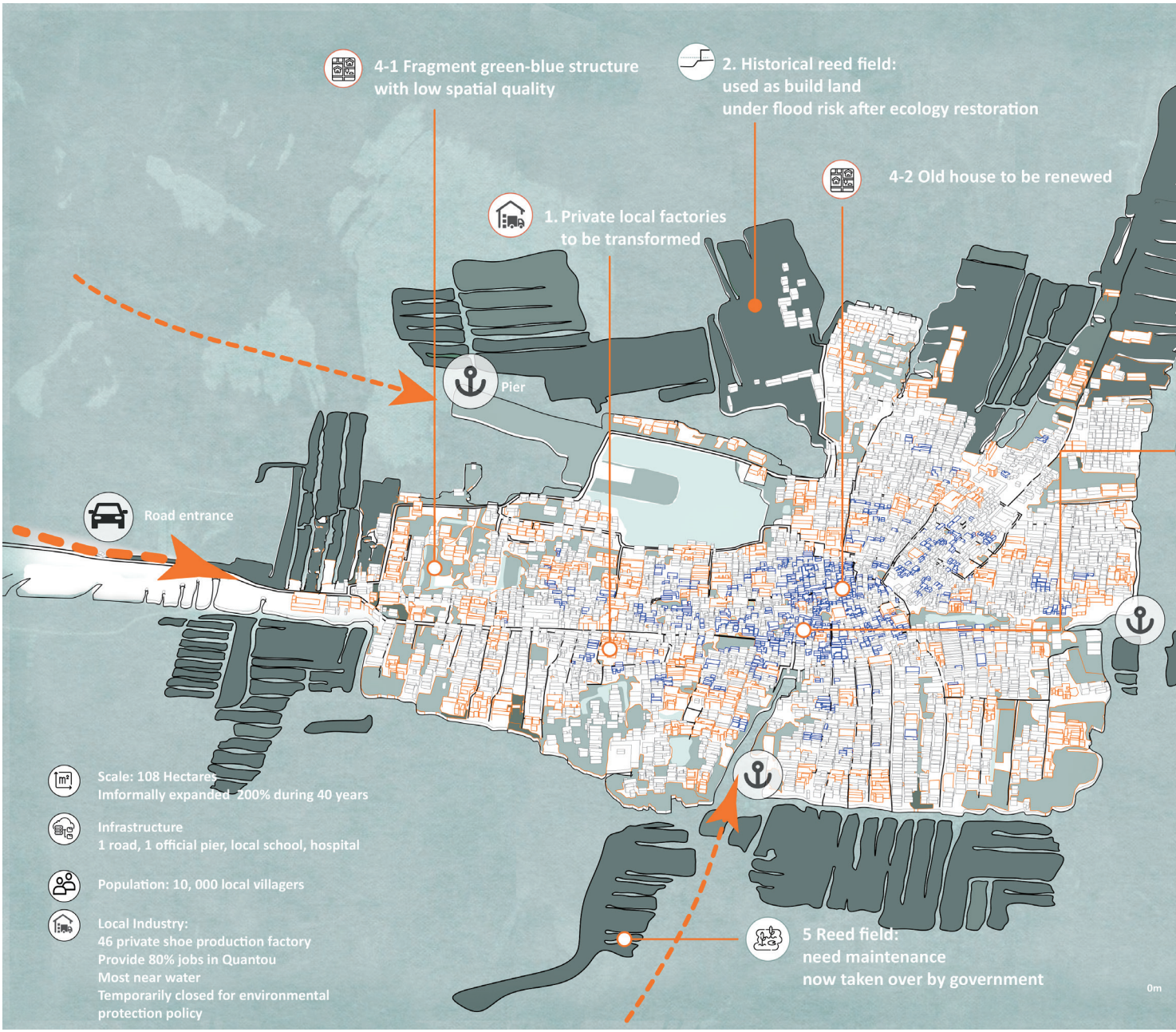


Figure 19: Water pollution in Bai-

regulations. Based on the government's firm stance on environmental protection, it is foreseeable that these factories will face closure and demolition. The space left after the demolition of these factories has potential.

3.4 exisiting layout

The structure of the village is clear and the structure of the encroached reed fields remains clear. A thriving private business has developed along the main road and three gathering points have been formed. This structure has a distinct local character.


4-1 Fragment green-blue structure
with low spatial quality
2. Historical reed field:
used as build land
under flood risk after ecology restoration
4-2 Old house to be renewed
1. Private local factories
to be transformed
Pier
Road entrance
Scale: 108 Hectares
Imformally expanded 200% during 40 years
Infrastructure
1 road, 1 official pier, local school, hospital
Population: 10, 000 local villagers
Local Industry:
46 private shoe production factory
Provide 80% jobs in Quantou
Most near water
Temporarily closed for environmental
protection policy
5 Reed field:
need maintenance
now taken over by government
0m



3.5 Problematic Conclusion

1 Industry land with factories need to be removed

2 Historical reed field under flood risk

3 Historical water structure disappeared

4 Current green-blue structure and housing with low spatial quality

5 Baiyangdian Presevrvation: lose connection with locals

At the village scale, the imbalance in the relationship between people and the lake is more visualized in terms of the human living environment.

The built-up land transformed from reed terraces is often below the original village height and the historical water level. While still safe in times of severe water level decline, these sites are at risk due to the government's goal of continued recharge and restoration of the lake's ecology and water levels, and if the Baiyangdian area continues to fulfill its water retention function in the future. There are insufficient flood risk free settlements

within the village to support the existing population and therefore the village will be downsized in the future.

In addition, due to the over expansion of the village, the original spatial quality of the water village and its symbiosis with water has been lost within Quantou Village. The remnants of the historic reed fields and the water system are fragmented and distributed in low quality within the village, while the historic pattern of the reed fields is still reflected in the layout and development of the village. Therefore, the reintroduction of part of the historic reed field-water system structure to enhance the quality of the existing space is considered to be one of the feasible options for the future development of the village.

Existing policies favor the ecological restoration of the lake, but at the expense of the livelihoods of the local people. The government's control of small businesses is a way to protect the ecology of the lake area and a corrective measure to past informal development. For the livelihoods of the local people and the future sustainability of the village, new industries need to be introduced to support the local economy. With the high value of Baiyangdian's natural environment and cultural and historical background, tourism, creative industries and handicrafts are seen as one of the possibilities. In addition, in the process of transforming the historical industrial land, it is necessary to consider solving the remaining pollution problems.

In terms of tourism development, in the comprehensive consideration of the village's size, location, and livelihoods, as well as the experience of developing common tourism in the Baiyangdian area, it is not considered that common tourism is suitable for the village. Ecotourism, on the other hand, is seen as an inclusive initiative and possibilities for the future renewal of the village and the reshaping of the human-water relationship. Based on the existing and potential spatial structure, historical and cultural connotations, and the local natural environment, it is believed that the introduction of activities based on the current situation and history could help to shape the local characteristics of tourism.

By redesigning Quantou village could bring a comprehensive possibility for renovation of other island villages and their relationship to the lake.

In summary, there are 5 main land typologies with problems that need to be renovated:

1. Industry land, factories need to be removed;

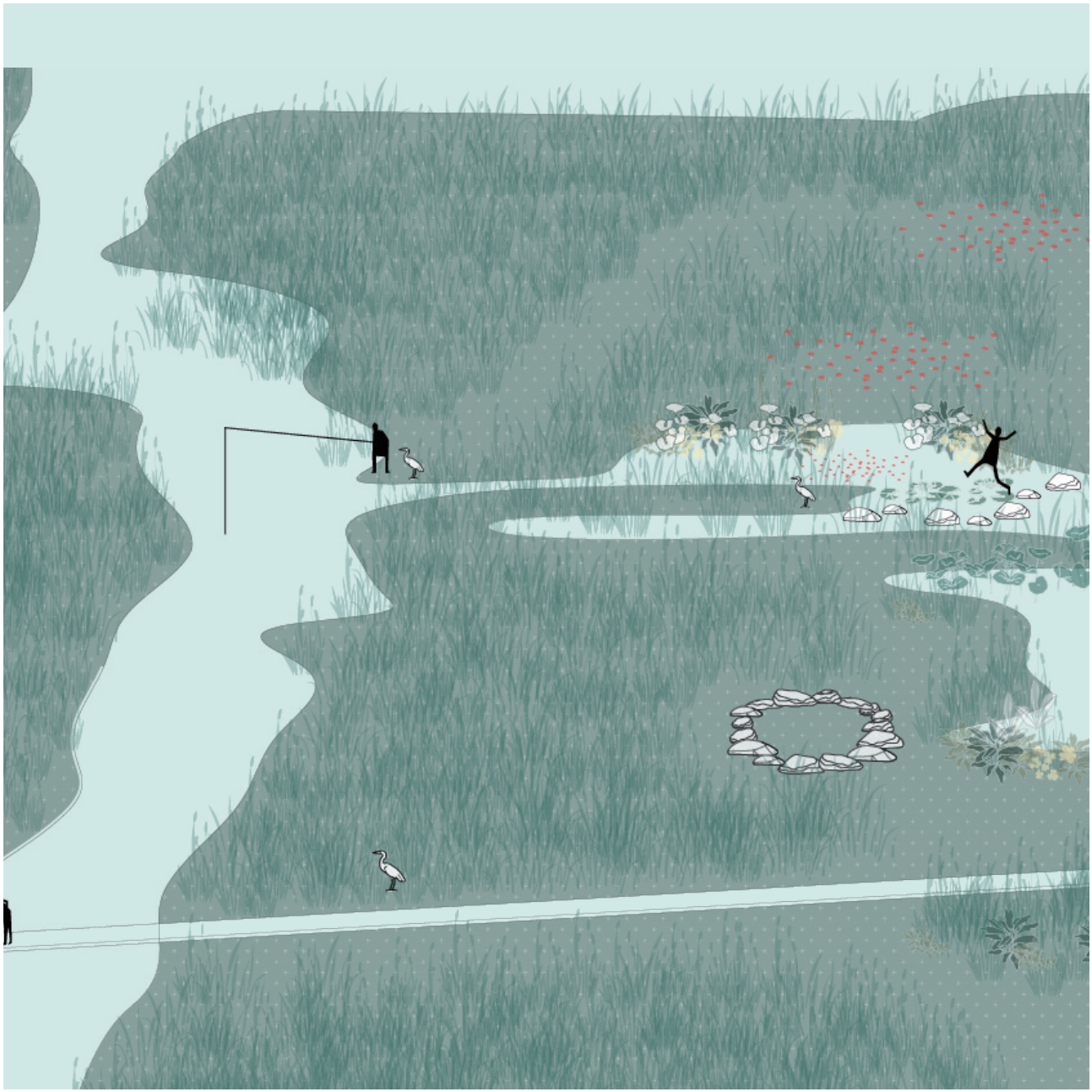
2. Historical reed field under

flood risk, with house on it;

3. Historical water structure, disappeared and lose the spatial quality with water;

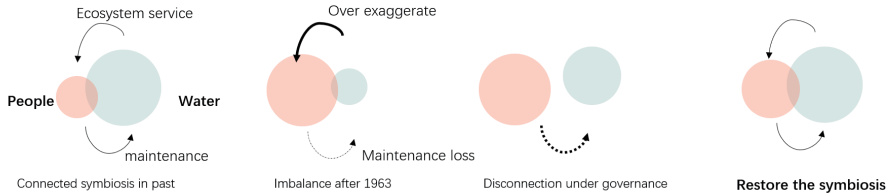
4. Current green blue structure and housing: with low spatial quality, and many deserted old houses need remove or renewed;

5. Baiyangdian Preservation: lose connection with lcoals.



5 Design project:
renovation of villages in Baiyangdian, take Quantou Village as an example

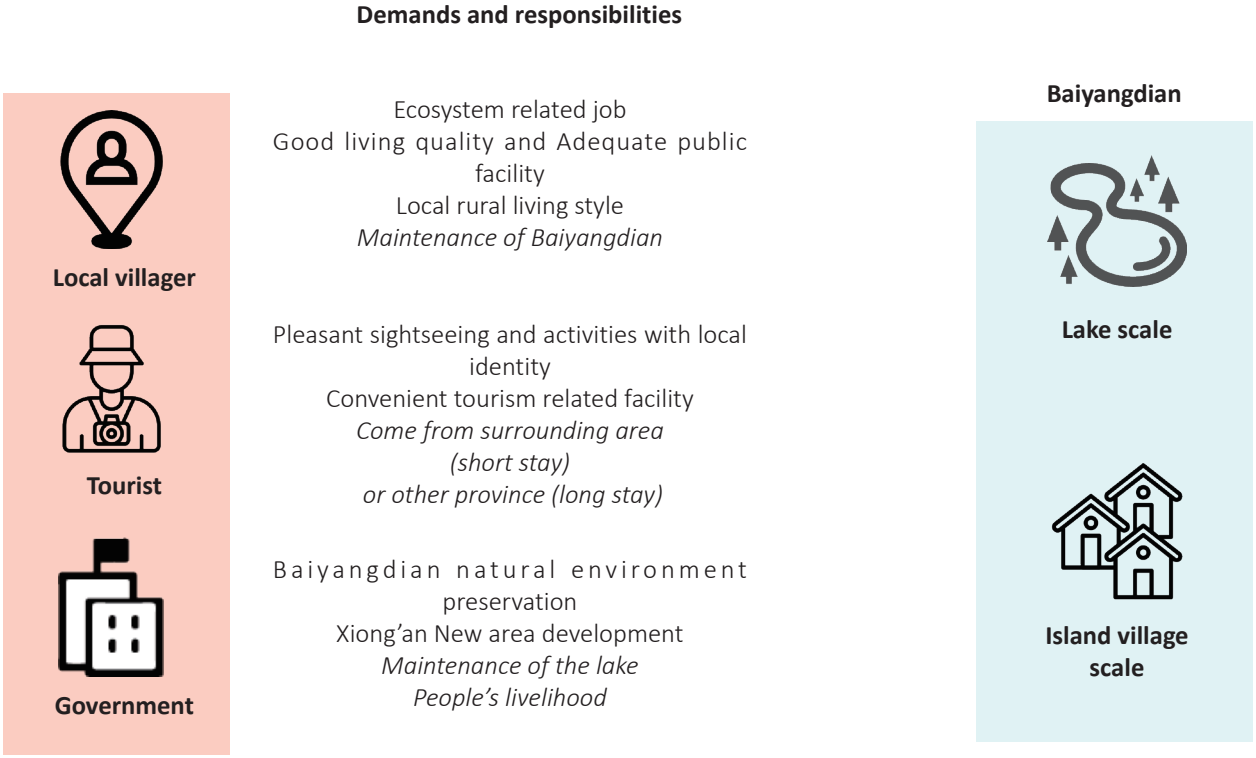
5.1 Design concept





Based on the previous conclusion that the government's current environmental protection measures are effective, it can be foreseen that Baiyangdian will return to its historical water level in 2035, maintaining a minimum of 8 meters and accommodating a maximum of 10 meters. However, there is room for upgrading the relocation villages and tourism in it. Because Baiyangdian is a symbiosis of people and water, people are an important part of Baiyangdian, and the local people's life pattern of living with water builds the local identity.

The main goal of the design is to revitalize the connection between people and water, to construct a new cycle based on eco-tourism, to reduce the size of island village, and to strengthen the local



identity. The design will be developed in phases based on the above four principles, proposing a design possibility to reconstruct the island village environment in about ten years.

Based on the differentiation of stakeholder needs and responsibilities, coping strategies for the five land use types were derived at both the Baiyangdian and village scales.

Principle and methods

Baiyangdian Scale

1 Tourism combination: common tourism, ecotourism and sightseeing route

2 Large scale ecology preservation

3 Water village as foundation, locals as gardener

Village Scale

1 Industrial land: Industry land transformation

1.1 Vegetation purify

1.2 Remove polluted top soil

2 Historical reed field: water level change adaptive design

2.1 Floodable green land

2.2 Pile up with removed material

2.3 Retention land

3 Historical water structure: Water structure as backbone

3.1Water way

3.2 Water front park and plaza

3.3 Water front street

4 Existing green-blue structure and houses: Improve spatial quality and add function

4-1Increase native species richness

4-2 reed field garden

4-3Productive pond

4-4Old housing renewal

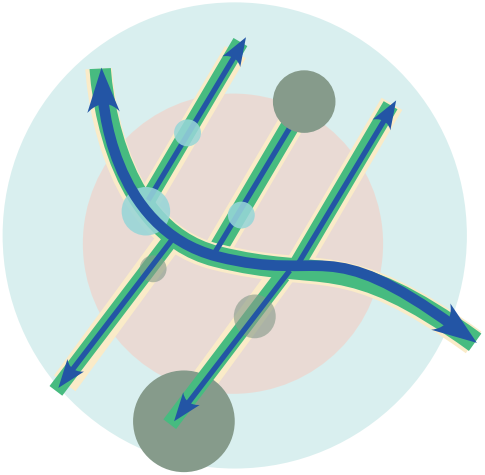
4-5Vacant house remove

4-6Community green land

4-7Villager harvest existing reed

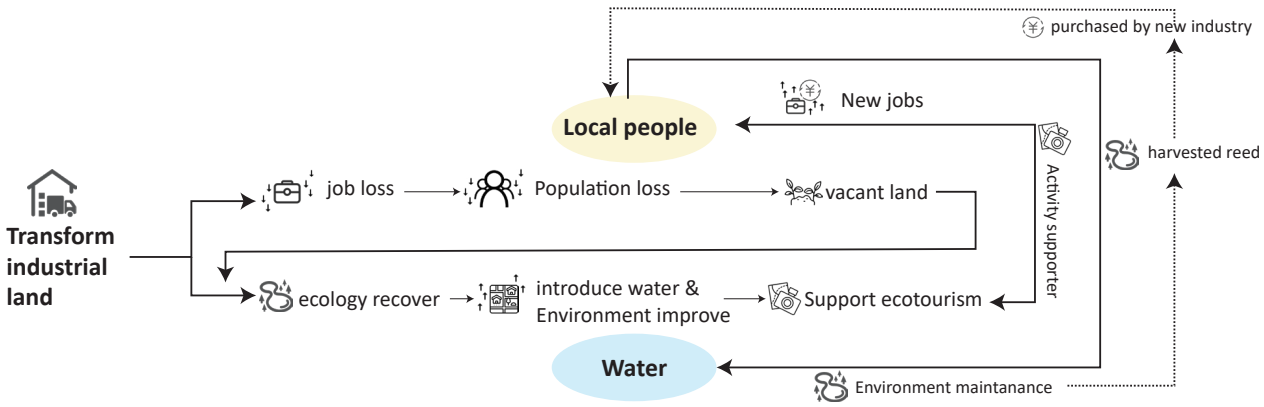
4-8 entertain pond

5 Human interaction: Maintenance, nature and local culture related

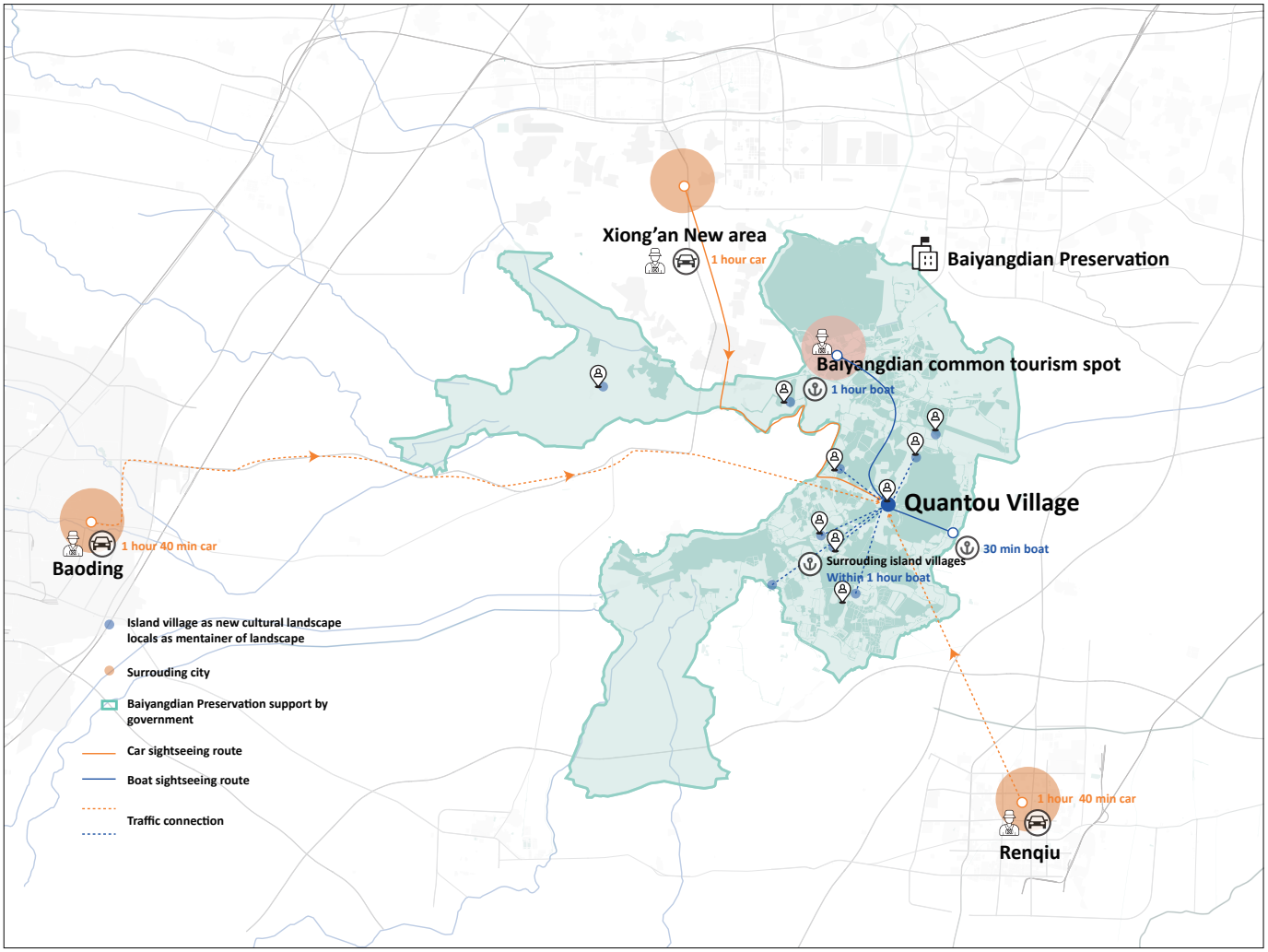


environment improvement

local identity



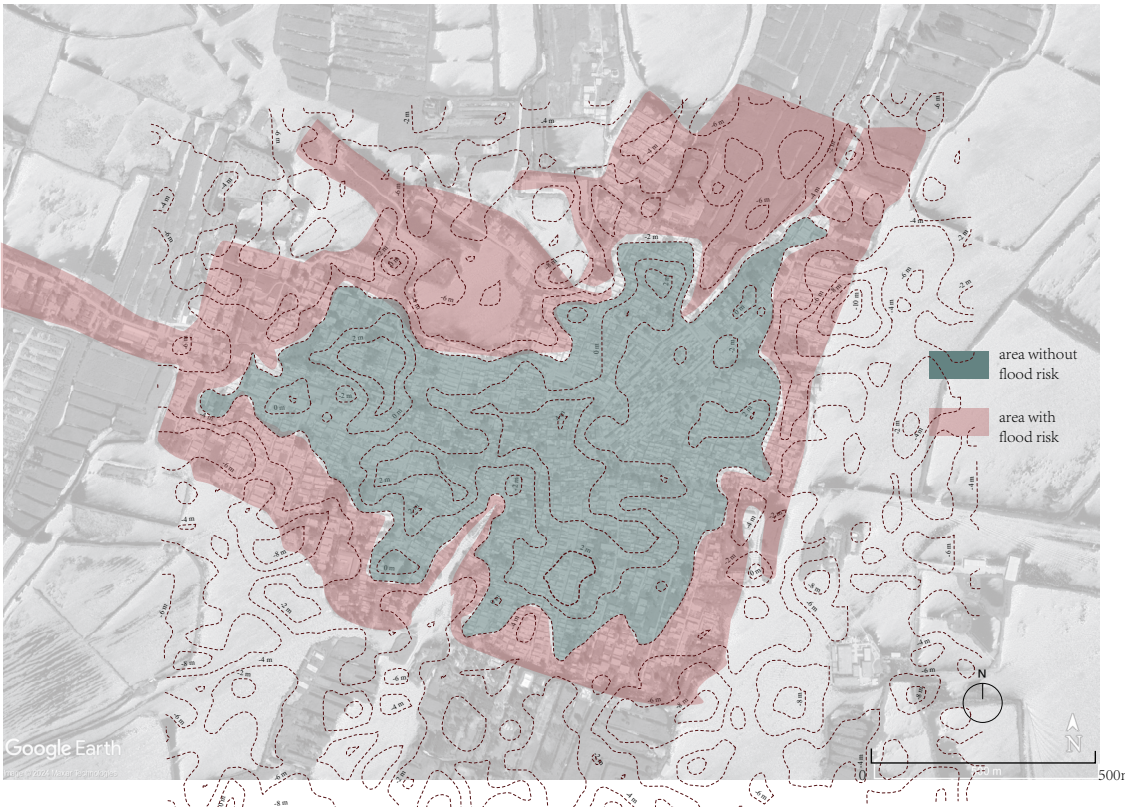
new circulation



Baiyangdian scale proposal

At the Baiyangdian scale, it follows the government's ecological protection of Baiyangdian and strengthens links with neighboring cities. Enhance the accessibility of the water village and its connectivity with the neighboring cities through the tour route planning, retain the livability of the water village, and make the local residents as the local managers of the protected area.

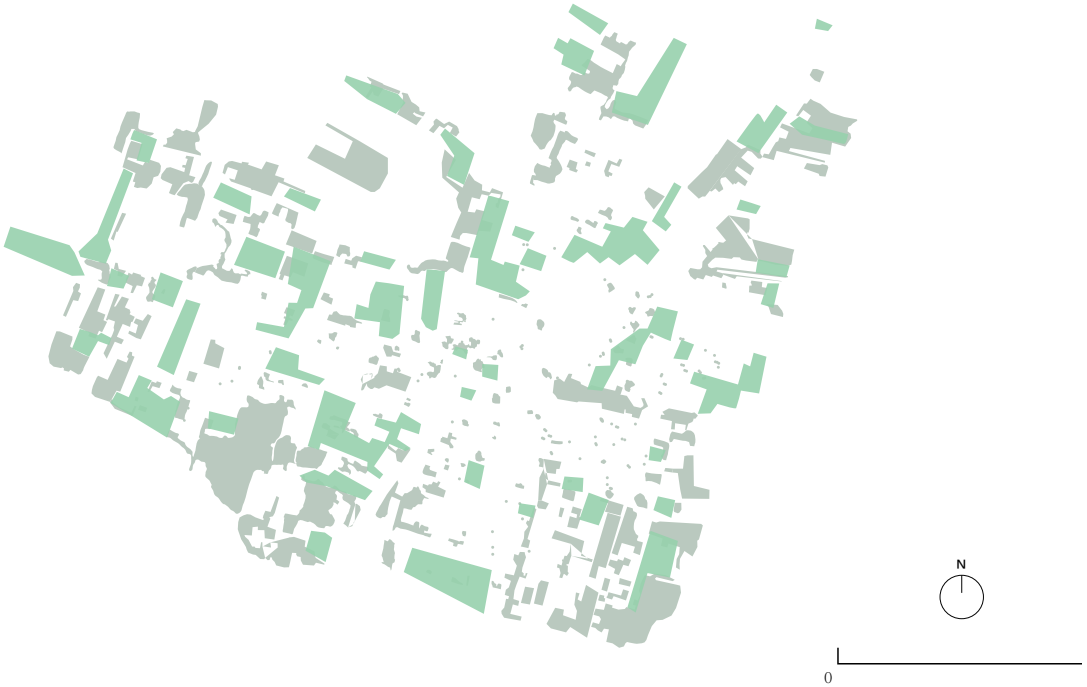
5.2 Strategy design



area under flood risk

5.2.1. transform sites with high flood risk, reduce the village's size and population.

As Baiyangdian will return to its historical water level in 20235, with a minimum of 8 meters and a maximum of 10 meters, some of the villages that expanded after the severe drop in water level in Baiyangdian will be permanently or seasonally inundated. This portion of the land will need to be transformed and designed for water level adaptation.



existing industrial land potential

5.2.2 transform industrial land

Private industries in the villages will face closure and the vacant sites have potential for transformation. The closure of the factories will lead to an inevitable process in which around 70% of the local population will lose their jobs, leave the villages and leave their houses vacant. But at the same time the transformation will bring potential jobs, income and new spaces.



designed water structure

5.2.3 reintroduce part of the historical reed field-water system structure and enhance the quality of the existing space.

Water, is the fundamental landscape feature of the local area and the basis of ecology. Historically water structures existed in the villages, but all disappeared due to falling water levels and village expansion, resulting in an almost complete loss of water space within the villages.

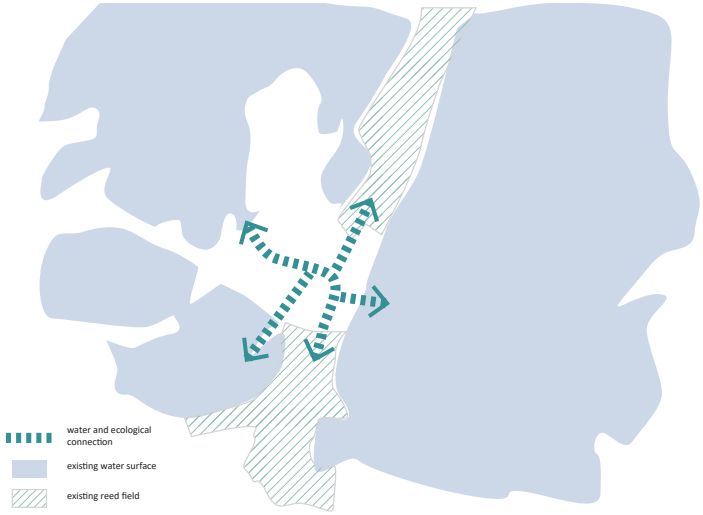
The reintroduction of the historic water system through a phased approach will act as a backbone to improve the quality of the space. Relying on the water system, spatial design and functional empowerment will be developed.



Phase 1

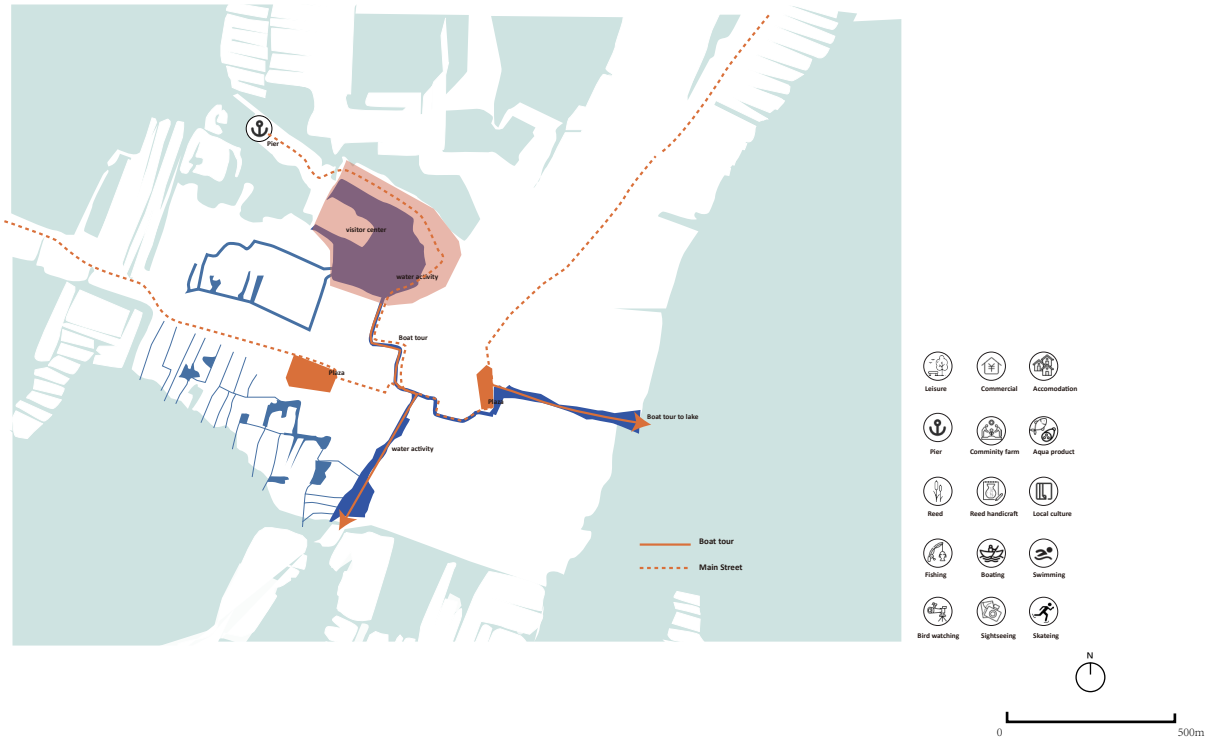


Phase 2



Lake scale influence

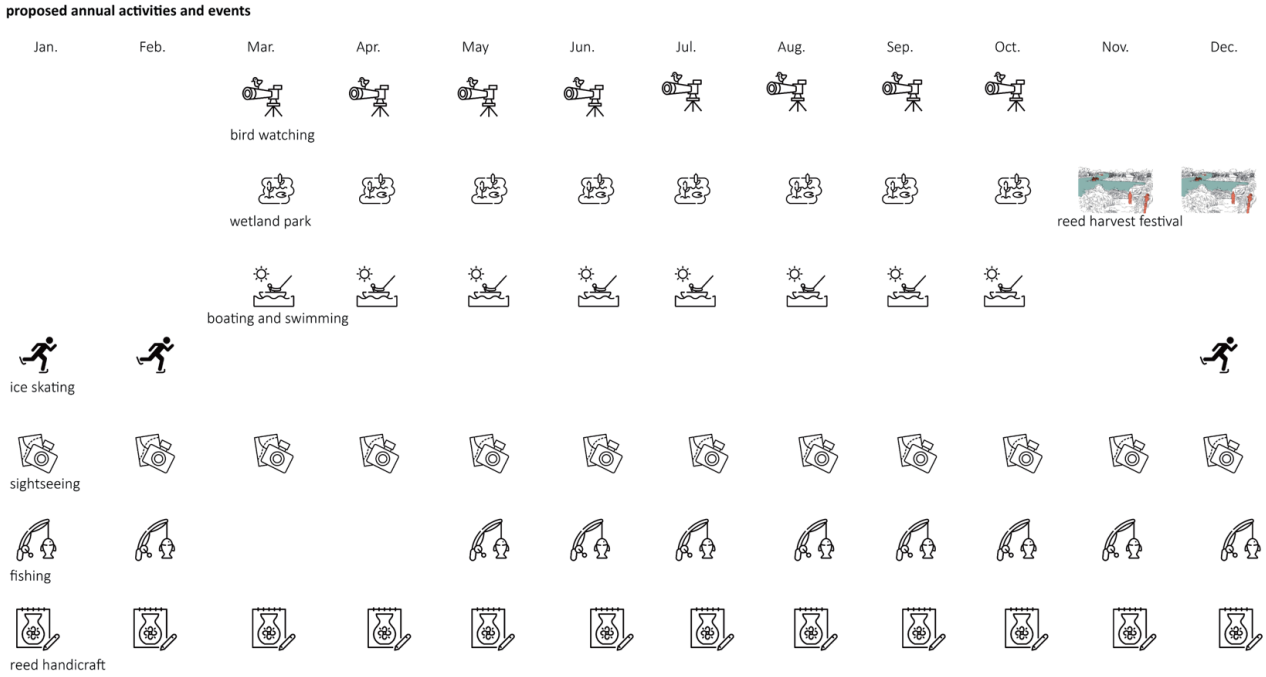
At the lake scale, the internal water system will reconnect to the lake and act as a buffer between habitat and water.



designed tourism structure

5.2.4. introduce activities based on the natural environment and local culture for tourism and local people.

Based on the reconfiguration and enhancement of the blue-green space, it will serve as a functional support site. The Baiyangdian system has rich natural and cultural resources and spatial seasonal changes that can support rich activities within ecology tolerance throughout the year.



Activity calendar



Tour in lake scale



Vision of Quantou 2034

5.3 Vision of Island village

Through the design, the village land will be returned to the nature reserve and a part of the space for human habitation and human maintenance functions will be preserved as part of the renewed traditional cultural landscape with tourism and living functions. Factories will be removed, building land will be cut back, reed beds and water bodies will be increased, and the residential population will be cut back. The existing spatial quality will be enhanced and adaptable to changes in water levels.

5.4 design process

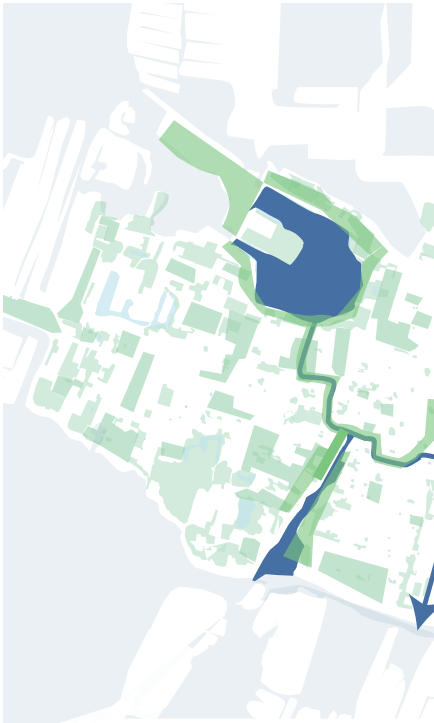
The design aims for a distributional transformation over ten years to build a sustainable new cycle. The transformation of industrial land and population decline are used as a starting point to promote the transformation of land use. In the first phase, environmental restoration and population reduction will be carried out to provide a small number of jobs and maintain a low population level to support the transformation project. In the second phase, the blue-green system and environmental reconstruction will increase employment and gradually introduce tourism. Tourism development and population rebound in the third phase to support subsequent site construction, maintenance and operation.

With the completion of the system, the village environment is reintegrated into the historic water system and locals take over the maintenance of the water system on a larger scale.

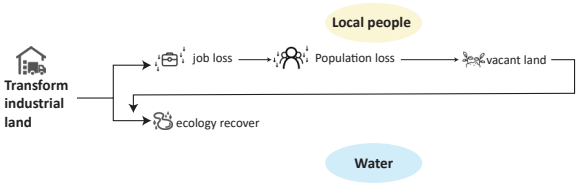
5.3 Design process

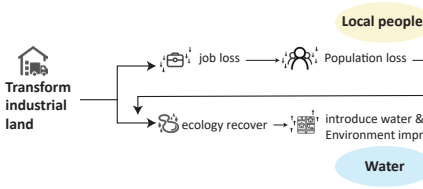


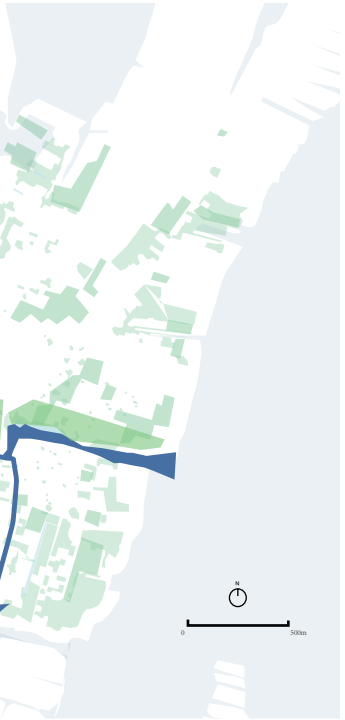
Phase Ⅰ 2024-2026 Current transform
Industrial land transform
population loss and residential house decrease
ecological restoration



Phase Ⅱ 2026-2028 environment r
water structure introduce
land transform
function developing







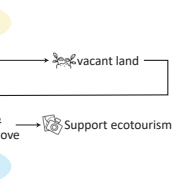
polulation -50%
build land -30%
maintanence cost +20%
income + 20%
green land +25%
water +10%

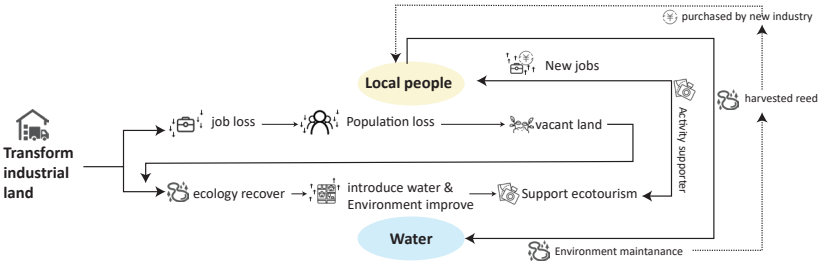
restore

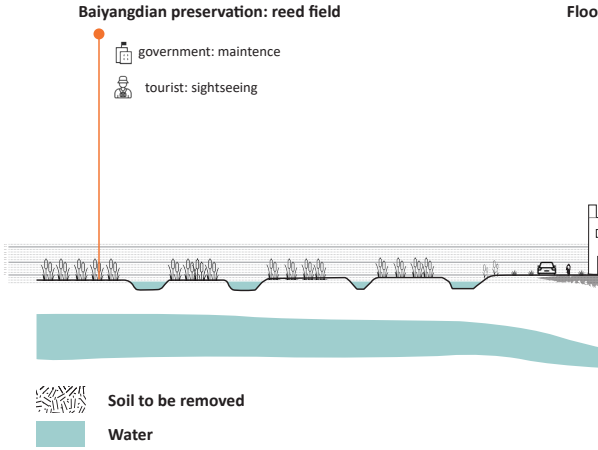


polulation -50%
build land -40%
maintanence cost -30%
income + 40%
green land +30%
water +10%

Phase Ⅲ 2028-2034 Diversity enhance
introduce people
continue to renovate other parts
enhance activities to support ecotourism
the annualy reed management can be assigned to local worker







Section 1-1 Reed to Resident area Transition Zone
Phase I Current transition

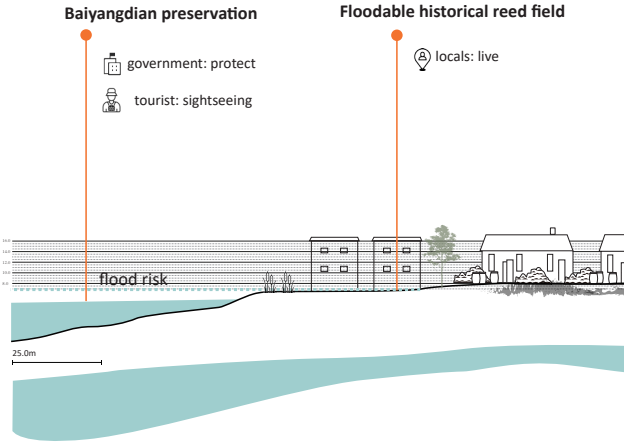
5.5 Zoom in design

5.5.1 Site 1

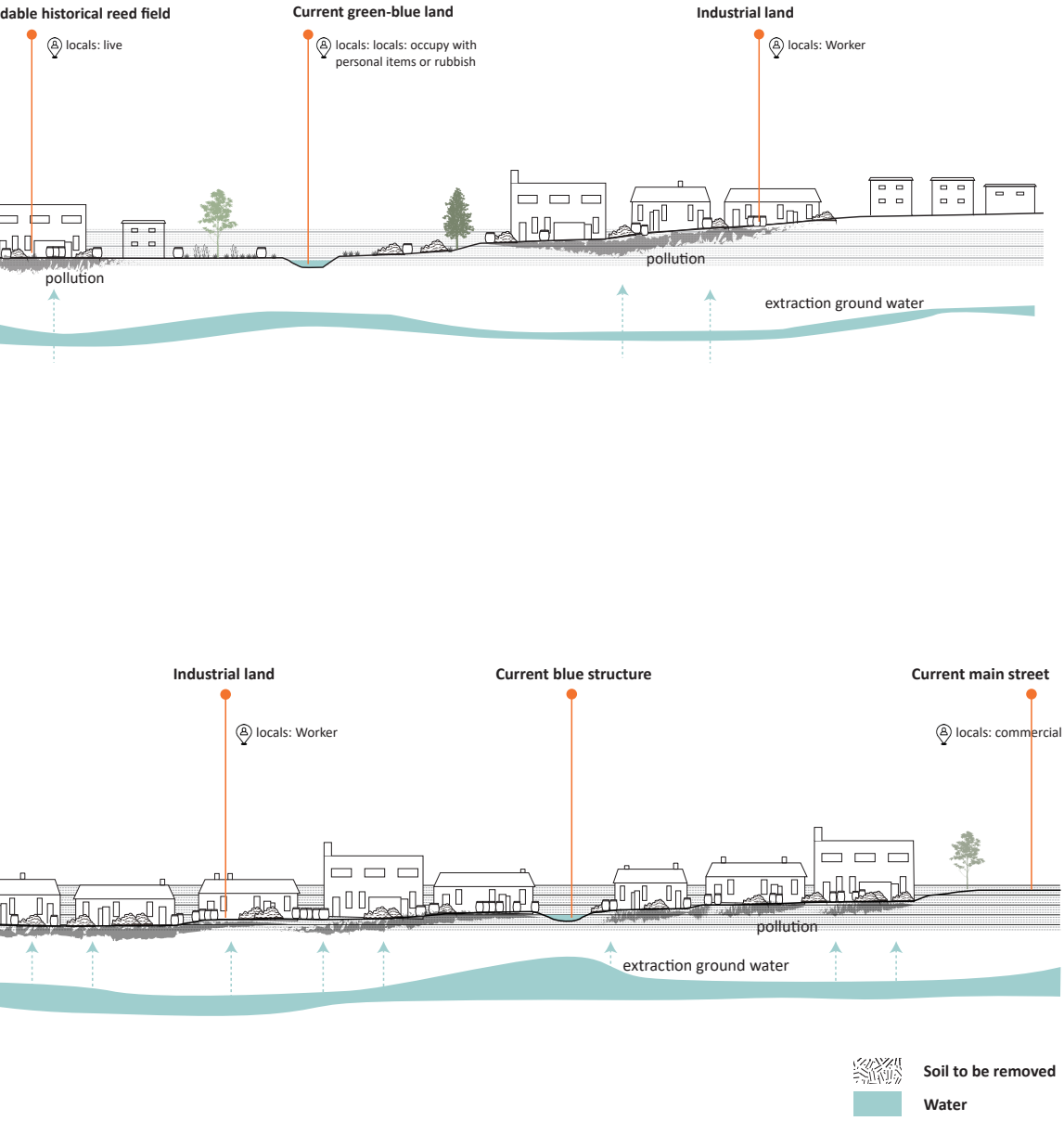
Industial land Transform and reed field renovation

Phase I 2024-2026 Current transform

The site is converted from reed fields and is a transition zone between the existing reed fields and the built-up area. Some of the reed fields have housing built on them but are at risk of flooding due to their low level. Part of the reed field is used for industrial land development due to its location on the edge of the village, where part of the historic water system and green spaces remain.

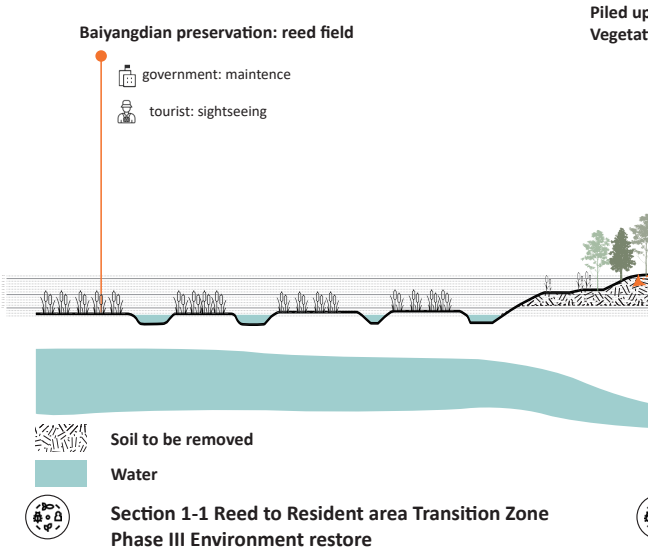


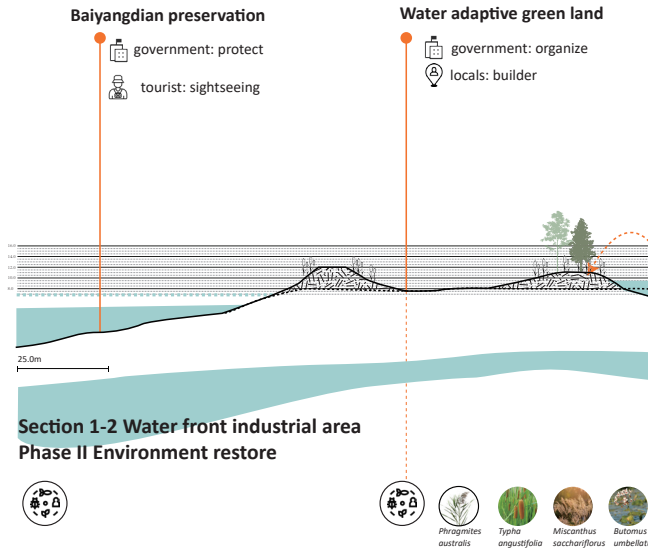
Section 1-2 Water front industrial area
Phase I Current transform

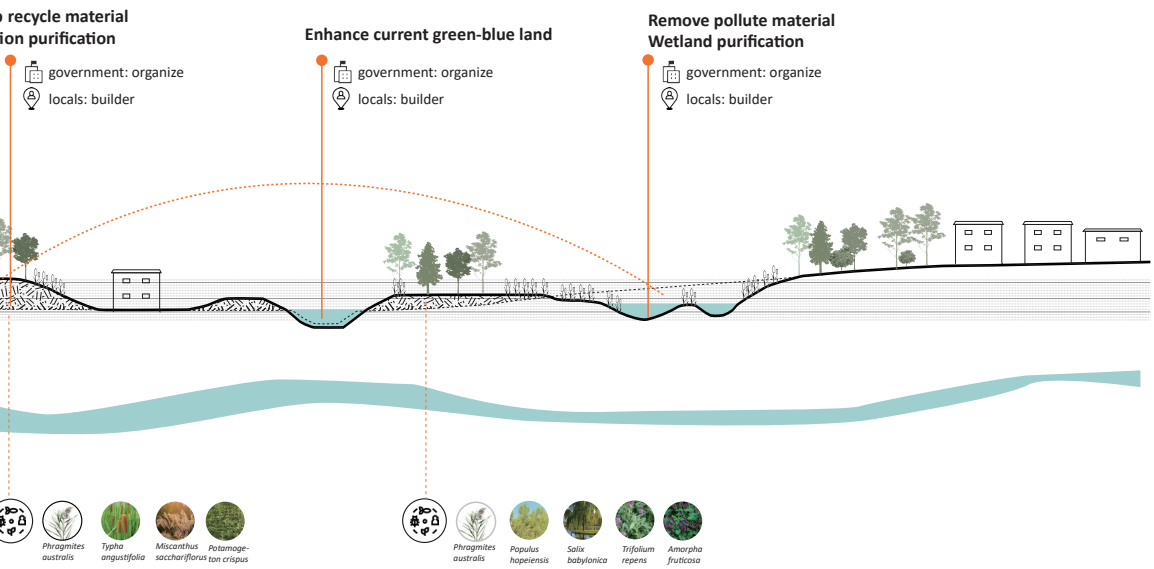

dable historical reed field
locals: live
Current green-blue land
locals: locals: occupy with personal items or rubbish
Industrial land
locals: Worker
pollution
pollution
extraction ground water
Industrial land
locals: Worker
Current blue structure
Current main street
locals: commercial
pollution
extraction ground water
Soil to be removed
Water

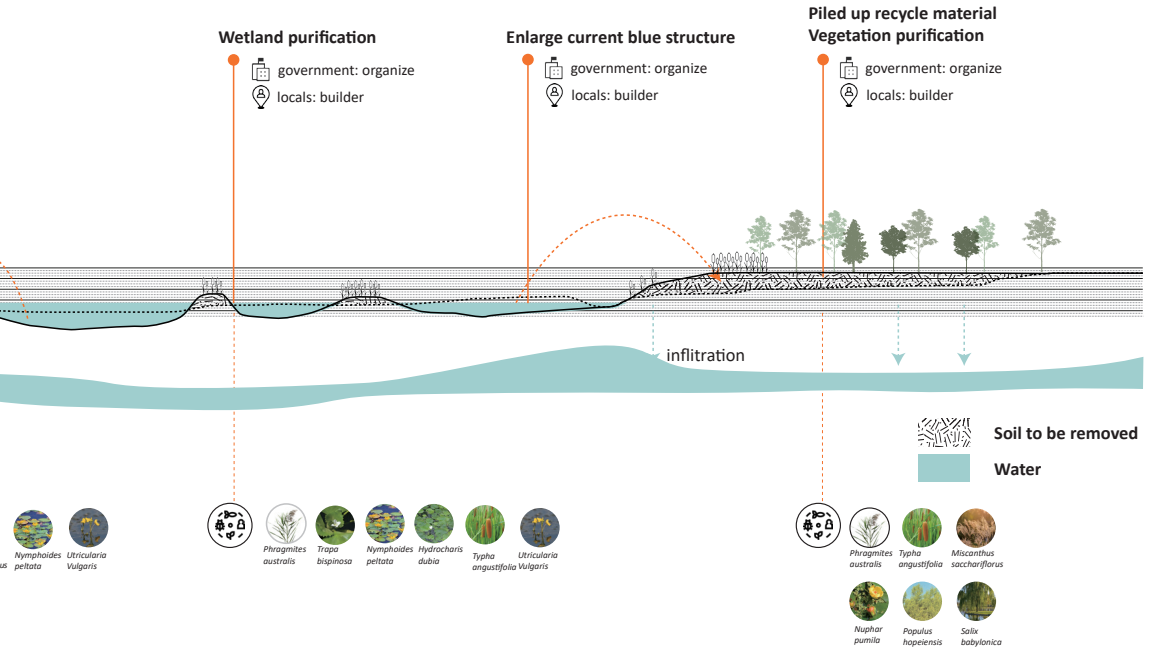
Phase II 2026-2028 Environment restore

This phase is dedicated to industrial pollution decontamination, terrain reconstruction and re-greening. Contaminated topsoil is removed and stockpiled, and decontaminated by vegetation. The raised terrain protects the existing internal settlements from the risk of flooding. In combination with the removed industrial soil, part of the historical water system is restored.



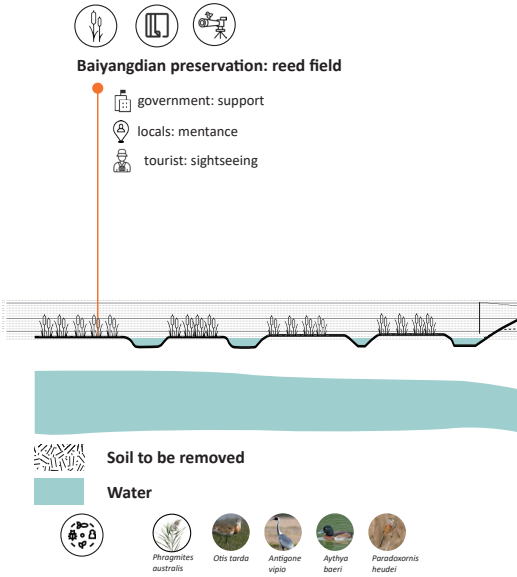



recycle material
ion purification
government: organize
locals: builder
Enhance current green-blue land
government: organize
locals: builder
Remove pollute material
Wetland purification
government: organize
locals: builder
Phragmites australis
Typha angustifolia
Miscanthus sacchariflorus
Potamoge-ton crispus
Phragmites australis
Populus hopeiensis
Salix babylonica
Trifolium repens
Amorpha fruticosa

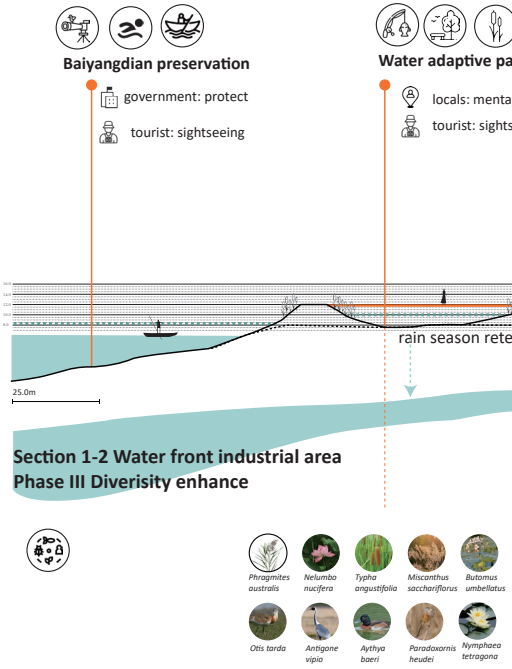

Wetland purification
government: organize
locals: builder
Enlarge current blue structure
government: organize
locals: builder
Piled up recycle material
Vegetation purification
government: organize
locals: builder
inflitration
Soil to be removed
Water
Nymphoides peltata
Utricularia Vulgaris
Phragmites australis
Trapa bispinosa
Nymphoides peltata
Hydrocharis dubia
Typha angustifolia
Utricularia Vulgaris
Phragmites australis
Typha angustifolia
Miscanthus sacchariflorus
Nuphar pumila
Populus hopeiensis
Salix babylonica

Phase II 2028-2034 Diversity Enhance

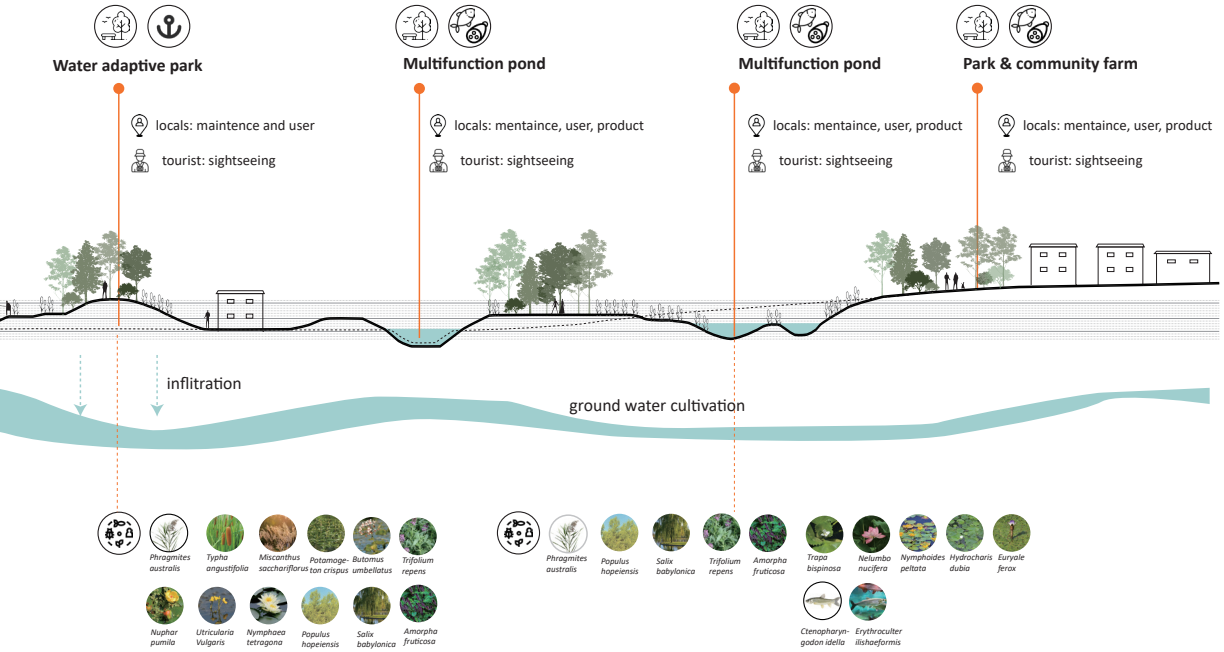
With the purification of pollution, ecological restoration, and environmental reconstruction, species diversity is enhanced, and the site is equipped with landscape, residential, and productive functions to support local lifestyles.

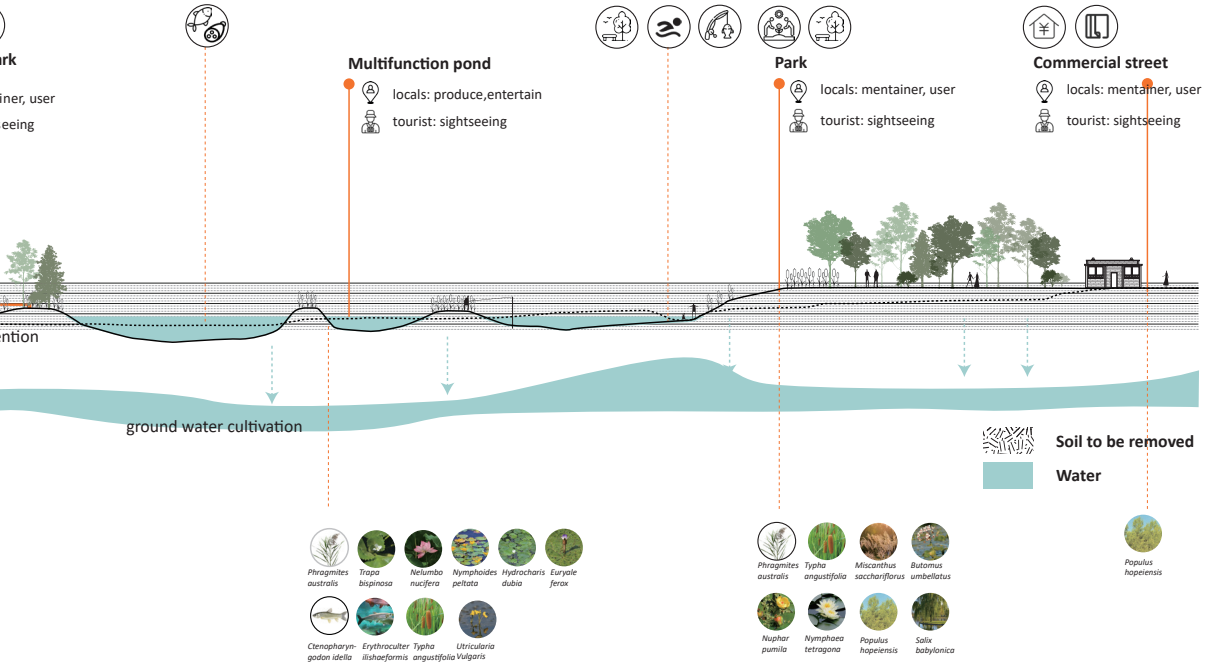


Section 1-1 Reed to Resident area Transition Zone
Phase III Diversity enhance



Section 1-2 Water front industrial area
Phase III Diverisity enhance


Water adaptive park
locals: maintence and user
tourist: sightseeing
Multifunction pond
locals: mentaince, user, product
tourist: sightseeing
Multifunction pond
locals: mentaince, user, product
tourist: sightseeing
Park & community farm
locals: mentaince, user, product
tourist: sightseeing
inflitration
ground water cultivation
Phragmites australis
Typha angustifolia
Miscanthus sacchariflorus
Potamoge-ton crispus
Butomus umbellatus
Trifolium repens
Nuphar pumila
Utricularia Vulgaris
Nymphaea tetragona
Populus hopeiensis
Salix babylonica
Amorpha fruticosa
Phragmites australis
Populus hopeiensis
Salix babylonica
Trifolium repens
Amorpha fruticosa
Trapa bispinosa
Nelumbo nucifera
Nymphoides peltata
Hydrocharis dubia
Euryale ferox
Ctenopharyn-godon idella
Erythroculter ilishaeformis


Multifunction pond
locals: produce,entertain
tourist: sightseeing
Park
locals: mentainer, user
tourist: sightseeing
Commercial street
locals: mentainer, user
tourist: sightseeing
ground water cultivation
Soil to be removed
Water
Phragmites australis
Trapa bispinosa
Nelumbo nucifera
Nymphoides peltata
Hydrocharis dubia
Euryale ferox
Ctenopharyn-godon idella
Erythroculter ilishaeformis
Typha angustifolia
Utricularia Vulgaris
Phragmites australis
Typha angustifolia
Miscanthus sacchariflorus
Butomus umbellatus
Nuphar pumila
Nymphaea tetragona
Populus hopeiensis
Salix babylonica
Populus hopeiensis

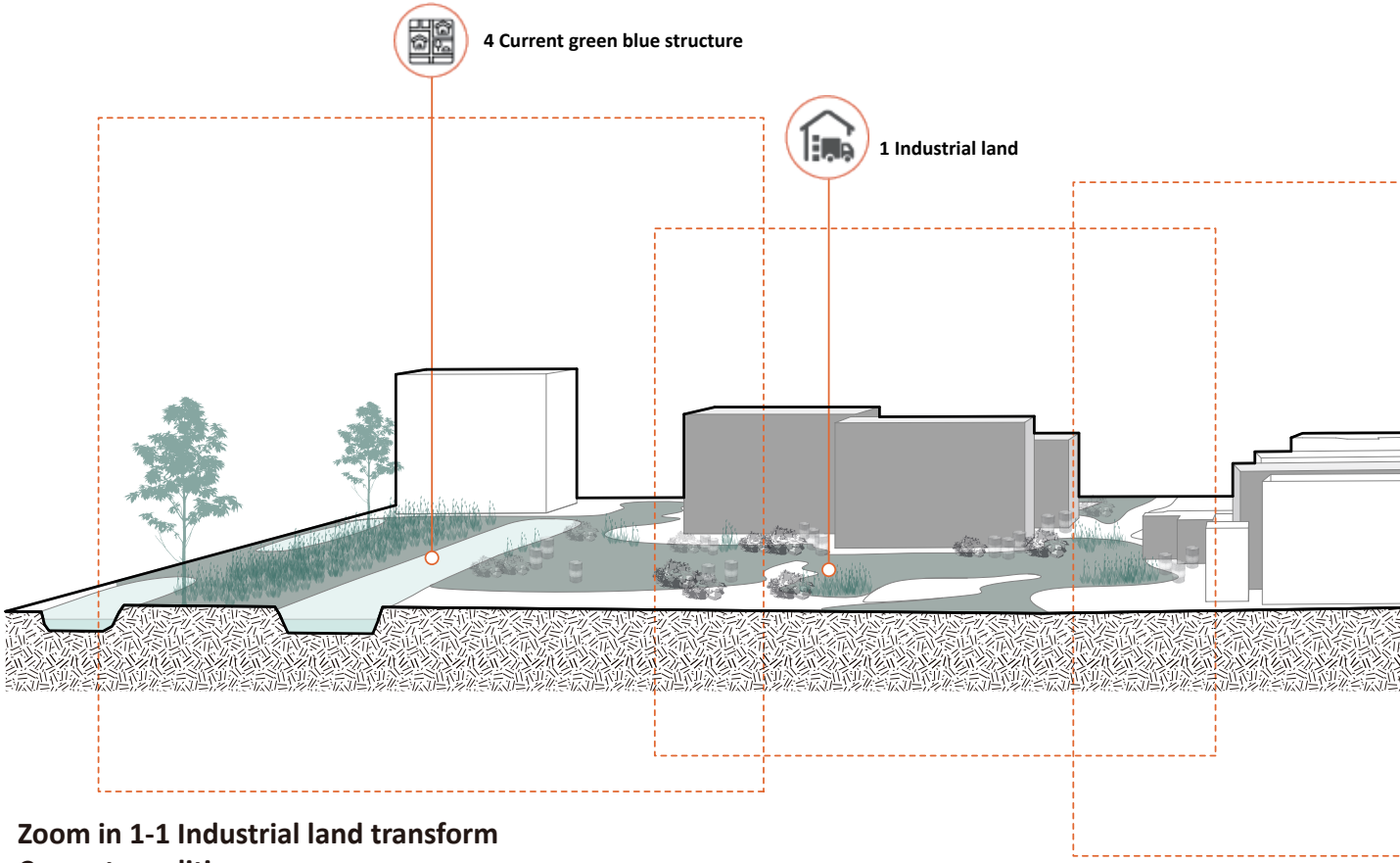


Site 1 Industial land Transform and reed field renovation
Before transformation



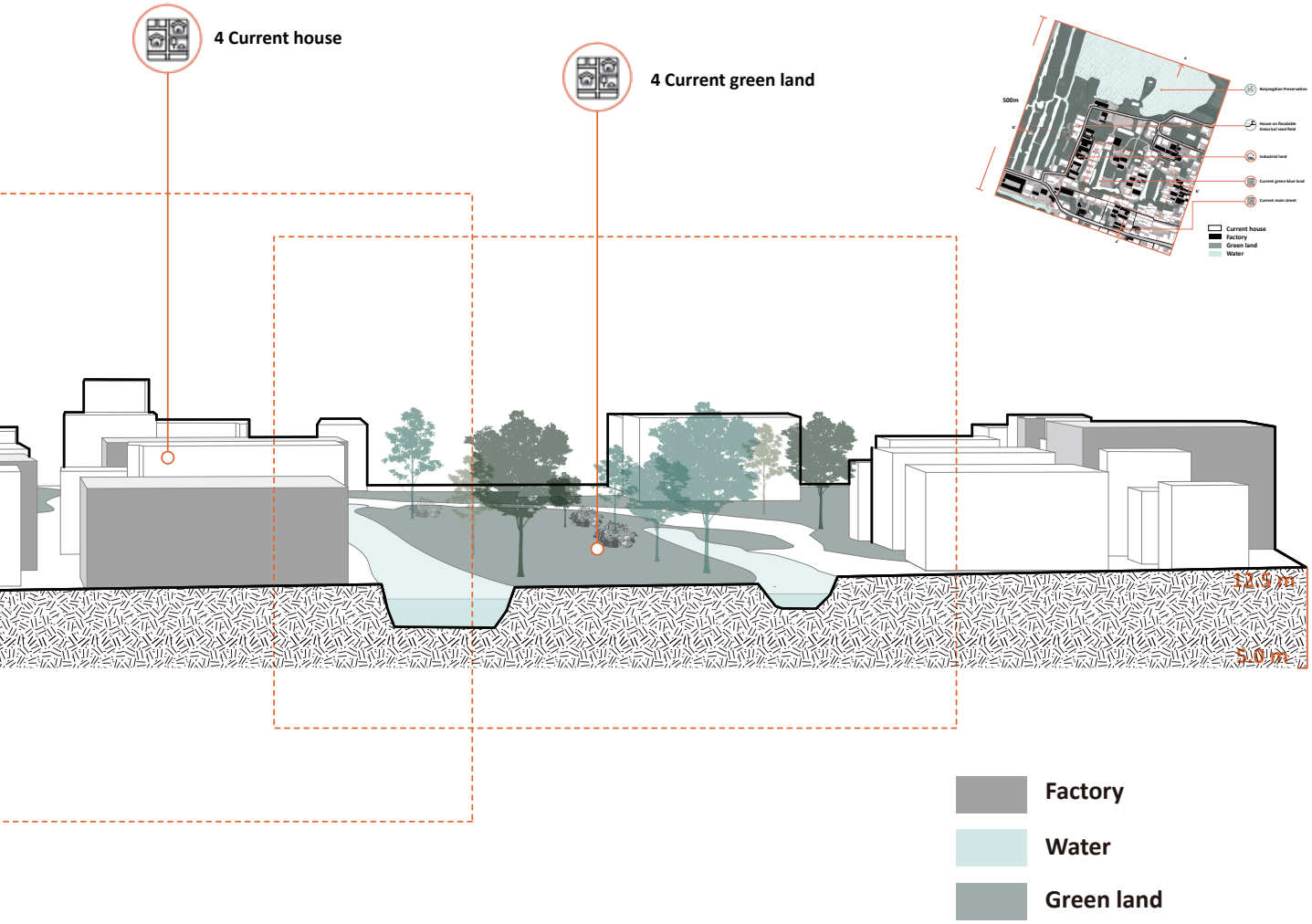
Site 1 Industial land Transform and reed field renovation
After transformation

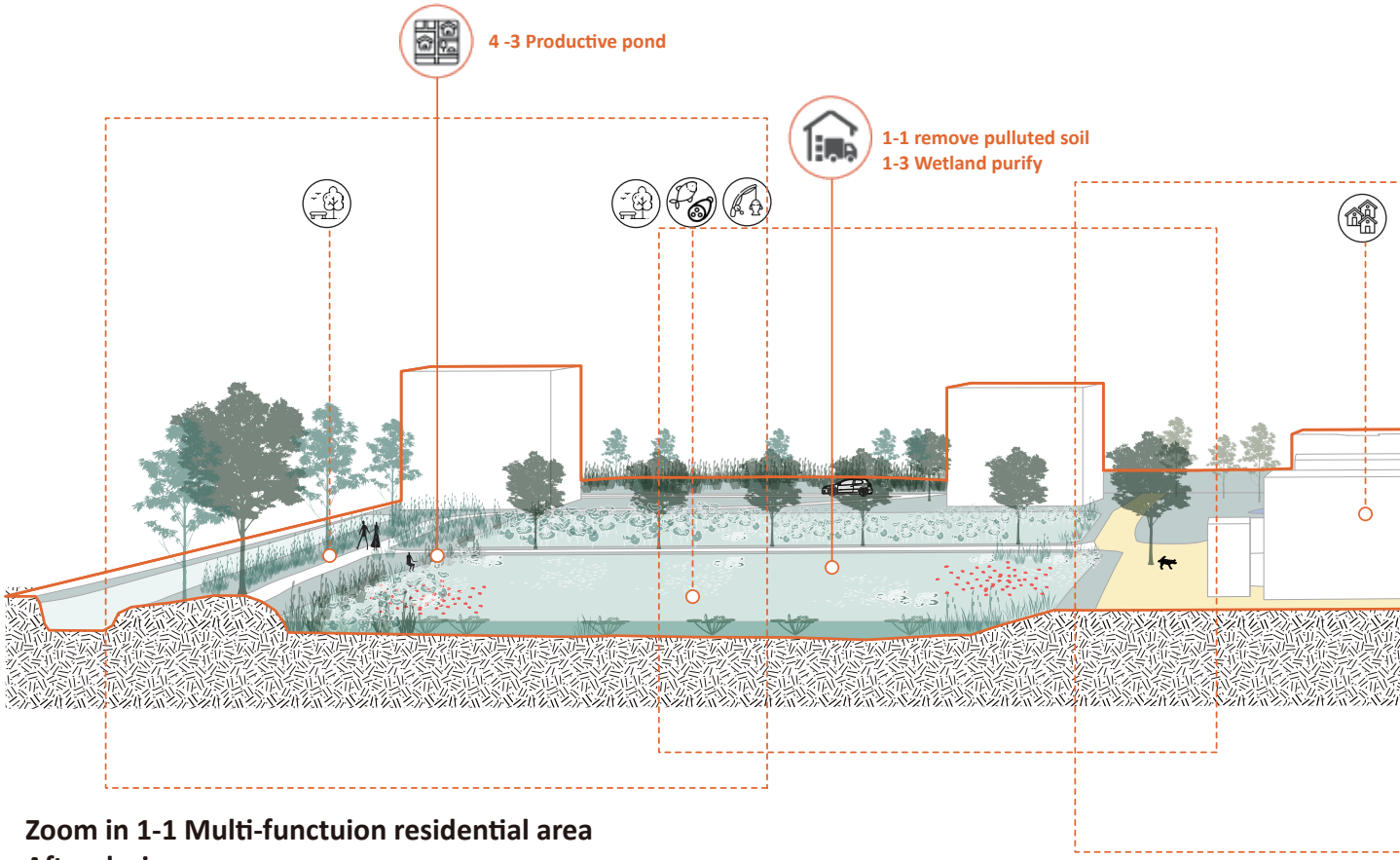
Zoom in 1-1 Industrial land transform



Zoom in 1-1 Industrial land transform
Current condition

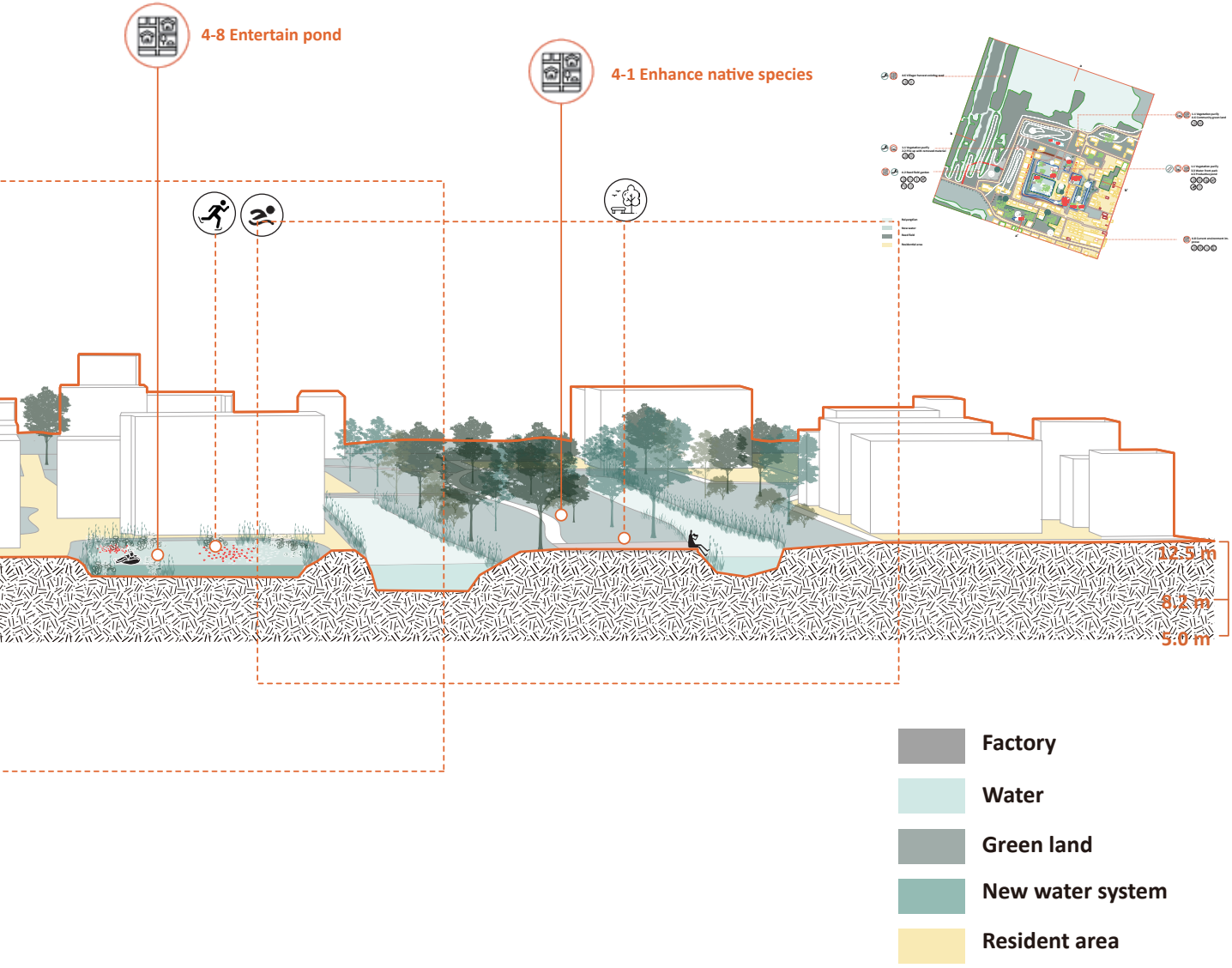
Currently, the site is being used for unorganized stacking of industrial and domestic debris. The site has low species diversity, low spatial quality and low accessibility.


4 Current house
4 Current green land
500m
Current house
Factory
Green land
Water
12.9 m
5.0 m
Factory
Water
Green land

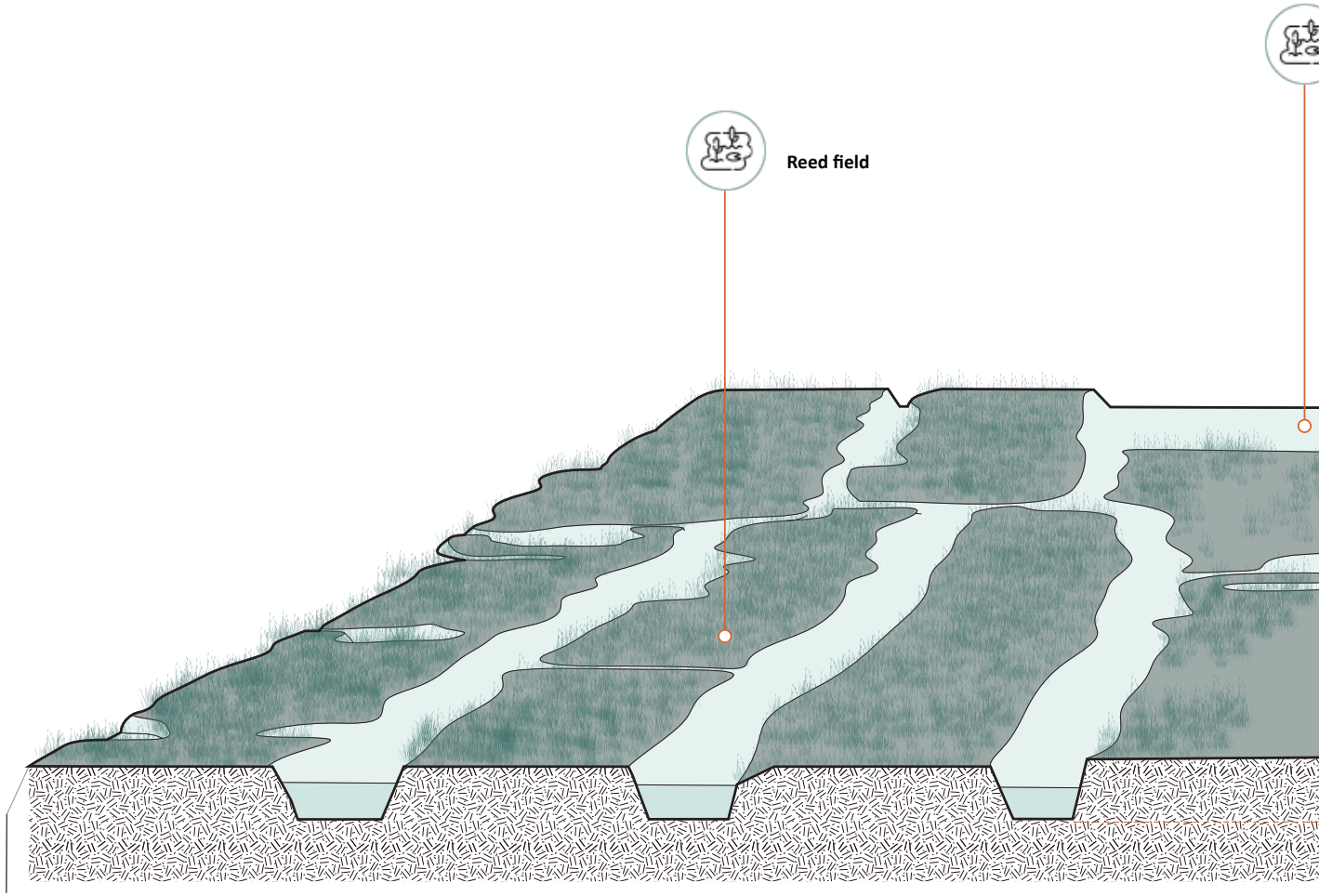


Zoom in 1-1 Multi-functuion residential area
After design

After design, the industrial land is transformed to produtive pond with landscape quality and recreational function. Current green land's biodiversity is enhanced to serve recreational function.

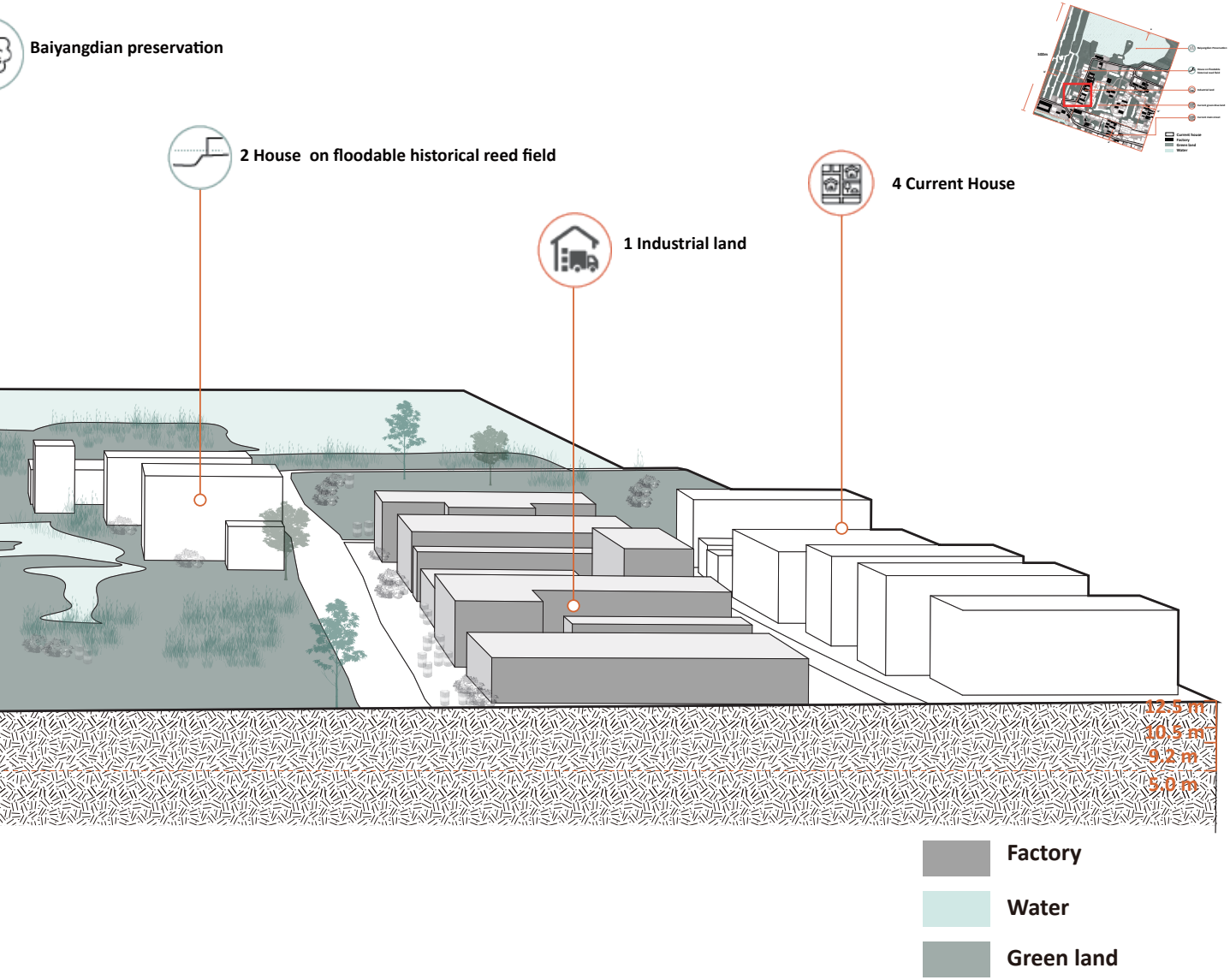

4-8 Entertain pond
4-1 Enhance native species
12.5 m
9.2 m
5.0 m
Factory
Water
Green land
New water system
Resident area

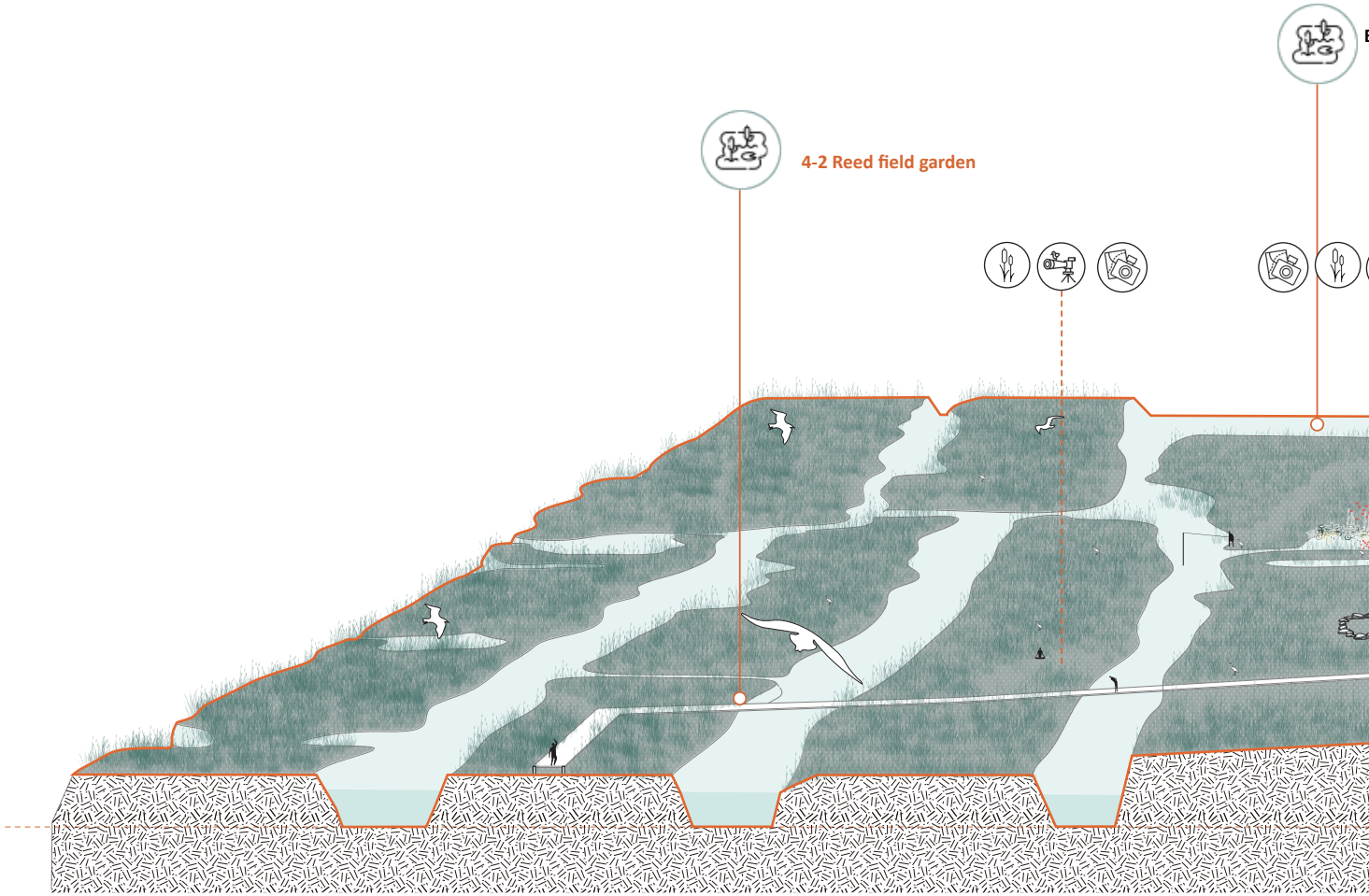
Zoom in 1-2 Reed field renovation



Zoom in 1-2 Reed field transition zone
Before design

Currently, the edge of reed field and village was transforming to build land, which should be stoped. Reed on it are being removed and occupied with houses and other stuff.


Baiyangdian preservation
2 House on floodable historical reed field
1 Industrial land
4 Current House
12.5 m
10.5 m
9.2 m
5.0 m
Factory
Water
Green land

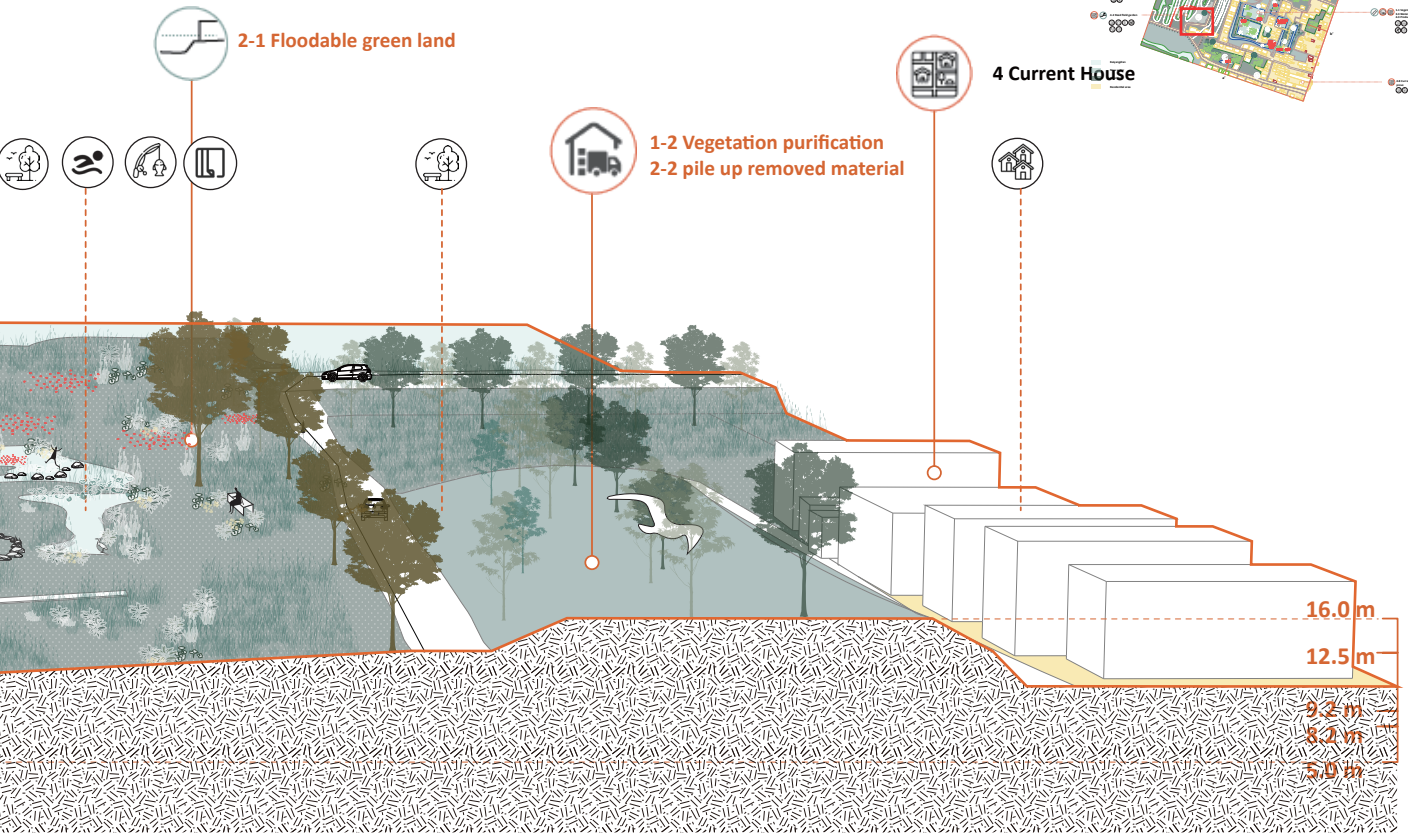


Zoom in 1-2 Reed field transition zone
After design

After design, the occupied reed field is restored, with enhanced accessibility and diversity. The village has been downsized to provide more green space.

Baiyangdian preservation





Factory

Water

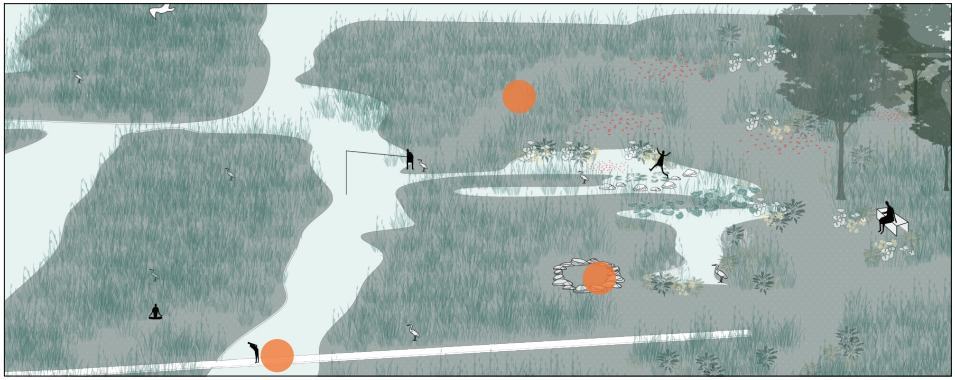
Green land

New water system

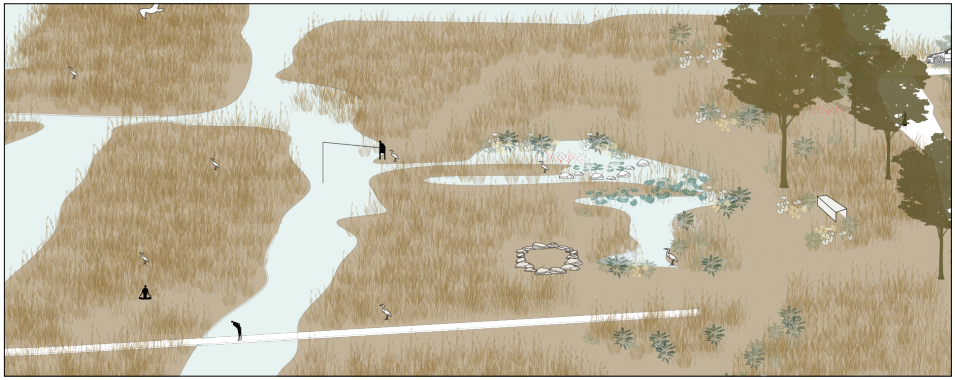
Resident area

Reed garden

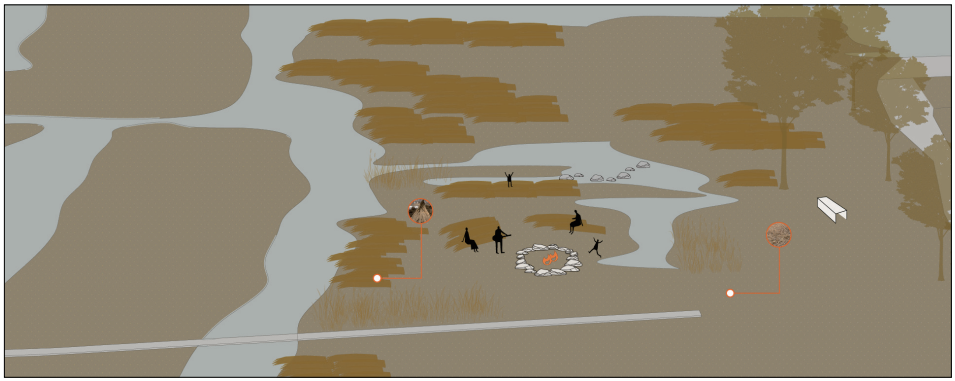
Summer

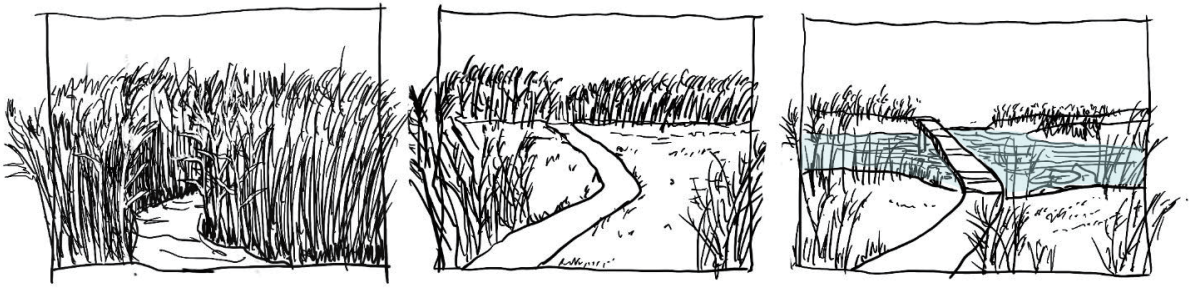


Autumn



Autumn: havested





Different spatial quality



Reed



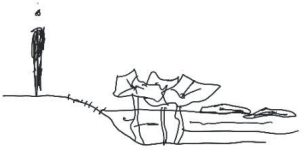


Harvested Reed





Water plant





Water front plant



Based on the seasonal change of vegetation and the traditional custom of harvesting reeds, the reed garden presents different spatial atmospheres in different seasons.

In summer, the green reeds are tall and dense, providing a peaceful and intimate spatial experience. In the fall, the reeds turn yellow. As the reeds are harvested, the environment transforms from a claustrophobic reed field to an open space that can accommodate seasonal activities.

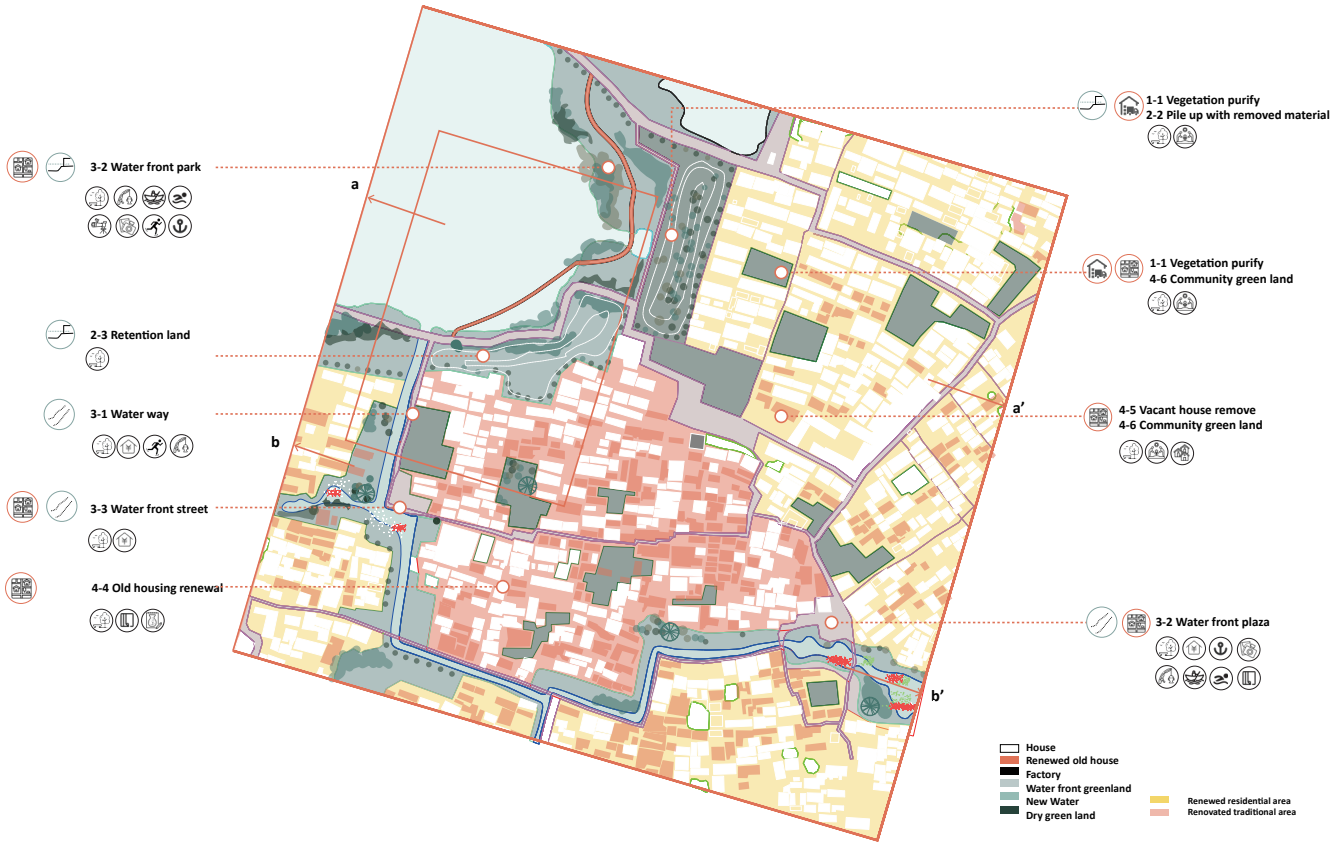


Site 2 Old area renovation and water structure reintroduce

Before transformation

This area is the oldest part of the island's villages, where once the waterways have been filled in and a large number of old abandoned local buildings exist.

The removal of the factory provides space to reintroduce the historic waterway and green space. A series of waterfront spaces have developed along the historic waterway. The old abandoned houses were partly removed and partly renovated to host

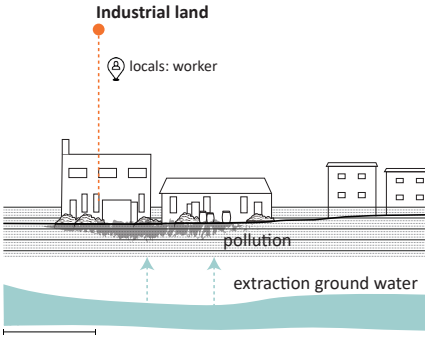


Site 2 Old area renovation and water structure reintroduce

After transformation

commercial, cultural and tourism functions.

Houses located on the waterfront lowlands were removed and part of the waterfront was used as a buffer for water level changes. Some of the removed soil and materials were piled in the waterfront spaces to reshape the topography and protect the interior houses from flooding.

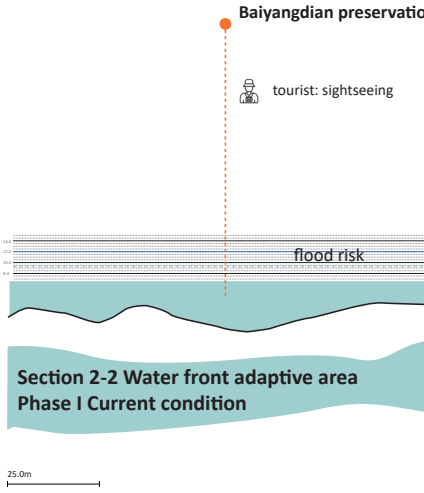


Section 2-1 Old village renovation area
Phase I Current condition

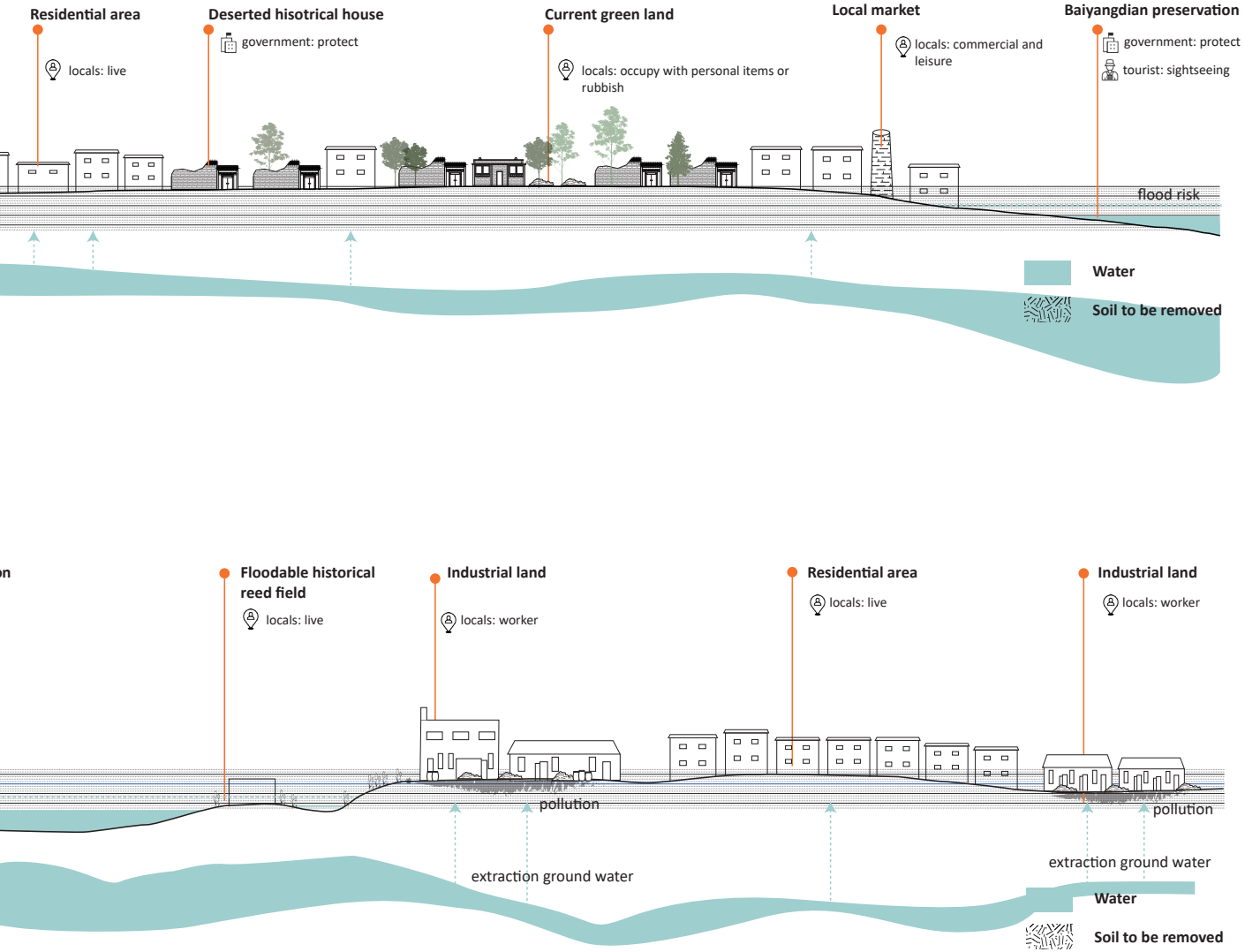
5.5.2 Site 2
Old area renovation and water structure reintroduce

Phase I Current condition

The site is located in the heart of the village on high ground. The former watercourse has been filled in by the expansion of the village and contains a dense concentration of housing, historic buildings and factories. Most of the historic buildings in the center have been destroyed and abandoned, while towards the edges, where the buildings are newer but on lower ground, there are potential flooding problems. Factories contribute to local environmental burdens through pollution and groundwater extraction. The area is very densely populated, with few and fragmented open spaces and low spatial quality.



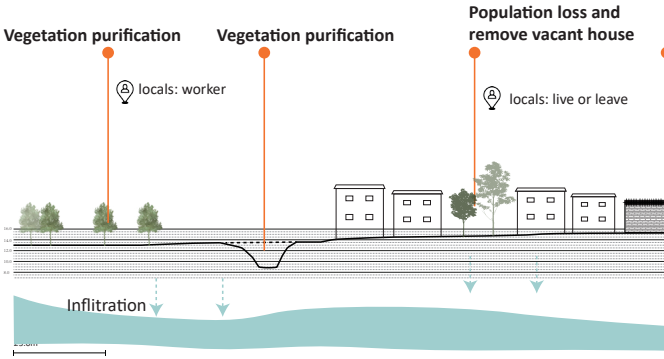
Section 2-2 Water front adaptive area
Phase I Current condition


Residential area
locals: live
Deserted hisotrical house
government: protect
Current green land
locals: occupy with personal items or rubbish
Local market
locals: commercial and leisure
Baiyangdian preservation
government: protect
tourist: sightseeing
flood risk
Water
Soil to be removed
Floodable historical reed field
locals: live
Industrial land
locals: worker
Residential area
locals: live
Industrial land
locals: worker
pollution
pollution
extraction ground water
extraction ground water
Water
Soil to be removed

Phase II Environment restore

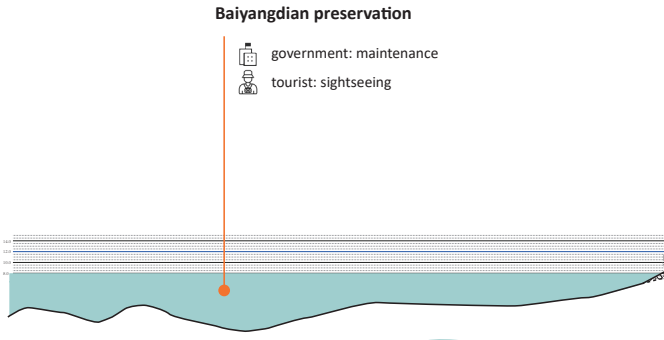
In the second phase, factories are dismantled, jobs are lost and some villagers will leave. The water system is planned based on historical maps and available open space, and contaminated topsoil and other excavated soils from industrial sites are concentrated and deposited in lowland areas along the shoreline, where they are purified of pollution through plant purification and other means, and villages inland are protected from inundation.

Some of the historic buildings are demolished to provide space, others are renovated as support measures for B&B or tourism. The renovation process provided a certain number of jobs for local residents.

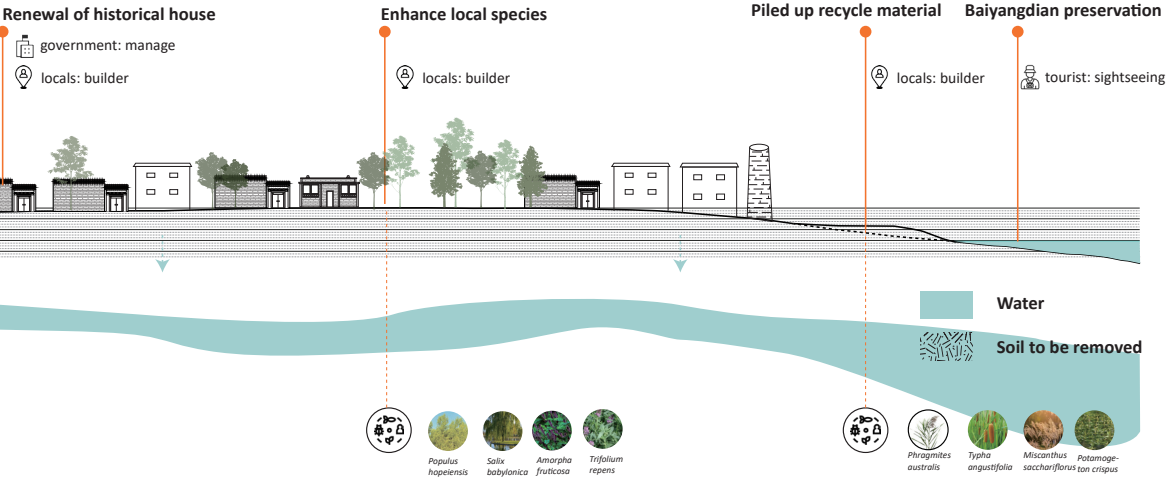


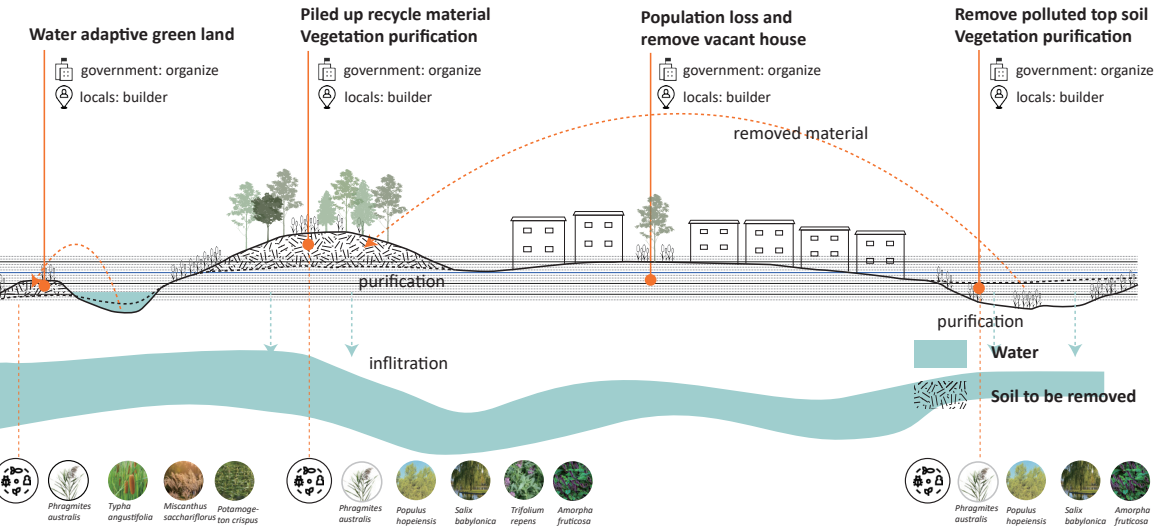
Section 2-1 Old village renovation area
Phase II Environment restore

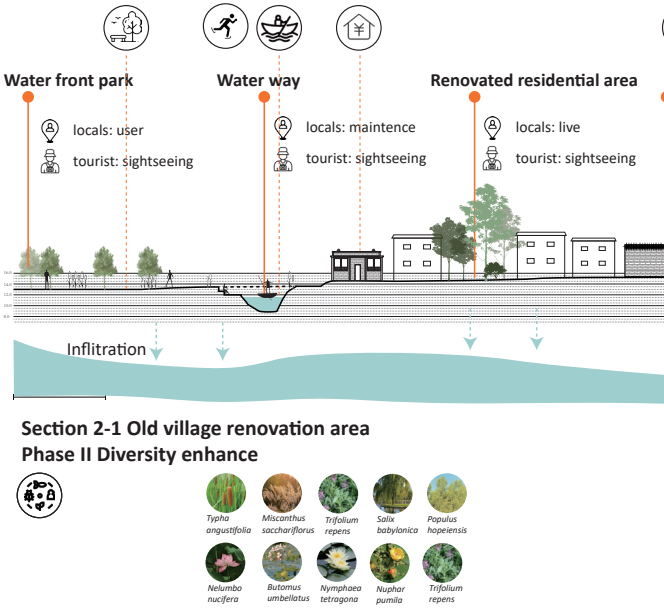




Section 2-2 Water front adaptive area
Phase II Environment restore

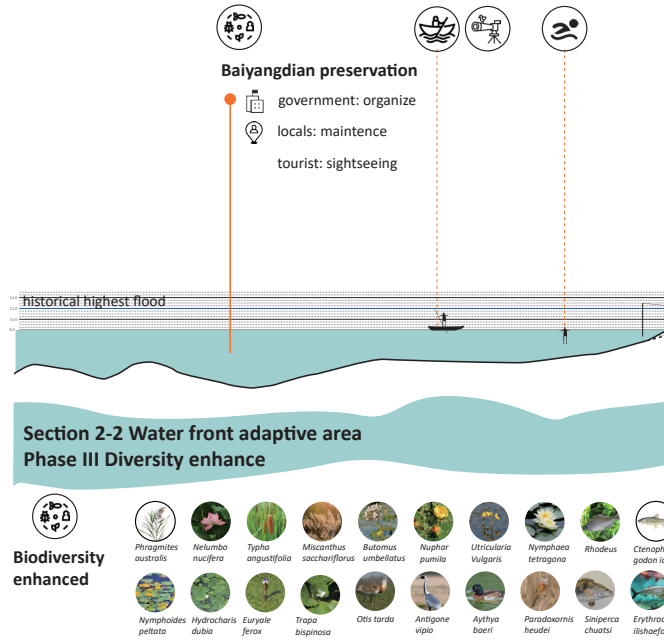

Renewal of historical house
government: manage
locals: builder
Enhance local species
locals: builder
Piled up recycle material
locals: builder
Baiyangdian preservation
tourist: sightseeing
Water
Soil to be removed
Populus hopeiensis
Salix babylonica
Amorpha fruticosa
Trifolium repens
Phragmites australis
Typha angustifolia
Miscanthus sacchariflorus
Potamoge-ton crispus

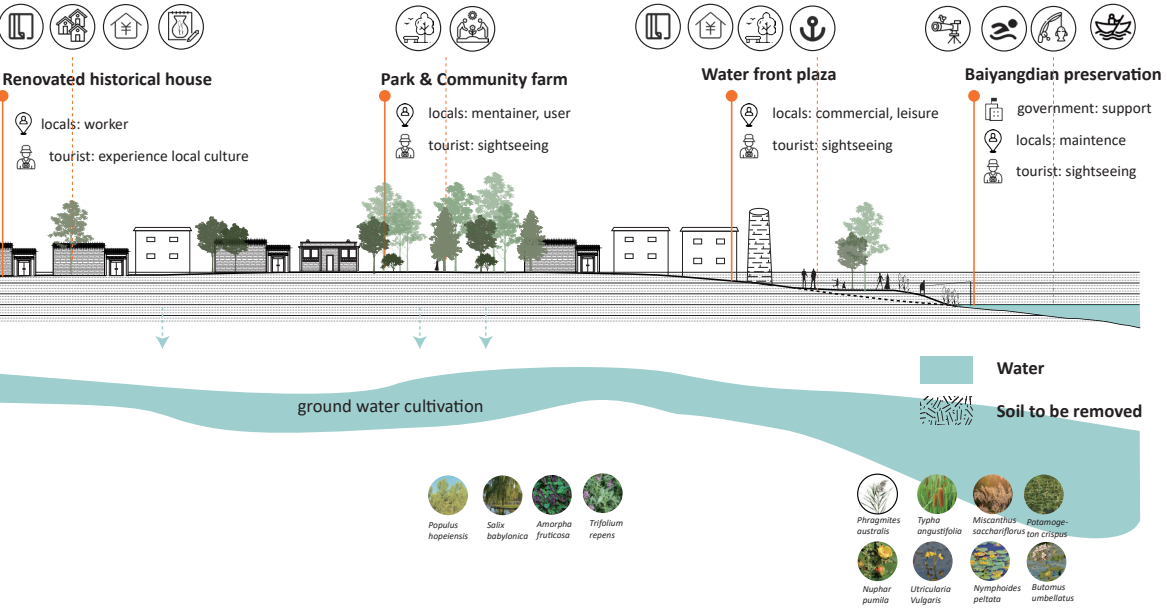

Water adaptive green land
government: organize
locals: builder
Piled up recycle material
Vegetation purification
government: organize
locals: builder
Population loss and
remove vacant house
government: organize
locals: builder
removed material
Remove polluted top soil
Vegetation purification
government: organize
locals: builder
purification
inflitration
purification
Water
Soil to be removed
Phragmites australis
Typha angustifolia
Miscanthus sacchariflorus
Potamoge-ton crispus
Phragmites australis
Populus hopeiensis
Salix babylonica
Trifolium repens
Amorpha fruticosa
Phragmites australis
Populus hopeiensis
Salix babylonica
Amorpha fruticosa

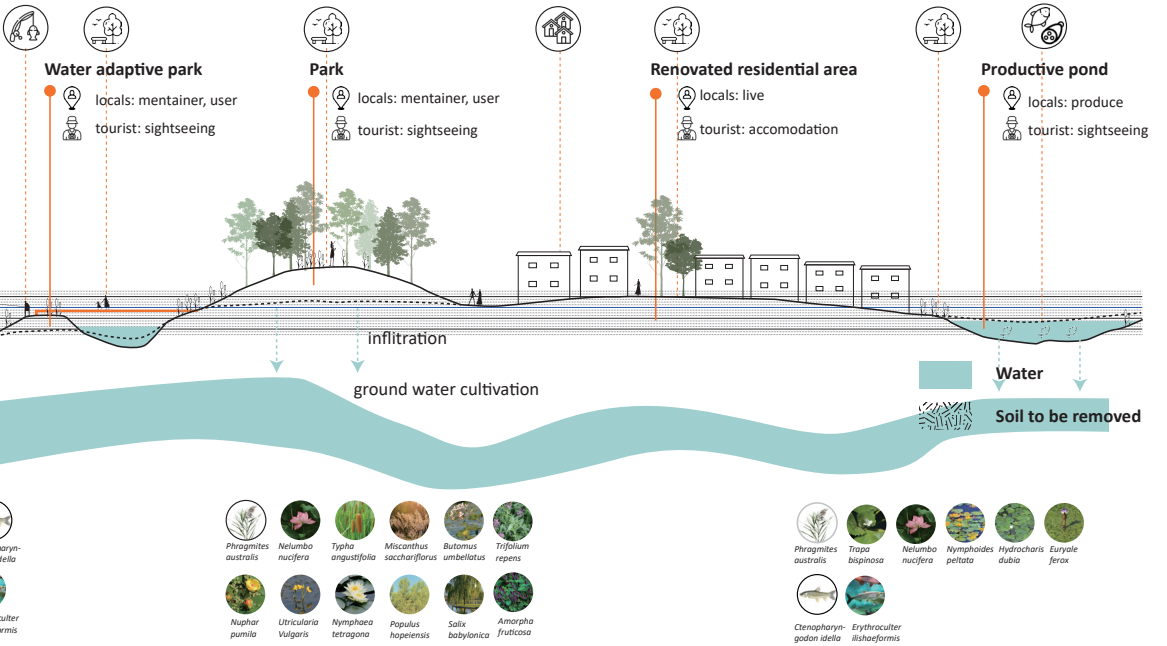


Phase III Diversity enhance

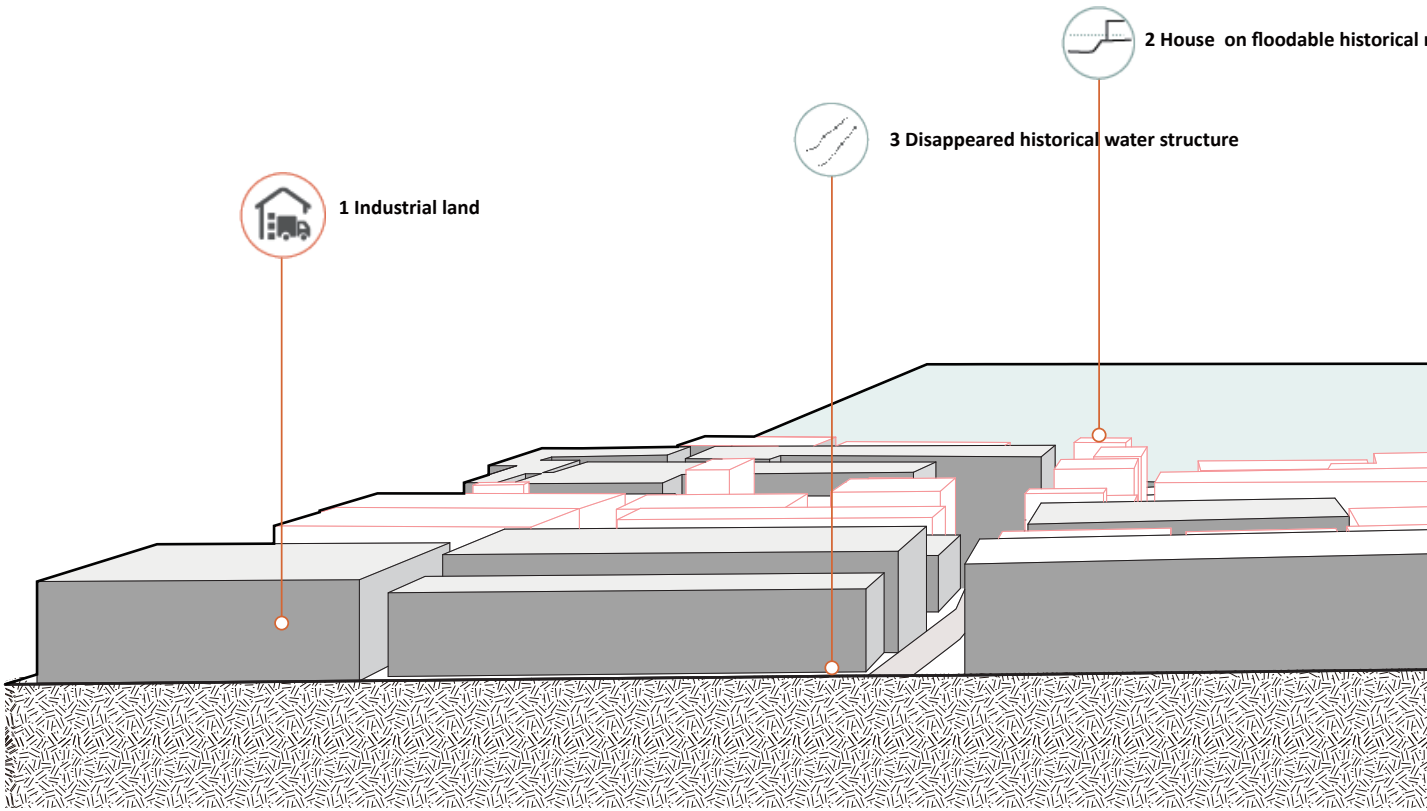
As the environment is restored, functional and ecological diversity is subsequently enhanced. The continued operation of the tourism industry and the maintenance of the landscape provide jobs for a proportion of the local population and, as the population declines, will provide additional sites for rezoning.




Renovated historical house
locals: worker
tourist: experience local culture
Park & Community farm
locals: mentainer, user
tourist: sightseeing
Water front plaza
locals: commercial, leisure
tourist: sightseeing
Baiyangdian preservation
government: support
locals: maintence
tourist: sightseeing
ground water cultivation
Water
Soil to be removed
Populus hopeiensis
Salix babylonica
Amorpha fruticosa
Trifolium repens
Phragmites australis
Typha angustifolia
Miscanthus sacchariflorus
Potamoge-ton crispus
Nuphar pumila
Utricularia Vulgaris
Nymphoides peltata
Butomus umbellatus

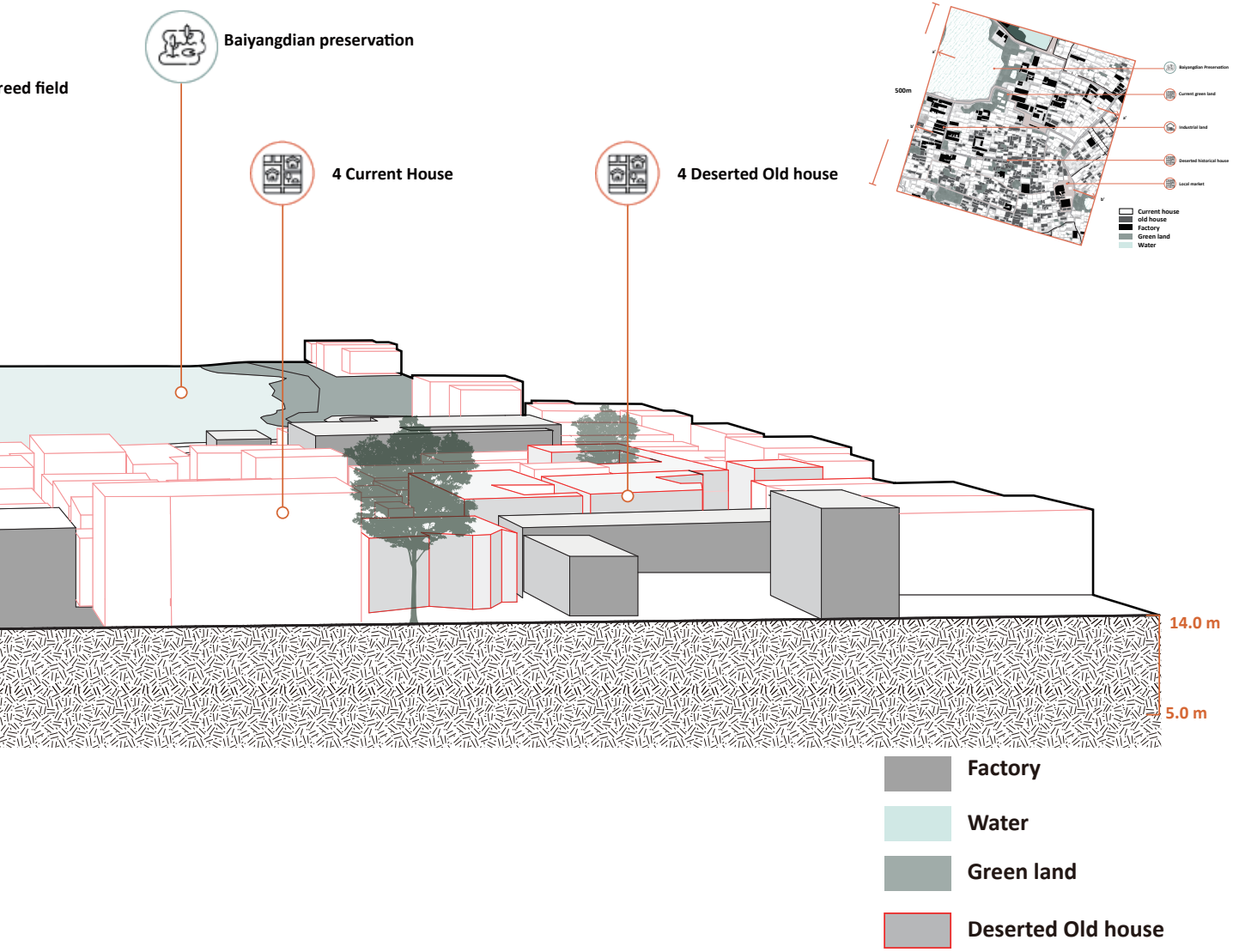

Water adaptive park
locals: mentainer, user
tourist: sightseeing
Park
locals: mentainer, user
tourist: sightseeing
Renovated residential area
locals: live
tourist: accomodation
Productive pond
locals: produce
tourist: sightseeing
infiltration
ground water cultivation
Water
Soil to be removed
Phragmites australis
Nelumbo nucifera
Typha angustifolia
Miscanthus sacchariflorus
Butomus umbellatus
Trifolium repens
Nuphar pumila
Utricularia Vulgaris
Nymphaea tetragona
Populus hopeiensis
Salix babylonica
Amorpha fruticosa
Phragmites australis
Trapa bispinosa
Nelumbo nucifera
Nymphoides peltata
Hydrocharis dubia
Euryale ferox
Ctenopharyn-godon idella
Erythroculter ilishaeformis

Zoom in 2: before

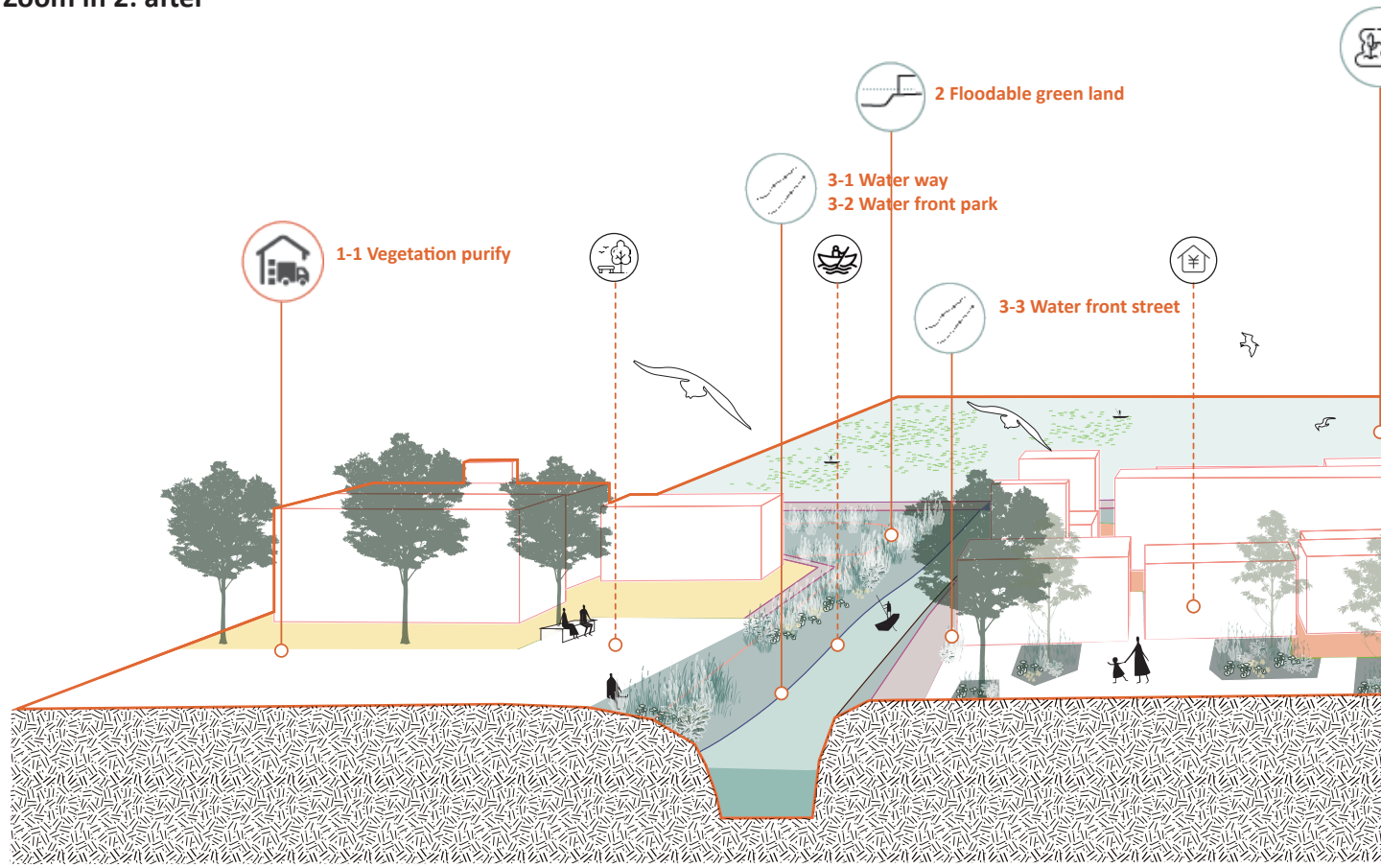


Zoom in 2 Old village renovation
Before design

Before the design, the site had a high density of housing, old deserted houses occupying a large amount of land, and existing green spaces were fragmented and occupied. Part of it was low lying near the water's edge and at risk of flooding.


reed field
Baiyangdian preservation
4 Current House
4 Deserted Old house
500m
Current house
old house
Factory
Green land
Water
14.0 m
5.0 m
Factory
Water
Green land
Deserted Old house

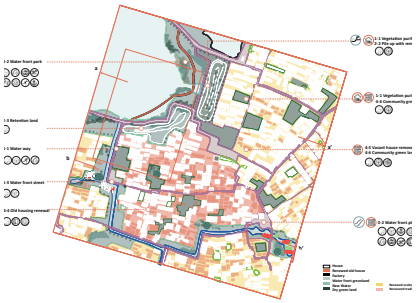
Zoom in 2: after

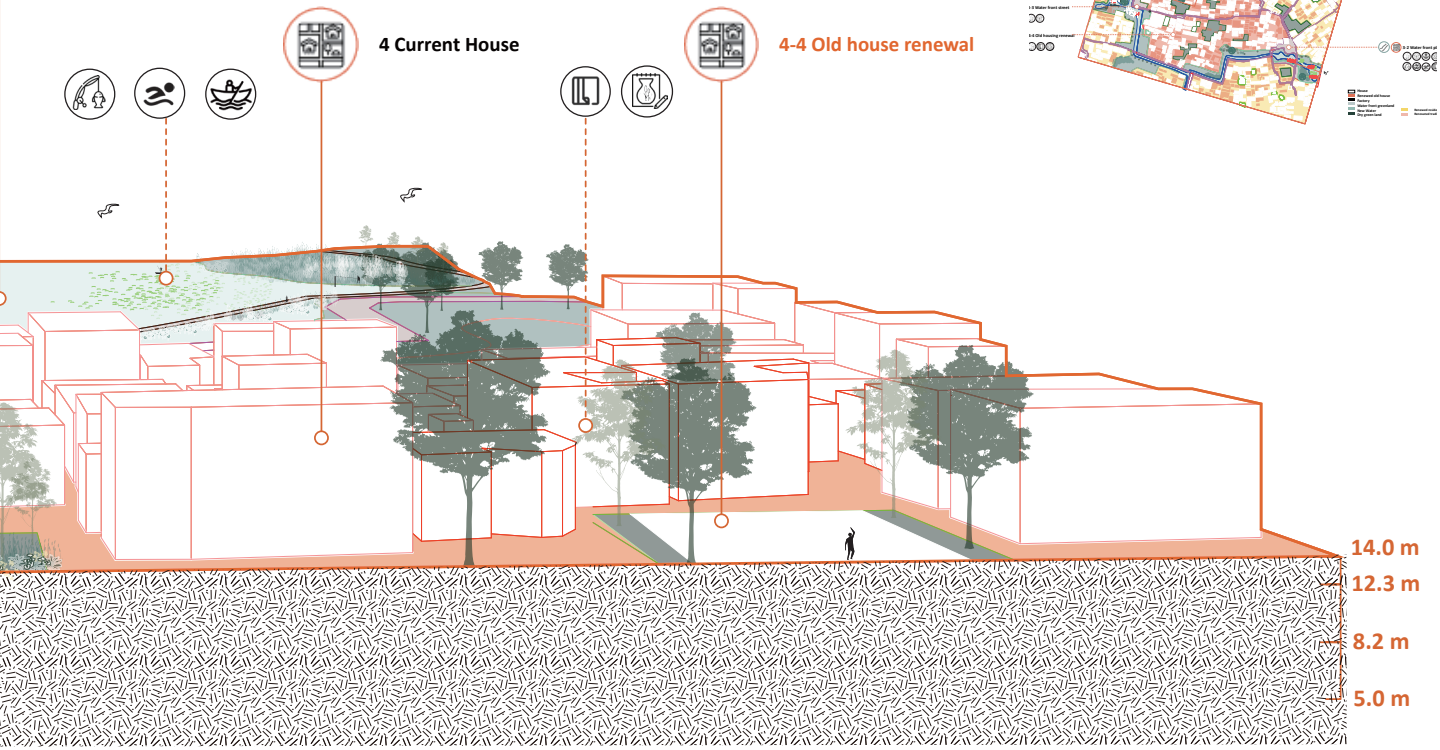


Zoom in 1-1 Old village renovation
After design

After design, the removed factory and some old houses provide space for reintroducing water and green. The water front area provide recreational function and water buffer function, as well as visual and transportation connection to the water front area.

Baiyangdian preservation





Factory

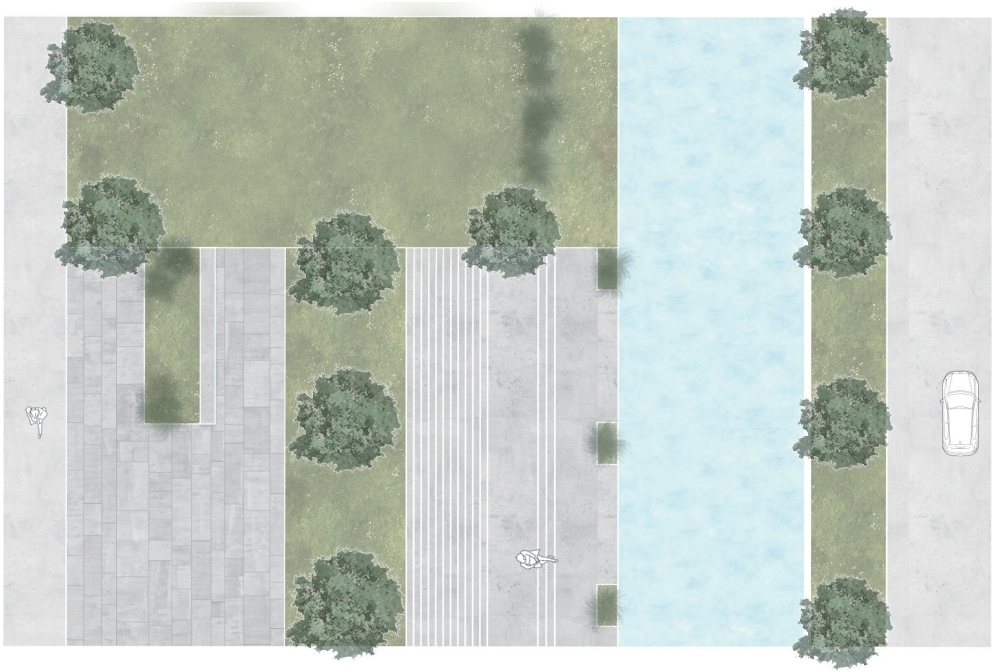
Water

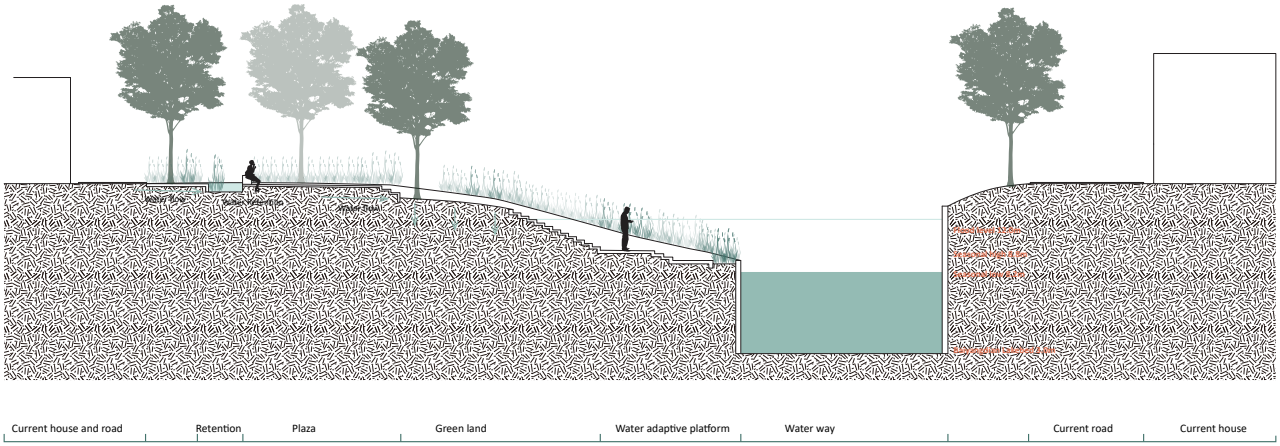
Green land

New water system

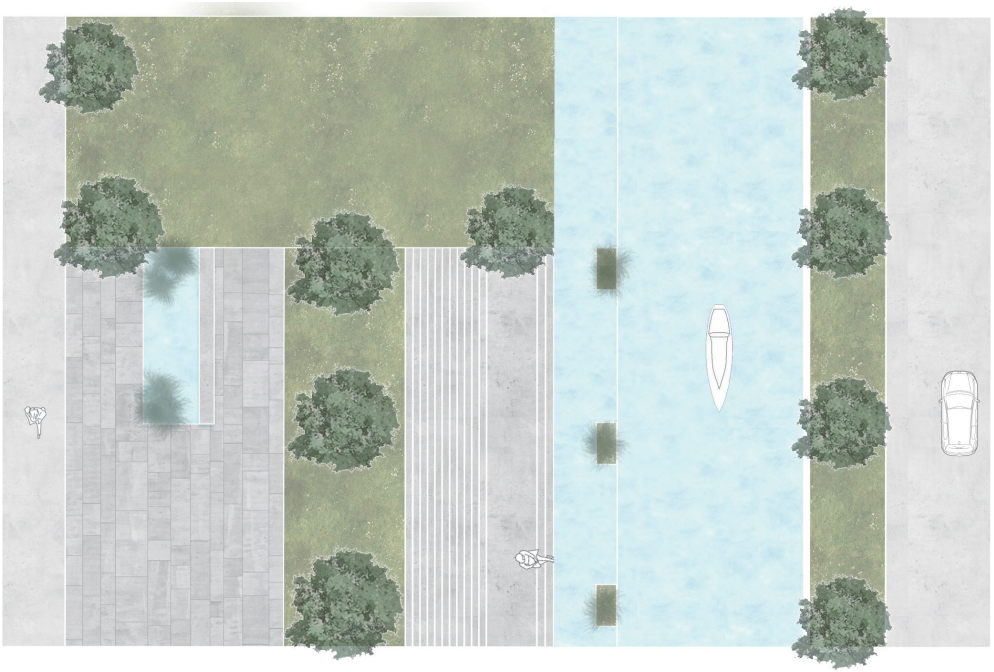
Resident area

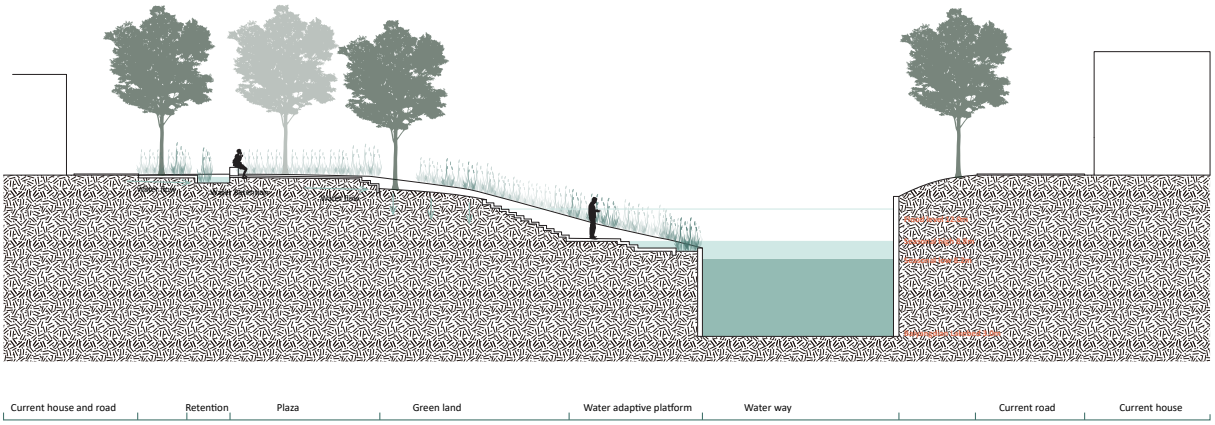
Renovated house





Water way in low water level



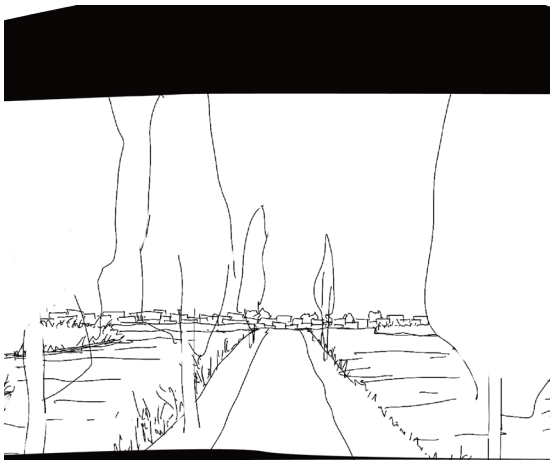


Water way in high water level

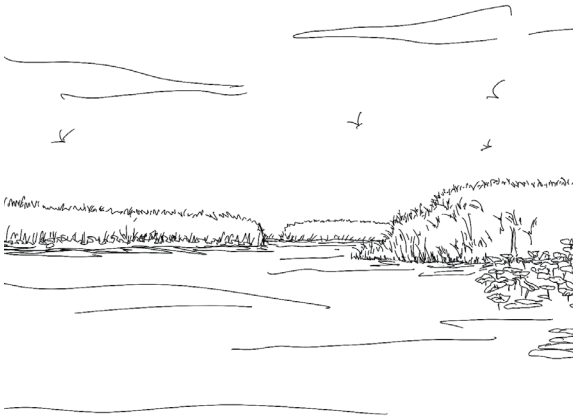
Sequence: a tour to Island village



Car route: lake view



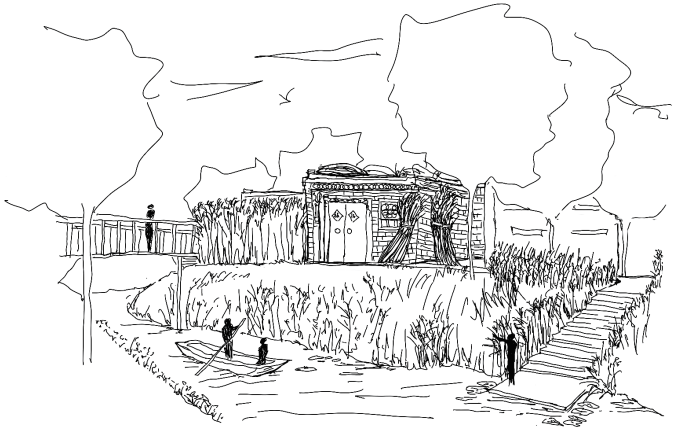
Car route: dike view



Boat route: open water



Boat route: dense water way



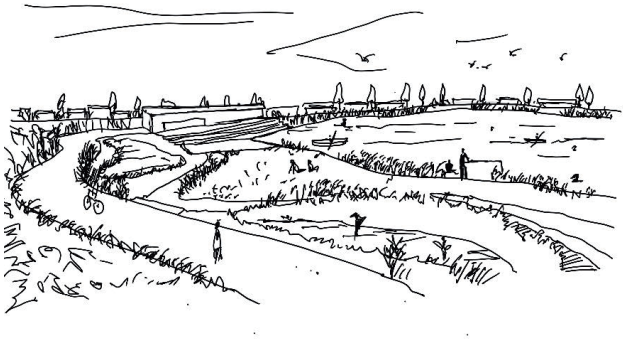
Island Village: water way



Island Village: residential area

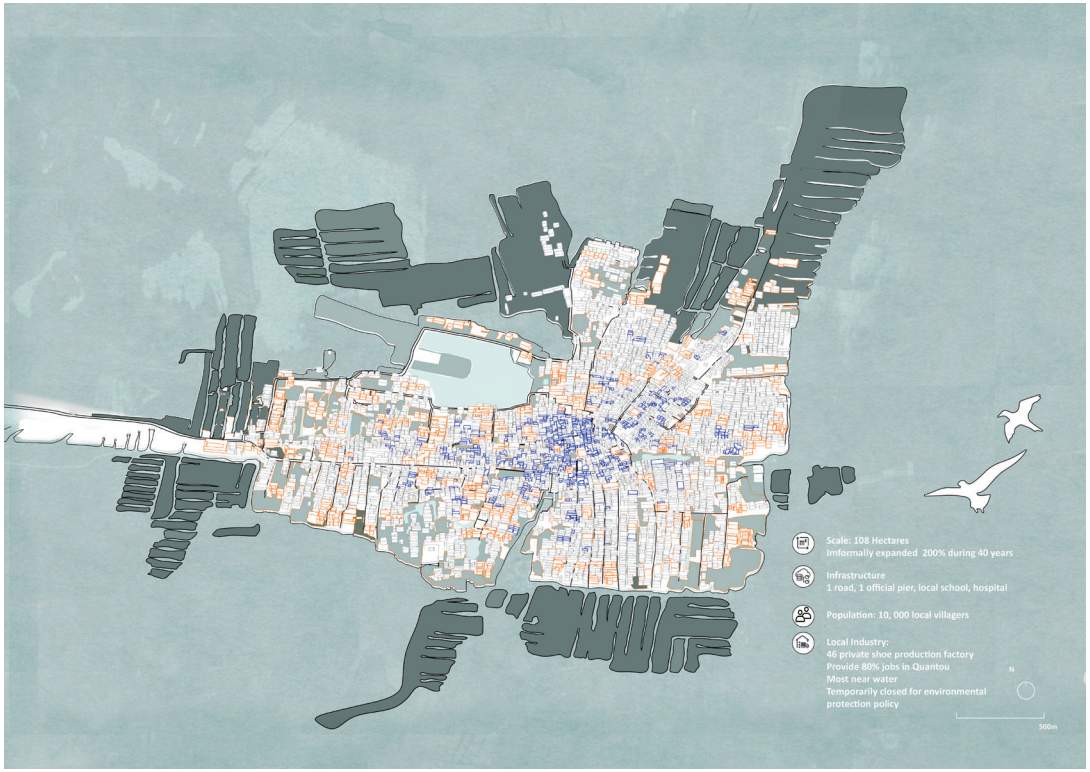


Island Village: reed garden



Island Village: water front area

6. Conclusion



108 hectars build area

10000 populat

Shoe Industry

Local identity disappear

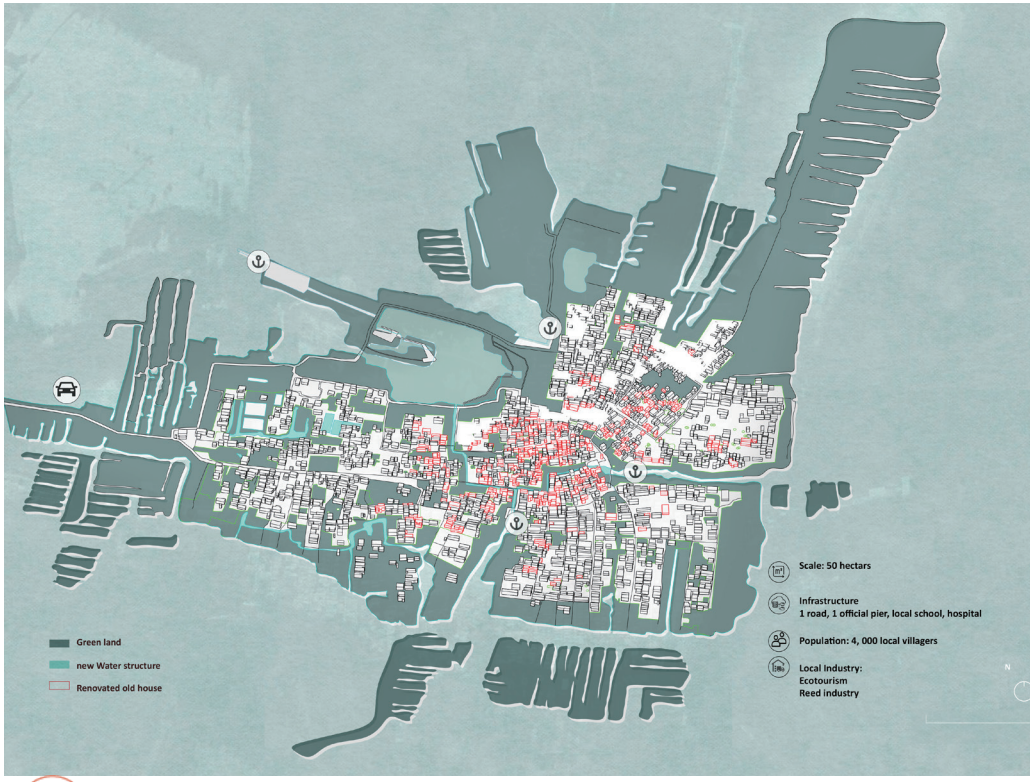
1 Industry land with factories need to be removed

2 Historical reed field with house under flood risk

3 Historical water structure disappeared

4 Current green-blue structure and housing with low spatial quality

5 Baiyangdian Presevrvation: lose connection with locals



60 hectars build area
48 hectars green area

4000 population

Ecotourism & reed industry & Aqua production

Local identity Rebuild

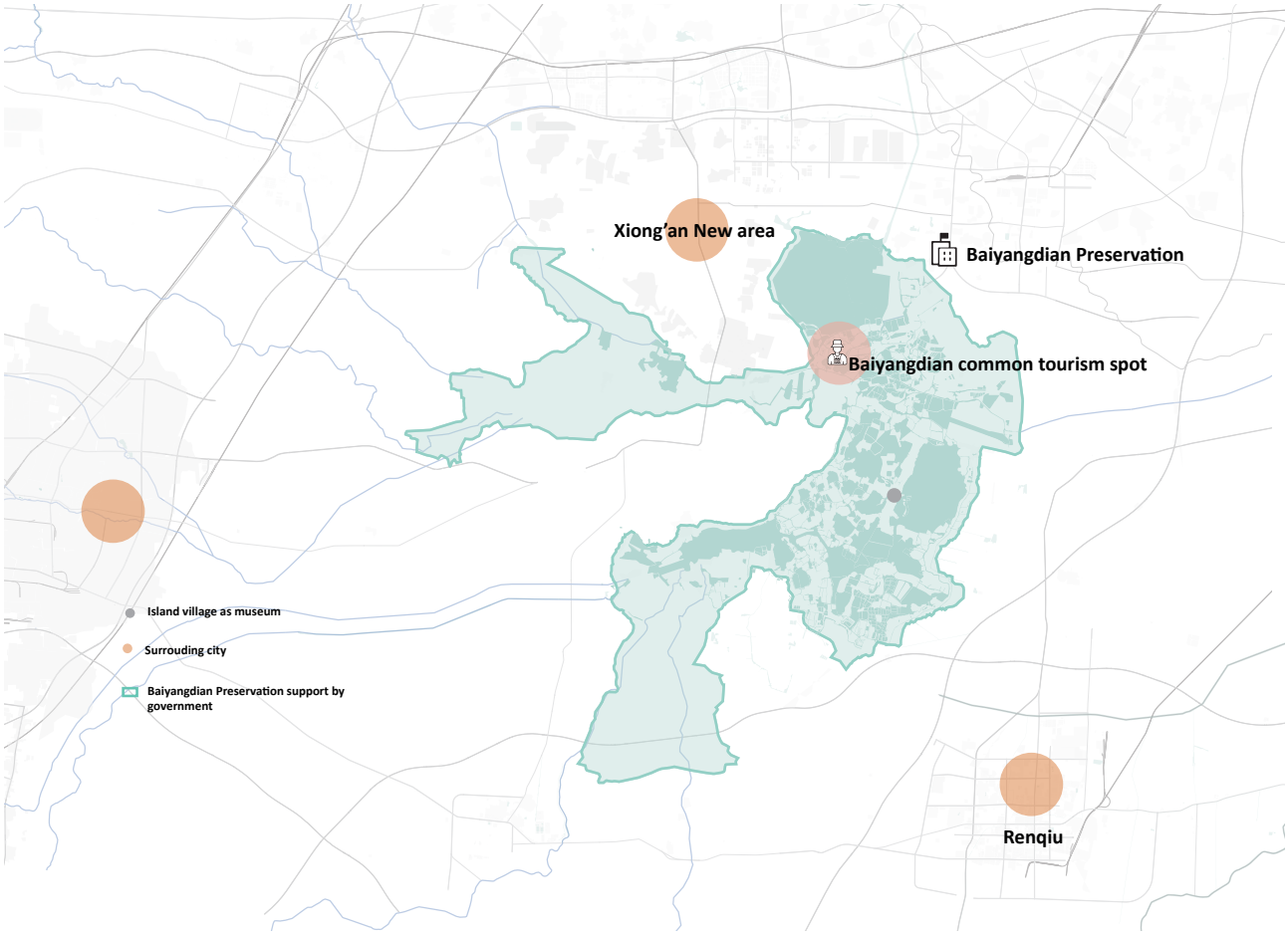
Green land with recreation and production function

2 Historical reed field restore and water adaptive area

3 Historical water structure restore

4 Current green-blue structure and housing renovate

5 Baiyangdian Presevrvation: maintenced by locals

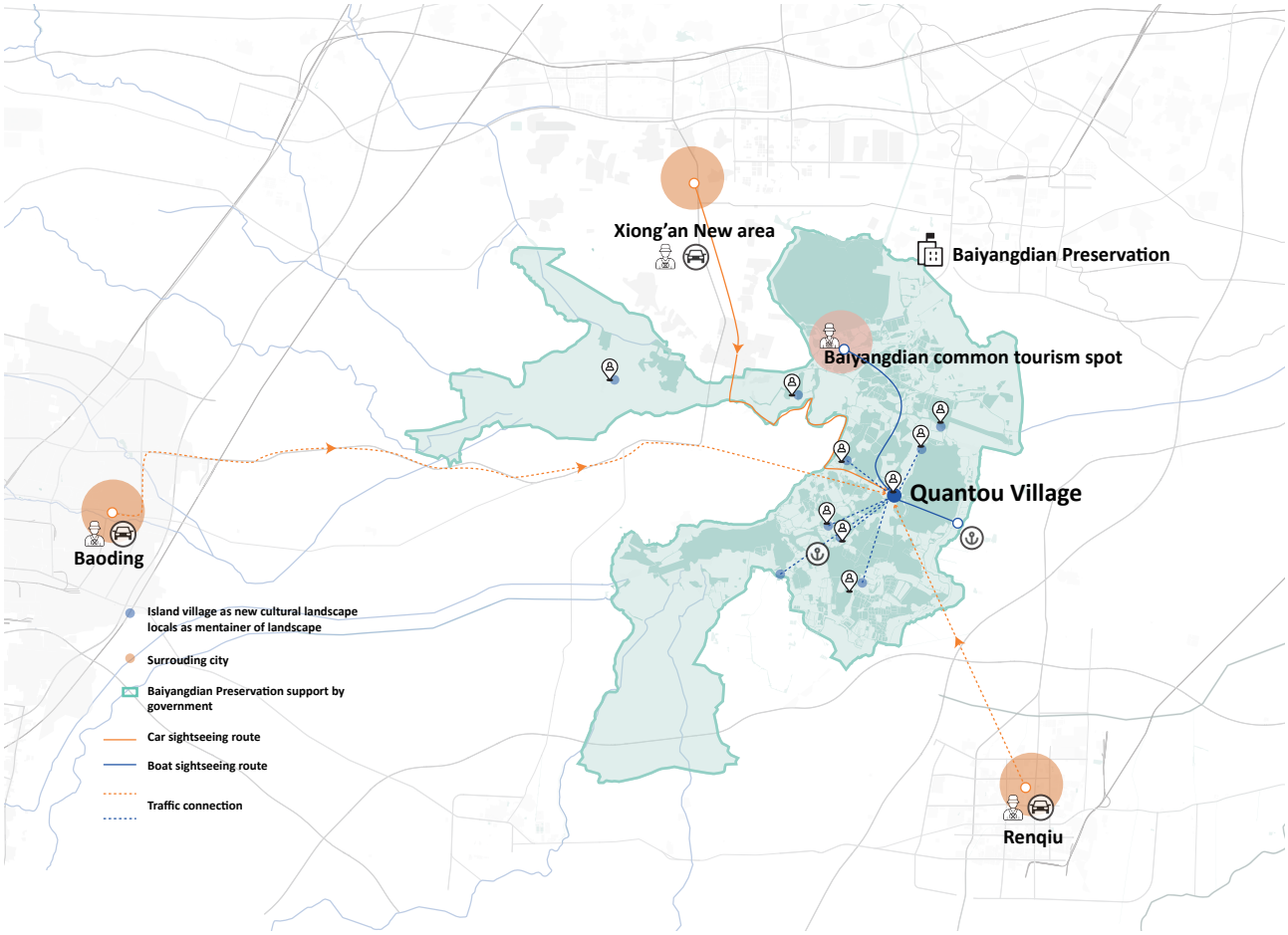


Baiyangdian environment restore

Locals leave Baiyangdian or stay as 'museum'

Common tourism as 'Disney land'

Government take over maintenance



Baiyangdian environment restore

Locals stay with local life style

Eco tourism with local identity

Locals take over maintenance

At the end, the sub-research questions can be answered:

1. How did village and water coexist harmoniously in the Baiyangdian area in the past? What problems have they suffered in modern times?

In the past, people and water were a balanced and dynamic symbiosis with adaption to seasonal water level change and flood. It has strong local identities. Humans transformed the sediments in the upperstreams of Baiyangdian into reed fields to ensure that the lakes did not silt up, the reed fields and lakes provided humans with means of production, and human's annually harvested the reeds, cleaned the silt, and maintained the landscape of Baiyangdian.

In modern time (after 1963), the symbiosis is broken. Due to social changes, the economic benefits of traditional production activities have declined, and human beings no longer maintain the landscape of Baiyangdian and over-exploit the water resources of Baiyangdian for social development, which caused severe ecological problems. The government's management has restored Baiyangdian's ecological environment, but attempts to develope common tourism and remove villages in Baiyangdian have raised maintenance costs and damaged Baiyangdian's original landscape and local identity.

2. In the process of transformation, which characteristics of the past can be retained, which need to be transformed, and what new characteristics can be added?

Up till now, the ecological treatments by government is effective and can be retained. This preserved Baiyangdian's natural landscape, which is the most apparent local identity.

The human-water relationship of the past should be preserved. In the past, people utilized the value of the lake and provided maintenance. In modern time, the productive value of the lake has failed, but people can still utilize the value of the lake through ecotourism.

The diverse cultivated habitat in Baiyangdian is resilient to seasonal water level change and flood, it also has potential of forming different landscape.

The traditional culture and activites should be preserved.

Island villages, which is a typical and unique

settlement in Baiyangdian, should be preserved. However, the spatial quality of the villages need to be improved. In the past, it was close to water. But now it is isolated from water landscape because of overexpansion, which needs to be transformed.

The dikes and fishponds in lake informally should be removed. Common tourism that does not fit the local identity of the lake and isolated from life of local people should be improved. The local factories have nothing to do with the Baiyangdian landscape, consume local water resources, pollute the ecosystem and should be transformed.

3. How to achieve these goal by means of landscape design, and what kind of spatial quality can these villages present in the future?

Ecotourism can be a new way to enhance the value of the lake. The transformation of local industry land can provide space and reduce popullation, which offer opputunities to reintroduce historical water structures and reed fields within villages. It will be backbones for ecotourism, which restore connectivity and habitats within the lake and provide places to visit and live with high spatial quality. Functions and activities can develope based on it.

The landscape of the future will be a water rural landscape that integrates humans and nature, with seasonal changes and local identity.

By answering three sub-questions, we end up with the answer of my research question.

-How can landscape design help the Baiyangdian area to reestablish a new relationship between human and lake in a resilient and sustainable way?

-Enhance the value of Baiyangdian through transforming local factories to eco-tourism, re-establish the circularity between people and water, reintroduce historical water structure and reed fields and utilize local adaptive habitat structures as backbone to improve spatial quality and deveope activities and functions, to create sustainable and dynamic landscape with local identity that is a human-water symbiosis.

Reflection

The sustainability and feasibility of the design should be considered. At first, the proposed design did not take this into account. And after considering the reuse of materials, the parts of the scheme became more integrated.

Neglect of spatial details. It is difficult for me to change my way of thinking from a macroscopic and abstract point of view, so I neglected the details of the design.

More in-depth consideration should be given to the manner in which the drawings are expressed and the corresponding functions. As this project focuses on describing the process of transformation, more attention should be given to the consistency of the elements of the before and after drawing representations that can be used to highlight the changes.

More thought needs to be given to the role of different drawing types - I never realized the importance of perspective drawings - as the most intuitive way to show the quality of the space, with too much emphasis on technical and analytical drawings.

Should be aware of whom I am designing for - as a student, I can't help to think of "designing as a homework for teachers". However, in the future career, the design is for clients no nothing about the project, landscape and myself. It's not about ***what I design***-but what can I provide to "you" and why do I give this. So always focus on what I give.

Consideration should be given to the coherence of the work flow, based on iterative refinement of fixed materials rather than the constant generation of something new. Throughout the whole process, there were many drafts that were discarded, which took many hours of work but did not come to final product. It was, of course, a process of trial and error, and I gained valuable experience as a result, but still regret that the project was not complete.

In short, there is no end to learning. The imperfections of the project are also reminders of what I've already learned, and I should always be learning.

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