

Wusong Riverfront: Landscape Infrastructure Pilot Project

吴淞滨河景观基础设施试验性项目

Project Statement

Guided by a regional riverfront restoration vision, a water treatment pilot project is being implemented upon reclaimed post-industrial borrow pits and a degraded water network. Monitoring and in-field adjustments to the design and implementation will inform the future phases of work. The project will serve as a model for landscape infrastructure supporting wild-life habitat, public education, and economic growth along the Wusong River corridor.

案例简介：

项目位于昆山吴淞江沿岸。原有基地受后工业时期生产和工业运营的污染，基地内沦陷为坑洼不平的取土坑和浑浊的水网，修复和重建这片滨水空间，使土地价值和环境品质得到更好的利用刻不容缓。我们接触并完成了这个环境修复和重建的景观项目。设计对现场水体的处理，结合持续的考察和实验，使项目的处理周期、阶段和成果为整个区域提供了可借鉴的科学数据和生态恢复手段。在完成基地内水处理的同时为其他区域发展提供了可生长的模数化案例。整个地块内的设计从生态方面着手，为动物提供了野外生存的环境，使这片区域成为一个重要的科考教育基地，为吴淞江沿岸长廊远期的规划和发展提供了示范引导作用，从而为经济文化环境发展带来质的飞跃。

New and innovative. One of the best projects this year, from the constructability to the analysis that shows what you're thinking about and a hint of how you can do it."

—2012 Professional Awards Jury

新颖、创新！本年度最好的项目之一，无论从项目的可操作性和分析的过程来讲，都给大家展示了该设计团队对类似项目的处理思维以及他们最终如何完成项目的具体过程。

—2012年 ASLA 专家评审团

Project Narrative:

项目介绍

Building Upon a Water System

Wusong River is the major water transportation corridor of the Northern Yangtze River Delta. Due to this logistical advantage, scattered industrial uses have taken over the riverfront, replacing the fish-farm villages that were once the identity of Huaqiao township. Over decades of unplanned utilitarian uses, and discharge from factories, farm land and adjacent development, the River has become an environmentally degraded drainage ditch. In addition, the

proximity to metropolitan Shanghai has brought unprecedented population and business growth to the area. The Huaqiao municipality saw the inevitable urbanization trend as an opportunity to restructure its land use, and regain their water-town identity. The Planning Bureau hosted a competition for a regional and first phase development plan, with the goal of supporting the area's robust economy, creating public open space, and restoring/conserving the environment along the Wusong River.

The design team's winning proposal established a water treatment landscape infrastructure to address the obvious water pollution. The first step made water quality the primary focus, suggesting that improved water quality would in turn make possible re-vegetation, habitat creation along the banks, and integration of recreational and social programs and finally human habitation of a formerly degraded water network.

After being awarded the commission, a year-long comprehensive analysis was undertaken by a collaboration between the lead landscape architect and affiliated consultants, including water-quality scientists, wetland biologists, hydrology engineers, architects and developers. The detailed study of the water body, its watershed and impacts of anticipated development helped inform and refine the original plan. The 95-hectare (235-acre) first phase at the key oxbow portion then started its construction at the upstream treatment pilot area.

The Pilot Project — Integrated Design and Planning Process

The site study found that the site was riddled with excavation pits left by a former brick factory, inundated by untreated surface runoff from adjacent parcels, and the river water was unsuitable for most waterfront programs. The design established a treatment flow rate capable of treating Class V water (the lowest water quality classification in China) to Class III water (suitable for recreation). Recognizing the limits of wetlands alone for treatment, the design integrates passive (treatment wetland processing) and active (fine diffused air in aeration ponds) water treatment technologies to achieve the water quality goals.

As part of the unique analysis and design process, the park is currently being constructed as a series of pilot projects. The importance of the pilot project approach is that information gathered from site specific monitoring of built portions informs the design refinement of future stages. This is especially critical in determining water budgets, pump controls, plant establishment and anticipating seasonal changes. Linking the planning process with design and construction thinking strengthens and enriches the eventual built project.

The pilot project is sited upstream of future development parcels, and intakes both river water and municipal stormwater outfalls. The system mimics a wide variety of natural processes and acts as the "kidney" for the river, cleaning sludge and industrial effluents discharged into the river upstream, extending the benefits of the park downstream to a larger region. A sequence of pools

and channels remove targeted pollutants through settling, filtration, aeration, and bio-processing in alternating oxic and anoxic environments. The goal-oriented hydraulic design/engineering further explores landscape based techniques for achieving treatment objectives, including estimating residence time and flow rates, manipulating velocity and volume through grading, and avoiding stagnation. A 'retrofitting' approach to design was proposed, in which the water treatment cells were designed to fit into the existing site contours, balancing cut and fill for soil conservation. For example, excavation pits were preserved and utilized for the aeration process, while treatment channels were graded to let water filter through wetland plants over the longest paths. While the purification process was precisely calculated, the system is designed to be flexible to accommodate flood and drought conditions. Planting design derived from the plants' spatial qualities and a temporal succession strategy whereby cleansing plants, requiring high-nutrient water, would give way to other species once water quality had improved.

Synergy Between Environment and Development

The design of the new water-treatment system also considers user experience and emphasizes public education. In the Treatment Wetland Park, built upon the initial pilot project sites, ponds and channels are conceived as a series of gardens and open spaces, based on functional uses. For example, a sediment pond is also a reflection pool; a treatment channel becomes a stone garden and bird blind lounge; and the aeration process is artistically expressed as ripple and bubble pools. A promenade runs the length of the Treatment Wetland Park, connecting the variety of programmed spaces and distinct landscapes, weaving together the story of the water-purification journey. In this way the design is an educational experience, where the community can witness the process of water cleansing, in a way not available with typical closed pipe engineering solutions.

After the water is purified in the Treatment Wetland Park, it flows into the future development areas of the business district: the inner bay campus, the marina recreational zone and canal walk shopping area. The inner bay includes diverse habitat types, maximizing enjoyment of the water's edge and integrating varied experiences of the water for residents, visitors and workers. By scaling the water infrastructure to occupy less than one-third of the site, the design ensures that all future buildings will have direct access to the cleaned water, greatly increasing the value of the overall development, for social, aesthetic and recreational benefits.

The water cleansing system will serve as a model for responsible development along the river, introducing constructed wetland technology to the region in a built form and expanding current perceptions of designed landscapes from passive ornament to active, complex systems capable of providing ecosystem services and enacting change. The Wusong Riverfront Business District will

begin its next-phase of construction in 2012, with a ten year overall build-out, developed upon the landscape infrastructure established in the park.

Client's Testimony

“The pilot project significantly increased the value of the surrounding development parcels in the area, where true accessible waterfront properties are hard to find.”

— Zeng Yuxiang, Director of Planning Bureau

“The design team's visionary scheme showcased the solution for the regional issue, and triggered the awareness and action of wetland sites along Wusong River. We're proud to be part of the movement.”

— Xu Ting, Chief Engineer

建于水系统之上的项目

吴淞江是长江三角洲北部一条重要的水运通道，因其独特的地理区位优势，河道沿岸布满了众多的工厂，从此，昔日闻名遐迩的花桥“鱼米之乡”便不复存在。经过几十年无计划、急功近利的开发，大量工厂废弃物、农田排放物让这条河道彻底沦为环境退化的排水沟。同时，作为上海的后花园，人口和经济的快速增长给这片区域带来了空前的压力。花桥政府当局审时度势，准确定位，这不可阻挡的城市化进程同时也给吴淞江沿岸重新定位发展带来了机遇，改善土地利用结构，修复生态，重新寻回昔日“鱼米之乡”不无可能。花桥规划局主持了对吴淞江滨河景观一期工程的设计竞赛，希望通过对吴淞江滨河区域的设计修复来创造一片新的开放空间，为沿岸的经济、文化、环境发展带来新的动力。

我们设计团队的设计理念在众多的方案中脱颖而出，注重对水体污染处理的想法与政府领导的意见不谋而合，我们意在创造出一套水处理系统来彻底整治水体污染，对水体污染的处理将会修复该区域的生态圈，植物会逐渐生长起来，动物有了栖息之地，进而带来沿岸的娱乐和社会活动，最终重建一块美好的人居环境。

在接到项目之后，国内外各领域的专家齐集，我们进行了为期一年全面的调查分析，这些专家包括：水质科学家、湿地生物学家、水文学工程师、建筑师以及发展商。通过这次详尽深入的调查，我们确立了进行水处理的方案，之后我们决定先对 U 型河湾这片重点区域进行处理，然后再考虑试验区上游的景观。

试验性项目—将涉及与规划进程有机结合的过程

在调查中，我们发现这片区域表面布满了由制砖厂挖掘土壤留下的孔洞，以及相邻地块河流冲击的沉淀物，常规的滨水空间处理在此并不适用。