



POLITECNICO
DI TORINO

Honors thesis

ARCHITETTURA COSTRUZIONE E CITTA'

This thesis is part of a broader research, started with the Joint Workshop done in Hong Kong to explore the relations between water and the public space at every scale, in order to foresee the consequences of a catastrophic event that could trigger a crisis on the urban water management infrastructure of Qianhai Bay, the so-called “Finger”. What came out was a picture of dramatic and extended vulnerability, connected to a situation of recurrent extreme meteorological events, as flooding and disruption, due to environmental and planning imbalances. Those considerations have led me to research the extreme urbanization process that is taking place in China, identifying a strict relation between the latter and the challenge of water management. The scientific research about the urban area of Shenzhen has revealed interesting insights into the water-related attitude and behavior of mega-cities populations, like in Shenzhen, presenting significant evidences of the dual- stresses that insist on the area. The Guangdong province presents the largest water-consumption trend, characterized by an increasing pressure on water resources due to the rapid industrialization and urbanization processes. On the other hand, the land reclamation process, that has become a common practice on a global scale, demonstrates to provoke significant influences on the groundwater flow systems, increasing water level. A further increase of the water level is expected in the next years on the Qianhai Bay, validating the speculations expressed in the initial workshop of potential flooding on the area. With a soil composition that does not allow water infiltration, the management of storm-water on the area has revealed a real challenge motivating me to find tools to provide a solution. Those considerations have called into question the urban layout and his resiliency where the “Finger” cannot foresee the water management. It shows a potential lack to operate out of the comfort zone, laying the foundations for a specific design solutions where the integration between the landscape and the urban environment that intend waste-water as a resource becomes a key element. Researching an integration between the aesthetic experience and the ecological dimension of the landscape, the potential widespread introduction of grey-water recycle and storm-water harvesting in the

urban environment has shown a valid solution to reduce the freshwater demand and the wastewater outflow. The result is an urban active component at a small scale, a “Sponge block”, that minimize the infrastructure system with on-site treatments performing a significant reduction of the storm-water action on the city surface, that prevent the rainwater to infiltrate in the ground by collecting it with green and porous pavements contributing to the well-being of the citizenship. The project shares some of the main principles of the sponge city, but shows also the restriction to apply them on the projects site: it involves an holistic view of the urban environment where every component of the city is involved and planned to perform coordinated resilient actions. However, the “Sponge block” acts as an incremental tool inside the urban environment that deviates from the holistic vision pursued from the sponge cities theories, presenting a local implementation of those principle that takes into account a site-specific approach. This project represents a solution for urban regenerations, that can be applied as relief to consolidated urban settlements that, despite all, suffer from potential threats related to storm-water management as the ones that insist on the Qianhai Bay. Specific conditions and contexts, as the ones articulated in this thesis, allow to implement this design solution to reduce the action of storm-water locally with a system able to address local water scarcity and management issues, to mitigate uncertainty, related to extreme conditions of future and existing cities.

An infrastructure-based approach to design scenarios in Qianhai Bay (China). Building with water

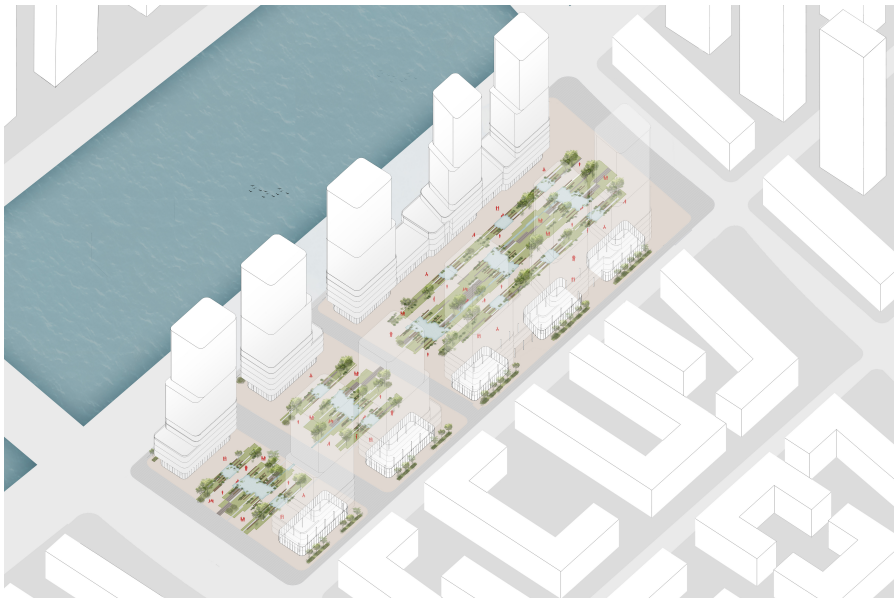
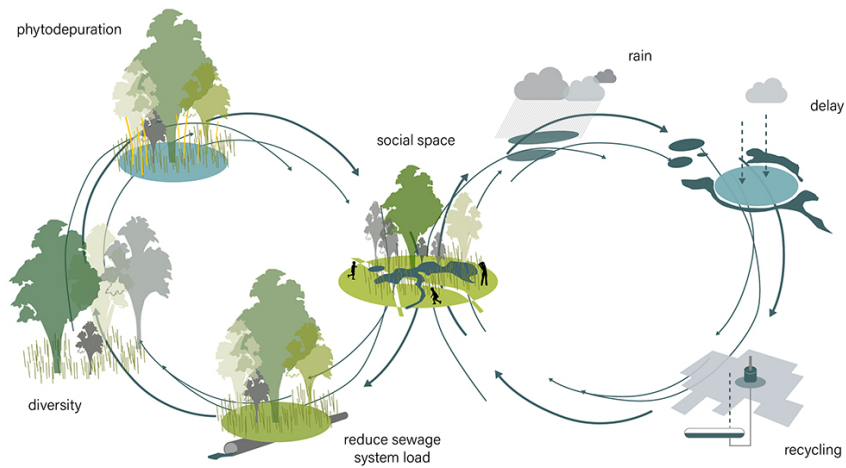
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