TRANSIT-ORIENTED DEVELOPMENT & SMART MICRO CITY
公共交通导向的发展模式与智能微型城市

RESEARCH BY DESIGN ON TONGZHOU NEW BEIJING EAST STATION AREA & QINGHE RIVER SURROUNDING AREA
通州新北京东站地区和清河沿岸地区设计研究

Towards2050: Developing a Sino-Dutch approach for Sustainable Urbanization

迈向2050年：中荷可持续城市发展工作营

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京津冀《迈向2050》为可持续性城市化量身打造综合发展方案

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本刊物是对2015京津冀《迈向2050》的研究实践汇报。《迈向2050》：在建筑和城市化发展历程中，探索一种城市可持续化的综合发展脉络和规划办法，也是中荷多年来的合作项目。该计划的目标是探索一个在荷兰已广泛应用，且涉及多部门跨领域合作的空间规划方法，通过设计改良、创造额外价值，并成功运用到中国大都市目前的发展规划上，以应对该区域可持续城市化进程中所面临的挑战。关于这个问题在每年中荷设计研究工作组，都会选择针对特定空间规划挑战进行探索。

《迈向2050》由Creative Industries Fund NL于2013年7月发起,并且得到了荷兰驻北京大使馆的支持。一直以来，《迈向2050》就同与北京国际设计周、北京城市规划委员会和北京建筑设计研究院紧密合作。经过这些年，《迈向2050》已经建立起一个强有力的规划专家网络，包括清华大学的吴唯佳教授、中国建筑设计研究院的崔恺、中国城市规划设计研究院张兵与北京市城市规划设计研究院的杜利群等，均自2014年起成为了《迈向2050》的联合策展人。近几年，《迈向2050》与北京建筑设计研究院的TOD研究中心、世界银行北京办事处、中国建筑中心、北京水务投资公司等公共或私人规划设计公司及政府机构展开合作。今年，京津冀——北京、天津、河北省的区域一体化挑战成为研究的主题。这种区域一体化的发展诉求，提供了广泛的可持续设计研究主题，比如如何整合和分配区域中的经济资源，如何提供可持续的连通性和可达性，如何改善环境，如何解决水资源短缺和洪水的困扰。除了这些技术挑战，京津冀还提出了一个首要的挑战首先要解决的问题——即如何提高该地区居民生活质量：干净的空气，无公害的食物和水，良好的公共服务，保障性住房和高品质的公共设施及进行体育锻炼的空间，休闲活动和社会交际场所。

This publication presents the results of *Towards2050*, 2015 edition. *Towards2050: Developing an Integrated Planning Approach for Sustainable Urbanization* is a multi-annual Sino-Dutch collaboration program in architecture and urbanism. The goal of the program is to explore how an integrated, cross-sectoral spatial planning approach as applied in the Netherlands can be of added value to the challenges Chinese metropolitan regions are facing in planning sustainable urbanization. This question is explored by means of annual Sino-Dutch 'Research by Design' work weeks on specific spatial planning challenges.

Towards2050 was initiated by the Creative Industries Fund NL in July 2013 and supported by the Dutch Embassy in Beijing. From the beginning, *Towards2050* has had a strong collaboration with the Beijing Design Week, the Beijing Municipal Commission of Urban Planning and Prof. Wu Chen of the Beijing Institute of Architectural Design. Over the years, *Towards2050* grew as a powerful network of planning experts, with Prof. Wu Weijia of Tsinghua University, Cui Kai of the China Architecture Design & Research Group, Zhang Bing of the China Academy of Urban Planning & Design and Du Liqun of the Beijing Municipal Institute of City Planning & Design, who all became co-curators of *Towards2050* since 2014. In recent years *Towards2050* also developed collaborations with Li Hui and BIAD's TOD Research Center, with the World Bank Beijing Office, with China Building Center, the Beijing Water Investment Center and many more public and private planning institutes and government bodies.

In 2015 the challenges of Jing-Jin-Ji - the regional integration of Beijing, Tianjin and Hebei provinces - were the subject of study. This regional integration offers a wide range of research and sustainable design topics such as how to integrate and distribute economic development in the region, how to provide sustainable connectivity and accessibility, how to improve the environment and how to tackle water scarcity and flooding. Next to these technical challenges, Jing-Jin-Ji offers an overarching challenge of how to improve the quality of life for inhabitants of the region, with clean air, good food and water, good public services, affordable housing and high-quality public facilities and spaces for physical exercise, leisure activities and social encounter.

Towards2050 work week 2013

《迈向2050》，2013年研讨会周

在第一次连续两周的合作期间里，我们针对通州站潜在的利益联系和地区的区域发展进行研究。第二周，我们的工作任务是研究北京北部清河高质量城市更新的潜力。这些研究项目可以为该地区的许多其他类似的项目提供相关设计经验。本刊物包含设计工作组全部的研究成果，结合文章背景：京津冀区域一体化政策中，我们研究对于21世纪北京和京津冀水资源管理、可持续城市公私合作和京津冀地区基础设施建设具有导向作用。我们了解到，通州站和清河沿岸地区的发展，可以从创建城市和它的公民附加值的综合空间规划做法中获利，尤其是在空间和基础设施的规划策略与综合金融战略方面的会有更好的补充。这两个研究项目可以作为相关设计运用在该地区的其他同类项目中。

第一周是由清华大学主办。在这一周中，该团队由40多名中国和荷兰不同的学科专家组成，例如建筑师，城市规划师，交通专家，城市经济学家和项目管理专家，分别来自知名大学、设计院、政府机构和私营公司等。清河河道和区域发展课题在第二周举办研讨会，并与北京水务投资公司和北京规划委员会合作，由李辉和北京市建筑设计研究院TOD研究中心策划。我非常感谢主办组织，他们创办了《迈向2050》这样一个有意义的研讨会。我也想感谢两个工作组的所有参与者，如此慷慨的分享他们的知识和专长。最后我想感谢对本出版物做出了贡献的作者。我真诚地希望我们的合作将有助于中国和荷兰在城市可持续发展方面提出设想和发展共同的未来。我也期待着与我们的合作伙伴在2016年及以后的研究中进一步合作。

Towards2050 Workweek 2015 Presentation

Photo:Merten Nefs

《迈向2050》，2015年研讨会周汇报

摄影： Merten Nefs

During the first of two consecutive weeks of collaboration, the assignment was Tongzhou station and potential benefits of node and area development for the region. In the second week the assignment was to study the potential of using Qinghe River regeneration as leverage for high-quality urban regeneration in the northern part of Beijing. These research projects can serve as relevant design exercises for many other comparable projects in the region. This publication contains the results of both Research by Design workshops, combined with the background essays: “Jing-Jin-Ji Regional Integration Policy”, “Transit Oriented Development in the Jing-Jin-Ji region”, “Developing a Polycentric Metropolitan Region in the Netherlands”, “21st Century Water Management for Beijing”, and “Jing-Jin-Ji, and Public-Private Collaboration in Sustainable Urban and Infrastructure Development”. The results of the Tongzhou Station and the Qinghe River workshops show that large infrastructure-related urban regeneration and area development projects can profit from an integrated spatial planning approach that creates added value for the city and its citizens, on the condition that a spatial and infrastructural planning strategy is complemented with the proper integrated finance and governance strategy.

The first workshop week was hosted by Tsinghua University. During this week, the expert team consisted of more than 40 Chinese and Dutch experts from various disciplines: architects, urban planners, traffic specialists, urban economists and project managers, from renowned universities, design institutes, government organizations and private companies. The workshop on Qinghe River and area development in the second week was organized and curated by Li Hui and BIAD’s TOD Research Center in collaboration with the Beijing Water Investment Company and the Beijing Municipal Commission of Urban Planning. I am very grateful to the hosting organizations and the curators for making this edition of *Towards2050* such a rewarding endeavor. I would also like to thank all the participants of both work weeks, for sharing their knowledge and expertise so generously. Finally I would like to thank the authors who have contributed to this publication. I sincerely hope our collaboration will help to envision and develop a shared future for sustainable urban regions in China and the Netherlands. I am also looking forward to further collaboration with our partners, in 2016 and beyond.

Towards2050 Workweek 2014

《迈向2050》，2014年研讨会出版物

第1章
PART 1

京津冀一体化面临的挑战

CHALLENGES OF JING-JIN-JI REGIONAL INTEGRATION

JING-JIN-JI REGIONAL INTEGRATION POLICY BACKGROUND AND MAIN OBJECTIVES
京津冀区域一体化政策背景及其主要目标研究

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京津冀地区面积为21.6万平方公里（占全国地域总面积2.3%），常住人口1.1亿（占全国总人口的8%），地区生产总值6.6万亿人民币（占全国10.4%，2014）。2013年，习近平总书记视察河北，提出要推动京津冀协同发展；2014年，习近平总书记就京津冀协同发展提出7点要求；2015年4月30日，中共中央政治局审议通过《京津冀协同发展规划纲要》。

为什么要推动京津冀协同发展？

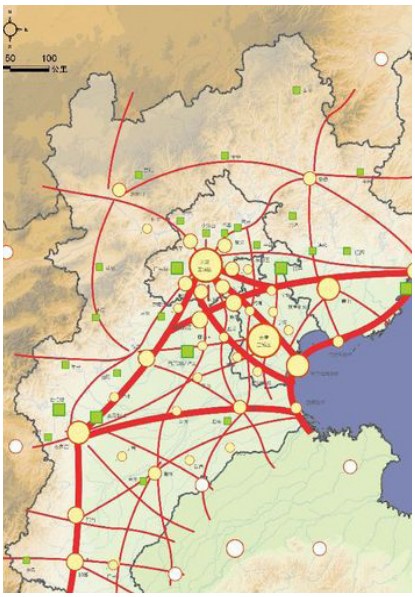
- 中国适宜人居的土地有限，发展高密度城市群具有重要意义，但面临行政区合作的治理难点。
- 京津冀拥有两个特大城市，水资源、土地、环境面临沉重压力。例如，京津冀年均降雨量不足600mm，人均水资源不足300m3，其中北京人均水资源不足170m3。京津冀农业用地用水量巨大，多年来河北农业用水一直保持在总用水的60%以上。
- 城市人口、城镇体系布局不均衡，京津走廊快速增长，河北城市发展相对缓慢。河北省经济发展的资源型特点对人口分布产生了较大的影响。2010年，京津冀城乡建设用地人口密度5009人/ km2，稍高于全国水平，但天津河北低于全国水平。建设用地上人口密度不高的原因在于乡村建设用地分散成片，人均建设用地占比高；重石化工企业数量多，占地规模大等。
- 京津冀社会发展差距过大。北京集中了最好的高校、医疗及文化设施，但没有能够带动周边地区的发展，北京的人均收入是河北的3倍左右，且差距越来越大。
- 区域性环境污染，包括河湖污染，海洋污染，雾霾，湿地退化，水土流失。对于北京，则有交通拥堵，空气污染，水资源短缺，垃圾处理，大量外来人口而引发的社会问题等。

京津冀协同发展的目标：

- 2014年，国家主席习近平视察北京，对北京和京津冀协同提出了七点要求：
- 加强顶层设计
- 推动区域协同发展
- 加快产业对接协作
- 优化城市布局和空间结构
- 加强环境和生态治理
- 构建现代化交通网络体系
- 加快推进市场一体化进程

《京津冀协同发展规划纲要》提出如下发展目标：

- 近期（2017年）
  有序疏解北京非首都功能取得明显进展，
  在交通一体化、生态环境保护、产业升级转移等重点领域率先取得突破
- 中期（2020年）
  北京城六区常住人口在2014年基础上下降15个百分点，
  公共服务共建共享取得积极成效，
  区域内发展差距趋于缩小
- 远期（2030年）
  首都核心功能更加优化，
  生态环境质量总体良好，公共服务水平趋于均衡，
  具有较强国际竞争力和影响力的重要区域



Urban system of Jing-jin-ji Region

京津冀地区城镇体系

图片：《明日人居，未来展望》2014年11月清华大学建筑与城市研究所出版

The Jing-Jin-Ji area is 216,000 km^2 (2.3% the territory of China), with a population of 110 million (8% the population of China), and a GDP of 1.04 trillion US dollars (10.4% the GDP of China, 2014). President Xi Jinping visited Hebei Province to put forward the proposal of Jing-Jin-Ji collaborative

development in 2013, and made seven separate requirements for 2014. The Political Bureau of Central Committee passed the outline of the Jing-Jin-Ji regional collaborative development plan in 2015.

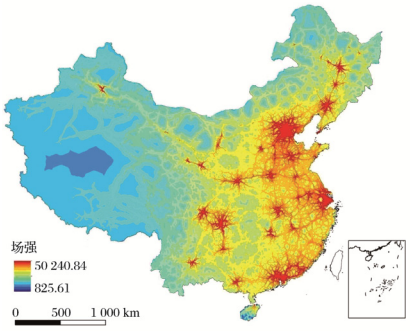
Why should the Jing-Jin-Ji cooperative development be promoted?

- Habitable land in China is limited. It is strategically important to develop megacity regions to efficiently use urban land, but regional governance faces challenges of cooperation.
- Jing-Jin-Ji has two megacities, exerting heavy pressure on water, land and the environment; annual rainfall of the Jing-Jin-Ji region is less than 600mm, with water resources per capita less than 300 cubic meters, of which Beijing's value is less than 170 cubic meters. In Hebei Province, agricultural production takes up more than 60% of the total water use.
- Uneven distribution of urban population and urban systems. Population growth is rapid along the Beijing-Tianjin corridor, but slow in Hebei Province due to the resource-based industry, with profound impacts on decentralization of population distribution. Population density in built-up areas of Jing-Jin-Ji is 5009 people per square kilometer, just above China's average, but density of Tianjin and Hebei is below national average. Built-up land in rural areas is scattered and sparsely inhabited. The massive number of heavy industry plants take up a large amount of land.
- Regional disparity. Beijing has the best service facilities but has not been able to trigger the development of its surrounding area. On the other hand, Beijing's per capita income is three times that of Hebei and the gap is getting wider.
- Regional environmental pollution. This includes river water pollution, seawater pollution, smog, wetland degradation and soil erosion. As for Beijing, there are traffic congestion, air pollution, garbage disposal and social problems caused by migrant population.

Goals of the Jing-Jin-Ji collaborative development

President Xi Jinping reviewed Beijing's urban construction in 2014 and put forward separate requirements to Beijing and the Jing-Jin-Ji region:

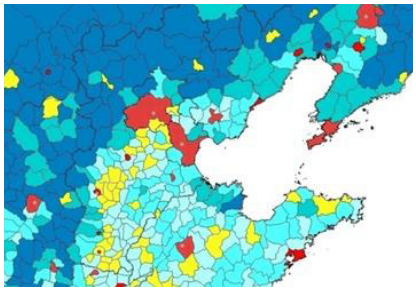
- Strengthen the top-level design
- Promote regional collaborative development
- Accelerate industrial collaboration
- Optimize the urban layout and spatial structure
- Strengthen environmental and ecological governance
- Build a modern transportation network system
- Accelerate the process of market integration



Spatial pattern in China

中国空间场能的分布格局

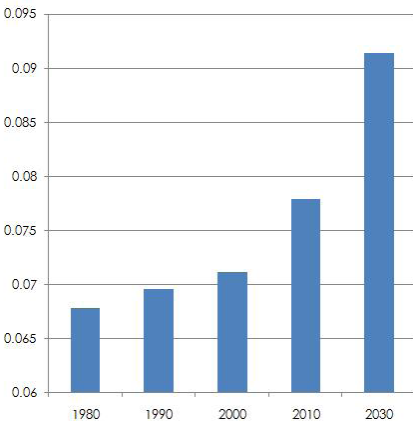
Image: 《基于腹地划分的中国城市群空间影响范围识别》
作者：潘竟虎, 刘伟圣



Population density of Jing-jin-ji (country scale)

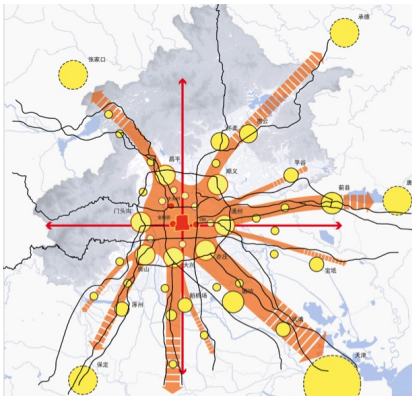
区县尺度的京津冀地区人口密度

图片：《明日人居，未来展望》2014年11月清华大学建筑与城市研究所出版



Beijing, Tianjin and the country's total population proportion of the population

京津冀人口占全国人口比例



The spatial development structure of '2 axes, 2 belts, 6 corridors' for Beijing and its surrounding area

首都北京及周边地区“两轴两带六廊”的空间发展结构与多中心体系

图片：《明日人居，未来展望》2014年11月清华大学建筑与城市研究所出版

To construct Beijing mega-city region with the idea of “regional city”

以区域城市的理念，建设北京特大城市地区

图片：《明日人居，未来展望》2014年11月清华大学建筑与城市研究所出版

Development goals of the region in the outline of the Jing-Jin-Ji regional collaborative development plan

1. Short-term goals (until 2017):
   - Relocation of Beijing's non-capital functions
   - Achievements in transportation integration, eco-environmental protection and industrial transformation
2. Medium-term goals (until 2020):
   - Population decline by 15% in Beijing 's central district
   - Relocation of public service
   - Equivalent access to regional infrastructure
3. Long-term goals (until 2030):
   - Optimization of core capital function distribution
   - Good environmental quality and balanced public services
   - An integrated region with strong international competitive and influential power

功能布局与战略措施

1. 控制发展规模
   - 严格限制北京人口规模，
   - 以次区域调控区域开发总量，
   - 高密度开发存量用地，
   - 以全国城镇化快速发展为背景，可以预计京津冀人口在2035年之前将会继续维持增长态势，增长速度可能会低于前十年，但规模较仍然较大。在适度维持人口规模有限增长基础上，综合运用政府干预和市场手段，致力于逐步促进京唐、京保、津唐、津保城市走廊的形成，是较为理性的选择
2. 建设多中心、网络化的区域
   建设以首都为核心，有秩序的、多中心的、相互协调、相辅相成的京津冀“城镇网络”、“交通网络”、“生态网络”、“文化网络”。
3. 加强跨界合作，建设区域城市
   首都功能和首都经济需要走向区域，降低集聚在中心城区的资源环境压力。
   北京、天津、河北建设跨界协作特区，实现互惠共赢。
4. 构建区域城镇走廊
   北京及周边地区层面，形成以北京中心城区为核心，以京张、京承、京沈、京津塘、京开、京广-京昆等高速公路网串联的六个区域城镇走廊。
   借助地铁、市郊铁路、城市铁路、高铁等交通体系，有效引导空间布局。
5. 功能疏解
   实行市场准入与产业负面清单。
   疏解北京非首都功能，包括：1）一般性产业特别是高消耗产业；2）区域性物流基地、区域性专业市场等部分第三产业；3）部分教育、医疗、培训机构等社会公共服务功能；4）部分行政性、事业性服务机构和企业总部。
   从地区设计的角度进行首都政治文化功能新区选址。
6. 首都核心功能提升
   建设国家首都核心功能区，整合国家行政管理和文化纪念设施。
   建设国家纪念地，弘扬民族文化遗产，铭记中华文明史与近代奋斗。
   完善城市绿地体系，以绿水青山传承历史，提升生态文明水平。
   - 规划实施的挑战与难点
   - 省级行政区之间、地方政府与市场之间如何进行有效协同，

- 如何利用激励与税收调控措施，引导市场力量参与建设，
- 行政区划调整有否必要，若调整可能产生怎样的影响，
- 如何确保政府项目的带动效益与公共投入的基本产出，
- 京津冀协同能否引领生产、生活方式的转变，
- 相应的交通、生态环境与基础设施能否得到支持，效益与投入能否匹配。

Spatial visions & strategies

1. Control population and urban growth
    - Strictly limit population of Beijing
    - Regulate development scale by sub-region
    - Redevelop the existing built-up land to high-density
    - According to the national background of rapid urbanization, it is estimated that the population of Jing-Jin-Ji will continue to increase before 2035. Therefore, it would be a rational choice to maintain a moderate population increase and promote the formation of urban corridors along Beijing-Tangshan, Beijing-Baoding, Tianjin-Tangshan and Tianjin-Baoding.

2. Polycentric networks. Construct ordered, polycentric and coordinated networks of urban, transportation, ecology and culture on the Jing-Jin-Ji scale.

3. Cross-border cooperation and the regional city concept. Put forward the concept of regional development to reduce the population pressure on the central city. Construct cross-border cooperation in the region to achieve trilateral benefit.

4. Construct regional urban corridors to form six regional urban corridors with Beijing, the central city, as the core. The aim is to effectively guide the spatial structure with a comprehensive transportation system of metro lines, suburban railways, inter-city railways, and high-speed railways.

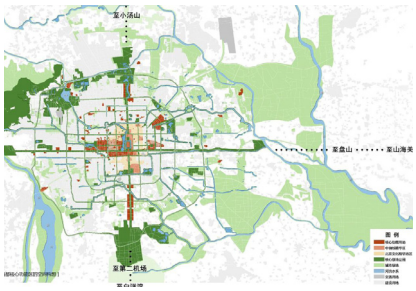
5. Relocation of functions

Implementation of negative market access list and relocation of non-capital functions. This includes:

- General industries with high energy consumption
- Regional logistic bases and professional markets
- Some educational, medical and training institutions
- Some government affiliated agencies and headquarters

Select new districts in the region to relocate political and cultural functions.

6. Improvement of core capital functions
    - Integrate national administrative sectors, cultural facilities and memorials on the scale of the core area of the capital
    - Construct national memorial sites to memorialize national history
    - Improve parks and green spaces



① 天安门国家政治中心区

Tian'anmen national polical center

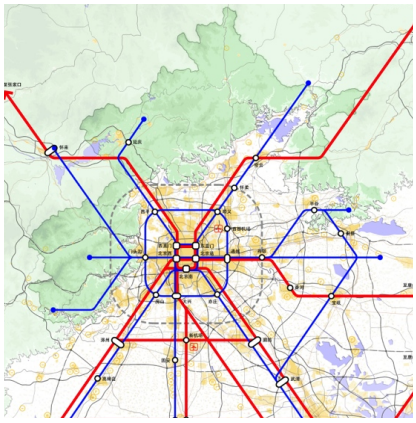
② 三里河国家行政及文化区

Sanlihe governmental and culture center

③ 南中轴国家行政办公及纪念区

South Central axis Administration Office and Monument

图片：《明日人居，未来展望》2014年11月清华大学建筑与城市研究所出版



The transit system of metro, suburban train, inter-city and high-speed railway for Beijing and its surrounding area

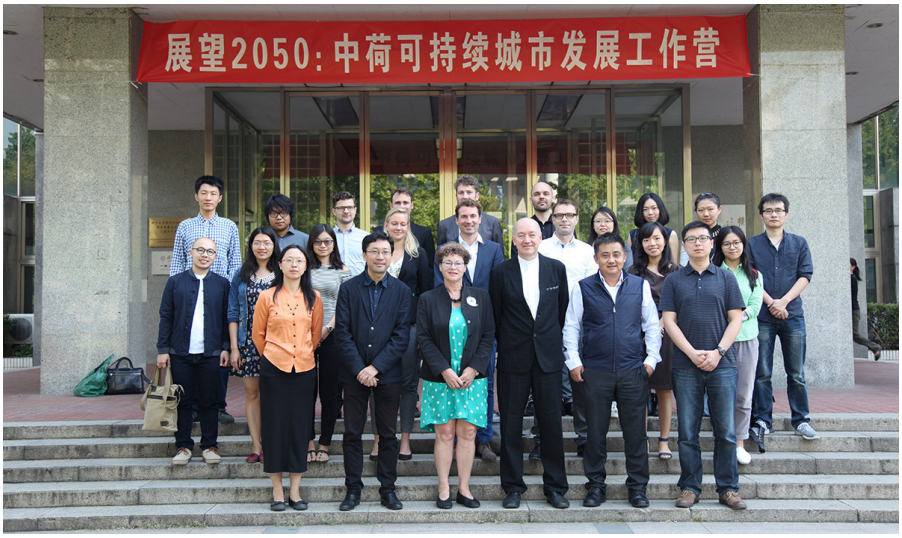
首都北京及周边地区高铁、城际、市郊铁路、地铁密切配合的轨道交通体系

图片：《明日人居，未来展望》2014年11月清华大学建筑与城市研究所出版

- Improve heritage with regeneration of beautiful historic landscapes
- Enhance ecological civilization

Challenges and difficulties

- How to realize effective collaboration between three provincial units, as well as between local government and market
- How to guide market forces by incentives such as tax regulation
- Is it necessary to carry out administrative border adjustment? What kind of impact might this have?
- How to guarantee the driving force of government projects and public investments
- Does collaborative development of Jing-Jin-Ji have the potential to generate a new regional urban life?
- Will transportation and ecological infrastructure be efficiently utilized? Will the future benefits match with the investment?
- An integrated region with strong international competitive and influential power



Opening of the Research by Design work week, on new Beijing East Station in Tongzhou and its surrounding area, 15 September 2015.

Front row from left to right:

Mrs. Huang He, Assistant Professor, Department of Urban Planning, School of Architecture, Tsinghua University

Mr. Zhang Yue, Professor, Department of Urban Planning, School of Architecture, Tsinghua University

Mrs. Ineke van de Pol, Counsellor Press and Culture at the Embassy of the Kingdom of the Netherlands in China, Beijing

Mr. Ton Venhoeven, Principal architect and urban planner, VenhoevenCS architecture+urbanism

Mr. Wu Weijia, Professor, Department of Urban Planning, School of Architecture, Tsinghua University

and other *Towards2050* Participants from both China and The Netherlands

photo: courtesy of Tsinghua University

2014年9月15日，

中荷可持续城市发展工作营开幕式

前排由左到右：

黄鹤，清华大学建筑学院副教授

张悦，清华大学建筑学院规划系副主任

Ineke van de Pol, 荷兰驻华使馆新闻文化参赞

Ton Venhoeven, VenhoevenCS 建筑和城市规划事务所、总建筑设计师、规划师、咨询师、《迈向2050》创始人

吴维佳，清华大学建筑学院规划系教授

照片：由清华大学提供

A DISCUSSION OF INTEGRATED RAILWAY DEVELOPMENT WITH PUBLIC-PRIVATE PARTNERSHIPS IN THE CONTEXT OF THE BEIJING-TIANJIN-HEBEI COOPERATIVE DEVELOPMENT PLAN

轨道交通公私合营一体化发展方式的探讨
京津冀背景下的发展方案

Li Hui
Chief Architect, Beijing Institute of Architectural Design, Beijing,
P.R. China

李晖
北京市建筑设计研究院副总建筑师

随着《京津冀协同发展规划纲要》的出台，京津冀的热度又上了一个台阶，北京联合张家口成功拿下了2022年冬奥会的举办权，这对于京津冀协同发展来说，又增添了更强的驱动力。以京津冀地区目前的状况来看，实现一体化面临着诸多的问题，无论是交通、基建还是城镇化问题与水资源问题，都是牵扯面甚广的状况。其中交通问题又是重中之重，京津冀交通基础设施建设布局还是亟待完善，础设施建设不平衡，包括现在河北省内的铁路、城际线路的建设步伐相对进展比较慢，跟天津、北京的衔接还有断头路、瓶颈路。另外就是一些交通布局、线路设计已经不适应当前新形势的要求。

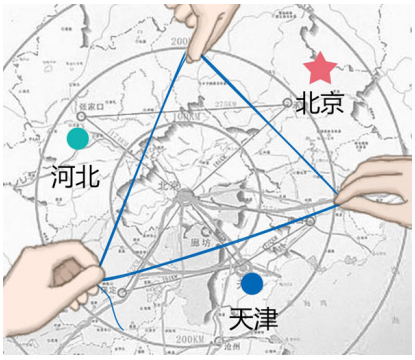
为了应对这一国家战略北京市力争到2020年构建一体化的区域综合运输服务体系，形成以北京为中心50公里半径范围内的“1小时交通圈”。实现中心城小客车(含出租车)出行比例在25%以内，绿色出行比例达75%。实现这“1小时交通圈”，依靠的是“轨道上的京津冀”。按照北京市的打算，2015年将会加快京张铁路、京沈客专、京九客专、京唐客专等项目的前期研究和建设工作，研究高铁、城际、市郊和地铁的四级轨道网络，强化城市群之间轨道交通的互联互通。

加快推进京台高速公路、110国道二期等重点工程建设，提速区域发展。开工建设京开高速公路主辅路拓宽工程、兴延高速和京秦高速。最终形成京津冀地区“一核、双城、三轴、四区、多节点”总体空间布局，力求打造以首都为核心的世界级城市群交通体系到2020年，多节点、网格状的区域交通网络基本形成，城际铁路主骨架基本建成，公路网络完善通畅，港口群、机场群达到国际先进水平，基本建成安全可靠、便捷高效、经济适用、绿色环保的综合交通运输体系。

要实现这一整体协同发展战略，不仅仅是三地联合，同时也包括政企协同推进，不仅仅是国家直接投资，同时也应通过多种融资平台挖据盈利模式，形成可循环操作结构，而PPP模式为这一合作提供了机会。

市场机制，包括社会资本、民间资本在物流资源配置和基础设施建设方面的作用没有充分发挥出来。

Along with the introduction of the ‘Jing-Jin-Ji Cooperative Development Plan Outline’, the Jing-Jin-Ji cooperative alliance entered a whole new level of vivacity; an alliance between Beijing and Zhangjiakou (a city in China’s Hebei region) cities successfully won the right to host the 2022 Winter Olympics Games, adding a strong driving force to Jing-Jin-Ji Development Plan. Observing the current situation in the Jing-Jin-Ji region, it is apparent that the integration is encountering a vast array of problems, wildly impacted by numerous difficulties, including: transport, infrastructure or urbanization issues, and issues regarding water resources. Amongst these issues, transportation proves to be one of the highest priorities; the Jing-Jin-Ji network foundation transport infrastructure and layout still needs improvements, with the current state of infrastructure between the regions remaining unbalanced. This imbalance includes existing railway lines within the Hebei Province, where the pace of construction for the inner-city lines is comparatively slow. When combined with infrastructure in Tianjin and Beijing, this slow pace of development leads to issues such as dead-ends on certain lines, or in some cases, bottlenecking and its associated congestion. Aside from this, there are a few transport networks where the current design is already unable to meet the demanding requirements of the new situation. In order to address this national strategy, Beijing City strives to construct a comprehensive regional transportation service system by the year 2020. The development area will span a radius as far as 50km from the center of the city, forming a ‘one-hour transportation circle’. Under the guidance of this strategy, less than 25% of vehicular traffic within the city center will be small passenger cars (including taxis), achieving a ratio of more than 75% of vehicular traffic pertaining



From ‘regional competition’ to ‘regional cooperation’

从“区域竞争”到“区域协同”：京津冀一体化的意义与困难

作者：宣晓伟，国务院发展研究中心研究员

to ‘green travel’ (meaning methods of transport that are environmentally-friendly). Realization of this ‘one-hour transportation circle’ vision relies on the Jing-Jin-Ji railway. According to the plans of the Beijing Municipal Government, following 2015 there will be accelerated design and construction work for the Beijing-Zhangjiakou, Beijing-Shenyang, Beijing-Kowloon, and Beijing-Tangshan Railways, with research focusing on the four key network systems of high-speed rail, intercity trains, suburban railways, and metro trains, in order to enhance the connection between different regions and cities.

The accelerated advancements of the Beijing-Taipei expressway, 110 National Road (stage two), will speed up the development of the region. Construction will start with the widening of the main roads of the Jingjintang Expressway (linking Beijing to Tianjin), and ultimately the Xing Yan and Beijing-Qing Huangdao Expressways, forming an overall spatial layout for the Jing-Jin-Ji area of, ‘one nucleus, two cities, three axes, four regions, and many nodes’, with the ambition to make a world-class transportation system in the capital by 2020. The overall layout of the area will comprise a basic foundational, multinodal, grid-like transportation system, the completion of the main intercity railway framework, perfectly smooth road networks, and an airport complex that achieves international standing, essentially building a safe, reliable, convenient and efficient, affordable and green integrated transport system.

To achieve this overall coordinated development strategy, cooperation is required by not only the three regions, but also the collaboration of government and private enterprizes – i.e. Public-Private Partnerships (PPP). Rather than relying on direct investment from the state, the strategy must also seek financing from alternative investment models and financing platforms. The PPP model provides such an opportunity for this cooperation.

With current market mechanisms, the total potential of public and private capital in terms of allocation of resources and infrastructure has not been fully realized.

PPP模式作为一种新的融资合作模式，近年来获得包括国家发改委、财政部等部委的大力提倡和地方政府的欢迎，在一些项目的实施上也已经取得了相当的成绩。政府与企业共同努力，通过PPP模式加大基础设施的建设，不仅能就地取材，还可以有效地化解过剩的产能，可以一举两得甚至多得。具体来说体现在以下四点。

1.可以拓宽融资渠道、缓解政府财政压力，并彻底摆脱营运期间的追加投资和更新投资的压力；

2.通过设置市场化的财政补贴机制，可有效激励企业控制成本，分散建设、运营期间的各类风险；

3.可以充分借鉴社会投资人轨道建设带动新城镇发展的运作经验，有效提升轨道交通沿线土地价值；

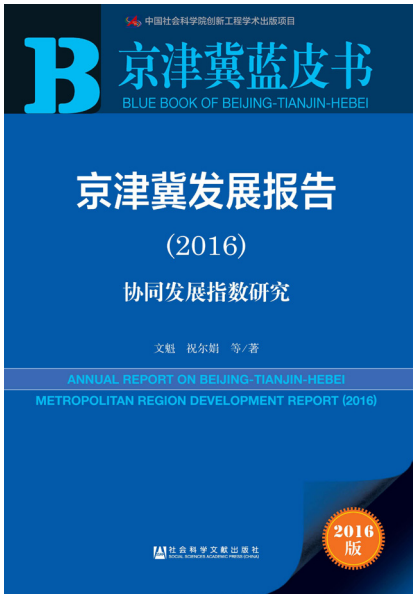
4.通过特许经营协议约束政府和企业，可以促进政府职能转变，提升公共服务水平。

PPP模式也在不断探索中前进着。今年河北审计预算部门安排PPP专项资金3亿，列入河北省推介项目和示范项目名单的重点项目,同时河北省的PPP项目，不仅服务于河北，还将为京津冀协同发展提供动力和支持。

The PPP financing model has become a new model of cooperation, with the National Development and Reform Commission, Ministry of Finance and other ministries and local governments strongly advocating its implementation. A number of projects that have incorporated this financing model have also made considerable achievements. Using the PPP financing scheme, government and private companies work together to implement the development of infrastructure, which not only allows for efficient use of local materials, but can also effectively resolve the issues surrounding excess capacity. In this way the PPP method can be seen as mutually beneficial, and more specifically in regards to the following four points:

- It can broaden the financing channels, easing pressure on government finances, and eliminating the need for additional investment and the pressure of sourcing new investment sources during the lifetime of infrastructure projects;
- It establishes a market-oriented financial subsidy mechanism to encourage enterprizes to effectively control costs, decentralizing construction and, distribute risks during operations;
- Provides an opportunity to learn from social investors' experience in terms of railway construction and leading new urban development, which could effectively enhance the value of the land along the rail;
- A franchise agreement binding government and private enterprize, can promote the transformation of government functions and improve public services.

PPP models are constantly exploring new realms. This year Hebei Province allocated special funds for PPP projects of around 300 million Yuan, including a list of key projects to lead the way, with these PPP projects not only servicing Hebei, but also providing impetus and support for the Jing-Jin-Ji collaborative development.



BLUE BOOK OF BEIJING - TIANJIN-HEBEI

京津冀蓝皮书

而ppp面临的三个主要挑战：一是轨道交通的融资量大；二是轨道交通是准公共产品，仅通过收费很难获得合理回报；三是轨道交通项目施工难，运营技术要求高，给管理带来挑战。为此，各地应积极开拓创新、设立PPP基金，加强组织保障、风险防范等多种方式，推动轨道交通领域PPP项目进一步开展。通过城市轨道交通不仅仅是一种现代化的城市交通工具，还是集客运服务、咨询服务、装备制造、高新技术研发、房地产开发和商业等多种功能于一体，对经济有多方面带动作用的重要产业。因此，从产业经济视角审视城市轨道交通项目建设有重要的现实意义。

However, PPP now is facing three main challenges:

- Railway networks usually have a large amount of funding;
- Railway networks are only partially public infrastructure, with tolls being the only method to obtain a reasonable return on investment;
- Rail transit projects are difficult to construct, technically-demanding operations that bring many challenges in management long after construction is complete.

In order to combat these challenges, each region should actively explore new innovations, establish a PPP fund, strengthen organizational protection, risk mitigation, and other methods to further promote the field of rail transportation through PPP strategies. Urban rail transit is not just a modern city transportation method, but also a represents a series of passenger services, advisory services, the

"Seminar of Beijing Rail Transit PPP & Inter-City Railway Development for Beijing, Tianjin and Hebei"

photo: Beijing Infrastructure Investment Co.,LTD

<北京市轨道交通引入社会资本合作模式暨京津冀城际铁路发展研讨论坛>

照片来源：北京市基础设施投资有限公司

China's first rail transit line financed using a Public-Private Partnership framework: Beijing metro line 4.

Photo: From internet

中国大陆城市轨道交通首条公私合营的路线-北京地铁4号线

照片：来自网络

manufacture of equipment, high-tech research and development, commercial real estate development and other functions all in one. Playing a multifaceted economic role, transit plays a leading role as an important industry. Therefore, when we look at urban rail transit projects from the perspective of economic development, their construction bears an important practical significance.

DEVELOPING A POLYCENTRIC METROPOLITAN REGION IN THE NETHERLANDS SHARING EXPERIENCES FROM THE RANDSTAD HOLLAND THROUGH THE CONCEPT OF A NETWORK CITY

在荷兰开发一个多中心都市群地区 基于网络城市概念就荷兰兰斯塔德地区开发经验分享

Roberto Cavallo

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Arnoud de Waaijer

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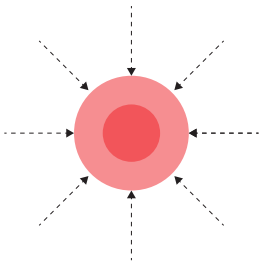
为减少和分解北京与天津的城市压力，京津冀都市圈的形成是由北京、天津、河北省组成且拥有1.1亿居民的多中心城市群。以前，城市如同北京和天津这样的高密度单中心城市，虽然在集聚效应上获益良多，但同时也承受着交通拥堵及生态方面的压力。京津冀都市圈意在以一个多城市中心的系统来发挥其效能，这个系统是由依据城市网络概念在网络中多重核心理想运行而组成的。通过分离和连接的其他卫星城市，在增强城市流动性、经济和生态方面表现的同时，避免了潜在的城市功能不协调运转。转型为一个网络城市对于京津冀地区的发展来说是一次重大的飞跃，但与此同时，对交通网络、水资源管理、经济和环境等方面也提出了巨大挑战性。

荷兰兰斯塔德地区具备构建一个网络城市群的良好条件：无论在历史和自然风景上它都是一个多中心城市区域。通过对兰斯塔德的观察研究，目的在于对网络城市的观察并了解其重要特质。此外，我们将阐明工作方法，这可以为构筑一个运作良好、具有超强竞争力的京、津、冀都市圈项目提供一些借鉴素材。

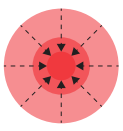
In order to reduce and divert urban pressure on the cities of Beijing and Tianjin, the formation of the Jing-Jin-Ji megalopolis is pursued - a polycentric urban region consisting of Beijing, Tianjin and Hebei provinces, with about 110 million inhabitants. High-density monocentric cities such as Beijing and Tianjin greatly benefit from agglomeration effects, but suffer from congestion and ecological stress. The Jing-Jin-Ji megalopolis is meant to function as a polycentric urban system consisting of multiple cores ideally operating in networks following the concept of a Network City. Through the constellation of detachment and connection, potential urban dyssynergies can be prevented while enhancing performance in the realm of mobility, economy and ecology. The transformation into a Network City can be a quantum leap for the Jing-Jin-Ji area, but is also challenging for the realization of mobility networks, water management, economical clustering and the environment.

The Randstad Holland is a Network City by nature; its roots as a polycentric urban region lay in history and scenic setting. By means of insights on the Randstad, this contribution aims at sharing observations on the Network City and its pivotal characteristics. Furthermore, we will illustrate working methods that could serve as inspiration for the project of creating a well-functioning and ultra-competitive Jing-Jin-Ji megapolis.



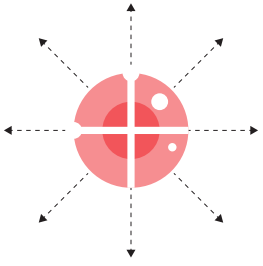
Monocentric cities such as Beijing and Tianjin have the tendency to attract population, facilities and employment.

单中心城市例如北京、天津拥有较大的人口吸引，设施和就业的趋势。



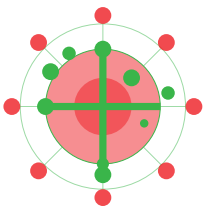
Although agglomeration effects take place, inward traffic and urban pressure can cause congestion and lack of space for ecology.

集聚效应发生，向内的交通和城市压力可引起拥堵和缺乏对生态的空间规划。



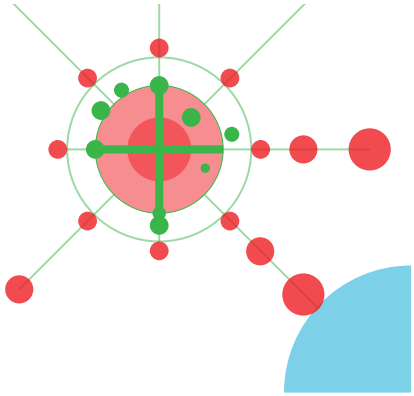
By creating multi-centers, specialized economical clusters can be made and space for ecology becomes available.

通过设立不同的经济聚落可以使得生态环境空间得到有效的预留。



An ecological network can be further advanced and mobility is spread out over a larger network preventing congestion.

生态环境网络已得到进一步的优化，由于交通已经分布在了一个较为辽阔的土地面积上有效的防止了交通堵塞的发生。



In a multicentric setting the formation of a bigger urban region becomes possible. Transformation into a polycentric region can be a quantum leap for Jing-Jin-Ji.

多城市中心的聚集使得一个更大的城市群落的形成变成为了可能，这种转变也可以被视为京津冀地区的腾飞动力。

兰斯塔德的视角和多中心城市的经验

兰斯塔德成为一个网络城市的根本原因首先处于得天独厚的荷兰河口三角洲自然条件下。然而由于位于海平面以下，该地区却是一片必须设置排水系统才能实现适合人类居住的沼泽地质。历史早期阶段这些城市水系统（运河）为货物运输产生了积极的作用。当地政府主导并提倡的运输方式是加强贸易交流和生产流程的分离，并且促进他们的形成发展。城市政府紧密地和当地资本合作，每个小镇根据自己的特色和自然条件发展自己的专长。城市区域之间通过良好的连接开始了竞争，更重要的是与此同时也产生了相互的合作；合作提高了效率，竞争则确保不同职能可以在最适合的平台上蓬勃生长。

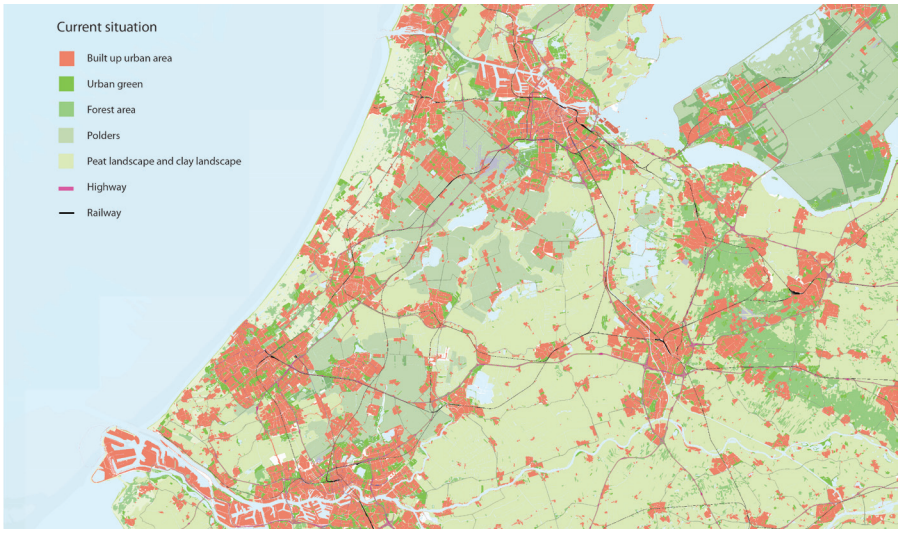
保证兰斯塔德地区持续的作为一个有竞争力的网络城市群，不是依靠城市自身而是通过精细的规划和不断地接受挑战和不断地适应新的环境。第二次世界大战后，荷兰的城市面临着巨大的住房建设需求。1950年开始，兰斯塔德的周边区域的扩张，已经威胁到了城市之间的开放性景观和多中心网络城市的特性。在当时的荷兰，政策制定者和城市规划者就保护区域中心的植被保持达成了广泛共识。经过一系列政策出现和演变，为实现当时预期的目标中央政府起到了指导和干预的作用。

经过三十年的多中心城市郊区化，中部景观成功保持了其开放性，生态和农业职能被地方机构在固定的生态范围内发展。于此同时，核心城市的竞争力已经被持续的城市去中心化严重削弱了。以自上而下空间政策制定，使得政府在财政上不堪重负，更加严重的是没有和其他重要城市的需要相结合，例如：发展相应的经济体聚落、高质量的新型交通干线。

如果在一个单中心城市集聚效应是通过紧密的交通联系和市场规模来实现，那在一个多中心城市，经济专业化配置、集群化和良好的工作联系则是关键的组成部分。他们需要通过从网络中相邻的地区互相“借用”竞争力、知识和市场来创建集聚效应，从而达到生产上的最大功效。为了面对世界其他地区即将产生的强大的经济体，荷兰国家的经济形态需要从生产转向更有利可图的先进服务型经济。在这种经济中，强有力的创新可以创造更多的附加价值，而专业知识相互作用的良好建设环境中这种优势得到加强。所以，聚落分布和连接的重要性更是成为了重中之重。多中心都市群则是满足这些需求的理想环境，荷兰积极地创造这样的城市环境并且完成了相应地进行经济转型。

Perspectives on the Randstad and experiences with polycentricity

The roots of the Randstad as a Network City lay in the specific natural circumstances of the Dutch river delta. Situated below sea level, the area consisted of marshy land where a system of drainage ditches had to be made to make this territory habitable.



The Randstad in 2015. Urban development until 1950 and between 1950 and 2015 is shown. Despite large extensions, the landscape was preserved by central policies.

Sources:
Mapping the territories of the Randstad Holland:
I.R. Pané and O.H. Diesfeldt,
Kadaster, Statistics Netherlands: Bestand Bodem Gebruik
Kadaster: TOP 10 Vectorkaart

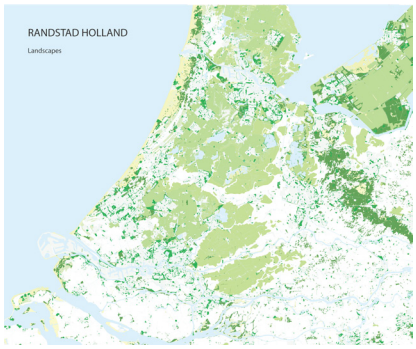
兰斯塔德2015年
城市发展在1950年和2015年之间
大量的植被面积被保存在了城市之间地区

A positive side effect was the presence of these waterways providing an excellent means for local transportation of goods at an early stage in history. The locally oriented transportation meant enhanced trade exchanges, separated production processes and their advancement. City governments collaborated strongly with local stakeholders; each town began to develop their own specializations based on local properties and scenic characteristics. Through these excellent connections the urban areas started to compete and, more importantly, co-operate simultaneously; cooperation increased performance, ensuring that functions were allocated where they flourished best.

Maintaining Randstad's qualities as a competitive Network City does not come by itself; careful planning and adaptation remain as ongoing challenges. After the Second World War, the cities in the Netherlands faced a vast demand for additional housing. Starting from the 1950s, extensions around the larger cities of the Randstad threatened the open landscape, highlighting the outdated monocentric character of cities. Amongst policy makers and urban planners in the Netherlands, a broad awareness arose for the need of protecting the valuable landscape. A series of evolving policies started and to reach the desired goals; the central government took a directive and intervening role.

After three decades of polycentric suburbanization, the landscapes were successfully kept open and ecological, and agricultural functions were nurtured by local bodies that functioned within the set ecological contours. At the same time however, due to ongoing suburbanization, the competitiveness of the core cities severely weakened. The intervening spatial policies which had been applied from a top down perspective, became financially uneconomical and more importantly had not been able to incorporate important urban requirements such as appropriate economical clustering and high-quality mobility links.

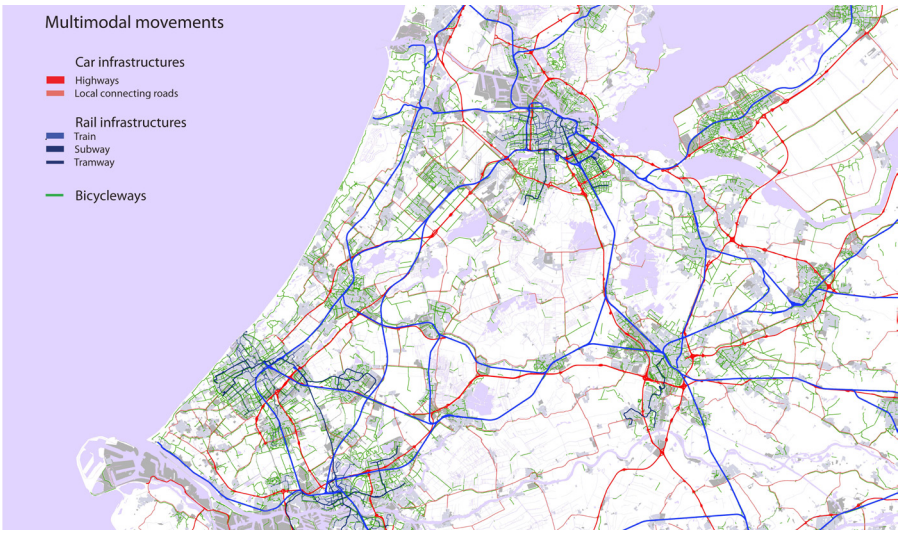
If in a monocentric setting agglomeration effects come about by close proximity



The landscapes of the Randstad in 2015. The preserved landscapes were well-nurtured by local bodies.

Sources:
Kadaster, Statistics Netherlands: Bestand Bodem Gebruik.
Deltares, UtrechtVos, P. & S. de Vries 2013: 2e generatie palaeogeografische kaarten van Nederland (versie 2.0).
Downloaded [march 6th 2016] from www.archeologieinnederland.nl.

2015年兰斯塔德的景观,中部林区被很好的保护起来。



Urban areas and mobility networks of the Randstad in 2015.

In the polycentric setting, precise connections are made in the dispersed urban setting. Clusters can be enforced via mobility networks. The networks for different distances and speeds intertwine and work together.

Sources:
Kadaster, Statistics Netherlands: Bestand Bodem Gebruik
Kadaster: TOP 10 Vectorkaart

2015年在兰斯塔德的移动网络

在多中心的设置精确的连接都在分散的城市环境做出。集群可以通过移动网络来执行。针对不同的距离和速度的不同网络相互交织而共同努力。

The map indicates the competitive region in development around Amsterdam (Northern Wing). Coherence in clustering is achieved by consultation and cooperation, and includes the key project of the Zuidas. The map also indicates the mobility projects of the high-speed line which integrates the Randstad in the ABC (Amsterdam, Brussels, Cologne) region and the Erasmuslijn, strategically urbanizing rural areas between Den Haag and Rotterdam.

Sources:
Mapping the territories of the Randstad Holland:
I.R. Pané and O.H. Diesfeldt,
Kadaster, Statistics Netherlands: Bestand Bodem Gebruik
Kadaster: TOP 10 Vectorkaart

地图所示项目

地图展示了竞争非常激烈的阿姆斯特丹周边地区，然而通过相互的磋商，城市之间形成了项目上的合作，例如阿姆斯特丹南站开发。图中还显示了“ABC地区”（阿姆斯特丹，布鲁塞尔，科隆）在交通、高铁上的合作，鹿特丹和海牙之间的保护林等。

and size of markets, in a polycentric urban setting economic specialization, clustering and well-functioning connections are critical components. These need to be created by means of well-targeted interventions that create agglomeration effects by ‘borrowing’ competition, knowledge and markets from neighboring areas in the network. In order to face upcoming economies in other parts of the world, the country’s economy needed to move away from manufacturing towards a more profitable advanced services economy. In such an economy higher added values are created by strong innovation, which takes place in well-developed built environments facilitating the interaction of specialized knowledge. These requirements emphasise even more the importance of clustering and connecting. The polycentric region is an ideal setting for this and the Dutch have actively worked to create such urban environments and transform their economy accordingly.

荷兰兰斯塔德：21世纪，重新定位网络城市的工作模式

为了城市转型过程的充分实现，对持续改善兰斯塔德经济、交通和空间特征的需求是21世纪初期很明确的议题。将多中心城市区域作为系统，而其履行任务的能力就是通过建立城市联系网络，并被视为组织城市的流程概念进行推广。联系网络是有效组织和规划复杂系统的方法，如经济，流动性和生态学等等。尽管这些城市化进程在不同的方面各有发挥，但如需运作良好的网络体系仍需要超越领土来创造集聚效应。

现今的荷兰网络组成方式，针对每个相关主题，协调各个实体并且实现互相协调来发挥其最大效能和优势。所有资本在早期即参与并确保了所有获益得到明确和妥善分配。通过这种方式，运作良好的城市系统和稳固的金融基础的实现是可以被预期的。政府层面的协调工作仍然存在，通过在城市发展的必要基础设施上提出指向性的投资方案和主导发展计划，项目对政府部门投资的依赖也大大削减。

Randstad Holland: working methods on repositioning the Network City in the 21st century

In order to adequately perform in urban transformation processes, the need for constant improvement of the economic, mobility and spatial characteristics of the Randstad was a clear issue at the beginning of the 21st century. The powerful notion to think of polycentric urban regions as systems, and their ability to fulfil tasks, was promoted by the concept of creating networks that organize urban processes. Networks are an efficient way of effectively organizing complex systems such as economies, mobility and ecologies, by realizing the relevant chains. Whereas these urban processes play at all scale levels, well-functioning networks need to exceed

Project for Zuidas Amsterdam -
Model:studiotransue
Picture: studiotransue

阿姆斯特丹南站地区项目

大规模的基础设施转变为全球性城市生态网络。主要合作伙伴是阿姆斯特丹市政府及铁路和公路建设的国家基础设施机构。现状的建议和现状照片

territorial barriers to create agglomeration effects.

In the Dutch network approach used nowadays, coordination entities are organized for each relevant topic, through which directions are set in order to accomplish good performance. Early involvement of all stakeholders ensures all interests are identified and properly addressed. In this way well-functioning urban systems and a solid financial basis for the stakeholders can be realized. Coordination still exists at the governmental level by directive investments in the necessary infrastructure for urban developments, and via appointed key projects for crucial chains within the networks, resulting in a severe reduction in the need for investments by the public sector.

Transforming massive infrastructure into an urban sphere respecting the ecological network. Main partners: Municipality of Amsterdam and other national infrastructural bodies. *Photo's: <Luchtfoto zuidas 2012> Pro Rail*

阿姆斯特丹南站地区项目

转变大规模的基础设施将其纳入城市的一部分，并保证和尊重其生态网络。

项目主要参与方是阿姆斯特丹市政府及铁路和公路建设的国家基础设施机构。图片为现状照片

建立有竞争力的城市区

建设网络的概念在基础设施走廊和多模态节点集群的发展中初具规模。其中一个走廊以NoordVleugel（兰斯塔德北翼）命名。该项目旨是开发一个世界级专业化的商务中心，将在荷兰阿姆斯特丹南部的Zuidas得以实现。在当地，上升的城市密度和经济活动与合作得到了极大地刺激。此外，在史基浦国际机场通过其周边有吸引力的商业园区获得发展和扩张的好处的同时，阿尔梅勒的周边城市地区也将提高其居住环境。同时，政府投资改善城市之间的连接性和实现了在Zuidas的重要节点位置上研发的重点项目。为了开发并实现项目上多方多层面的介入，并使它运作良好，并联合该区域内的重要业主组成了名为“阿姆斯特丹都市圈”的管理实体组织。在这里，通过提议和协商的多循环程序，制定了对该地区最佳的开发分配方案和最终产生具有法律约束力的发展协议。由此，一个具有国际竞争力的经济服务区出现了。

Zuidas是该地区具有带头作用的重点项目，有利于将不同类型的交通网络进行整合。整合城市、城市功能、各层级的交通基础设施、公共空间和生态环境等任务，形成了一个同化很多攸关利益的极其复杂挑战，最后当地政府引导并把这些元素整合为一个设计的过程。为了达成协议，一系列的设计方法被制定，并咨询不同的相关方并发起讨论。最终得出名为DOK的模型：一个关键的基础设施解决方法，在这其中，不同的交通网络可在同一个整体项目中得以优化。

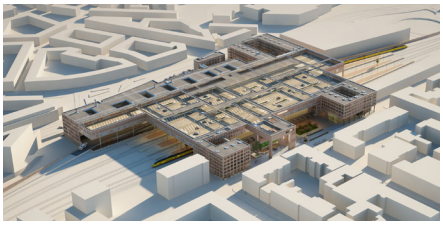
Building competitive urban regions

The notion of building networks took shape in the development of clusters on infrastructural corridors and multimodal nodes. One of these such corridors is Noord Vleugel (Randstad Northern Wing). The project consists of developing an international, highly-specialized business center to be realized at the Zuidas on the south side of Amsterdam. Here, increased density and enforced economic activities and cooperation are greatly stimulated. In addition, the neighboring city of Almere will develop high-quality residential environments, while the international airport of Schiphol benefits from both developments, and expands with an attractive business park in its proximity. Simultaneously, the government invests in improving the infrastructure networks to the required connectivity level, and in an important node and area development project at the Zuidas. To develop and realize this multifaceted intervention, and moreover, to make it function well, the main stakeholders on the territorial level joined forces in an organizational entity called Amsterdam Metropolitan Area. Here, through a multicyclic process of propositions and consultations, guidelines were formulated for the optimum distribution of developments over the area, ultimately leading to legally binding agreements on these developments. In this way, an internationally competitive region for service economy has been created.

Breda Centraal: the city is repaired, unifying town and station into one building. Main partners are construction companies and the City of Breda.

Sources: Bredacentraal and Your Captain Luchtfotografie

布雷达中心：全市在一个建筑修复统一城镇和车站。主要合作伙伴是建筑公司和布雷达市。左图像是模型，右图是在建的建筑物。



The Rotterdam Centraal terminal organizes the urban fabric in such manner that surrounding developments can be left to the market, enabling more rapid developments.

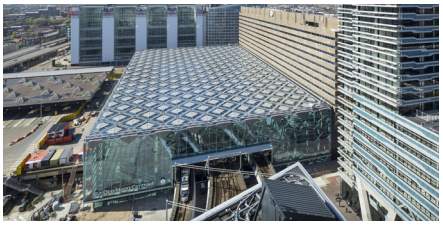
Sources: www.rijksoverheid.nl and Bureau Spoorbouwmeester www.spoorbeeld.nl

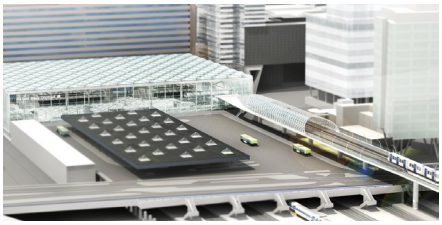
鹿特丹中央车站的规划方式，将城市周围的发展可以留给市场并且实现更快速的发展。

Den Haag Centraal Station was upgraded to a multimodal hub and commercial property was redeveloped. The Erasmus line was integrated.

Sources: Pro Rail

海牙中央站已经升级到一个多式联运枢纽和商业功能也被重新布置。





Developments on Erasmuslijn are tailor-made depending on local circumstances.

Erasmuslijn的发展则取决于当地的实际发展情况。

左：Pijnacker站。右：Leidschenveen的城市发展

The Zuidas is a key project because of its backbone role for the region, favoring the integration of the different types of networks at the local level. In this key project, investments in city, mobility and ecology are combined. This task of integrating city, urban functions, transport infrastructure of all levels, public space and ecology, generates the very complex challenge of assimilating the many interests at stake. The integration of these elements into one design was developed in a process initiated by the local government. To reach an agreement, a series of design proposals was made and discussed in consultation with the different parties involved. In the end, the consultation led to the so-called ‘DOK’ model, a pivotal infrastructural solution in which the different networks can be improved in one holistic project.

建造不同规模层次的交通流动系统

运作良好的交通网络对于网络城市中所需的相互交流非常重要。从基础设施角度来看，中央政府和基础设施筹划的各方正在努力优化交通移动系统以同时操控不同程度的速度和距离来确保各层级的运作模态。在兰斯塔德，更大区域的整合也称为了热门话题。高速铁路网络被建造使得兰斯塔德整合进入更大的ABC（阿姆斯特丹 - 布鲁塞尔 - 科隆）区域。在这里，荷兰中央政府决定着重关注一系列重点项目，如连接城市的高速列车站以及良好连接的公共空间。根据当地的实际情况和相关资本的需求，在上图中这六个项目中，每个不同策略都是显而易见的。

为了使兰斯塔德更加具有可持续性，通过TOD模式推动的区域空间整合正在各处筹备和发展。一个较小规模的例子是两个主要城市的连接：鹿特丹和海牙。项目改造了一个未充分利用的铁路线由乡村铁路线变成名为Erasmuslijn的大都市线。该项目包括新的空间发展，使得区域发展和优化交通充分融合的。这里项目的特点在于通过线形空间概念整合了住房，就业，设施和完善的公共空间。此外，项目让当地较低的规模水平的指导做法在高度一体化的城市项目中找到了自身定位。

Building with transit mobility systems at different levels of scale

Well-functioning mobility networks are key to the interaction required in a network city. From an infrastructural viewpoint, the central government and the relevant infrastructural parties are working to advance the transit mobility systems to simultaneously operate at different degrees of speed and distance, ensuring intermodality on all levels. Also for the Randstad, integration in the wider region is topical. A network of high-speed railway lines has been constructed, integrating the Randstad further into the larger ABC (Amsterdam-Brussels-Cologne) region. Here the central Dutch government decided to focus on a series of key projects involving high-speed train stations, where all modalities and connections to the cities, as well as excellent public spaces, are combined. Depending on local circumstances and on the stakeholders involved, a different approach is visible in each of these six projects.

To make the area of the Randstad more sustainable, spatial integration of regions by means of Transit Oriented Development (TOD) is taking shape everywhere. One smaller scale example is the connection of two key projects, Rotterdam and The Hague, via the transformation of an underused train line in farmland, into a metropolitan line called Erasmuslijn. This project includes new spatial developments reaching full integration with regional development and transit. The projects here are characterized by the integration of housing, employment, facilities and well-functioning public space organized in a linear city concept. At this lower-scale level, the approach in process guiding directive bodies also allows local developments to find a place in highly integrative urban projects.

21ST CENTURY WATER MANAGEMENT FOR BEIJING AND JING-JIN-JI
FLOOD RESISTANCE, RAINWATER MANAGEMENT AND ECOLOGY
21世纪京津冀地区水利管理
洪水防护、雨水收集管理和生态保护

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城市化通常会导致城市密集区的生态环境退化，如土壤板结，空气中的水和土壤污染，人类暴露在污染物中，污染物使生物多样性逐渐的丧失。这不仅发生在陆地，而且会通过水、土壤、空气污染物增多和污染物长距离扩散到更广阔的地区。这些退化的阻碍了如食物和水的供应，防洪，影响气候变化规律和生态系统。而其中最大的挑战是降低城市的温度，对抗缺水，抵抗洪水以保护生活和生产免受损害，在预算少和时间短的条件下保护或增加物种的多样性。

雨水泛滥，干旱和水质恶化是大多数城市化地区的重要问题，例如：北京。由于气候变化，这些问题在不久的将来可能会在人口稠密的城市地区引发严重问题。因此，问题的解决方案将被在随后的文中列出，其中可持续城市排水系统（SUDS），也可以作为整体战略将用于清河及“迈向2050”研讨会中。SUDS的综合战略实施可以降低内涝的可能以及减少雨水对城市水循环的污染。

对世界上城镇密集地区的挑战

对引起城市化的天然集水过程的影响已被广泛承认，并且在世界许多地区，可能导致并增加城市洪水的幅度和频率，以及下游水质恶化。城市化要求必须增加抵御极端天气措施。在这些地区，如北京，有必要把水资源短缺时期与水盈时期相结合以提高存水储容量。

储水量

在世界许多地区气候变化和城市化将增加城市洪水发生的频率和扩大问题水质的规模。在城市化进程高的地区，出现了增加采用可持续的城市排水系统（SUDS）的现象。这些都被视为用于减少城市内涝，减少对收纳雨水及排放污染的影响。

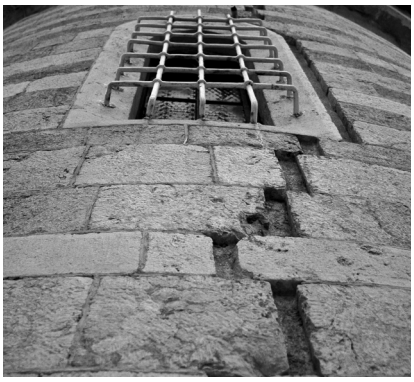
水质

鉴于世界范围内城市化的增加以及城市雨水对人类和水生生态系统的影响，城市排水管理正受到非常严峻的挑战。城市化增加了下游受收纳水域检测出的污染物数量和品种，并且也导致了已知全年污染负荷，城市收纳水体促进城市雨水排水系统的实施。在欧洲，欧盟水框架指令（WFD）建议加强水生环境的保护，以解决排水系统充分排放，并在采取一系列措施时，并且控制收纳水体的质量。在世界其他许多地方都不太注意城市地表水的退化。

大多数人认为，气候变化可能对水管理系统产生影响，然而许多业主或者相关利益群体数，并没有意识到气候变化也可能对城市水体产生显著的影响。使用可持续的城市排水系统（SUDS），可以为密集的城市地区提供许多有益之处，并且可以在北京实现（Boogaard F.C. 2015年）可持续水管理系统。

Examples of problems in the Urban areas: degradation of waterways, heatstress, drought leading to lower groundwater table and subsidence with results as damage of buildings.

问题的例子在城市地区：水路的退化、干旱导致地下水位沉降与建筑物受损



Urbanization usually leads to degradation of dense urban areas through issues such as soil sealing, and air, water and soil pollution, resulting in increased risk of exposure to floods, contaminants and a loss of biodiversity. This occurs not only locally, but also at a broader scale through the transport of airborne pollutants and contaminants in waterways. These degradations hamper the delivery of ecosystem services such as food and water supply, flood prevention, climate change regulation, and recreation. Some of the biggest challenges are to bring down city temperatures (heat stress), fight water shortages, protect homes and businesses from damage by flooding, and increase biodiversity within small budgets and timeframes.

Stormwater flooding, drought and degradation of water quality are important issues for most of the developed areas in cities as Beijing. Due to climate change, these issues may contribute to serious problems in dense urban areas in the near future. Therefore these issues are addressed in this book, followed by possible solutions such as Sustainable Urban Drainage Systems (SUDS), that can be used in the integral strategy for a sustainable Qinghe River and Beijing towards 2050. The implementation of SUDS in an integrated strategy can reduce urban surface water flooding as well as reduce the impacts of urban stormwater runoff on receiving waters.

Challenges in the urban dense areas of the world

Impacts on the natural catchment hydrological process caused by urbanization have been widely acknowledged. In many regions of the world urbanization can lead to an increase in the frequency and the magnitude of urban flooding, as well as the deterioration of downstream water quality. Urbanization demands increased resilience to extreme weather events. In these areas such as Beijing, it is essential to combine enhanced storage capacity in periods of water surplus, with periods of water scarcity. About half of China's 657 cities are considered water scarce or severely water scarce by UN measures, and another half fail to reach national standards for flood prevention. While more than 230 cities were affected by flooding in 2013, 90% of older urban areas do not even have basic flood plans, say officials (Guardian 2016).

Water quantity

Climate change and urbanization will increase the frequency and magnitude of urban flooding and water quality problems in many regions of the world. In areas where urbanization is often high, there has been an increase in the adoption of sustainable urban drainage systems (SUDS). These have been installed with the expectation to reduce urban flooding and reduce the pollution impact of urban stormwater runoff on receiving waters.

Water quality

Given the worldwide increase in urbanization, and the impact of urban stormwater

Flooding in Beijing

Source: www.telegraph.co.nk/news

7.21北京特大自然灾害

北京（来源: *www.telegraph.co.nk/news*）

Heatstress in the urban area

城市热浪来袭

照片：《北京“高烧”迎入伏 最高气温直逼40℃》中新网

http://www.chinanews.com/tp/hd2011/2015/07-13/540728.shtml

on both humans and aquatic ecosystems, the management of urban drainage is a critically important challenge. Urbanization increases the variety and quantities of pollutants found in receiving waters downstream. Urbanization also leads to the implementation of urban stormwater and wastewater drainage systems that are known to contribute significantly to annual pollutant loads, and also cause degradation of urban receiving waters. For Europe, the European Water Framework Directive (WFD) advises enhanced protection of the aquatic environment. As a consequence, the WFD advises to address the emissions from drainage systems adequately and to take action when these emissions affect the quality of receiving waters. In many other places of the world, less attention is given to the degradation of urban surface water.

Most people acknowledge the fact that climate change can have a significant impact on the hydraulic performance of water management systems, but most stakeholders do not realize that climate change can also have a (significant) impact on urban (surface) water. The use of sustainable urban drainage systems (SUDS) can provide a multitude of benefits in dense urban areas to achieve sustainable water management in Beijing (Boogaard F.C., 2015).

商业模式：综合方法

法规和政策执行层面将可持续城市排水系统纳入其中，其执行成本大大降低，其社会效益可以得到优化。无论在技术上和财政上，将这些技术措施纳入大型市政基础设施的调整方案中，可以包含以下四类：屋顶绿化、墙面绿化、洼地、湿地和透水路面，进而促进城市可持续排水。屋顶绿化措施可以在当地的建筑法规和设计规范得到优化。如果这种持续渗透和储存措施都集中在长期使用的道路上，公园和人行道并作为长期城市规划策略的一部分而公共投资可以比作单机排水投资的小一部分。对于城市规划师和设计师来说，需要采取一个综合的设计框架，优化不同的方面，如交通基础设施，公共空间，绿化等基础设施皆可以和可持续地面排水系统的质量相结合。

关注城市气候的测算

城市排水系统与可持续发展理念相结合被统称为可持续排水系统（SUDS）。通过恰当的设计、建造和维护，可持续排水系统比传统的城市排水方式来的更加具有可持续化，因为他们可以减少许多城市雨水径流对环境的不利影响[Woods-Ballard et al., 2011]。他们可以通过以下来实现：

- 减少径流率，并减少下游洪水的风险
- 减少额外的径流量，因为城市化径流的频率的结果，可能加剧洪水风险和损害收纳水体水质
- 鼓励天然地下水补给，以尽量减少对地下水的影响，并在接收流域河流基流
- 减少雨水污染物浓度，保护收纳水体的质量
- 通过防止高浓度的污染物直接排放到收纳水体充当意外溢出的缓冲区
- 减少地表水径流排入合流系统，并减少污染排放的水通过污水口溢流河道造成（CSO）泄漏
- 有助于加强市容和经济发达地区的城市景观，
- 增强生物多样性和提供野生动物在城市地区栖息地的机会。

恰当地使用可持续的城市排水系统（SUDS），可以减少城市地表水以及减少对收纳城市雨水及污染排放的影响。然而，SUDS的性能还没有很好地得到许多利益相关者的理解，当与更传统的工程解决方案相比，其工作效率往往被质疑[Viavattene et al., 2013]。

城市雨水管理的重点在过去十多年里已经改变了，然而目前已经全面覆盖洪水减灾，保护公众健康方面等其他问题。城市雨水管理措施通过了新的术语来描述这些新的方法，包括 [Fletcher et al., 2014]：最佳管理措施（BMPs）;绿色基础设施（GI）;城市水资源综合管理（IWM）;低冲击开发（LID）;低影响城市设计与发展（LIUDD）;源头管控;雨水控制措施（供应链管理系统）;水敏城市设计（WSUD）和可持续城市排水系统（SUDS）。

Financial strategy: integrated approach

Implementation costs of measures can be seriously reduced and societal benefits can be optimized if they are integrated in local regulations and policies. Measures should also be integrated in larger infrastructure adjustment schemes and strategies, both technically and financially (integrated approach). SUDS as green roofs, green walls, swales, wetlands and permeable pavement can contribute to sustainable drainage. Measures such as green roofs can be promoted in local building regulations or design codes. If measures for sustainable infiltration and storage are integrated in long term strategies on the maintenance of roads, parks and pavements, public investments can be a fraction compared to stand-alone drainage investments. For urban planners and designers this also requires an integrated design approach with an aim to optimize the combination of separate aspects such as traffic infrastructure, quality of public space, green infrastructure and sustainable surface water and drainage systems.

Focus on urban climate measures

Urban water drainage systems that have been developed in line with the ideals of sustainable development are collectively referred to as Sustainable Drainage Systems (SUDS). Appropriately designed, constructed and maintained SUDS are more sustainable than conventional drainage methods because they can mitigate many of the adverse effects of urban storm water runoff on the environment [Woods-Ballard et al., 2011]. They can achieve this through:

- Reducing runoff rates, and reducing the risk of downstream flooding;
- Reducing the additional runoff volumes and runoff frequencies that tend to be increased as a result of urbanization, and which can exacerbate flood risk

Beijing, September 2015: sandbags as a temporary measure to prevent flooding

Photo: Floris Boogaard

2015年九月，北京市内用沙袋来防止洪灾对城市的侵袭

Permeable pavement in Beijing

北京可透水路面

and damage receiving water quality;

- Encouraging natural groundwater recharge (groundwater levels drop in Beijing due to groundwater extraction for drinking water) to minimise the impacts on aquifers and river baseflows in the receiving catchment;
- Reducing pollutant concentrations in stormwater, and protecting the quality of the receiving water body;
- Acting as a buffer for accidental spills by preventing the direct discharge of high concentrations of contaminants to the receiving water body;
- Reducing the volume of surface water runoff discharging to combined sewer systems, and reducing discharges of polluted water to watercourses via Combined Sewer Overflow (CSO) spills;
- Contributing to the enhanced amenity and aesthetic value of developed areas; and
- Providing habitats for wildlife in urban areas and opportunities for enhancement of biodiversity.

The appropriate use of sustainable urban drainage systems (SUDS) can reduce urban surface water flooding as well as reduce the impacts of urban stormwater pollution discharge on receiving waters. However, the performance of SUDS is not yet well understood by many stakeholders, and their efficacy is often questioned when compared with more traditional engineering solutions [Viavattene et al., 2013].

The focus of urban stormwater management has changed over the last few decades and now covers more aspects than just flood mitigation and public health protection. The stormwater industry has developed and adopted new terms to describe these new approaches, [Fletcher et al., 2014] including: best management practices (BMPs); green infrastructure (GI); integrated urban water management (IUWM); low impact development (LID); low impact urban design and development (LIUDD); source control; stormwater control measures (SCMs); water sensitive urban design (WSUD) and sustainable urban drainage systems (SUDS). Descriptions

Amsterdam around 1970 and 2015

阿姆斯特丹1970年左右和2015年

图片：左： *Stadsarchief Amsterdam*

右： *from internet*

of SUDS, including their design, purpose and performance can be found in a variety of reference material.

所需使用的仪器，包括它们的设计，目的和性能的描述可以在各种参考材料中找到。在下一段中将讨论用世界各地最好的管理实践经验和案例，作为可以解决北京水管理问题的借鉴。研究案例，选择与我们的污染运河临近Westergasfabriek公园，相信可以给世界各地带来的借鉴经验。

案例研究北京

以下两个案例是运用于《迈向2050》研讨会的例子。该方法也被应用到清河的防洪计划中的湿地公园，于106页开始介绍了对于这种混合的生态湿地公园所带来的多种益处，具体来说在于：改善生态环境，方便交通，增加临近亲水的休闲区，改善水质。

试点案例荷兰式“运河”

在我们看来，阿姆斯特丹的运河河道已经不再是以前肮脏污染的河道了（图3），我们认为其改善方法也可以适用于北京的情况。

该改革规划包括：

- 综合设计和团队
- 了解情况及治理的决心
- 实施条例规范
- 清理减排
- 改进下水道系统
- 教育：提供公众意识
- 监控
- 监管与治理

In the next paragraph solutions for the Beijing situation from best management practices around the world will be discussed. Case studies such as the Dutch polluted canals approach and Westergasfabriekpark, can bring lessons learned from around the world.

Amsterdam Westergasfabriekpark

old time *(left: photo: UPLabs)*

now *(right: westerliefde)*

阿姆斯特丹 Westergasfabriekpark

旧时照片，左图

现状照片，右图

Eastern Scheldt storm surge barrier
Source: http://en.academic.ru.
Three Gorges Dam
Le Grand Portage Derivative work
Photo: wikipedia

上：荷兰东斯海尔德风暴潮屏障
图片： *http://en.academic.ru.*
下：三峡大坝
图片： *wikipedia*

Casestudies for international knowledge exchange

The next two pilot cases from the Netherlands are examples of lessons learned that were in the workshops of the Towards2050 team. The approaches are applied to the development of the wetland park that is part of the flood protection plan for the Qinghe River and described on page 107. For this mixed ecological wetland park, multiple benefits are implemented, such as: improvement of ecology, accessibility and recreational opportunities next to adaptation to floods, and improvement of the water quality.

Pilot case Dutch situation: 'the canals'

From the Dutch perspective is not that long ago that our waters where polluted; our approach can be applied to the Beijing situation.
The action plan covered:

- Integrated approach and team
- Determination of situation and ambitions
- Implementing regulations
- Emission mitigation
- Improving the sewer system
- Education: public awareness
- Monitoring
- Evaluation & governance

案例研究：Westergasfabriekpark

在19世纪末期,当时的荷兰帝国大陆天然气协会 （ICGA）于阿姆斯特丹建造了两座煤炭工厂，（东、西煤气厂）。在最开始的时候，煤气被用于城市道路照明。

后来，工厂被关闭了，工厂所在地被严重的污染，这使得在该原址上重建任何项目显得异常的艰难，这与北京的一些地点有着相同类似的经历。与此同时，GEB即城市能源公司将其用作车

Beijing Qinghe workshop

北京清河研讨会
照片由BIAD 提供

间和仓库。1992年，原工厂被暂时地用作为文化和创意产业。重建项目原址需要一个综合性的发展框架和对于污水处理的着重关注。通过对该区域的水系统转型应使得该区域由一个严重污染区域，转变为了一个多功能的公园并且可以实现自净和组织周边地表地下水资源遭到污染和破坏，为了达到这个目的。每一滴周边的雨水被收集起来，并且被运用到了灌溉和水循环净化的循环里。

其中，一片小型的区域被输送以可饮用水并被用于沐浴区来使用。现在，Westergasfabriekpark 为高密度的城市提供了一片绿洲。 重建的工厂原址和公园的所在地块，对于阿姆斯特丹城市来说，都是非常宝贵的财富并且对周边的环境起到了积极的价值。创意产业工作者在此工作设立公司、同时知名的音乐节等在此召开。Westergasfabriekpark 作为荷兰境内的开发改造典型，已经超越了荷兰范围，闻名于海外。

Beijing, Qinghe and surrounding area

北京清河沿岸地区情况

图片由BWIC 提供

Case Studies as Westergasfabriekpark

At the end of the 19th century, the Imperial Continental Gas Association (ICGA) built two coal gas factory complexes in Amsterdam: the Ooster and the Wester Gasfabriek (Eastern and Western Gas Factory). Originally, the gas was used for street lighting.

By the time the factory shut down, the site was heavily polluted, making it difficult to find a new purpose for the area, as in several regions in Beijing. In the meantime the GEB, the municipal energy company used it for storage and as a workshop. From 1992, the buildings were used temporarily for creative and cultural activities. The redevelopment of the site demanded an integral approach and much care was given to the [polluted] water system. The water system in this transformation from a polluted 'no-go area' to a multifunctional park, needed to be self-sufficient in order to prevent the spread of polluted [ground]water to the surrounding area. In order to accomplish this goal, every drop of stormwater from the area is being stored in different places and used for irrigation and filling of the water system [Boogaard F.C., 2014]. A small area is used as a bathing area which is filled with drinking water of high-quality. Nowadays, the Westergasfabriek is providing a green oasis in the urban dense area. The redeveloped factory site and the laid out park are an asset for the local area and have a positive effect on the value of all buildings around it, making the construction of the park a valuable asset for Amsterdam. Creative entrepreneurs work in the renovated historic buildings and many high-profile events and festivals are held here. The Westergasfabriek is regarded as a model for redevelopment, far beyond the Netherlands' borders.

"迈向2050"北京清河研讨会

一系列的试点案例被作为国际经验于北京"迈向2050"研讨会上被提出。荷兰、中国以及相关经验在北京被提出和分享。 使用这些最佳管理措施（BMPs）被证明是在基于针对北京2050年发展规划基础上可以刺激经济高效发展为主的综合性战略。

'Towards 2050' Beijing Qinghe workshop

A number of pilot cases have been used in the international knowledge exchange in Towards2050 between the Netherlands and China, and has resulted in an integrated strategy to meet the urban challenges in Beijing. Using these best management practices (BMPs) has proven to stimulate the development of a cost effective nature-based integrated strategy for Beijing 2050.

PUBLIC PRIVATE COLLABORATION IN SUSTAINABLE INFRASTRUCTURE AND URBAN DEVELOPMENT FINANCE & GOVERNANCE STRATEGIES FOR THE NEXT 15 YEARS

在可持续性基础设施与城市发展领域的公私合作

未来15年的财政与政策

Albert Hutschemaekers
(former) Maganging Director, Project Organization Station Area, City of Utrecht, The Netherlands

Robert van Ieperen
Partner and Chief Commercial Officer, Fakton, Rotterdam, The Netherlands

Albert Hutschemaeker
乌特勒支市火车站周边地区开发
前项目主管

Robert van Ieperen
荷兰鹿特丹Fakton公司，合伙人与首席经济师

制定能够开展低碳经济发展道路的国家性政策措施变得越为迫切。在2015年12月第21届巴黎全球气候变化大会上，近190个国家同意制定旨在应对气候变化的全球战略措施。而对于一个国家是否有能力实现可持续发展目标的一个决定性因素是一个国家构建、运营基础设施的方式。我们期望可以加大在社会上、经济上、生态上在可持续发展策略上的投资。

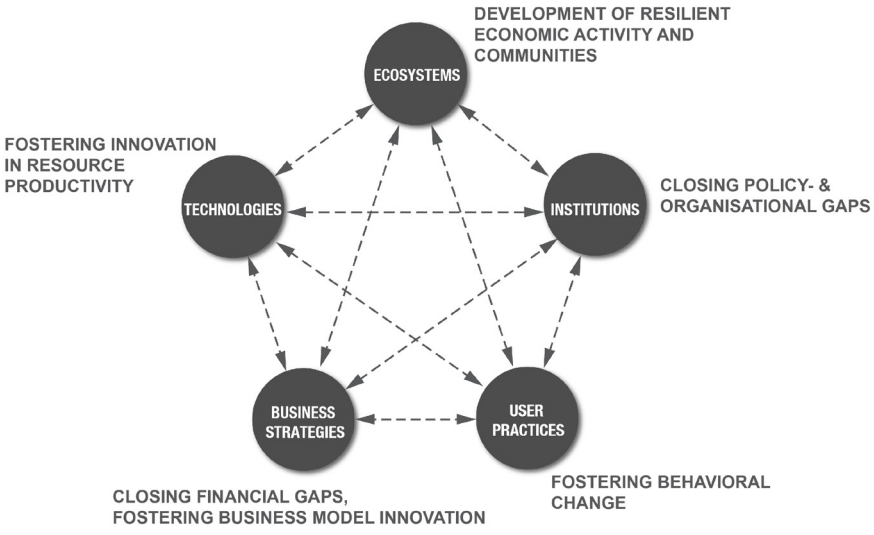
《新气候经济》（NCE）的研究指出：在2015年到2030年期间，全球对于新基础设施的需求量有可能会超过90万亿美元。若是可持续发展性质的基础设施，预付成本估计将增加6%以上。目前全球基础设施每年需支出2.5 万亿到 3万亿美元。据统计，未来15年基础设施的需求量将会达到6万亿美元。为了减少由此产生的资金缺口，私有经济参与投资被认为是一个正确的必要条件。

在2007年至2012年间，中国已经显著增加了基础设施的开支,但与此同时私有性质的基础设施支出仅占据了很一小部分。伴随如今这种对公共基础设施的严重依赖性趋势，越来越多的人们认为中国政府应该放弃这种策略，替而代之的是更好地促进和发展国内的消费和服务业。

如果以上所做的假设被证明是真实有效的，那么中国将会为了城市发展和实现可持续性发展而越来越依赖于吸引私有成分的投资。为了实现这一点，需要在将来预先排除一些障碍。从投资者的角度来看，一般性质的障碍包括：缺乏透明的“银行担保”项目渠道；高昂的开发和交易成本；缺乏用来操作和维护基础设施的可行的商业模式；不足的风险控制和回报以及不完善的法规和政策。在中国，传统国有企业所具有的强有力的角色则会加大这些障碍。

但是，消除投资缺口和私有成分投资障碍不是唯一需要考虑的问题。单独将重点放在这些方面并不能提前充分的意识到挑战的复杂性，同时也可能会忽略在中国背景下当前所面临的特殊挑战和机遇。或者，退一步来讲，人们可将重构核心挑战作为必需，以应对在解决可持续发展项目的综合战略时所面临的日益加剧的复杂性问题。这将意味着不仅要解决资源的稀缺性问题，而且还要用长远的角度来看待管理方式问题。以这种更广泛的角度来思考问题，新的与发展相关的问题就成了焦点：根据经合组织的观点，在城市生态发展的背景下，六个主要的治理缺口可以需要审视：目标、资金、政策、能力、信息和行政边界条件。

从不同的角度，存在更多可能性单独关注资金缺口问题。例如，在发达地区存在的遗留基础设施所产生的投资成本和投资集中，有时候在发展中地区是能够避免。例如，发达地区可能会遭受到因几十年来某种类型能源基础设施所引起的“低效率”，甚至是“技术锁定”的影响。考虑到中国面临的挑战规模，在不同地区的投资量和可持续基础设施需要的投资量会收益于这种分化，这种分化在最发达或最不发达地区会各自超过所呈现的参数。



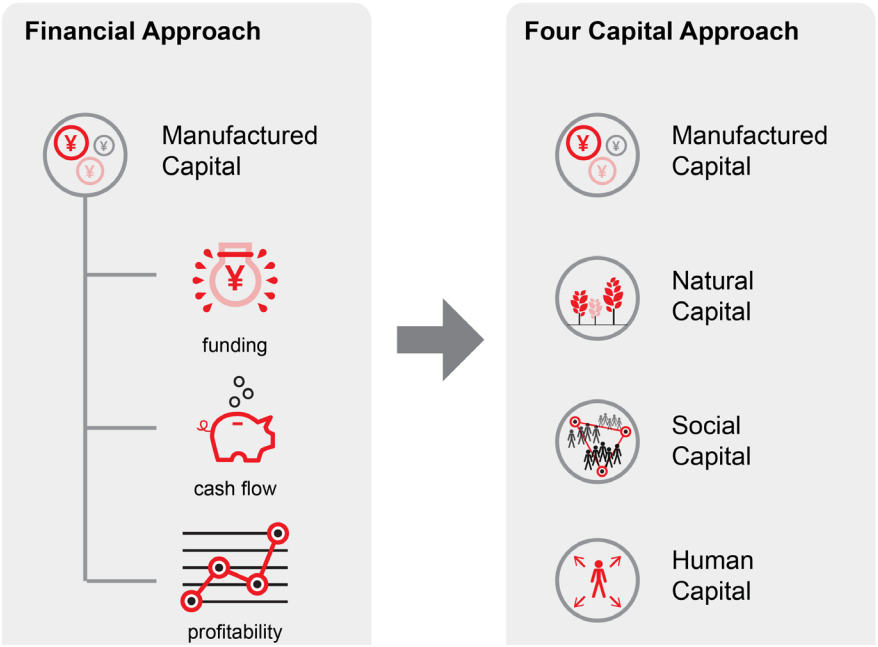
The transition towards sustainable cities consists of the co-evolution of several factors

迈向可持续发展的城市转型由几个因素共同组成

It is becoming increasingly urgent for countries to define the policy measures that can move their economies onto low-carbon growth pathways. During the COP21 conference in Paris in December 2015, almost 190 countries agreed to a global strategy that seeks to counter climate change. A major factor in a country's ability to deliver on its sustainability goals will be determined by the way a country builds and operates infrastructure. One expectation is that countries are likely to scale up their investment in sustainable infrastructure – defined as infrastructure that is socially, economically and environmentally sustainable.

According to research by The New Climate Economy (NCE), the global demand for new infrastructure could amount up to more than $90 trillion between 2015 and 2030. If this infrastructure is to be sustainable, NCE estimates it to increase upfront capital costs by 6% or more. While current global spending on infrastructure amounts to $2,5 – 3 trillion annually, it is estimated that $6 trillion would be needed to meet average annual demand over the next 15 years. In order to reduce the resulting financing gap, it is considered essential to create the right conditions for private sector investment to participate.

China has been able to increase infrastructure spending between 2007 and 2012 significantly, but at the same time accounts only for a very small portion of private infrastructure spending. While this trend has implied a heavy reliance on public spending on infrastructure projects, up until recently, there has been a growing



By defining at first the Public Business Case for a sustainable urban development project, a holistic view can be developed about the public benefits that need to be achieved. This can help to establish the parameters for public and private investment in a project.

通过在第一公共商业案例中的定义来看，一个可持续发展的城市项目，更加全面的来说，是需要得到公共利益。这可以为公共和私人的投资建立起模型参数。

perception that the Chinese government is backing away from this strategy, in favour of promoting domestic consumption and the service sector instead.

If all of the assumptions made above prove to be true, China will depend increasingly on the ability to attract private sector investment in order to meet both its development and sustainability goals. To achieve this, there are several barriers that will need to be removed first. From an investors' perspective, generally current barriers include: a lack of transparent and 'bankable' project pipelines; high development and transaction costs; a lack of viable business models to operate and maintain the infrastructure; inadequate risk-adjusted returns; and unfavourable and uncertain regulations and policies. In China, the traditionally strong role of state-owned enterprizes could be added to these barriers.

However, the investment gap and removal of barriers for private sector investment are not the only challenges to consider. A focus on these aspects alone could fail to fully appreciate the complexity of the challenges ahead, while it could also overlook the specific challenges and opportunities present in the Chinese context. Alternatively, by taking a step back, one could reframe the core challenge as the necessity to address the increased complexity of implementing a comprehensive strategy for sustainable development projects. This would imply to not only address the scarcity of resources, but also the way these resources are managed using a long-term perspective. Using this broader perspective, other development gaps come into focus: according to the OECD, six major governance gaps can be observed and diagnosed in the context of green development in cities, in terms of objectives, funding, policy, capacity, information and administrative boundaries.

There are more opportunities to put the relevance of a solitary focus on the investment gap in a different perspective. For instance, the costs and concentration of investment generated by the presence of legacy infrastructure in developed regions is something developing regions are sometimes able to avoid. For example, developed regions might suffer from inefficiencies or even from a 'technology lock-in', created by decades of investment in a certain type of energy infrastructure. Given the scale of the challenges in China, the quantification and qualification of the investment needs for sustainable infrastructure in the different regions would benefit from a differentiation that moves beyond the parameters presented in the most or least developed regions alone.

在城市规模上，基础设施和城市发展中的一些传统部门也因新技术的出现而发生了改变。有迹象表明，可以通过应用依赖于城市和基础设施发展间的更多集成新技术来实现效率的提高。一般来说，一个城市新陈代谢效率的提高需要一个更为全面的方式。基础设施和城市发展项目的范围应该潜在包含的新的协同作用中。

吸引私有投资项目需要一定程度上的标准化和投资机遇，而且也需要对此进行审查。而在可持续城市发展所面临的挑战中不可避免的一部分就是与应用创新科技在一定程度上的风险。通过更为有效的分散相关的风险，公共部门将需要在实现城市持续性创新努力中起领导作用。不阻碍创新，为私营成分投资唯一有用的是构建一个干净的项目渠道。

总之，我们可以看到可持续发展设施和城市发展的投资收益需求在一个更为综合的方式中获得，也可以看到发展中地区出现的发展机遇将会改变这些与生活投资息息相关的参数。其次，假

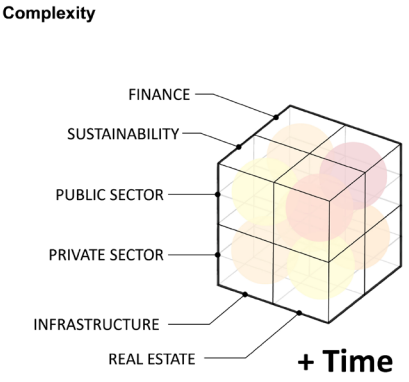
设通过定义更高的前期资本支出创造出新一代城市基础设施的措施需要被质疑。因为一部分新科技可能会涉及到分散化的系统中，而这种分散化系统可能会更廉价的保证节约开支的顺利实现。最后，创新与风险合理的分配以及服务于多个可持续发展目标的解决方案将会达到实现吸引私有投资的目的。

为了以一种全面的方式应对不同的发展挑战，解决可持续发展目标间的潜在矛盾，以及为吸引私人投资而展开充分的风险测评，我们提出下列方法来解决下一代可持续发展基础设施和城市开发项目的复杂性。

可持续发展的四个周期：通过构建公共-私有合作关系解决城市发展核心挑战的路线方针。

这种方式可以看做是以定义城市发展或基础设施定义为公共商业案例来联合公共和私人利益作为路线的。目的是通过公开的私有合伙关系把招募的私有投资投入到支持的事务中去，从而使这种可持续发展得到更为有效的应用。这个发展路线依赖于创建一个框架，它能够在计划的早期起到连接城市发展各类利益相关人士的作用，这个基本框架为公共部门利益和私人部门利益提供了一个谈判平台——所有的利益相关人士聚集到一起，由一个专门的项目组织管理，而该项目组织应该有专门的政策级别的委托管理和明确的决策制定机制。本路线的首要目标是创建公共商业案例的基本模式，从联结国家或者城市（第一周期）水平上的政策目标到最初的项目概念——发展城市部门或者大型基础设施项目如地铁或者自来水厂项目（第二周期），并且让模糊的概念升级进化成为明了清晰的实体项目。

第一和第二周期包含了项目的策略框架：通过分析所有相关的先决条件，并且与经公共政策和城市规划定义过的可持续发展目标相结合。在这两个周期内，政策制定、管理规则、内部组织、知识和资金的缺口也得到了明确。在商业公共案例的范围内，金融目标（比如投资需求、风险和回馈）被认为与社会目标（环境价值观、社会价值观、人类价值观、普遍的生活质量）紧密相连，一个明确而且透明的决策制定过程的定义是初始定义阶段的一部分，因此在“温和目标”（经常是长期）和有参数优势的短目标之间建立了一个平衡。这两个周期的最后一套行动计划的建立将会作为一个大方针来指引未来的决策制定。



the complexity of decision-making in infrastructure development

Source:Fakton

基础设施建设中，项目决策过程中复杂的各种因素。

照片为*Fakton* 提供

On the scale of a city, some of the traditional divisions between infrastructure and urban development are also subject to change with the emergence of new technologies. There are efficiency gains that can be achieved by applying new technologies that rely on more integration between urban and infrastructure development. In general, a more holistic approach is needed to increase the efficiency of the metabolism of a city. The scope of infrastructure and urban development projects should be inclusive to the potential for new synergies to materialize.

The extent to which a standardization of project and investment opportunities is needed to attract private investment should also receive scrutiny. Certain risks connected to the use of innovative technologies are likely to be an integral part of the challenges sustainable urban development will be facing. The public sector will need to take a lead in sustaining innovation efforts in the urban realm by distributing the connected risks more effectively between the public and private sectors. Structuring a clear pipeline of projects for the private sector to invest in is only helpful if this does not stifle innovation.

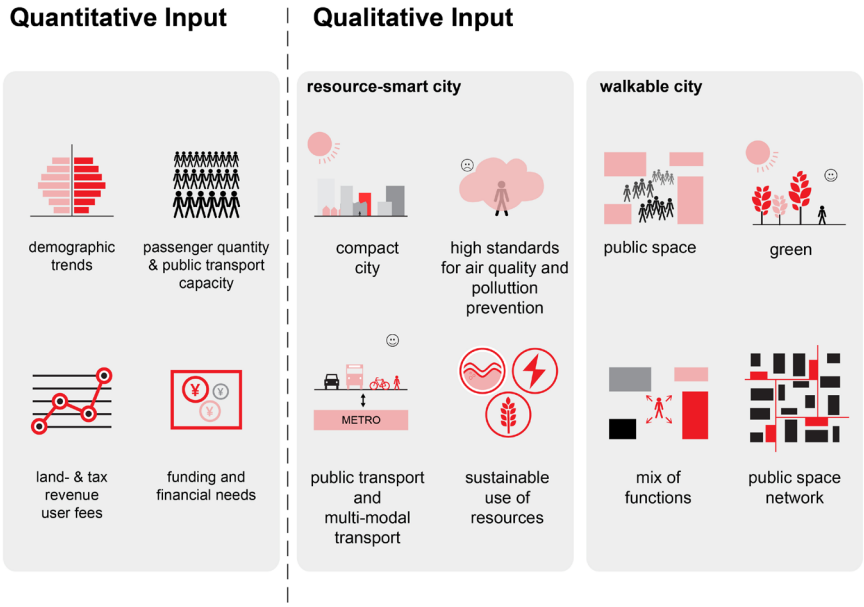
In short, we see that the definition of investment needs for sustainable infrastructure and urban development could benefit from a more integrated approach, and that in developing regions, opportunities emerge to change the parameters that relate investment to societal outcome. Secondly, the assumption that a new generation of sustainable infrastructure in cities will create, by definition, higher upfront capital expenditure should also be questioned, because several of the new technologies

could involve decentralized systems, which are potentially cheaper to realize and/or generate savings in operating expenditure. Finally, the need to attract private investment should result in a clever allocation of innovation-related risk, and stimulate the application of solutions that serve multiple sustainability goals.

In order to address the different development challenges in a comprehensive manner and to overcome the potential contradictions between sustainable development goals and the need to provide adequate risk-adjusted returns to attract private investment, we propose the following approach that addresses the complexity of a next generation of sustainable infrastructure and urban development projects.

The 'Four Cycles' of Sustainable Development: A roadmap to address core challenges in urban development by structuring public-private collaboration

This approach can be seen as a roadmap that uses the definition of a **Public Business Case** for an urban development or infrastructure development to align public and private interests. The goal is to enable a more effective application of sustainability goals in projects that depend on the presence of private investment through public-private partnerships. The roadmap relies on the creation of a framework that can connect the different stakeholders in an urban development early on in the process. Within this basic framework, which acts as a negotiation platform for combining public sector interests with private sector interests, all relevant stakeholders are brought together and managed by a dedicated project organization, which has a clear mandate from the relevant political levels and has been provided with a clear decision-making structure. The first objective within the roadmap is to construct the basic version of the Public Business Case, by connecting policy objectives on a national or city level (first cycle) to the initial project brief for development of an urban sector or large-scale infrastructure project, such as a metro line or waterworks project (second cycle), and to evolve the definition of this



Combining quantitative and qualitative input is a key challenge for susainable urban development. The definition of a Public Business Case can be a key instrument to achieve this.

结合“量”于“质”的投入是城市可持续发展的主要挑战。针对公共商业案例的定义可以是实现这一目标的重要手段。

brief towards a clear vision for the project.

The first and second cycle together embody the **Strategic Framing** of a project, where thorough analysis of all relevant preconditions is connected to the sustainability goals that are defined by the public policy and city planning. In these first two cycles, also the gaps in policy-making, regulation, internal organization, knowledge and funding are identified. In the definition of the Public Business Case, financial objectives (such as investment needs, risk and rewards) are considered together with societal objectives (environmental values, social values, human values, quality of life in general). The definition of a clear and **transparent process** that includes principles for decision-making is part of this definition-phase so that a balance between the softer (often long-term) objectives against the dominance of parameters focused on the short term can be established. At the end of these two cycles a set of performance indicators have been defined that act as a framework to guide the further decision-making process.

在第三个周期里面，通过应用公共商业案例本身到城市某项具体的事物中（使目标里的这种平衡更加详细化，并将关注长期可持续发展目标的公有成分）并且转化为项目框架内多样的投资机会。因此在个人投资配置文件“子项目”的定义中，关于风险和回报的具体分配也可以得到实现，同时这也适用于存在特定专长项目的各个环节。第三个周期的关注使公共商业案例中足够大的可持续性目标与私有成分可被接受的实际商务相结合，通过不同形式的公私伙伴关系以获得维持一个有效的项目交付和前期的投资需要、风险和回报分配也被考虑在内了。

本周期的目的是确保不同商业案例的风险和回报在不同的群体之间能够进行透明交易，并且依据每个群体相匹配的专业知识将双方投资和风险能力进行划分，同时也可以在其他项目中应用这种体现公共商业案例定义的有条理的解决办法，而这种解决方法不仅体现在项目早期责任与奖励的现实性分工上，也能吸引私人对城市或者地区的基建投资。更进一步，它能减少项目实施过程中遇到的不可预知的障碍。当然这很明显需要一个专门组织来指导这个过程，那么这就意味着需要处理一些早期提到的管理缺口。

In the third cycle, the Public Business Case elaborates this balance in objectives by applying itself to a concrete project framework of multiple projects in a city. The public sector focus on long-term sustainability goals is translated into different investment opportunities within the project framework, so that a realistic division of risk and rewards between the public and private sector can be achieved early on in the definition of the investment profiles of individual ‘sub’-projects. This applies also to matching the capabilities that are present in each sector with the requirements for specific expertise that a project can have. This third cycle is thus focused on connecting as much as possible the larger sustainability goals within the Public Business Case with realistic business cases that the private sector can take up. This is also achieved by taking in consideration the various forms that public-private partnerships can acquire, to sustain an effective project delivery and division of upfront investment needs, risks and rewards.

The goal is to ensure that risks and rewards of the multiple business cases are made transparent between the different parties and delineated in such a manner that they correspond with the expertise, investment and risk-taking capabilities of each party. A methodical approach embodied by the definition of the Public Business Case, which can be repeated in other projects, allows not only for a realistic division of responsibilities and rewards made early-on in a process, but

Mr. Albert Hutschemaekers and Mr. Robert van Ieperen in the financial experts meeting

photo offered by:BIAD

Albert Hutschemaekers先生与Robert van Ieperen

先生参加研讨会经济学会议

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enables also the attraction of private investment on a structural basis in a city or region. It can furthermore reduce unexpected obstacles during the realization of a project. Clearly a dedicated project organization is needed to guide this process. This implies some of the earlier mentioned governance gaps need to be addressed.

第四周期着力于单个项目级别策略的实施。一个城市发展项目的整体发展策略和单个项目的范围一经确定，第四周期就可以开始了。在这个周期中，金融工具在前几个周期中已经规划到很详尽的细节，如进行投标,交易完成以及签订合同，并为项目实现阶段打下良好基础。在这个阶段中，项目管理组织的职能从策略方面转移到合作和财力控制的方面以及指导整个项目及其附属子项目的方面上。

正如我们讨论到这里的一般的设想是私有投资在减缓可持续发展的基础设施融资缺口中发挥更为重要的作用。随着私人投资在公私合作关系中不断地加大影响，以及由于单个项目范围内的风险和回报产生的越来越大的社会影响，公私合作关系服务范围不断得到扩展，在中国可持续发展项目的规划也将不得不关注于消除现存其他主管理项目发展的差距。可以通过应用整体分析(战略框架)，即用项目范围与核心目标以外的可持续性目标建立更多的协同合作来达到这个目标。公共商业案例的引入可以将金融角度与战略和组织的角度联结起来,并且成为下一代的城市和基建项目的关键工具。公共商业案例提供了一种方法——在各种发展差距逐渐减小的同时滋生出一个极有效吸引私有投资的环境。

The fourth cycle addresses the execution strategy on an individual project level. This can start once the overall development strategy for an urban development project is established and the scope for individual projects has become well-defined. In this cycle, the financial instruments that have been identified in the previous cycles are elaborated to a level of detail that allows tendering, deal-making and contracting, and enables the start of the realization phase. During this phase the responsibilities for the project organization shift from strategic aspects to coordination and financial control, and steering of the overall project and sub-projects.

As we have argued here, the general expectation is that private investment will have to play a more prominent role in closing part of the financing gap in sustainable infrastructure development. However, for private investment to become effective within public-private partnerships, and for public-private partnerships to serve broader societal outcomes that lay beyond the risks and rewards allocated through the scope of single projects, the planning of sustainable development projects in China will have to focus also on closing the other development gaps that are currently present, which are chiefly related to the governance of projects. This objective can be achieved by applying a holistic approach (Strategic Framing) that can establish more synergy with the sustainability goals that can be found outside a project's scale and core objectives. The introduction of the Public Business Case allows the combination of a financial perspective with a strategic and organizational perspective, and can become a key instrument in the next generation of urban and infrastructure development projects. The Public Business Case implies a methodology that enables the gradual reduction of the various development gaps, while fostering an environment that is increasingly effective in attracting private investment.

Rapid Chinese infrastucture development

Traffic moves under elevated roads at night in Shanghai, China. The Economic Observer newspaper reported December 26 on its website that an official from the NDRC's Zhejiang provincial bureau said the government had approved more than 420 infrastructure projects needing investment of more than 10 trillion yuan.

Text: <China Said to Accelerate $1 Trillion in Projects to Spur GDP>by Bloomberg News

January 6, 2015 — 3:35 AM CET Updated on January 6,2015 — 10:41 AM CET

Photographer: Tomohiro Ohsumi/Bloomberg

迅猛发展的中国基础设施建设

上海高架桥下的车辆来往。一位中国经济官员称，政府已经批准了10万亿元的基础建设投资。

第二章
PART 2

迈向2050年
京津冀地区
TOWARDS 2050
IN THE JING-JIN-JI REGION

CHALLENGES FOR JING-JIN-JI IN TONGZHOU STATION & QINGHE RIVER AREA DEVELOPMENT
通州在京津冀和清河区域发展中的面临挑战

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总建筑设计师、规划师、咨询师

Beijing facing traffic issue

北京交通面临的问题

图片：《北京中秋节前全城拥堵宛如停车场》
http://www.ce.cn/xwzx/shgj/gdxw/201509/26/t20150926_6589076.shtml

Qinghe River Restoration project has been basically completed.

清河河道综合整治工程已经基本完成。

图片：《走近清河再生水厂：每天可处理污水55万吨》
北晚新视觉 *2015*年*1*月*27*日发表
http://www.takefoto.cn/viewnews-295603.html

今年，京津冀一体化的挑战是以北京、天津、河北等省市的区域整合为主题的研究。这种区域一体化提供了广泛的研究和可持续发展的设计主题，如：如何整合和发展经济，如何实现可持续发展的连通性和可达性，如何改善环境，例如：解决水资源短缺和水灾问题。除了这些技术上的挑战，京津冀面临的最大挑战是如何提高生活在该地区居民的生活品质，例如：清洁的空气、天然无公害的食物和水、良好的公共服务、保障性的住房条件以及高品质的公共休闲场所，休闲活动和社交环境，最后一个挑战则是如何以经济实惠的方式实现这些目标。

中国规划部门试图缓解北京的城市压力的原因有很多，迅速壮大的城市人口数量，从1949年2,000,000，到2000年的13,500,000，甚至到2013年的21,150,000居民，这种快速增长已导致城市产生了许多重要问题，如城市中心房价飙升，从卫星城镇的居民区到中心市区工作，（城郊居住区与市中心办公区之间）几乎都是无止境的交通拥堵，空气污染严重，城市居民生活品质整体不高。应对这些挑战需要重新分配居民乃至整个区域的经济活动，而这也正是京津冀一体化政策的目标。

设计一个充满活力的多中心都市生活区十分容易，但是落实到实处却面临着很大挑战。其中，京津冀地区的主要挑战是如何在不同节点之间打造绿色的交通体系，如何切实满足日益增长的人口的物质需求，如何满足不断增长的经济竞争力和各个关联部门的应变能力，以及如何保证环境的可持续发展和高质量的生活居住环境。今天，因为公共交通缺乏舒适性，许多居民依靠私家车通行。虽然铁路、地铁及公共汽车的网点正在迅速扩展，但站区的无障碍设施仍然较差。

In this year's workshop weeks, the challenges of Jing-Jin-Ji were the subject of study. This regional integration project offers a wide range of research and sustainable design topics such as how to integrate and distribute economic development in the region, how to provide sustainable connectivity and accessibility, how to improve the environment, and how to tackle water scarcity and flooding. Next to these technical challenges, Jing-Jin-Ji offers an overarching challenge of how to improve the quality of life for inhabitants of the region, with clean air, good food and water, good public services, affordable housing and high-quality public spaces for physical exercise, leisure activities and social encounter. The last challenge is how to achieve these goals in an affordable way and which governance and finance principles could be applied.

There are many reasons for Chinese planning authorities to try to relieve pressure on the city of Beijing. The city has grown very rapidly, from 2,000,000 inhabitants in 1949 and 13,500,000 in 2000, until 21,150,000 in 2013. Next to the matter of rapid city construction, this rapid growth has caused major side effects for the city and its inhabitants, such as soaring real estate prices towards the city center, very long commuting times from residential satellite towns to the job centers downtown, almost endless traffic jams, severe air pollution, and a poor quality of life in the city. In combination with a continuous immigration pressure due to income differences between Beijing and surrounding areas, a redistribution of people and economic activities over the region is needed to deal with these challenges - which is exactly what the Jing-Jin-Ji integration policy is aiming for.

Creating a vibrant polycentric region with a high-quality of life is easier said than done. One of the main challenges for the Jing-Jin-Ji region is how to develop green mobility in and between the different regional nodes; a question which is linked with the growing demand for connectivity and accessibility for people and goods, economic competitiveness and resilience for all sectors, environmental sustainability, and a high-quality of life for inhabitants. Today many inhabitants

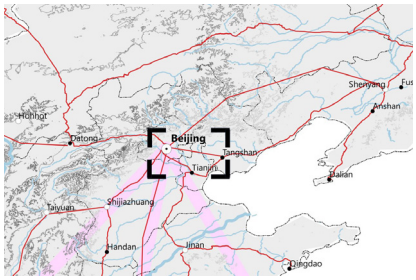
in the region rely mostly on transportation by private car because of the lack of comfort in public transportation. Although extensions to the networks of rail, metro and busses are rapidly being built, pedestrian accessibility and comfort of the station areas remain relatively poor.

在此背景下，我们主要集中研究通州的区域发展，以此作为京津冀地区的其他部分地区开发项目的范例。如何改善出入口人行系统，穿越道路系统，以及公园的自行车系统是我们设计研究的重要组成部分。但它也包括混合功能区的发展，优化车站枢纽功能，区域内流动理念的发展，以及如何将区域发展设定成为未来智能城市发展的一个坚实的基础是这个项目研究的至关重要的一部分。

该地区的水资源短缺，洪涝和水生生态系统质量差也是北京市的主要问题。由于气候变化以及城市化的加速发展，地下水位由六十年代的0下跌到地面以下80多米，以每年1米速度下降。道路、停车场以及建筑物表面的硬化处理在一定程度上遏制了雨水向土壤的渗透。加上排水和污水处理系统的不足，这在一定程度上也导致了间歇性洪水的爆发和区域污水的肆意排放。当然也存在这些问题解决方案的技术。可持续城市排水系统，可用于创建海绵城市，具有较强的绿化覆盖率和高生活质量，但是作为一种独立性的投资项目，居民无法从中获取更多的利益。政府正在探求一种方式，一种通过整合公共基础设施在水系统以及因城市再生和区域发展而彰显的土地价值的投资来获取利益的更为有效的方式，来改善该区域的水资源管理。

我们的研究主要集中在清河更新维护，作为北京北部的高品质的城市发展杠杆。在不久的将来，这项研究成果将会替代现有发展战略被应用在京津冀地区的发展上。

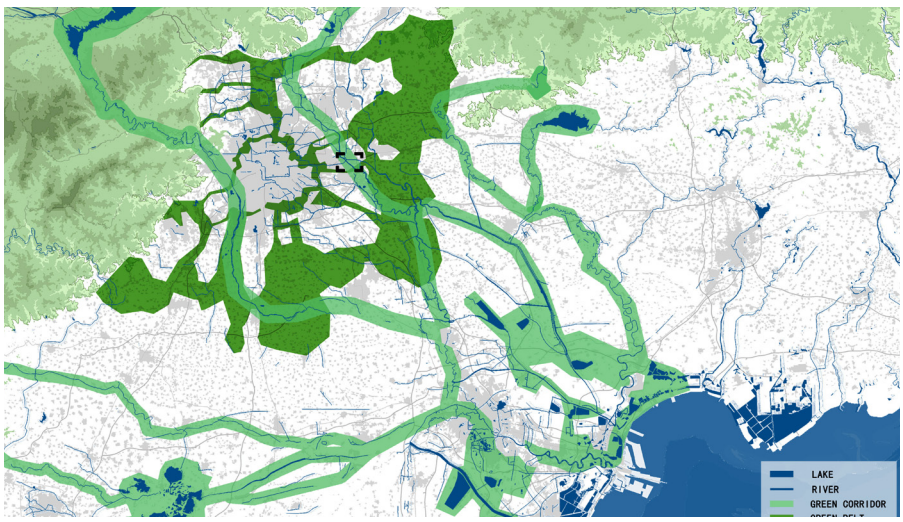
无论是推广绿色交通，或引入可持续城市水资源管理，都需要扩展公共基础设施建设和加重跨行业投资策略，通过从私有资本中获益从而创造出多种组合形式。我们了解到，这两个项目可以从创建城市和居民额外收入的综合方法中获利，尤其是空间和基础设施的规划策略与综合金融战略的实施。该地区其他同类项目可参考这两个项目研究成果。



Jing-Jin-Ji area train connection

京津冀地区的火车连接

In this context, our Research by Design workshop focused on Tongzhou Station and the surrounding area development as an example for comparable stations and area development projects in other parts of the Jing-Jin-Ji region. How to improve entrances and pedestrian networks, the ability to cross streets, and park bicycles were important mobility aspects of our study. It also included the development of concepts for mixed-use area development, optimization of the hub function of the station, and multimodal connectivity as a mobility concept for the region. How to



Ecological map in Jing-Jin-Ji area

京津冀地区的生态系统网络

heritage canal - reconstruction Jingdong charm Watertown

《传承千年运河文明再造京东魅力水城》

图片：北京市规划委员会—通州分局网站
http://www.bjghw.gov.cn/

use station area developments as a solid basis for future smart cities, and how to earn money for public and private partners in the project are important parts of this research as well.

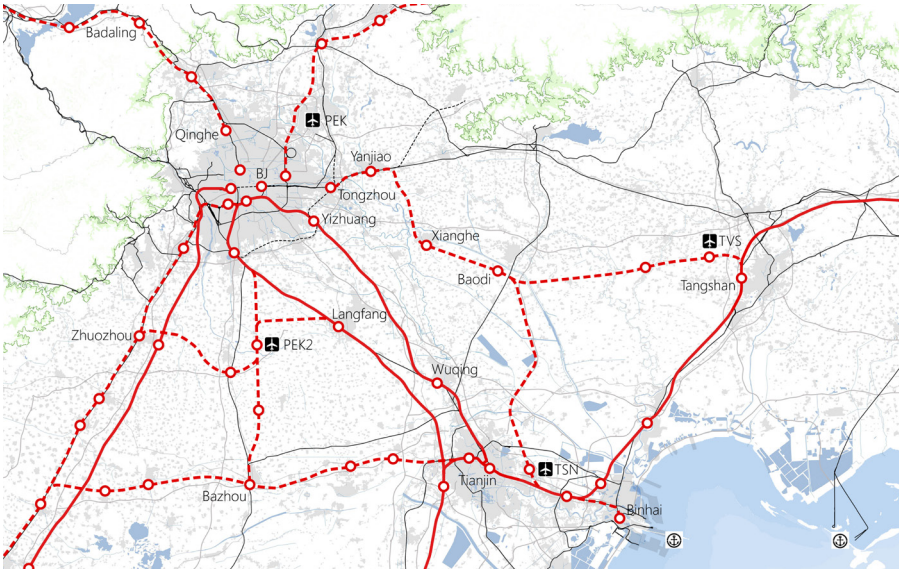
Water scarcity, flooding and the poor quality of aquatic ecosystems in the region are main problems for the city of Beijing and Jing-Jin-Ji. Due to climate change, as well as increased urbanization, ground water level fell from 0 in the sixties until more than 80 meters below ground level today, and it is falling by one meter each year. The increase of hard surfaces for roads, parking lots and buildings prevents rainwater from infiltrating the soil. Together with inadequate drainage and sewage treatment systems, this also causes occasional flooding and the uncontrolled discharge of pollution in regional waterways. Of course there are technical solutions to these problems. Sewage treatment and Sustainable Urban Drainage Systems can be used to create sponge cities with strong green coverage and a high-quality of life, but it is hard to finance these as stand-alone investments. The city is looking for ways to improve its water management in a cost effective way, by earning money from combining public infrastructure investments in water systems with land value capture from Urban Regeneration and area development.

The second workshop focused on Qinghe River Regeneration as leverage for high-quality Urban Regeneration in the northern part of Beijing. The results of this study can be used to develop alternative development strategies for the Jing-Jin-Ji region in the near future.

If area development and Urban Regeneration projects are related to infrastructure investment in green mobility (Tongzhou Station), sustainable water management and urban drainage (Qinghe River), opportunities to capture increased land and property value come to the fore. A public-private collaboration based on a cross-

Jing-Jin-Ji area railway system

北京铁道交通系统



sectoral approach and a spatial, governance and finance strategy with proper checks and balances, offers opportunities to harvest these added values. This way both the Tongzhou Station and Qinghe River project can profit from an integrated planning approach that creates added value for the city and its citizens. Both research projects can serve as relevant design exercise for many other comparable projects in the region.

研讨会背景

中国北部京津冀地区不仅包含了首都北京，而且还是国家主要经济结构的一部分。京津冀地区的基本景观特点是山脉、冲积平原和天津河口。城市景观是提供如清洁的空气、饮用水以及休养环境之类的生态系统服务所必需的一个因素。但是目前城市景观的使用状况并不好。除了北京规划范围中的绿化带外，仅在首都附近存在一些小型绿化空间。第一层绿化带是狭窄而富有城市化的特征，第二层绿化带则是由村庄、农田、工厂以及余下的绿化空间拼接而成。

该地区的一大环境挑战就是威胁到大众的生活质量和竞争力的被弃用了的生态结构。而与城市更新战略项目有关的北京河流更新计划则为解决该问题提供了一个良好的机遇。清河再生和区域发展研讨会就是旨在发展类似于组合投资的空间金融策略。

作为一个迁移磁铁的北京已经不是一个适应增长的地方，而其中一部分原因就是它的中心式结构。工作与服务业的密集化导致了污染严重、水资源短缺以及运输问题等一系列问题。而发展多中心化和多重联运系统就有了一个很大的需求量。中央政府分散北京事业单位，医院、大学以及与之相关的新（高速）铁路站建设就成为未来一个潜在的趋势。而探求综合性方法的通州站和区域发展研讨会就是为了解决这些发展问题。

Workshop photo

Photo: Merten Nefs

研讨会现场照片

Background of the workshop assignments

The Jing-Jin-Ji region in north China includes the national capital, Beijing, and is part of the main economic structure of the country. The underlying landscape of Jing-Jin-Ji is characterized by the hills, the river plain and the estuary of Tianjin. The metropolitan landscape is a necessary asset for providing ecosystem services, such as clean air, drinking water and recreation, but in the current situation this is not functioning very well. Little green space is available near the capital, despite the green belts included in the Beijing master plan. In practice, the first green belt is narrow and urbanized, while the second consists of a patchwork of villages, agriculture, factories and leftover green spaces.

Environmental challenges in the region are the deprecated ecological structures that threaten quality of life and competitiveness. Plans to regenerate Beijing's rivers offer good opportunities to tackle this issue, provided they are linked to strategic Urban Regeneration projects. The Qinghe River Regeneration and Area

Ambition: creating space for Beijing Centre

为北京市中心创造城市空间

Beijing and Tianjin metropolitan night photo

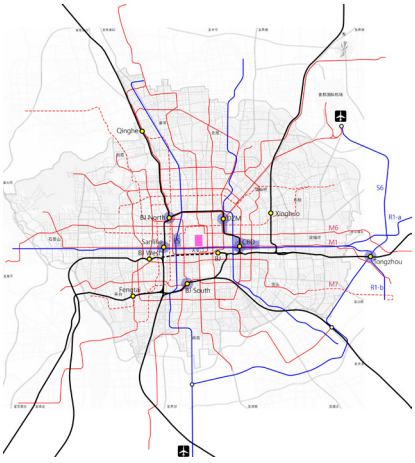
北京天津夜空卫星图

图片：*NASA*

Development research workshop was aimed at developing a spatial and financial strategy for such combined investments.

Beijing as a migration magnet can no longer accommodate growth, partially because of its monocentric structure. The concentration of jobs and services leads to severe pollution, water shortages and transport problems. There is a great need to develop additional centers and an efficient multimodal transport system. Potential is found in the decision by the National Government to decentralize Beijing institutions such as the administration, hospitals and universities, and to link these with Beijing by the construction of new (high-speed) rail stations. The Tongzhou Station and Area Development workshop was used to explore the potential to develop an integrated approach for these developments.

从战略方位上讲，通州站应该设置在两个飞机场之间，而由于山脉问题，北京会向南部和东部延伸发展。通州注定会成为未来多中心区域的中心。通州未来极有可能会成为该区域一个集就业和服务为中心的、整合生态和移动网络的、提升生活质量的一个新型城市。通过这种形式，通州将会成为整个京津冀区域的一个范例。



Beijing city area train station and its connected net work

北京市区火车站与其相连的交通网络

通州的发展奠定了不同时期的很多里程碑。一些计划已经制定，如政府的搬迁，而其他有助于通州成功发展的计划也即将开展。通州站的使用者也会随时间而改变。起初，农民工和上班族在北京的人口数量占据统治地位。随后出现了多元化的群体，如国际商务人士,其他城市通勤通州的工人和生态游客。而带来这些变化的交通网络的一系列改进如连接通州的新高速线、快速S6线的实施以及北京中心区域的快速环形路线，就变得至关重要。

Tongzhou is strategically located between two airports and due to the surrounding mountains, Beijing is bound to develop to the south and east. Tongzhou is therefore destined to be in the heart of the future polycentric region. Tongzhou has the potential to establish a new centrality of employment and services in the region, to integrate ecological and mobility networks, and to enhance quality of life. In this way, Tongzhou can become an example for the entire Jing-Jin-Ji region.

The developments in Tongzhou involve many milestones, which do not all occur at the same time. Some are already confirmed plans, such as the relocation of administration. Others are assumed to happen soon, or are required in the future to make the ambitions for Tongzhou a success. Like the milestones, the users of Tongzhou station will also change over time. Migrant workers and commuters to Beijing will be dominant groups in the beginning. Later a more diverse group will emerge, including international business people, workers from other cities that commute to Tongzhou itself and ecotourists. To bring about these changes, certain improvements in the transit network are crucial, such as the construction of the new high-speed line to Tangshan, the realization of a fast S6 line, and possibly a fast ring line in the center of Beijing, integrating the main railway stations. In the future, it may prove to be essential that the high-speed line is continued to the center of Beijing.

尽管这些设计型研究的研究成果可能看起来像设计，但是它的目的不是为清河区域发展提供一个整体规划，也不是对于建设通州站高速铁路终端线路的一个更深层次的研究。这些研讨会将这些设计研究作为一种用于探求通州站和清河区发展的方式。设计型研究作为一种工具运用到探索大型基础设施在实施规划之前的区域需求研究中。

Although the results of these Research by Design workshops may look like designs, the aim is not to produce a master plan for Qinghe River area development or an in-depth research for the construction of the new high-speed railway terminal of Tongzhou Station. These work weeks use Research by Design as method to explore the development potential for Tongzhou station and Qinghe River area. Research by Design is a tool often used to explore the required scope of large infrastructure and area development projects before actual planning begins.

Workshop photo

研讨会结束合照留影

Map for next page:

下页图片：

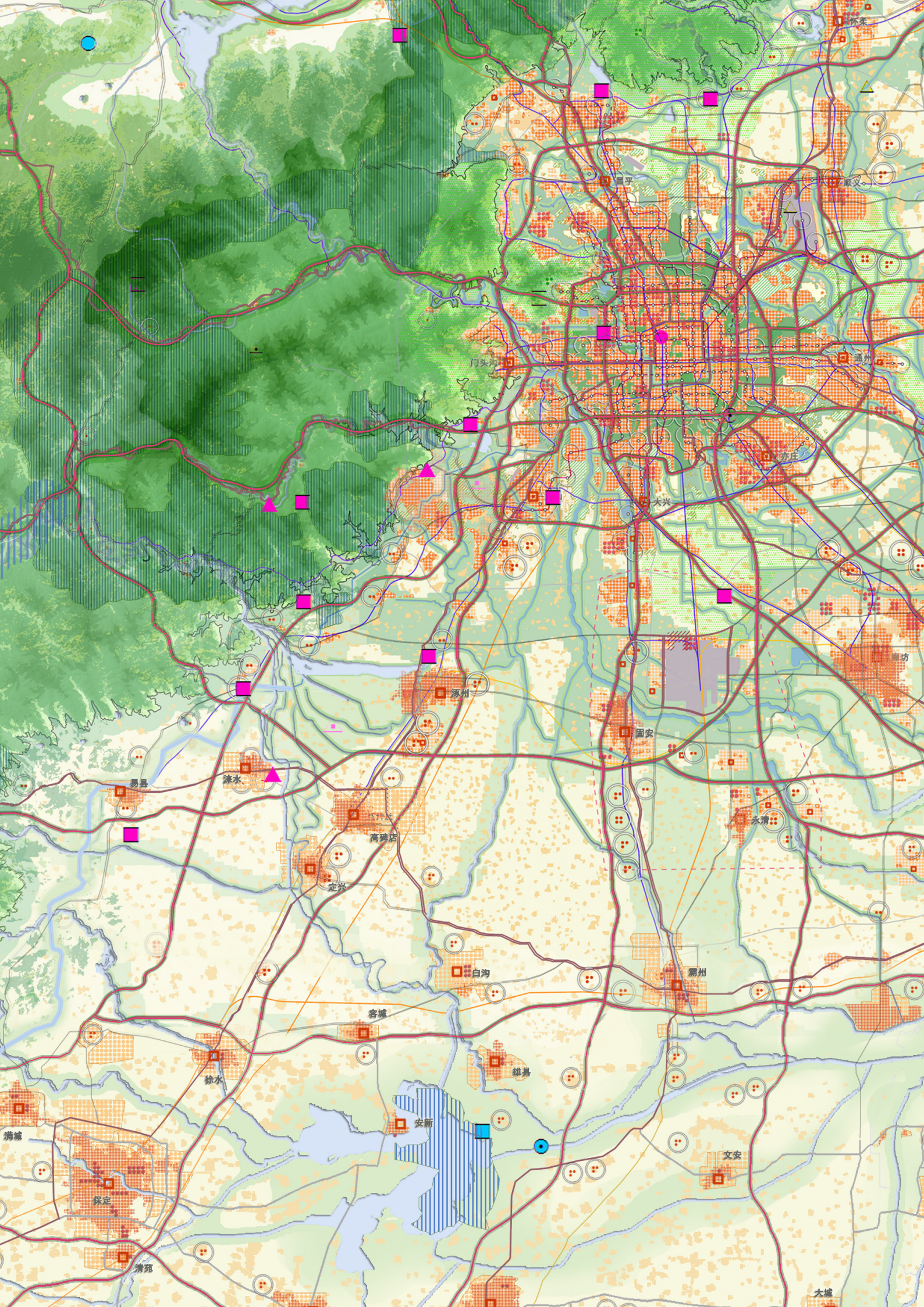
Jing-Jin-Ji area spatial development framework

Provide by TsingHua University

京津冀地区空间发展格局示意图

面向未来城镇空间布局，构建世界级的京津冀特大城市地区

图片由清华大学提供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涞水
高碑店
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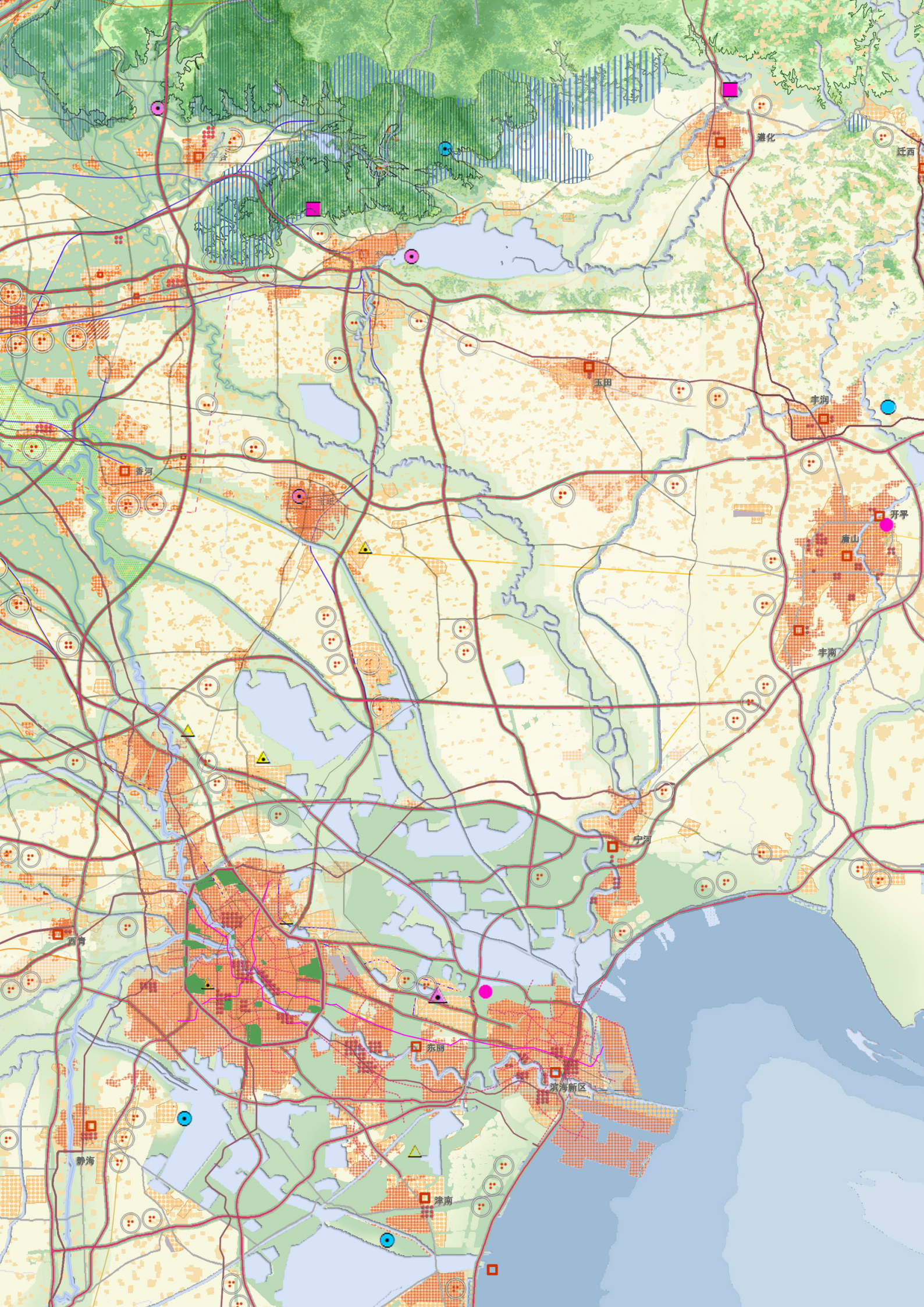
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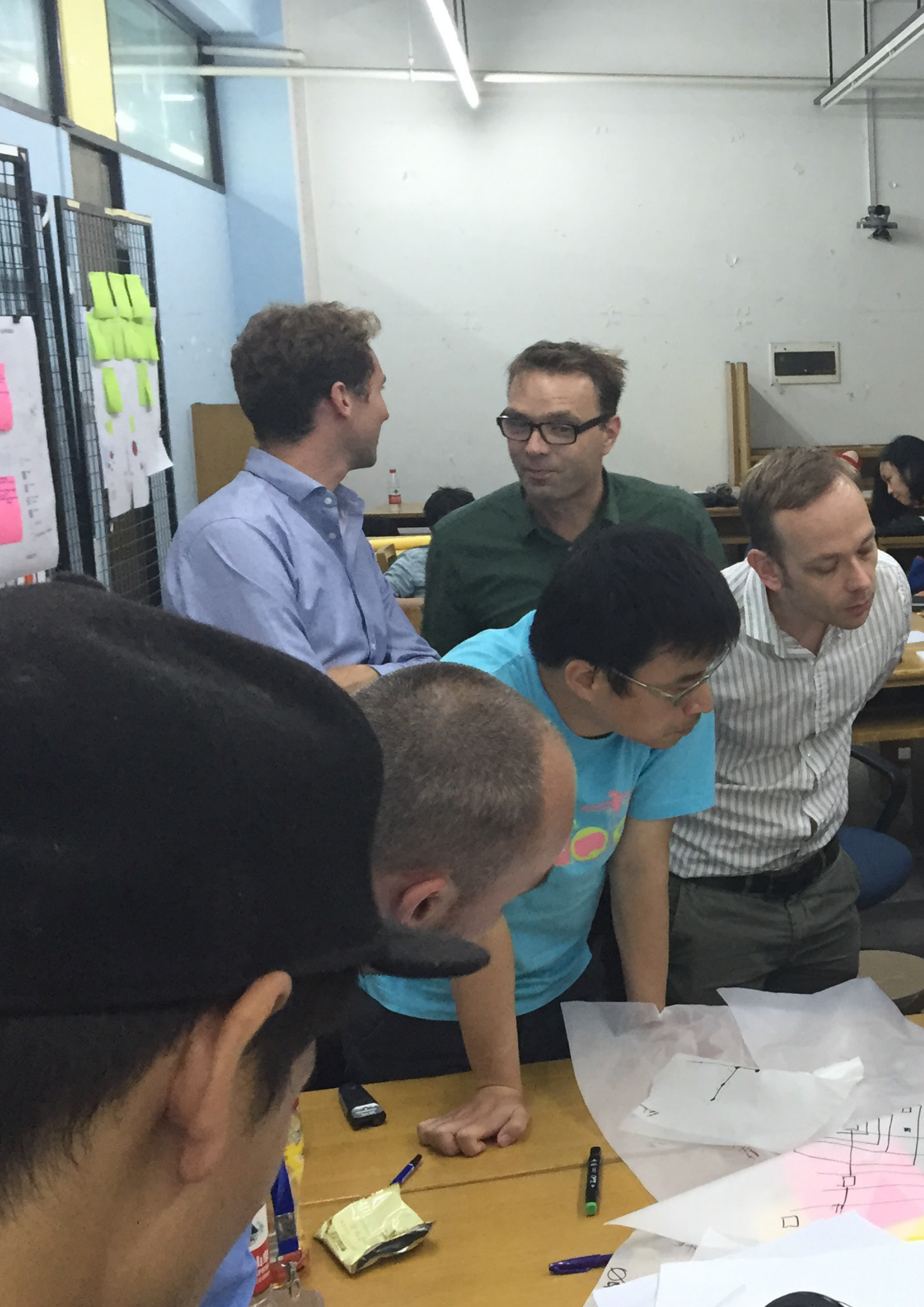


通州，北京
新东站

TONGZHOU, BEIJING
NEW EAST STATION

TONGZHOU'S ROLE IN THE JING-JIN-JI REGION
通州在京津冀发展中所扮演的角色

Daniel Jongtien
Architect, Benthem Crouwel Architects, Amsterdam, The Netherlands

Adam Visser
Partner, Group A Architects, Rotterdam, The Netherlands

Daniel Jongtien
建筑师, Benthem Crouwel Architects, 阿姆斯特丹，荷兰

Adam Visser
建筑师, Group A Architects, 鹿特丹，荷兰

京津冀地区正在高速的发展和转型中。对该区域的未来发展来说，北京东部走廊的发展在其中起到了至关重要的作用。而位于该区域中心的通州极有可能在这个发展进程中起到主导型的作用。下列四个战略指导方针就着重体现了通州发展问题的解决方案和巨大的发展潜力。

- 作为交通系统中的一个关键节点的区域综合交通网络，通州将在其中起到战略性的作用。
- 此外，位于五条河流与大运河交汇点的通州目前正存在着一定的隐患。而随着通州的不断发展，这些河流走廊和绿化带都需要 行强化。
- 考虑到现有的交通状况，改进非机动车和行人路网就成为了目前城市发展进程中一项无法避免的基础问题。
- 最后，通州极有可能从TOD发展模式中受益匪浅。而正是考虑到这些关键点，现已经推出了一项新的通州发展战略。

The Jing-Jin-Ji region is rapidly developing and transforming. The development of the east corridor of Beijing is essential for the future of the region. Tongzhou lies at the heart of this region and can play a leading role in its development. Tongzhou's issues and significant potential are addressed in the following design strategy comprising four leading guidelines:

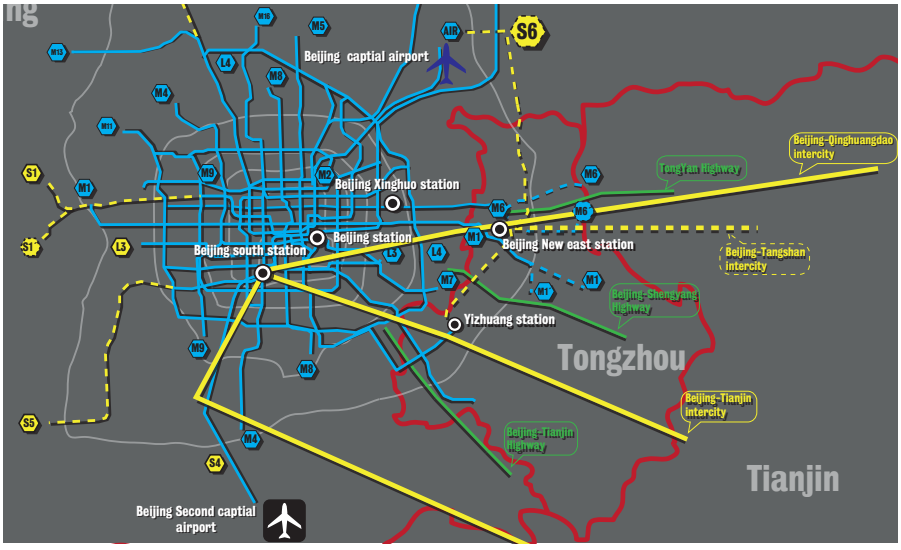
- Tongzhou will play a strategic role to support the regional multimodal networks in which the station area can develop into a key node of the transport system.
- Tongzhou is situated at the intersection of five rivers and the Grand Canal which are currently being threatened; both these river corridors and the green network should be strengthened with the development of Tongzhou.
- Considering the current traffic situation, the improvement of cycling and pedestrian networks is a fundamental issue at the basis of the New Town development.
- Tonghzhou may greatly benefit from the pursuit and implementation of a TOD model of development. With these focal points in mind, a spatial and financial strategy for Tongzhou was developed.

High Speed passing by Tongzhou

飞速行驶的和谐号高铁

Today's situation Tonghzou Station

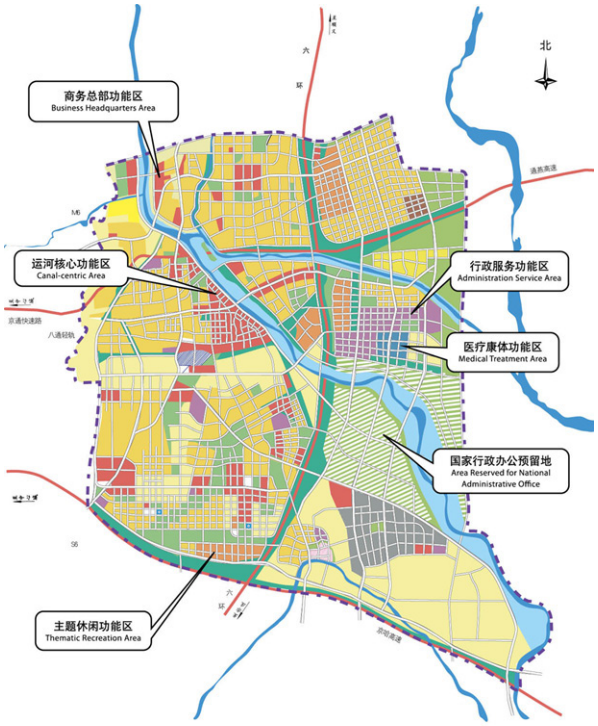
通州火车站老站台



Network connection between Tongzhou and Beijing Inner city

通州与北京市区交通联系

首先，通州需要修改和扩展交通网络以支持城市的发展。目前通州只有两条地铁线，市中心只有火车通过但没有火车站。根据已确认的基础设施建设规划在2020年左右，北京至唐山的城际高铁将连接完成，并设通州站。地铁1、6、7号线和S6、R1和M18等快速列车将站区与新城区的其他职能部门进行连接，其中包括新北京市政府、环球影城和宋庄艺术文化村。这些线路和目的地



通州新城规划（2005年-2020年）

Tongzhou Planning (2005-2015)

通州2005-2015规划

图片：通州规划院发布

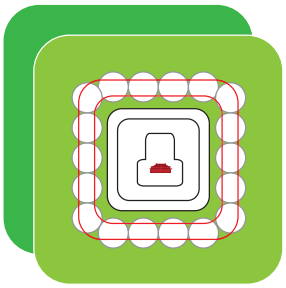
将成为通州的基本交通网络。为了确保2025年后北京第二阶段发展中建立更为有效的交通体系，北京市采取了一系列措施：在车站与两个国际机场之间通过S6列车建立一条高速路线，在不断发展该路线的同时大力发展通州站和北京市中心。除了铁路系统外，公路干线也应该确保北京中心城区，顺义和亦庄新城的连接，特别是在增加联系市政府的道路方面。

其次，通州的发展应包括足够的绿化和非机动车、行人交通系统。发展绿化将使通州发展成一个健康的城市副中心。第一步则是建设一系列的社区公园和绿色走廊以及能够覆盖全市的自行车系统。该自行车系统可临近绿色基础设施和河畔，创造愉悦的绿色交通，并尽量减少道路障碍物。

第三，增强沿河公园和自行车道向农村延伸的必要性。生态管理措施的最终目标是使河水清澈到足以鱼类在其中自在畅游。

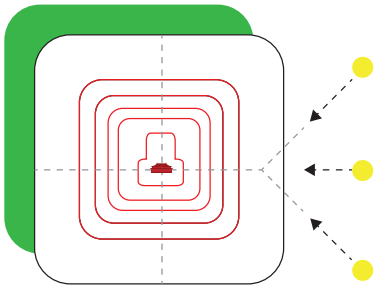
First, Tongzhou's mobility network requires significant modification and extension to support the town's growth. Currently, there are just two metro lines, and trains go through the town center without stopping. According to the confirmed infrastructure plan, around the Year of 2020, the Beijing-Tangshan intercity high-speed railway connection will be completed and trains will stop at Tongzhou station. The metro lines 1, 6, 7 and the rapid train of S6, R1 or M18, will connect the station area with other functional areas in the New Town, including the new Beijing

CHALLENGES
我们面对的挑战



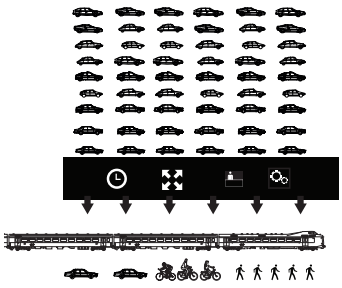
Deprecated ecological structures threaten quality of life and competitiveness

急需更新的生态结构，影响生活和城市竞争力的质量



Beijing as a migration magnet cannot accommodate growth

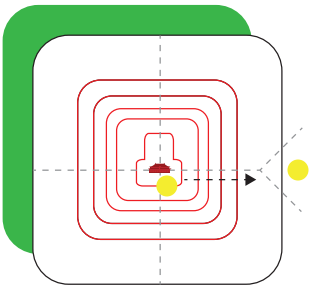
北京作为磁石一般的前夕目的地已经无法承载人口的持续增长



Concentration of jobs and services causes transport problems and pollution

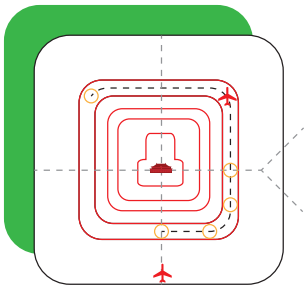
工作与服务行业的高度集中导致了 污染和交通问题

POTENTIAL
我们面对的机遇



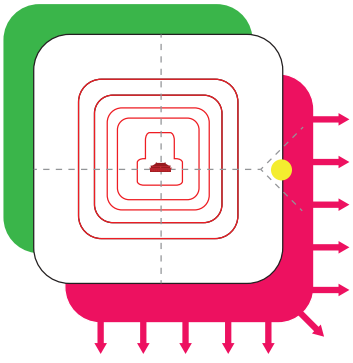
Decentralization of Beijing institutions and new (high-speed) stations

北京的去中心化趋势和高速交通方式的跟进



Tongzhou strategically located between two airports

通州位于两座机场之间



Due to the mountains, metropolitan Beijing develops to the south and east, Tongzhou located centrally in the region

由于北部靠山，环北京都市圈向南面和东面发展，通州则位于两个发展趋势的中间地块

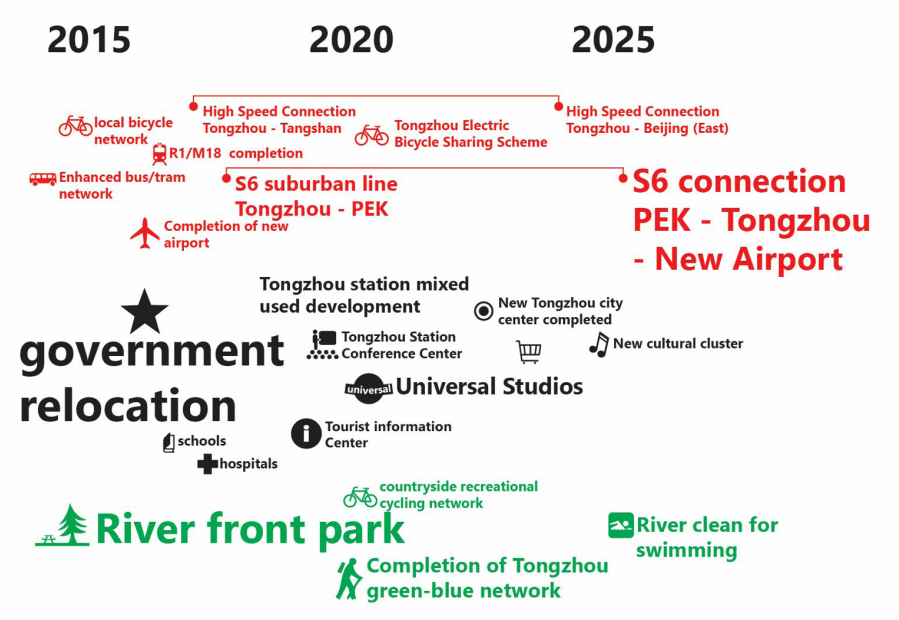
Municipal Government, Universal Studio and Songzhuang Art and Culture Village. These lines and destinations will form the basic transit mobility network of Tongzhou. In order to create a more efficient network region of Greater Beijing in the second Municipal Government, Universal Studio and Songzhuang Art and Culture Village. These lines and destinations will form the basic transit mobility network of Tongzhou. In order to create a more efficient network region of Greater Beijing in the second phase of development after 2025, a high-speed connection between Tongzhou Station and Beijing City center and a high-speed connection between the Station and the two international airports through the track of S6 will be developed. These will enhance the centrality of Tongzhou in the polycentric urban system of Jing-jin-ji. The trunk road network should be linked to the station and ensure the connection to Beijing central city, Shunyi and Yizhuang New Town and especially improve road linkage to the new Municipal Government offices in Tongzhou.

Secondly, the development of Tongzhou should include an adequate green network and optimal cycling and pedestrian systems. The development of the green network will enable Tongzhou to develop from a local community into a healthy sub-center. As a first step, the construction of a series of community parks and green corridors goes hand-in-hand with the construction of bicycle lanes that cover the whole town. The bicycle lanes can be integrated into the green infrastructure and waterways to create pleasant routes and minimize hindrance.

Third of all, the completion of river parks and the extension of cycle lanes to the countryside will be necessary. The ultimate goal of improved ecological management measures is to make the river water clean enough for swimming.

第四， 开发TOD模式战略。这种方法可以用来塑造高密度和多功能的中转站或沿中转站连接通州新城区，北京市政府、环球影城、上海龙东商务中心和宋庄艺术村等功能区和重要的基础设施都将得到落实。这使得通州区和新城市中心将成为人流的焦点。新城的发展将起到巨大作用，通州提供便捷的购物中心、优良的服务、多方位的就业机会，而这些足以吸引大批人群来到通州发展。

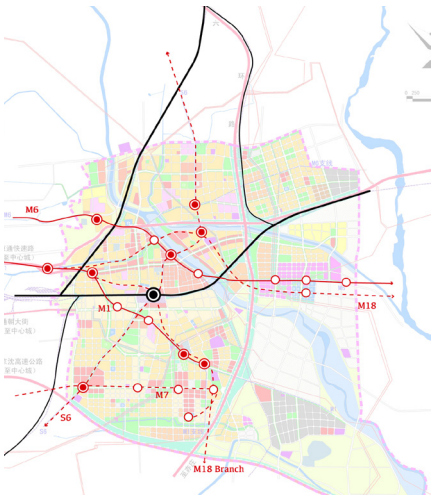
A fourth and fundamental aspect of Tongzhou's development is Transit Oriented Development (TOD). TOD can be used to shape high-density and mixed-use development around transit stations or along transit corridors and organize construction in the new town efficiently. Among all the functional areas and important infrastructure in Tongzhou, the relocation of the new Beijing Municipal Government, Universal Studio, business center at the riverfront, and Songzhuang Art and Culture Village have all been confirmed. As a result, Tongzhou Station and the new town center will be the focal point for the flow of people. The development of a pedestrian neighborhood around the station will give a great impulse to the development of Tongzhou as new center in Jing-Jin-Ji.



USERS OF THONGZHOU STATION 2015 - 2030
通州2015-2030年居民类型变化

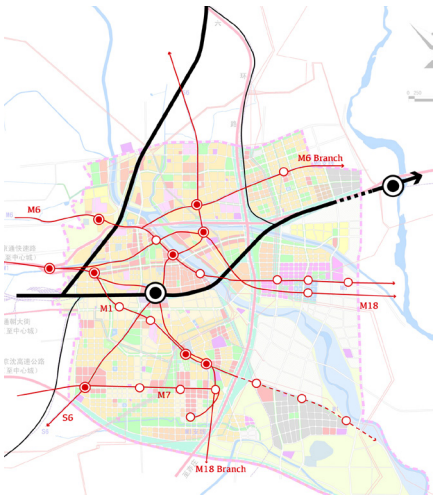

avellers
eco- tourists

CONNECTIONS
交通网络构架



Existing and planned railway connections

现有道路和轨道交通网络



Proposed rapid lines & high frequency network

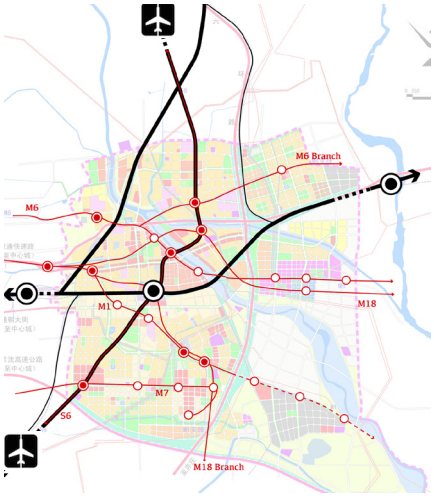
Enhanced local connectivity with:

- Songzhuang
- Universal Studio
- Municipal Government

拟定的高速高频率交通网络

加强当地交通链接

- 宋庄
- 环球影城
- 北京新建市政府



Rail connection (2025 and beyond)

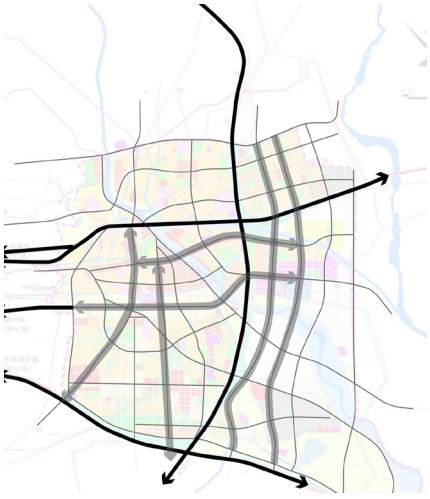
Enhanced inner city connectivity:

- With Beijing Capital Airport and Beijing city center
- Strong rapid rail corridor connecting Tongzhou, Shunyi, Yizhuang and other suburban centers

未来的铁道交通链接 （2025 年之后）

加强与城镇之间的链接

- 与北京首都机场和北京城市中心
- 高效的快速交通轨道连接着通州、顺义、亦庄和其他的卫星城镇。



Vehicular Circulation

Ensure vehicular connection with:

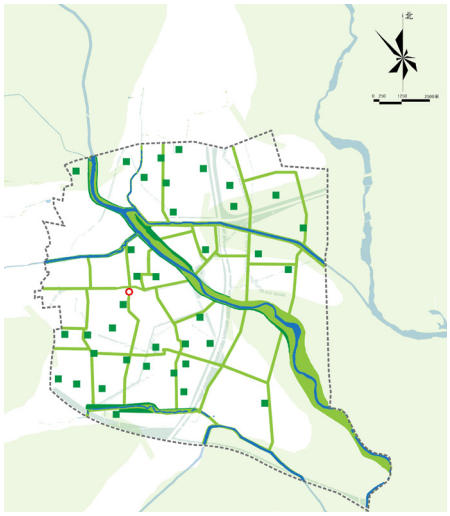
- Highways leading to Beijing inner City, Shunyi and Yizhuang
- Two culture centers and municipality area

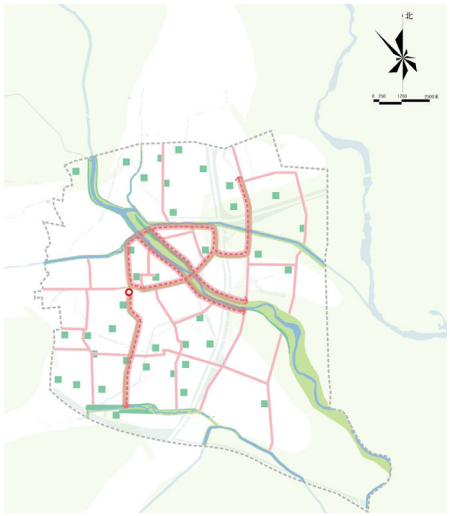
未来机动车网络

确保未来机动车高速网络连接

- 高速交通网络链接北京城市中心、顺义、亦庄
- 与两座文化和市政中心区相连

GREEN NETWORK SYSTEM
绿色空间系统规划





2015:

Community Parks

Green Corridors

2020:

Completed River Parks

Countryside Cycling Network

2025:

River Clean for Swimming

2015:

中央公园

绿色走廊

2020:

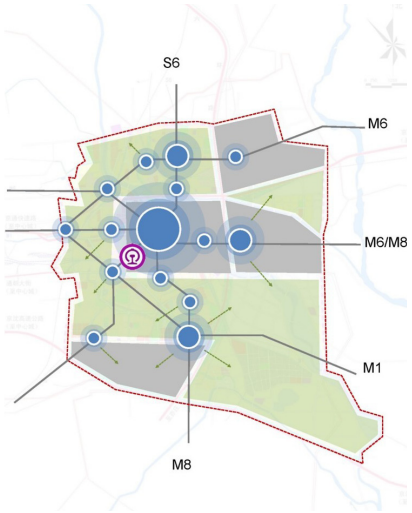
完成河口公园建设

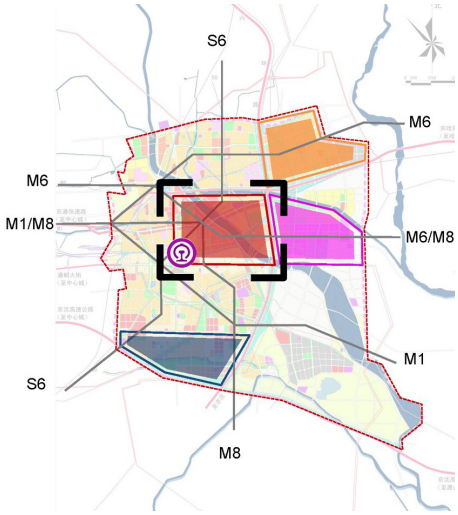
乡村自行车道网络

2025:

可供游泳的河流网络

TOD STATION AREA DEVELOPMENT
公共交通导向站区规划策略





TOD AREA:
High-density & Mixed-use

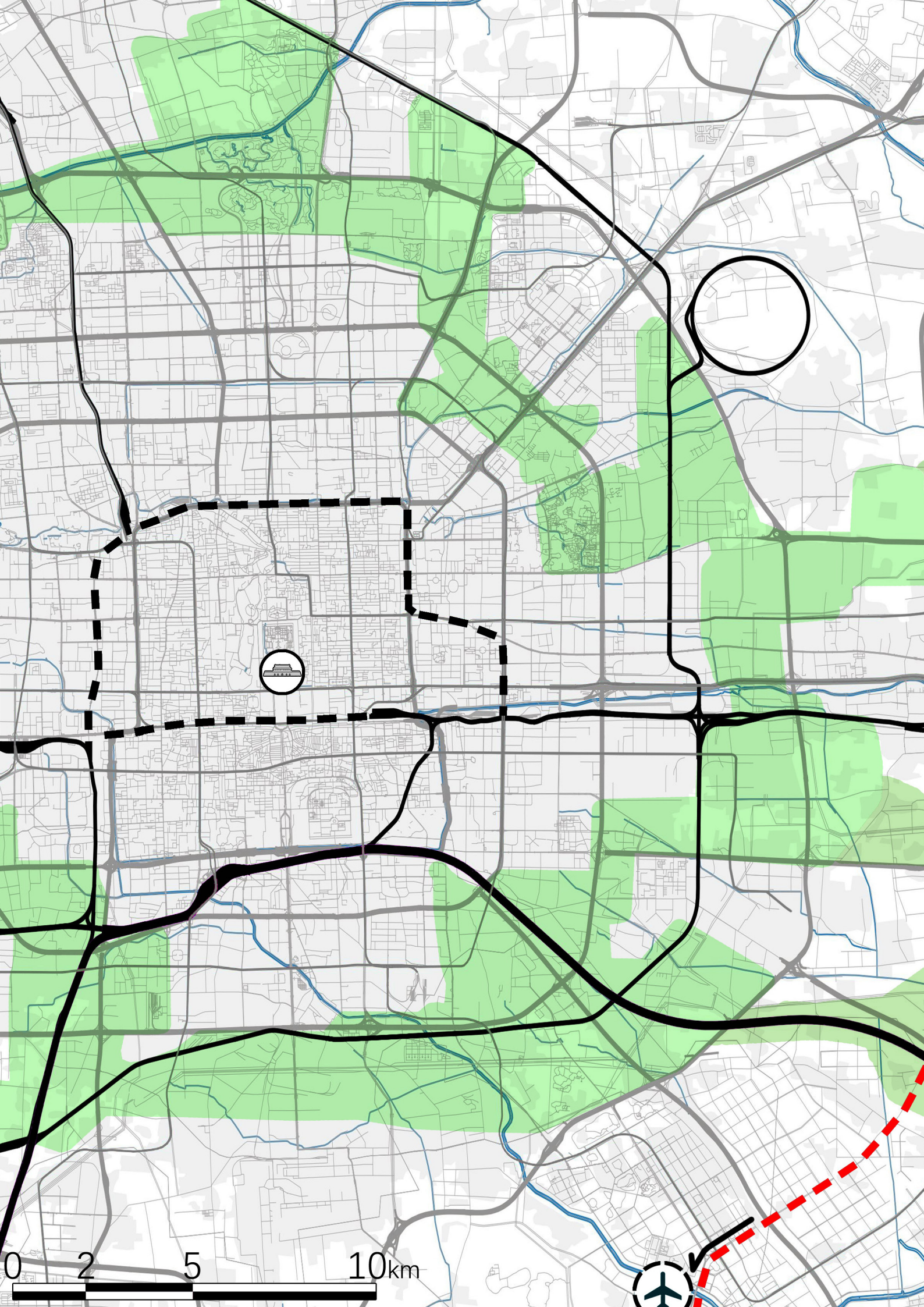
公共交通导向发展区域：
高密度&混合使用

Green connection

通过绿色网络链接

OUTSIDE AREA:
Low Density & Ecology

室外区域
低密度&生态保育区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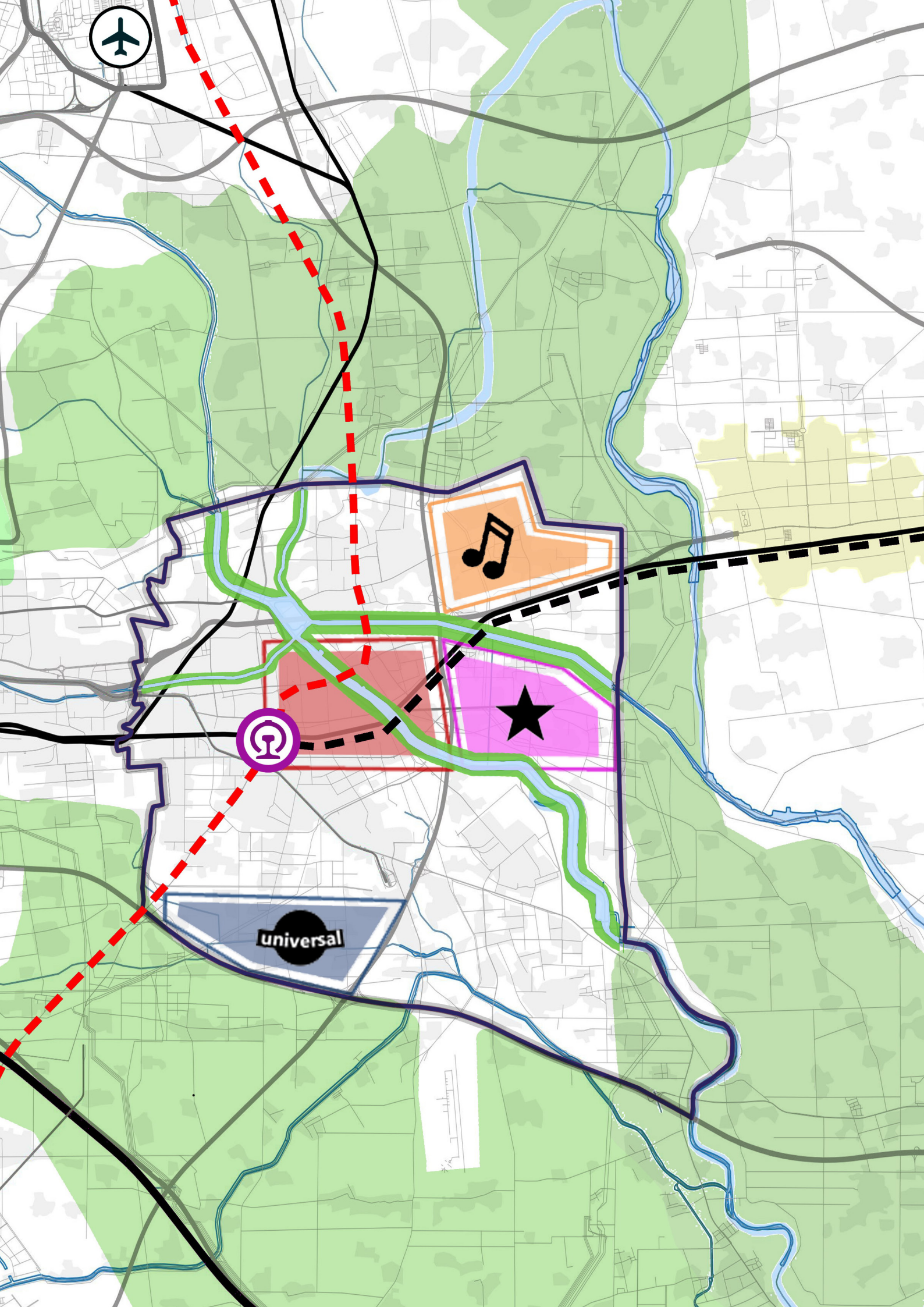
universal

TONGZHOU CENTER
通州核心区

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今天，环通州火车站地区是一个传统的郊外中心区。在未来，这个地区将会发展成为通州乃至整个北京都市区最重要的、最富有生机的场所之一。这样的发展，需要正确的决策来提高未来结构的机动性和可实施性。新的高铁站将和现有老站位置相同，现有的北京地铁18号线在老站南部一公里处，这意味着它是一个不方便人民出行的交通枢纽。如果S6和R1的车站可设在中间，人们就可以在这些车站之间轻松出行。如果以这种形式开发城市中心区，那么它就将发展成为整个区域的多元化的发展中心。

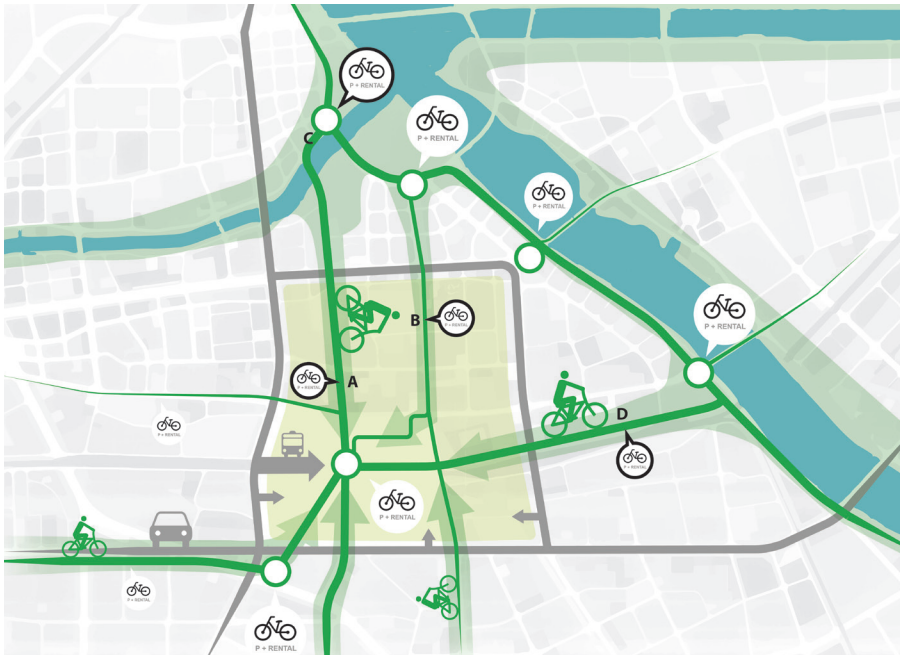
Today the area around Tongzhou train station is a traditional suburban center. In the future, this area can develop into one of the most vital and vivid places in Tongzhou, and even the entire Beijing Metropolitan Area. Such a development requires clever decisions to improve the future structure of mobility and accessibility. The new high-speed station will be in the same position as the current old station. The existing R1 stop is 1km away in the south, which means it is an inconvenient connection for people to transfer. If the station of S6 and R1 could be located in the middle, people can easily transfer between these modalities. When the hub is developed in this way, it can become an efficient multimodal heart for the whole area.

Existing situation Tongzhou center

通州城区现状

Pedestrian boulevard connects station to the surrounding area

人行大道连接站周边地区



Attractive routes for slow traffic and attractive bike routes.

建立能够吸引人的自行车慢行网络

其次，在通州中心区的交通系统需要升级。倡导绿色交通出行，自行车和行人应设在交通运输结构的顶部。指导所有机动车行驶在围绕中部绿色交通而设的周边道路上，以保证中部地区的自行车和行人的良好通行。在重要交通节点处将添加租赁自行车设备，以提高自行车交通的可行性，因此从任何地点任何人都可以轻松地到达城镇的各个地方。通州可以向行人提供有趣的旅游地图。在通州中心区，人们可以乘坐电车通过绿色通道直接到达河畔文化区。在这条路线上，人们可以体验和探索当地的食品和穆斯林村庄以及商店。在这个区域的工业遗产和建筑可以改装成画廊、餐厅，从而来呈现出多个不同表达方式的城市景观

Secondly, the local traffic system in the central area of Tongzhou needs to be upgraded. According to principles of green mobility, slow traffic, including cyclists and pedestrians, should be in the top of the transportation hierarchy. All of the through traffic by car is guided around the center on perimeter roads to keep the central area attractive to cyclists and pedestrians. Rental bike locations must be added at important traffic nodes, to enhance bicycle traffic to the riverside and other attractive places in town. For pedestrians, Tonghzhou can provide information on tourist maps with interesting local destinations. In central Tongzhou, one can take a tram through the green corridors to go directly to the riverside cultural area. On this route, one can experience and explore the Muslim village with local food and shops. In this area industrial heritage and buildings can be converted into galleries and restaurants, showing a varied cityscape with multiple expressions of the city.

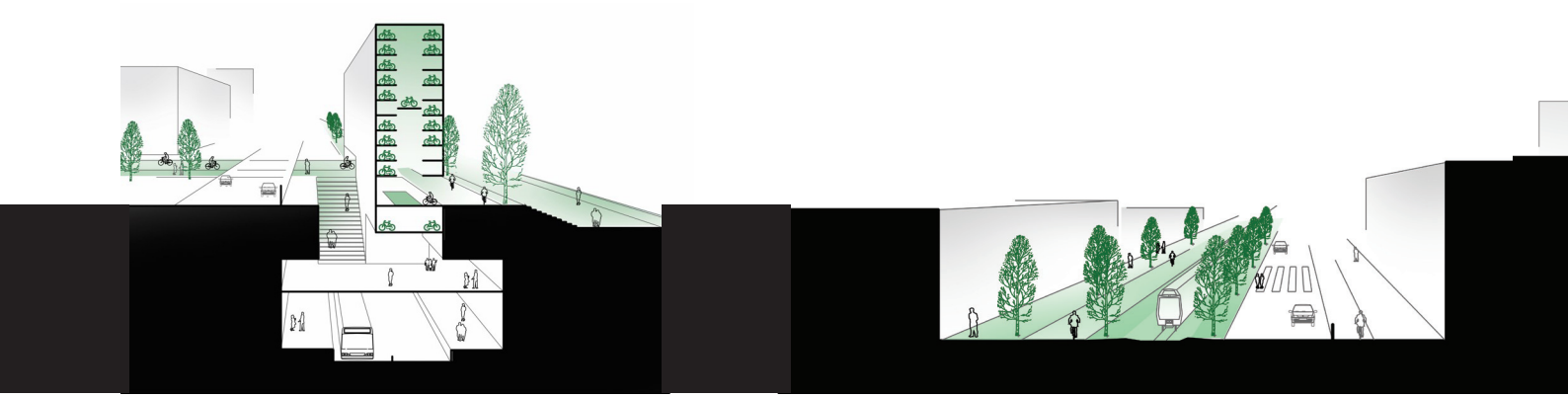
Nanjin city boulevard

南京城市林荫道

图片来自网络

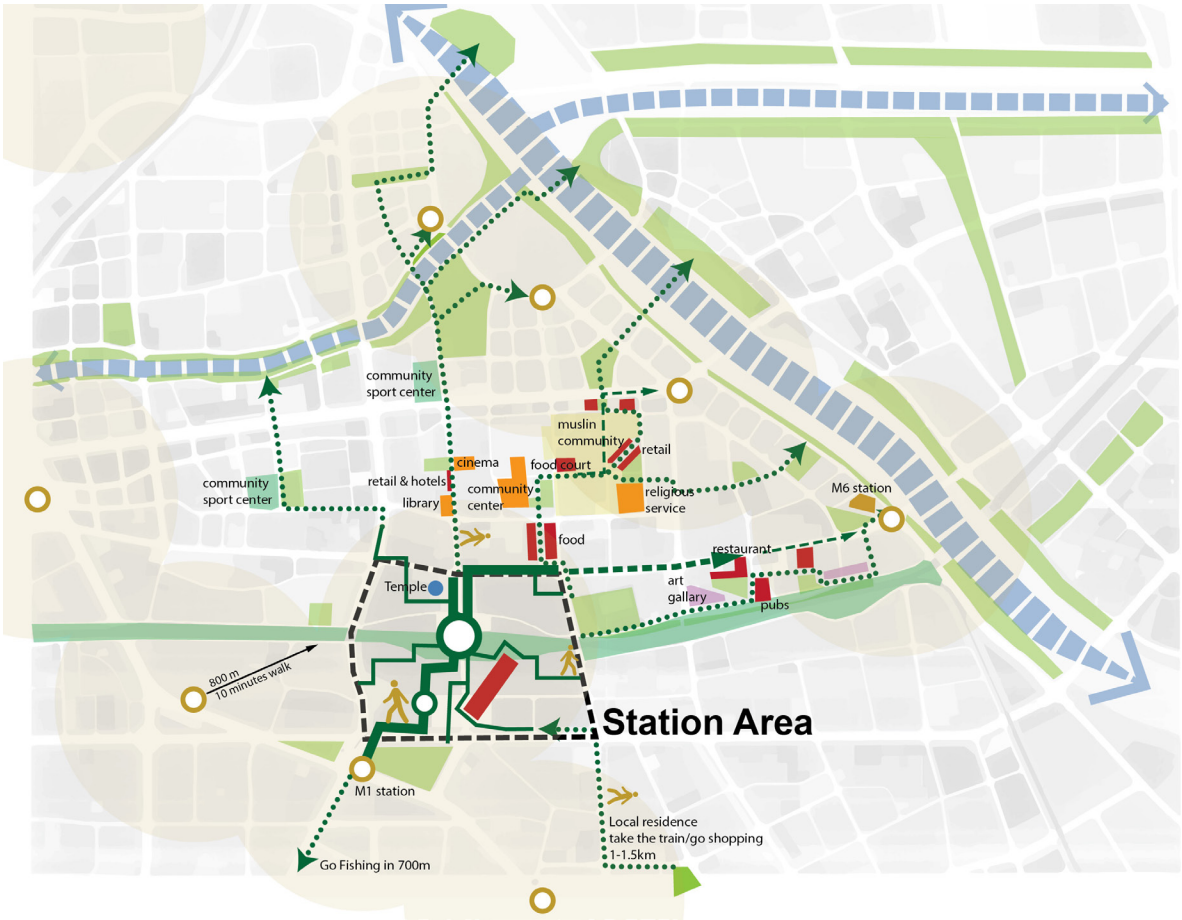
http://lotus-apr.lofter.com/

ECOLOGY
生态绿色网络构架



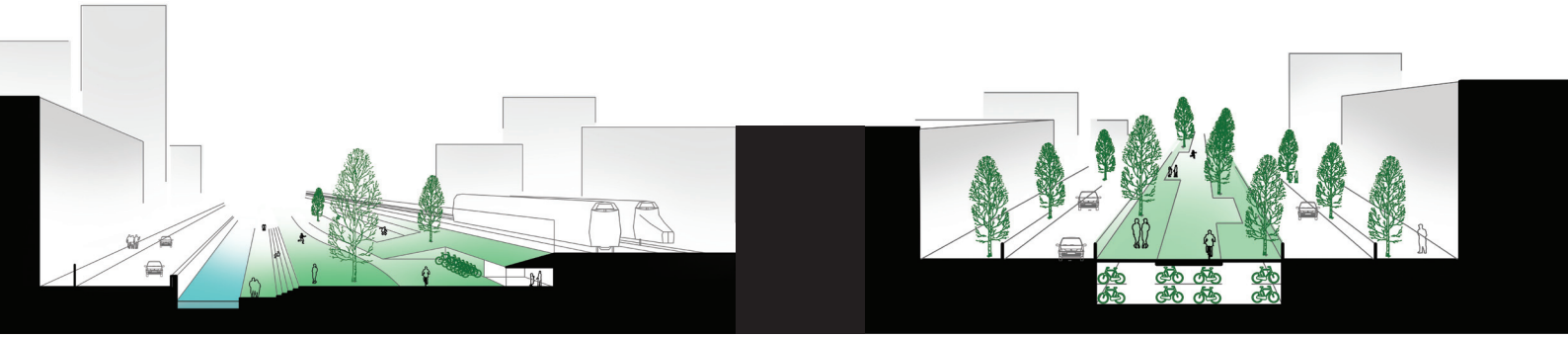
Combining eco-structure with slow traffic

慢行交通网络与生态构架相结合



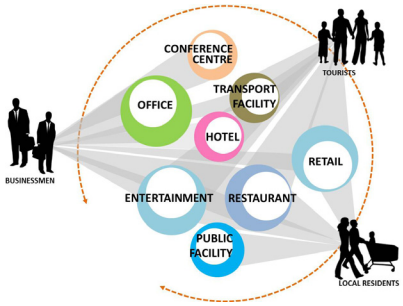
Pedestrian boulevard connects station to the surrounding area

步行林荫道将车站周边的地区相联系起来



Station area ecologicial network

站区周围地区生态网络构架



Micro city different situations users

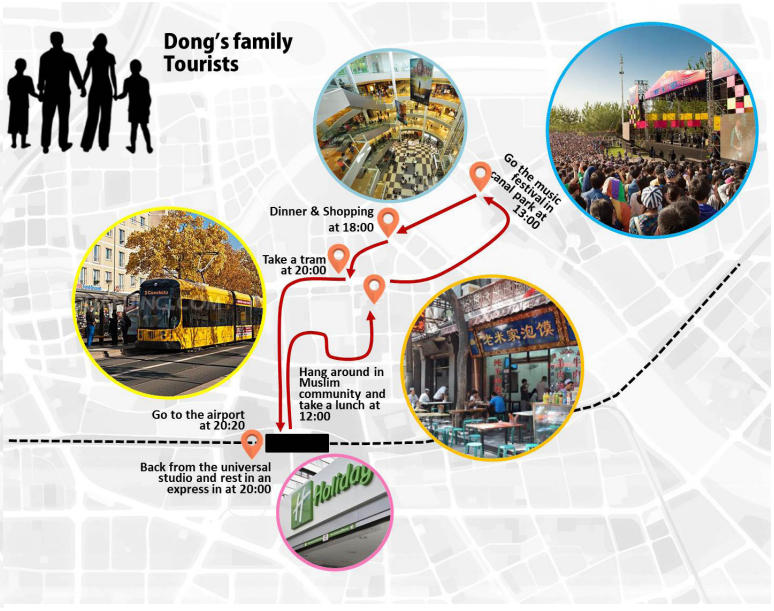
在微型城市范畴内，不同的使用者们

目前开发新的发地产综合体项目是发展通州中心区的关键策略之一。为了吸引人们前往通州，当地开发了不同类型的综合体项目，以便能够在开发服务于休闲功能的同时，接纳所有不同类型的用户，使他们享有在该地区居住的权利。无论是通州工作，北京居住，还是通州居住，北京工作，人们都可以通过地铁或城际快车在城市之间穿行，如在车站附近办公楼中工作，在当地餐馆中享用午餐，在舒适的酒店中休息，或者乘坐电车前往当地的酒吧放松身心。这些是一个完整独立的城市必须具备任何因素，缺一不可。因此，在五彩斑斓的外界生活的诱惑下，游客将会整天都乐不思蜀，如体验农村生活，参加音乐节，或者参观艺术文化区。当地居民可以在绿化带中嬉戏游玩，也可以在交通枢纽附近的商场中购物。正是考虑到这些用户，我们可以认为该车站是当地交通网络中一个完整的交通节点，而这将会成为北京一个独具风格的特点。

Mixed-use development of current and new real estate is one of the key strategies for central Tongzhou. To attract a range of different people to Tongzhou, the development of different types of mixed-use buildings is accompanied by the development of service-and leisure functions, to allow all types of users to enjoy their stay in the area. Either working in Tongzhou and living in the center of Beijing or vice versa, people will come and go by metro or local train, work on office floors near the station and have lunch in a local restaurant, stay in comfortable hotels and take a tram to relax in local bars. Any ingredient required for a complete city life must be present. Thus, tourists will be tempted to stay an additional day for the city life, to visit the village, join a music festival or visit the arts area. Local people can enjoy running through green belts or go shopping in a mall near the transport hub. With these users in mind, we consider the station a full node within a local network; a unique feature in Beijing.

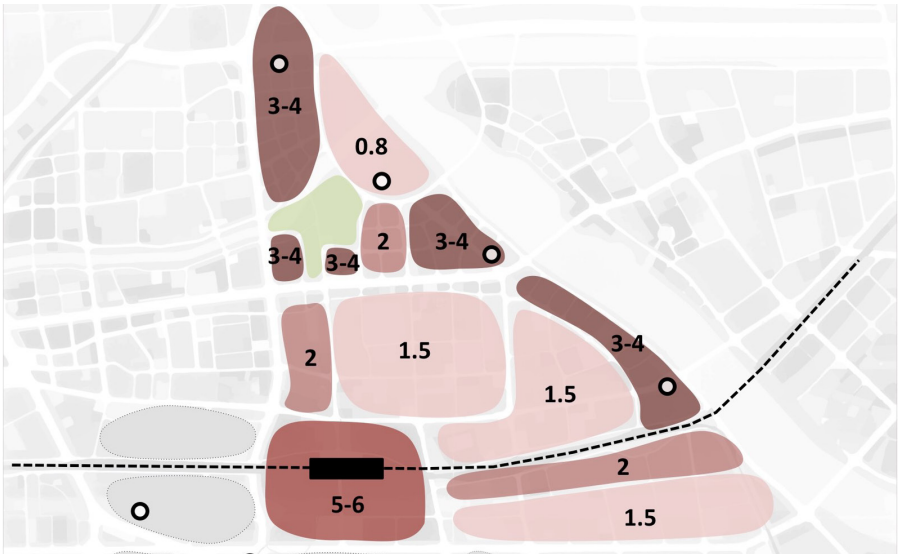
Business Traveler

商务旅行者



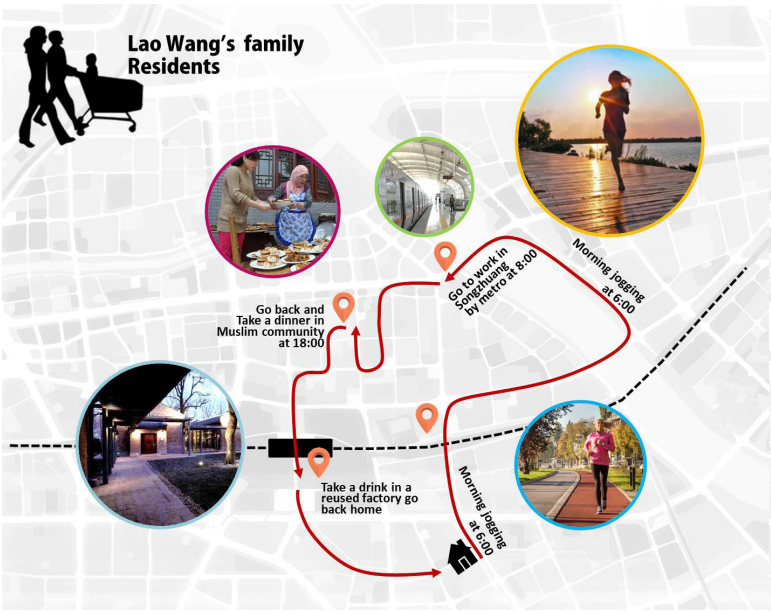
Family trip

家庭出游



Densities in FAR

站区周围容积率规划



Family Residents trip

本地家庭外出

Business commuter

商务通勤


043

TONGHZHOU STATION AREA
通州站区域

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围绕通州新火车站的新城市中心，专为自行车和行人设计。这个区域的设计是机动车和慢速交通的分离。在新火车站最佳位置周边将会建设为自行车和行人设计的专用道。

一个精心考虑的设计让所有的交通流线处于最佳位置，交通发展在不同模式之间的干扰最小。汽车围绕现有主要道路的站区并连接有限的站区，在站区里规划骑自行车者和行人的高品质系统化通畅路线，让他们具备足够的空间。这使得一个既与通州的其他区域有着完善交通联系又有着宜人步行系统的高密度发展区域成为可能。

Around the new train station of Tongzhou, a new city center specifically designed for bicycles and pedestrians will be developed. The design of this area is based on a separation of car traffic and slow traffic.

A well-considered design puts all traffic flows in an optimal location, with minimal interference between the different modes of transportation. Cars are guided around the station area on the existing main roads and have limited access to the station area. In the station area there is ample room for unobstructed routes for a high-quality system for cyclists and pedestrians. This enables a very high-density development and a pleasant walkable environment in the station area, with excellent connections to other parts of Tongzhou.

Beijing Tongzhou station site visit

photo: Thijs van Spaandonk

北京通州站实地考察

火车站通过垂直排列来创建一个非常高效的多通道交通节点，并且可以实现最短的步行距离。车轨道离地面有6米高，这样的高架方式使轨道在城市里不再是一个障碍。地面可用作为步行区域连接通州的两个部分，而以前这两个部分是被铁轨分开的。站台下的公共区域将是一个宽敞大街，有着充足的光线通过平台间隙照射下来，可直观的观察到出站和到站的火车。

地下车站S6线将坐落于通州站的南部。根据容量和日程安排,R1列车可以同时使用该地下车站,或者仅仅是单独的平行车站。地下购物中心为给车站增添一系列商店和服务,但服务范围仅限于车站地区与现有的M1 stop连接地段。靠近购物中心的M1 stop 为汽车和自行车提供停车设施。

The train station is vertically arranged to create a very efficient multimodal transportation node with the shortest possible walking distances. The train tracks are raised six meters above ground and no longer form a barrier in the city. The ground level becomes available as a pedestrian area, connecting both parts of Tongzhou that were formerly separated by the tracks. This public area under the platforms will be a spacious street, with ample light falling through voids in the platforms and a direct view towards departing and arriving trains.

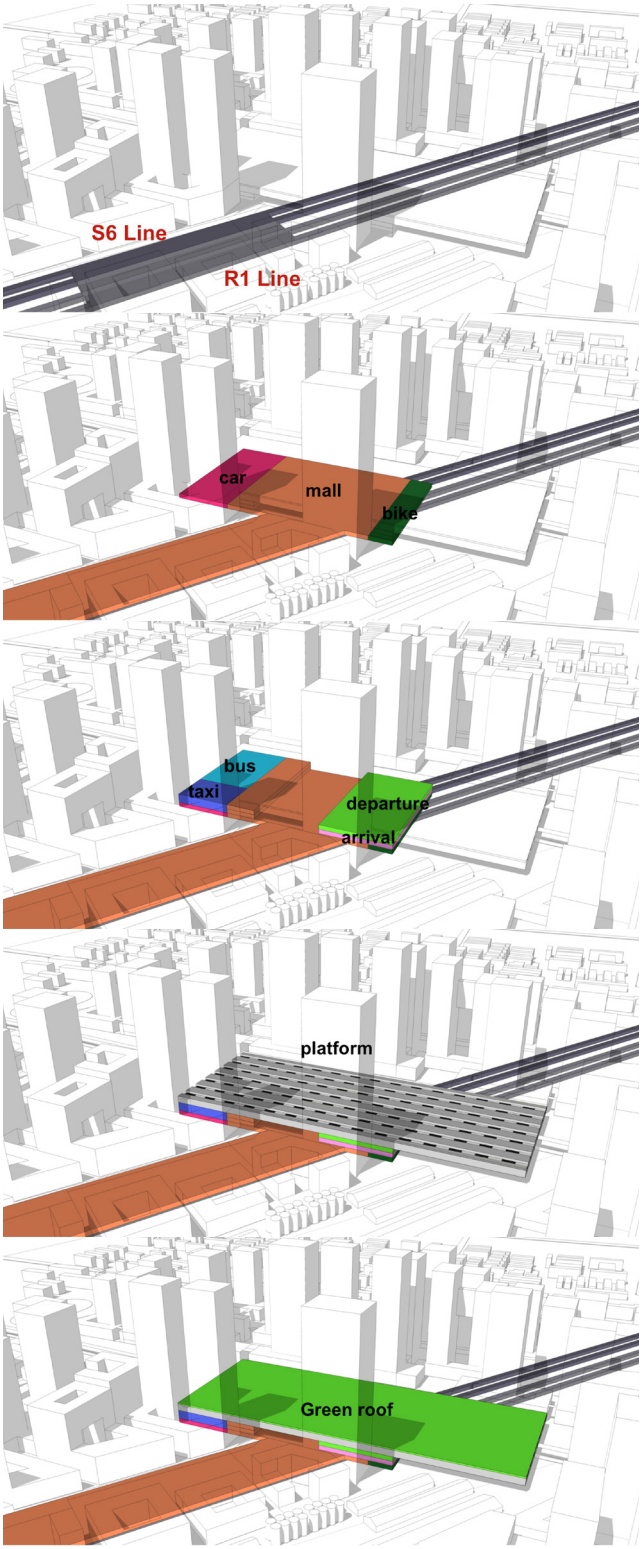
An underground station for the S6 line will be positioned to the south of Tongzhou station. Depending on capacity and schedules, the R1 train can use the same underground station, or may have its own parallel station. The shopping mall, directly underground, adds a wide array of shops and services to the station, but also serves as the connection of the station area to the existing M1 stop. Parking facilities for cars and bicycles are conveniently positioned next to the shopping mall.

Today's situation Tongzhou station area

photo: Thijs van Spaandonk

通州站内现状

该站的地面为行人开放，通过地下通道乘客可以直接去往车站。在铁轨下方，有公交车站和出租车站点，位于邻近公共场所。火车的13个高架轨道连接七个月台。这些月台都有独立的自动扶梯方便出入站的乘客，这些独立的出站与入站的分支创造了一个清晰又高效的交通传输系统。



Rail track

站区轨道走向

Commercial level

上层商务服务区

Transfer hall

中转站厅层

Platform

站台

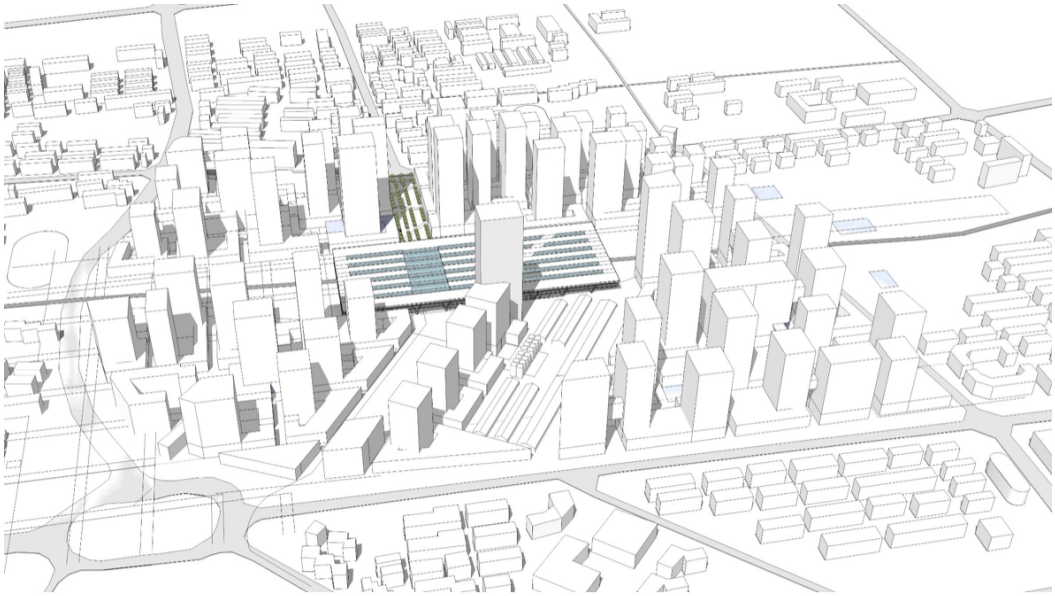
Green roof

绿植生态屋顶

ECOLOGY
生态绿色网络构架

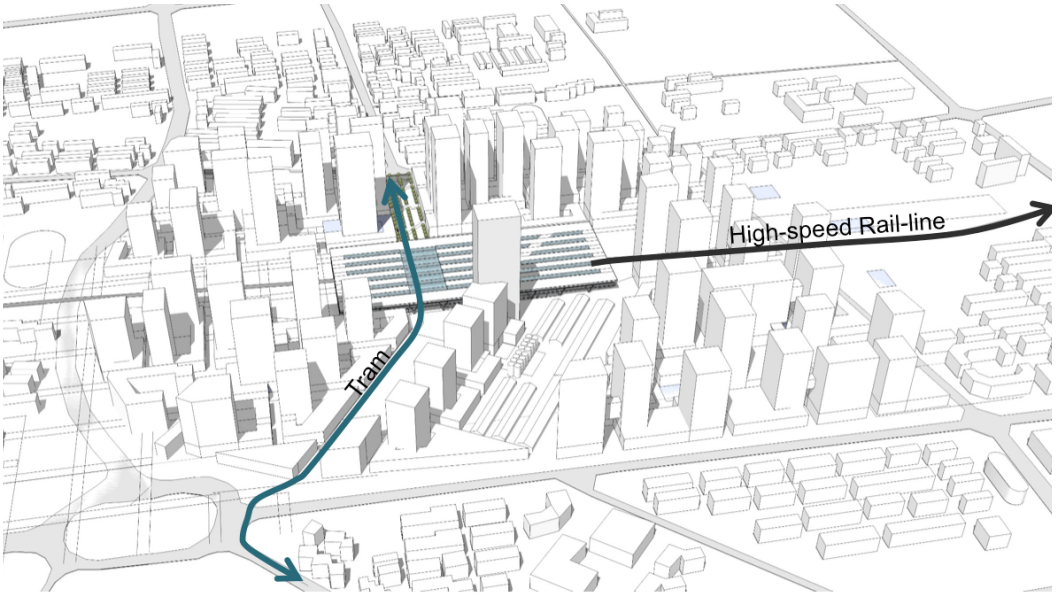
Proposed relocation to the west

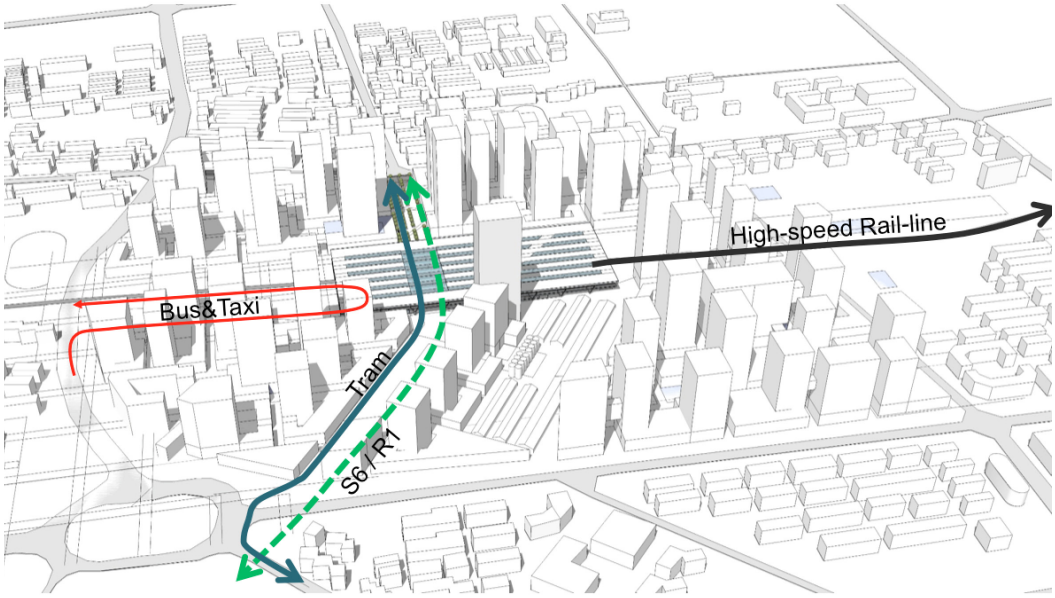
将入口重新定义为朝向西面



Future high speed train passing

未来新高铁线进站





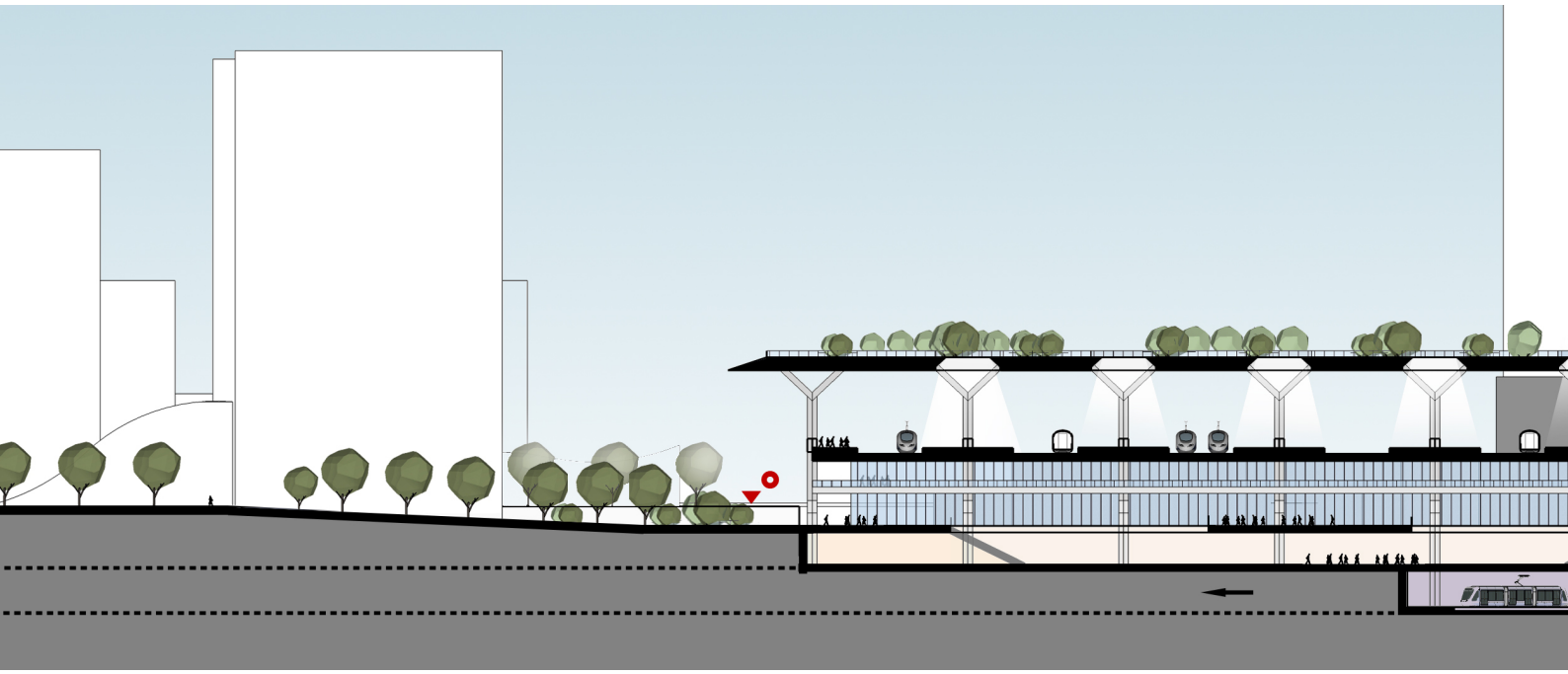
Different transportation method integrated

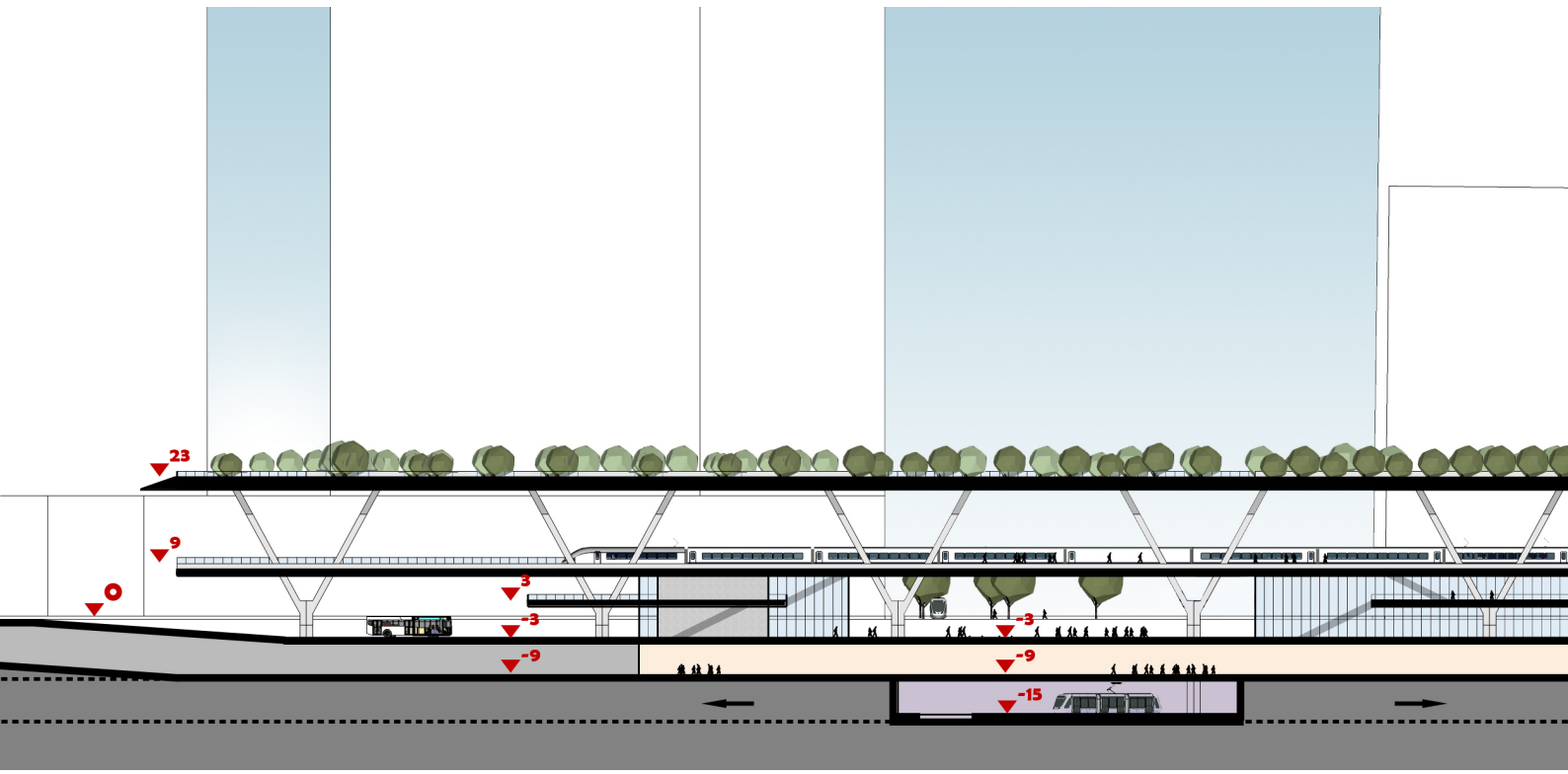
不同的交通方式综合开发利用

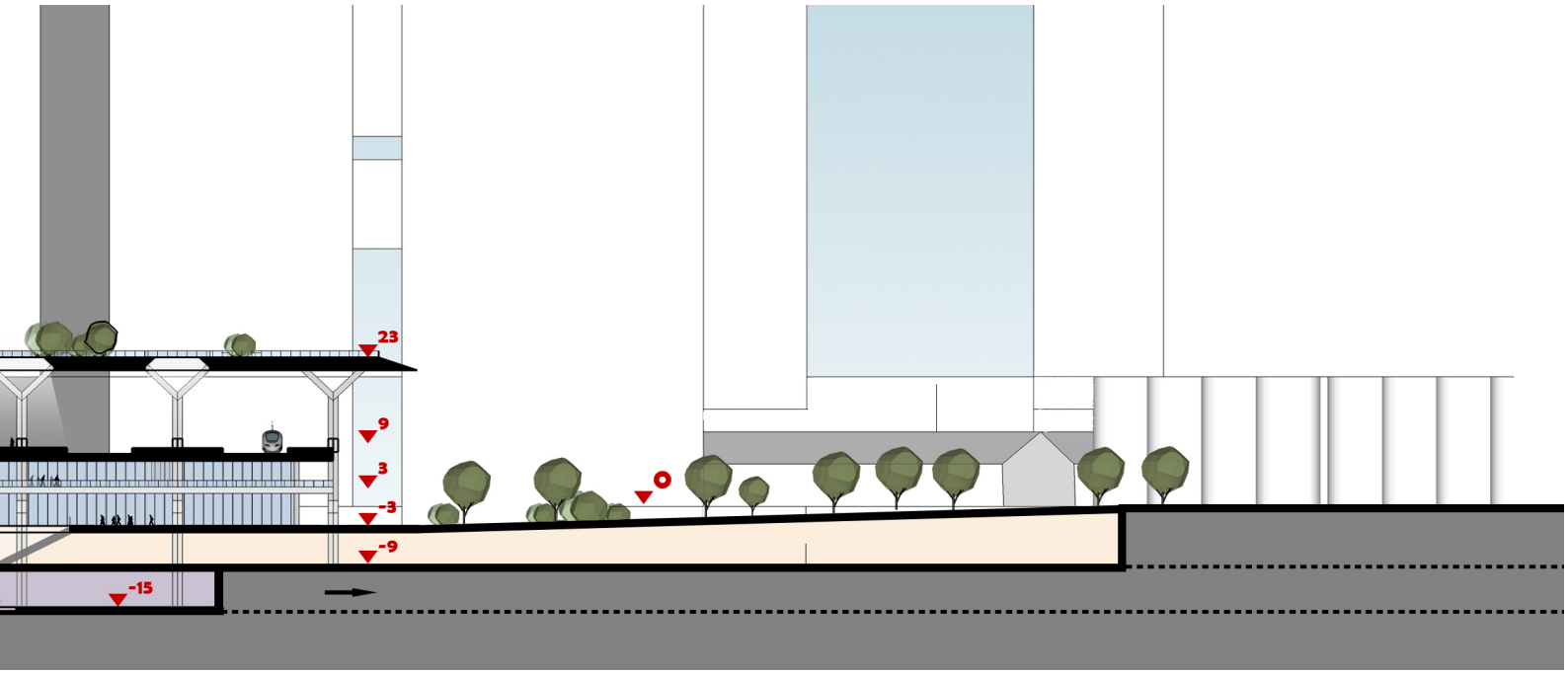
Slow traffic integrate into whole district

慢型交通融入进区域网络

NEW PROPOSED STATION SECTION
新东站剖面意向



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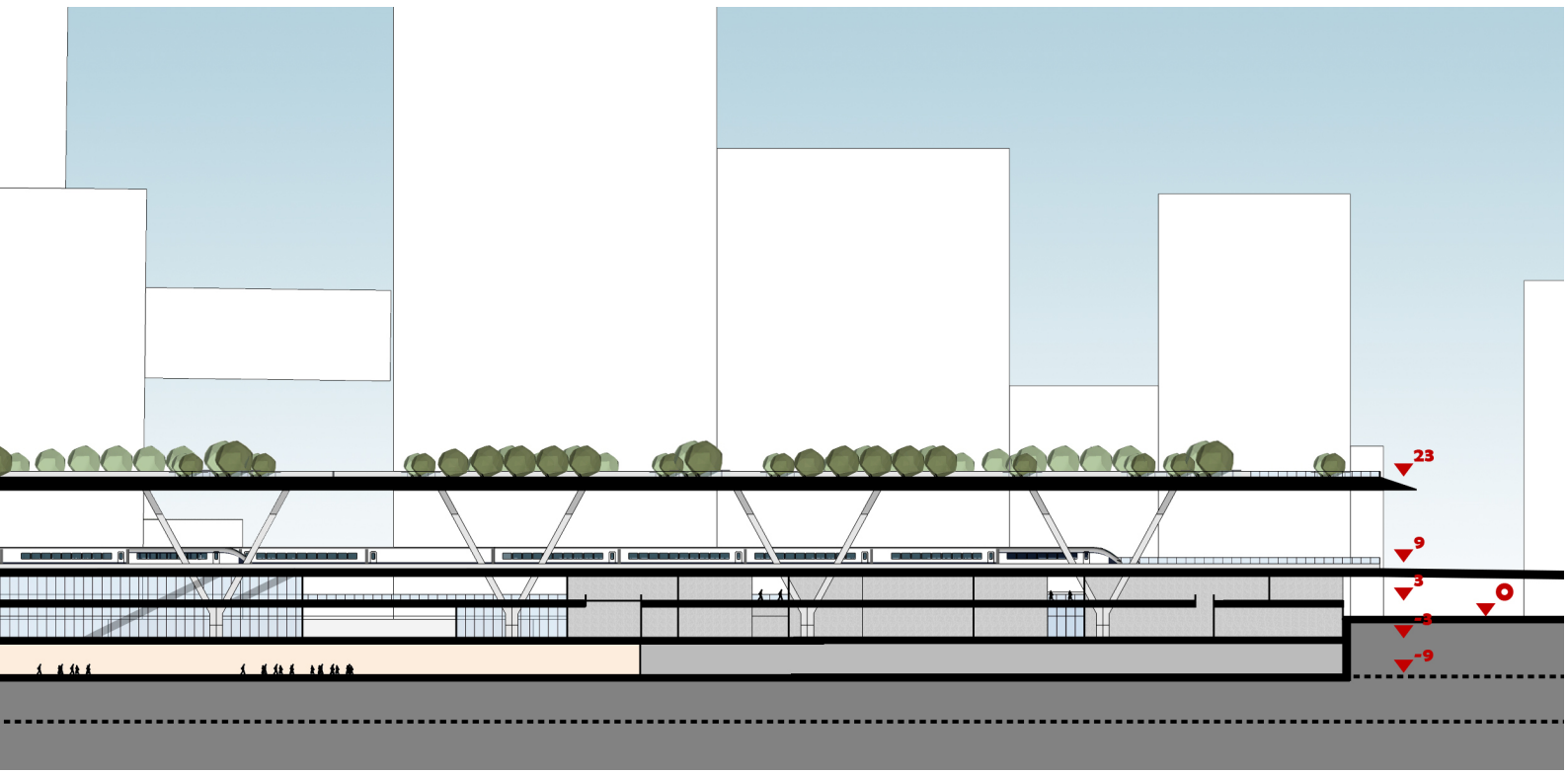
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Beijing Tongzhou Station site picture

Photo: Ton Venhoeven

通州站现状照片

火车站被绿色屋顶覆盖，可以收集雨水和减少车站区域的热岛效应。通过玻璃开口过滤日光并照射到月台之上。绿色屋顶可以用作公共公园,成为通州中心的一个非常有吸引力的开放区。火车站周边区域通过这样的设置方式非常容易进出，而且有可能发展成一个活跃的、高密度的、高质量的城市中心。这种共同交通导向发展模式的城市布局结合了有着舒适步行系统的多功能叠加分层城市发展。

The ground level of the station is an open underpass for pedestrians. From the underpass passengers will have direct access to the departure and arrival areas of the station. The covered bus station and taxi stands are positioned adjacent to the public areas, under the train tracks. The trains, on thirteen elevated tracks, are accessible for seven island-platforms. The platforms have separate escalators for departing and arriving passengers. Separated arrival and departure flows create a clear and efficient transfer system.

The train station is covered by a green roof that harvests rainwater and reduces heat island effects in the station area. Filtered daylight enters through glass openings and sheds light on the platforms. The green roof can be used as public park and become a very attractive open space in the center of Tongzhou. This way the area around the train station will be very accessible and has the potential of developing into a lively, high density, high quality city center.

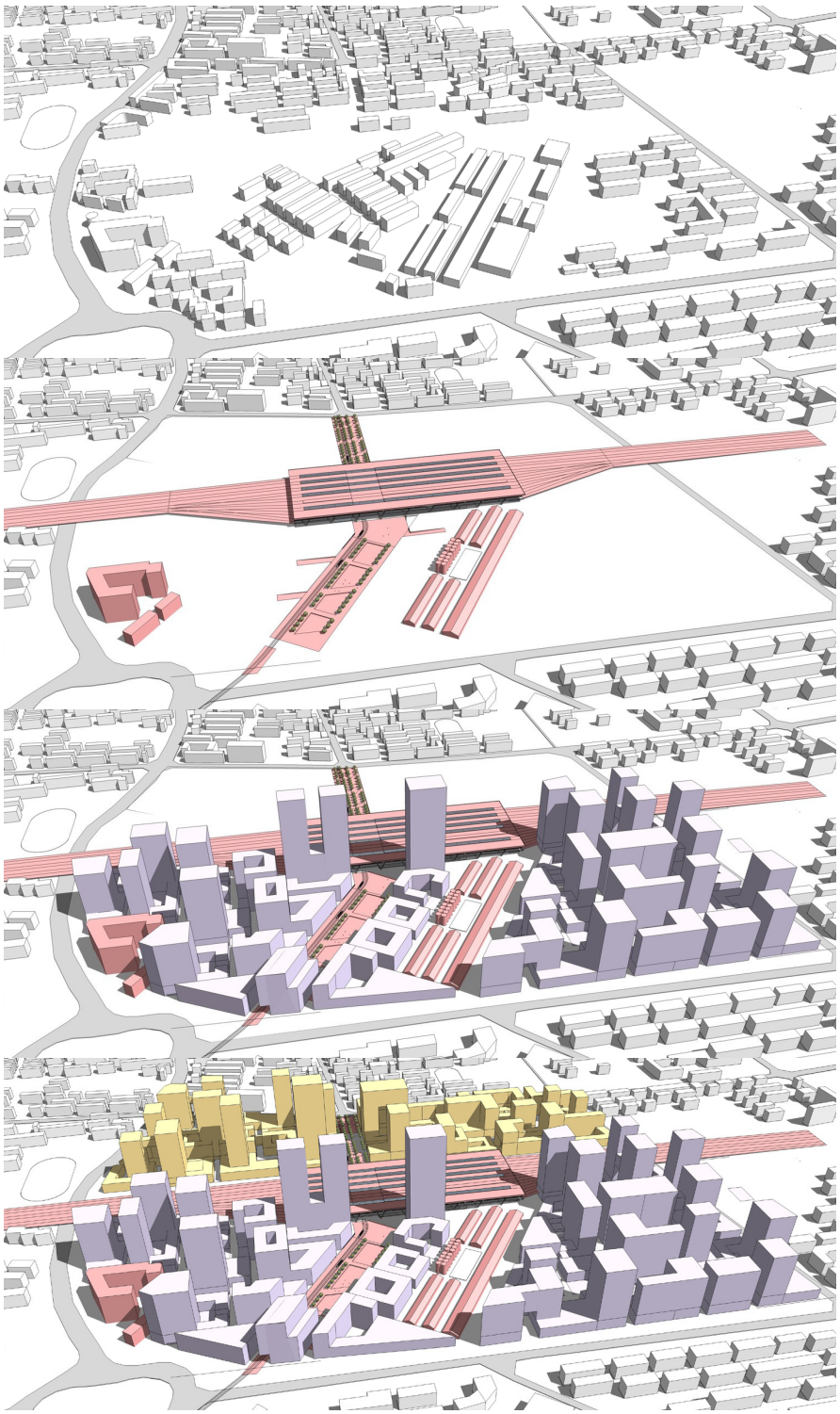
所有高层建筑都有着30-50米的公共和混合基础区域。建筑物创建在像迷宫般的街道、小巷和广场中。写字楼、商业建筑、公共职能和公寓可以结合起来，创造一个充满活力的城市。现有的工厂通过这样的发展方式可以转换成餐馆、商店和公共服务站。

通州站地区的发展将是一个过程,遵循需求和市场情况。首先构建公共基础设施。房地产开发从南侧厂房改造开始至车站北部的重建。在车站地区整个发展过程中，临时使用现有建筑有利于地方营造和活跃气氛。通州具备独特的潜力，发展通州将会将其变成一个美好的生活城市，同时也会为经济、环境和高品质生活做出贡献。

In line with the principles of Transit-Oriented Development, the urban layout combines multifunctional high-rise development with a pleasant walkable city on ground level. All of the high-rise buildings have a base of 30-50 meters with public and mixed-use functions. The buildings create a maze of streets, alleys and squares. Offices, commercial buildings, public functions and apartments can be combined to create a lively city. As a spark for such a development, the existing factory can be converted into restaurants, shops and public services.

The development of the Tongzhou station area will be a process that follows demand and the market situation. Public infrastructure is constructed first. Real estate development starts in the south around the converted factory and will end with the redevelopment of the north side of the station. Temporary use of existing buildings contributes to placemaking and a lively atmosphere during the entire development of the station area. Tongzhou has a unique potential. Developing it will make a wonderful living city and a significant contribution to the economy, the environment and quality of life.

PROPOSED STRATEGY TO DEVELOP AN ADDITIONAL RAPID TRAIN NETWORK
对于快速发展的轨道交通建设建议



Current situation

现状

First stage: finalizing station construction

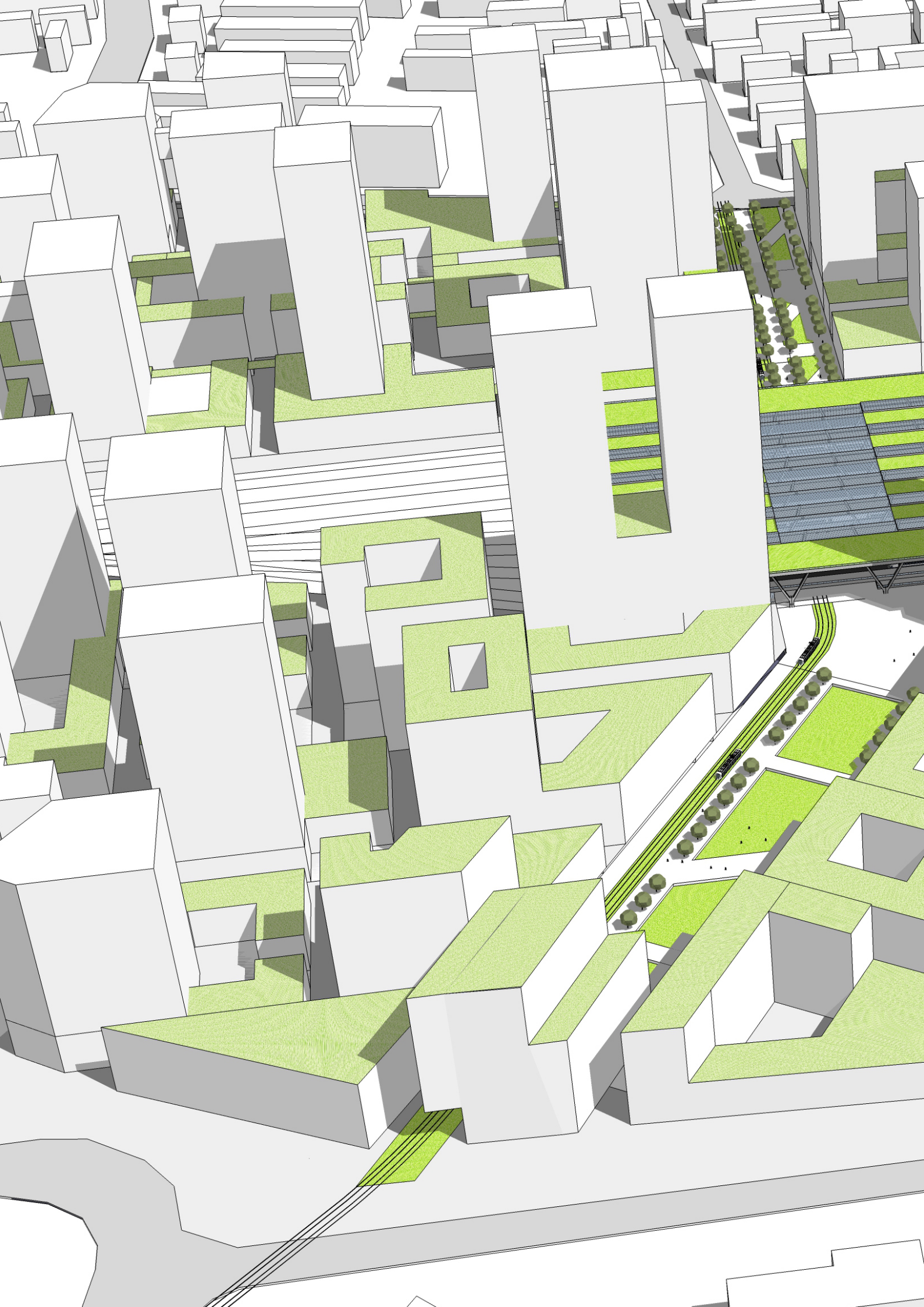
第一阶段：车站建造

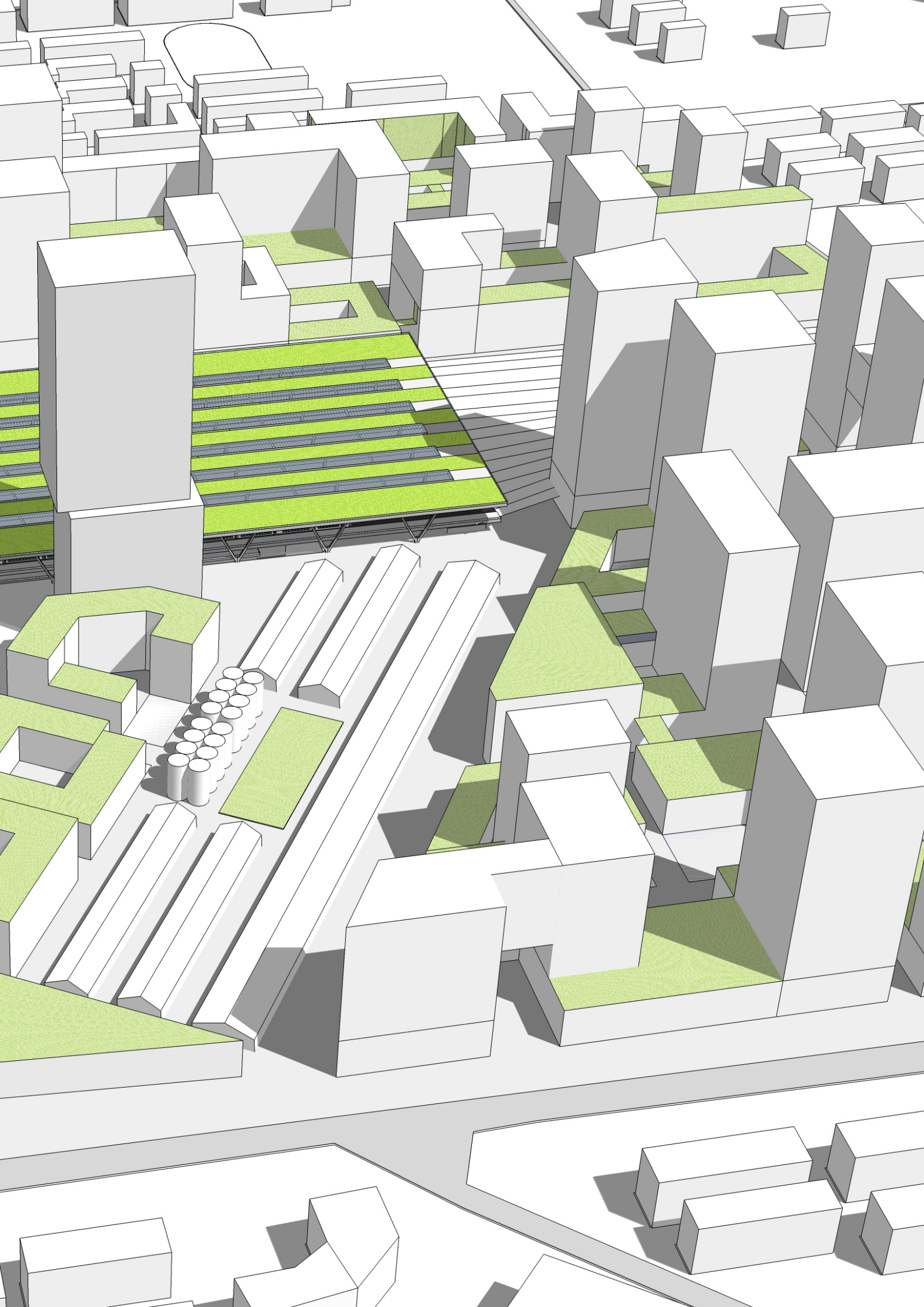
Second stage: develop supporting programs for area surrounding station (commercial + public service)

第二阶段：站点周边地区辅助项目的增设（商业+公共服务）

Third stage: development of area surrounding station (adding residential program) into integrated mixed-use TOD district

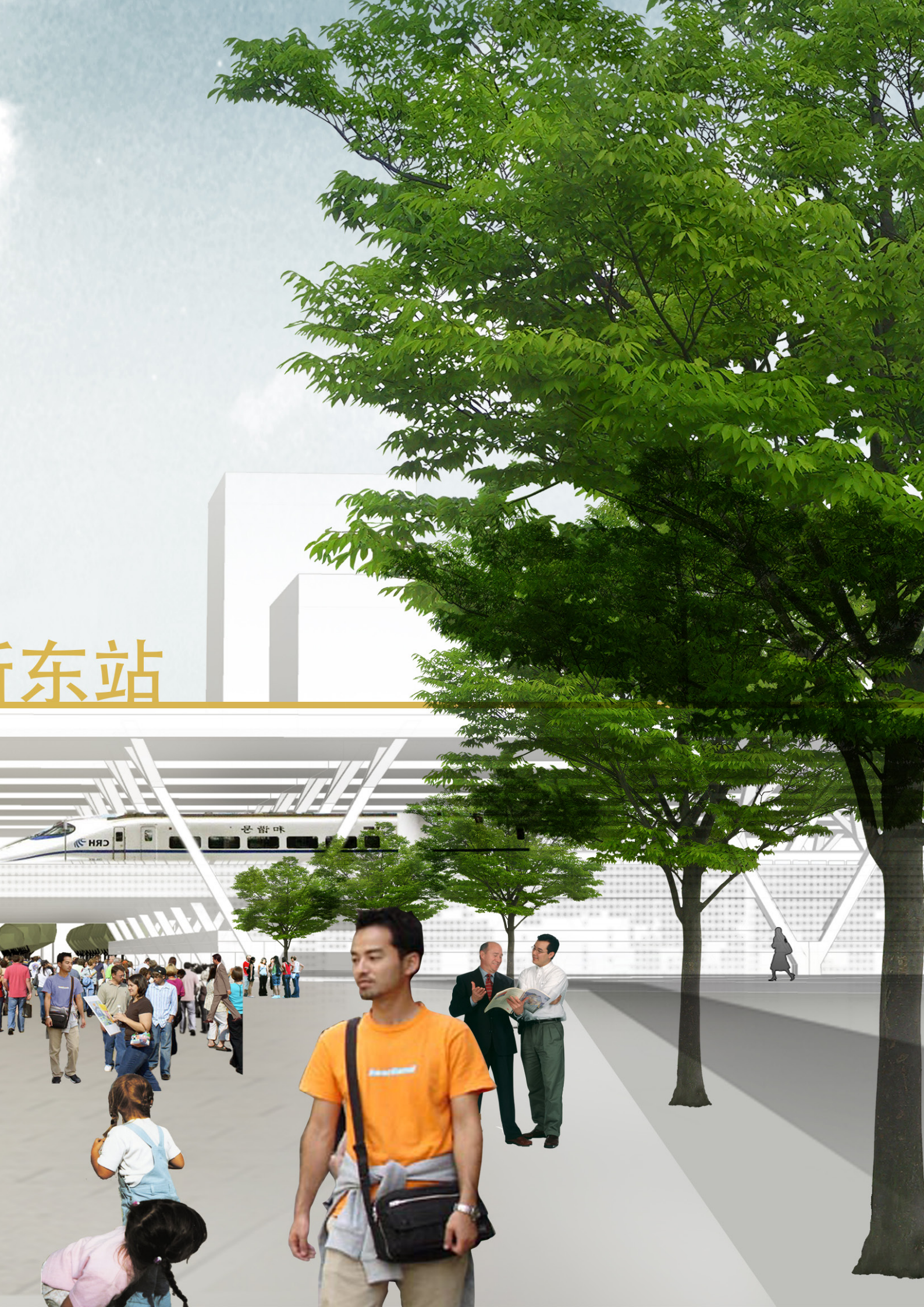
第三阶段：站点周边开发，增设住宅等项目，达到混合类型使用且公共交通导向发展街区





PROPOSED MASTER PLAN
站区规划方案


北京新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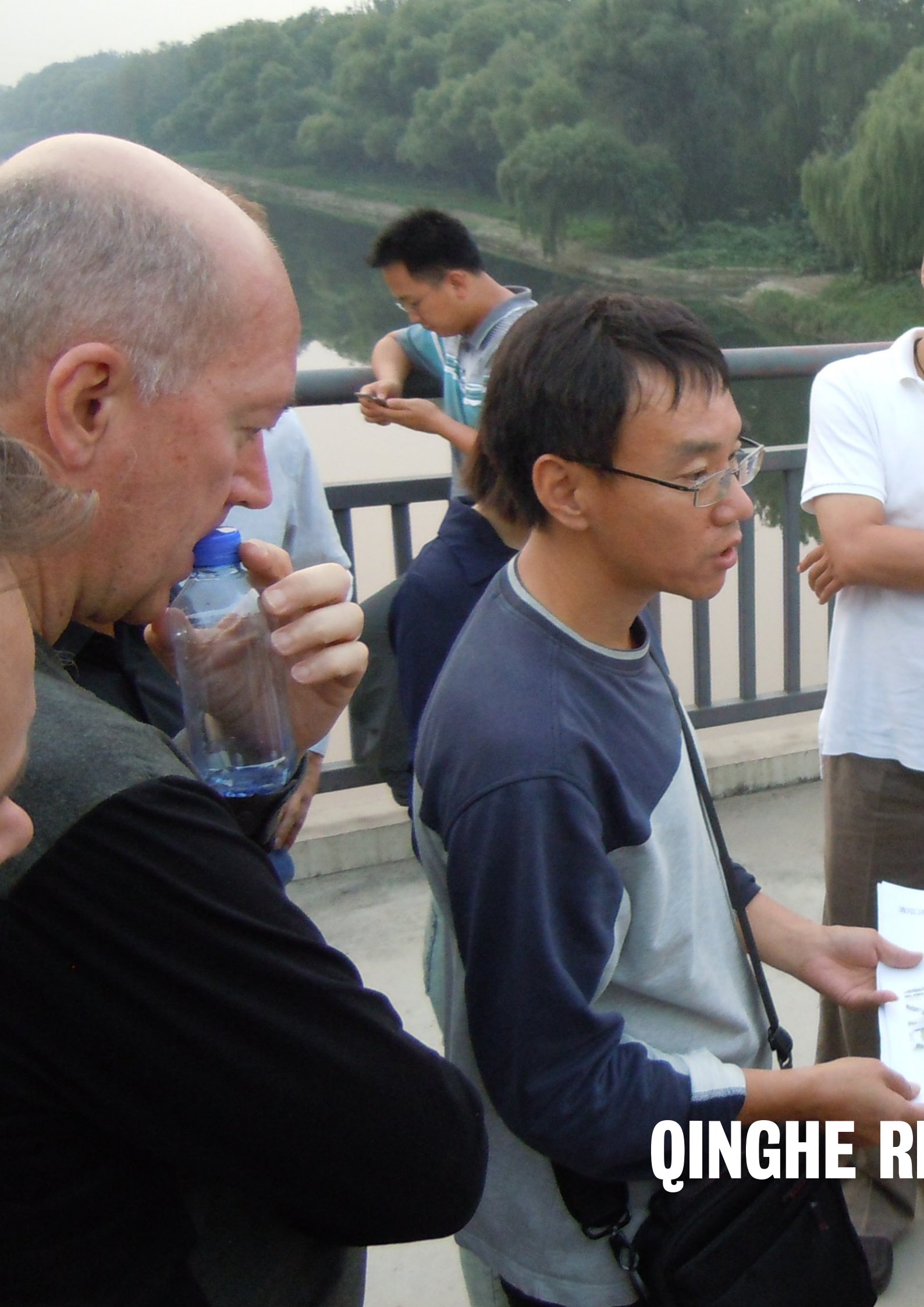
北京新


I'PARK
현대산업개발



QINGHE R

北京
清河更新战略
BEIJING
IVER REGENERATION STRATEGY

QINGHE RIVER REGENERATION AND AREA DEVELOPMENT
清河更新和区域发展

Bart Dijk

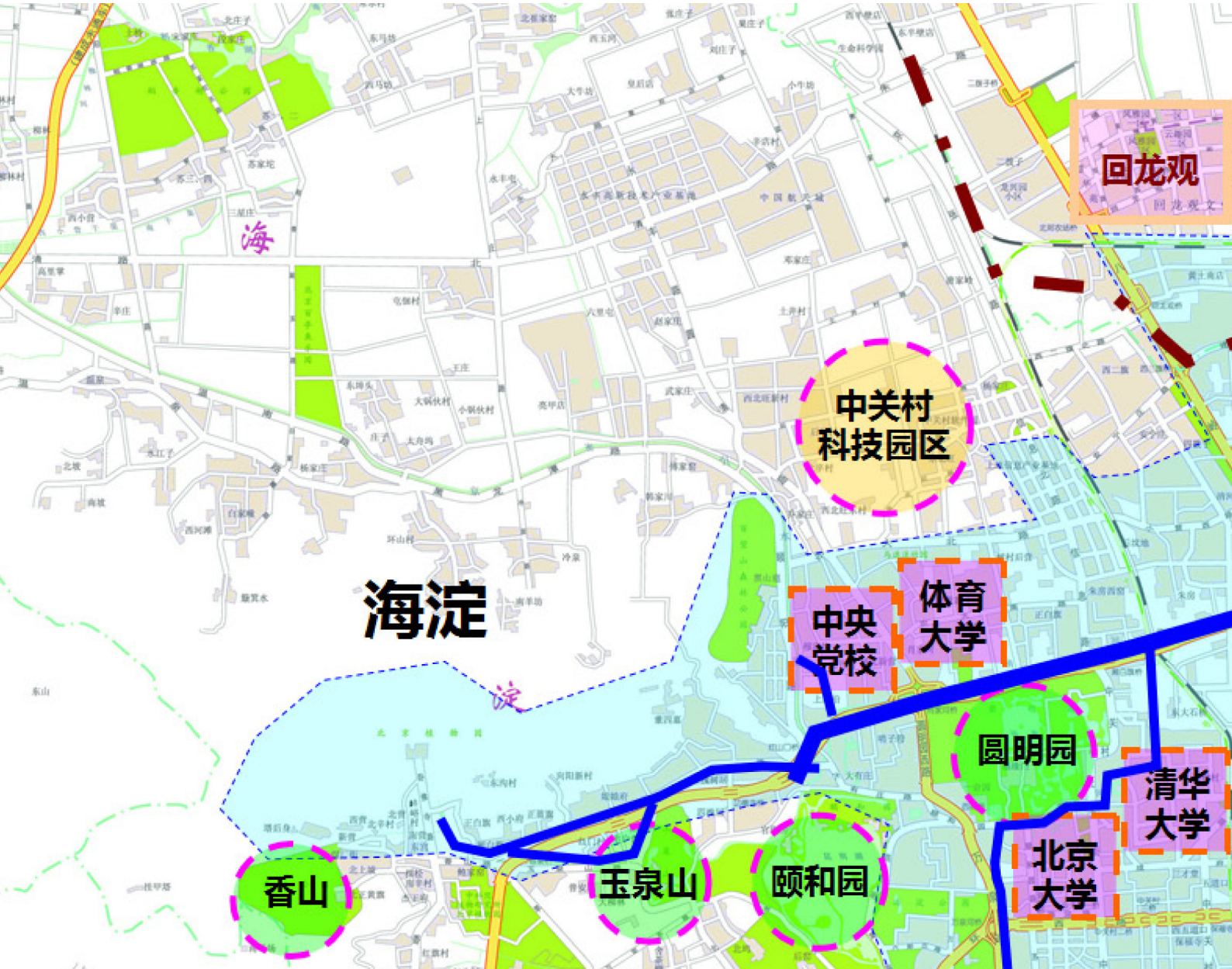
Landscape designer, OKRA Landscape Architects, Utrecht, The Netherlands

Bart Dijk

景观设计师，OKRA Architects，乌特勒支，荷兰

对于京晋冀来说一个重要挑战是提升北京居民的生活质量，提高水和生态系统的更新能力。而这座城市不仅面临日常交通拥堵和重工业造成污染，气候变化导致降雨减少，增加用水需求导致地下水位每年下降一米等挑战。并且，缺乏城市绿色公共空间和有吸引力的慢行交通网络，导致城市汽车骤增，现状环境降低了对居民游客的吸引力。如何改造使清河更新工程作为杠杆撬动城市发展和如何发展相关的金融和空间策略是本次研讨会的主要任务。

An important part of the challenges for Jing-Jin-Ji integration is the improvement of the quality of life for Beijing's inhabitants, combined with the regeneration of water and ecosystems. The city not only suffers from daily traffic congestion and heavy industries that cause poor accessibility and pollution; reduced rainfall as a result of climate change and increasing water demand led to a groundwater level fall of one meter each year. Additionally, the lack of green urban public space and attractive slow traffic networks has resulted in a car-orientated city, which is not an attractive environment for inhabitants nor tourists. How to use the regeneration of Qinghe River as leverage for Urban Regeneration and how to develop the related financial and spatial strategies were the main assignments of this workshop.



Recent water treatment plants improved water quality

photo: OKRA landscape architects

近期的污水处理厂改善水质。

照片：*OKRA*景观建筑师

Functional river banks without recreational facilities

photo: OKRA landscape architects

功能河岸没有娱乐设施。

照片：*OKRA*景观建筑师

Qinghe river as part of the Northern Beijing water system

清河作为北京北部水系统的一部分。

Workshop picture

photo: Merten Nefs

研讨会现场照片

照片：*Merten Nefs*

Poor accessibility to the riverbanks

photo: OKRA landscape architects

不佳的无障碍河岸。

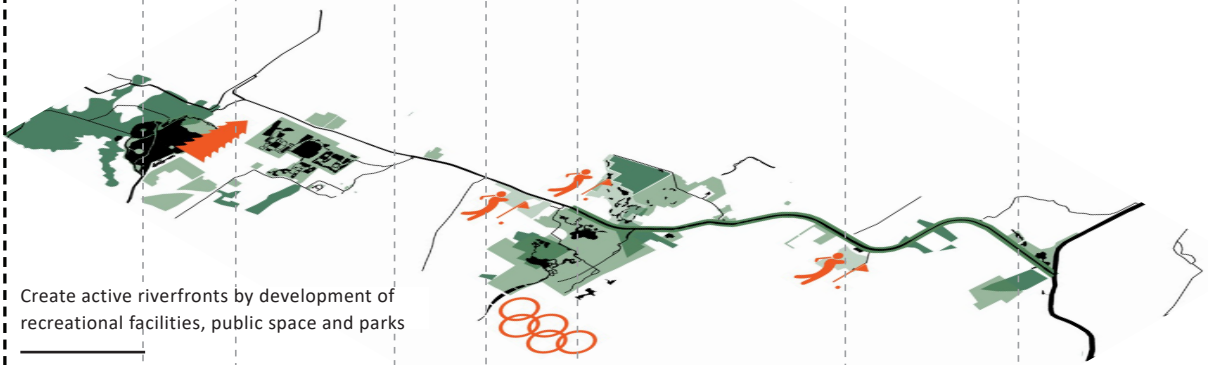
照片：*OKRA*景观建筑师

北方河流系统中存在一部分历史悠久的水系，这些水系连通北京市中心并有效防止洪水入侵。如今，清河作为运河的实际河岸比原来的自然河流和人们的生活更加紧密。相邻的住宅和商业区域并没有给娱乐功能的开发带来局限性。在过去的十年清河重建中，由于污水处理厂的建成，水质得到迅速改善，河岸的整治有效改善防洪河道的容量。在未来几年内第四污水处理厂和一个大型湿地公园将会完成防洪和雨水收集计划。如何使用这些公共资源吸引城市更新，以及如何吸引私人投资开发公私合作的空间和提高经济发展是本次研讨会面临的挑战。

Part of the northern Beijing river system has been constructed to protect the historic city center of Beijing from flooding. Today, with its concrete riverbanks and many weirs, the Qinghe River is reminiscent of a canal more than a natural river. Adjacent residential and commercial areas are not facing the riverside, and recreational possibilities are limited. Over the last decade Qinghe River was reconstructed. As water treatment plants were built, water quality improved rapidly. The treatment of the riverbanks has improved the river capacity in terms of flood prevention. In coming years a fourth water treatment plant and a large wetland park will complete the flood protection and rainwater harvesting plan. How to use these public investments to attract private partnerships and investments for Urban Regeneration and how to develop a spatial and financial strategy for public-private collaboration was the challenge for the workshop.

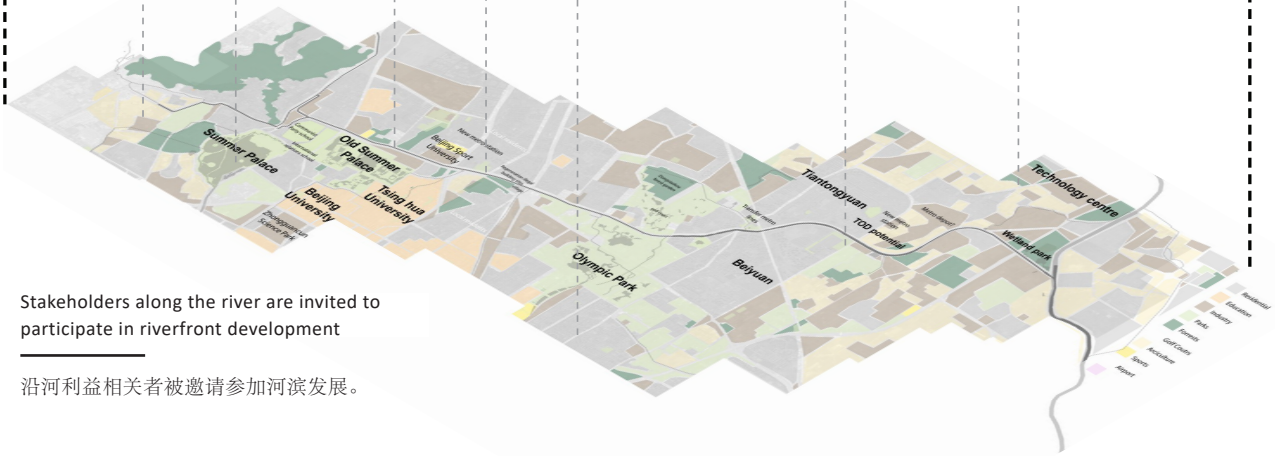
Create access to the river by enhancing connectivity on the city scale and create connections on the local scale

通过增强城市连通性和创造当地规模的连接建立进入河流。



Create active riverfronts by development of recreational facilities, public space and parks

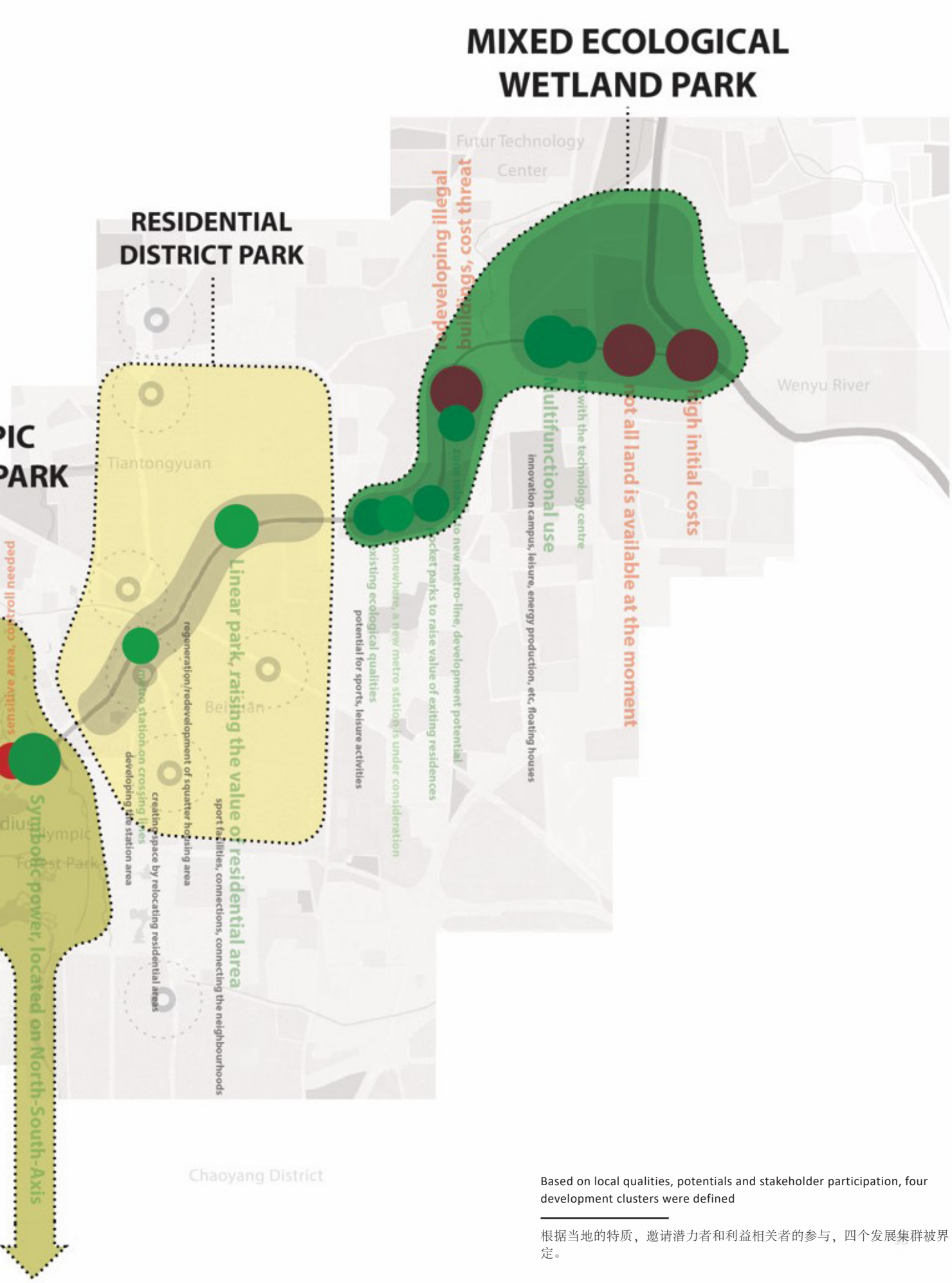
通过创建康乐设施，带动公共空间和公园发展的积极河岸。



Stakeholders along the river are invited to participate in riverfront development

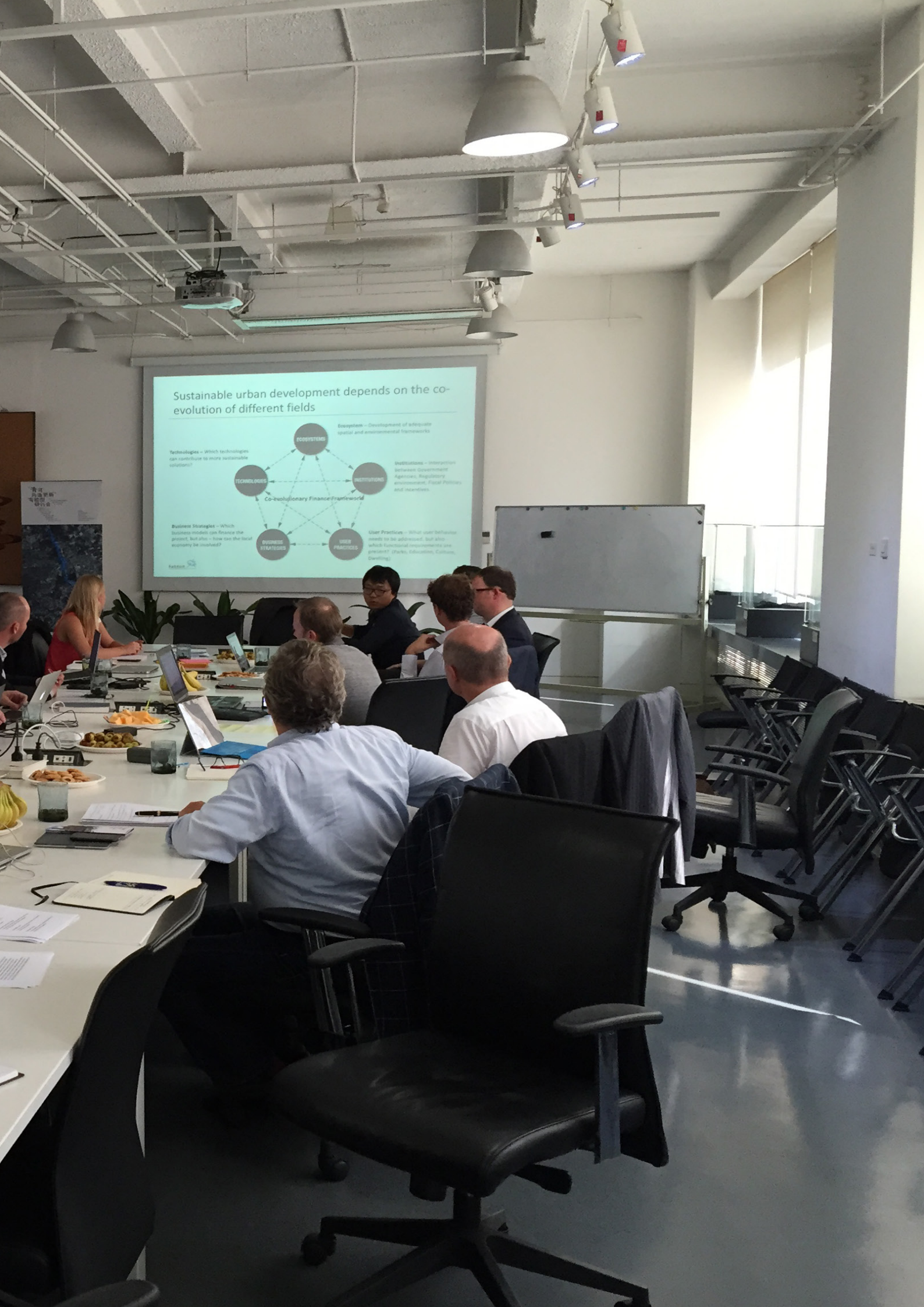
沿河利益相关者被邀请参加河滨发展。

CULTURAL HERITAGE & INNOVATION VALLEY



Based on local qualities, potentials and stakeholder participation, four development clusters were defined

根据当地的特质，邀请潜力者和利益相关者的参与，四个发展集群被界定。


Sustainable urban development depends on the co-evolution of different fields
ECOSYSTEMS
TECHNOLOGIES
INSTITUTIONS
BUSINESS STRATEGIES
USER PRACTICES
Co-evolutionary Finance Framework

THE STRATEGIC ROLE OF INFRASTRUCTURE PROJECTS IN SUSTAINABLE DEVELOPMENT OF CITIES

城市基础设施项目在可持续发展战略中的作用

Albert Hutschemaekers
(former) Maganging Director, Project Organization Station Area, City of Utrecht, The Netherlands

Robert van Ieperen
Partner and Chief Commercial Officer, Fakton, Rotterdam, The Netherlands

Albert Hutschemaekers
乌特勒支市火车站周边地区开发
前项目主管

Robert van Ieperen
荷兰鹿特丹Fakton公司，合伙人与首席经济师

对于像清河再生和区域开发项目，实现公共方面和私有利润双赢是多数地区实现了跨部门的可持续发展目标所期望的结果，项目战略概况需要在早期阶段提前完成。此外，及时分析和解决潜在的发展差距（资金，财政，政策，组织或知识缺乏的问题）；在规划过程中防止失败；有助于增强一个城市或地区的整体可持续性项目的成功。最后，一个成功的公私合作需要一个专门的项目组织指引发展所需的方向。

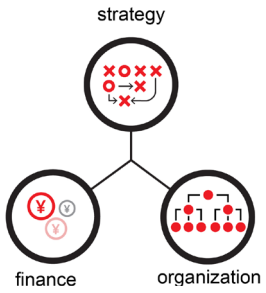
For a project like Qinghe River Regeneration and Area Development, to achieve the desired results in terms of public and private profits and achieve cross-sectoral sustainability goals for the larger region, strategic (re-)framing of the project brief is required at the earliest stages. Additionally, analyzing and fixing potential development gaps in time (issues of funding, fiscal, policy, organizational or lack of knowledge), prevents failure during the planning process and contributes to successful projects that enhance overall sustainability of a city or region. Finally, a successful public-private collaboration requires a dedicated project organization to guide the development in the required direction.

战略框架

类似清河更新和区域发展这样的单一的城市基础设施和城市开发项目，可以在项目早期在整体可持续发展方面发挥更加有效的作用,他们的范围限定连接到一个城市的整体发展途径和可持续发展目标。一个项目在战略框架层面上把开发过程的重点由单一功能发展转向至多部门协同合作。而至关重要的第一步：战略框架可概括为如何在不同的方面为城市发展制定目标，一个城市能通过仔细分析数据和信息而产生更多的具有协同效应的综合实施方法。通过设计进行研究可被视为整个策略框架的工具之一。

其次，战略框架还有助于评估早期是否有可能阻碍发展到达特定目标的“发展间隙”。这些间隙的性质可能各有不同（它们可能由资金或财政缺口、政策差距、组织上的间隙或知识空白），但他们的存在往往为项目带来一些不必要的麻烦，从而无法促进更广泛更长期的可持续发展。狭隘的视野还可能使问题更加复杂化且导致一个项目关闭或投资缺口，因为它会降低多个商业案例的实现可能性

第三，战略框架允许创建围绕项目利益相关者框架的库存和分析是否以及如何在一个项目的范围重点的变化可以通过吸引足够的利益相关者进行匹配。总之，战略构架是在一个项目的初始时期。约束连接到定量和定性的改进空间，可能在一个更大框架、功能、技术、财务和组织的一个项目的上下文中找到的第一步骤。为了对这一战略的提升空间项目的一个明确的说法是如果涉及城市基础设施，如清河水厂。如果这样的项目从宏观层面上来说不能顺利开发，那么让所有利益相关者在不同级别的政府和组织的决策清晰的框架下整合起来也将非常困难。然而从另一个角度来说，在整体的规划和决策下也可以吸引私人投资来填补资金的缺口。



Framing the strategic, financial and organizational dimensions of an urban development is a cyclic process that should be activated at the start of a project.

image: Fakton

构建一个战略性的，金融性的和组织性的规模的城市开发项目是一个循环的过程,应该在项目的开始时期被激活

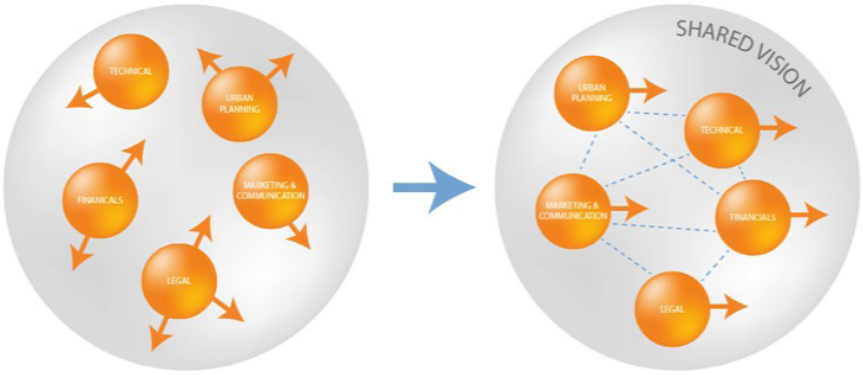
资料来源: *Fakton*

A strategy that identifies the principle steps in development and that has a measure of independence from a finalized end-image or plan allows the project to adapt to changing circumstances.

image: Fakton

战略确定需要一定数量的项目逐步适应不断变化的环境。

资料来源: *Fakton*



Strategic framing of the objectives, variables, opportunities and constraints of a project into a shared vision

Image: Fakton

项目战略框架中的目标、变量、机会和约束的共同存在。

资料来源: *Fakton*

城市基础设施建设项目无论是在交通、能源、水或废物，都与现有的城市和它所包含的房地产业有巨大的联系。但由于技术更新和发展，在未来几年里，城市基础设施建设和地产开发之间的关系也将发生戏剧性的变化。科技组件作为城市基础设施的一部分将开发出更多的功能，支持全方位多功能协作并在社区层面提供特定的服务。例如，启用智能芯片管理本地资源从而为当地范围内进行服务和并且创造价值，交换当地新的商业机会。这些新的一体化城市基础设施和房地产开发的模式可以进行相互合作产生协同效应，并提出能吸引私有投资的新机遇和新的商业模式。

Strategic Framing

Single urban infrastructure or urban development projects like Qinghe River Regeneration and Area Development can play a more effective role in the overall sustainable development of cities if - early on in the process - their scope is framed in connection to a city's broader development pathway and sustainability goals. This strategic level of framing of a project is an essential first step to shift the focus of a development process beyond a single objective and towards a multisectoral outcome: strategic framing can outline how the different aspects and objectives of urban development in a city can reinforce each other by carefully analyzing the opportunities for an integrated approach that can produce more synergy. Research by Design can be used as one of the tools in strategic framing.

Secondly, strategic framing also helps to assess early on if there are 'development gaps' that might hinder a development from reaching specific goals. The nature of these gaps can vary (they might consist of funding or fiscal gaps, policy gaps, organizational gaps or knowledge gaps), but their presence will usually result in a project with an unnecessarily narrow focus and outcome, thus unable to contribute to broader long-term sustainability goals. A narrow focus can also make it more complicated to close an investment gap in a project, because it can reduce the possibilities for combining multiple business cases.

Thirdly, strategic framing allows the creation of an inventory of the stakeholder framework surrounding a project, and an analysis of if and how changes in focus of the scope of a project can be matched by attracting adequate stakeholders. In short, strategic framing is a first step to connect the initial constraints of a project to the quantitative and qualitative room for improvement that might be found in

the larger spatial, functional, technological, financial and organizational context of a project. To have a clear view on this strategic room for improvement of a project is especially relevant if it involves urban infrastructure such as the Qinghe River waterworks. If a holistic view for such a project cannot be developed, it will be very difficult to engage all relevant stakeholders in the different levels of government and to organize a clear framework for decision-making that can also attract private investment to close the financial gaps that can be present.

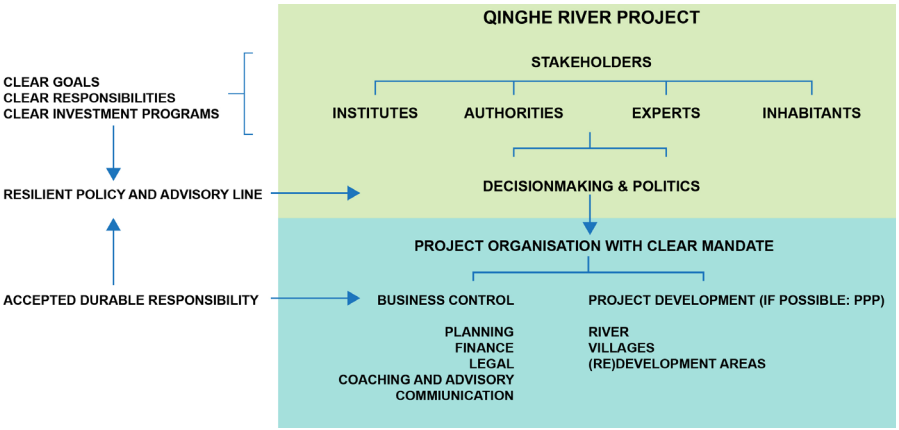
An urban infrastructure project, whether focused on mobility, energy, water or waste, has an enormous interface with the existing city and with the real estate it contains. In coming years this relationship between urban infrastructure development and real estate development will change dramatically because of technological innovations. Technological components that are part of urban infrastructure will develop more capabilities to support decentralized functionality and provide specific services on a neighborhood level. For instance, smart microgrids enable opportunities for local resource management and thus for new business cases based on a local exchange of services and local value creation. These new forms of integration between urban infrastructure and urban real estate development should receive particular attention in order to unlock new synergies and new business cases that they can bring forward, as they will present new opportunities to attract private investment.

清河研讨会金融和组织策略讨论

Finance and Organization Strategy in the Qinghe River Workshop

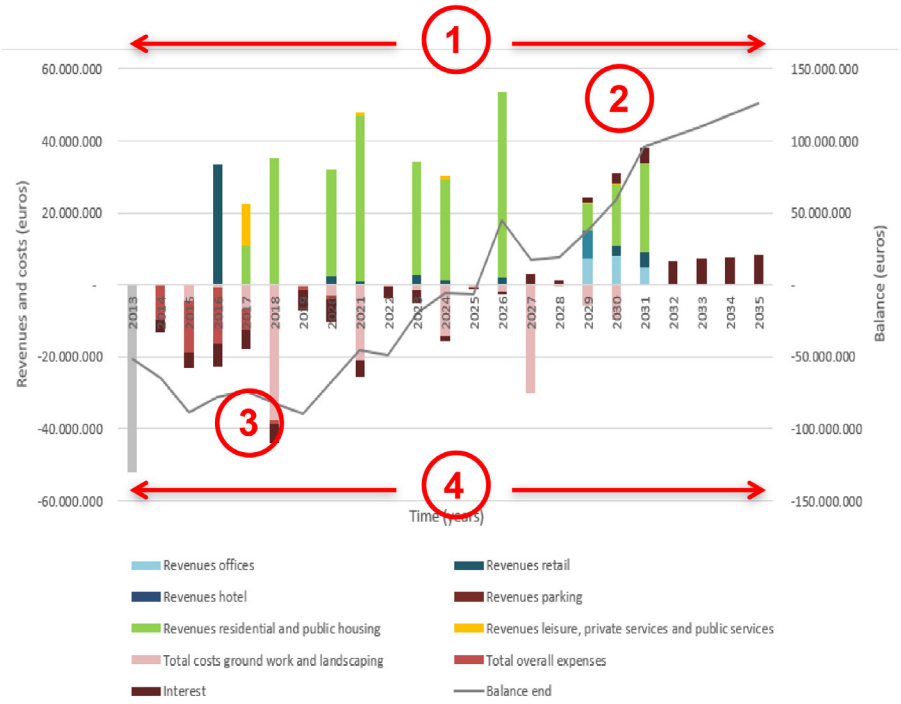
清河项目工作组战略会议上使用经济框架策略作为工具去详细地描述和解决现有项目存在问题并且检验项目是否具有更加广泛的可行性。

The workshop on the Qinghe River project has sought to elaborate this approach by using a session of strategic (re-)framing as an analytical tool for questioning the existing scope of the project and to examine if a broader view could increase the opportunities for the project to close the development gaps.



Strategic framing of the organization of a project: creating a framework for durable and transparent decision-making and governance early on.

在项目初期创建一个持久的透明的战略组织框架。



研讨会上第二个方面是阐述了战略框架，如何将项目各利益群体的角色和职责联合在一起，构建一个决策机制。针对各种类型的水主题项目进行补建、重建(如河边再生项目和湿地项目)，并且与可能的周边城市的发生潜在联系,这需要额外的利益相关者去实现针对一目标的评估。

A second aspect of the workshop was to illustrate how strategic framing can connect the scope of a project to the roles and responsibilities of the various stakeholders and thus structure the decision-making process. An assessment was made on how various types of water treatment projects that make up the redevelopment (such as the riverside regeneration project and the wetlands project) could be connected to the regeneration of the surrounding urban areas and which additional stakeholders would be needed to achieve this.

通过调查可以发现潜在与项目相关的机遇,这些机遇在初期的研究中可能被忽视，比如大型城市公园或城市重建的需要、不同范围城市水系统工程出现的可能性，这种范围可能反映出大量关键性问题。它表明,通过定义相关项目的关联范围,例如加强北京城区水体与现有绿地之间的联系， 项目可以从一个相对狭义的定义，转变为多方面、多角度交互的项目，从而增加北京清河附近的地块质量。

By investigating the presence of these additional opportunities that could be connected to the project, opportunities that were perhaps initially overlooked (such as the presence of large urban parks and the need for Urban Regeneration), and the possibility of a different scope for the waterworks-project emerged – a scope that would be able to respond to a larger amount of critical issues. It showed that by defining relatively modest additional scopes for the project, such as reinforcing the connection between the river and existing green areas in this segment of Beijing,

Framing the financial challenges:

A clear assessment of how and when investment is expected to match revenue can identify the primary financial challenge and indicate a possible necessity to reframe the scope of a project:

1. What are the primary investment needs and what is the overall timeframe for investment?

2. Will user fees be able to pay back up-front investment in a reasonable timeframe or is additional revenue needed from real estate development or other business cases?

3. Can such opmitization of revenue solve the financial gaps or is there a structural funding gap?

4. Is there room for phasing infrastructure investments in order to spread up-front costs and benefit from revenue entering during development?

If this type of assessment is executed together with thorough financial modelling, the principle development strategy can be tested against different (risk) scenarios (below). The outcome of this type of verification can require a project to reframe the strategic focus of a project.

框架式金融挑战:

如何明确评估以及投资预计的收益可以识别金融主要的挑战,表明可能需要重新定义项目的范围:

1、什么是主要的投资需求，投资周期是多久？

2、在合理的时间内能否通过用户付费偿还前期投资，或者从房地产开发或其他业务中获得额外的收益？

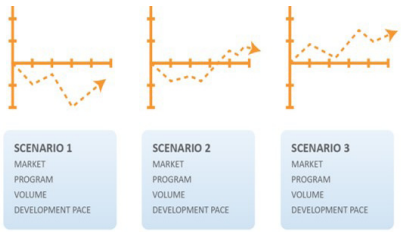
3、这种收入可以优化或解决金融缺口、结构性融资缺口吗?

4、有逐步的空间基础设施投资,以传播在发展的前期成本和受益于收入进入?

如果执行这种类型的评估与彻底的金融模型,发展战略原则可以测试不同的(风险)场景(下图)。这种类型的验证的结果可能需要一个项目来重塑其战略重点。

4，是否有空间在开发过程中扩展前期成本和收益，从收益中逐步开展基础设施投资？

如果这种评估与全面的财务原则发展战略制度一起执行，才能测试针对不同的（风险）的情景（见下文）。验证这种类型可能需要通过一个项目的结果来重构其战略重点。



the project could move from the relatively narrowly defined outcome it initially had, to a multisectoral outcome that would increase the quality of the entire urban sector along Qinghe River.

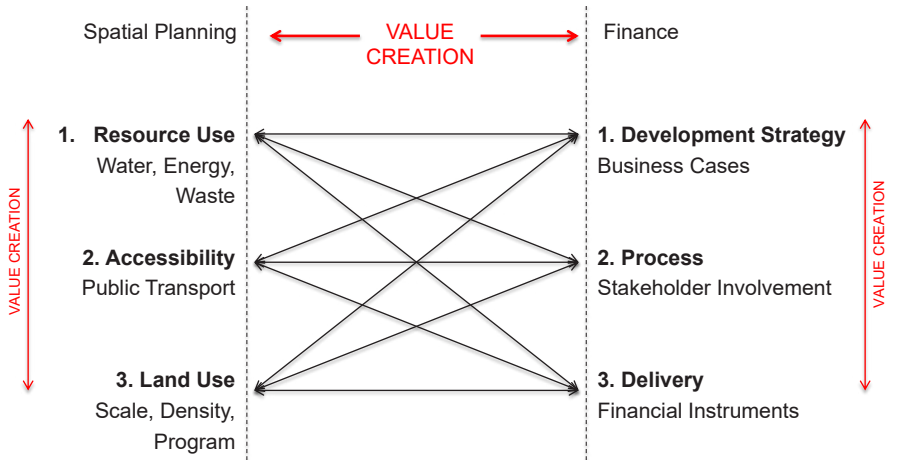
而一组空间和功能的机会在城市背景下被发现,可以将项目引导进入不同类型的开发策略，在此期间项目的政治层面会出现十分明显的限制。在这里，研讨会所将面临的挑战则是去界定存在于重点城市发展的各种战略，财务、组织和项目边界界定。例如，清河更新项目 - 可能会导致一个“客观的差距”，“组织差距” “政策空白”或“知识的差距”。如果一个项目团队可以从中得出一定的结论，那么将组织框架代入到项目中则变得相当的重要，并且可以使得项目更具弹性以及在经济上更加具有可行性。在此过程中相关利益群体的合作与互动也应当得到保证。研讨会组织的利益相关者、决策者和项目管理机制则是在某种意义上来说具有更高更广的意义。

While a set of spatial and functional opportunities was found in the urban context that can steer the project towards a different type of development strategy, significant constraints appeared on the governance side of the project. Here the challenge of the workshop was to show how the various strategic, financial and organizational thresholds and barriers that are present in a key urban development - such as the Qinghe River regeneration project - could lead to an ‘objective gap’, ‘organizational gap’, ‘policy gap’ or knowledge gap. If a project team would come to the conclusion that the introduction of alternative development strategies would be key to making the project more resilient and more financially feasible, it would still have to organize the interaction with the stakeholders accordingly. The workshop revealed the importance of organizing the stakeholders, decision-makers and the project organization in a way that is consistent with the higher level of complexity that comes along with a broader scope for a project.

综上所述，良好的发展战略:

In summary, a sound development strategy should:

- 针对定量和定性这两个方面的相连，视清河区域以及周围的城市地区和城市作为一个整体。这一步应该澄清整体观发展到什么程度，定义在项目本身的规模挑条件下需要解决这个观点涉及的其他尺度水平的治理、利益相关者和类型的投资;
-
- 制定利益分配原则来界定国家公共部门和私营资产之间的投资风险和利润回报，创立一个商业



Relation between Spatial Planning and Finance
diagram: Fakton

空间规划与经济间的关系
图例：*Fakton*

模型来说明公有私有业主之间的联系，并且借此来产生更多的合力。

- 提供一个决策的过程框架,可以指导不同类型的利益相关者参与清河更新项目(组织维度)。 从整体的角度定义了项目的目标和金融框架，战略框架之间的联系，划分风险的识别机会和收入之间。公共部门和私营部门在一定基础上的互动，决定了项目的决策机制。

- Connect quantitative and qualitative objectives (Strategic Dimension) both on the level of the Qinghe River area, as well as for the surrounding urban areas and the city as a whole. This step should clarify to which extent a holistic view on the development can be defined on the scale of the project itself and at which point it is necessary to address this view by involving other scales, levels of governance, stakeholders and types of investment;

- Define the principles for the division of risk and revenue between the public sector and the private sector (Financial Dimension) and create a financial model that can illustrate in a transparent manner to both private and public sector stakeholders how this division is envisioned; verify which business cases can be connected to each other to create more synergy;

- Provide a decision-making framework that can guide the process for the different types of stakeholders involved in the Qinghe River regeneration project (Organizational Dimension). The connection between the strategic framework that defines the objectives from a holistic perspective of the project and the finance framework that identifies opportunities for dividing risk and revenue between public sector and private sector parties essentially determines at which stage a project will need to interact with the market and thus how a decision-making framework should be conceived.

在研讨会期间，经研究确认的清河周边地区存在有潜力区域并且可以发展与水相关的一些重建项目和更新计划。利用每个区域的不同性质（如奥林匹克公园，清华大学与城市滞后地区）提出建议，所来说明城市改造和河道再生的商业案例。基于针对不同区域制定不同的子项目组织构架以此上升至整个城市的层面来整治所有清河沿岸地区，并且借此归纳总结出相应的组织管理和决策模型。

During the workshop, several sub-areas were identified as sites with potential to connect with the water regeneration project of the Qinghe River with Urban Regeneration and urban (re-)development. Using the varying nature of each sub-area (such as the Olympic Park, Tsinghua University area and the areas with urban blight in the projected wetlands area), several proposals were made that illustrate how the business cases of Urban Regeneration and the river regeneration can reinforce each other if one embarks on a process that is actively seeking to achieve synergy with existing opportunities in the city. By also framing the different sub-projects on a larger scale of the city into a strategy for Urban Regeneration along the entire river, an outline was made of an approach that would ask for a different organization of the governance and decision-making model applied up until now.

Qinghe Project meeting with BIAD leader and experts

专家团队与相关领导就清河项目进行会议和讨论


农夫山泉

研讨会结果
WORKSHOP RESULTS

WORKSHOP RESULTS
研讨会结果

Bart Dijk

Landscape designer, OKRA Landscape Architects, Utrecht, The Netherlands

Bart Dijk

景观设计师，OKRA Architects，乌特勒支，荷兰

经过研究表明，通过保证水质量和抑制洪水，清河及其邻近市区将会成为一个城市发展的新热点。为了实现该目标，工作组开展了关于整个清河区发展的集成空间和金融发展战略的一系列研究讨论。

The workshop showed that with clean water and protection from flooding, Qinghe River and its adjacent urban areas can become a hotspot for city improvement. The following integrated spatial and financial development strategy for the entire Qinghe River area can be used to make this happen.

首先,作为清河再生项目和增加河水容量项目的一部分,必须梳理河岸附近70米范围内的障碍和建筑物。这样就为发展沿河、线性公园、迷人的码头和休闲活动区创造了条件。与单项项目投资相比，集成项目中这些公共投资的结合更符合成本效益。

第二，基于现有的交通网络分析。全方面流动策略可以运用到多通道连接和区域可达性的开发上。慢行交通道路与穿越地铁线路系统的河流平行关系，也为TOD开发、步行社区和休闲河岸的建设创造了机遇。从而提高该土地价值，也为当地政府获取市场价值创造了机会。

第三，为了平衡公共和私人投资收入，在整个清河再生和区域发展项目的概念化、公私多元化经营模式的基础上，提出了发展战略。整个发展可以划分为不同的项目和既独立又相互联系的商业案例与盈利目标。虽然整体目标是打造健康、可持续的和富有吸引力的沿河区域，但不是全河流段具有相同的业主和发展机制。以当地的品质差异、潜力和利益相关者的差异为基础，可以定义为四个独立发展的子集群。而每个子集群不仅仅需要一项定制策略，也需要独立商业模式的干预。

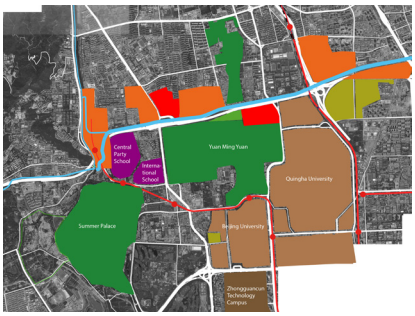
Tshinghua University as one of the stakeholders to activate Qinghe river

photo: www.tsinghua.edu.cn

清华大学是清河周边地块非常活跃的业主。

Firstly, as part of the Qinghe River Regeneration project and to increase the river capacity, the riverbanks must be cleared from obstacles and buildings within a 70-meter zone. This leads to opportunities for riverfront development with linear parks, attractive quays and leisure activities. Combining these public investments in integrated projects is more cost-effective than investing in stand-alone projects.

Secondly, based on analysis of frictions in the existing traffic networks, an overall mobility strategy can be developed to improve multimodal connectivity and accessibility of the area. Slow traffic roads parallel to the river that connect to the crossing system of metro lines, create opportunities for TOD development, walkable neighborhoods and leisure usage of the riverbanks. This increases value of the area and creates opportunities for value capture for the local government.



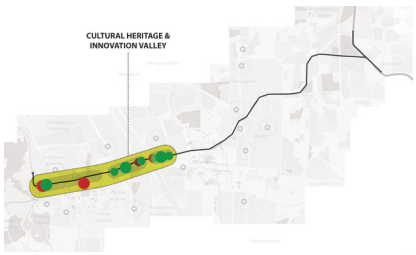
Today: Qinghe and the campus are isolated

现状：清河与大学校区较为隔离

Thirdly, the proposed development strategy is based on a conceptual public-private multiple business model for the entire Qinghe River Regeneration and Area Development project in order to balance public and private investments and revenue. The overall development can be subdivided into separate projects and interventions with separate business cases and profitability targets. While the general aim is to create a healthy, sustainable and attractive area around the river, not every part of the river requires collaboration of the same stakeholders, nor contains the same strategic elements. Based on differences in local qualities, potentials and stakeholder participation, four separate development sub-clusters can be defined. Each sub - requires a customized strategy with interventions tied to separate business models.

文化遗产与创新谷

在清河区的最西端区域中，开展了河道两侧附近区域的利益相关者的互动。北方地区将受益于额外的跨河文化景点，如颐和园和圆明园。若连接良好，那么这些壮观宏伟的公园将会有助于提高沿河的活力和吸引力。夜晚，当地的餐馆、酒吧和其他休闲设施将可以吸引游客，从而在一定程度上提高公园的吸引力，加强当地经济、地铁系统的使用。以及有助于防止交通拥堵和二氧化碳排放量。同时也为沿河和北京清华校园之间建立了良好的联系。河岸可以成为大学公共空间的一部分，也可以开发成为该区域办公酒店及住宅的辅助休闲景观空间。该校区的发展也可以促进该城市这一板块的知识型经济，以及该区域的项目研究和创业公司的发展。仅举一例，水系、水资源管理、河道生态以及城市更新间的联系，将会成为由大学生主导的，以教育为目的的创新项目的一部分。

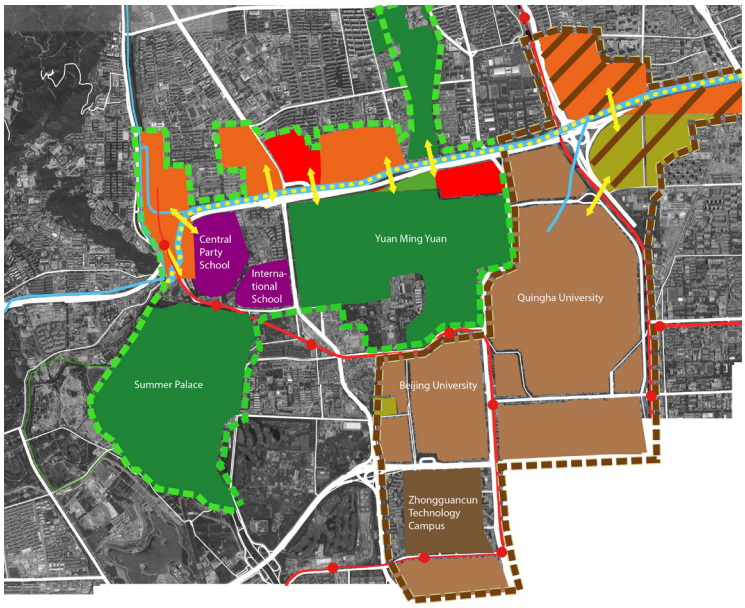


Beijing University developed as an innovation valley with strong relations to the river.

发展由北京的大学组成的创意谷构成较强的与清河间联系

Cultural Heritage & Innovation Valley

For the most western cluster of the Qinghe River area, interaction with nearby stakeholders on both sides of the river is proposed. The northern areas will benefit from the additional river crossings to the cultural sites such as Summer Palace and Yuan Ming Yuan. If well connected, these magnificent parks will contribute to the vibrancy and the attraction of the riverfront. In the evening, local restaurants,



Strategy: create connections between campus and riverside and join forces to enhance the river front identity

策略：建立校园河边之间的联系，形成合力，提升了河边地块知名度

Public parks transform anonymous riverbanks to active public space, added value for the area

公共开放公园将河流周边地块激活并且使得周边地块增加额外价值

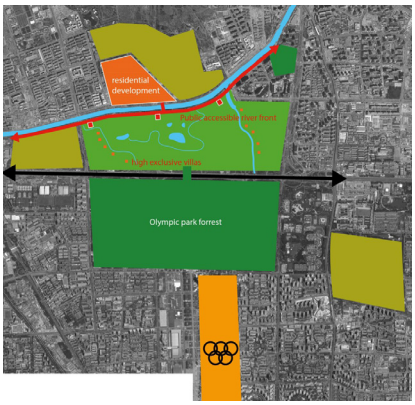
bars and other leisure facilities can keep visitors in the area which benefits the park's attractiveness for tourists, the local economy, usage of the metro system, and helps to prevent traffic jams and CO2 emissions. Good connections between riverside and campuses of Beijing and Tsinghua University are proposed as well. The riverbanks can become part of the public space of the campuses and universities can be invited to develop conference hotels and short stay residential facilities in this area. This campus development can also boost the knowledge economy in this part of the city with research programs and startups in an attractive setting. As just one example, the river system, the water treatment, the river ecology and the relation with Urban Regeneration can become part of an innovation program with educational purposes, led by the universities.

奥林匹克森林公园

与奥林匹克森林公交界，清河穿过了北京的南北轴。较好利用了森林公园的南部也与奥林匹克森林公园的联系。北五环的公园是孤立且未充分利用的区域。通过创建一个有吸引力的公共河岸公共区域可以将背面也转变为了正面。沿河慢行交通将会加强该沿岸区域的发展。因休闲功能设施和休闲服务的发展所带来的收入将大于建设成本。早期阶段中，森林中高级私人别墅为整个项目提供了收入保障。这也在一定程度上降低了林业维护成本,与此同时也从日趋增长的财产价值中的保证了财务税收。

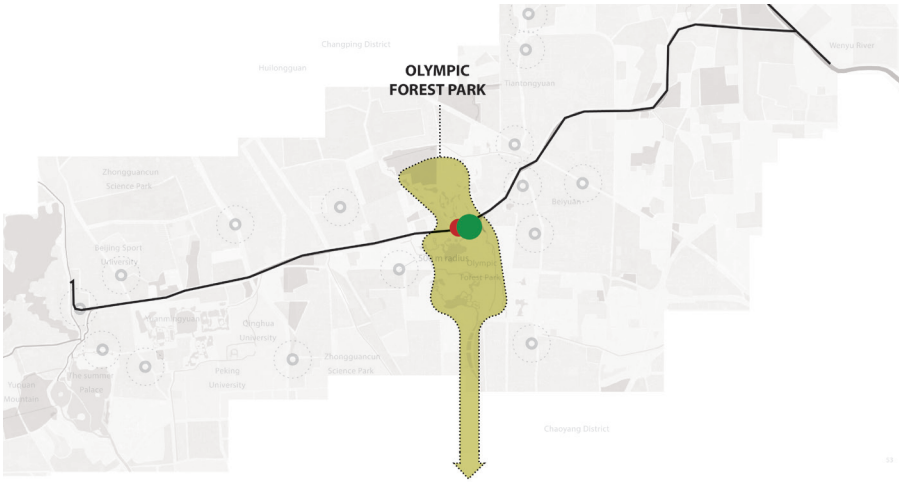
Strategy: create a public riverfront to add value to the northern Olympic forrest park

策略：创造更多的河岸空间来为奥林匹克公园增加更多的使用价值



Olympic Forest Park

At Olympic Forest Park, Qinghe River crosses Beijing's north-south axis. The southern part of the forest park is well-used and well-connected to the Olympic site. North of the 5th ring roa,d the park is isolated and underused. By creating an attractive and publicly accessible waterfront to Qinghe River, this back side is turned into a front side. Slow traffic connections along the river can enhance this riverfront. Revenue from the development of leisure functions and recreational services will cover construction costs. The development of highly exclusive villas in the forest generates revenue in an early stage of the entire project. This also reduces maintenance costs for forestry, improves the overall quality of Beijing for businesses, and generates taxes from increased property value.



Olympic forest park, where the Qinghe river and the North-South axis of Beijing meet

奥林匹克公园位于清河与北京南北中轴线交汇处

居住区公园

清河居住区的发展空间非常有限，邻近社区主要为高端住宅区。70米的无障碍区可以作为具有休闲与商业功能的线性公园。现有法律允许的条件下开发地下商业，可以给予商业开发提供支持。如果设有地铁系统和非机动车网络，那么清河的街道规模可以缩减为单向交通街道，并且可通过获得的公共空间将交通街道转变为可以与周边公园、河流相连接的公园街道。这样有助于减少热岛效应,改善雨水渗透,减缓交通压力以及增强公共区域的利用率。这些规划中的措施提升了北京居民和企业的环境质量,而且也可以通过税收征收来提升经济价值。

Residential District Park

In this part of Qinghe River, room for development is very limited. Adjacent neighborhoods consist mainly of expensive residential areas. The 70-meter obstacle-free zone can be developed as a linear park with recreational and commercial

High value residential areas without river connections

photo: OKRA landscape architects

昂贵的住宅校区，却缺乏与河岸的必要连接

Residential district park

公园步行区

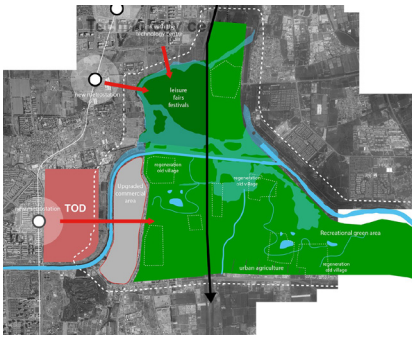
Today: quality public space consist of isolated pockect parks. There is no interaction between neighborhood and river
Strategy: park streets and river parks are developed to create a green network.

现状：公共空间，公园。有河流附近的地块缺乏相互作用

策略：公园街道和沿河公园的开发，可以创造绿色网络

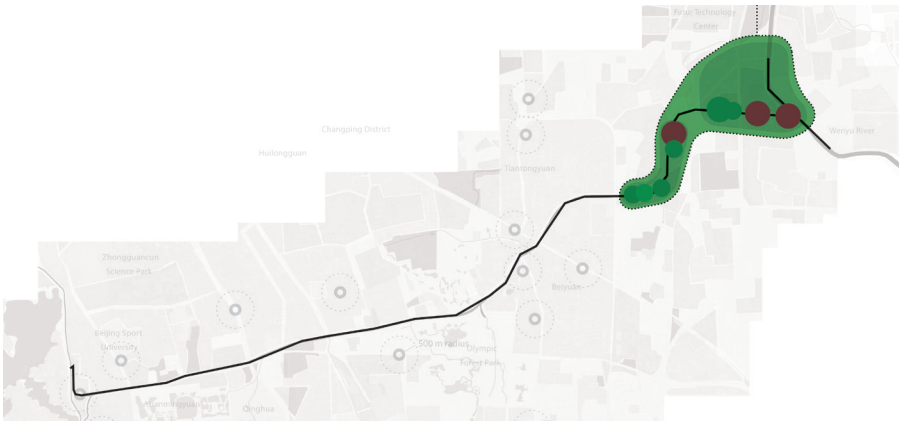
The large green waste land area of the Qinghe river estuary.

清河河口地区大型湿地区实景



Today: upportunities for a mixed ecological wetland park in adjacent areas

如今：清河河口湿地公园面临许多发展机会



The wetland park as part of the Qinghe river estuary

湿地公园作为清河河口的一部分

functions. Underground commercial development is possible within current legislation and can be applied if commercially feasible. Streets perpendicular to Qinghe River can be downscaled to one-way traffic streets if accessibility is improved by the metro system and non-motorized networks. Gained public space can be used to transform the mineral streets into park streets connecting to neighborhood parks and the riverfront. This benefits the residential area, helps to reduce heat island effects and improve rain water infiltration, and slow traffic connectivity and accessibility of the area. These interventions improve the quality of Beijing for inhabitants and businesses and lead to an increase of property value which can be collected by taxes.

混合型生态湿地公园

湿地公园的开发是清河流域防洪规划中的一部分。原计划是清除该地区自然形成的障碍物，为现有人口和生态公园的建设提供足够的空间，当然同时这里也可以作为北京居民的休闲设施区。本次研讨会的主题就是关于如何扩大湿地公园，以及通过采用大型文化、体育活动来提高其娱乐性，而这对于一个商业案例来说也会是一个坚实的基础。附近的地铁站可以在不造成交通堵塞的情况下达到吸引游客的目的。通过发展车站附近的TOD,最大可能性的提高地铁网络的使用价值。

Mixed Ecological wetland Park

The development of a wetland park is part of the flood protection plan for Qinghe River. The original plan was to clear the area from obstacles, outplace the current population, and develop an ecological park which can also be used as leisure facility by Beijing's inhabitants. The workshop generated ideas about how to enlarge the wetland park and improve its recreational use with large cultural or sports events, which is also a solid basis for a business case. A nearby metro station can be used to attract visitors to the area without creating traffic jams. With TOD development around the station, accessibility via the metro network can be improved.

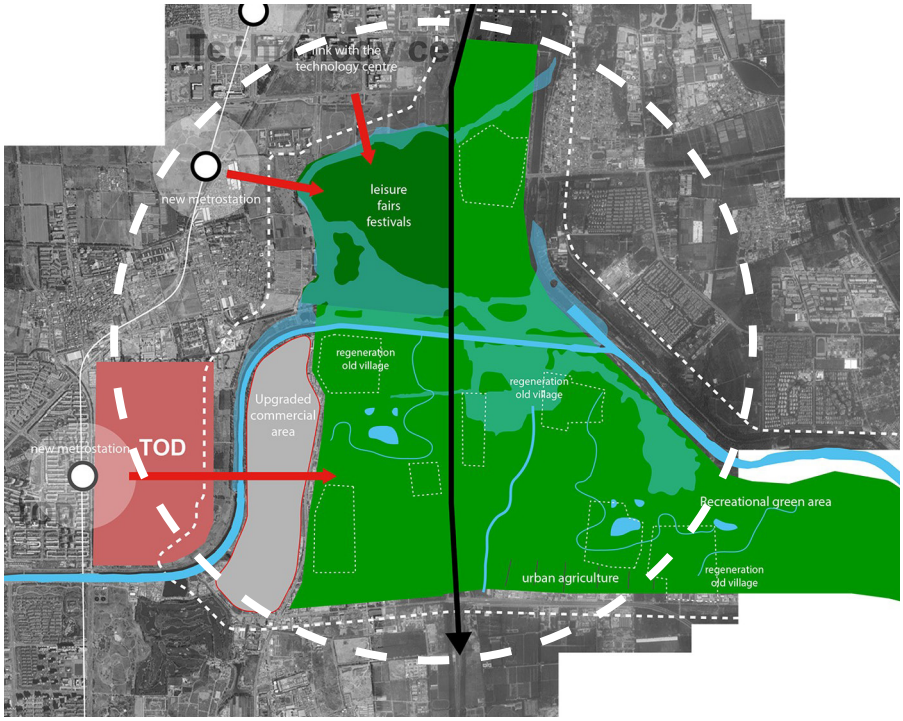
重建清河村

在清河和大部分的湿地公园的周边区域，有许多尚未规划的村庄。根据传统的规划方法,这些村庄大多数将在未来重新安置，从而达到防汛计划顺利实施的目的,但是这种规划做法是非常昂贵

的。而另外一种策略则是对村庄进行保留和改善并将之转化成为催化剂，激活一个充满活力的可持续发展城市。

Qinghe Villages Reactivated

Along Qinghe River and in most of the wetland park area, there are many non-planned villages. According to the traditional planning method, most of these



Strategy: intensify activities and leisure in the wetland park, take advantage of the adjacency connectivity

策略：利用邻近优势连通性，加强发展活动、休闲于一体的湿地公园。

Mixed functions in the park for permanent and flexible use.

混合使用功能公园具有十分高的功能灵活性可供使用

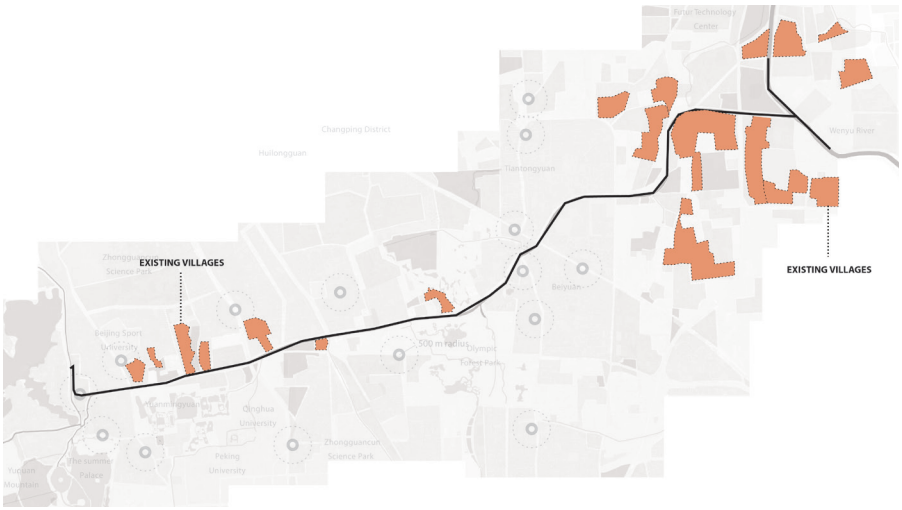
villages have to be relocated to implement the flood prevention plan, which is very costly. An alternative strategy can be to keep and improve the villages, and to transform these into decentralized catalysts for a vibrant and sustainable city.

一定程度上的通过提高容积率和空间置换使用权,即使没有大规模的政府投资，这些村庄也可以进行自我改善提高土地价值。如果业主认为有必要为他们的财产增加附加值，如扩展他们的业务，那么也可以做出特殊批准。而作为置换条件，政府将会得到一些税收来改善农村基础设施和构建防洪堤坝。如果业主放弃改造机会，那么他们也可以将他们的权利转让给他们的邻居，从而增加邻居的改造范围。有了这样的收入，每个业主都可以提高自身的财产数量和村庄的集体利益。通过这种方式村民们在发展中成为了实际的参与者，同时改善了该区域，增加了湿地的表面积、提升雨水收集率以及将北京发展成为一个对居民和企业都有吸引力的城市。

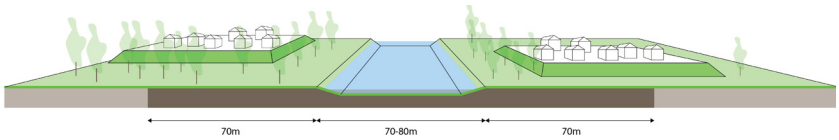
By raising the allowed Floor Area Ratio (FAR) and introducing transferable air rights, these villages can improve themselves, even without big government investments.

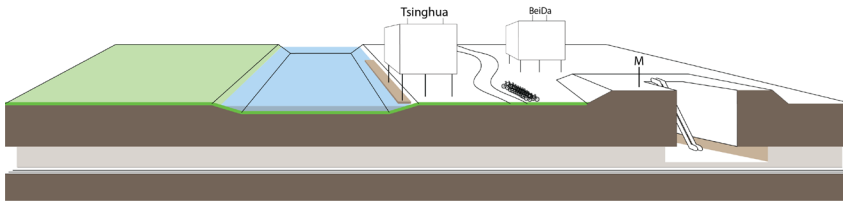
Exsisting villages in along the Qinghe River

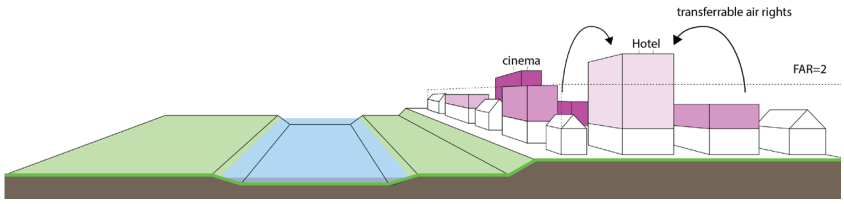
沿河地区现存村庄范围

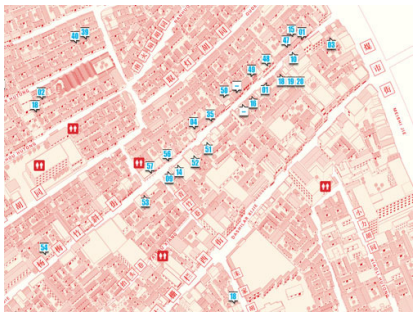


Raising FAR increases land and property value. If owners have the need to add a few stories to their property, for example to extend their business, they are allowed to do so. In return, the government gets paid to improve village infrastructure and build dikes against flooding. If owners do not want to use the opportunity, they are allowed to sell their rights to neighbors who can add these to their own rights. With such revenues each owner can improve the quality of his property with a collective benefit for the village. With this method, villages become active participants in the development and improvement of the area, simultaneously creating the opportunity to increase the surface of the wetland, improve rainwater harvesting and boost the quality of Beijing as an attractive city for people and businesses.









Interventions to preserve, protect and activate villages

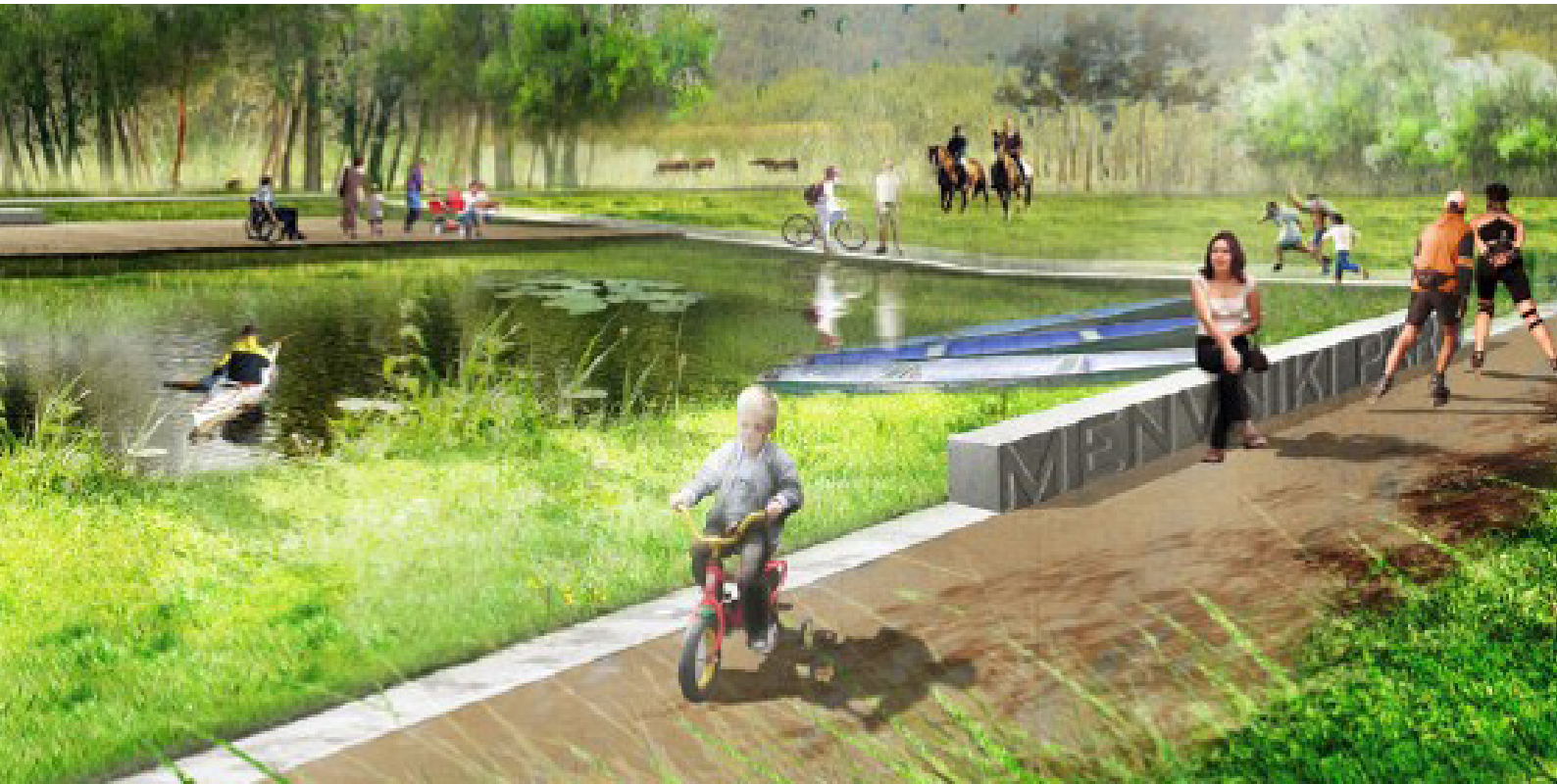
Source: Beijing design week 2015 Dashilar

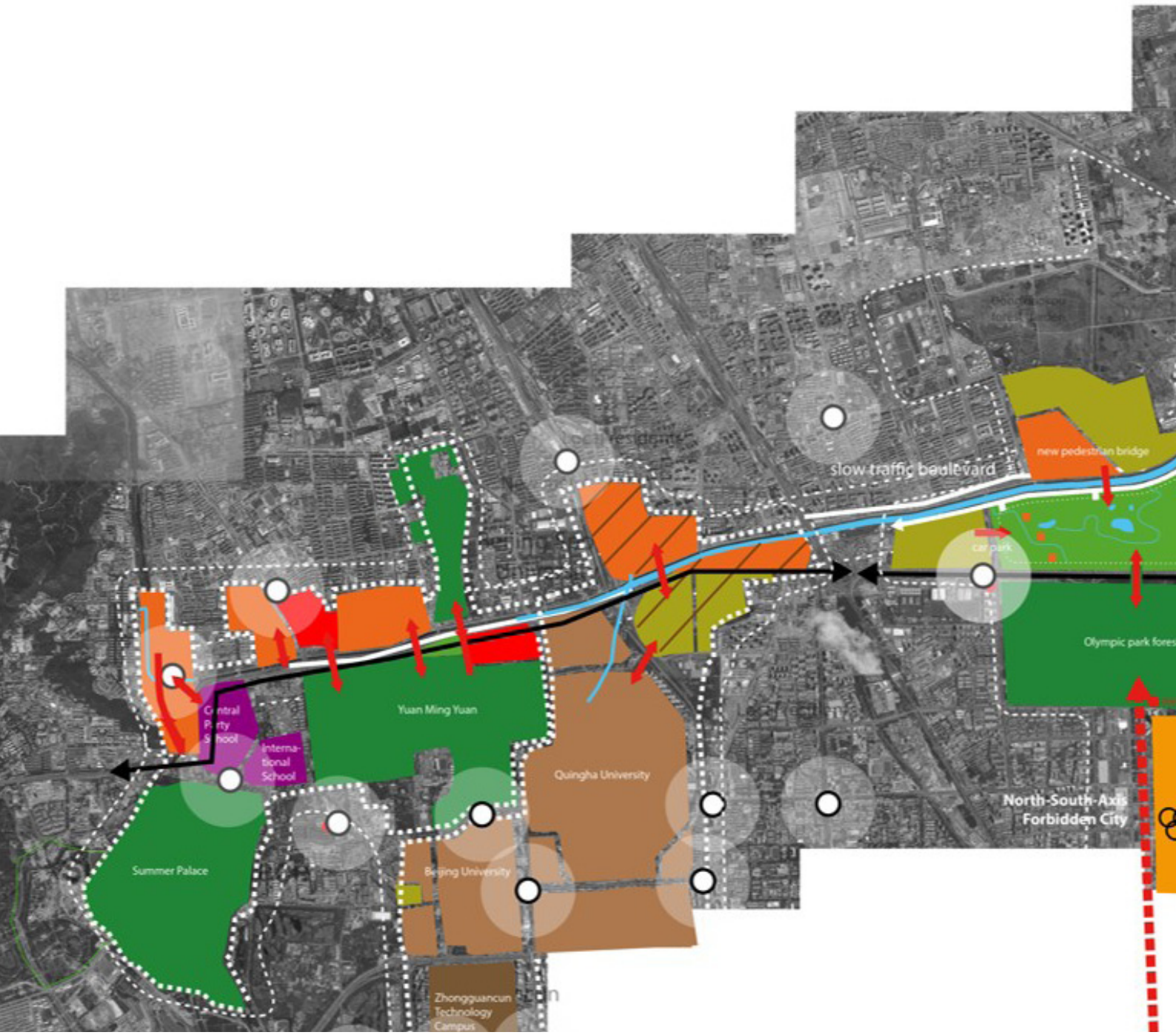
保存、保护、激活原始村落或聚落

资料来源: Beijing design week 2015 Dashilar

Existing villages benefit from and contribute to the improvements in the four strategic areas.

现存村庄从框架策略中获利并为完善地区发展贡献自身力量




slow traffic boulevard
new pedestrian bridge
car park
Olympic park fores
Yuan Ming Yuan
Quingha University
Beijing University
Summer Palace
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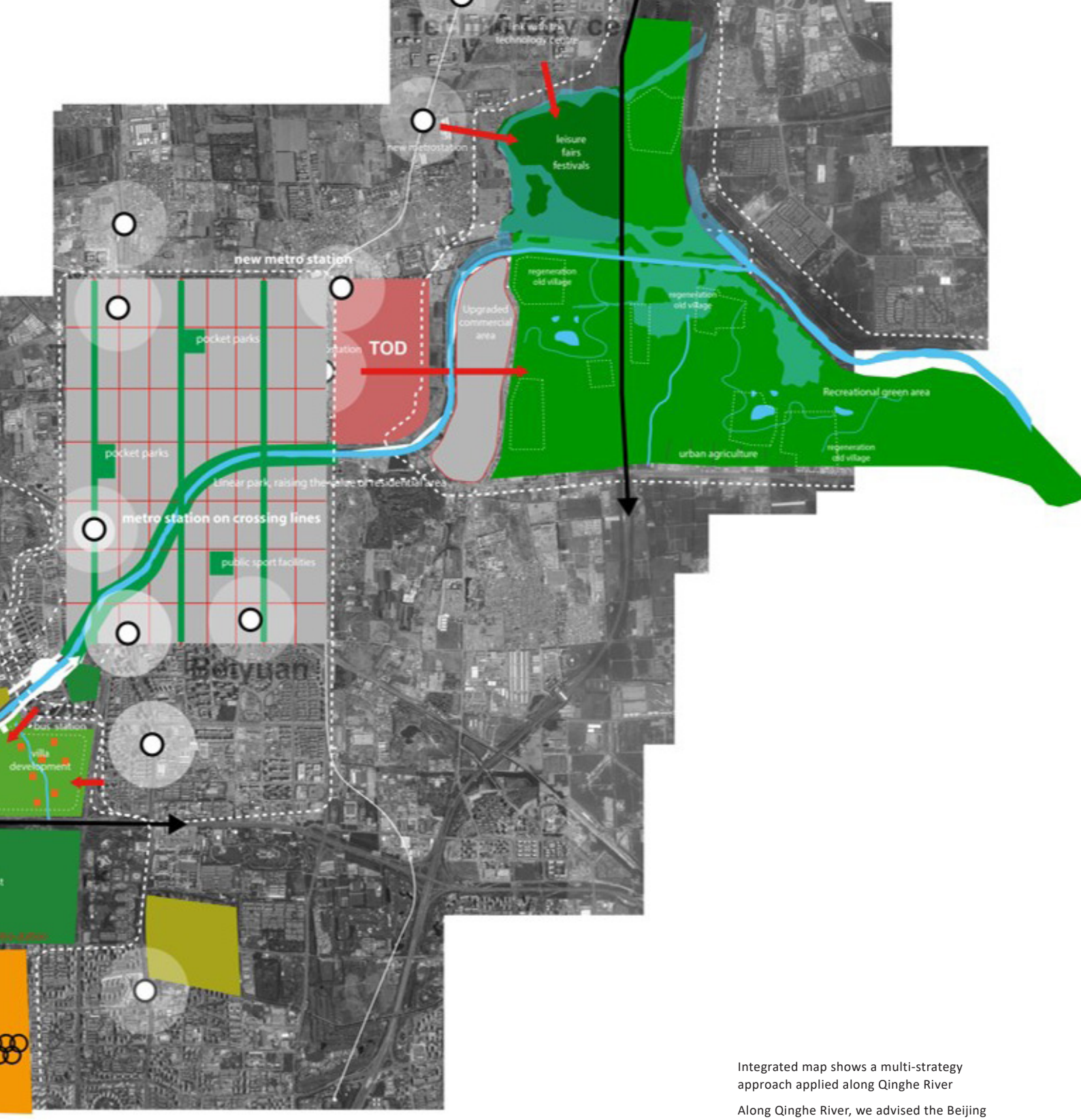
School
North-South-Axis
Forbidden City
Zhongguancun
Technology
Campus



Integrated map shows a multi-strategy approach applied along Qinghe River

Along Qinghe River, we advised the Beijing universities area to: develop into an innovation valley; create more waterfront public space for Olympic Forest Park; make a comfortable walking/cycling path for the residential district; rebuild villages along Qinghe River; and activate the wetland park in the east.

多重发展策略沿清河流域发展

沿着北京清河，我们建议北京大学区构建“创意谷”；为奥体公园森林增加更多的河岸公共空间；为周边的居民区设立有效且舒适的步行网络和自行车专用路线；重建清河流域的村庄聚落并且激活位于东侧的湿地公园。

TOWARDS2050 #3: PROGRAMME AND PARTICIPANTS 2015

WEEK 1: 13-18 SEPTEMBER: RESEARCH BY DESIGN ON NEW BEIJING EAST STATION IN TONGZHOU AND ITS SURROUNDING AREA

Assignment
Research by design for future development at Qinghe Station and its surrounding area

Theme
Smart MicroCity and Transit Oriented Development

Sunday 13 September	Briefings and site visits
Monday 14 September	Briefings, site visit, workshop
Tuesday 15 September	Research by design workshop, visiting critics
Wednesday 16 September	Research by design workshop
Thursday 17 September	Research by design workshop

Public event:

Friday 18 September	Presentation of results & network party

Commissioned by
Creative Industries Fund NL, Rotterdam
Beijing Municipal Commission of Urban Planning, Beijing (BMCUP)

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Beijing Institute of Architectural Design

Tsinghua University

Beijing Water Investment Center

World Bank, Beijing Office

VenhoevenCS architecture+urbanism

Fakton

The Cloud Collective

Grontmij

OKRA

NEXT architects

Delft University of Technology

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Benthem Crouwel Architects

Deltametropolis Association

GROUP A

Tauw

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Beijing Design Week

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Fakton
Hanzehogeschool Groningen University of Applied Sciences
Grontmij
NEXT
Tauw
THE CLOUD COLLECTIVE
BNA Royal Institute of Dutch Architects
GROUPA
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DutchCulture centre for international cooperation
transitionLAB urban innovation / strategy / design
清華大學 Tsinghua University
BIAD 北京市建筑设计研究院有限公司 BEIJING INSTITUTE OF ARCHITECTURAL DESIGN
HLN
北京水务投资中心
WORLD BANK GROUP
BNTHMCRWL
OKRA
TU Delft

WEEK 2: 20-26 SEPTEMBER: QINGHE RIVER WORKSHOP, THE NETWORK CITY AND THE NEXT CITY

Assignment
Qinghe river regeneration, urban regeneration potential, governance and business model

Sunday 20th September
Site visit Qinghe river

Monday 21th - Wednesday 23th September
Workshop Qinghe river with BIAD, BWIC, World Bank, Netherlands Environmental Assessment Agency, Dutch Ministry of Infrastructure and the Environment.

Hosted by Beijing Institute for Architectural Design
Partner Towards2050
Location: BIAD

Participants
Ton Venhoeven (VenhoevenCS architecture+urbanisme), Gubai Li (VenhoevenCS architecture+urbanisme), Adam Visser, GROUP A), Arnoud de Waaijer (architectenbureau de Waaijer), Merten Nefs (Deltametropolis Association), Daniel Jongtien (Benthem Crouwel Architects), Nanet Rutten (Grontmij), Gert Kwekkeboom (The Cloud Collective), Wopke Schaafstal (Next architects), Roberto Cavallo (Studio-AI), Bart Dijk (OKRA landschapsarchitecten), Albert Hutschemaekers (City of Utrecht), Robert van Ieperen (Fakton), Paul Gerretsen (Deltametropolis Association), Zhou Qing (BIAD), Paul Procee (World Bank), Chinese Participants.

Commissioned by
Creative Industries Fund NL, Rotterdam
Beijing Municipal Commission of Urban Planning, Beijing (BMCUP)
Beijing Water Investment Centre (BWIC)

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Bart Dijk, OKRA landscape architects

Visiting Critics
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Ton Dassen, Netherlands Environmental Assessment Agency, The Hague
Marijn van der Wagt, Dutch Ministry of Infrastructure and the Environment, The Hague

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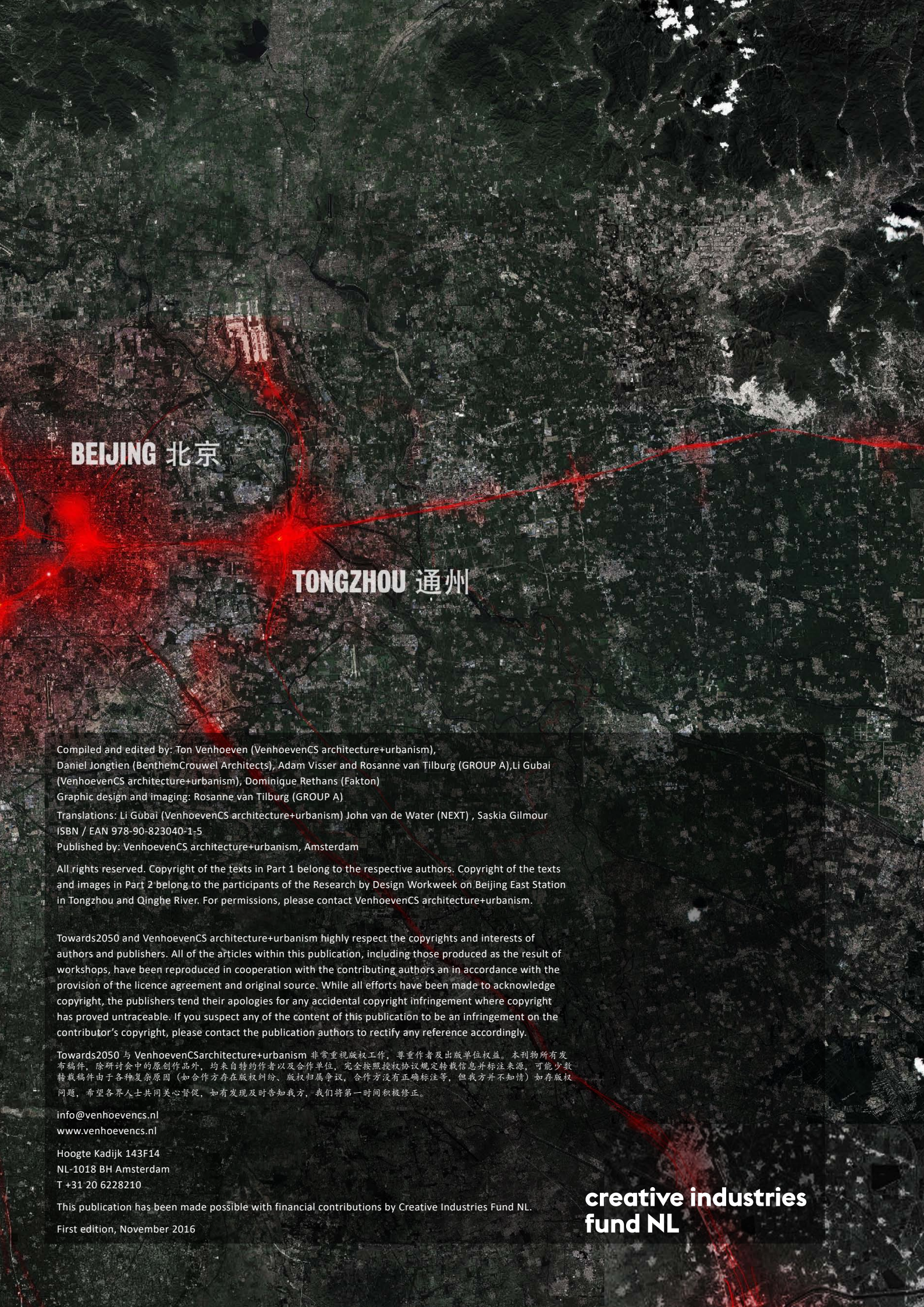
Nanet Rutten, Grontmij, De Bilt
Bart Dijk, OKRA landscape architects, Utrecht
Dominique Rethans, FAKTON, Rotterdam
Executive organizations: Beijing Institute for Architectural Design, Beijing (BIAD)

Wednesday September 23rd – October 31th 2015
Exposition: 'NETWORK CITY, the way ahead'
Organizers: Ton Venhoeven, Arnoud de Waaijer and Roberto Cavallo (TU Delft)
Location: Next City Living Lab, The Nurturing House Dashilar, o. 21 Sanjing Hutong, Xicheng. District Beijing Beijing.

Thursday 24th September 2015
Expert meeting: 'NETWORK CITY, the way ahead'
Organizers: Ton Venhoeven, Roberto Cavallo (TU Delft) and Arnoud de Waaijer.
Location: Next City Living Lab, The Nurturing House Dashilar, o. 21 Sanjing Hutong, Xicheng. District Beijing Beijing
Speakers: Wu Weijia, Paul Gerretsen, Albert Hutschemaekers, Floris Boogaard & Zhou Qing.

Friday 25th - Saturday 26th September 2015
The Next City Sponge City, Urban Regeneration. Country vs City, bottom-up urbanism.
Host: CBC/The Next City
Location: Nurturing House

Saturday 26th September
Design for China
Host: UED
Location: China Millennium Monument



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