Exploring New Productive Landscapes. Landscape-based spatial and temporal planning and design of post-industrial areas along Foshan's waterways

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Landscape-based spatial and temporal planning and design of post-industrial areas along Foshan's waterways

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Adaptive Landscape Transformation: Pearl River Delta Lab

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Content

Abstract

The Pearl River Delta (PRD) is a the watershed consisting Xi (west), Bei (north) and Dong (east) rivers located in the Guangdong Province in the South-West region of China. Much of the PRD area lies between 0-20m above sea level and the rivers from the mainland feed the delta with 340 billion cubic meters of rainwater yearly (Weng, 2007). Water and sedimentation from the rivers up north and on the west side are constantly moving through this low-lying region, making the soil fertile and suitable for agriculture. This fertile low laying area is also home to one of the most densely urbanized regions in the world (Weng, 2007).

Apart from agriculture, this region has also seen multiple cycle of different types of production subjugated upon their land. In past decades, with the rise of consumerism and globalization, parcels of rural land were transformed into factories manufacturing goods which brought about rapid rural industrialization and urbanization throughout the region. This industrialization of the PRD resulted to as much as 60% of new urban land cover being converted from previously non build-up areas such as agriculture land and forested areas in industrial cities like Foshan within 1988 -2003 (Hao, 2008). The change in landcover placed pressure to the drainage and capability water retention in the area which resulted in deadly flooding. Apart from rapid land cover change and massive urbanisation, industrialisation also usually bring about forms of pollution. Water plays an integral role during the manufacturing process and also as its by-product resulting to most of the waterways in the PRD to be heavily polluted and toxic for the environment and people living around it. The environment, unfortunately took most of the direct impact of the rapid industrialisation and urbanisation.

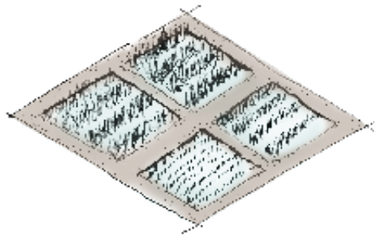
As cities in China began to prosper in the last two decades, the manufacturing economy started to focus more onto technology and innovation. In 2019, the PRD was rebranded to The Greater Bay Area (GBA), where economic development plans were lay out for market integration and advance development among the cities in the region. One of the impact of this new development plan is that most cities area have to shift to a higher skill labour and high-tech advancement in their manufacturing industry. The shift from traditionally intensive production to advance and high-tech manufacturing will create changes in many different aspect ranging from the labour market to infrastructure. The streamlining of production due to the technological advancement implemented by businesses will result in the reduction of factory operation and labour size thus leaving cities with decommissioned industrial areas.

Nevertheless, the transitioning period allows for the opportunity for transformation these scarred land sustainably, to one that remediate using landscape based solution and regenerates the area into a safe area redevelopment for the benefit of the ever changing community, environment and economy. Delta regions are characteristically dynamic, it changes in space and time, so must the solution. So how do we appropriate decommissioned industrial areas located along waterways to mitigate the impacts of urban flooding and water pollution while also redefining the relationship and interaction of the inhabitants working and living nearby with water using landscape based solution?

INTRODUCTION

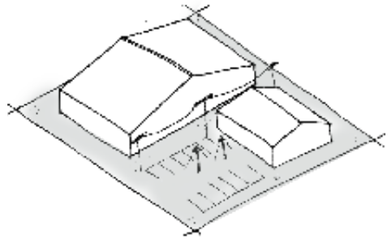
Fascination

I grew up in my dad's furniture shop. He surveyed kampung houses that were about to be torn down and bought the wood that could be savage. In South East Asia, timber mostly comes from hardwood. Hardwood are the more valuable (stronger) as they aged and that wood fresh from the timber yard are the weakest. So it's not uncommon to build an entire structure from recycled wood. My dad would repurpose parts of the house into various item. Sometimes floor planks would be resold to the timber yard while more unique and intact elements such as window frames and architecture ornaments would be repurpose into full length mirrors and handle knobs. So as person and as a designer, when I carry an something whether running an errand or design, I ask myself is there more then one purpose? As a designer, I asked, how if you do manage to create something of multipurpose then how does it more value added compared to what it was before? As a consequence with this mindset also made me more inclined toward landscape architecture, as I have a great appreciate toward nature because of its multifunctionality as habitat, ecological service provider and simply as aesthetic value.



Rice Fields

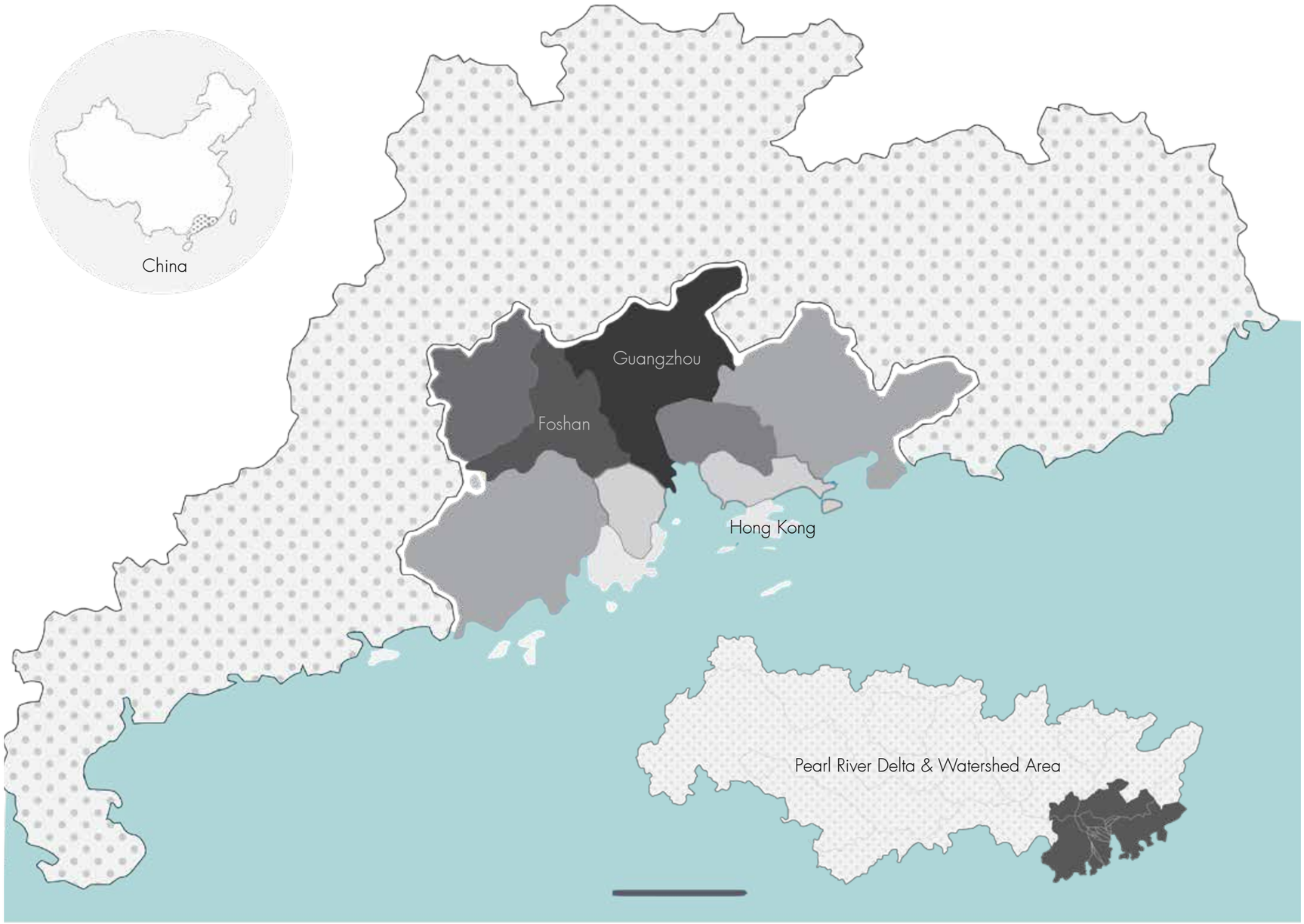
Dike Ponds



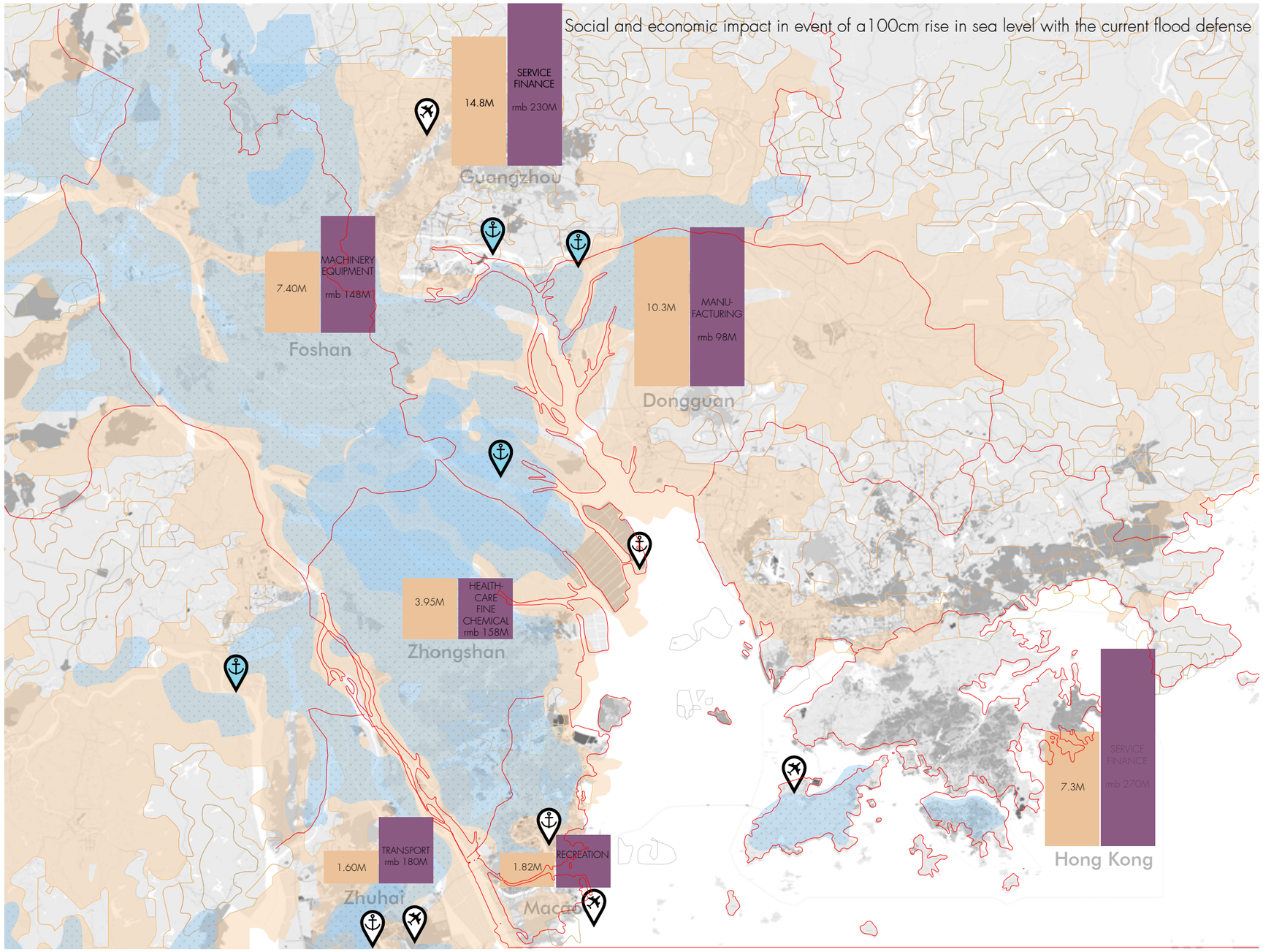
Manufacturing

Pearl River Delta

The Pearl River Delta (PRD), also known as Greater Bay Area (GBA), is situated in Guangdong Province in south-west of China and is the fastest-growing region in the country. Much of the PRD area lies between 0-20m above sea level. The north, west and east rivers from the mainland feed the delta with 340 billion cubic meters of rainwater yearly (Weng, 2007). The delta supports one of the most diversified agricultural areas in the world, with agriculture ranging from paddy, sugarcane and fruit horticulture, and dike– pond agriculture–aquaculture. Water and sedimentation from the rivers up north and on the west side are constantly moving through this low-lying region, making the soil fertile and suitable for agriculture. This fertile low laying area is also home to one of the most densely urbanized regions in the world (Weng, 2007). As the different cities shifted from agriculture to heavy industries, the urbanisation process shifted the fluvial flooding to pluvial flooding in these cities. Along with the rise of climate change and the decline of natural coastal defences, coastal flooding has also become an urgent issue in need of tackling by the government and people living in the area. The flooding seen in an event of 15cm sea-level rise alone will affect potentially 1642km2 of area, the majority in the low-lying area of such as Foshan and Zhongshan (China National Marine Basic Information Network Service System, ND).



According to the Oxford dictionary, the definition of flood – "an overflow of a large amount of water beyond its normal limits, especially over what is normally dry land". This common definition by dictionaries and of people is very much an anthropological view on how we humans think nature should behave. Prior to major human settlement in this area, the malleability of land allowed water and sediments to constantly shift, making the area constantly moist and dynamic. With the loss of permeable surfaces, water bodies and natural defence against the impact of climate change, a 100cm rise in sea level will affect approximately 7823km2 of the area (China National Marine Basic Information Network Service System, ND). The increase of human activities in the delta region hinders the dynamism of the natural delta conditions and the disruption of flow results in water occupying areas not welcome by people and development.



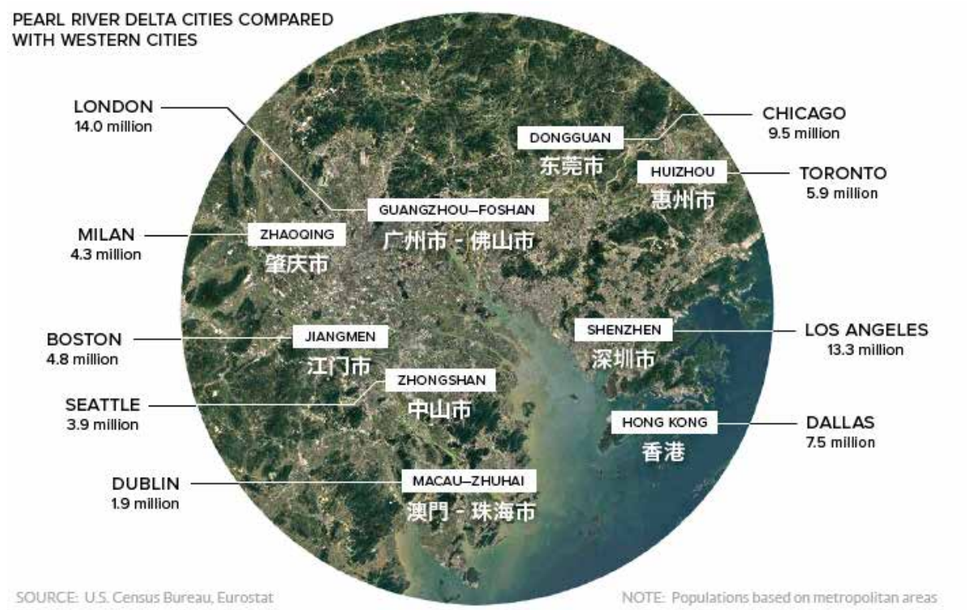
Greater Bay Area

Advances in urbanization in the region are strongly linked to the economy rise of Greater Bay Area (GBA), which accelerated in 1979 due to decentralization policies and market-oriented reforms. The reform prompted shift away from agriculture focused economy, which was the major economical driver of the region, and introduced traditionally agriculture townships to light industrialisation. Fertile land that were once cultivated for food production were converted into small scale light manufacturing factories to support the growth of the newly open market and the growth of consumerism (Lin, 1997). Many of these rural factories were small scale village enterprise hence well ill equipped to properly treat their industrial waste which resulted in significant environmental damages such as air, water and soil contamination (Lin, 1997).

As stated in the development plans of the Greater Bay Area by the central government, the region has plans to shift for low skilled – high labour industries to high tech industries (Constitutional and Mainland Affairs Bureau, 2019). This has prompted the closure and decommissioning of many factories. Existing factories will be either refurbish adapt to the demand a high tech industry or decommission. Factories that decide to seize operation will probably choose to sell away the land they are sitting on for-profit – residential or commercial or other industries proposes (Heikkila, 2011).

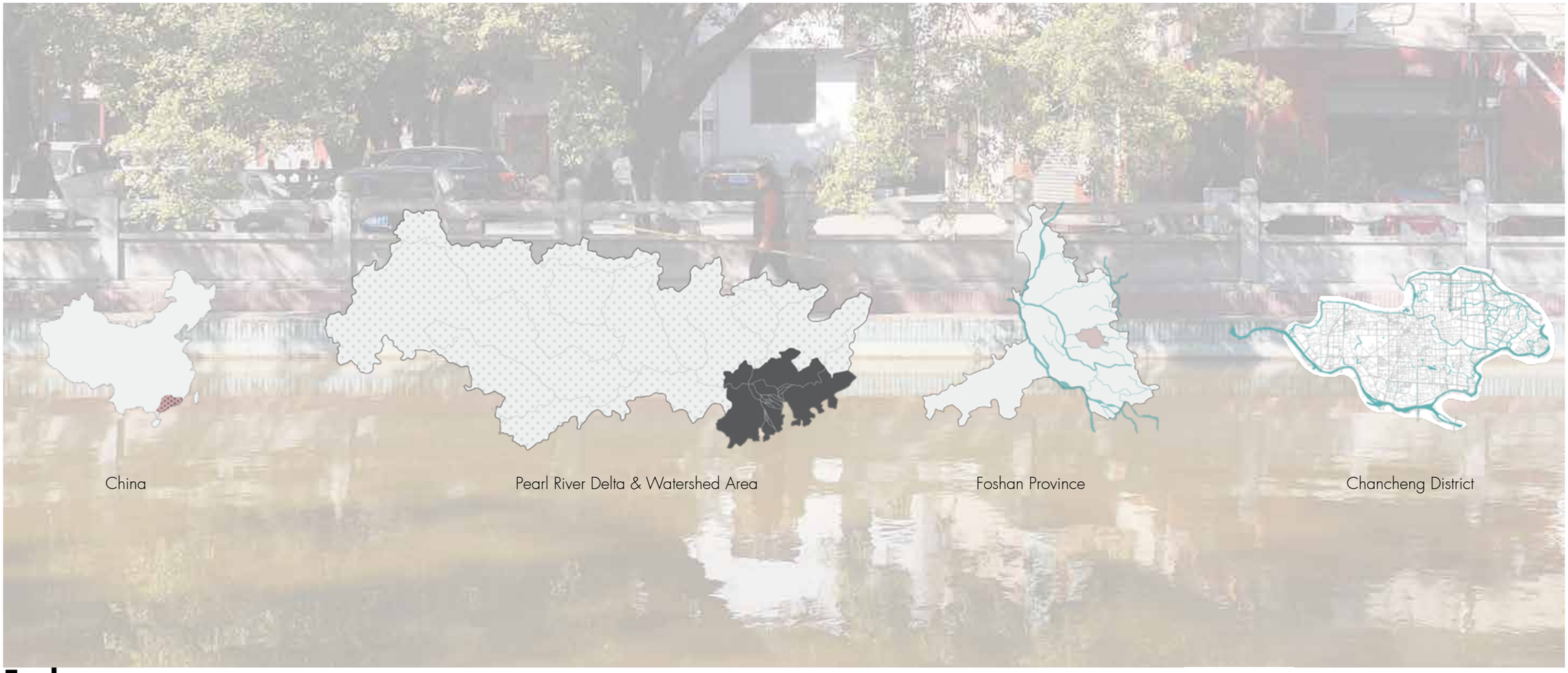
Many of these industrial infrastructures have scarred the land they stood on and the surrounding area with toxic pollutant

Source: Norm Sun Company Formation



by-products. The reckless change of land use and cover change in pursuit of efficient and profit to accommodate rapid industrialization have left with negative impact on hydrological processes and increase flood risks. Many of the factories developed on fertile and permeable land of previous rural agriculture land as there cheaper due to its location (Lin, 1997). These factories are especially in middle delta cities, with industrial developments that also grew along with the intricate web of waterway found in those areas. They are common found alongside waterways due to easy access to water for production processes and transportation.

China has for years, unfortunately, developed the reputation for being the 'World's Factory' and also accused of being the world's largest polluter. The new development for the GBA is its opportunity for these production areas to clean up their image and rebrand themselves. With the economical transition towards a high-tech and service industry, the region can transition itself in a cleaner and sustainable manner while taking the opportunity to reserve the negative impact the past industrial era had incur to the delta.



Foshan

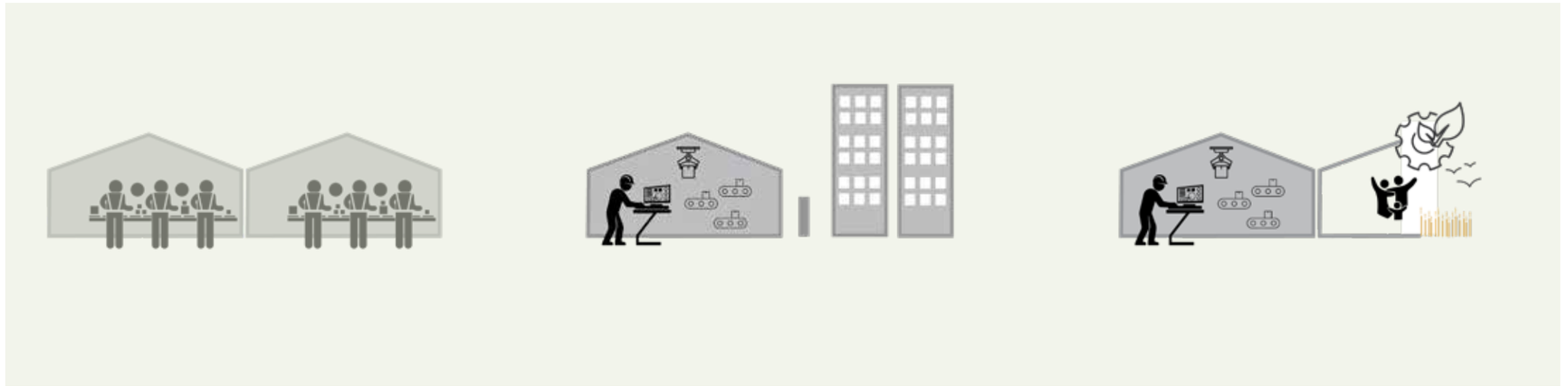
Foshan is the oldest industrial city of the PRD region and is adjacent to the province capital, Guangzhou. The city is intertwined with dense water network, giving the city the identity of a water city in the past. Geomorphologically, this area dominantly consists of plains and hills, of which the percentages are 70.9 % and 20.0 % respectively, with the highest elevation at only 805 meters. The plains consist of the 'high sub-delta plain' and the 'sub-delta plain'. The 'high sub-delta plain' is mainly in the east, north and northwestern parts, of which the elevation is 5-12 m. The 'sub-delta plain' is mainly in the southeastern part, of which the elevation is 2-3 m. The, Xijiang and Beijiang River, one of the 4 major waterways of the PRD, run through the delta plains of Foshan (Hao,2008). As Foshan is located in a subtropical zone, it experiences frequent rain with the precipitation level ranging from 1600mm to 2000mm annually, mostly during the monsoon month between April till September. Originally, the city of Foshan consisted of only the Chancheng district, but it has since combined administratively with other 4 districts Shunde, Nanhai, Sanshui, and Gaoming making it an emerging metropolitan covering an area of 3,813 km2.

The dense waterways and delta conditions provided accessibility to waterways for port activities and river sedimentation, which were favourable to the city's water trade economy and their famous ceramic art industry. At present, many of its waterways have disappeared or been canalised while remaining industrial building continue to pollute the its remaining waterways. The Fen River, also known as the River Mother, located on the north part of the historical city and it was one of the first areas to be commercialised and industrialised. And at present day, the area along the waterway is occupied by various state of unused industrial areas.

Problem Statement

With the introduction of new plans for market integration and advance development among the cities in the Greater Bay Area, many cities area shifting to a higher skill labour and high-tech advancement in the manufacturing industry. The shift from traditional intensive production to advance and high-tech manufacturing will create changes in many different aspect ranging from the labour market to infrastructure. The streamlining of production due to the technological advancement implemented by businesses will result in the reduction of factory operation and labour size thus leaving cities with decommissioned industrial areas. This transitioning period also allows the opportunity for the transformation the scarred landscape to one that cleans and regenerates the area for the benefit of the community, ecology and economy.

The streamlining of production due to the technological advancement will result in the reduction of industrial operation and labour size thus leaving cities with decommissioned industrial areas that would be converted to other commercial profitable land uses.



Hypothesis

As cities transition to advance and high-tech industries, this will allow the opportunity for the transformation of the scarred landscape. The transformation that cleans and regenerates the scarred area for the benefit of the community, ecology and economy by identification of opportunities and adaptation of existing site properties to built resiliency to changes of the climate and socio-economic landscape.

The past production landscape were based on necessity and economy,if the area plan with a landscape perceptive, how will these new production landscape look like?

If these decommissioned industrial areas are to be redeveloped to a more sustainable and ecologically sensitive programming and land uses which are adaptable to the delta conditions and resilient to climate change, the degrading impacts of industrialisation can be reversed.

Self-Sustenance

Collective Farming

Village Industry

Manufacturing

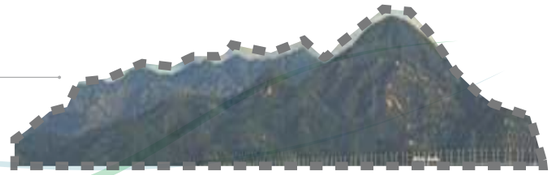
Post-industrial Landscape?

What will the new production landscape look like?











Research Question

How can we explore spatial potential of post-industrial transformation of areas along waterways to mitigate the impacts of urban flooding and water pollution, while redefining the relationship of the nearby inhabitants ?

- What are the natural and urban elements found along the industrial area along the waterways?

- What are the spatial relationship between the different inhabitants, waterways and industrial building & area?

- What are the challenges of theses industrial areas and their surrounding along the waterway of Foshan?

- What relevant elements of the existing natural and urban structure can we use as part of the design strategies to overcome the problems in the area?

- How to extract the relevant properties of existing elements to use as a foundation for the design to overcome the problems in the area?

- How would the design effects the area in terms of ecology, economy and society over the years?

Design Aim

explore spatial potential of post-industrial transformation

Design Canvas

industrial areas located along waterways

Goal

mitigate the impacts of urban flooding and water pollution, while redefining the relationship of the nearby inhabitants

Challenge 01

urban flooding

Challenge 02

water pollution

Challenge 03

redefining the relationship of the nearby inhabitants

Methodology

Main Research Question	Sub- Research Question	Methods	Intention
How can we explore spatial potential of post-industrial transformation of areas along waterways to mitigate the impacts of urban flooding and water pollution, while redefining the relationship of the nearby inhabitants ?	What are the biophysical and urban elements found along the industrial area along the waterways?	Site surveying: • Observing of the varying spatial conditions and degree of abandonment of industrial plots and building in Foshan. • Observing of the types and qualities of the waterway Foshan.	• To collect inventory of possible biophysical structure and physical structure that can used to build a design strategy
	What are the spatial relationship between the different inhabitants, waterways and factories and industrial areas?	Literature review & Temporal-spatial study: • Mapping landscape elements along side urban developments through the various defining time periods and comparing with the existing conditions. • Literature for reference and contextual knowledge. • Observing people's interaction along the various waterways in Foshan in various urban setting.	• To understand the development of Foshan • To observed the changes that industrialisation and urbanisation has caused to the area and how natural elements such as waterways have been affected. • Reading literature to supplement and comprehend occurrence of certain phenomenon. • To understand current socio-spatial relationship between water and people in Foshan.

Methodology

Main Research Question	Sub- Research Question	Methods	Intention
How can we explore spatial potential of post-industrial transformation of areas along waterways to mitigate the impacts of urban flooding and water pollution, while redefining the relationship of the nearby inhabitants ?	What are the challenges of theses industrial areas and their surrounding along the waterway of Foshan?	Mapping: • Identifying the industrial areas and cross-referencing them with pollution data and climate risk data. Site observation • Observing the impacts the challenges to areas surrounding the site - eg polluted waterway in a neighborhood.	• To identify challenges and potential area for design intervention.
	What relevant elements of the existing natural and urban structure can we use as part of the design strategies to overcome the problems in the area?	Research by design: Isolating prominent and relevant element on found on site. • 01. Defining prominent and relevant element • 02. Identifying them • 03. Understanding the spatial relationship of the element to its surrounding context	• To select elements that related to the surrounding local context and also applicable as a solution to site challenges

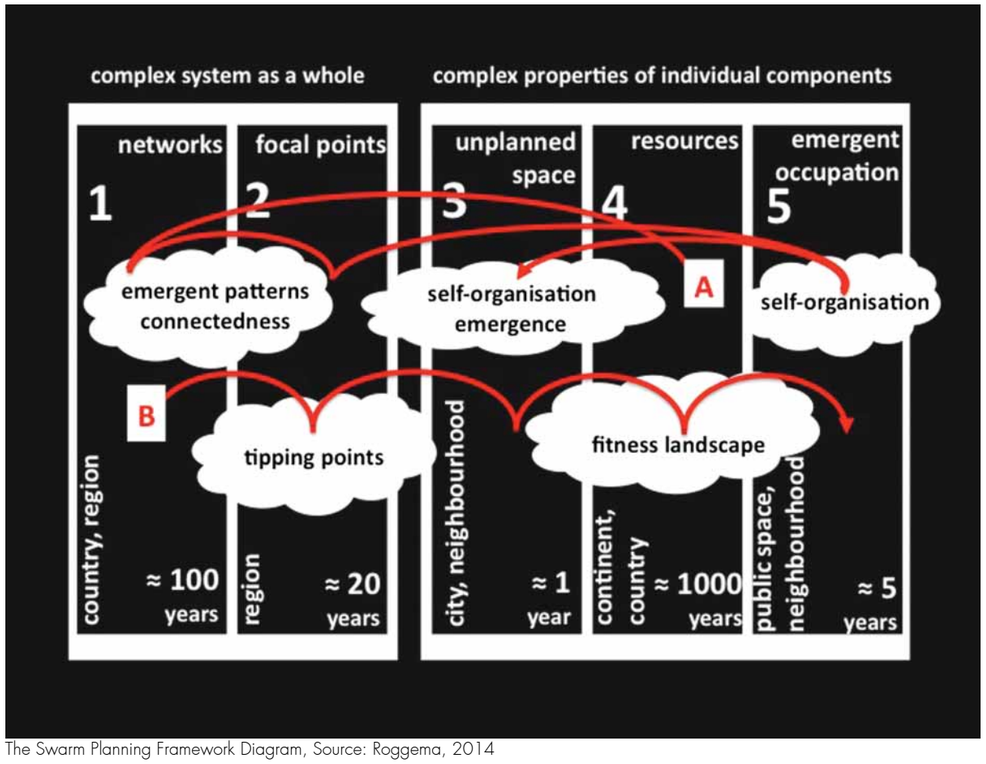
Methodology

Main Research Question	Sub- Research Question	Methods	Intention
How can we explore spatial potential of post-industrial transformation of areas along waterways to mitigate the impacts of urban flooding and water pollution, while redefining the relationship of the nearby inhabitants ?	How to extract the relevant properties of existing elements to use as a foundation for the design to overcome the problems in the area?	Research by design: adapting design principle extracted from literature review and case studies into site context and incorporating it with water management solutions. • 01. Spatial planning : District master-planning emphasizing on climate change impact mitigation and resilience, highlighting areas for long & short -term programing of vacant industrial area. • 02. Categorizing degree of disuse/ abandonment of industrial area. • 03. Allocating the appropriate landscape solution (eg. Bioremediation, urban farming, aqua farming, wetland, 'room for the river') according to the different land-use (long, mid or short term) and state an industrial area (demolished or partial vacant.	• To develop a multi-scalar tool box of design strategies that takes account of the ever changing urban delta conditions, resilient to climate changes and allows spatial redundancy to accommodate to sudden disturbance. • To combine the diverse methods of approaching a complex area (decommissioned industrial land) and formulate a multi-scalar, multi-time frame and multi-functional design toolbox.
	How would the design effects the area in terms of ecology, economy and society over the years?	Scenario design • Picking the extreme scenarios and visualising the outcome of it upon applying strategies from the toolkit.	• To evaluate whether the toolbox generate desirable outcomes.

THEORETICAL FRAMEWORK

Swarm Planning

By applying the layering approach found in Swarm Planning Theory by Rob Roggema taps on the concept's suitability in dynamic regions and epoch as it is practical approach to deal with uncertain future as it provides spatial flexibility to adapt and mitigate impacts of climate change (Roggema, 2014). Specifically, applying the layer approach where layers are organised in correlation to specific time horizons and of geographical entities. The spatial plan will emphasise on climate mitigation and adaptability by allocating long-term land-use programmes such as converting unused industrial plots into protected wetland ecological parks. This long-term land-use should equip the city to handle the increment effects of climate change and improve the general quality of the environment. While the short term land-use will equip the area with flexible programming that are robust enough to handle the sudden and short-lived climatic disturbance such as seasonal typhoon and support urban self-sustenance endeavors such as energy and food production.



The Swarm Planning Framework Diagram, Source: Roggema, 2014

Layer	Name	Properties	Time horizon (years)
1	Networks	Water, energy, transport, communication Carriers of information, matter and energy Amount, quality and fitness determines connectivity Higher connectivity lead to higher adaptive capacity	100
2	Focal Points	Inter-linkages and co-location of multiple resources Nodes change suddenly due to altered networks or a strategic addition Number and fitness of nodes, strong cores with many connections, which cluster and minimize distances, determine the start of a system change High potential for emergence of innovations and adaptations Novel arrangements in close proximity enables learning and self-organization Require a catalyst to encourage innovation Source for dispersing innovations	20
3	Unplanned Space	In the proximity of the focal points Land use is deliberately not determined Wastelands, temporary use or underutilized space Highly dynamic Respond to unforeseen or unpredictable change in a very short period	1
4	Space for Resources	Energy, food, water produced and stored Extremely slow transformation Anticipate the increase in demand or a potential decrease of production capacity Continuously capable to adjust the spatial sizes and configurations Small-scale mosaic of functions	1000
5	Emergent Occupation Patterns	Changing land use, incubation areas, old docklands or gentrified neighbourhoods New unplanned patterns emerge Intensity of networks and functions to enhance interactions	5

The Swarm Planning Framework, Properties and time horizons of the five layers. Source: Roggema, 2014

Adaptation of Site Element

Case study to observe how other post industrial projects have adapted exiting physical structure of the project site as part of their design solution or strategy.

1. Duisburg Nord Landspace Park is was previously heavy industrial area producing and processing metal. Industrial structures such container that once held iron ore now hold water for cleansing and storage.

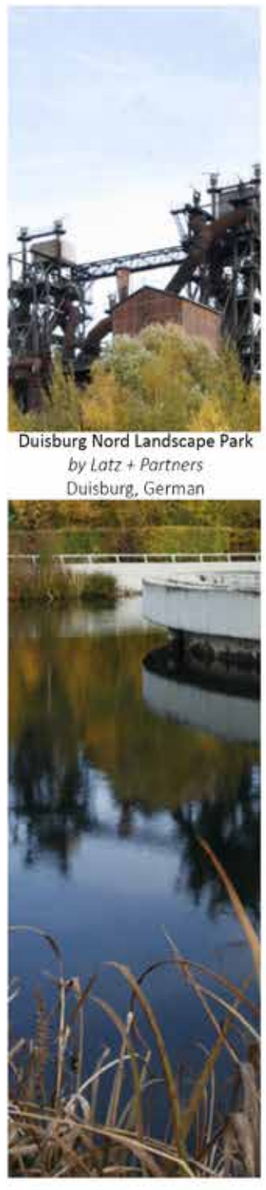
2. Westergasfabriek was a gas plant providing energy to the neighborhoods in Amsterdam. It has since been converted into a urban park incorporating structures such its gas chambers into ponds and using site topography to filtrate water.

3.Zhongshan Shipyard Park is located beside a river apart from modifying structures for aesthetic, the designers also made modification to land on site to create more space for the river.

4. The drastic height and depth differences of the quarries in Quarry Garden in Shanghai Botanical Garden provided water collected various function ranging from aesthetic to water management.

6. Abandoned carpark was slowly turned into a garden by simply breaking the imprevious tar surface to allow for seedings to grow inbetween gaps.

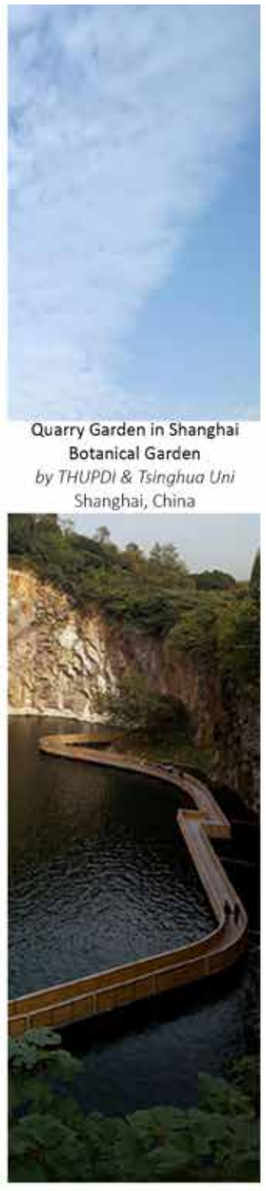
5. The buildings of the old water treatment plant of Changchun Culture of Water Ecology Park are hollowed to allow for new spatial functions and programming such as water collection and boardwalks.



Duisburg Nord Landscape Park
by Latz + Partners
Duisburg, German

Westergasfabriek
Gustafson Porter + Bowman
Amsterdam, Netherlands

Zhongshan Shipyard Park
by Turenscape
Zhongshan, China



Quarry Garden in Shanghai Botanical Garden
by THUPDI & Tsinghua Uni
Shanghai, China

Jardin des Joyeux
by Wagon Landscape
Paris, France

Changchun Culture of Water Ecology Park
by W&R GROUP
Jilin, China

Site Element Adaptation Principles

Using existing structure to contain, carry and cleanse water found on site.

Modifying existing structure to contain, carry and cleanse water found on site.

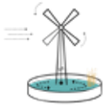
Using existing biophysical elements to contain, carry and cleanse water found on site.

Modifying existing biophysical elements to contain, carry and cleanse water found on site.

Adding vegetation to phyto-remediation site and purify water.

Increasing permeable surfaces.

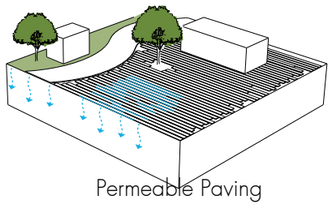
Using natural energy and processes to contain, carry and cleanse water.



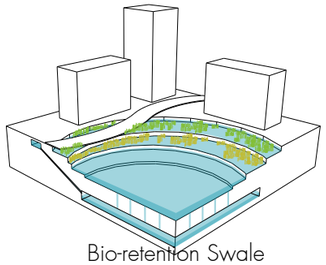
Adding threshold to oxygenate water.

LANDSCAPE SOLUTION TOOLKIT

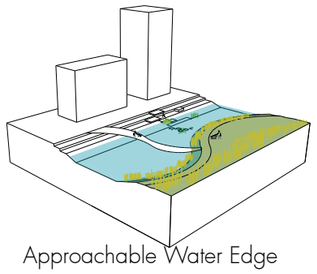
This is landscape generated design tool kit that has been develope that will be used during the design implementation stage. There are design solution commonly utilised by river and urban landscape projects to mititage universal climatic and urbanisation issue faced by cities all over the world.



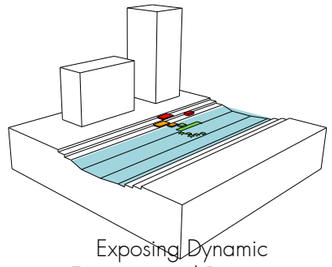
Permeable Paving



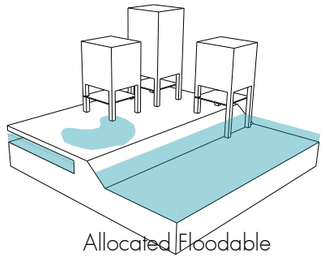
Bio-retention Swale



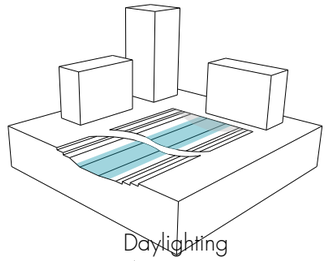
Approachable Water Edge



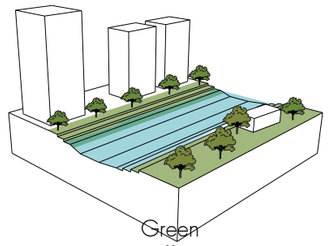
Exposing Dynamic
Environmental Processes



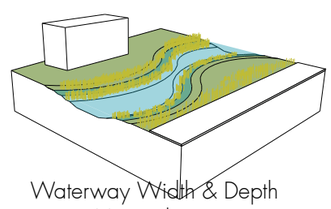
Allocated Floodable
Urban Area



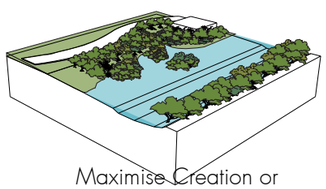
Daylighting
Waterways



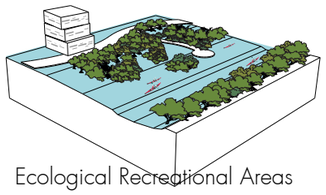
Green
Buffers



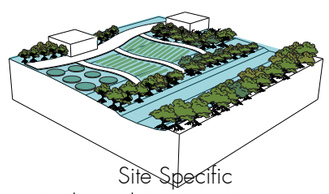
Waterway Width & Depth
Manipulation



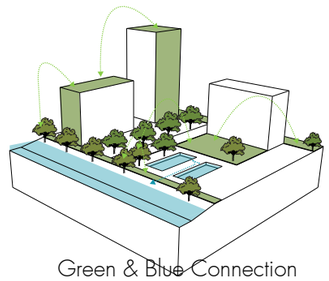
Maximise Creation or
Restoration of Wetlands



Ecological Recreational Areas



Site Specific
Ecological Sensitive Economy



Green & Blue Connection

Research Relevance

The topic of water is the biggest and closest relation between the project and landscape architecture master track. Understanding water in terms of natural dynamics, tradition (human and water relationship) and how to work with water through landscape approaches are one of the few components is evident in the project and they are lessons extracted from TU Delft landscape architecture master program. The landscape based approach is implemented in multiple scale in the design - this approach is a more organic and emphasis on preventing undesired situations by understand and looking into how natural and urban systems operate. The master program has always pushed students to study and understand how all the different layer work (base, network and occupation layers) individual and as a whole together to form an adaptive system.

An adaptive system approach is much needed in every shifting and growing region such as the Pearl River Delta. Many delta region naturally attract urban migration due to their favourable natural conditions that puts them at an advance economically. In the past centuries cities were planned with economy efficiency in mind, neglecting the environment and the consequences of the all the harmful activities. This graduation project provides a principles and toolbox of design strategies that delta cities at risk can implement, not only onto their decommissioned industrial sites but also other types unused and possibly polluted spaces to prepare them to be resilient.

Decommissioned industrial areas are one of the various types of waste landscape that are the by-product of past and on-going consumption, industrial and economic growth. And with the advancement in technology, commitment to cleaner and sustainable practices and in the change socio-demographic of industrial cities, many industrial spaces will be decommissioned. Hence the toolbox can also be adapted by other cities to deal with other types of waste land facing hydrological and pollution issue.

PRINCIPLES

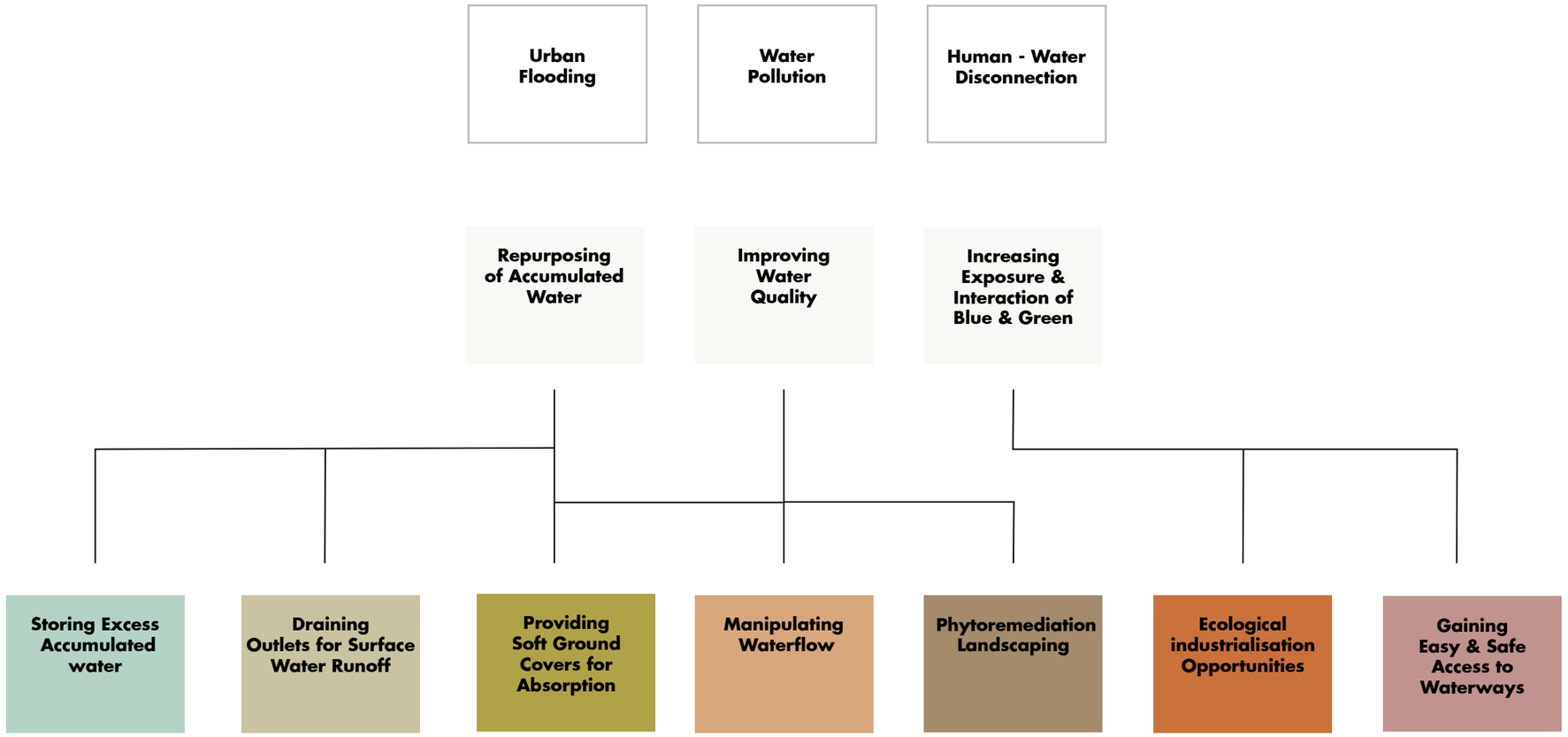
Landscape Emphasised

The ultimate environmental end goal to mitigate impact of climate change and the rapid urbanisation in growing cities such as Foshan, this project focus on the issue of urban flooding and water pollution while improving human-nature relationship. Hence the principles that were synthesised from case studies and analysis emphasis by aiding urbanised cities with tools that allow for the;

a) repurposing of accumulated water
b) improving water quality
c) Increasing exposure and interaction of blue and green

By

i) storing excess accumulated water
ii) adding soft ground covers to allow for absorption of water into the ground
iii) providing sufficient outlets for surface water runoff to be channeled away
iv) designing elements in the water network that allows for manipulation of water flow speed
v) growing plants with phyto-remediating properties along waterways
vi) ecological industrialisation
vii) allowing easy and safe access to waterways for human interaction

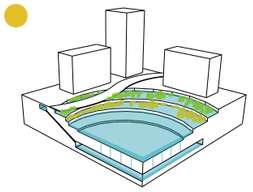


Approachable Water Edge

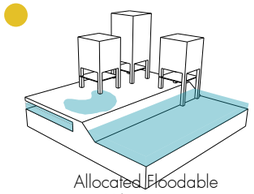
Landscape Emphasised

The strategies and implementation formed under 'repurposing of accumulated water' focuses on letting water accumulated by rain in the ground or floor surface to be quickly extracted from the surfaces and brought to somewhere else for collection or productive usage before being release back to the waterways when water levels has subsided. Those under 'improving water quality' then focuses more on strategies and designs that allow for water to be cleaned by the means of filtration or/ and sedimentations of plants and other natural elements. And the intention of last principle, 'increasing exposure and interaction of blue and green', is bring back the human and water connection by setting up opportunities where people would interact with nature in in different settings and activities in their daily lives, economically and recreationally.

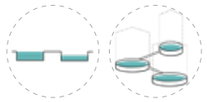
Storing Excess Accumulated water



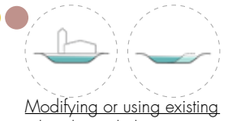
Bio-retention Swale



Allocated Floodable Urban Area



Modifying or using existing structure to contain, carry and cleanse water found on site.

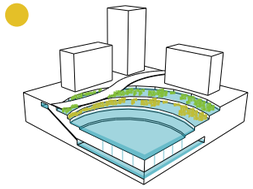


Modifying or using existing biophysical elements to contain, carry and cleanse water found on site.

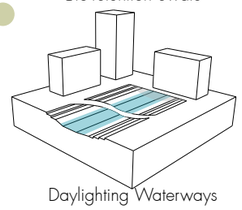
Draining Outlets for Surface Water Runoff

Naturalising Waterways

Semi Open Retention Waterways



Bio-retention Swale



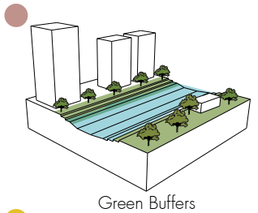
Daylighting Waterways

Providing Soft Ground Covers for Absorption

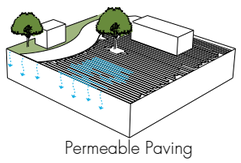
Naturalising Waterways

Semi Open Retention Waterways

Park Connector Pathways

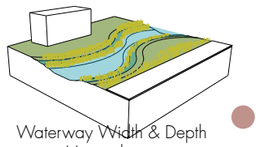


Green Buffers



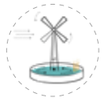
Permeable Paving

Manipulating Waterflow



Waterway Width & Depth Manipulation

Adding threshold to oxygenate water.



Using natural energy and processes to contain, carry and cleanse water.

Phytoremediation Landscaping

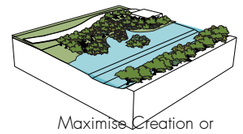
Naturalising Waterways

Semi Open Retention Waterways

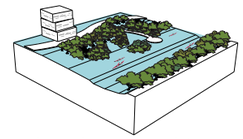
Adding vegetation to phyto-remediation site and purify water.

Ecological industrialisation Opportunities

Blue-Green Productive Activities



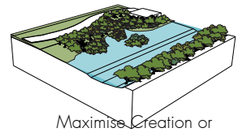
Maximise Creation or Restoration of Wetlands



Ecological Recreational Areas

Gaining Easy & Safe Access to Waterways

Park Connector Canal + Pathways



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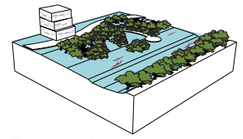
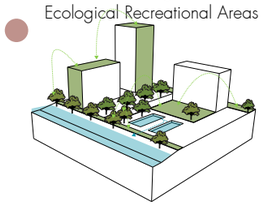
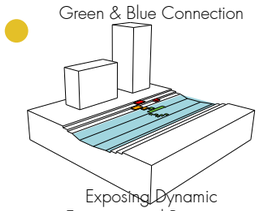


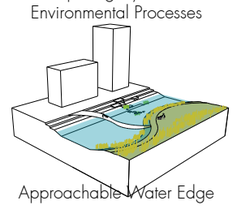
Ecological Recreational Areas



Green & Blue Connection



Exposing Dynamic Environmental Processes



Approachable Water Edge

Small Scale Short Term	Mid Scale Mid Term	Large Scale Long Term

Time | Scale | Place

The approach the planning and design of Foshan with a landscape emphasis allow for area along the waterway to be more adaptable and resilience to future scenario. The principles used must also be able to deal with the dynamism of the delta region and future. While we cannot predict the future we equipped cities with spatial and programs that are flexible to adapt and mitigate impacts of climate change and human activities.

Temporal aspect allow us to understand how the area worked in the past, what worked and what did not. The environment is a dynamic entity which is constantly shifting, Hence understanding relationship in terms of time will have to how things evolved and also provides a hint on what can be readapted to current situation to solve an issue.

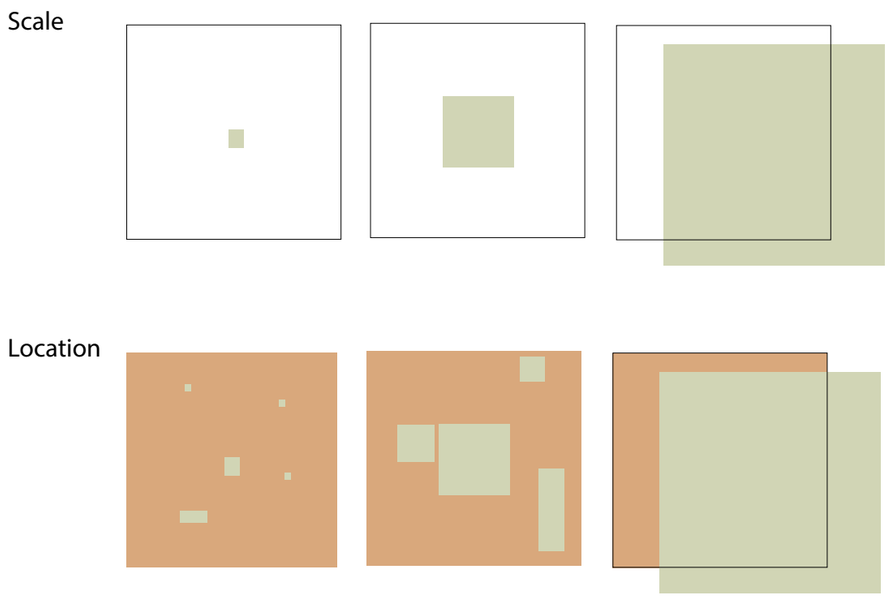
Looking at different scale is very important especially because water is a continuous element which flows from one point to another according to pressure and gravitational force. Projects involving water must be tackle in an inter and multi scale manner; a pollution in a small waterway will eventually reach the bigger waterway. Although a pollution in one small waterway may not so much harm the bigger waterway, if the entire small waterway network (made of many small waterways) was polluted, it will definitely impact the other waterway system downstream.

Address the design with the context of location in mind is also important especially during the planning stages as depending on how large a space and where is it location and vice-versa how small spaces and where it is located will determine the permanence or flexibility of a programme.

In the end these three parts are interrelated and when taken into consideration altogether, they will have a programmatic outcome that allows for long term, infrastructural level programmes like wetlands that anticipate and response to the predictable impact and consequences climate change and nature such sea level rise and typhoons or flexible short term programmes such as urban square that allow for quick adaptation to response and cushion sudden disasters like a broken dike.

Flexible short term programmes that allow for quick adaptation to response and cushion sudden disasters.
eg broken dikes

Long term, infrastructural level programmes that anticipate and response to the predictable impact and consequences climate change and nature.
eg Sea level rise and typhoons



Scale and Time

Determines how the project is seen on a larger scale during the planning stage. In this project majority of the programmes were slotted out in the earlier stage in relation to context to location, scale and duration of existent and purpose.

In this concept, we can see how the design implementation are slotted out according to its ability to be adapted in large scaled space such as an abandoned large strip of land to small scaled spaces where space limited due to existing land uses in the instant of the built up area of a historical area.

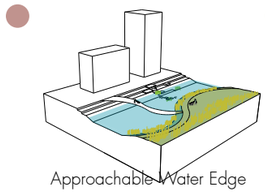
One of the difference between these three categories is the adaptability of the design according to the constrains in available space for design intervention. Those in small scaled spaces have design implementation that are easily implemented as the design works in small and isolated voids. This category can be seen as low hanging fruit as they can be implemented anywhere.

While designs under the large scaled spaces are designs which outcomes much beneficial outcome to the city in terms of environment, society and economy from having in large continuous spaces. These designs implementation can be seen important infrastructure for city that will last has to exist for a longer duration of time as they are crucial for protection and function of the city.

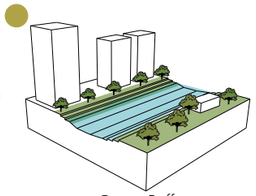
Small Scale Short Term

Semi Open Retention Waterways

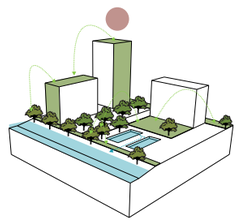
Park Connector Pathways



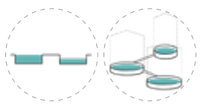
Approachable Water Edge



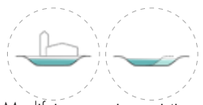
Green Buffers



Green & Blue Connection



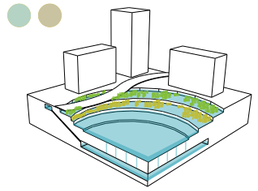
Modifying or using existing structure to contain, carry and cleanse water found on site.



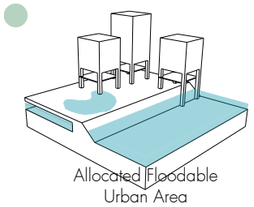
Modifying or using existing biophysical elements to contain, carry and cleanse water found on site.

Mid Scale Mid Term

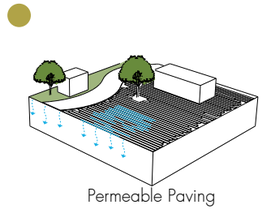
Park Connector Canal + Pathways



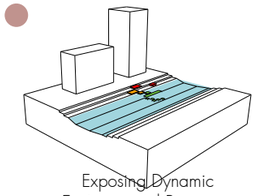
Bio-retention Swale



Allocated Floodable Urban Area

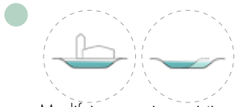


Permeable Paving



Exposing Dynamic Environmental Processes

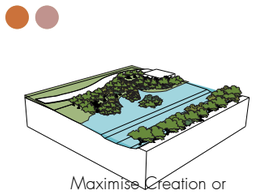
Adding vegetation to phyto-remediation site and purify water.



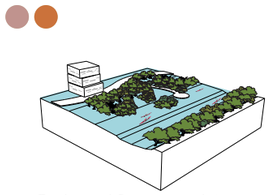
Modifying or using existing biophysical elements to contain, carry and cleanse water found on site.

Large Scale Long Term

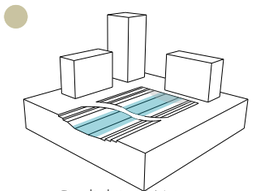
Naturalising Waterways



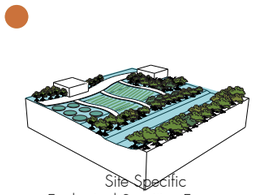
Maximise Creation or Restoration of Wetlands



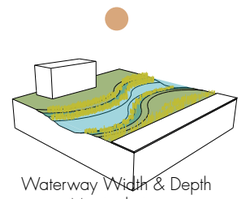
Ecological Recreational Areas



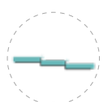
Daylighting Waterways



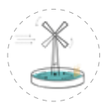
Site Specific Ecological Sensitive Economy



Waterway Width & Depth Manipulation



Adding threshold to oxygenate water.

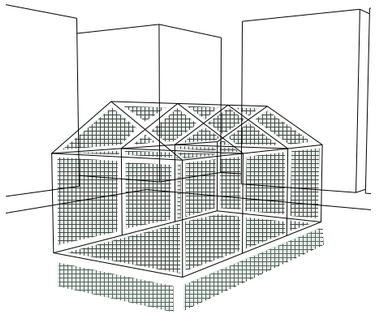


Using natural energy and processes to contain, carry and cleanse water.

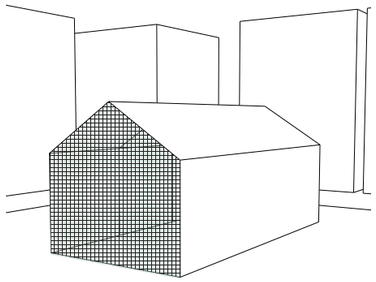
Place and Scale

This concept would help determine what programme would be appropriate and how a design implementation can fit into an post-industrial site in a building scale.

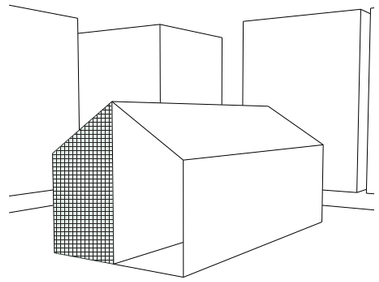
Dealing with industrial area, the project addresses the prominent physical presences on the site which are the industrial buildings. As observed in the spatial analysis, buildings were in various state of dis/use and also had various spatial characteristic.



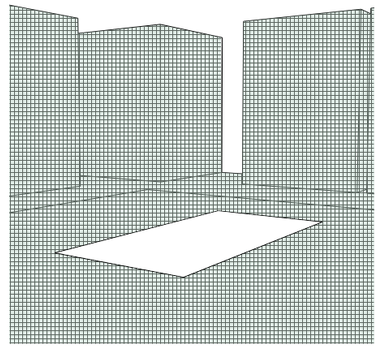
Leftover structural elements act as place holder of a space that once existed in the area and also hints at many future possibilities. Future programmes, not only can they adapt within the structure but also flow in and out of the structure due to the lack the constrains of walls. In that sense programmes in such area will interact with the structure and the structure immediate surrounding.



In scenario where the entire building, facade and structure, is safe and suitable to be repurpose for future usage. Adapting the programmes within that compliment and highlight the spatial characteristic of the building. For example a building with long spanning beam could be appropriated for programmes that would benefit space free from columns.



This is site that still shares the building with existing programmes and importantly, occupants. In this situation, design could then use this existing social contexts a hint which programmes could be beneficial for the area. Sometimes the occupants also reflects the demographic of the surround area too hence making the design appropriate in a larger scale.



In the instant of a flatten plot of industrial area,when there is nothing from the previous activity to reference from, the surrounding context would be an option. And in fact the understanding of the surround context outside the main design should be taken account supplementary to the context of the existing building. At this level it helps the design at the building scale connect to the neighborhood scale.

ANALYSIS

CHINA

PEARL RIVER DELTA
&
WATERSHED AREA

FOSHAN

CHANGCHEN DISTRICT

Past

Foshan is the oldest industrial city in the Pearl River Delta. It started out as a city comprising with fishing villages in the 259–210 BCE. And by the Ming and Qing dynasties (1368–1912) dynasties, it had established itself a thriving handicraft and commercial trading port city (Huang, 2019). And its pottery and ceramics were highly sought after and renown within and outside of China. The dense waterways and delta conditions provided accessibility to waterways for their large port activities and river sedimentation, which were favorable to the city's water trade economy and their famous ceramic art industry. Unlike most ancient cities, Foshan does not have city wall as a defense system and boundary wall, it utilized its naturally encircling waterways (Huang, 2019).

By the 1910s, water transportation had seized in operation as road infrastructure were being build and taking over the export of goods from port and warehouses. Waterways that were usually adjacent to industrial areas were replaced by roads and this was the start of the redundancy of water transportation and disappearance of the ever so presence waterways of Foshan. With the start of rapid industrialization since 1988, 34.4% of dike-ponds, 26% of shrub land, 19.1% of forest and 19.3% agriculture land cover were transformed into built up area (Zhang, 2008). The increase of built up area and decrease in waterways and green landcover placed tremendous pressure to the city's drainage system. As a result of missing waterways and impermeable surface, urban flooding in Foshan was common.

Current

Importantly, in the midst of rapid industrialisation, the connection between water and people has disappeared. People forgot the natural benefit and purpose of their waterways and in turned used them as a mean to dispose waste. Those waterways that were hidden beneath the surface become ideal outlet to dump polluting waste as no one could see who was doing the harmful deed and that it would be someone's else problem. While waterways that were still open to the public were too pungent and toxic for any forms of interaction, and in turn became a dumping area too. Fortunately since the 2000s, the city of Foshan had started its initial step to fix its waterway. Intervention ranging from big to medium scale such as linear floating wetlands and new river side parks.

Future

In general throughout most of the Chinese cities within and outside of the Pearl River Delta are branding their cities as a modern cosmopolitan urban identity. This is to attract foreign and major local investment to invest into their city. Apart investors, cities also want to attract the right social demography that is align with their idealised image of their city. Foshan, has been known as the industrial city, the grittier sibling to the financial and high tech city of Guangzhou. Guangzhou is the capital of the Guangdong province and it located strategically in the north and middle of the west and east side banks of the Pearl River Delta. Plans of absorbing Foshan as a twin city into Guangzhou is already in the progress since late 2010s with the integration the two cities metro line for seamless connectivity as part of the strategies. While Foshan aspires to create an image of a modern city with luxurious waterfront projects on par with sister city Guangzhou, there could be an opportunity to demonstrate that the quality of landscape and green spaces can also signify progress, livability and success of a city. Foshan aiming to reduce as much as 80 percent of existing industry activities over next few year, space freed up especially those by the waterways could become Foshan own adaptive landscape oriented waterfront development that markets Foshan water city and industrial identity and also complements Guangzhou waterfront development

DEVELOPMENT PATTERNS

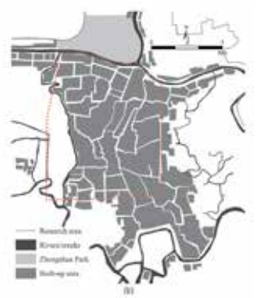
The sections illustrate the evolution of Foshan city's development and urban expansion. Foshan and its economy, society and landform was literally shaped by its intricate waterways. Ancient Foshan as mentioned earlier, used the water as its city boundary and defence system. Logically at the city's edge was where the warehouses and what was deem as heavy industries such as metal casting and ceramic kilns were located. This is followed by commercial areas and admirative building and them residential areas. And on the other side of the waterways or city boundaries was the rural areas and larger agriculture lands. So not only were these industrial activities away from residential complexes, it was adjacent to trading port for quick transportation.

Subsequently with the invention of automobile technology, which was more efficient then boats and shipping cargos, many of the waterways that were use for transports were submerged and covered over with paved roads. And waterways that were not submerged, were canalised to facilitate the flushing of production by-product. Over the year, as the city expanded pass its water boundary, more waterways disappear and eventually Foshan lost its connection and relationship to its waterway.

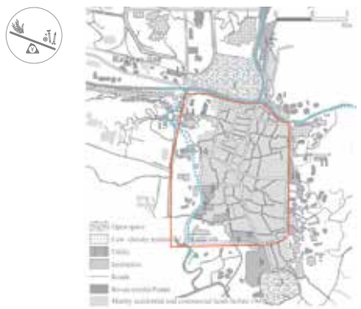
Map Source: Lihua, H., Zheng, J. and Yinsheng, T. (2019). Fringe-Belt Phenomenon in a Historic Chinese City: The Case of Foshan. Journal of Urban Planning and Development, 145(3), p.05019008

Waterways as city's boundary 1700s

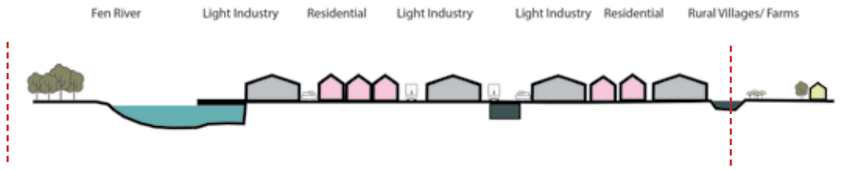
Inner Ring Road Replaced Waterways as City's Boundary 1950s



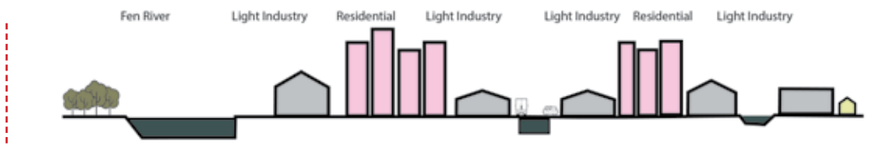
Additional Ring Roads Added and More Waterways Canalised 1990s



Inner ring road act as city's boundary and built area extended
- the start of waterway being submerged



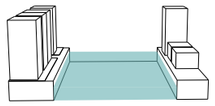
Inner ring road act as city's boundary and built area extended
- more waterway submerge



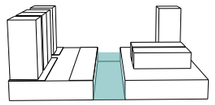
Biophysical Elements Waterways

What are the biophysical and urban elements found along the industrial area along the waterways?

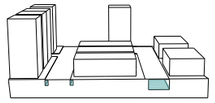
The city of Foshan and the rest of the Pearl River Delta were once intertwined and shaped by a extensive networks of waterways. However due to the rapid industrialisation and urbanisation much of the water become canalised, resulting many of the natural waterways to be combined with together or straighten or disappeared from the surface. While there might be more types of waterway that can be observed in Foshan, these were the ones found specifically nearby and alongside industrial areas. This section of the analysis will show 3 common types that were encountered in Foshan and it relationship to its surrounding context.



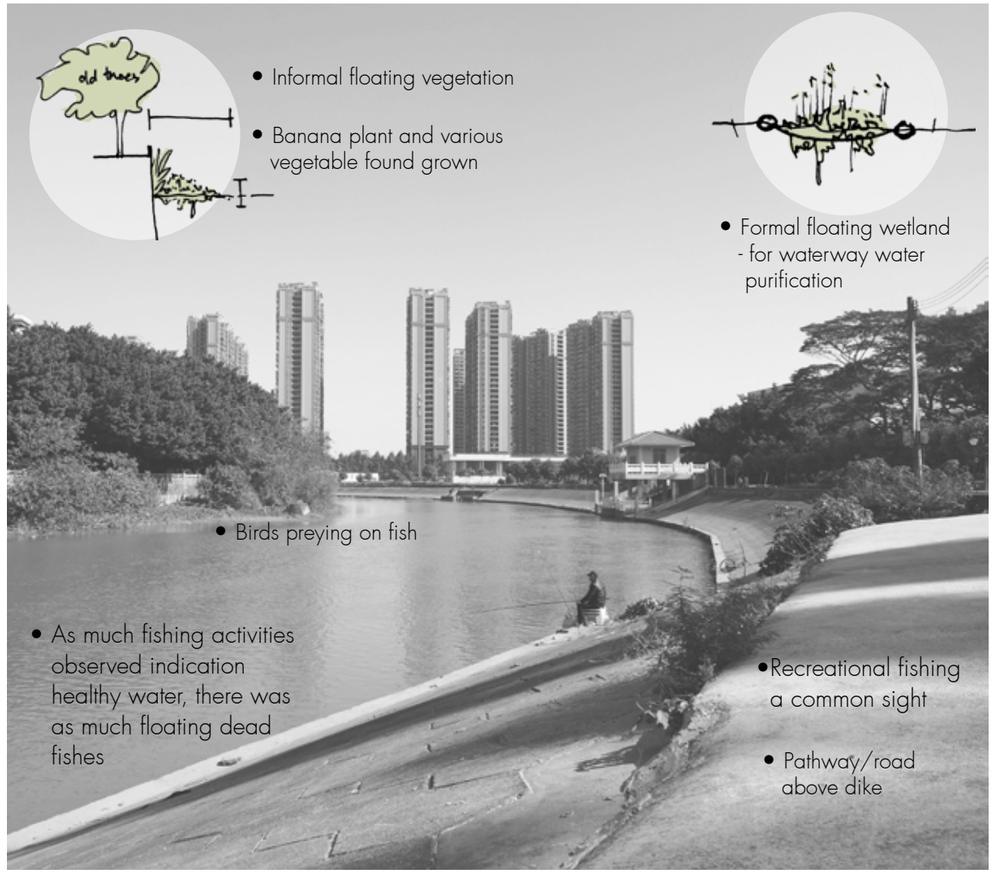
Large waterways



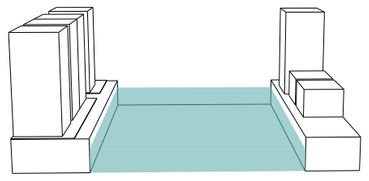
Smaller waterways



Missing waterways



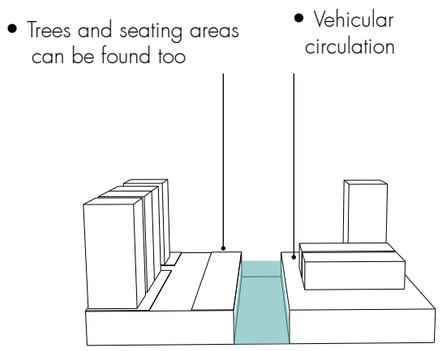
Large waterways



Edge condition:

- Straight drop. No access from or to water
- Steep and slope concrete banks on one side
- Smooth bank surface leads to faster water flow
  = increase flooding downstream
  + dangerous for people using the banks
  + lack opportunity for animal movement/ crossing

Smaller waterways



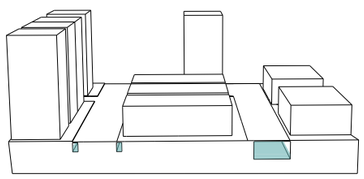
Edge condition:

- Hard edge with vertical drop
- Foot bridges crossing prominent
- Multiple access point into water via stairs

Water condition:

- Smell pungent
- Murky water with oil streaks on surface indicating biological and chemical pollution
- No plant or animal life observed

Missing waterways



Edge condition:

- No edge
- Non-porous surfaces with pipe mostly going into the ground

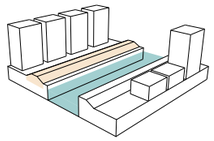
Water condition:

- Reported to be at the highest level pollution that is not safe for human consumption or activities

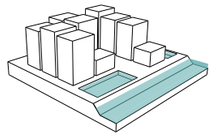
Biophysical Elements

What are the biophysical and urban elements found along the industrial area along the waterways?

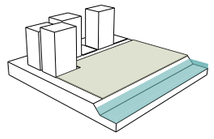
Apart from waterways found in alongside industrial areas, there were other elements that stood out in term of spatial and functional significances, namely the dikes, urban village ponds and small scale agriculture plots. These three elements individually formed very subtle interrelationship between the people living in the area and the waterways and industrial area. How these element function also serves as a hint of how people in the area interact with their current environment and serve as an inspiration on the direction of future planning and design.



Dikes

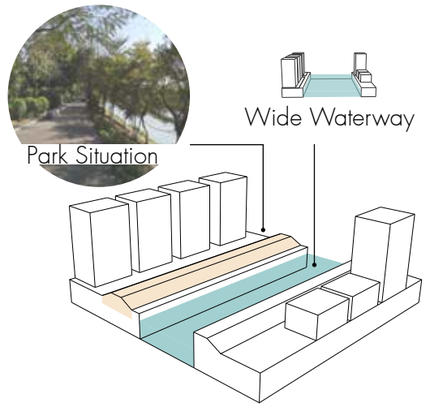


Ponds



Urban agriculture

Dikes

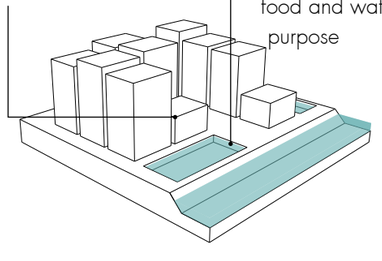


Edge condition:

- Hard surfaces
- Ranges between bare and open grassy (main image) to promenade or parks with trees
- Space by between water and dike varies

Ponds

- Usually located infront of the village
- Ancestral hall/ Temple found close by usually
- Found within compound of (urban) villages
- Used for mirco-climate, food and water storage purpose



Edge condition:

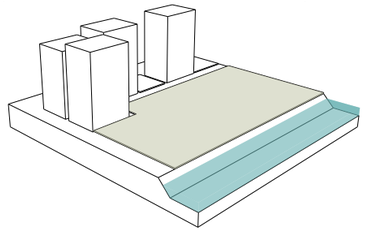
- Hard surface with safety barriers
- Stairs (access point) usually accompanies with benches
- Trees like banyan trees commonly found among the sitting areas

Water condition:

- Varies from healthy with fish and birds feeding on them to algae filled

Urban agriculture

- Informal agriculture plot are usually smaller and adjacent to existing residential or factory maintained by those in the vicinity. They grow on left over spaces such as on abandoned plots.



Edge condition:

- Soft ground and crops continue growing on gentle slope towards the water and continues growing (floating) on water.

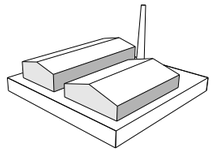
Water condition:

- Most use the water from the waterway for irrigation, so water quality depends on the adjacent waterway. Others also receive water supply from well in the ground.

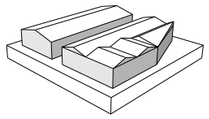
Urban Elements
Factory Typology

What are the biophysical and urban elements found along the industrial area along the waterways?

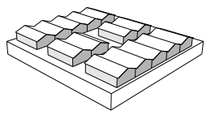
Within the realms of industrialization there is a wide range a varieties in terms of the types of activity, time period, production method to the spatial and physical structure of the factories. In Foshan there are a few variety, and in this section they are selected and characterised base on the spatial quality each typology provides. Spatial qualities that specifically that were noted were, the different geolocation characteristic that each typology were found and occupied.



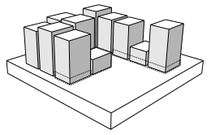
Reinforce Concrete and Steel Factory



Metal Structured Factories



Brick



Small Scale Factory within the Urban Villages

Production timeline of South China

Pre- Republic

Self sustenance

Republic Period

Collective Farming

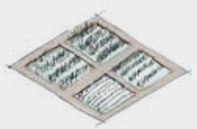
Peoples' Republic of China

Village Industry

Economic Reform

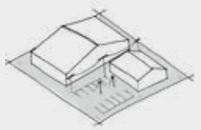
Manufacturing

Cycle of Production Landscape over the Years



Rice Fields

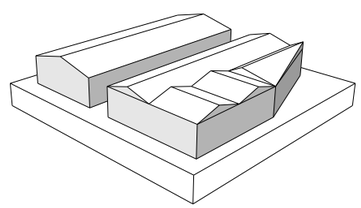
Dike Ponds

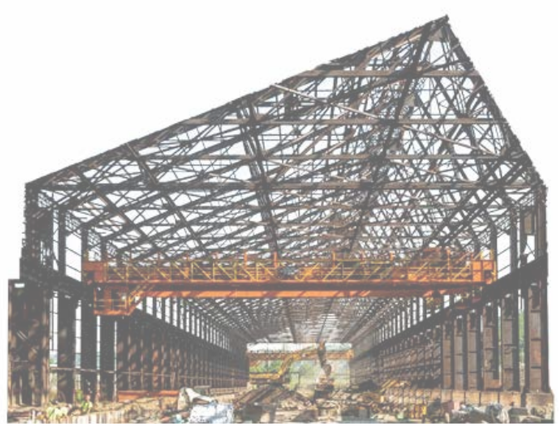


Manufacturing

Metal Structured Factories

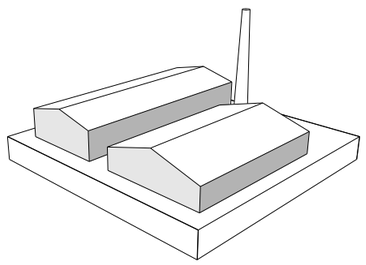
Metal structured factories takes up the largest and continuous sprawl found in industrial areas. They host a myriad of industrial activity ranging from automobile repair workshop, carwash, metal work to warehouse. Their main structure are made of steel or sort of allow structure with truss spanning far allowing no other structural interruption in the ground and they are cladded by aluminium façade and roof. They can be often be spotted on satellite images by the iconic blue or off-white aluminium roof. Due to the flexibility of steel construction, such factories can constructed to cover any shape and size of a plot land and are not tied to a convention rectangular block.





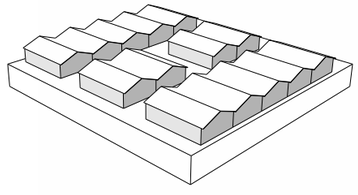
Reinforce Concrete and Steel Factory

These large factories are common along the main water on the north and south side, comprising of heavy industries such as cement production and heavy metal works. Located at the fringe of the main river also indicate that they were located for the purpose of easy of transportation of goods to and from ship and ports. They are generally made of huge reinforced concrete columns with wide spanning steel frame structures, typically with high ceiling to accommodate their heavy industrial equipments.



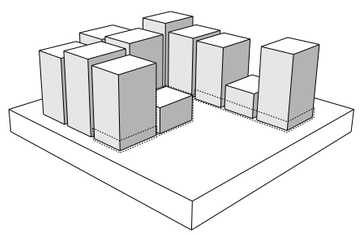
Brick

Bricks factories are common in an industrial Chinese city as they were the oldest type of factory building that are still around. They are also generally found adjacent to still surviving urban villages and in places villages once stood as when rural industrialisation started many villagers converted their agriculture plots into factories. As common as they are, many are in the state of total abandonment or demolished to make way for better and more commercially efficient buildings. Often built tight multiple rows but not as sprawling as the other types of factories. Due to the time period they were built, likely during the rural industrialisation, they were built with the easiest and cheapest material - red or grey bricks with clay roof tiles. And to keeps the structure affordable and quick to built, most of the factories were single storey.



Small Scale Factory within the Urban Villages

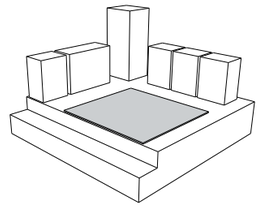
On the ground level of the urban village it is common to find small scale manufacturing activities such as garment sewing or packing occurring. These enterprise usually take up the whole ground floor of the block or the entire multi-story building. Unlike the other type of factories, they are embedded inside the village, among the residential apartments. It started with a villager converting his plot of house into a multiple story building, where the owner (villager and family) lives on the top most level and rents out the ground and bottom stories for commercial purposes.



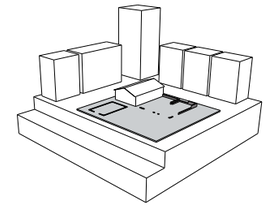
Urban Elements State of Abandonment

What are the biophysical and urban elements found along the industrial area along the waterways?

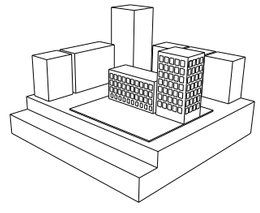
Pearl River Delta, and China as a whole, is a fast developing part of the world and just walking through Foshan, it was common to see industrial areas in various state of use or disuse. In its various state of use/disuse we also see various form and frequency of utilization by surrounding inhabitants. Different state of the site will allow different activities and different utilization which was quite interesting to observed and could serve as an guidance and inspiration in how to handle future post-industrial site in terms of temporal aspect and spatial availability.



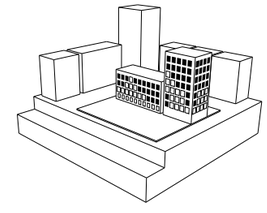
Empty Site



Leftover Rubbles



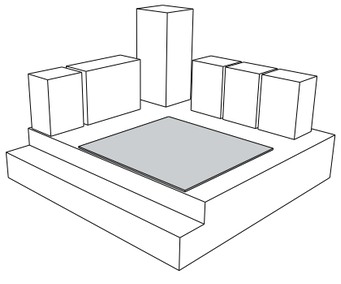
Vacant Building



Partially Vacant

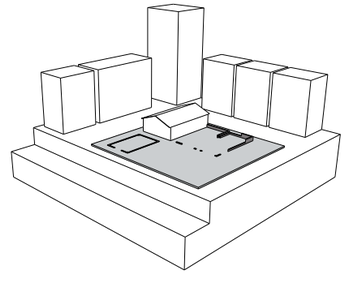
Empty Site

Industrial activities have stopped and buildings are demolished and the ground flatten. Only evidents of it being an industrial area will be on landsue map or online map. Sometime spontaneous vegetation or informal vegetation plots can be found growing on the side among the rubbles.



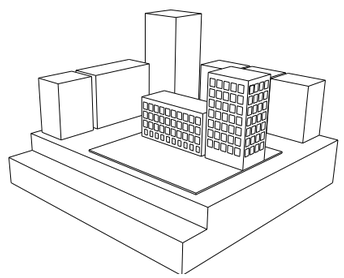
Leftover Rubbles

Structural leftover and partial part of the buildings are usually still present on site. Site with left over bricks have been observed to be collected from the site and reused by the community around as building material for small structures such as garden terrace and benches.



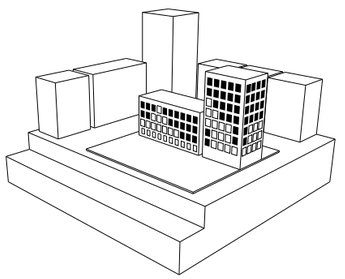
Vacant Building

Due to the cease of industrial activity, there are a number of empty factory building left standing either awaiting for demolition or future plans. While the inside is empty and possibility unused, the exterior spaces are usually taken up by informal spaces for parking or vehicular storage area.



Partially Vacant

This buildings can be found within residential area and it was usually a mix-used building that once held small scale industries on one part of of the building, usually the ground or/and bottom levels where it was more accessible to the road. However with the ceased of industrial activity it is just left vacant with only the other parts of the building still occupied by the other tenants.



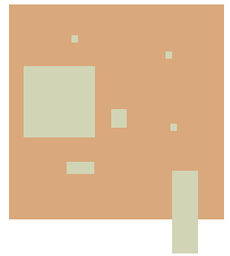
DESIGN IMPLEMENTATION

The Approach

Analysis for this project does not end at the prevision chapter, it still carries on in this chapter. Analysis on the last chapter informs us generally the condition that can be observed on the surface. Analysis still happens on the design state and every time a new design and/or information is found, a new set of analysis is need to carried out in order to verify with design choices.

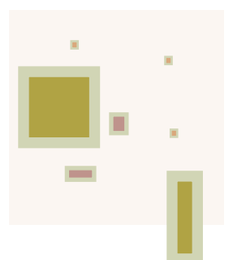
The following diagram shows the step taken to derive the final design outcomes. We first start by identifying and understanding the problem of the site we like to address. This will be done by carrying out a few mapping analysis. Next, from the analysis we extract the pain points and challenges and make them into design opportunities. And lastly, we apply design strategies and design toolkit to solve the issues. All the steps are done ,specifically with a landscape perspective.

1. identify the problems



2. extract opportunity

2. apply design solutions



Regional Scale

The regional scale take into consideration of the flow of water into Foshan (Changcheng district) and out to Foshan and into Guangzhou. Guangzhou is the capital of and is the financial hub of the Guangdong province. Foshan and Guangzhou are considered sister cities and have some of their infrastructure integrated such as their metro line and main waterway.

Looking at the flow of water in a larger scale, the main aim is to ensure water entering the Dongping waterway and into Fengjiang waterway is cleansed by the time it enters further into the inland and smaller waterway of Changcheng. And once inland should have retention capability to slow down speed of water.

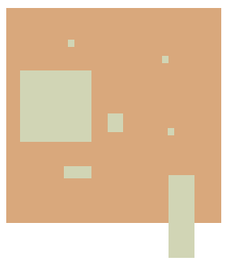
Flooding from water run off from the high grounds in the centre of Changcheng district has to be address by providing retention and storage spaces before it flows out again into east part of Changcheng. And finally before water leaves for Guangzhou, it needs to cleansed and to be flowing out in a controlled and safe manner to ensure that Changcheng does its part in flood management.

IDENTIFY THE PROBLEMS

Working in a delta region, water related issues are one of the main challenges faced by cities in the region be it in China or elsewhere in the world. Water crisis around the world are also on the rise with the rising water levels, unpredicted storms and coupled with harmful human activities such as unregulated and unsustainable urbanisation. Specifically, in relation to waterways alongside industrial areas, the three issues that will be explored are:

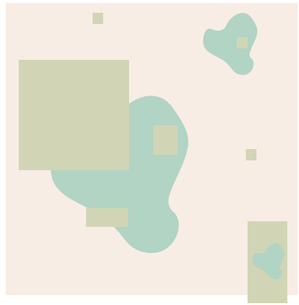
i) missing waterways,
ii) urban flooding and
iii) polluted waterways.

All of the issue are closely link together as every drop of water ultimately will end up in one of the connected waterways. And the solutions for each issues builds upon one and another.



MISSING WATERWAY

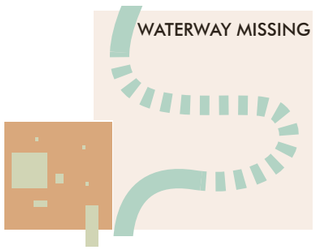
URBAN FLOODING

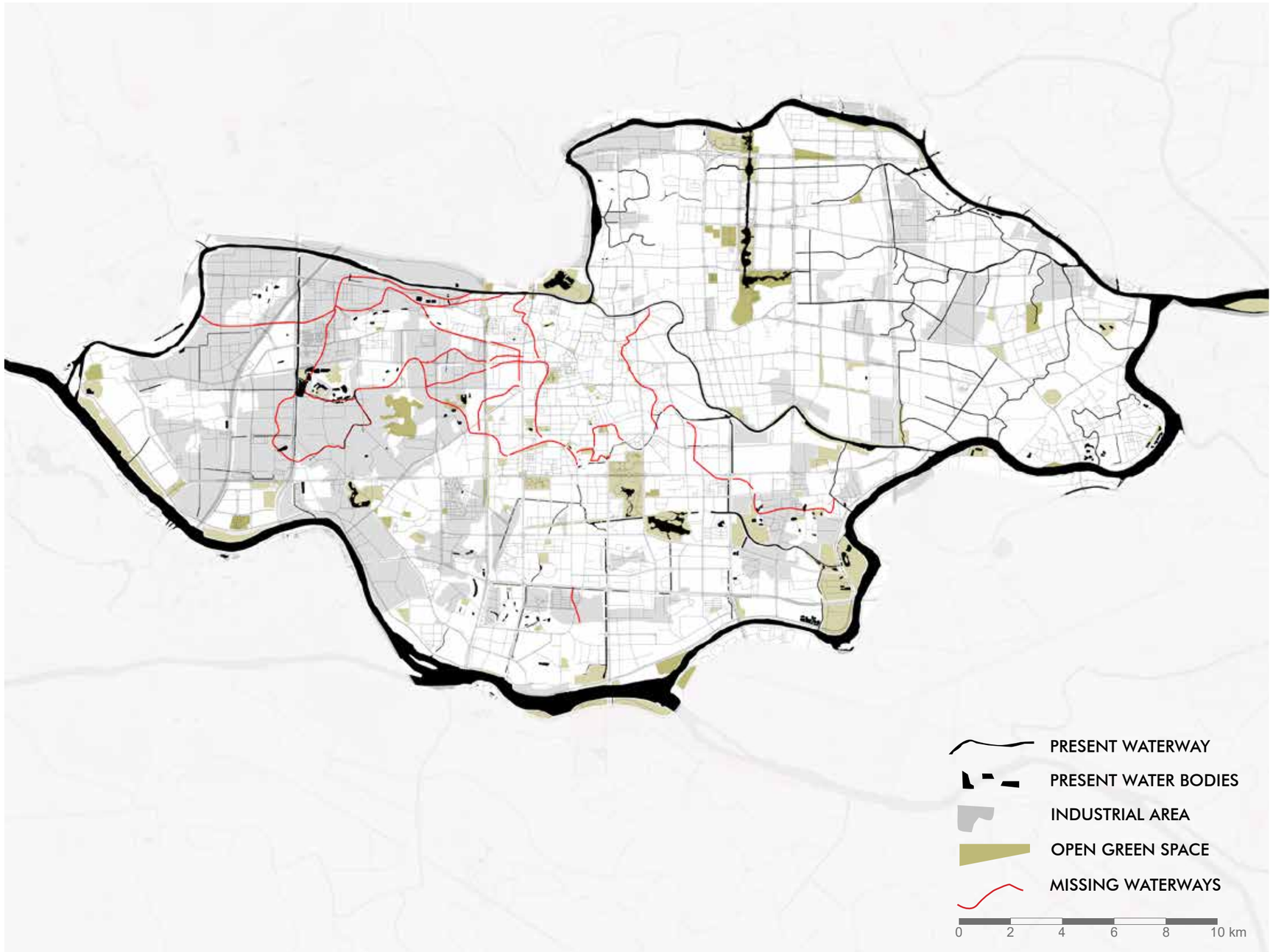


POLLUTED WATERWAYS

MISSING WATERWAY

Lay over an existing map of the research area the red lines indicate where old waterways once flow between the years of before 1950s. The old waterways were predominantly under the industrial areas (in grey) and the road infrastructure at fringe of the old city area. From the earlier reading and analysis it is indicative to say that there are some waterways hidden underneath the urban surfaces. They have been hidden underneath factories and roads transporting water and pollutants out of the area. Waterways were once considered the life source of a civilization but once industrialisation started most of them were canalised to efficient channel by-products of the factories out and away from the factories area.

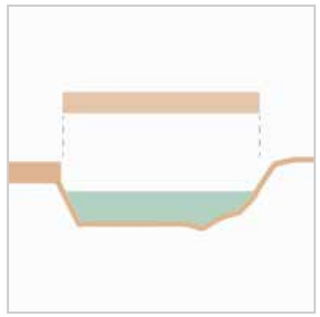


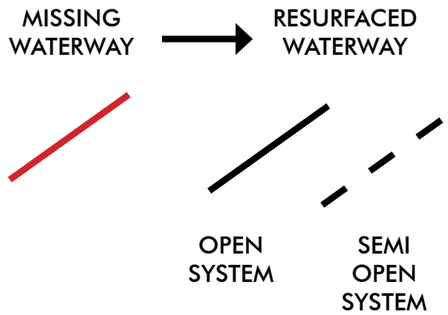


RESURFACING WATERWAY

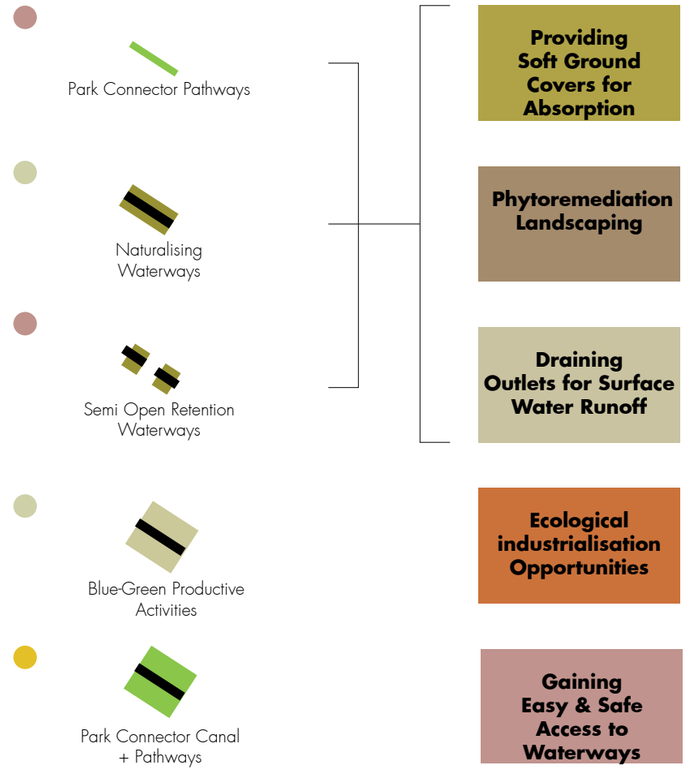
It is a known fact that waterways that a hidden or beneath the ground are not as healthy as those that still natural and open. The lack of exposure to the air reduce the oxygen content in the water making it inhabitable for any flora or fauna that could make the water quality better and better the biodiversity of the area. And by having it out of sight cut the interaction the waterway could have had with the people in the area as people were less likely to care for something they cannot see.

Using waterway resurfacing as a strategy come in two forms i) open system and ii) semi-open system. The difference between resurfacing waterways and daylighting is that apart from exposing hidden waterways we also recreate waterways that use to exist in that area. Many waterways not only went underground but some were merge and straighten into bigger waterways. Design implementation from the landscape toolkit such as daylighting contributes to the health of the waterway, permeable surfaces, water storage and slowing of waterflow helps managing flooding and last providing public accessibility to the waterways will solidify the connection between people and their waterways.





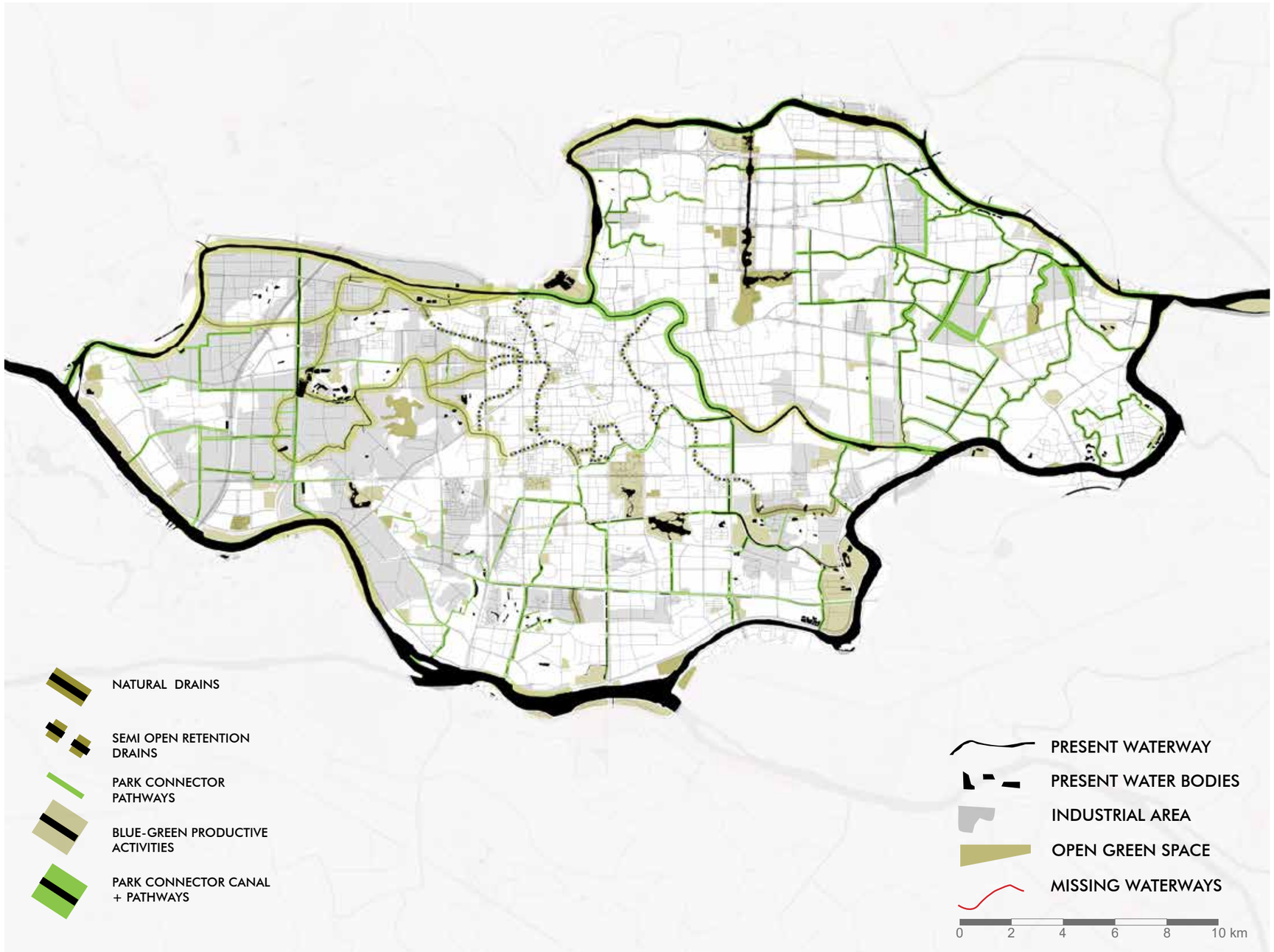
Possible implementations:



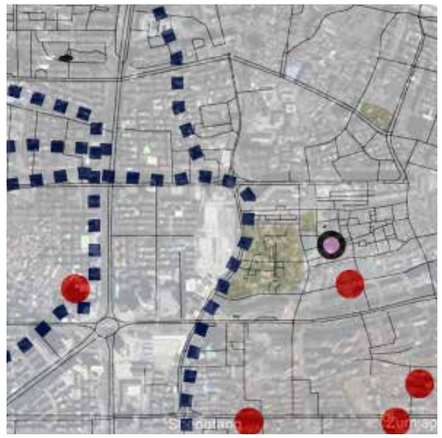
BLUE AND GREEN NETWORK

In the open system entails either naturalised waterways or open canal. This will be done in areas with ample space such as the (soon to be) vacated industrial areas . The semi open area system will be placed in existing dense area such as in the older part of the city and in residential areas, where it is less feasible to male space for a big open system. A semi open system will be made up of less invasive design implementations such as swale garden that run along between pedestrian pathways and vehicular road where surface run-off can accumulate in the swale basin for further sedimentation and filtration before going into the under waterways.

Ultimately the new water network will also incorporate a green and blue network throughout the city, connecting the smaller of waterways such as street side bioswale to the bigger waterways. Green network will come from the green buffer and vegetation grown alongside and in the waterways. This will further amplify the ecological, social and economic benefit as the blue and green network are less fragmented which is good for flora and fauna and also people now can use these networks for recreation and a route for transportation such as cycling.



ZOOM IN SECTION



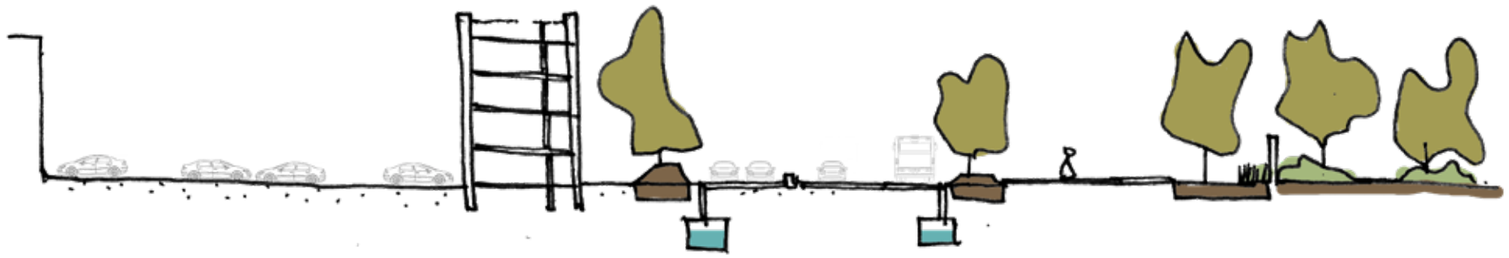
SEMI OPEN SYSTEM

Location:
Zumiao,
Old historical center of Chancheng District

Site Description:
Highly dense urban area with mixture of historical public buildings such as temple, commercial and high-rise residential apartments, sprinkled with parks.

Situation:
Despite high amount of open green spaces and situated on the highest point of the island, the area is flood prone. Due to the lack of space for big design implementation, a semi-open system will implement in this type of situation.

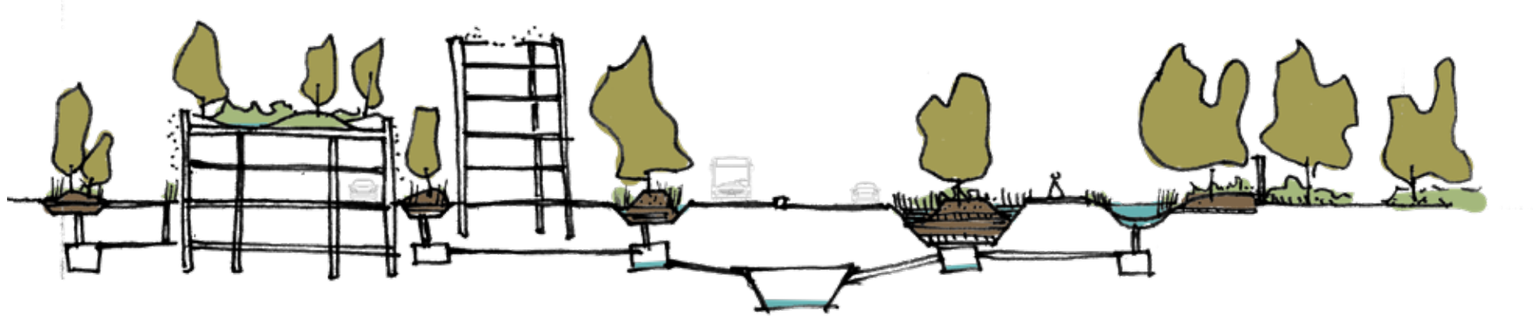
Existing Condition



Semi Open System

Semi Open Retention Waterways

Park Connector Pathways



ZOOM IN SECTION

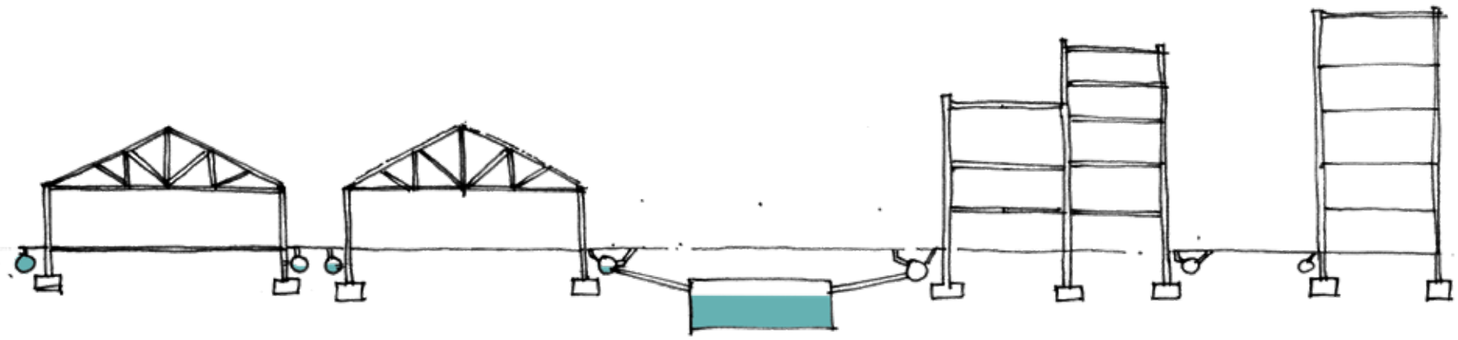
OPEN SYSTEM

Location:
North-west industrial area

Site Description:
The area is mostly filled with dense area of industrial building with sprinkle of residential area and smaller green open spaces comprising of agriculture land.

Situation:
The area is littered with factories that are polluting the underground waterways. Assuming that eventually 80 percent of the industrial land will be converted into land use, this area has large and continuous amount land for landscape design possibilities that could carry activities that will be around for the long-term.

Existing Condition

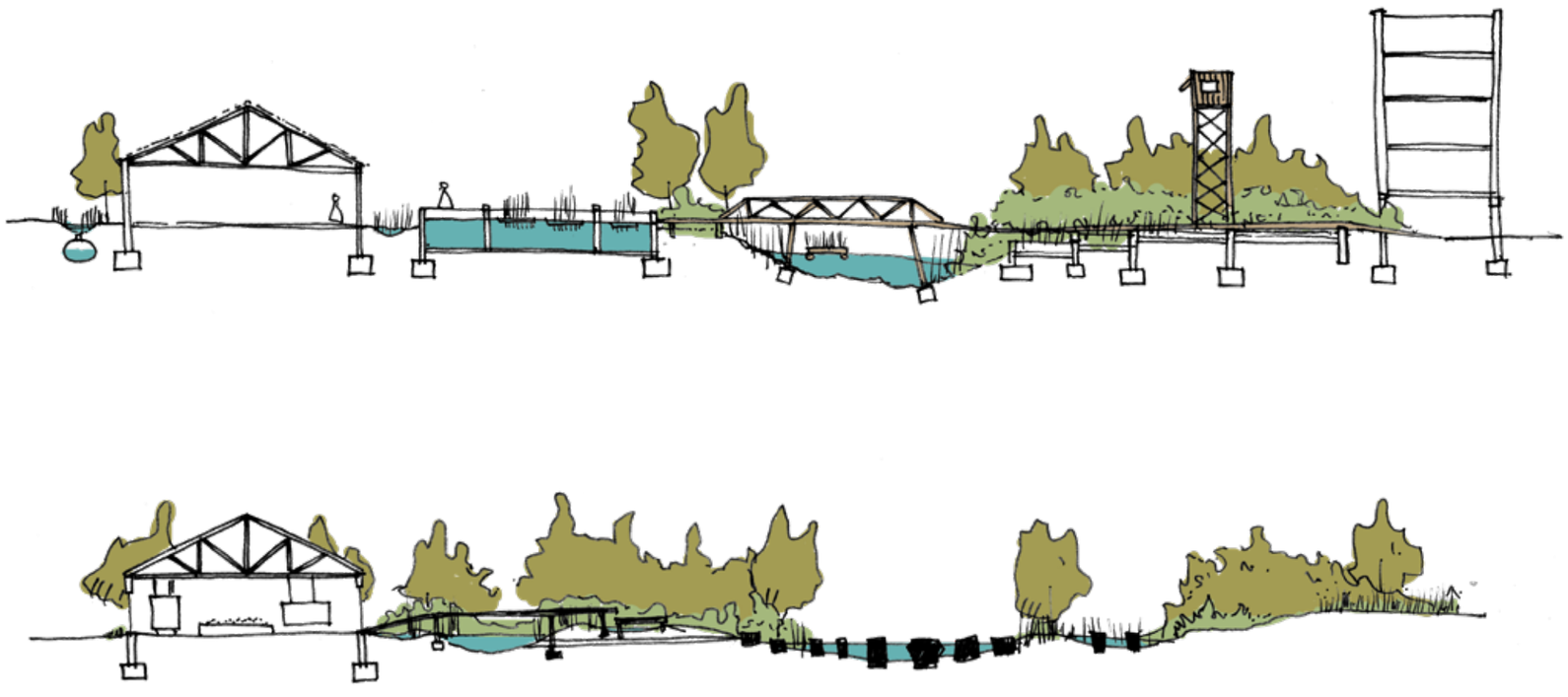


Open System

Naturalising Waterways

Park Connector Canal + Pathways

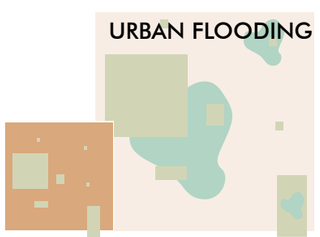
Blue-Green Productive Activities

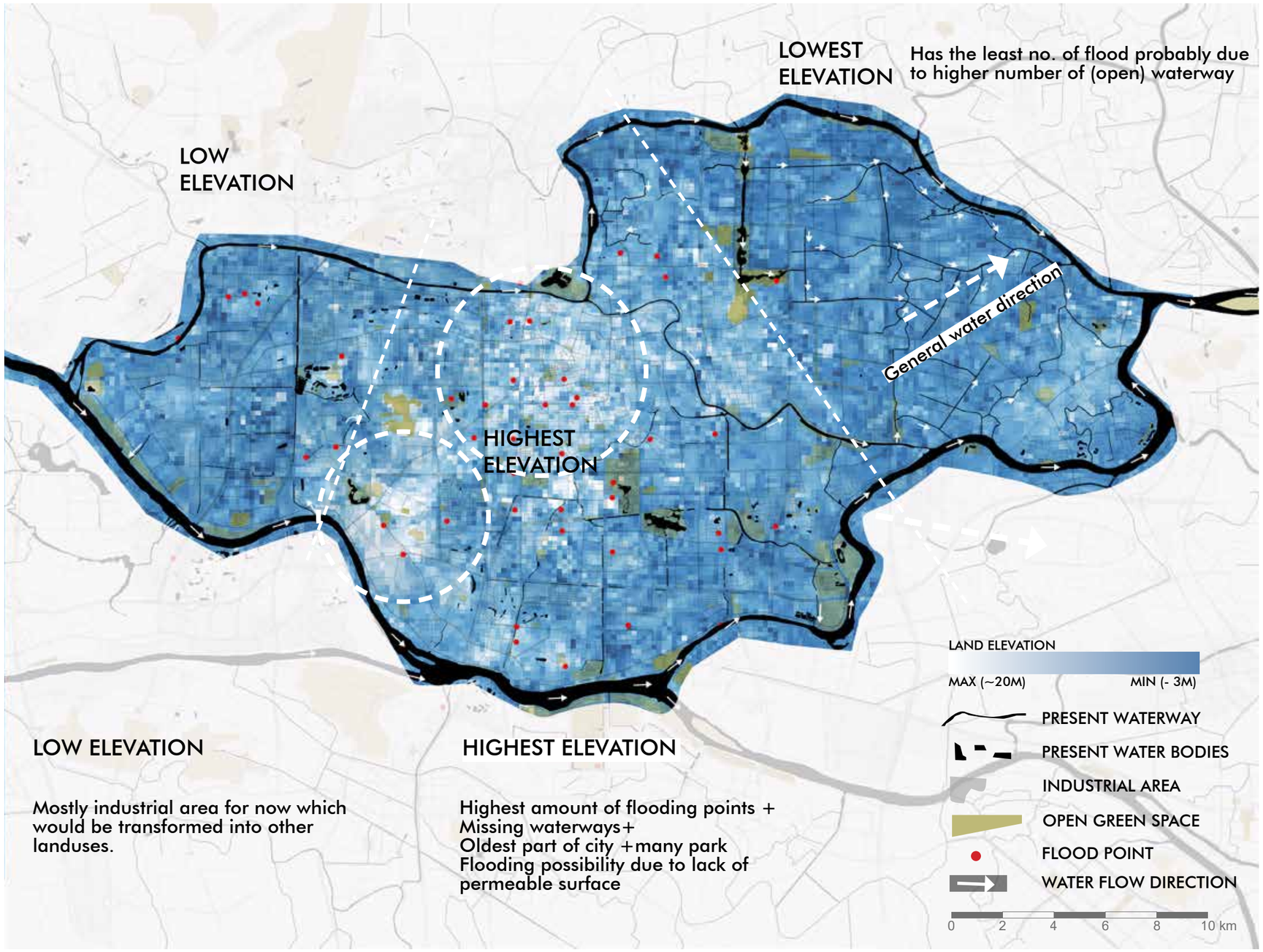


URBAN FLOODING

Urban flooding is a common occurrence in the Pearl River Delta. The heavy rains from annual monsoon and the occasional typhoon couple with its low elevation and rapid decease of open space it makes the region susceptible to urban flooding or waterlogging as it is also known as. The pressure on the drainage system is hard as so much green covers converted into built area to support the rapid urbanisation.

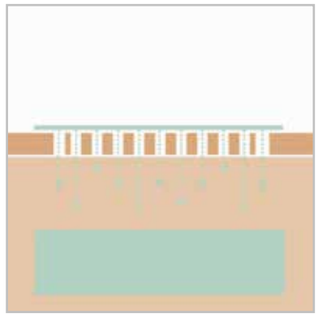
This is an elevation map with urban flooding spots with waterflow directions. The lightest of the blue in the elevation map indicates higher elevation, located in the oldest part of the city where development first began. The lower elevations are in the west and east area occupied by mostly industrial area and residential area. While the flooding occurs all over the city, majority of it are happening in the oldest part of the city which also coincidentally has the highest elevation. And east side which has one of the darkest blue areas have almost no urban flooding but has noticeably larger amount of open waterways as compared to the west and old city. It indicates that having ample space for water and higher amount of outlet for water to flow helps decrease urban flooding.



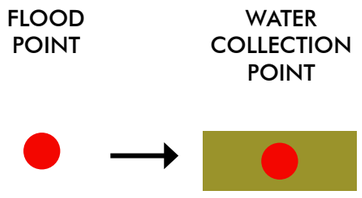


INCREASE PERMEABILITY & WATER RETENTION

The flooding points are in reality areas that water has been accumulating on a surfaced area or overflowing of water from waterways due to choke point. From the earlier analysis, the strategies of increase ground cover permeability and water retention will alleviate the occurrence of urban flooding in urban areas. Since these spots are already considered unpleasant it allows us to turn the area into opportunity by converting it into a green open space with permeable surfaces and water retention capability. These will carry design implementation that allow for water to filtered and absorbed into the ground for further transportation into other waterways or storage space. Essentially, what was once a flooding point is now a water collection point where water is treat productively.



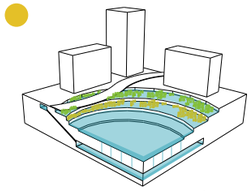
Neighbourhood Scale



Building Scale

Possible implementations:

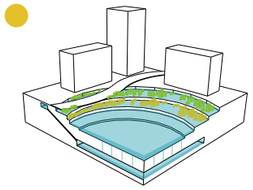
Storing Excess Accumulated water



Bio-retention Swale

Allocated Floodable Urban Area

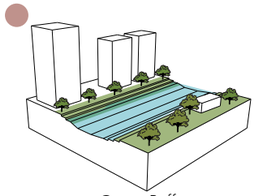
Draining Outlets for Surface Water Runoff



Bio-retention Swale

Daylighting Waterways

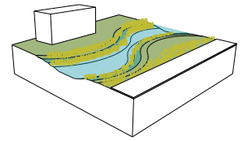
Providing Soft Ground Covers for Absorption



Green Buffers

Permeable Paving

Manipulating Waterflow



Waterway Width & Depth Manipulation

Modifying or using existing structure to contain, carry and cleanse water found on site.

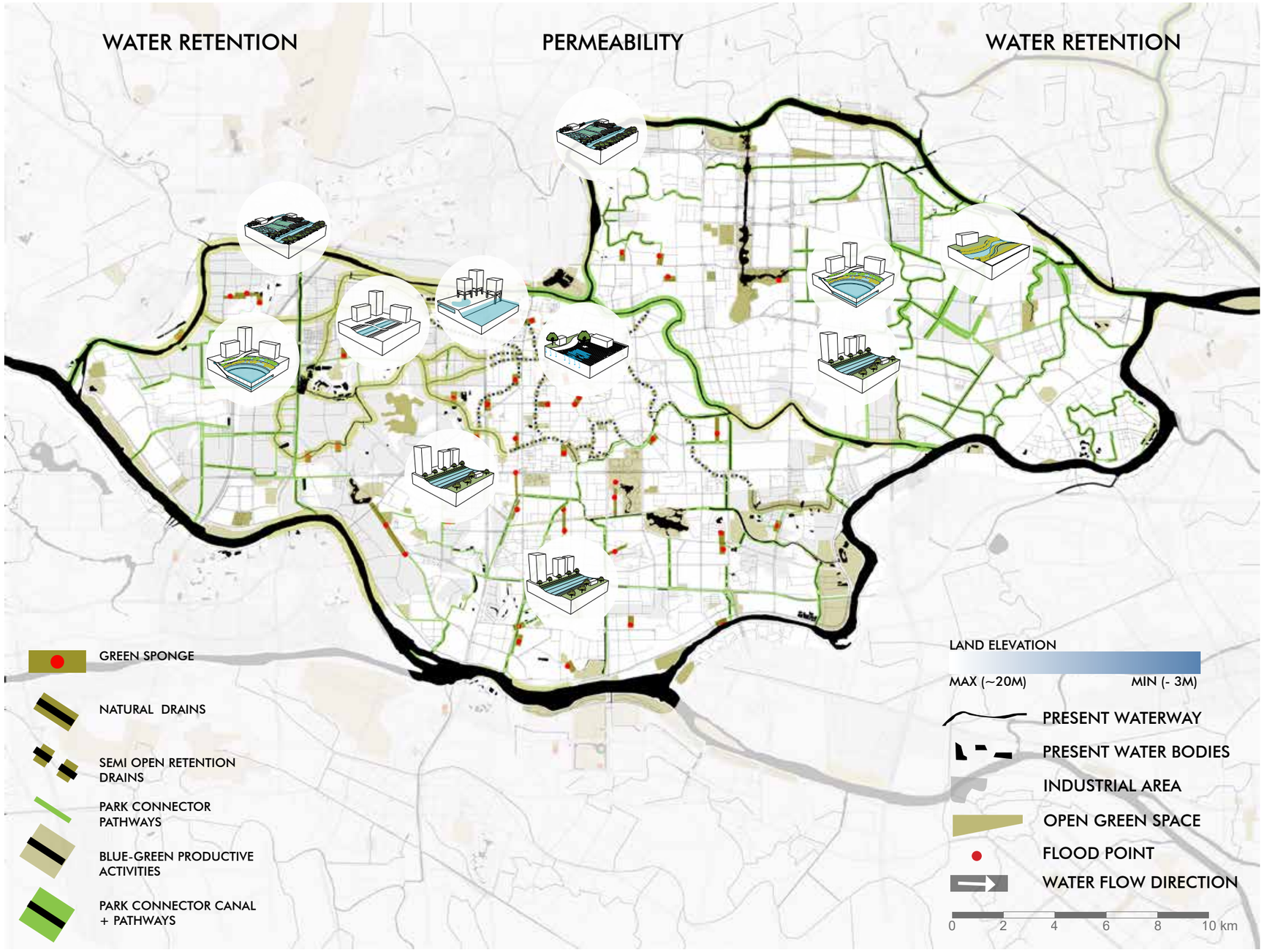
Adding threshold to oxygenate water.

Modifying or using existing biophysical elements to contain, carry and cleanse water found on site.

Using natural energy and processes to contain, carry and cleanse water.

INCREASE PERMEABILITY & WATER RETENTION

Here we assign the different landscape design solution according to the area's different focused needs. In general the west need to expand its retention capability, central area needs to allow for more permeability and the east, before it reaches Guangzhou area need to be able to slow down by allowing for more retention spaces.



ZOOM IN SECTION

ALONG SMALL WATERWAY

Location:
Urban Village in the South

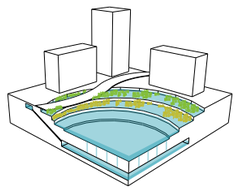
Site Description:
- Highly dense
- Small clusters of Urban Village
- Dense industrial sprawl

Situation:
- Two flooding area
- Extremely polluted (small) waterway

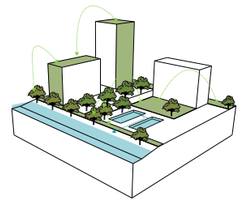
PARK CONNECTOR PATHWAYS

BLUE-GREEN PRODUCTIVE ACTIVITIES

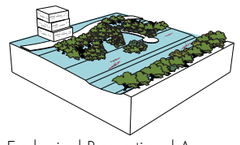
PARK CONNECTOR CANAL + PATHWAYS



Bio-retention Swale



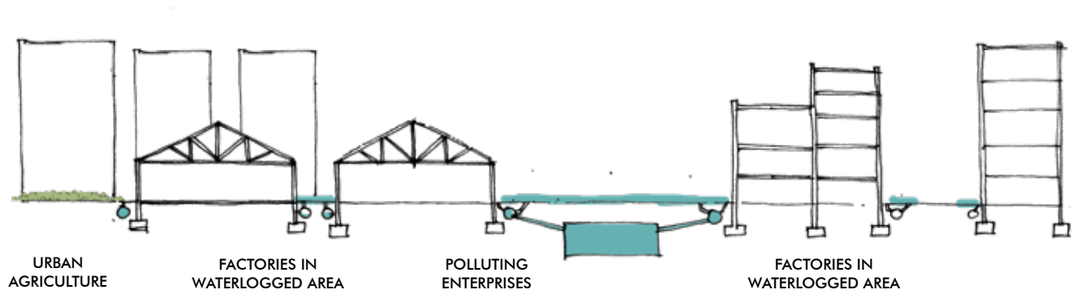
Green & Blue Connection



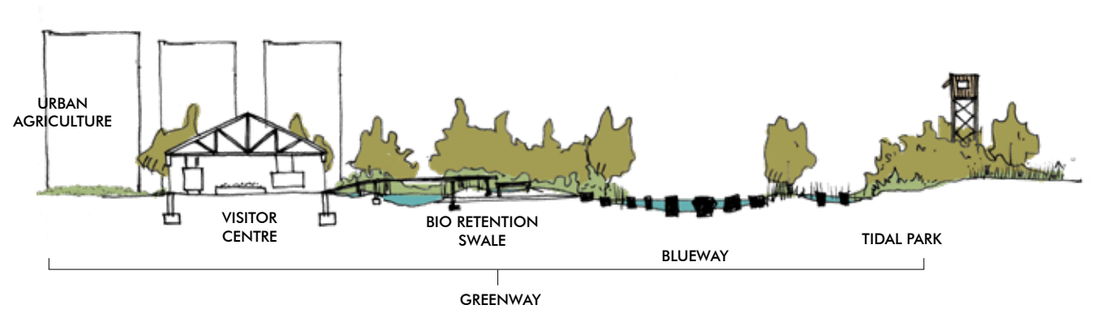
Ecological Recreational Areas

Site Specific
Ecological Sensitive Economy

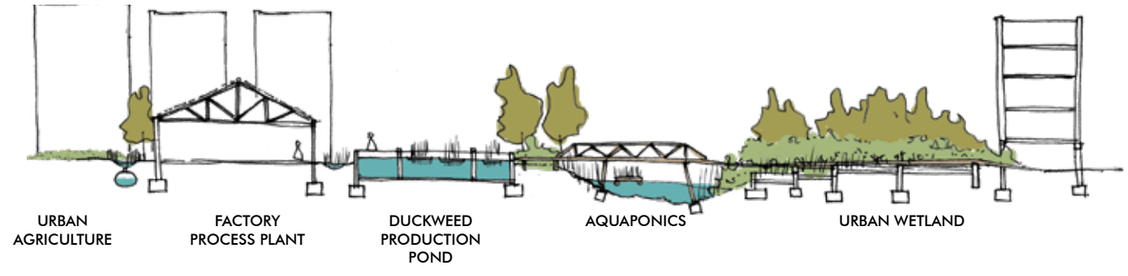
Existing Condition



Nature Oriented Transformation

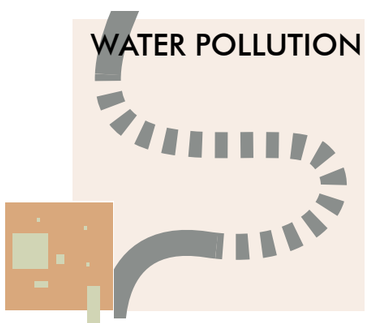


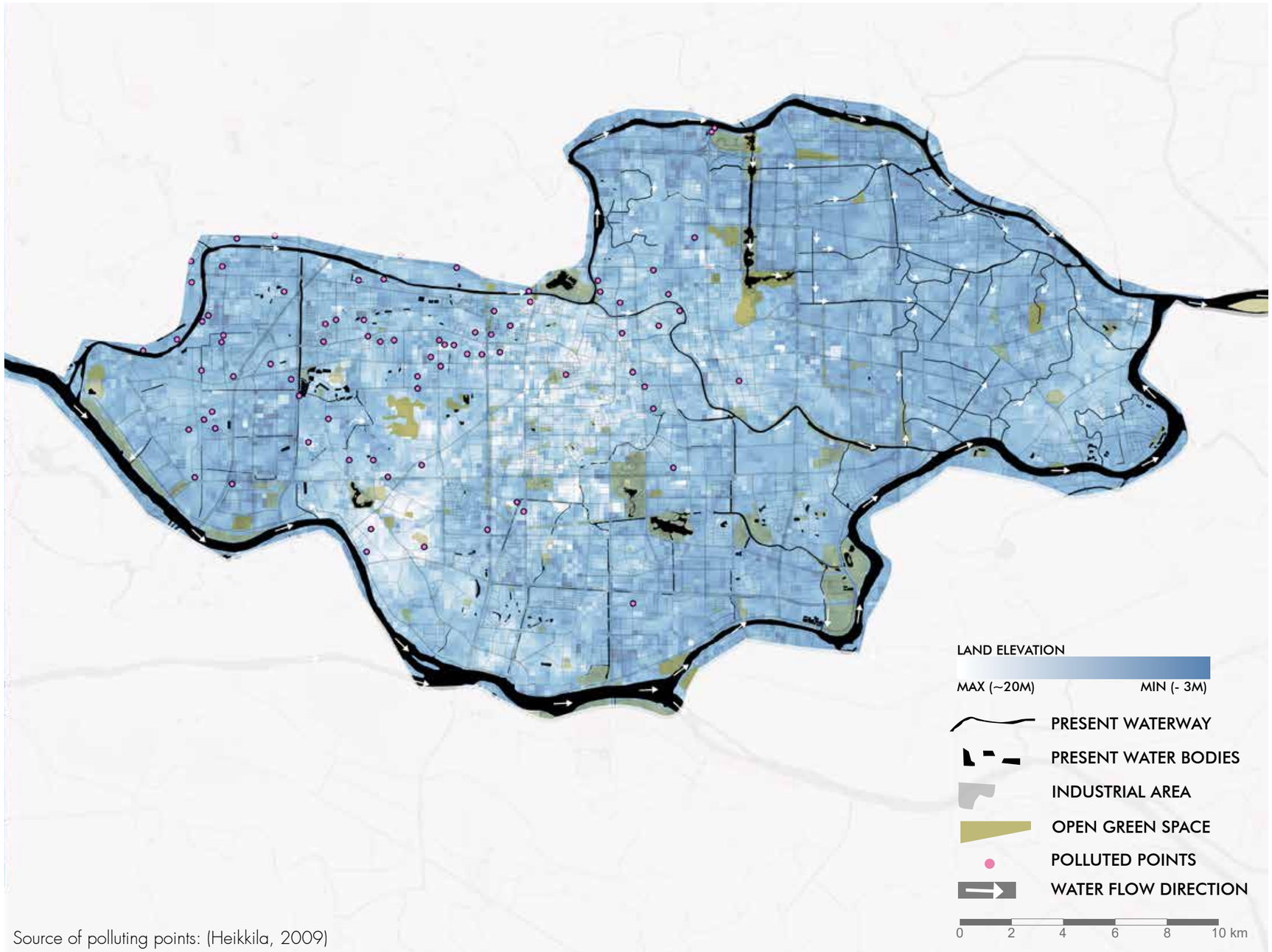
(Ecological) Industrial Transformation



POLLUTED WATERWAYS

The map here show the same elevation map with red dot indicating enterprises polluting the waterways and there are quite a number of them in the western industrial area. Foshan, specifically Chancheng and its surrounding district had already moved most of the polluting industries out of Foshan almost two decades earlier when the government issued out law and stricter regulation targeted at major cites. While most of the heavily polluting industries moved to the rural areas where laws were less enforced, there were some that clearly remain as water till this day remains polluted. Clearly due to the foul smelling, oil slicken and black appearance of the waterways, there is minimum interaction between people and waterway. Only form of interaction seen during site visits were farmers using the water to irrigate their crops and people fishing for recreation, both activities seemingly harmless but potentially dangerous dues to amount of pollutant one would ingest.

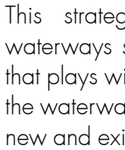


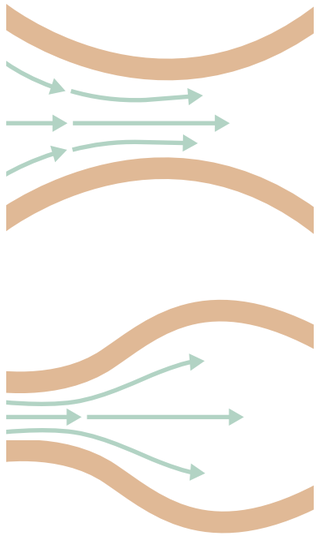


Source of polluting points: (Heikkila, 2009)

WATERFLOW MANAGEMENT

The main strategy to cope with polluted waterways is the management of waterflow. This strategy rides on the resurfacing waterways strategy by designing a system that plays with the speed of water flowing in the waterways will promote movement in the new and existing waterways. As reported in papers and observed on site visits some of the smaller waterways were stagnant. This stagnation leaves the waterway clogged with floating plants and an unpleasant smell due to the accumulation of nutrient from surface run-off and the lack of oxygen. Speed of water can be manage by a few ways, the addition of water pumps for instance, but for this project will look into exploring the different width and depth as a way to control the speed of water. Hence the waterways will comprise of wide and shallow waterways to facilitate slow movement of water and narrow and deep to pressure water move fast into another part of the waterway. The shallower area will have allow for sedimentation and phyto-remediation planting to aid with the clearing of the pollutant that will flow by them. As part of the continuation of waterway resurfacing strategy, polluted spoil from the digging and from the area will be transported and bio-remediated in an allocated area within the neighbourhood.

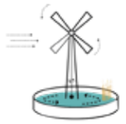




Possible implementations:

WATER POLLUTION

Using natural energy and processes to contain, carry and cleanse water.



Adding threshold to oxygenate water.

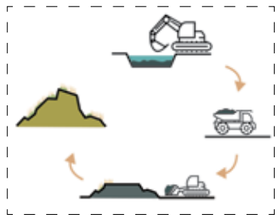
Manipulating Waterflow

Adding vegetation to phyto-remediation site and purify water.

Increasing permeable surfaces.

Phytoremediation Landscaping

SOIL POLLUTION



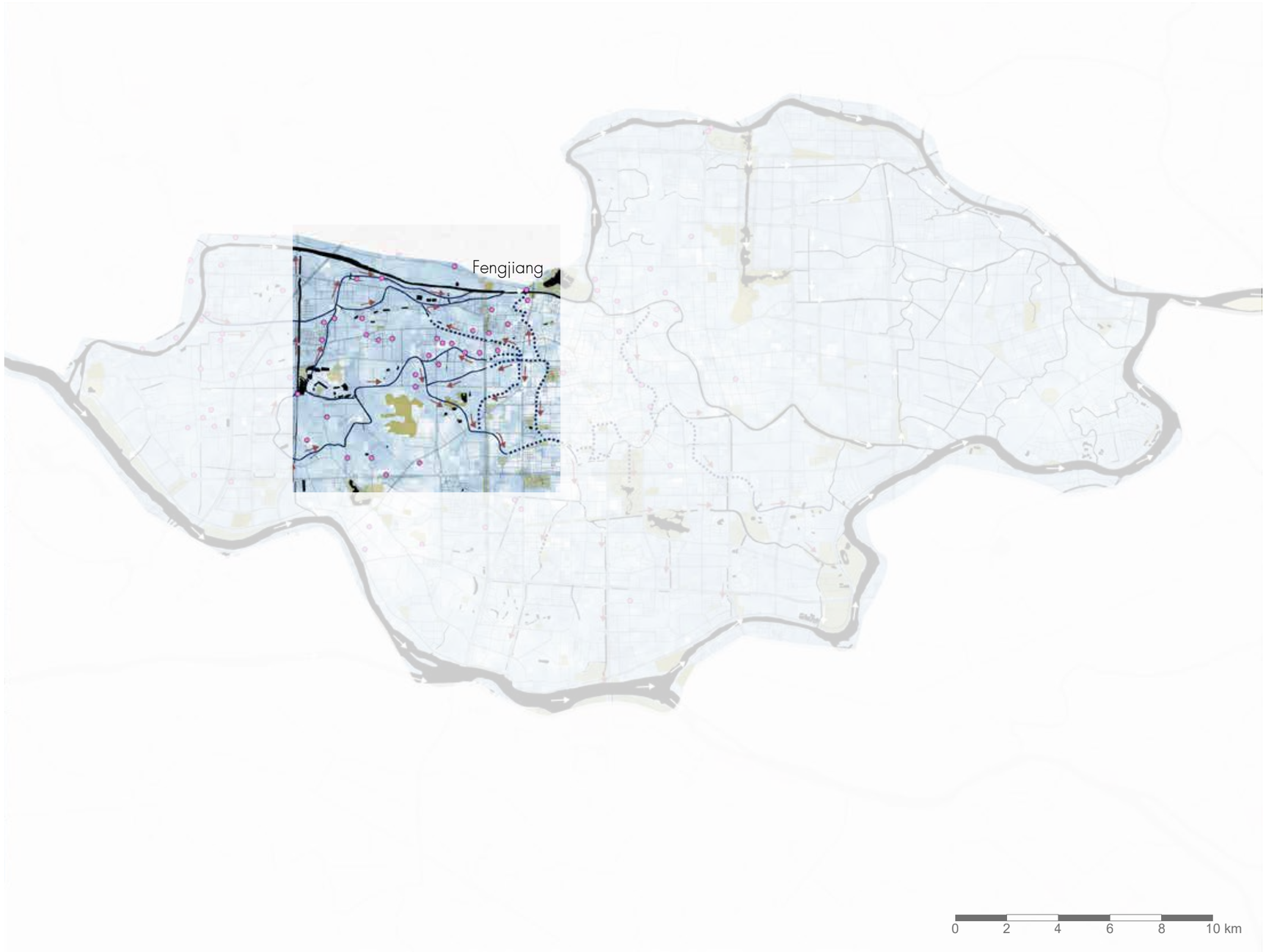
Phytoremediation Landscaping

Manipulating Waterflow

NEIGHBOURHOOD SCALE

To better demonstrate the waterflow management and phyto-remediation strategy, we will zoom into a neighbourhood scale to further the design exploration.

The area chosen is an area in the north of Changchen. The area has significant amount of missing waterways, urban flooding points and pollution. The landuse also varies from old historical core where it has significant amount of impervious surfaces and on the west side of it is a major industrial area which will allow for larger design influence. It also has a range of different waterways ranging from big, small and missing. Notably, the large waterway in the area is Fengjiang, also known as Mother River to the locals as it is the point where Foshan first began.



TRANSFORMATION PHASING

PHASE 01.

Clearing factories to secure bioremediation treatment area.

Daylighting first waterway and constructing bioswales

PHASE 02.

Clearing more factories to secure bioremediation treatment area and ecological buffer zone.

Building up the bio-remediation into a hill with a fresh water reservoir at the top.

Resurfacing more waterways.

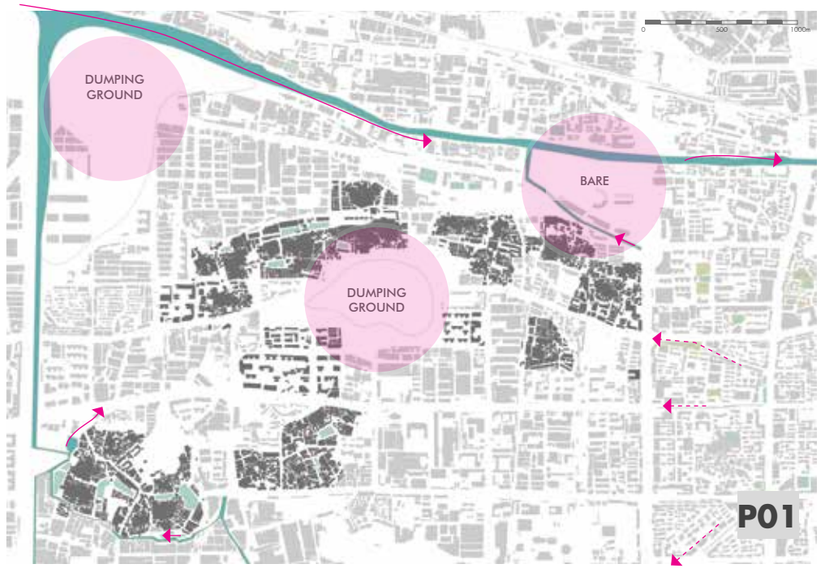
PHASE 03.

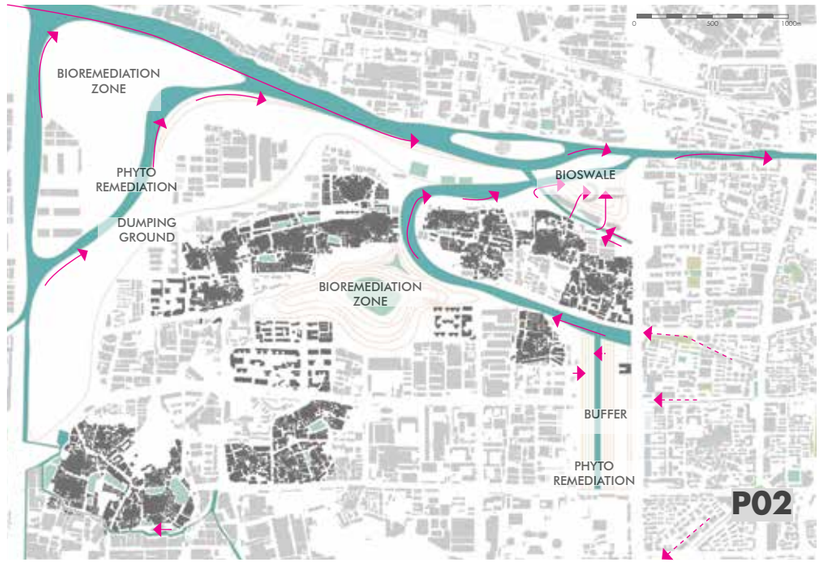
Stabilising the remediation areas and establishing it as ecological and recreational zone and resurfacing more waterways.

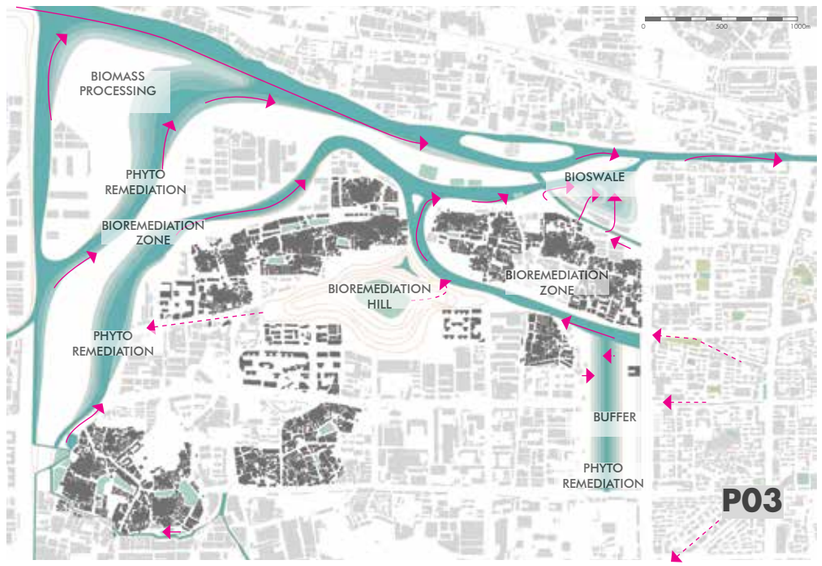
Setting up facilities to harvest biomass from bio-remediation byproduct.

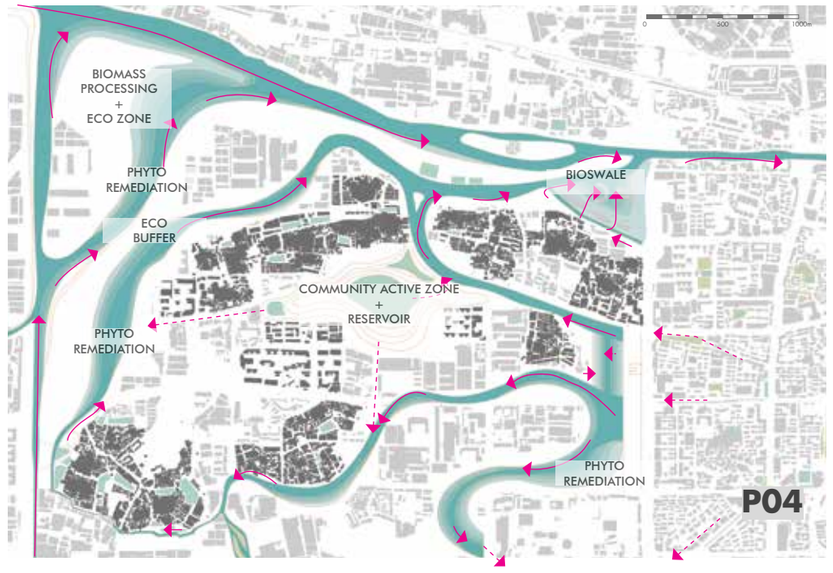
PHASE 04

Adding the last waterway that connects and removing more factories from production landscape such us agriculture, aquaculture.

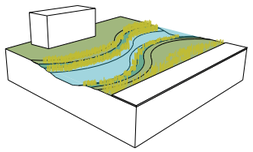






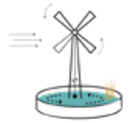


WATER FLOW MANAGMENT



Waterway Width & Depth Manipulation

Using natural energy and processes to contain, carry and cleanse water.

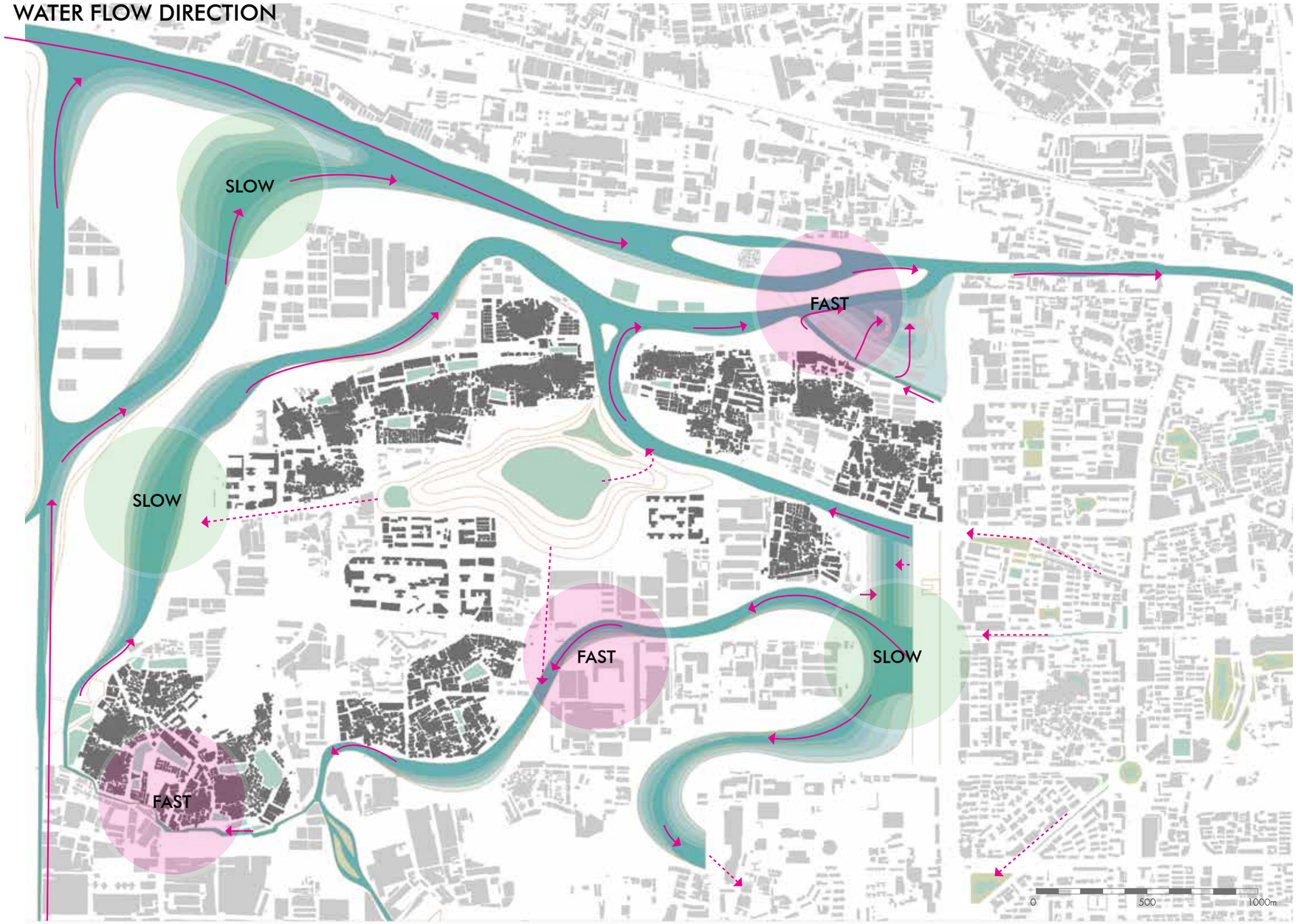


Adding threshold to oxygenate water.

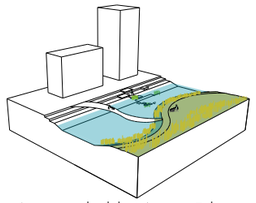
The interplay of waterway width and depth will influence the pressure exerted into water flowing through. This play on pressure will allow water speed to change accordingly and allow for movement of water. Movement of water in waterways is essential as it flushes out contaminates that were not filtered by the plants, prevents odor from stagnate water and oxygenate the water in the waterway.

The manipulation of waterway width is also incorporated with the water edge condition. Area with slower water speed are areas with wider and hence more gentle slope angle, which makes water edge and slope more approachable and safe for the public and for animals

WATER FLOW DIRECTION



WATER EDGE CONDITION



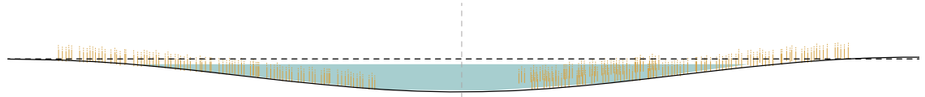
Approachable Water Edge

Adding vegetation to phyto-remediation site and purify water.

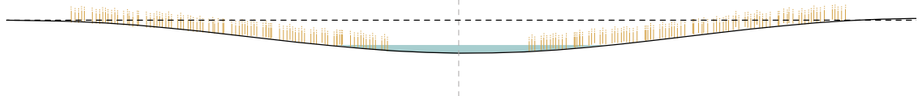
Increasing permeable surfaces.

Segments where water is planned to move slower and allow for sedimentation are located in place with amply space that allow for soft nature water edge that can accommodate gentle slope for sedimentation and growth of plants that can carry out phyto-remediation processes. These gentler gradient slopes provide opportunity for animals and people to gain safe and easy access to and out of water (when water quality gets better in time). While segments where water move fast, have narrower and deeper waterways. They will in area were space is constrained but they will also have additional measures such as green buffers for safety and underground water tanks to anticipate for overflows.

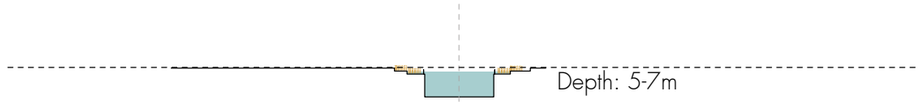
Slow/ Wide Waterway 1:12
Waterway width: ~ 400m
Wet season



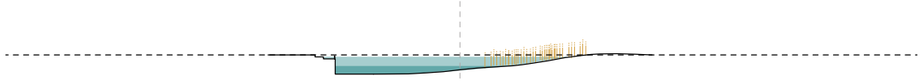
Dry season



Fast/Narrow Waterway
Waterway width: ~ 10 - 20m

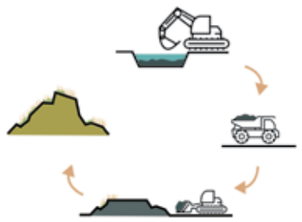


Mix Waterway
Waterway width: ~120m



Before/After landscape design implementation of Bishan Park, Singapore Image: Ramboll Studio Dreiseitl Singapore

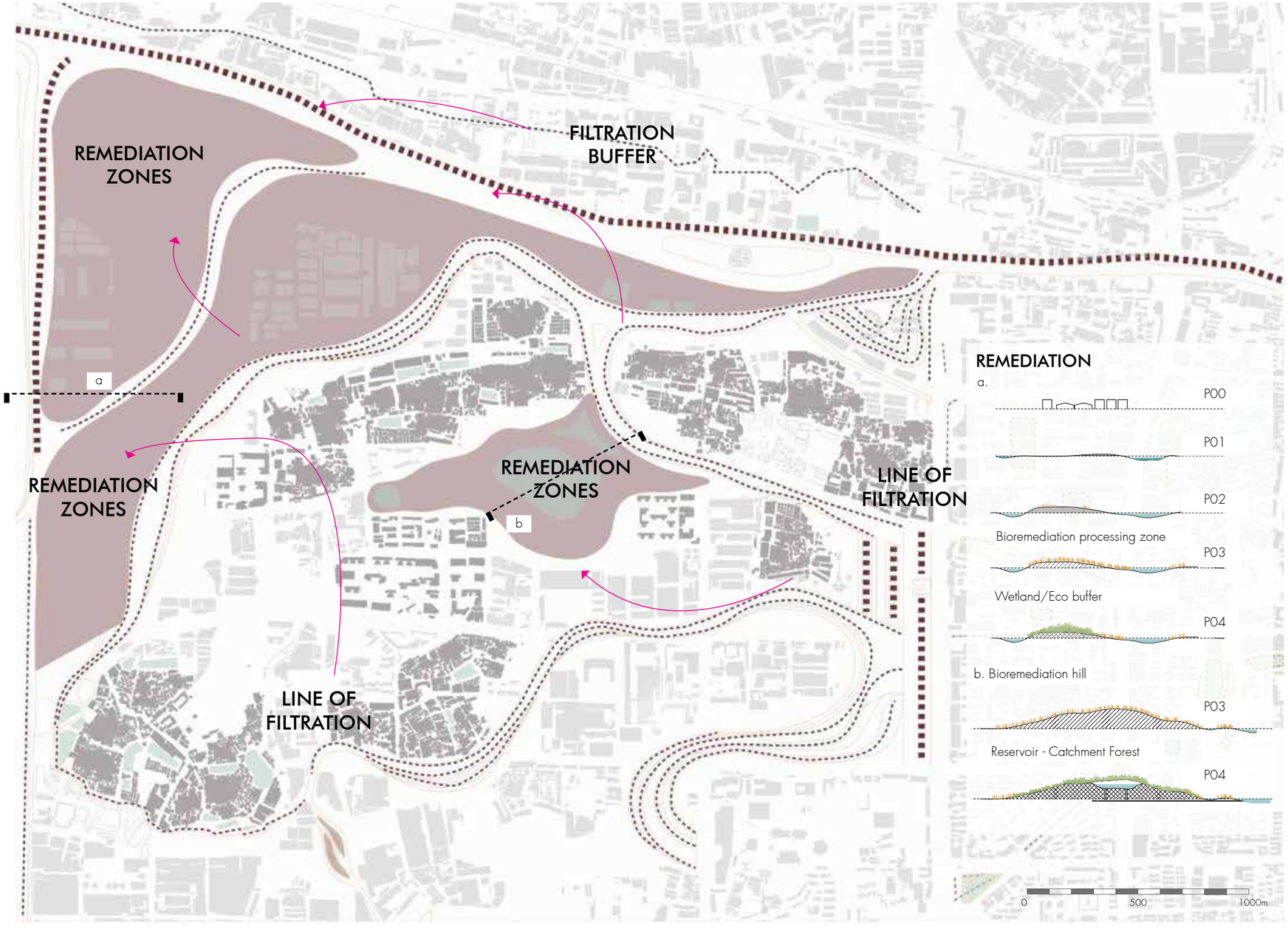
PHYTO-REMEDIATION



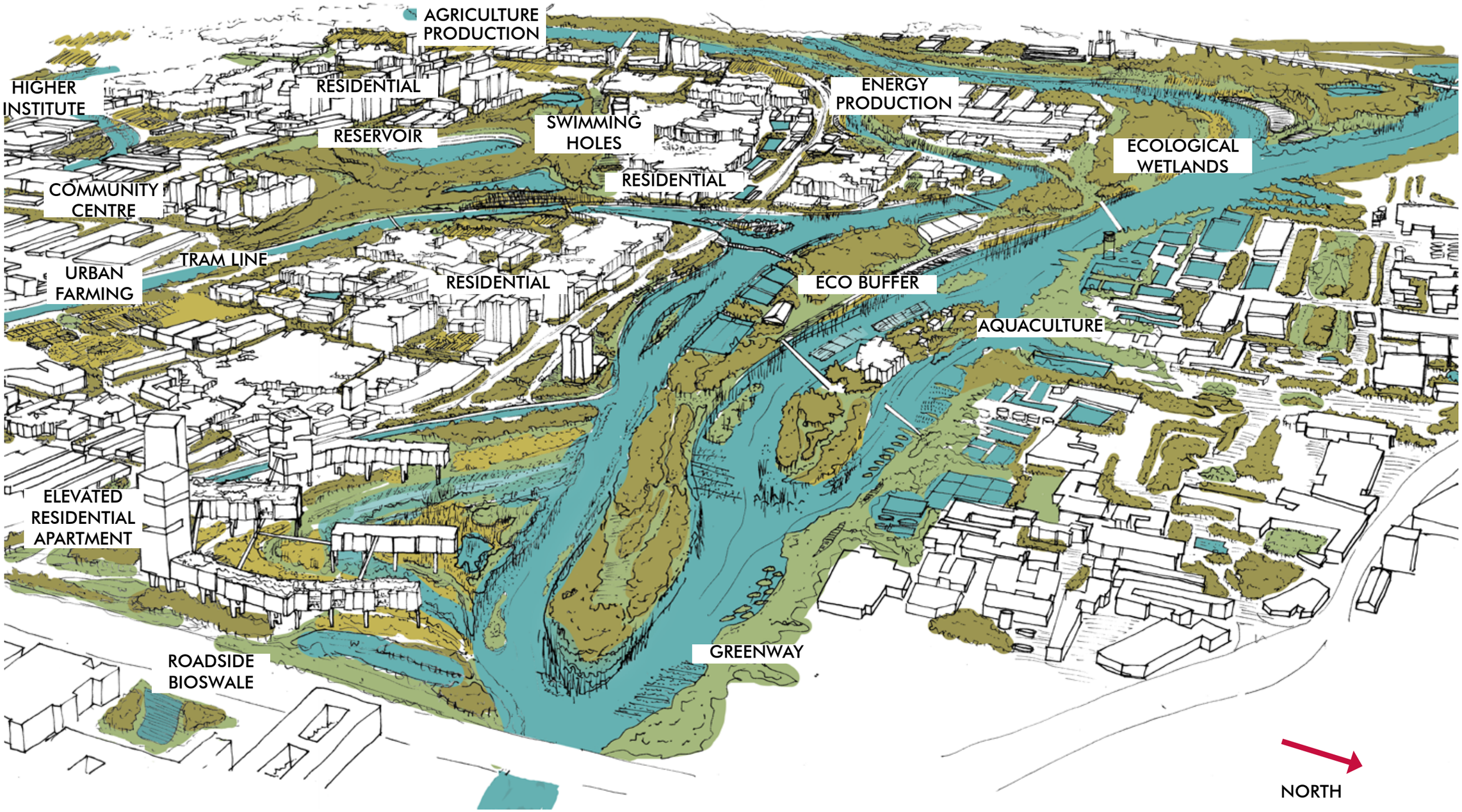
Adding vegetation to phyto-remediation site and purify water.

Increasing permeable surfaces.

Building on top of the water management strategy, dotted lines are rows of plants suitable to extract pollutant out of water by breaking down bacteria or by uptaking heavy metal into their roots or stem. And every few months once the plants have to continue to be harvested to ensure continous uptake of pollutant in the remediation process of the waterway. Harvested green waste is then left to be process in a plant where biomass can be product extracted and distributed back to the community. Polluted soil that we dug up from the waterway resurfacing will be place make mounts where it will left to remediate in a similar process and overtime when it is safe, it will be turn into natural dikes/eco buffer and hills for reservoir and recreational proposes. The reservior collects water from the rain, recharges the groundwater and also flushes the waterways during dry season.

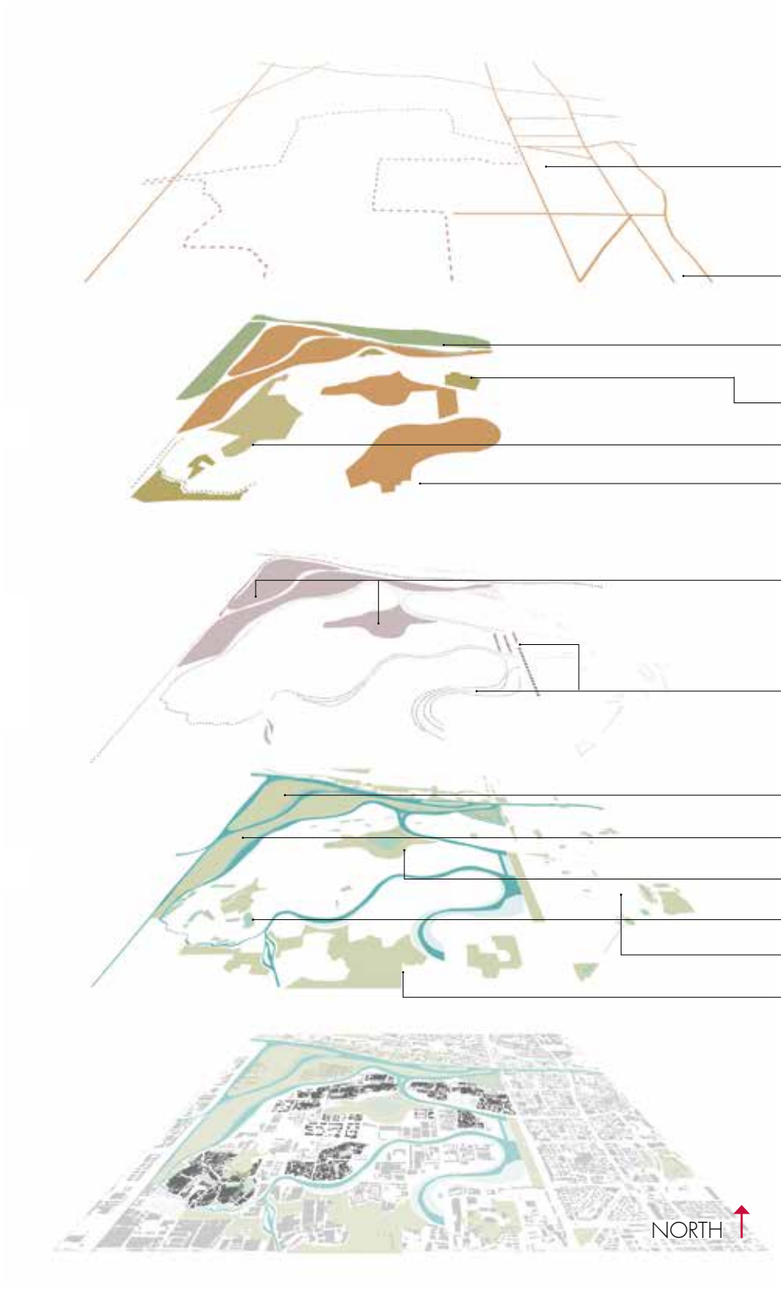


Fengjiang Waterfront

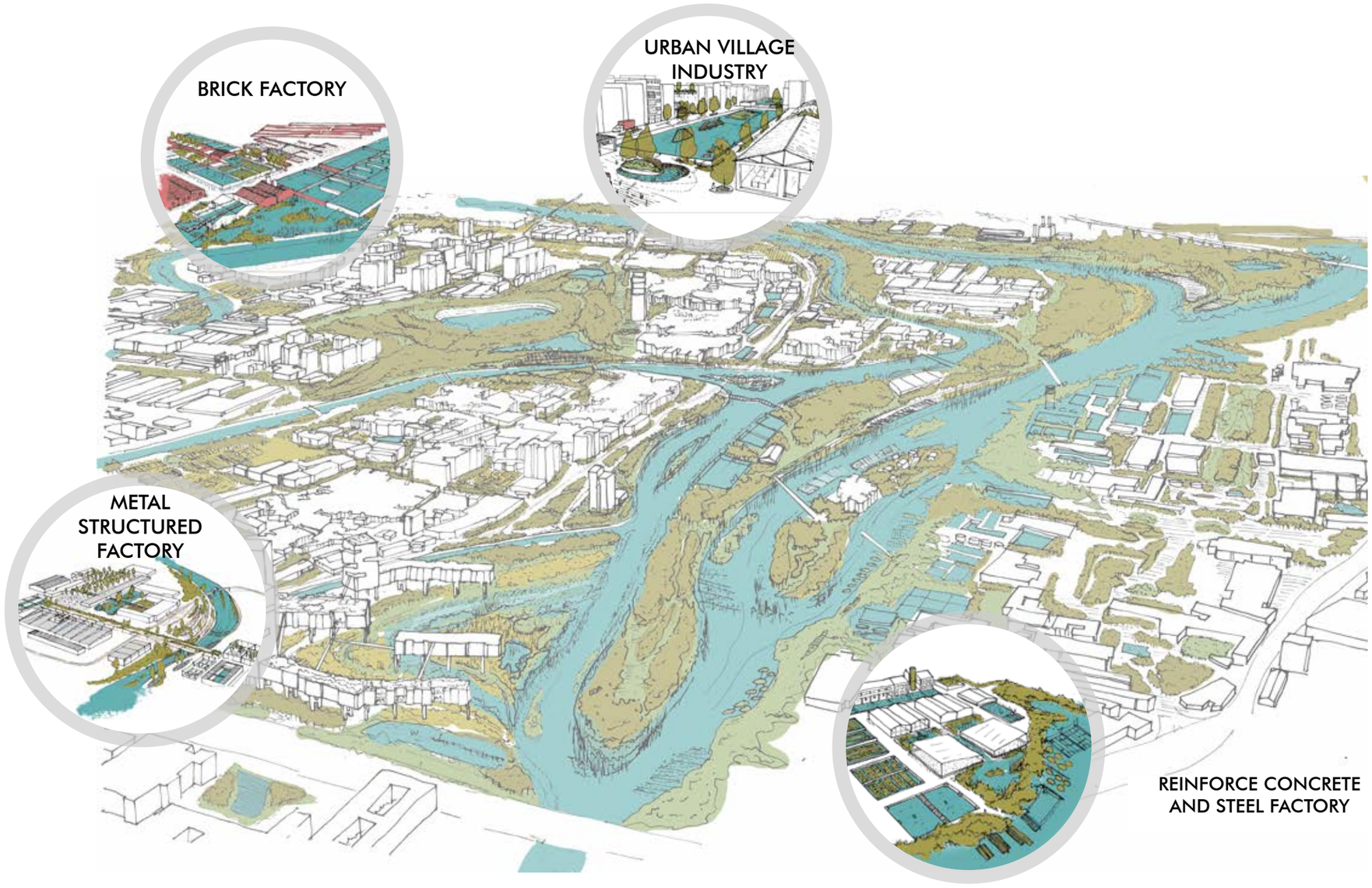


PROGRAMMES

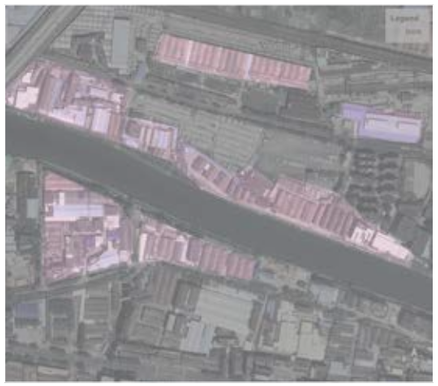
This exploded diagram illustrates the various programmes of this area. And from the phasing diagrams we would have see how certain areas such as the ecological wetlands has many other programs at certain time period (wetland, nature dike) but also has different overall programmes over the year/ different phases. It started out as industrial area, stripped bare and become a collection point for contaminates to be dedicated to become a remediation zone, before settling into a ecological area. This example illustrate that an area, according to its location, size can be planned have many different programs to adapt to the changing needs of an area. Similarly the opposite is possible too, where an area can just serve as an ecological buffer for the long-term propose for the protection of the city.



FACTORY INTERGRATION



REINFORCE CONCRETE AND STEEL FACTORY

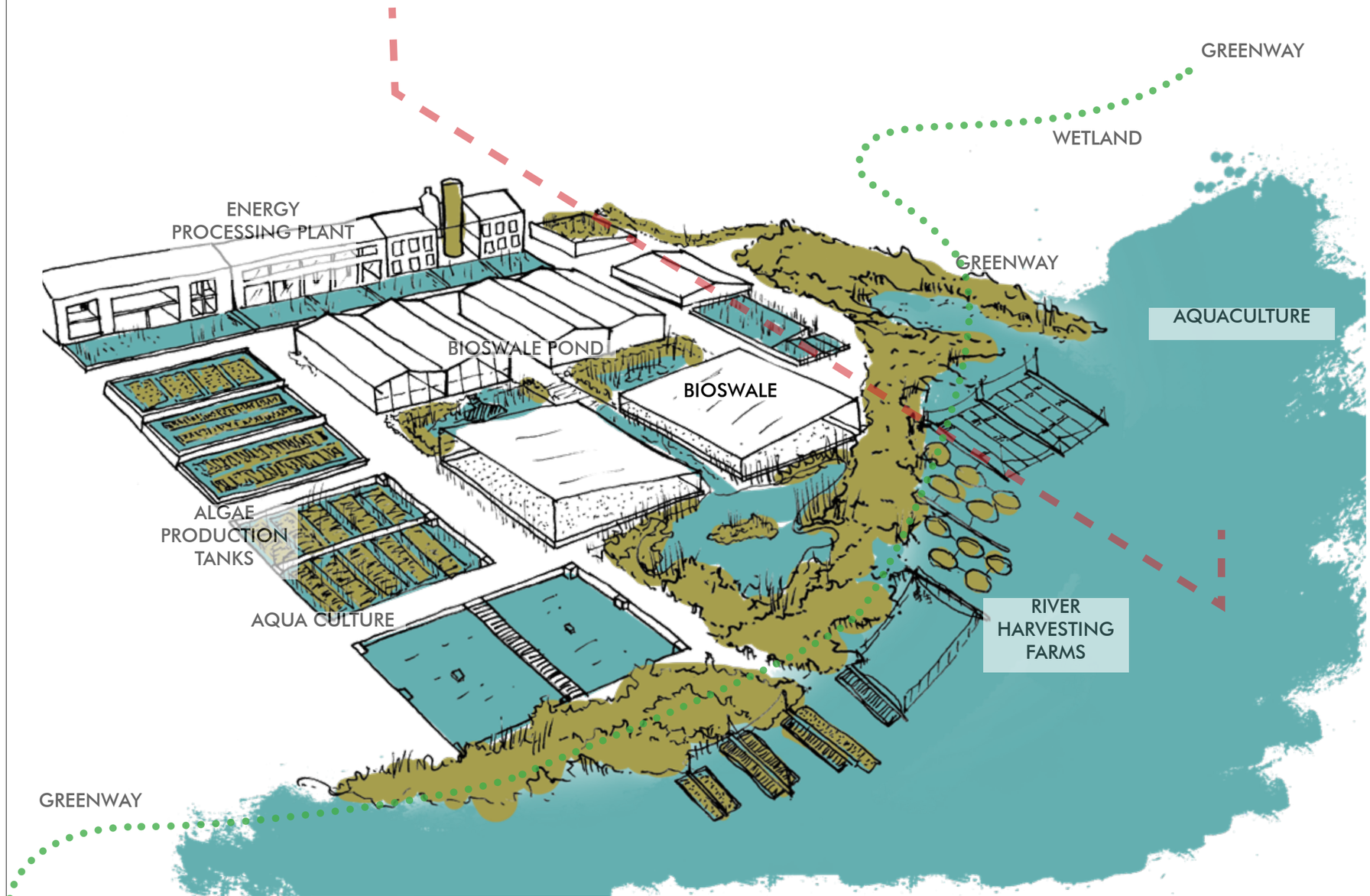


- Large factories are common along the main water on the north and south side,

- Heavy industries; cement production and heavy metal works.

- Reinforced concrete columns

- Typically with high ceiling to accommodate their heavy industrial equipments.

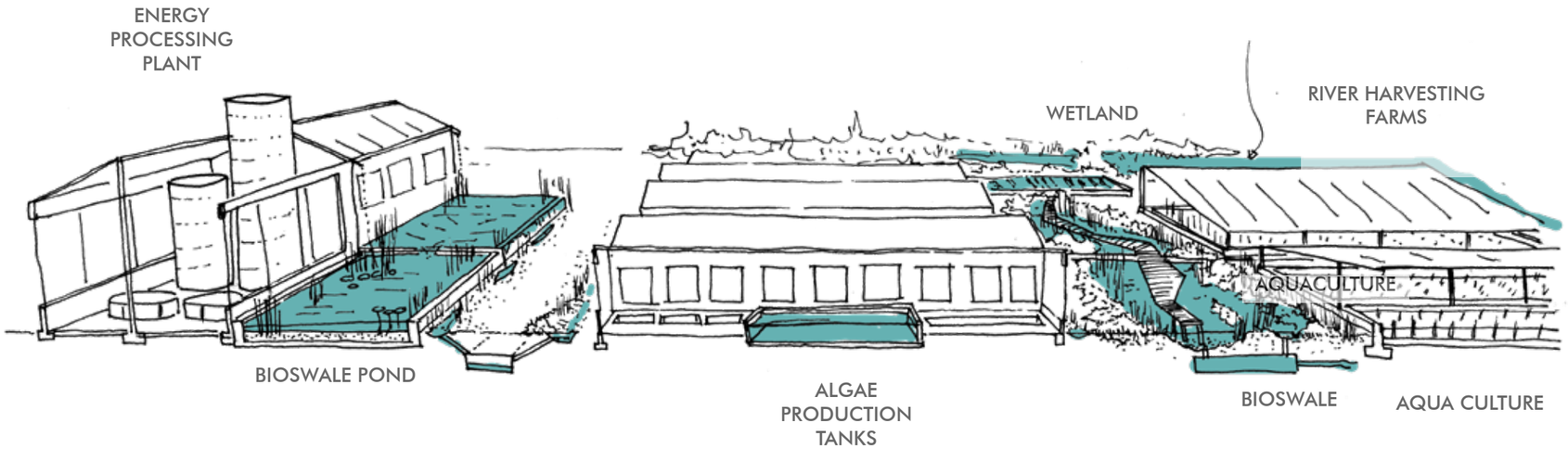


REINFORCE CONCRETE AND STEEL FACTORY

The water has been edge is soften to allow for publicly accessible greenway and commercial cultivation. Greenway now acts natural protection buffer that also benifical for the ecology and economy.

With the need for lesser factory buildings, some have been kept for newer programmes and others repurpose into ponds to hold water for production or storm water retention storage.

SECTIONAL PERSPECTIVE

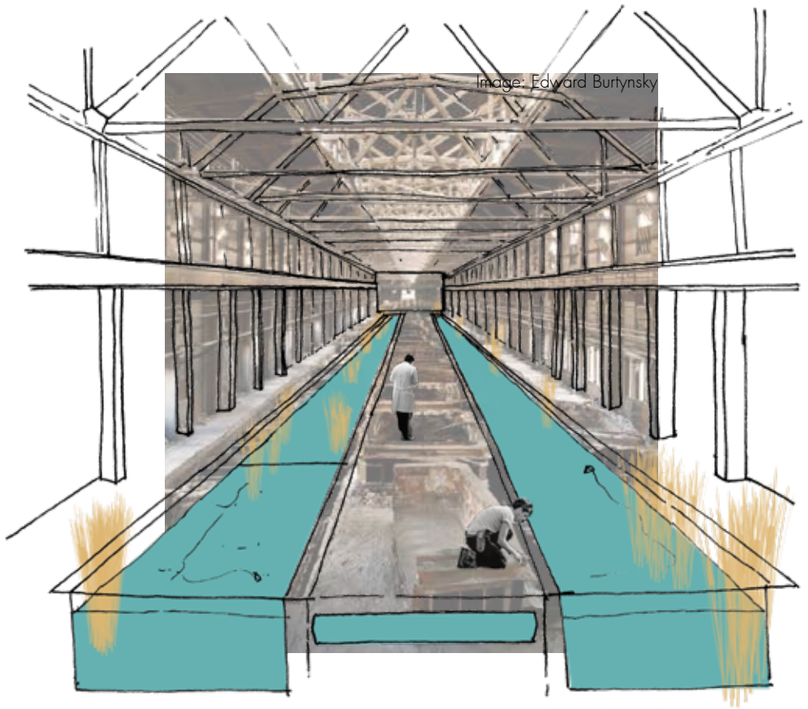


REINFORCE CONCRETE AND STEEL FACTORY

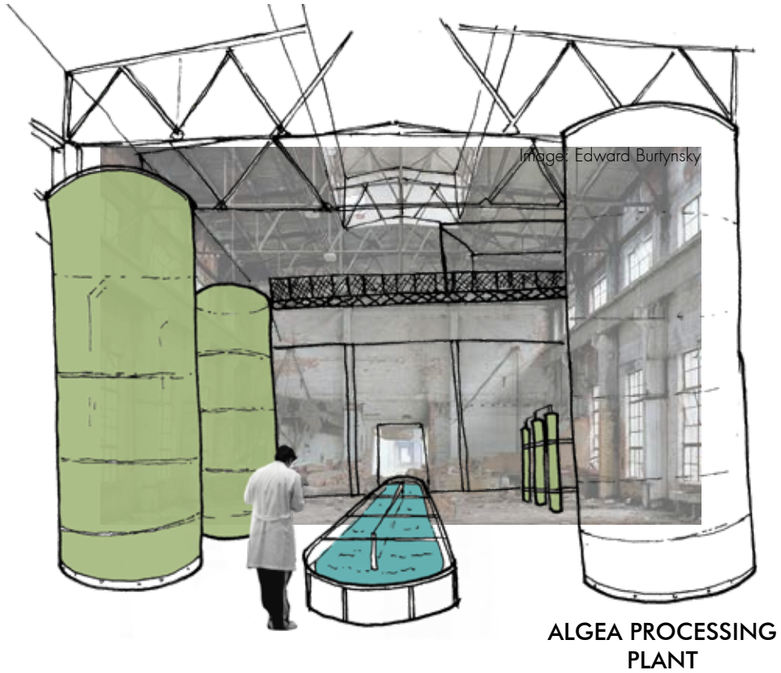
INTERIOR ADAPTATION

As this typology is known for their high ceiling and interesting structures like having trenches within the building, these structural and spatial characteristic are reuse and integrated with new and cleaner forms of industrialisation.

Trenches allow for aqua and other forms of wet industries to exisit. While high ceilings allow for cleaner types of processing plants to take over the spaces.

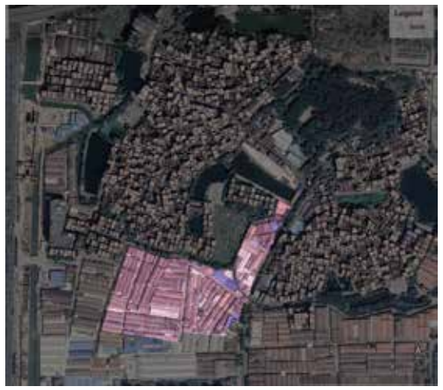


FISH PRODUCTION

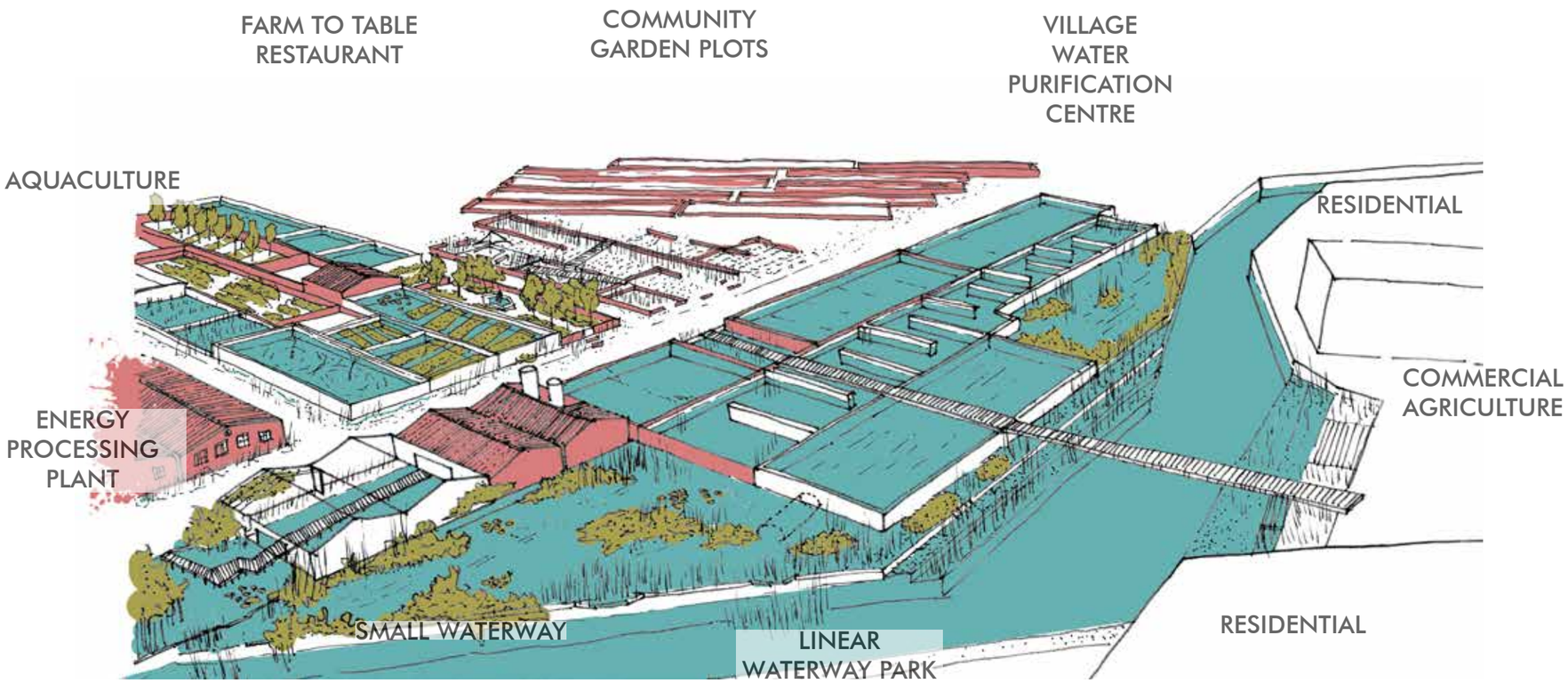


ALGEA PROCESSING PLANT

BRICK FACTORY



- Oldest type of factory building
- Garment production
- Generally found adjacent to urban villages,part of rural industrialisation era
- Converted their agriculture plots
- Red or grey brick with red tiled roof
- Single storey structure

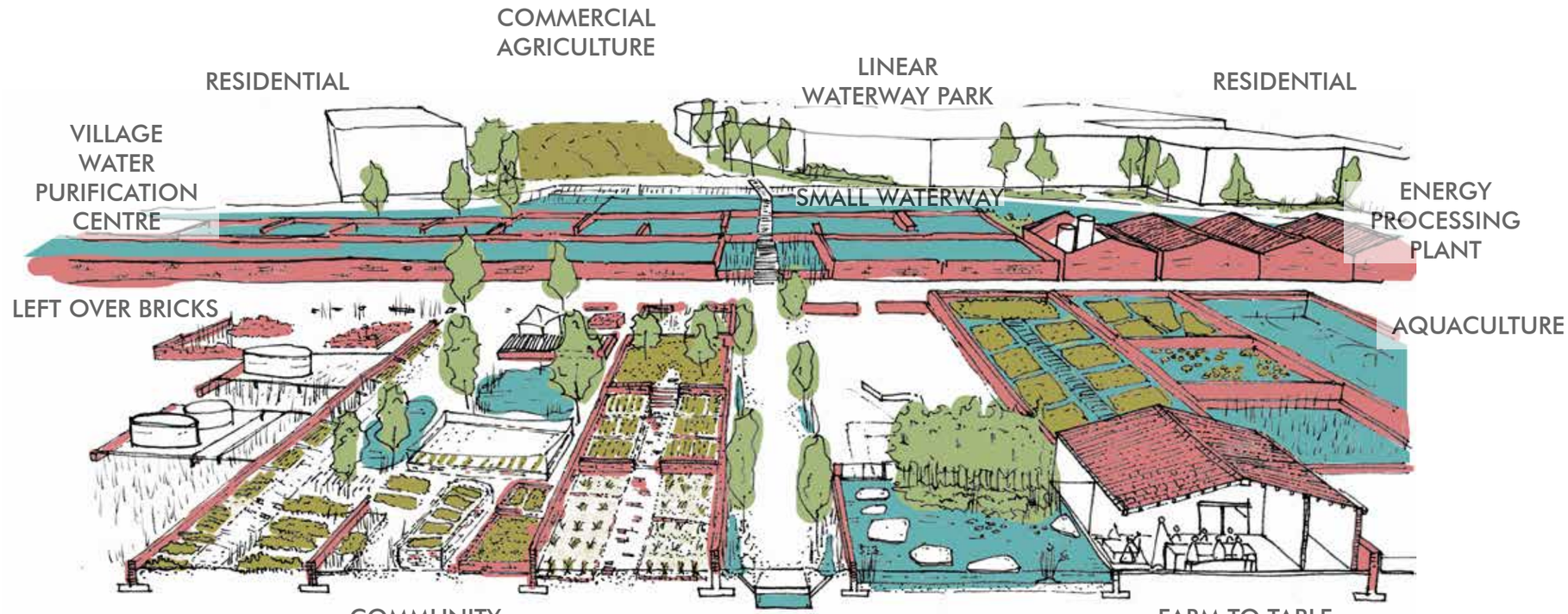


BRICK FACTORY

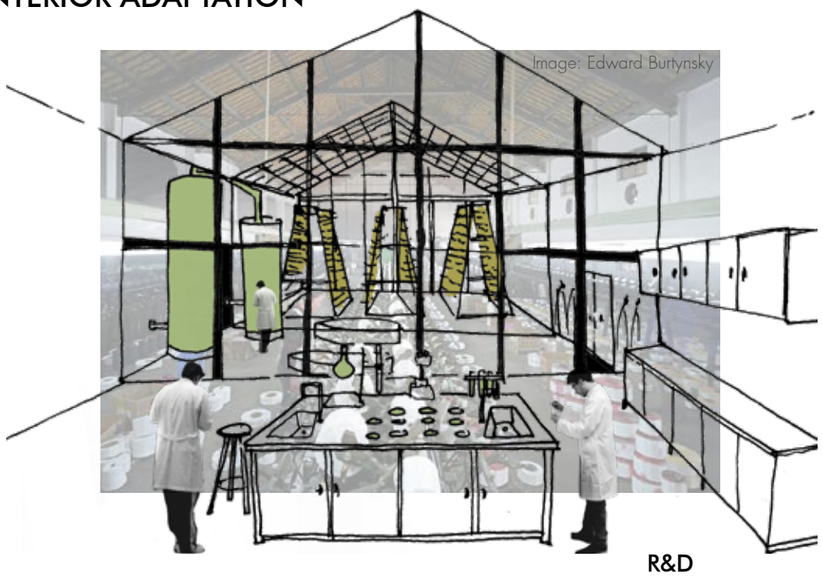
Instead of being a spatial divider, the waterway and the industrial area now works as a connector and extension of the community, where water is collected and cleaned on site for further use of the community.

And the with shift in the socio demography and increase awareness of environmental and personal well being, it is even possible to dream for a once polluted area to hold a farm to table restaurant and urban farming plots to service the residents living in the area

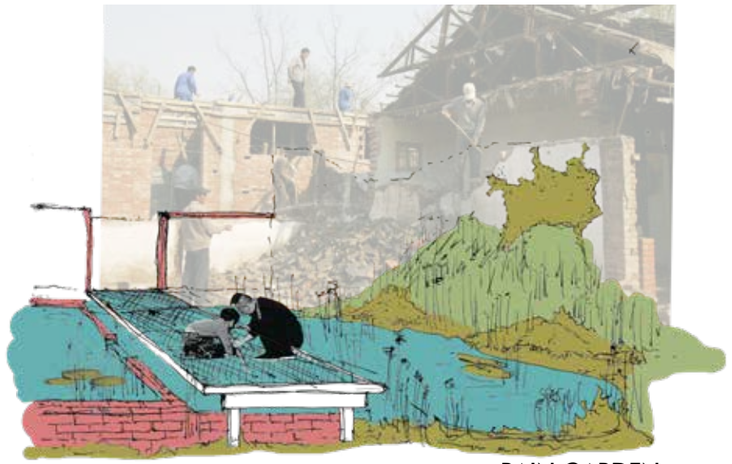
SECTIONAL PERSPECTIVE



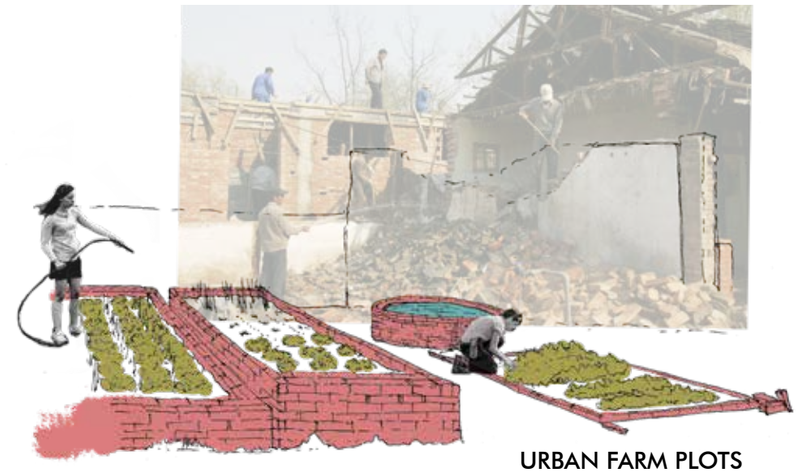
INTERIOR ADAPTATION



R&D
RESEARCH LAB



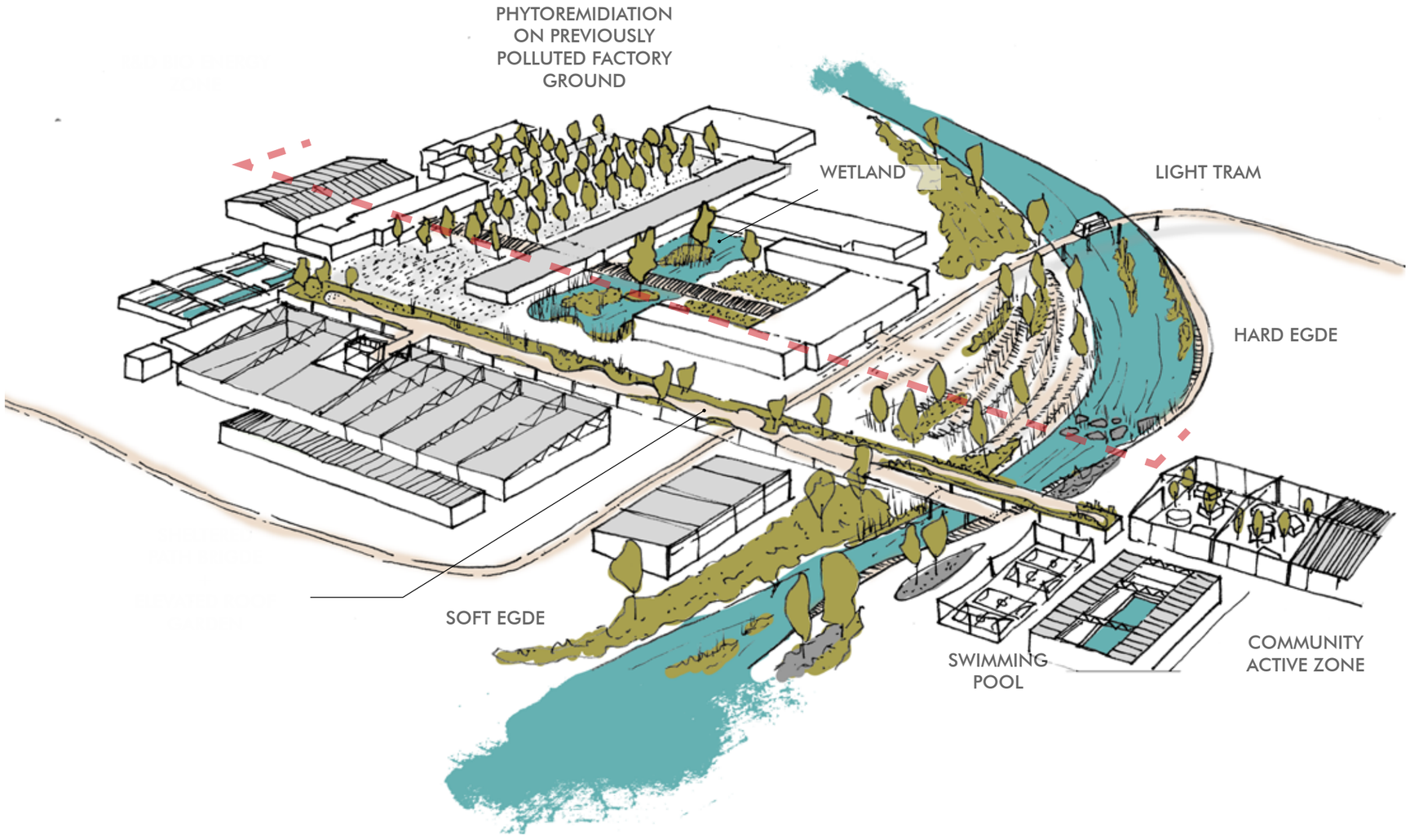
RAIN GARDEN



URBAN FARM PLOTS

METAL STRUCTURED FACTORIES

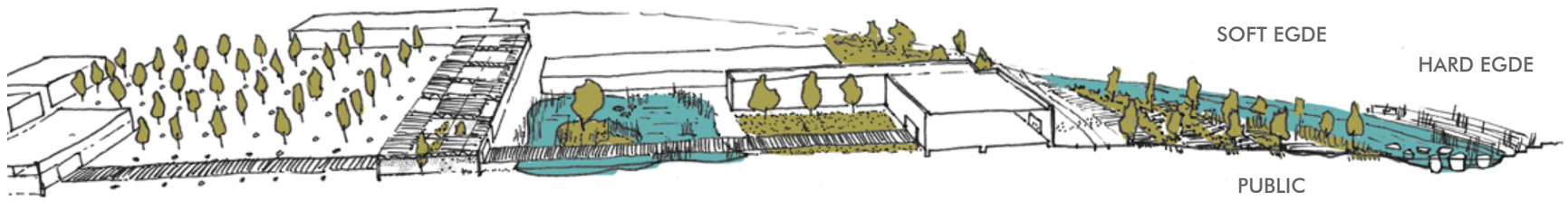
- Largest and continuous sprawl
- Steel structure with truss spanning allowing for wide span for uninterruption ground surface
- Aluminium cladded façade and roof.



METAL STRUCTURED FACTORIES

With the type of wide spanning structure, we are allow to have sports arena that could benefit columnless space. And to cross to the other end of the waterway, an existing building can be converted into a brigde and sheltered walkway. Very polluted industrial area and their factories are suggested to be torn down for full remediation of the area into phyto-remediation forest or wetlands and their harvested product processed into biomass in facilities nearby.

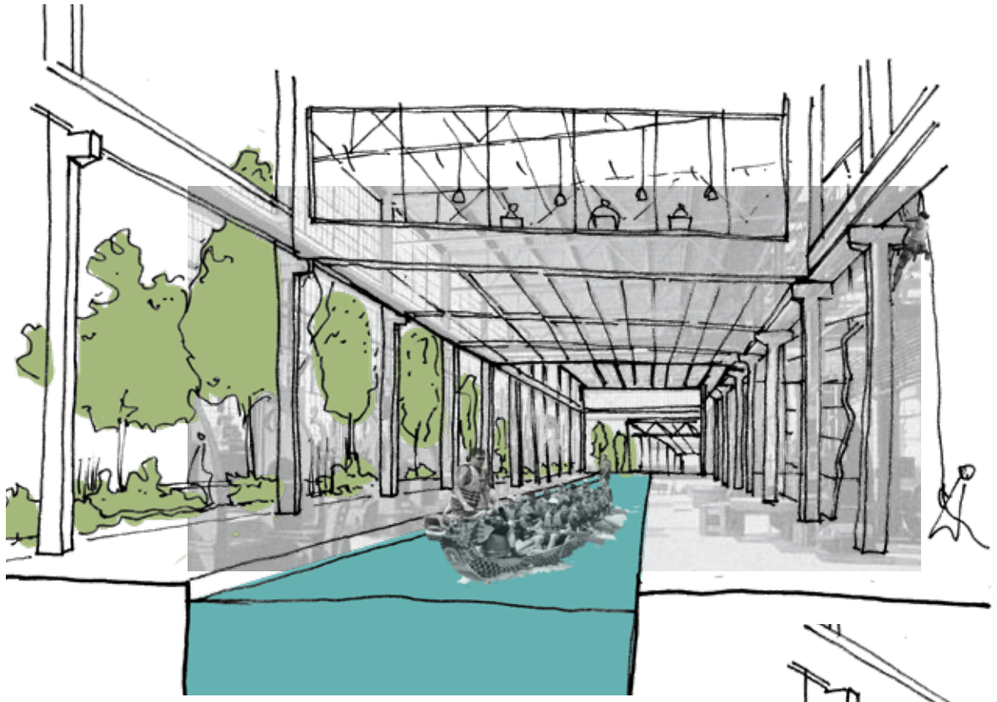
SECTIONAL PERSPECTIVE



The revitalization of water culture into Foshan, aquatic training area can be incorporated into such spaces and high ceiling space have vertical purposes like climbing walls and offices to maximize the space for the community and businesses.

In a hot and wet climate, having sheltered walkway would be very appreciated. Aluminum wall and roof facade can be easily taken out to allow for landscape to come into the space for aesthetical value and restoration purpose.

INTERIOR ADAPTATION

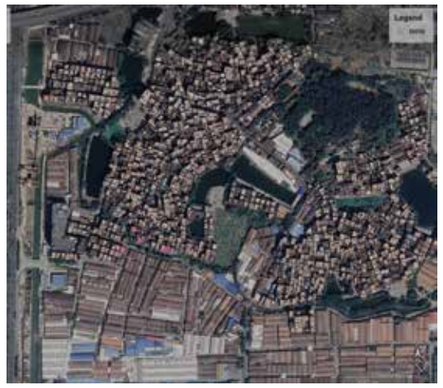


DRAGON BOAT TRAINING POOL

ROCK CLIMBING WALLS

SHELTERED WALKWAY

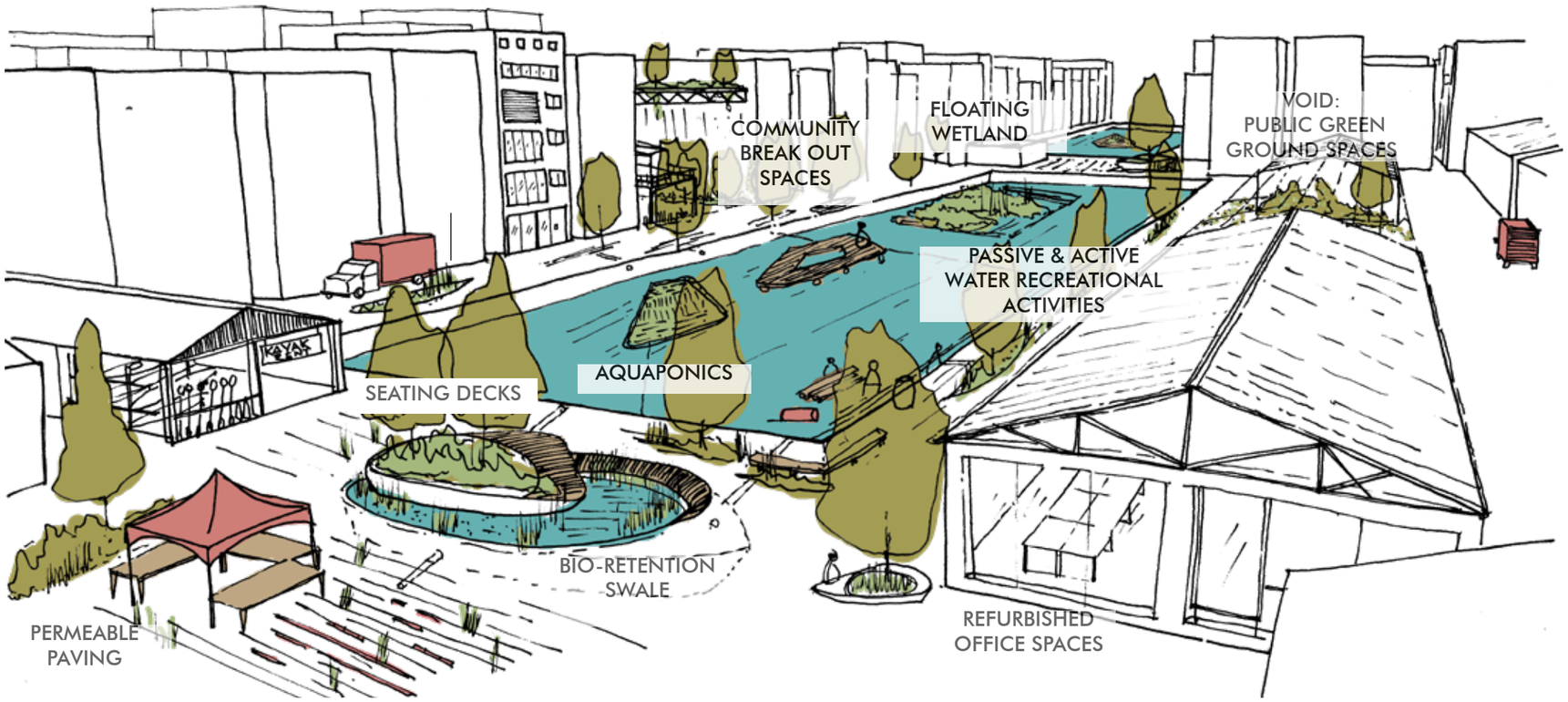
WITHIN URBAN VILLAGE



- Small scaled manufacturing activities

- Embedded inside the village among the residential apartments

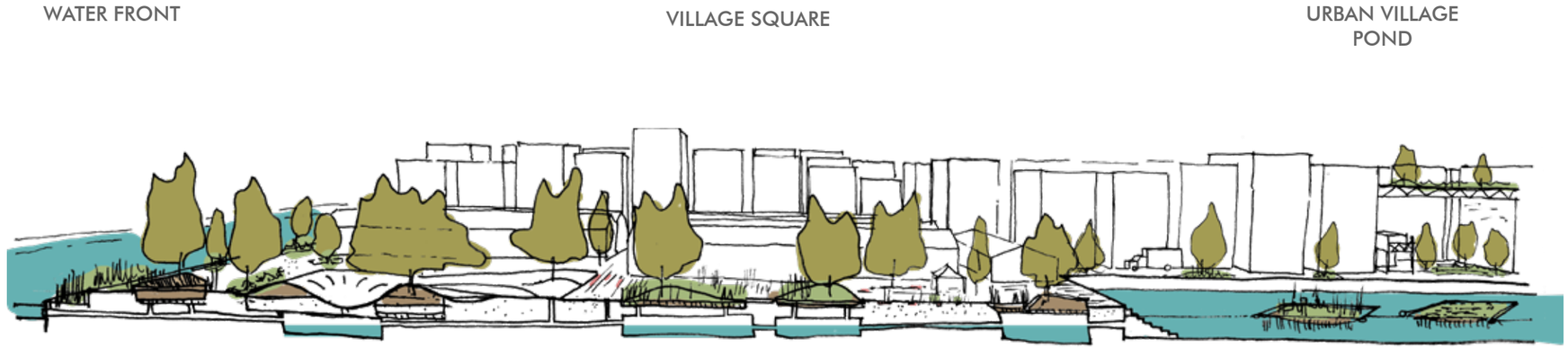
- Whole ground floor of the block or the entire multi-story building.



WITHIN URBAN VILLAGE

Decommissioned industrial buildings within the urban village are kept as void to allow the space to be taken up the community space or public open green space. The new voids will provide space beneficial the community activites such as sitting area with bioswale ponds and skate boarding bowl that transformed into water collecting pond during heavy raining period. Water related processes are constantly happening above and below the surface. Importantly the resurfaced waterway has now provided the village with a waterfront that they did not once had, it is a change for them to reconnect themselves the water and the surrounding elements.

SECTIONAL PERSPECTIVE



CONCLUSION
&
REFLECTION

Conclusion

Research and Design

Walking on site was a valuable experience, as studying at area and making analysis without observing the site would have resulted with a different conclusion. Working on presenting the analysis allowed me to pick apart the observation and focus on the key points and making connections with other key point of other elements. Conclusion from readings and site observation indeed point out that the relationship with water has indeed demised and it was more seen as separate entity over the years. This is irony as water shaped the city to be what it is today.

The aim for the analysis was to understand the what relationship is existing or lack off. The natural and urban elements found on site are not only inventory of the site but also the building structure of the environment, even though on site they don't seem to have much connection with one another, they gave a hint of what relationships might have existed previously and also a hint on possible new connections and relationships.

Initially, isolating of existing elements was to only understanding characteristic and the workings of it to fully maximise the utilisation of it. But as the project delved more into the design exploration of what is possible spatial with the inclusion of new elements that added in to solve the challenges if the site, new connections and relation start to emerge. The new additions such as wetlands and resurface waterway would be considered as part of the structure of the landscape alongside the existing ones. And they now also created their new relationship and connection with the existing and future elements of the landscape.

Methodology

As mentioned in the fascination section in the introduction chapter, as an individual and designer I inclined toward actions and objects that worked in multiple functions and nature and landscape is one great example. Personally as landscape architect or designer, I feel that one of the main design task is to fully understand where and when we as designer should intervene with design implementations and when and where it should be left alone to nature. And then there is also the question of appropriate amount intervention. This rational influenced the landscape focused design implementations where it ranges from very urban centric design where there are more hard-scape and design implementation because if such spaces were left on its own in an urban area would not be able to regenerate on its own. Whereas in some areas where there were less human activities, a more nature centric design were chosen as in such undisturbed larger areas could allow nature to take its course and the task as a designer to allow for nature processes to occur successfully.
The whole project also relies on the principle of the scale, temporarily and the context of location to frame the research and this framework is applied throughout the different stages most evidently in the analysis and design. Temporal Analysis to understand how the area worked in the past, what worked and what did not. Also provides a hint on what can be readapted to current situation to solve an issue. Looking at different scale is very important especially because water is a continuous element which flows from one point to another according to pressure and gravitational force. Projects involving water must be tackle in an inter and multi scale manner; a pollution in a small waterway will eventually reach the bigger waterway. Although a pollution in one small waterway may not so much harm the bigger waterway, if the entire small waterway network (made of many small waterways) was polluted, it will definitely impact the other waterway system downstream.

Spatial analysis to understand how a space work and how people in the area use the space throughout the years. Helps a designer appropriate assign a program to a space that will useful for the environment and people in relation to the space for the future. The strength in this approach is that the project can continue to strengthen with the inclusion of additional layers eg sedimentation, dike formation, energy. This is also a weaken in this project, it had a limited scope of focus and it would be much more of a holistic and workable project if all the different aspect were considered. It would be a more complex and challenging project but we are working in a complex environment.

Integratedness of Nature

The value that the design added in this project is the seamless and gradual integrations of landscape into the urban structure and spaces; landscape as solutions to climatic and urban environmental issue and an element to improve the quality of living space. For the longest time landscape and nature have always been kept in a vessel or bordered area. The creation of border as part of the compartmentalisation of human area and natural area that made people loss touch with the human-nature connection. It is always easiest to cause harm or disregard to somethings one has least connection with. While in the past the 'encroachment' of nature into living and working area were seen as part of life and also seen as a convenient eg using water from high river water level to fill up pond, irrigate fields or move across a large waterbody more efficiently. While now, living with defined borders, such encroachment of nature is deemed as an issue. These borders create a perception that human space and nature are not meant to interweave with one another. The underlining of the design exploration tries to break this perception by blurring the boundaries and allowing people to get use to the idea again of a shared space in hopes to reconnect the lost relationship.

Relevance

Research Relevance

An adaptive system approach is much needed in every shifting and growing region such as the Pearl River Delta. Many delta region naturally attract urban migration due to their favourable natural conditions that puts them at an advance economically. In the past centuries cities were planned with economy efficiency in mind, neglecting the environment and the consequences of the all the harmful activities. This graduation project provides a principles and toolbox of design strategies that delta cities at risk can implement, not only onto their decommissioned industrial sites but also other types unused and possibly polluted spaces to prepare them to be resilient.

Decommissioned industrial areas are one of the various types of waste landscape that are the by-product of past and on-going consumption, industrial and economic growth. And with the advancement in technology, commitment to cleaner and sustainable practices and in the change socio-demographic of industrial cities, many industrial spaces will be decommissioned. Hence the toolbox can also be adapted by other cities to deal with other types of waste land facing hydrological and pollution issue.

The result of the research can be implemented in the cities in the PRD can served as a case study to understand its successes and failure before it deciding to implement it to other new post- industrial cities. Many cities within China and also other part of the developing countries are still in the manufacturing industry as many of these cities have taken over production that was previously done by the now post-industrial cities. These cities, unfortunately, are also subjected to similar the negative impacts that the earlier industrial cities such as Foshan faced, hence the some of the strategies might be applicable.

Societal Relevance

Cities are developing at a faster rate as compared in the past, more of the younger population are getting opportunity of higher education hence in general people are more aware about themselves and their environment. And many cities in the Great Bay Area are moving towards advance technology industry in order to handle these shift in the industry a more advance skilled and technologically trained manpower is then essential. This gap in the workforce would be filled by the younger population who are trained with the skills needed for the current times. With the increase of middle class population in China, the growing younger population are more well read about ones psychological wellbeing and the ingredients to a well-balanced and healthy life.

One of ingredient to healthy life is spending time being in the nature to enjoy its many benefit, this is an area well researched and proven. Nature is a wonderful multipurpose entity that humans are blessed with. It's free and benefit us in many ways such as for our mental and physical health, provides us soothing aesthetic and also increase our real estate. Accessibility to nature within ones living area is something many these days are looking for. This is true not just for individual but also in the cities.

Cities all over the world have been out doing each other to build and provide an attractive place to live and play, so that the best and brightest talent will choose their city. While in the past, cities have competed with each to build the tallest skyscrapers and the most unique iconic architecture to flex its financial and cultural capabilities. In the last two decade, cities have started to incorporate their own iconic urban landscape project as part of the branding of their city as there evidence that cities with quality open green spaces have higher chances of attracting the creative professionals hence increasing the competitiveness of knowledge-based economies of the city (Florida, 2004).
As many industrial cities are transitioning and will face similar issue such as faced in Foshan, principles and design strategies would be of use.

Landscape Architecture Relevance

Landscape architecture started from the beginning in the planning stage. This project delved into multi scales, from regional to building. Development of new plans for cities were most led in old school urban planning orientation where infrastructure such transportation, industries and economic development are prioritised to aid in the growth of the city and left over spaces are given to green spaces and recreational as in the past nature was not a sign modernity and success. Unfortunately the negative impacts of such planning are felt today. With the impacts of climate change, detrimental consequences of uncontrolled urbanization and by-product of industrialization, cities are constantly bombarded by with natural disasters and recently with complex emergencies. Cities need to be design and build to be resilience to the change of times and adaptive to cope with sudden changes. Emphasising and prioritising landscape base solution in multi scaler planning in land uses and programming makes use of the sustainable, protective and restorative quality of nature. Landscape architects do not have the answers to everything, we need to expertise of others such as biologist, engineers and sociologist understand and make environment work best for us. Landscape architects are at their best when they use landscape architecture as the medium to bind all the different knowledge into a physical space made up of natural (and sometimes urban elements) for benefit of the living nature and society.

Dilemma & Ethics

The beginning of post industrialisation in one city is the beginning of rapid industrialisation and uncontrolled urbanisation in another city. Cities are urge to switch from intensive manual and/or polluting industrial activities to cleaner, sustainable and technological advance activities. And factories who cannot afford to do so simply shift to other parts of China or outside China where it cheaper and less regulated to continues their business. It is evident when one will noticed that increasingly commercial produce such as clothing and surgical mask are being manufactured in places like Vietnam and Bangladesh and it is reporting increase environmental damages to this places (Mai, 2017) .

While this research project presents opportunities for healthier environment in Foshan, the negative scenario of industrialisation is still being repeated elsewhere out of our sight. There is a chance that some of the production have been moved to the north, although not specifically stated its exact location, one can imagine that if the industries continues its unsustainable and dangerous practices, pollution will still end up in the waterway and eventually arriving downstream to the other part of the Pearl River Delta. While this research due the thesis timeline can only focus on a specific scale and part of the Pearl River Delta, order to improve the quality of the entire river and delta system in the area the project needs to address and work from the source of river up in the north and comb it way all the way to the south. This is why it is important to overcome this issue through a multi-scaler approach.

And design alone cannot solve the problem, design is tool to combat the challenges face. One has to address the root of the problem, which are dangerous and unhealthy practices of these industries. International and national policies targeted at to discourage harmful practices and strict national regulation might discourage such unlawful practices. Education and financial incentive have also been proven to work to encourage business to stir towards more sustainable practices seen in other manufacturing cities such as Singapore (Cheam,2015).

One dilemma come in mind happen in a conversation with a fellow colleague while on a visit to one of an urban park and traditional village in Foshan. The discussion was regarding the lack of soft green edge in the urban places we had visiting while in China. This was a general comment made based on first impression, given that we were still in the beginning stages of the research and had not spend much time in the area. But as someone who had watch many Chinese period movie, visited traditional Chinese village, replicated Chinese village and seen Chinese painting over the years, I seconded the comment about lack of soft green edge. But I was also questioning myself that maybe hard edges have always been how Chinese cities and villages have always work and stoned paved public urban space is part of the identity of Chinese public spaces. And it is very tempting to apply this ' softening and greening the edge' as a solution to all hard edges and to see hard edge as the enemy because it is common practice these days as it is implied by the things we learn in school and exposure to award winning projects around the world that a softer edge is better and more beneficial in many extend. A lot of river landscape projects in the last decade in China have been lined with soft green edge. And coincidentally most of these projects are lead by international firm based in the west or major Chinese firm with western influence, which leads me to wonder how close are these new water landscape design showing the characteristic of Chinese waterways. This question was constantly in my mind whenever I pick up my pencil to design. "If I let the waterways and floor surface be paved, then water would move too fast and we will ended with fast moving waters and flooding eventually but I will somewhat resemble how Chinese waterways used to look like in their glory day" On the other hand "If I naturalised and soften the entire waterway network, water will slow down, it will be cleaner and people and animal get easy access to water but it will somewhat be out of the local context." Eventually in the design it is careful mixture of soft and hard edges, the allocation of edge condition is depended on location e.g. residential or wetland and its specific need the area needs pertaining to the water situation. Just as the project embraces the industrialisation as part of the identity of the landscape of these cities, soft green edge and surfaces should also be part of the growing characteristic of Chinese water management as it is a respond to the evolution of Chinese cities.

The outcome of the thesis would not inform me on whether the decisions on the methods and design I made were correct or not but I made me thought more and be articulated with consideration of such dilemmas.

Personal Reflection

Personal Gain

Prior to my thesis graduation project I have never been interested in anything related to the Chinese context. This ignorant attitude change when a Hong Kong based project got modified and expanded into a project on the Greater Bay Area, the opportunity have me great exposure to explore the region and strike a fascination in me. My initial reluctant to ever pick a Chinese based project was due to the language barrier which will hinder the data collecting process which is one of the important steps of getting a grip on the project. This fear is not an irrational fear as, yes throughout the whole thesis project simple number, figures and maps that those from the western countries can obtain from a few click on their government website are on the other hand extremely difficult to obtain as an non-Chinese citizen. For example, to obtain a image map of buildings an area, I had to ask a Chinese classmate for assistance, in which she had to sign into various Chinese based websites using her Chinese email account and get verification through her Chinese sim card (which only can be obtained in China) and doing this all of it in Chinese language. The amount of loops I had to jump to obtain simple information made it challenging to design with numbers and accuracy. Hence I had to always maneuver myself in various way to obtain information and understand a situation, sometime quick and rational assumptions and consideration had to be made in order to carry on with the project. While the vagueness of the information and lack of accuracy of the design outcome is something I am extremely unpleased, I think the project showed me that is possible to come up with principles and concepts without number and exact details. I learnt many other ways of searching for data and analysing during these few months and I am certain as I move on in the coming years there will be more that I will pick up that would benefit me in my future projects.

COVID-19

Having observing the behaviour of people all around the world by personally following the news and social media, parks and green spaces are increasing vital in times like this. The increase in visitor and frequency to open green space emphasises the relevance landscape architecture and accessibility to public green spaces in time like this. I also think there will be increase toward local regional tourism after all the lockdowns around the world have been lifted up in the coming months as recent surveys done in with Chinese residents indicated that 50 percent of them are have cancelled overseas plans for the year (Hutton,2020) and domestic flights in India may start implementing an age limit (Tripathi, 2020). While it is still early to jump into conclusion, big national parks or protected natural area, apart from just being design and built as an ecological area and flood protection have major part in the future of regional tourism in China and elsewhere.

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