

“从研究到设计”

-- 城市空间分析论坛暨第三届中国空间句法研讨会

水系连城

City Connected In Water System

罗志航 Zhihang Luo

- AICP 美国注册规划师
- APA 美国规划学会会员
- ULI 城市土地学会会员
- LEED GA 美国绿色建筑专业认证
- M.L.A. 美国南加州大学景观建筑学硕士
- B. ARCH 深圳大学2002级建筑学学士
- ASSOCIATE @ SOM 设计事务所理事、高级城市设计师

联系:

cell: +86 13143869001 (China); +1 3129124231 (US)

email: zhihang.luo@som.com

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If Creating a Map Based on Ecosystem

如果说水是孕育生命的摇篮，那么这些水系的区域是不是人类活动最密集的区域？那么研究应如何划分边界呢？



如果重新划分我们的地图…

If Creating a Map Based on Ecosystem

如果我们在谈城市发展之前，重新把地球理解为由不同自然物质体系构成的一个大系统，把地区按照不同的自然系统和地理特征重新划定边界，我们将看到一个和现实中的行政区版图完全不同的结合方式。

在呈现于地表的自然物质系统中，水系是最重要的元素，可以说一个水系就是一个完整的生态系统。如果设想将一个水系的分水线作为行政区的界限，那么一个行政区就被整合在一个完整的生态系统中；

这个生态系统也仅由此地区的行政部门来管理和维护。按照这个设想，城市的发展与生态系统保护将在行政机制上最紧密的联系在一起。

----- 罗志航, “水域连城, 区域生态视角中的城市转型契机” 《城市中国》第51期 转型

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National Park Vision for China Grand Canal

中国京杭大运河研究分析与国家公园愿景 2000年的文明遇上生态的思考

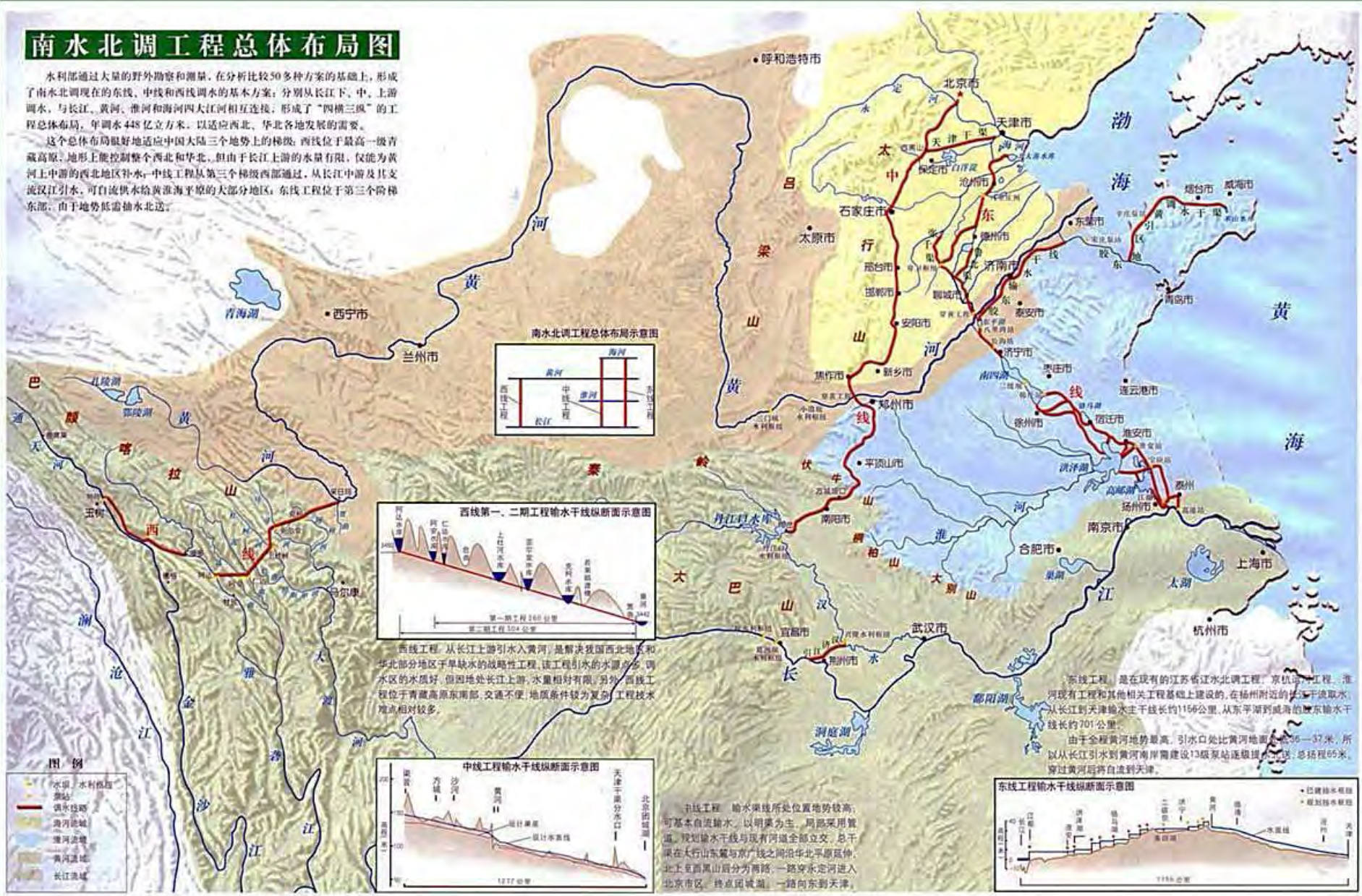
南水北调曾经一度牵动中国南北方人们的心，巨大的投入，而工程的成果却非常有限。京杭大运河作为南水北调的东线承载了无数的历史和古籍。通过分析，作者提出创建京杭大运河国家公园的愿景，用以更好的保护运河。利用水系联系城市，赋予运河新的历史使命。

南水北调工程布局图(源自中国国家地理杂志)
South to North Water Transfer Project

南水北调工程总体布局图

水利部通过大量的野外勘察和测量,在分析比较50多种方案的基础上,形成了南水北调现在的东线、中线和西线调水的基本方案:分别从长江下、中、上游调水,与长江、黄河、淮河和海河四大江河相互连接,形成了“四横三纵”的工程总体布局,年调水448亿立方米,以适应西北、华北各地发展的需要。

这个总体布局很好地适应中国大陆三个地势上的梯级:西线位于最高一级青藏高原,地形上能控制整个西北和华北,但由于长江上游的水量有限,仅能为黄河上中游的西北地区补水;中线工程从第三个梯级西部通过,从长江中游及其支流汉江引水,可自流供水给黄淮海平原的大部分地区;东线工程位于第三个梯级东部,由于地势低需抽水北送。



Ecosystem Thinking Meets 2000 Years of Civilization

Exploring an Ecological, Sustainable, and Historic National River Corridor

China Grand Canal & South to North Water Transfer Project Study

By Zhihang Luo
USC School of Architecture



South to North Water
Transfer Projects



to be the World
Heritage Site



Economic Development



the Future
of China Grand Canal

2000年文明国度的城市化可持续性发展

- 南水北调东线京杭大运河城市化的生态发展研究
- 探索开发一个环境生态性，经济可持续性，文化历史性的国家级的水公园

The South-North Water Transfer Project Eastern Route, which mechanically directs water from Yangtze River to Tianjing and Beijing areas, is aimed to improve the utilization of water resources in China. The study explored new sustainable development strategies to approach the goal of ecological and culturally sensitive. My Proposal to serve these purposes is creation of a National River Corridor to carry the Grand Canal's historic significance forward while advancing sustainable imperatives for the future.

南水北调东线，通过有两千多年历史的京杭大运河把长江水调往缺水的京津唐地区。这项工程大量人力物力的投入，为京杭运河沿线的十二个发展中城市带来重整城市生态结构，建立可持续性发展基础设施千载难逢的机会。本研究的目的是探索开发可持续性和文化性并存的经济环境发展策略。研究方案提出创建一条国家级的生态线性水公园，同时为这十二个发展中城市提供了具有历史性意义的可持续性发展的方法论，以及城市规划 and 生态设计的指引。

During the last century of extremely rapid development along China's eastern coast, a very serious water shortage problem has developed in northern China, especially in Beijing. The south to north water transfer projects which first commenced in 2003 are aimed to direct water from the Yangtze River to the Tianjing and Beijing area. This graduate study involves using new ecologically sustainable development strategies to approach the South-North Water Transfer Project of China's Grand Canal.

从上个世纪中期开始，中国东部地区极为迅速的发展，导致了北方，以北京为代表的极其严重水资源短缺的问题。2003年开工建设的南水北调项目，把长江水通过人工天然动力引至天津和北京等地区。本研究针对南水北调项目所带来的机遇和问题，提出应用新型生态可持续发展策略，为南水北调项目沿线城市经济和环境的发展提供新的解决方案。

The study is centered on the Beijing Hangzhou Grand Canal, which is more than 2000 years old and as the water transfer project eastern route, also recently under consideration as a World Heritage Site including numerous valuable historical sites along its route. The total length of the Grand Canal is roughly 1,770 km (1,114 miles). From Beijing, the northern port, to Hangzhou, the southern port, there are twenty-two cities and hundreds of towns and villages along the Canal. And there are fourteen cities directly related to the south to north water transfer project. However, over the past decade, radical developments caused very serious water pollution and the northern part of the canal has become a highly polluted barge raceway.

京杭大运河，即南水北调东线，有着两千多年的历史文明，日前也成为申请世界文化遗产的对象之一。京杭运河全长约为1770公里，从北端头北京到南端头杭州，期间流经22个城市，近百所村镇。其中有14个城市直接涉及南水北调建设项目。然而，过去的几十年里，经济高速的发展导致了非常严重的水资源污染的问题，部分运河的北段由于污染和开发的不当导致了截流。

In this study, analysis & design supports both the very critical water transfer mission as well as providing one of the most beautiful ecologically sustainable and historical green corridors in the east of China. The city of Xuzhou, one of the major cities related to the Grand Canal, as a national river corridor that remediate environmental pollution alleviates negative social factors, and improves economic prospects. The project site, city of Xuzhou, situated in the northwest of Jiangsu and directly related to the Grand Canal.

这项研究的分析和相关的设计内容提供了南水北调工程的合理开展的指引，同时提出建设一条国家级环境生态的，经济可持续性的和文化历史性的运河公园。徐州，素有兵家必争要地，东西南北的最为重要的交通枢纽中心，同时是京杭运河，南水北调东线工程项目最为重要的城市之一，是本研究的示范的城市研究基地。

超过2600年的历史古城徐州，不仅是中国著名的历史文化名城，同时也是全国重要的交通和铁路枢纽，能源基地和工业基地，淮海经济区中心城市。它位于南水北调东线项目的中心。为支持世界文化遗产的申请和保护，2008年徐州旅游局计划投入11.5亿人民币为京杭运河的旅游开发建设。这项投资计划也为本研究提出了一个重要的问题，其中可持续性发展策略如何与历史文化资源的旅游开发的相结合，如何在保护生态的前提下，既能结合南水北调工程的建设，旅游开发的资源，建立可持续的城市发展格局。

Eco² Landscape Strategy is the Key Solution for Developing China

Exploring an Ecological, Sustainable, and Historic National River Corridor

By Zhihang Luo



A Statement Chinese Sustainability

There is different understanding of sustainability between China and the United States. As a developed country, the United States focus on direct solutions of recycling or saving resources. While as a developing country, China's major concerns are sustainable developments with its the rapid growth of economy and population.

The Economic and Ecological

Ecological issues and economic issues can be resolved by creating positive factors with coherent intentions. As a developing country, China spends most of her energy on economic development, which also produces severe environmental impacts. When ecological thinking meets economic issues, the environmental impact could be reduced to its minimal, and the two conflicting factors might eventually supporting each other.

The People and the Canal

The China Grand Canal is one of the oldest and longest canals in the world. It represents a significant achievement of the Chinese. Every Chinese should feel proud of their Grand Canal and preserve it as treasures. However, today's everyday's lives have been completely disconnected to canal, the Grand Canal has fallen into dispairs and lost its value. As the major cultural and natural resources of China, the Grand Canal should welcome people all over the world. New relationships between the people and canal should be re-established, spaces along the canal should be regenerated.

Design Objectives

Sustaining the Microecosystems

Identify the major related distributaries, and plan the distributaries as Eco-corridors connecting the canal.

Natural Water Cleaning Treatments – Redesign the Levee

With about sixty-five meters average width, only about 4% of the levee on the northern levee covers by vegetation. In regards to the over changing water surface levels, new levee to be designed integrated with sustainable water treatment facilities.

Exploring Functional Open Space; Connecting the Canal with people

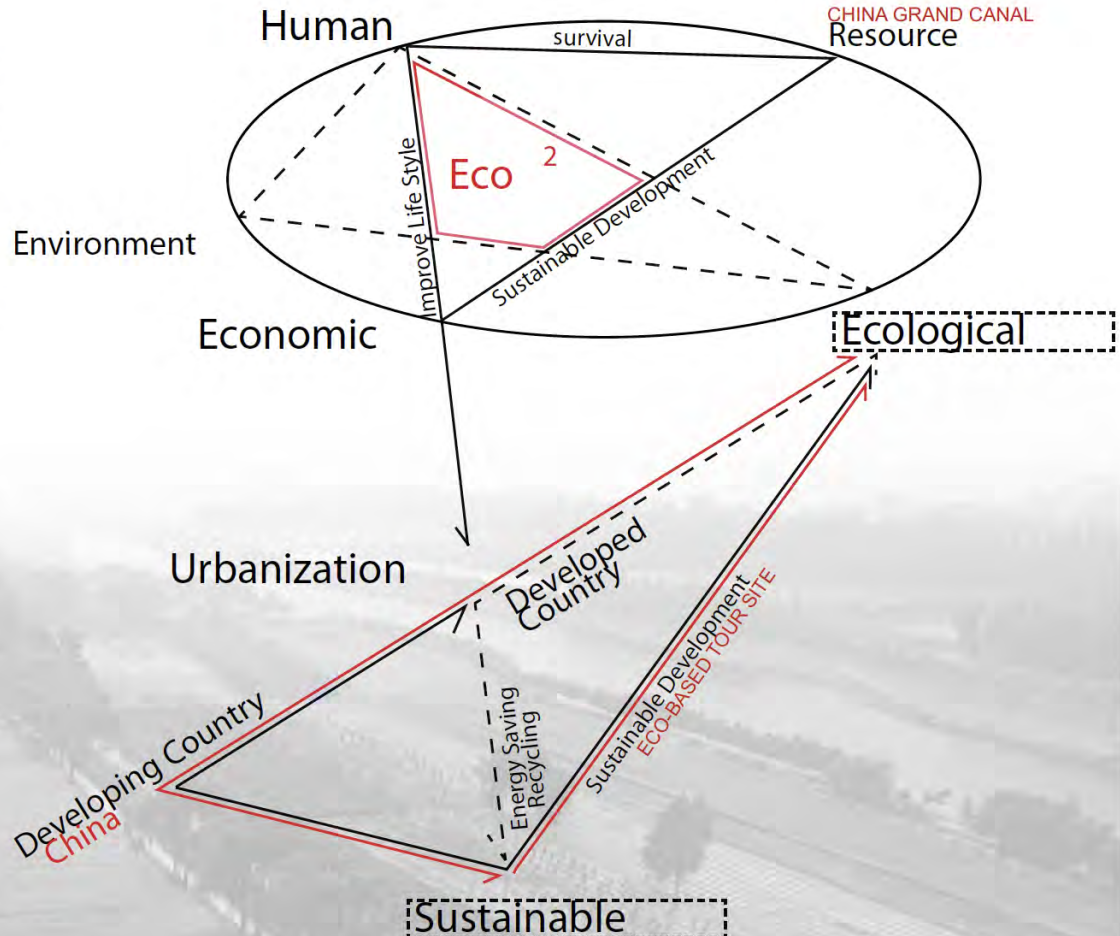
The both sides of the canal are totally inaccessible, trails system are designed to provide pedestrain and biking access on the site. Eco-based tour site is designed to provide functional open spaces, in regards of sustainable uses, which included agricultural, ecological, educational, etc.

Promoting the Canal Transportation

Water transportation is the life of Grand Canal throughout the history. Freight shipping and passenger shipping should gradually replace the coal shipping in the future, in order to maintain the transportation function in the canal but also minimizing heavy industrial pollution. The proposed transportation system is designed to connect with existing ground transportation systems.

Historical Presevation

Eco² Landscape = Economic X Ecological



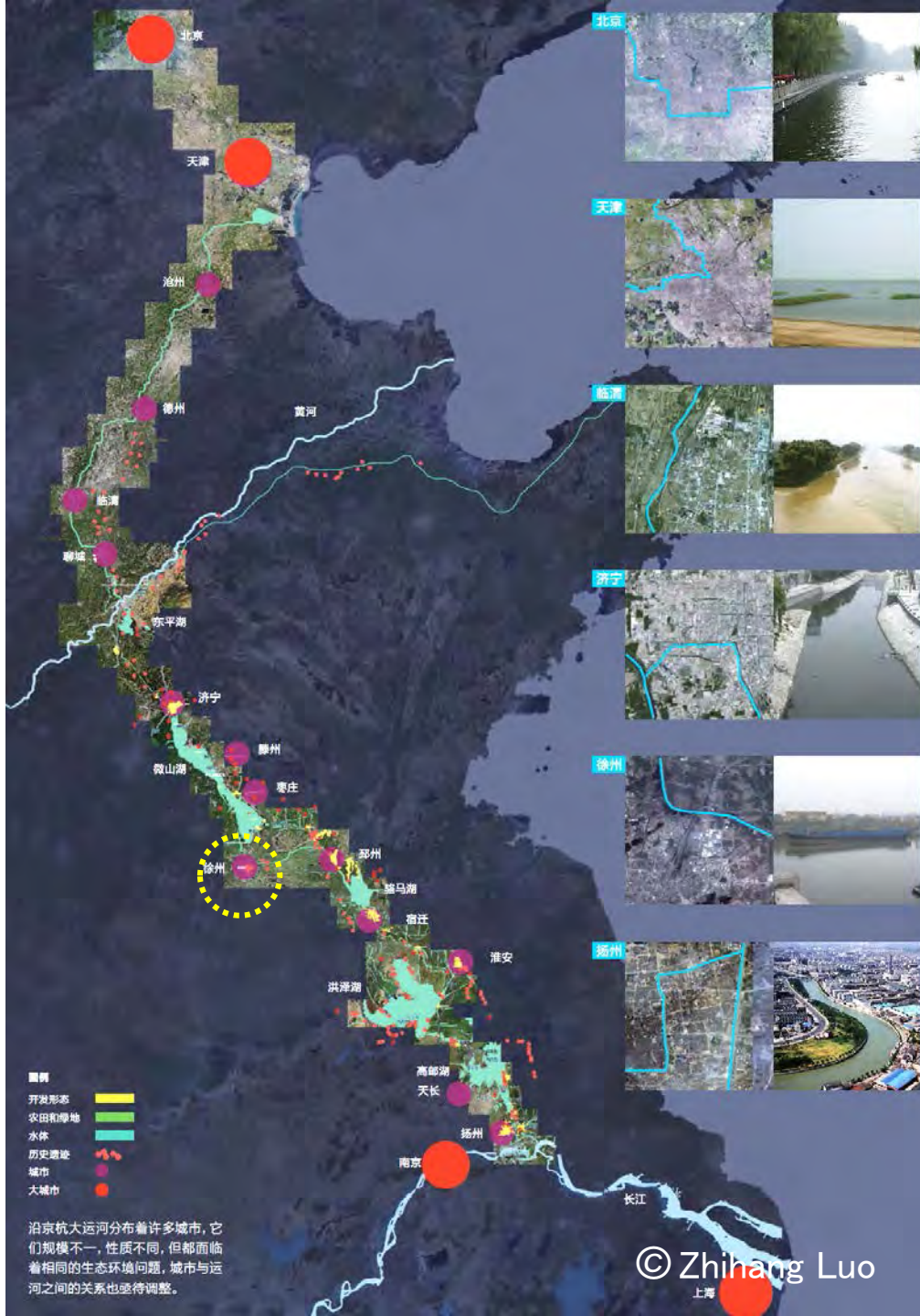
如果把大运河看成是一个基于水系的国家公园系统

If Grand Canal is a National Park

关于京杭大运河的五个设想

Five Proposals for the Great Canal

1. 京杭大运河是否能建成一条国家历史文化走廊？
2. 京杭大运河是否能成为一条净水运水的自然栖息地走廊？
3. 京杭大运河能否为城市创造更多的开放空间，形成城市性和生态性并存的国民休闲旅游目的地？
4. 京杭大运河是否可以成为区域性水上交通系统，把沿线的城市整合成为一个城市体系？
5. 京杭大运河是否可以从沿岸小尺度的湿地公园和农民经营的环保果园开始，探索建立一个环境生态性，经济可持续，拥有文化历史的运河国家公园？



京杭大运河的历史

Grand Canal in History

In history, the China Grand Canal, also known as Beijing Hangzhou Grand Canal, was the important economic and political linkage between Northern China and Southern China. **The first piece was built 25 hundreds years ago.** The existing Grand Canal, most are built from Yuan dynasty (1271-1368 CE). It was used for shipping food from south to north.

Spring and Autumn Period (722-481 BCE)

The first piece was built. This canal became known as the 'Han Gou'.

Sui Dynasty (581-618 CE)

The water transportation in Gran Canal contributed greatly to the Chinese government under the policy, 'Cao Yun'.



The Commercial Development of Grand Canal in Bozhen, Sui Dynasty

Tang & Five Dynasties and Ten Kingdoms Period (618-960CE)

Grand Canal preformed a very important status of connecting southern and northern China, especially for transporting grain.

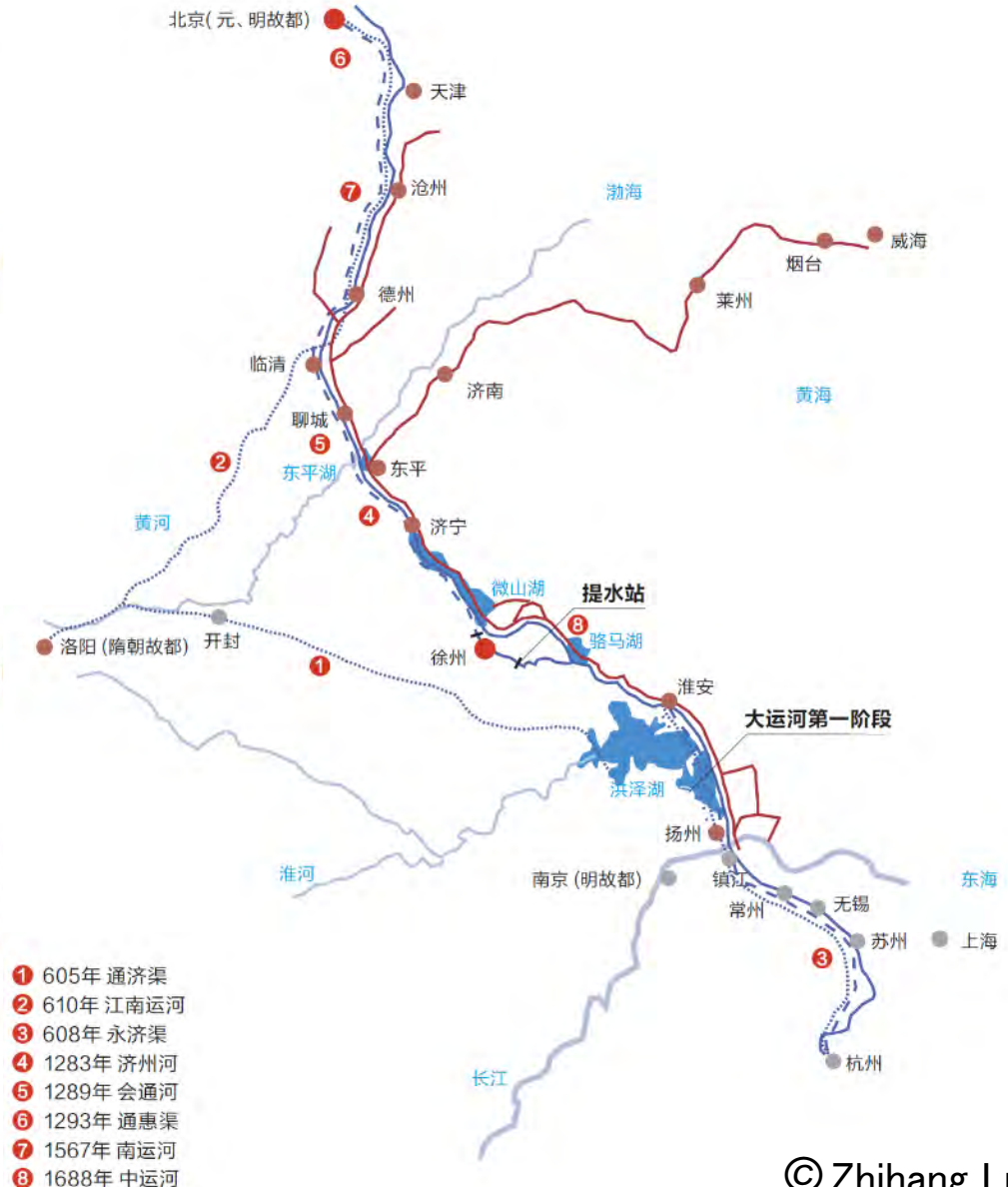


Tang Emperor Travelling in the southern China along Grand Canal

Qing Dynasty (1644-1912CE)

Because of various factors, many of the canal sections fell into disrepair, and some parts were returned to flat fields. The policy of 'Caoyun' was abolished in 1901. The Grand Canal became disused & the water level dropped significantly.

HISTORY OF CHINA	
PRE-HISOTRY	
BC 2100	XIA
BC 1700	SHANG
BC 1122	W-ZHOU
	E-ZHOU
BC 221	QI
BC 206	W-HAN
220	XINCHAO
	E-HAN
265	W-JIN
420	E-JUN
	SONG
581	QI
	NORTHERN WEI
618	LIANG
	WEI
907	CHEN
	WU
960	SONG
1271	YUAN
	MIN
1368	QING
1644	REPUBLIC of CHINA
1912	PEOPLE REPUBLIC of CHINA
1949	



京杭大运河的文物

Grand Canal Historical Sites

Become a World Heritage Site

South to north water transfer project commenced in 2003. The Grand Canal is considering be the world heritage site. 2008BMW china culture Journey travelled all along from Beijing to Hangzhou. Many students ride bike from Beijing to Hangzhou to appreciate the Canal and support the Canal to be the world heritage site. Recently more and more people pay attention to the historical Canal.

We should preserve and sustain the more than 2000 years old China Grand Canal, with its diverse culture and valuable historical integrity. The new Grand Canal (Eastern Route) is a dynamic system running through 12 major cities. Each city has their own characteristics, carry their own culture, traditions and native habitants. As a World Heritage Site, the Grand Canal will definitely attract more attention from all over the world to support its preservation. The attentions brought by the nomination of World Heritage Site will become a valuable opportunity to rectify the damaged enviroments along the China Grand Canal.

The Mission to Divert Water

The Grand Canal beared the mssion to transfer water from the south to the north. The water quality of the river becomes the key factor in the South-North Water Transfer Projects. Since the continuous construction works, coal mining and farming activities are having great negative impacts on the microecosystems along the canal, thoughtful planning strategies and protection measures should be reinforced at the area.

Opportunity

The new Grand Canal (Eastern Route) is a dynamic system connecting the cities along the canal. Each city along the canal represents culture, society, and nature. The South to North Water Transfer projects and be the World Heritage Site are great opportunities to evoke culture and to revitalize the environment of the China Grand Canal.



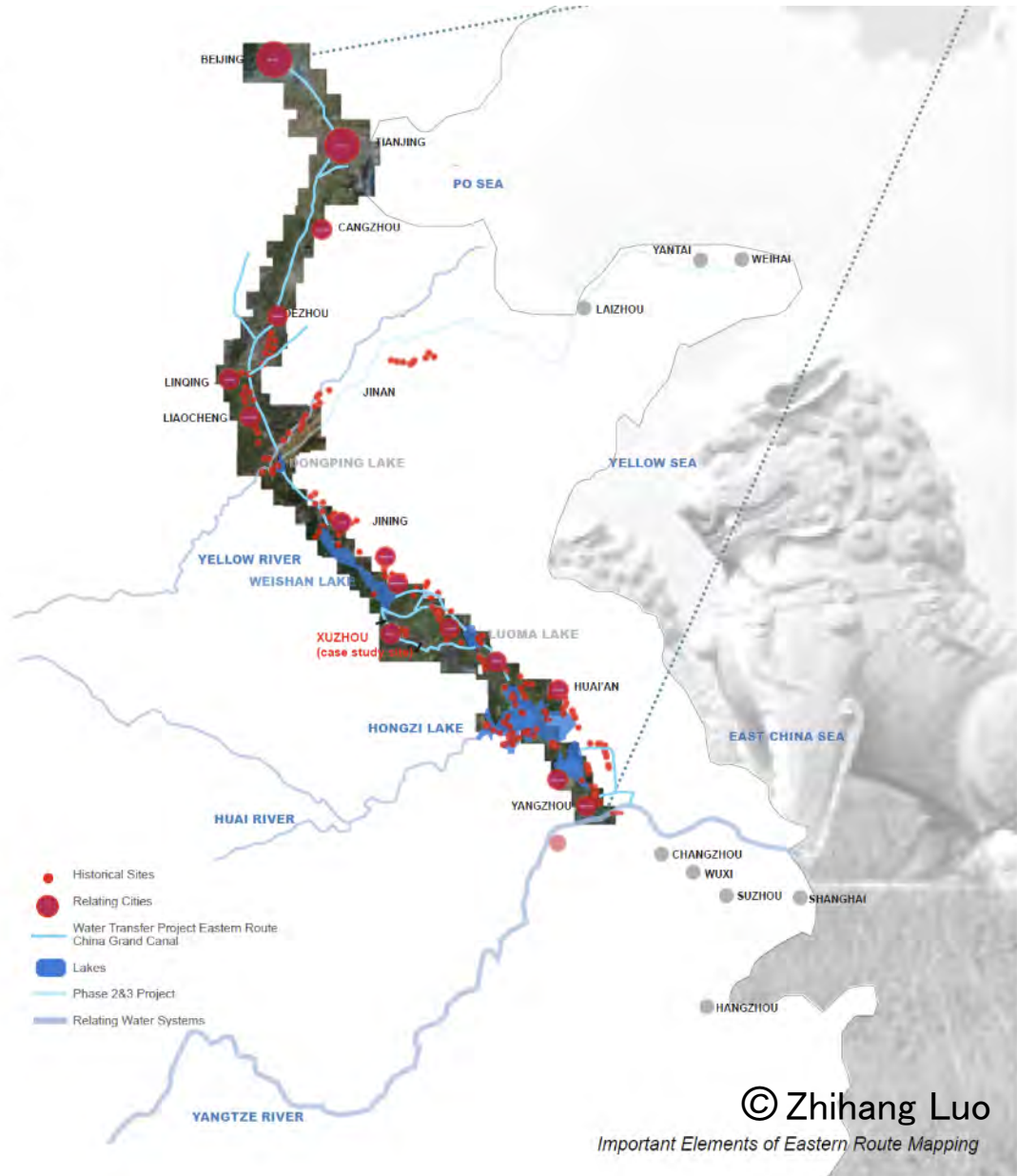
Dongshan Han Cemetery
at Xuzhou



Stone Lion
at Hongze Lake



Historical Dam
at Linqing



© Zhihang Luo

Important Elements of Eastern Route Mapping

京杭大运河的水质

Grand Canal Water Quality

Eastern Route Water Pollution

The eastern route existing water quality diagram shows the water in north is seriously polluted. From Yangta River to Luoma Lakes, the water qualities most are Type II & III, which means the water is suitable for drinking. From Luoma Lake up to Cangzhou, the color dark brown shows the water quality is Type V. Type V water, which is heavily polluted and only suitable for agriculture & landscaping.

The Source of Pollutions

The table below shows the major pollution chemic resource is NH3-N. The NH3-N most possibly comes from the pesticide for agriculture.



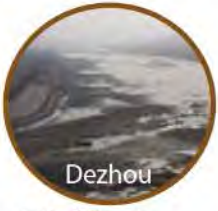
Shandong

1 Household Garbage



Jiangsu

2 Run off Water



Dezhou

3 Soil Erosion



Xuzhou

4 Coal Industries and Coal Shipping



Nanyunhe

5 Industries Waste Water



Shandong

6 the Pesticide for Agriculture



徐州端京杭运河水质问题

Water Issues in Xuzhou



1 未经处理的灌溉用水流向运河



2 未经处理的生活用水和雨水排向运河



3 河堤没有植被覆盖



4 煤炭生产严重污染水质



5 大运河的可达性差



6 污水汇入运河



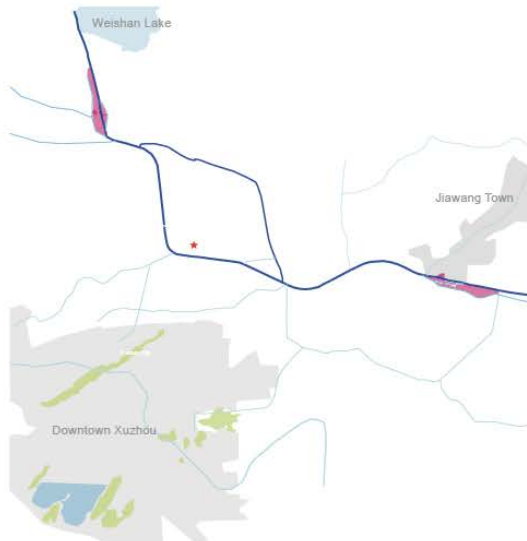
7 仅存不多的沿岸植被



8 河堤濒临破坏



京杭大运河中间区域水系 Grand Canal Central Area Water System



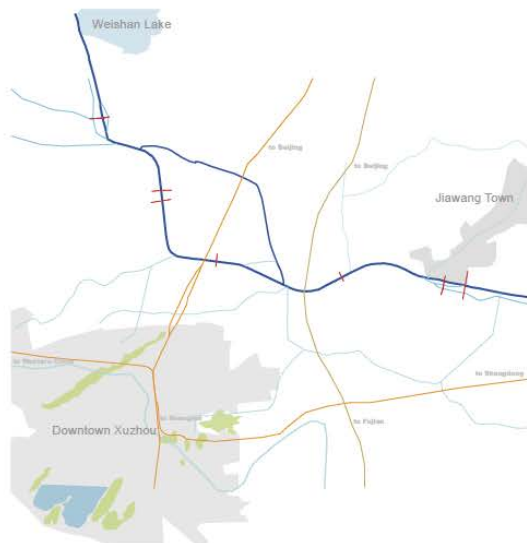
Water Systems



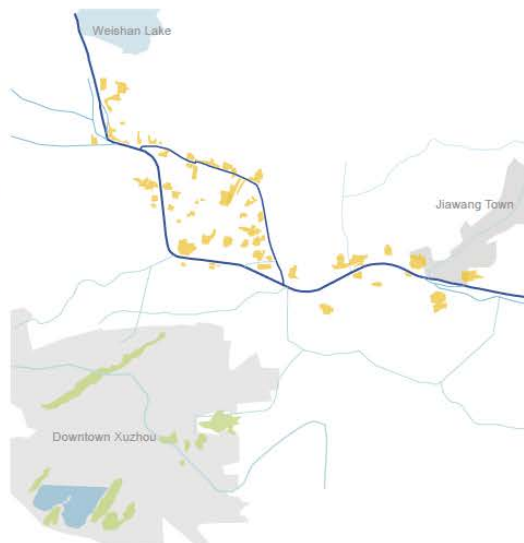
Agriculture



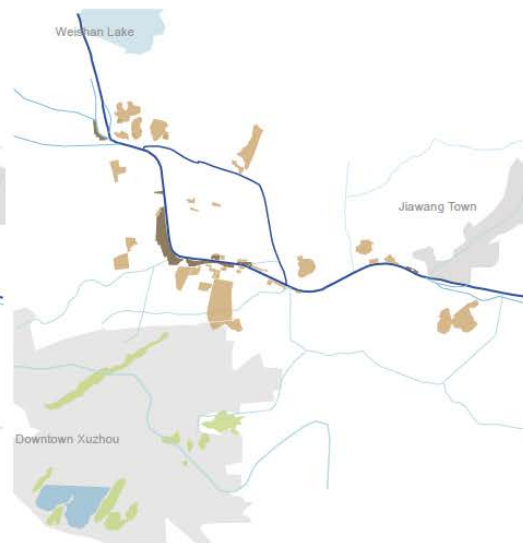
Dirt Levee



Transportation



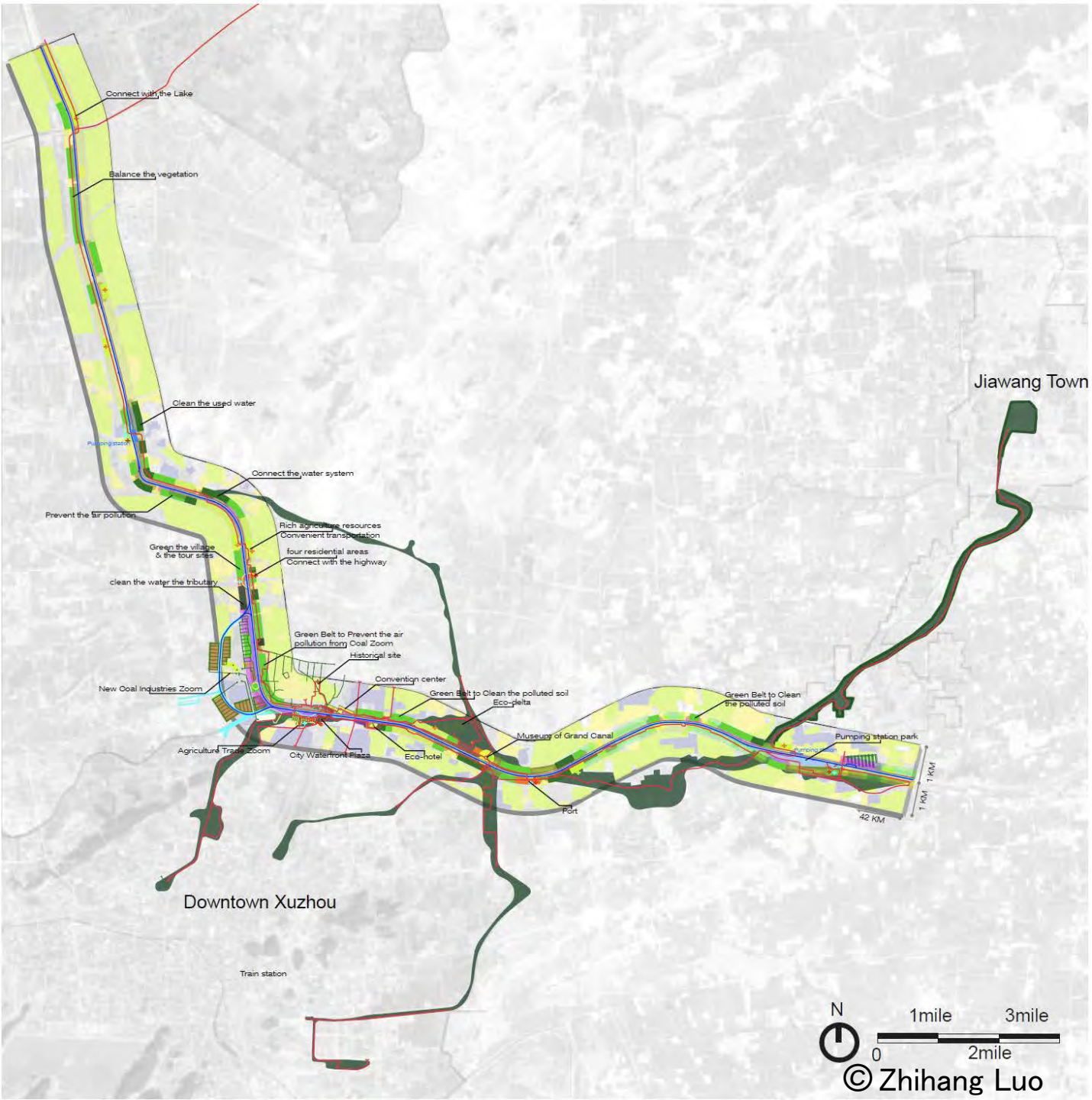
Residential Villages



Industries

徐州段京杭运河生态修复
Ecology Restoration in Xuzhou

- STRATEGY 1 : CONNECT THE CANAL AND THE CITY BY ENHANCING THE GREEN NETWORK
- STRATEGY 2: RE-DESIGN THE LEVEES
- STRATEGY 3: REPLACE THE COAL SITES
- STRATEGY 4: CREATE ACCESS TO THE CANAL WITH TRAIL, ECO-BASED TOUR PARKS
- STRATEGY 5: PROMOTE THE CANAL'S TRANSPORTATION SYSTEM



2

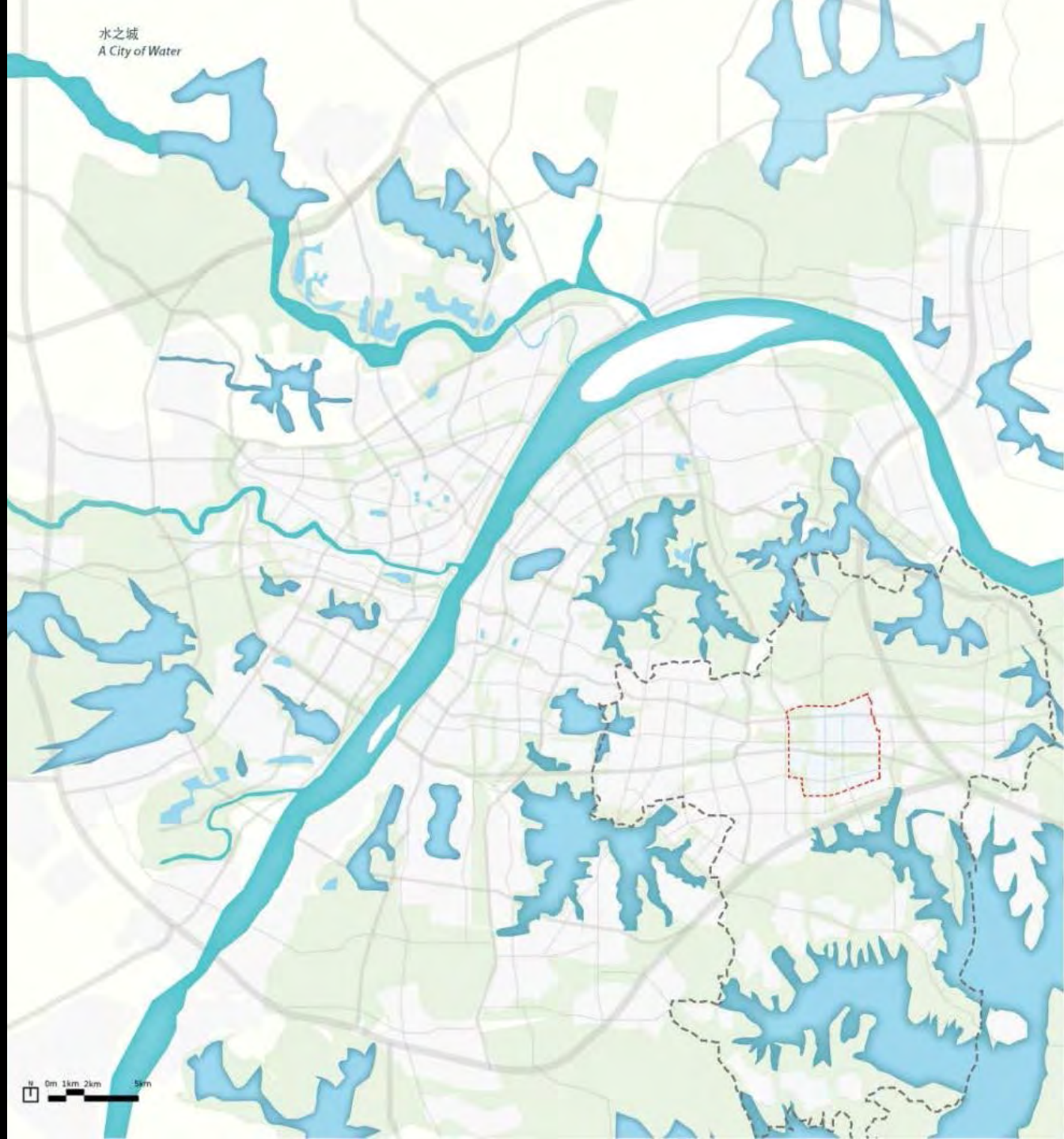
A New Kind of CBD Wuhan Optics Valley

生态水系的围合的城市核心 武汉光谷中心区总体规划与城市设计

水系保护是生态城市规划重要的目标，如何在高强度开发的城市核心区对原生态的水系的进行保护，同时利用水系与开放空间的结合来统筹城市公共开放空间。塑造盛行风廊道，通过微气候的分析进行建筑体量的优化，从而营造具有强烈的地域性独一无二的城市空间。

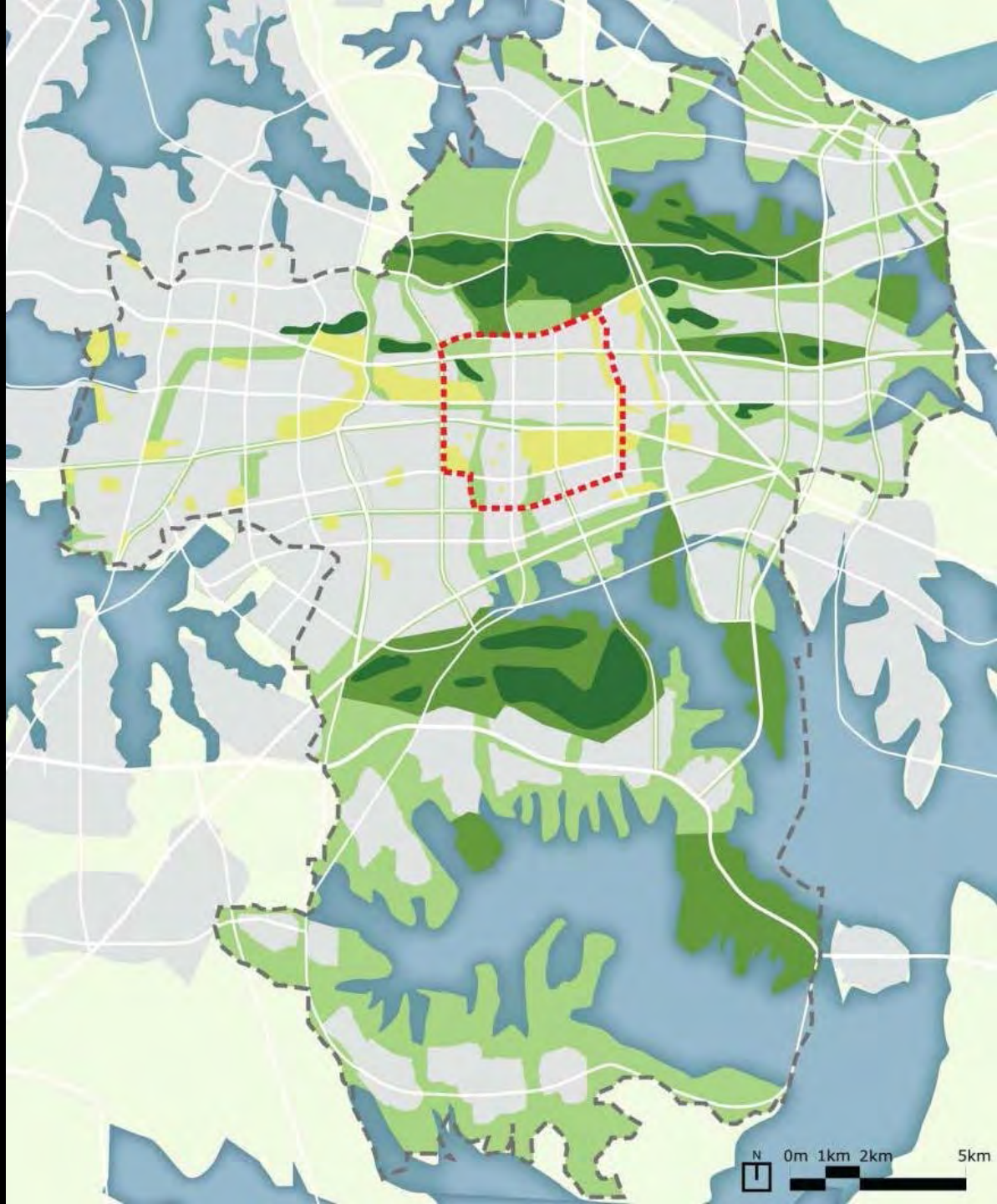


千湖之市
City of Lakes



山湖之间

From mountain to the lake



场地现状
Existing
Conditions







自然水流路径
Waterways



微流域
Watersheds



确定的道路
Fixed Roads



Scale Comparison 尺度比较

Wuhan 武汉



Chicago 芝加哥



0 500m 1000m 1500m 2000m

© SOM

Scale Comparison 尺度比较

Wuhan 武汉



San Francisco 旧金山



0 500m 1000m 1500m 2000m

© SOM

Scale Comparison 尺度比较

Wuhan 武汉



Beijing CBD 北京



0 500m 1000m 1500m 2000m

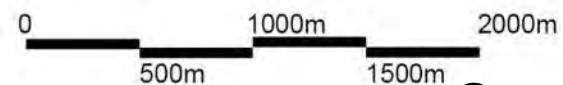
核心区尺度比较

Core Area Scale Comparison

武汉
Wuhan

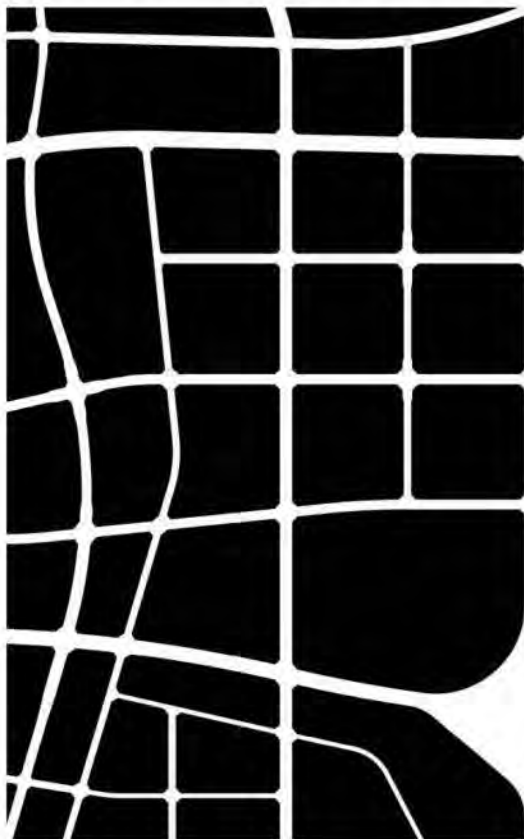


北京中央商务区
Beijing CBD

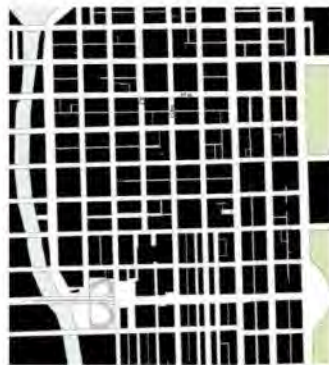


Block Comparison 尺度比较

Wuhan Startup Area Blocks 武汉



Chicago 芝加哥



San Francisco 旧金山



New York 纽约

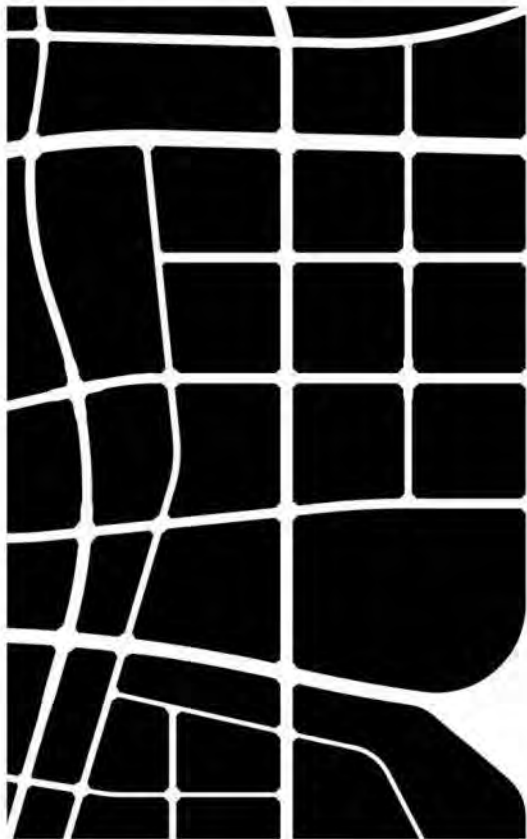


Lisbon 里斯本



Block Comparison 尺度比较

Wuhan Startup Area Blocks 武汉



Boston 波士顿



Canary Wharf 金丝雀码头



Wuhan 武汉



Pudong 浦东



0 250m 500m 750m 1000m

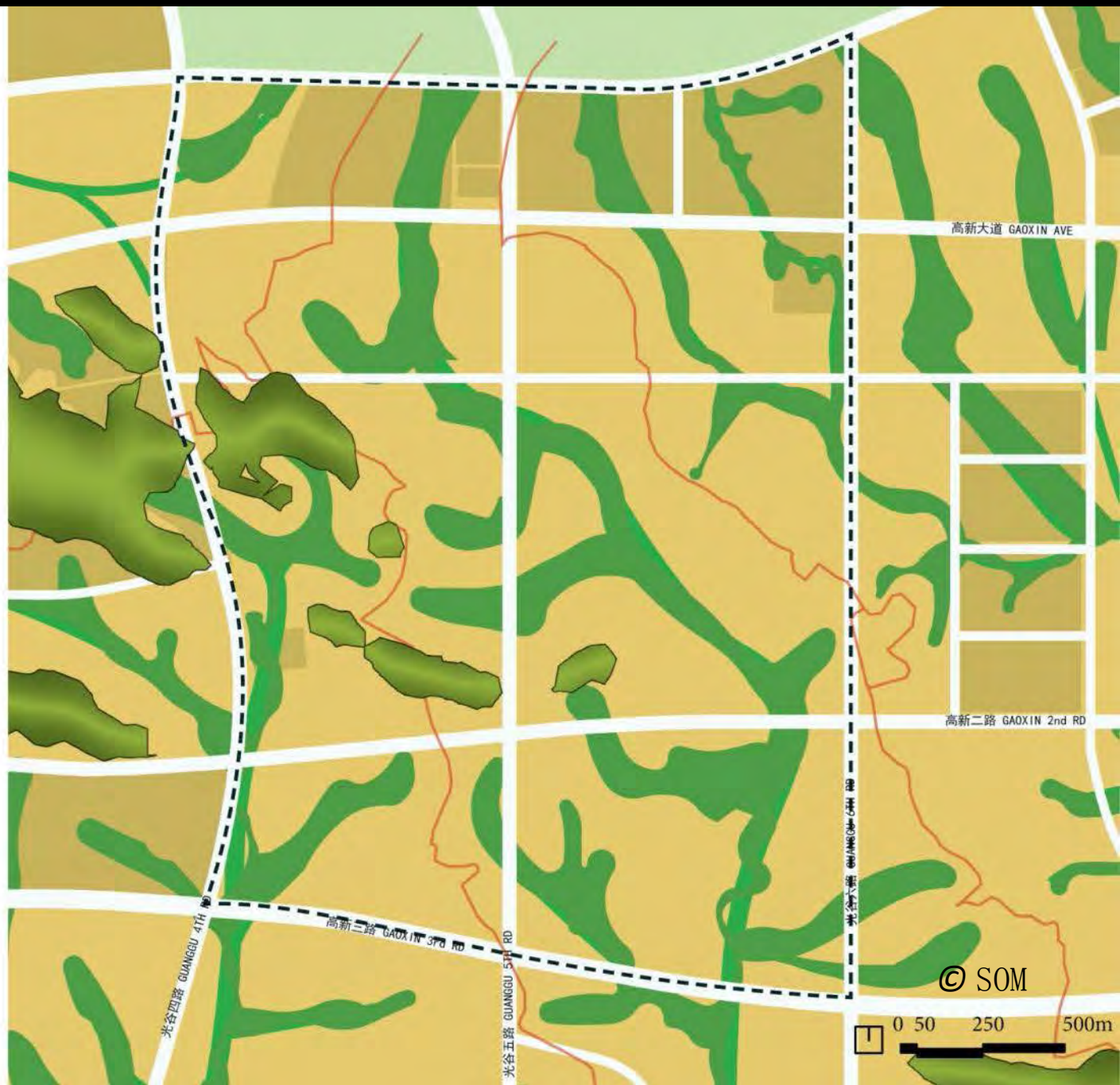
商务核心区 Commercial Core

场地自然限制与
确定的道路
Natural Constraints With
Fixed Roads



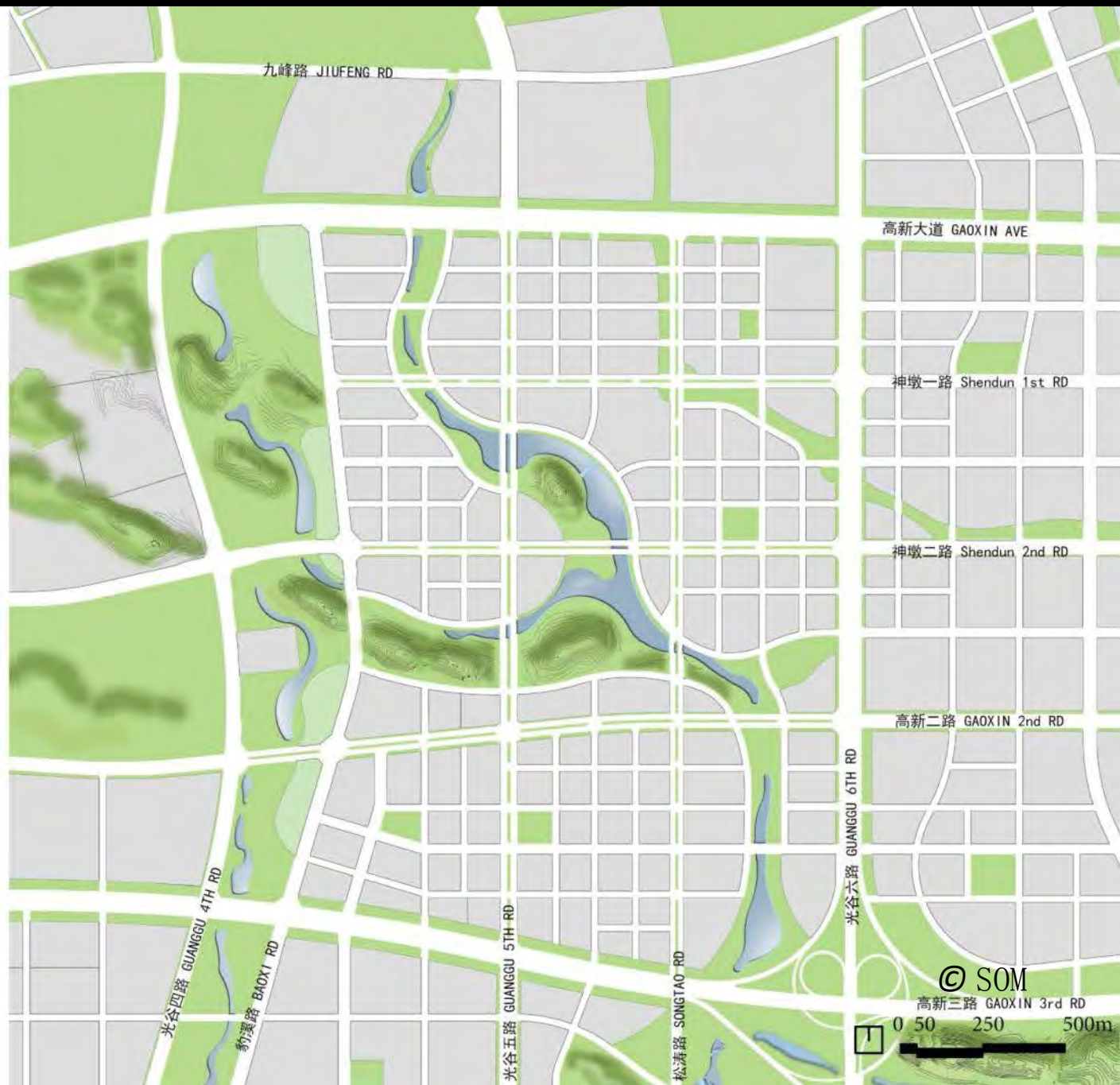
商务核心区 Commercial Core

场地自然元素控制与
确定的道路和地块
Natural Constraints with
Fixed Roads and Parcels

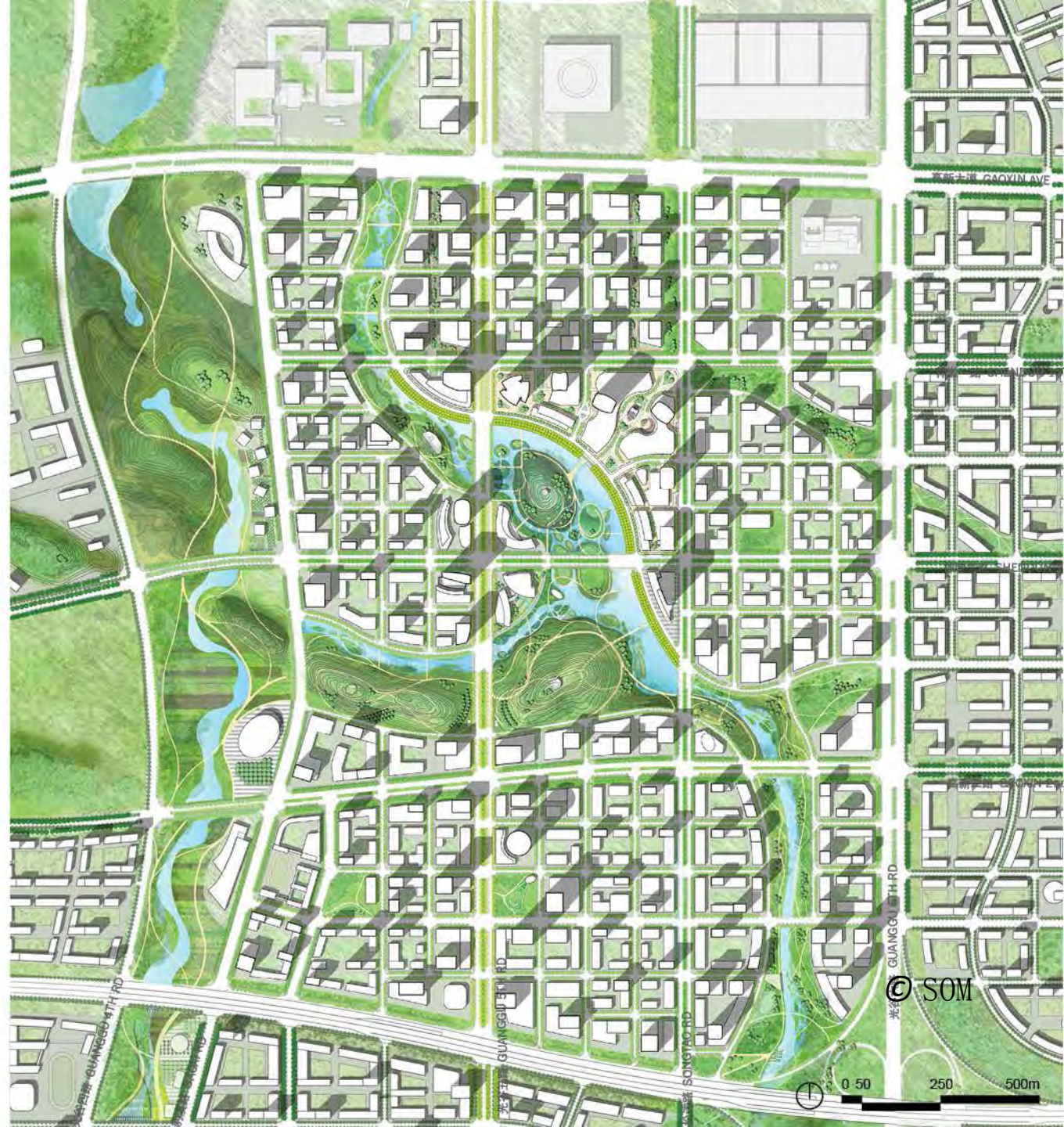


商务核心区 Commercial Core

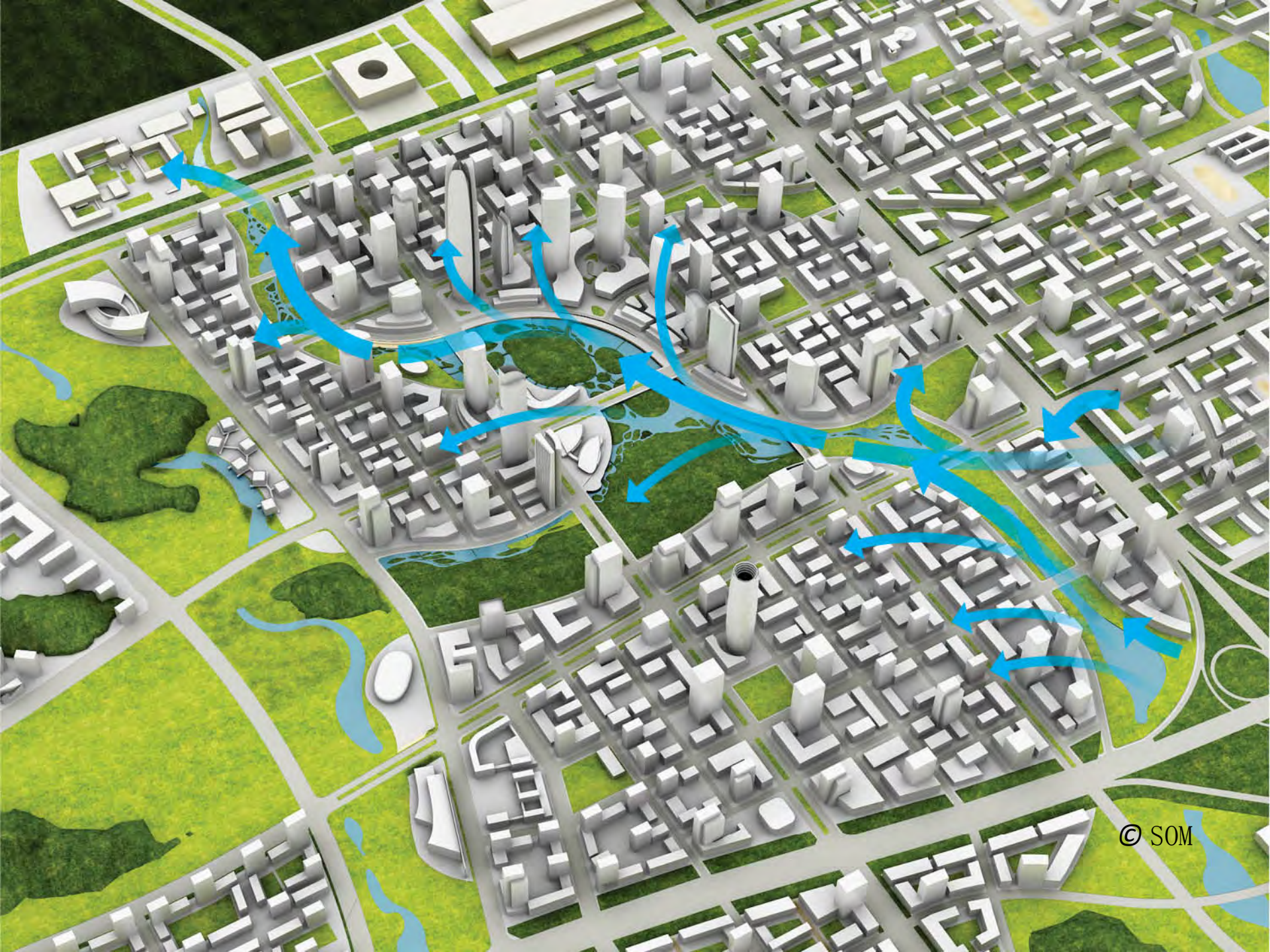
开放空间系统
Open Space



北核心区总平面
North Core
Illustrative Plan















山水自然之城

City Of Mountain and Water

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在以水系生态系统的视角下，我们将看到不同的研究对象和不同的设计问题，设定更有效的研究边界范围。

大尺度的城市设计，在解决城市内部的问题外，也应重新探讨城市的区域布局及其与自然水系及其生态系统的关系。

小尺度的城市空间研究，在强调城市“内涵”转变的同时，也需要考虑城市“外延”的联系。

在物质空间层面，水系作为线状的生态系统，理应突破行政区域的分割，进行统一的规划和管理

同时，水系作为动态的系统，在承载交通运输功能同时，更将同一水系连接的城市更紧密的整合在一起，创造一个适宜自然和经济系统健康运转的区域发展体系。

谢谢！

Thanks!

罗志航 Zhihang Luo

cell: +86 13143869001 (China); +1 3129124231 (US)

email: zhihang.luo@som.com

wechat: luozhihangchicago