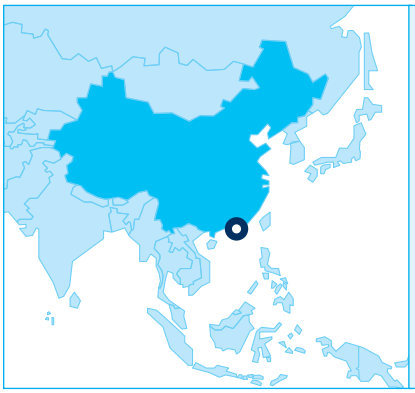
City Water Stories:
Shenzhen

the international water association



Population
- Population as of 2015 roughly 11.38 million.
- Expected to grow to 14.80 million in 2020 and 18 million in 2030.

Geography
- 6 districts and 4 new areas
- Shenzhen River in the south.
- Area: 1,997 km^2

Main challenge
- Rapid urbanization, water shortages and pollution.

Main solution
- Through the construction of "Sponge City", Shenzhen aims to minimize the impact of city development on the environment and to build a sustainable and healthy water circulation system in the future.

Solutions to Shenzhen's Resource Shortages

The city of Shenzhen was established in 1979, and in a swift 36 years, this tiny border town of just over 30,000 people has grown into a modern metropolis. However, rapid urbanization has brought with it many challenges, including serious water crises in the form of stormwater pollution, reduced environmental capacity and resource shortages. It has been estimated that Shenzhen will face shortages of 690 and 890 million cubic metres by 2020 and 2030 respectively.

Shenzhen is aware of these issues and is taking action, aiming to be an urban water leader among rapidly developing cities through the implementation of circular economy concepts and coordinating departments across the city. The city is also gearing up for the uncertain future that lies ahead, and has established a flood control program called the "Shenzhen Water Strategy." The four basic measures of the Strategy are the protection of water resources, the recovery of water in the environment, the guarantee of water safety and the enhancement of visible water. To complement this strategy, the city has also come up with "The Working Plan of Shenzhen's Flood Control and Water Improvement (2015-2020)", with the Sponge City concept as an important component for all future development.

A Sponge City in the Works!

Shenzhen has become one of the earliest adopters of the Sponge City concept, with the introduction of Low Impact Development (LID) in China. In 2004, the city began to implement concepts such as rainfall infiltration, retention, and storage in new construction projects. In 2009, these commitments were strengthened and relevant polices were enacted to ensure resilient planning standards. The city chose the Guanming New District as the demonstration zone for all things sponge-related. Work across municipal government sectors has since been coordinated, harmonizing Shenzhen's Water Strategy. Citizens are engaged through public hearings and knowledge sharing, and financing platforms have been created.

So what exactly has this demonstration area achieved? Guangming New Area has 26 LID projects within the new developments, residential and industrial areas, parks, and roads. For example, Guangming's People's Sports Center has been built with green roofs, rain gardens and pervious pavements, which have a capacity to capture more than 60% of annual rainfall. New roadways include sunken green spaces, permeable driveways, bicycle paths, and sidewalks. These adaptations will increase the drainage capacity and reduce runoff. As all of these projects and more are applied in the Guangming New Area, they can provide the adaptability and flexibility needed to gradually extend throughout the whole city.

Case Study: Futian River, a Liveable Urban Ecosystem

Futian River is located in Shenzhen Futian District and runs through the central area of the city. Unprecedented urban development resulted in severe urban water pollution and damaged ecosystems within the basin. The City addressed this issue through sewage management and a combination of water reuse and wetland purification systems. Sewage collection and treatment capacities were improved with a collection rate of 100%. Today, the indicators of water quality have reached the surface water quality requirements, with improved urban liveability and ecosystems.

Shenzhen

Shenzhen's Journey to Become a Water-Wise City

A closer look at how Shenzhen is satisfying the IWA Principles for Water-Wise Cities

1 Regenerative Water Services

Replenish Waterbodies & their Ecosystems
- ✓ Shenzhen Blueline Management Regulations.

Reduce the Amount of Water & Energy Used
- ✓ Shenzhen Water Conservation Regulations.

Reuse, Recover, Recycle
- ✓ Technical Specifications for Rainwater Utilization Engineering & Water Quality Standard of Reclaimed Water and Rainwater
- ✓ Nutrient recovery by sludge reuse.

Apply a Systemic Approach for Integration with Other Urban Services
- ✓ Sponge City Construction.

Increase the Modularity of Systems and Ensure Multiple Options
- ✓ Many projects concurrently aim to improve resilience as outlined in the Guangming New Area projects.

2 Water Sensitive Urban Design

Enable Regenerative Water Services
- ✓ LID facilities like rain gardens, wetlands, etc.

Design Urban Spaces to Reduce Flood Risks
- ✓ Flood Control Standards.

Enhance Liveability with Visible Water
- ✓ Futian River improved liveability.

Modify & Adapt Urban Materials to Minimise Environmental Impact
- ✓ Shenzhen promotes environmental friendly materials for buildings.

3 Basin Connected Cities

Plan to Secure Water Resources & Mitigate Drought
- ✓ Division of drinking water source protection areas.

Protect the Quality of Water Resources
- ✓ New wetlands, green infrastructure and more reduce water pollution, as seen in the Futian River example.

Prepare for Extreme Events
- ✓ Shenzhen Headquarters Office for flood control, drought, sea-level rise and typhoon preparedness.

4 Water-Wise Communities

Empowered Citizens
- ✓ Public hearings, online communication the environmental public interest litigation, etc.

Professionals Aware of Water Co-Benefits
- ✓ Water, urban planning, and landscape science experts working together.

Transdisciplinary Planning Teams
- ✓ The Urban Planning & Design Institute of Shenzhen (UPDIS).
- ✓ LID Research Centre.

Policy Makers Enabling Water-Wise Action
- ✓ Collaboration across sectors.

Leaders that Engage and Engender Trust
- ✓ Leaders are clear on Sponge City Vision and taking action.

5 Building Blocks for Shenzhen on the journey to water-wise cities

Vision

Through the construction of "Sponge City", Shenzhen aims to minimize the impact of city development on the ecological environment and to build a sustainable and healthy water circulation system in the future.

Governance

The Shenzhen Sponge City Construction Leading Group has led to establishment the "Implementation plan for Sponge City construction in Shenzhen".

Knowledge & Capacity

Introduced Low Impact Development concept from U.S. and hosted several workshops and conferences on it.

Planning Tools

Shenzhen Sponge City Specialized Plan

Implementation Tools

Guangming Low Impact Development Demonstration Area