CRC for
Water Sensitive Cities

Australian Government
Department of Industry, Innovation and Science

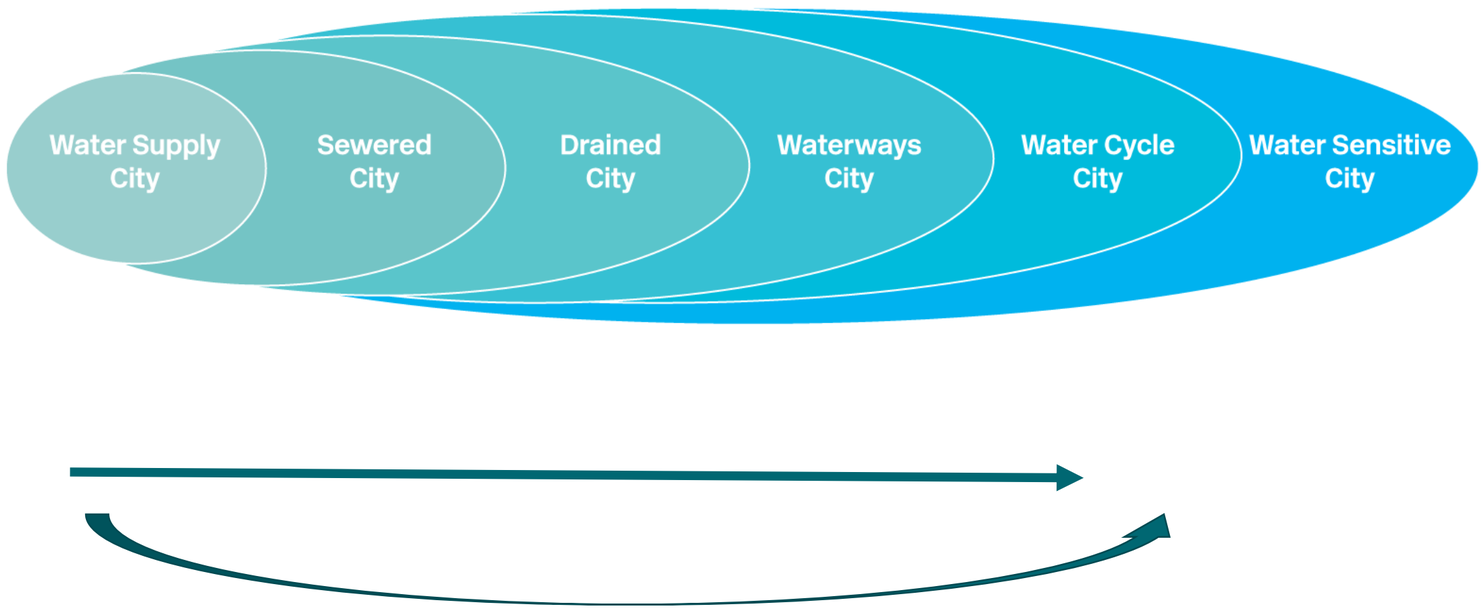
Business
Cooperative Research
Centres Programme

Water Sensitive Cities:

Examples of cities making the transition

watersensitivecities.org.au

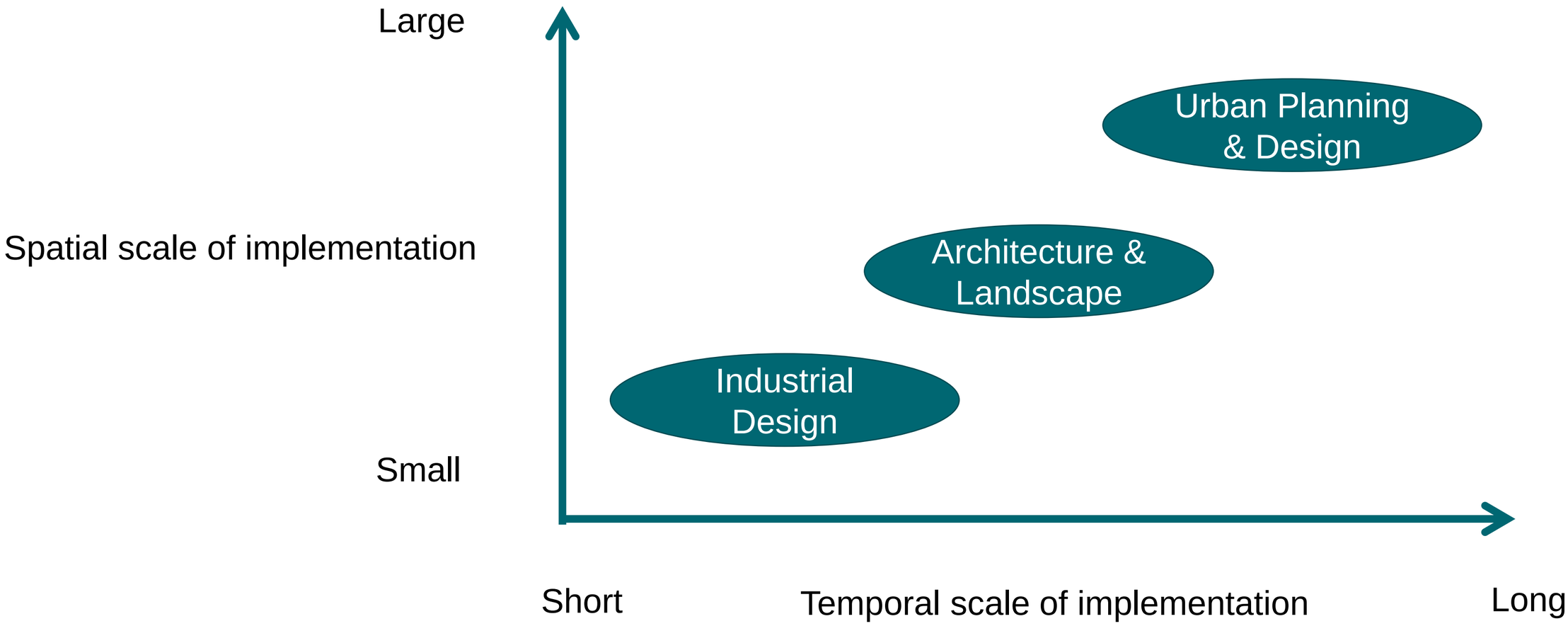
City transitions



Its possible to leapfrog the traditional evolution process by:

- Closer integration water resource management and urban planning
- A stronger focus on fit for purpose use of all sources of water
- Better use of natural assets (ecosystem services)
- Early engagement to align vision, pool expertise and resources and sustain effort

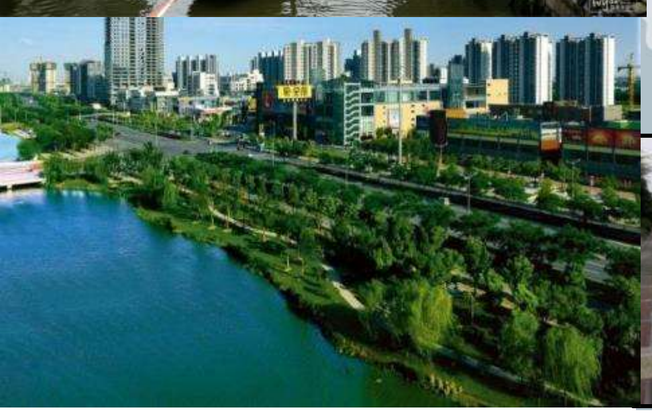
Large and small scale solutions for a integrated response

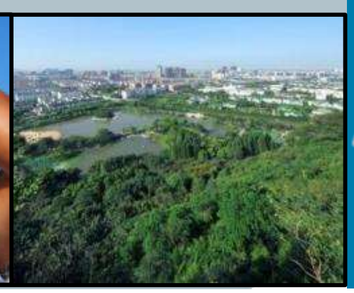


Example 1: A flood prone city

Kunshan (昆山) is a satellite city in the greater Suzhou region. Administratively, it is a county-level city within the prefecture of Suzhou. It is located in south easterrn part of Jiangsu Province, China, adjacent to the Shanghai Municipality. It has been regarded as the back-garden, and lately the back-office of Shanghai.

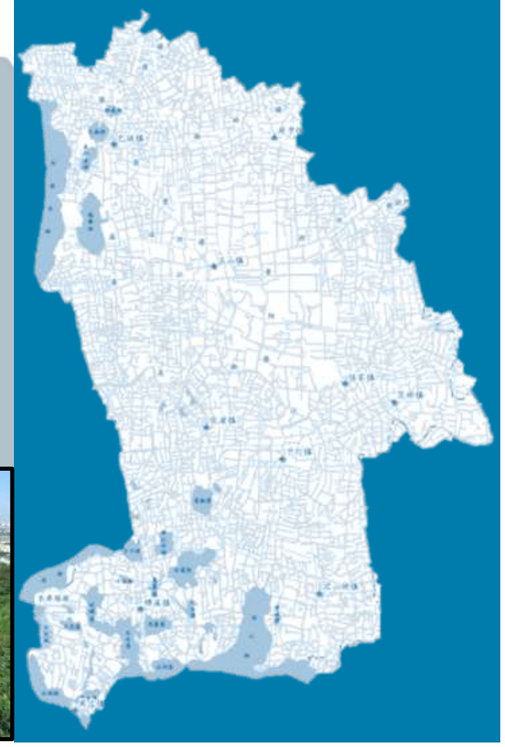
Kunshan sits on Taihu Lake Plain in the Yangtze River Delta Area.





Present 2015
Population 人口
- 2million

Future 2030
Population 人口
- 3.3million



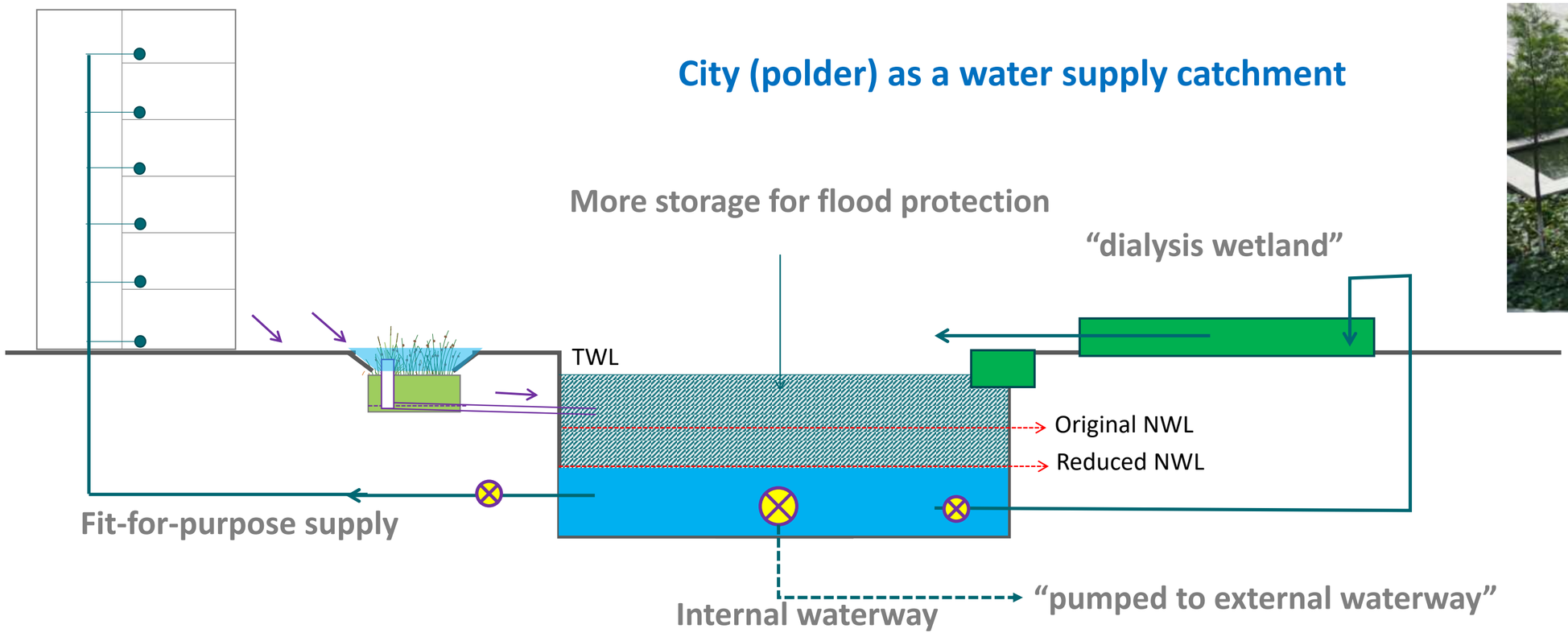
中国昆山
Kunshan China

City of Kunshan to be China's first CRC Incubator City for Water Sensitive Design and Technology

Date Published 21st Jan 2014

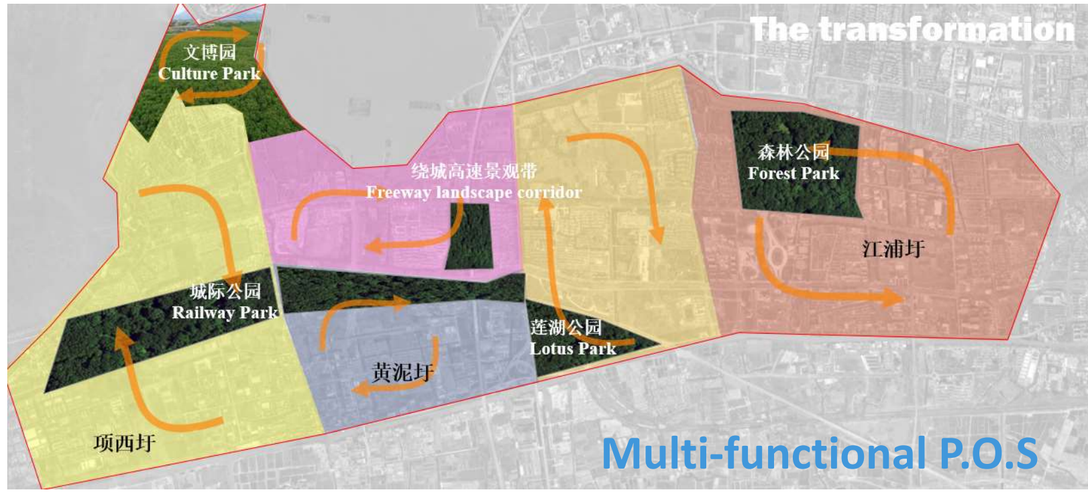
On Friday 17 January in Kunshan, China, a three-party Memorandum of Understanding (MoU) between the CRC for Water Sensitive Cities (CRCWSC), the Kunshan City-construction Investment and Development Company (KCID) and the Planning Bureau of the City of Kunshan was signed. The MoU represents a combined commitment by the two Kunshan City agencies for city planning and city construction to "extensively use their future projects as incubators of new planning, design concepts and new technologies that are generated out of the CRCWSC and thus providing the opportunity to test research concepts and findings at a city-scale".

Strategy Development @ Whole-of-polder strategy

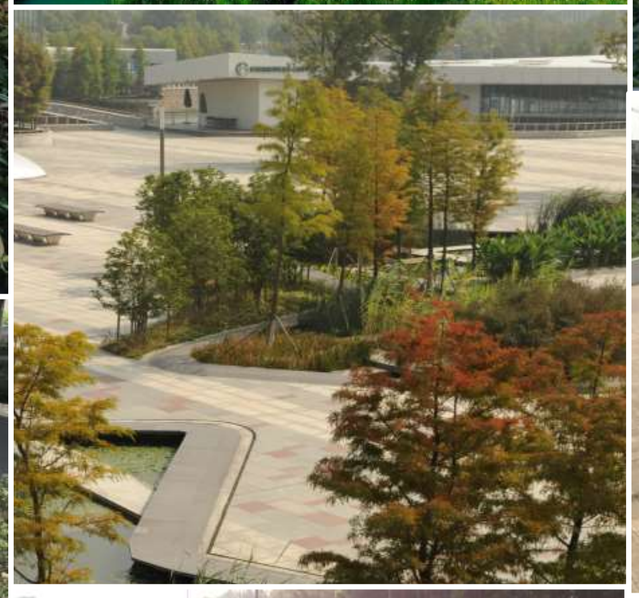


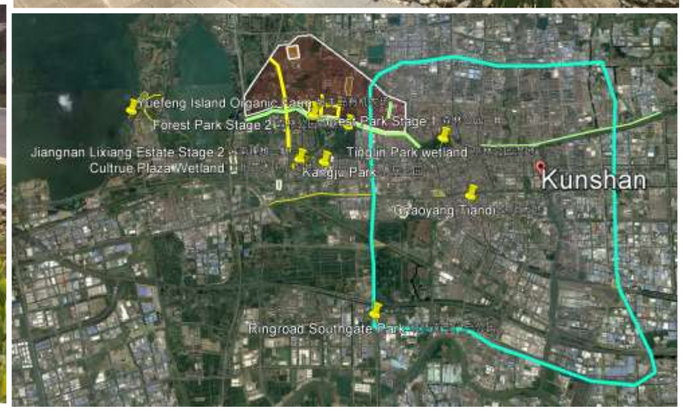
- “Dialysis wetland” as kidney for water cleansing
- internal river for toilet flushing to reduce potable water demand and support future population growth
- More storage in internal waterway for flood protection
- parks for water cleansing and extreme flood events

Internal waterway

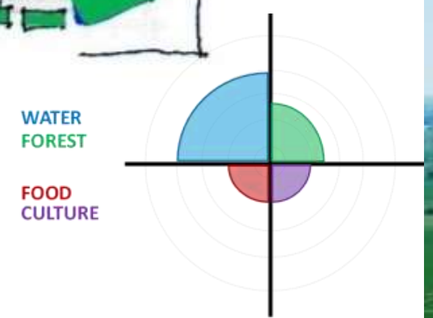


Architecture and Landscape Design Scale @ over 30 projects built or being built





Urban Planning and Design Scale @ Kunshan Ring Road Strategy



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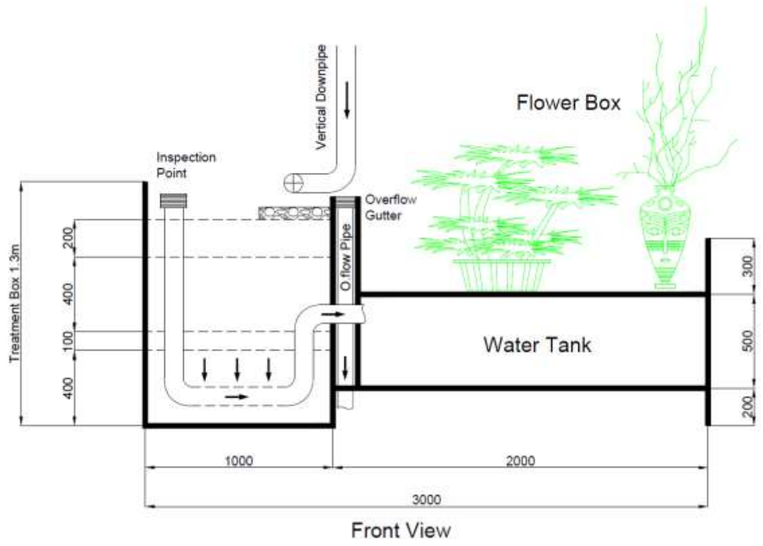
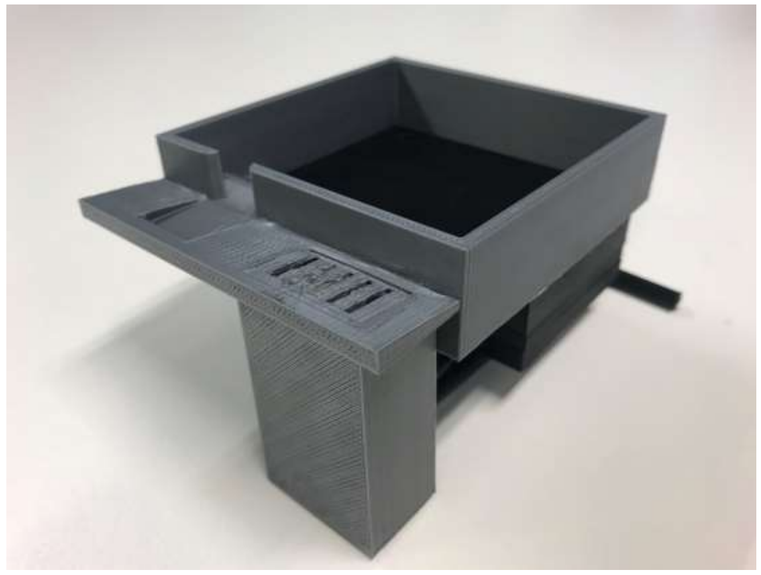
Industry Design @ water sensitive city furniture



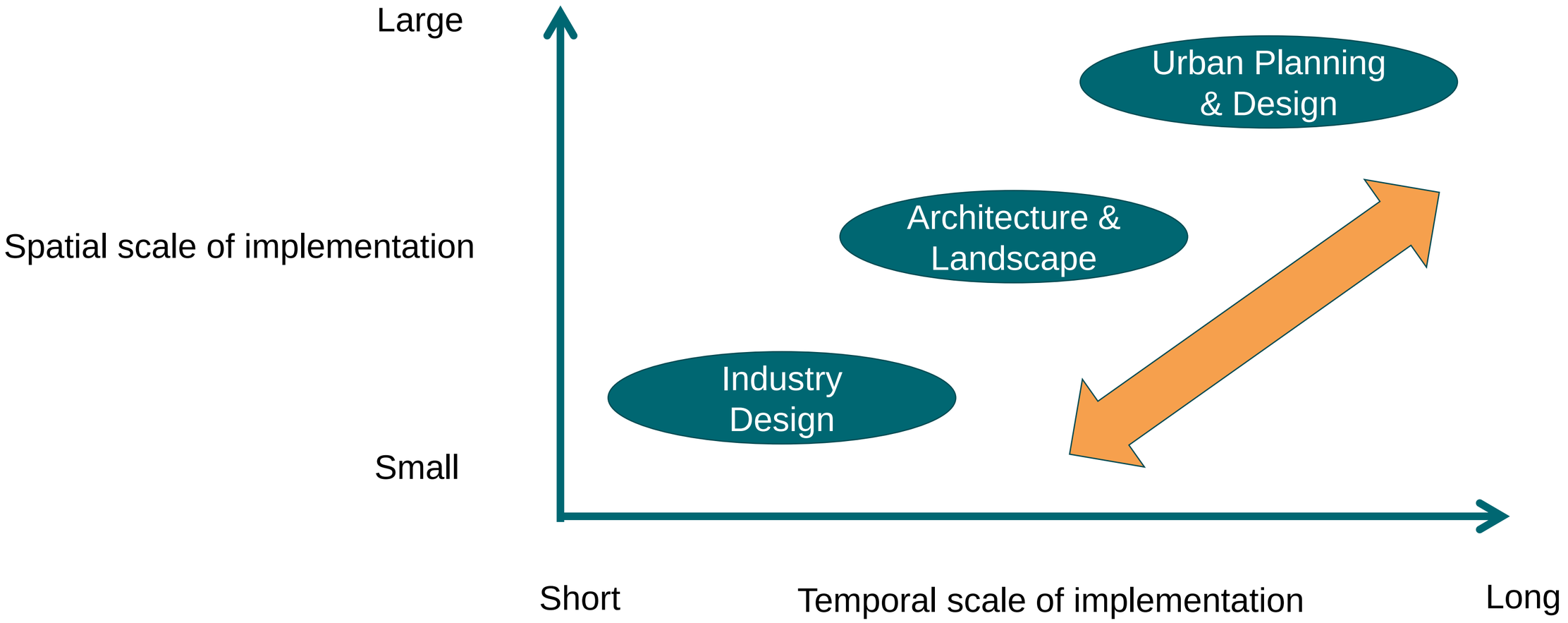
Front View

Industry Design @ water sensitive city furniture

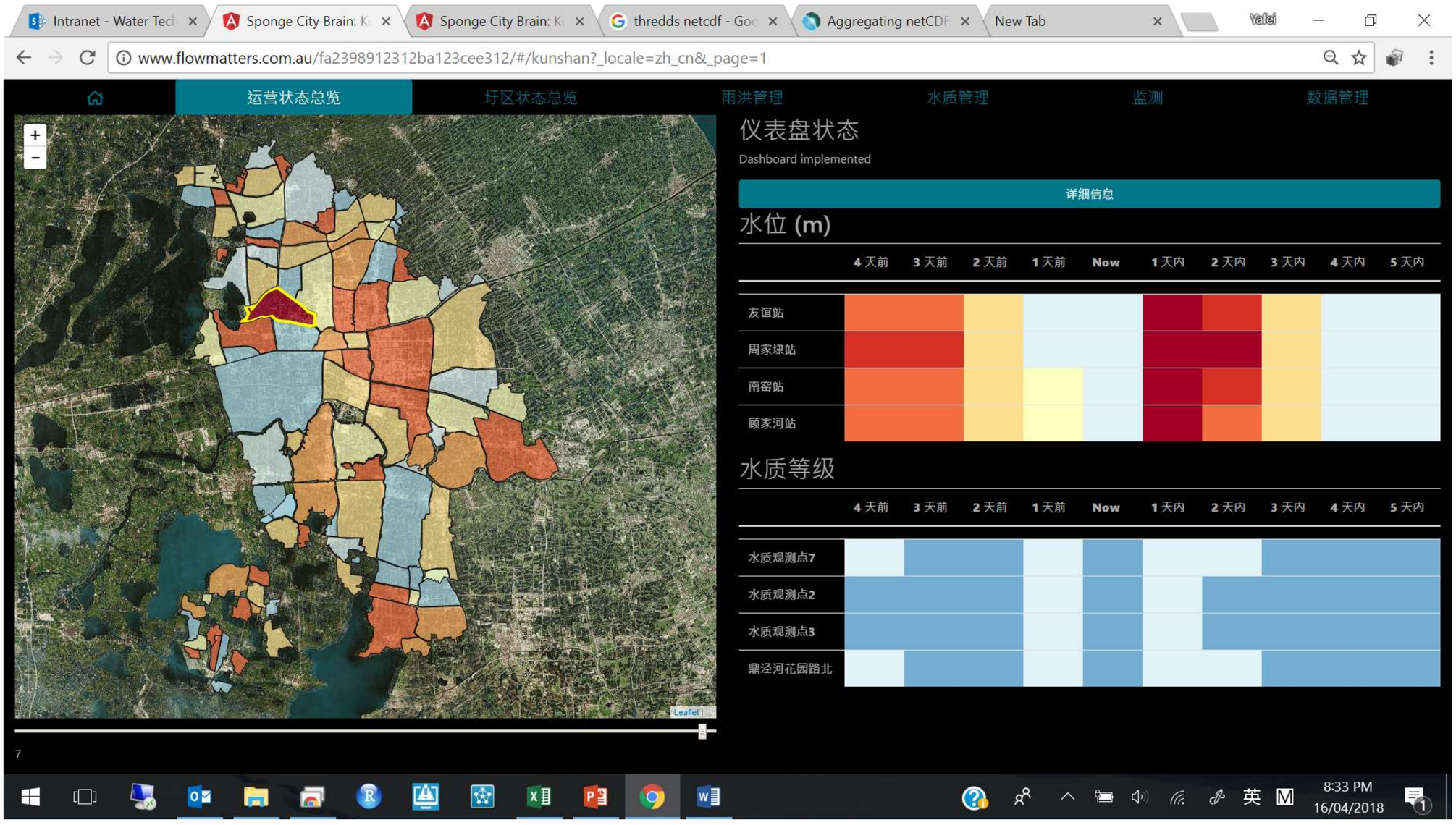


Industry Design @ retrofitting existing road with water sensitive furniture

Integration platform to implementation water sensitive practice



Polder Real Time monitoring and control



CRC for Water Sensitive Cities

FlowMatters

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Governantment engagement and collaboration

Victoria-Jiangsu Sponge City Innovation Park 2017-2019 @ 100million RMB

To establish an 10 ha innovation park focusing around Research-Training-Industry partnership and validation facility

- To bring Australian advanced research, leading-edge technology and WSC products into Kunshan for demonstration, incubation, local application and commercialization
- To facilitate a whole-of-government approach and ensure Kunshan's leading position in Chinese sponge city
- To be used as future training base for Jiangsu sponge city industry


March 2017 MOU signed in Melbourne


November 2017 land cleared

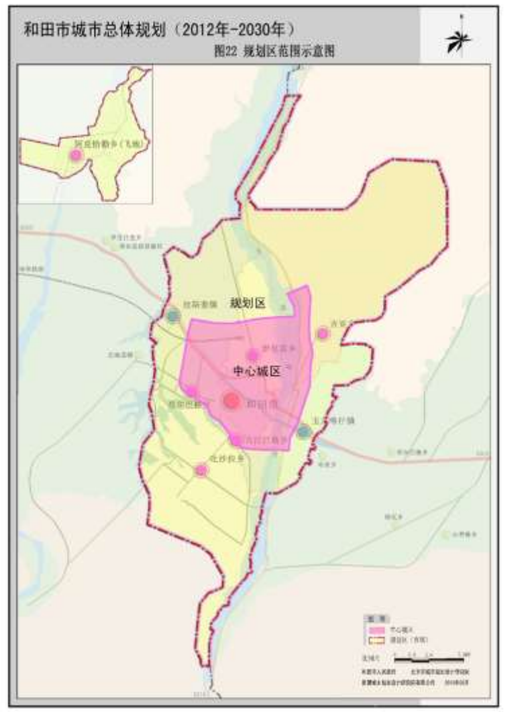
April 2018 Ground

Example 2: A desert city

Hetian

From the rapid assessment undertaken by the CRCWSC team of the **water security vulnerability of the City and the critical inadequacies of the existing water services** has identified opportunities to position and transition Hetian City into a water sensitive city with key attributes of water sustainability and resilience to climate change, and to promote greater liveability and ecological civilization outcomes from incorporating water ecological landscapes into the urban design of the city.

This vision presents great opportunity to develop Hetian City into **a model Chinese Sponge City for desert environment** and demonstrate to the Chinese government that the current concept of Sponge City goes beyond just stormwater management that is often narrowly understood and practiced by the Chinese industry.



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Find out more about us and download our research.

Thank you.

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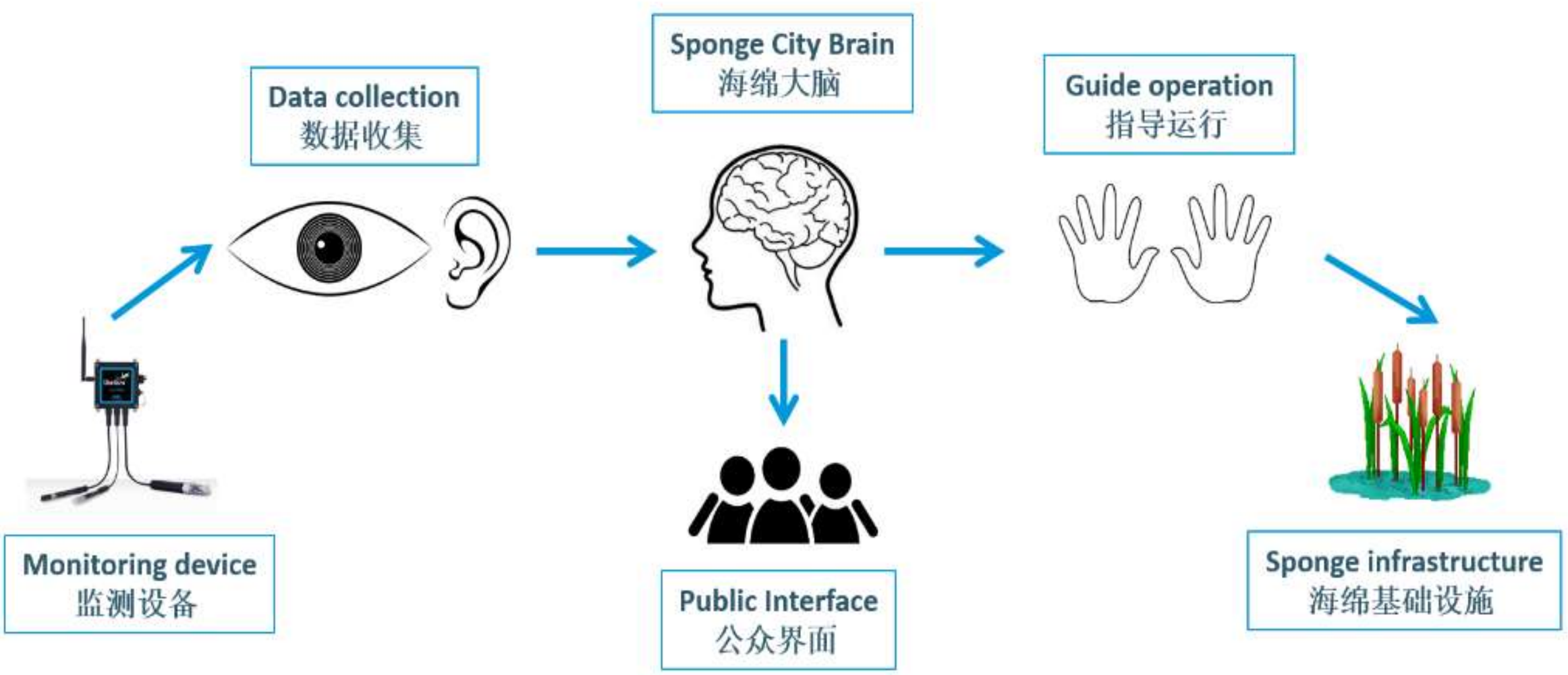
Questions


Hetian, China
Kunshan, China
India
Singapore
Indonesia
Australia
Fiji
South Africa
New Zealand

Emerging Technology @ IOT enabled green infrastructure



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Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Programme

World Bank IUWM Study Tour

IUWM in the Asia Pacific region

Kerrie Burge

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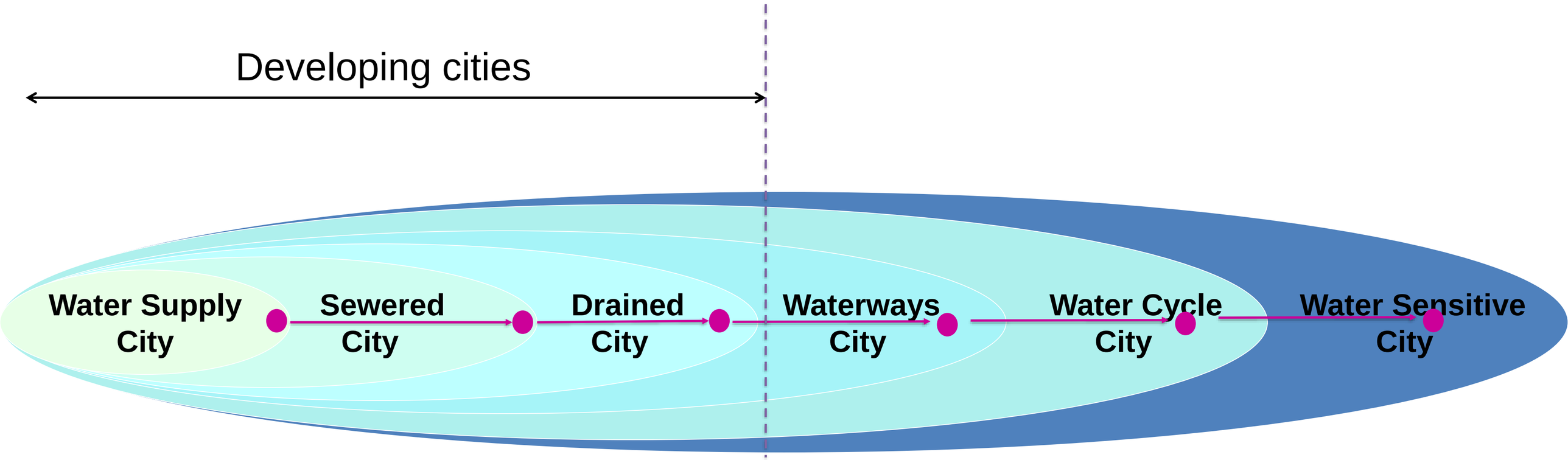
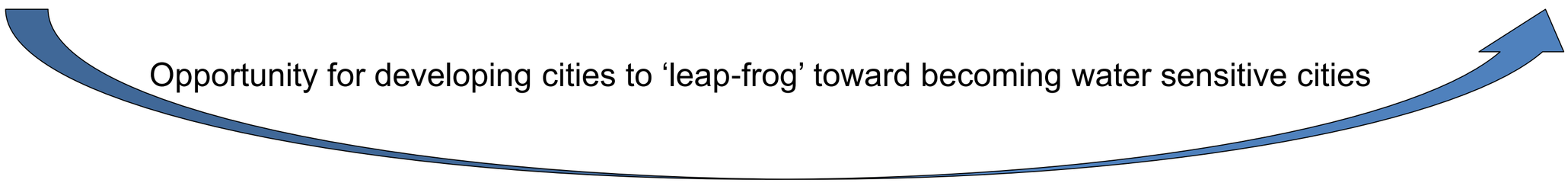
Urban Water Transitions: Development continuum

Traditional servicing takes a linear approach

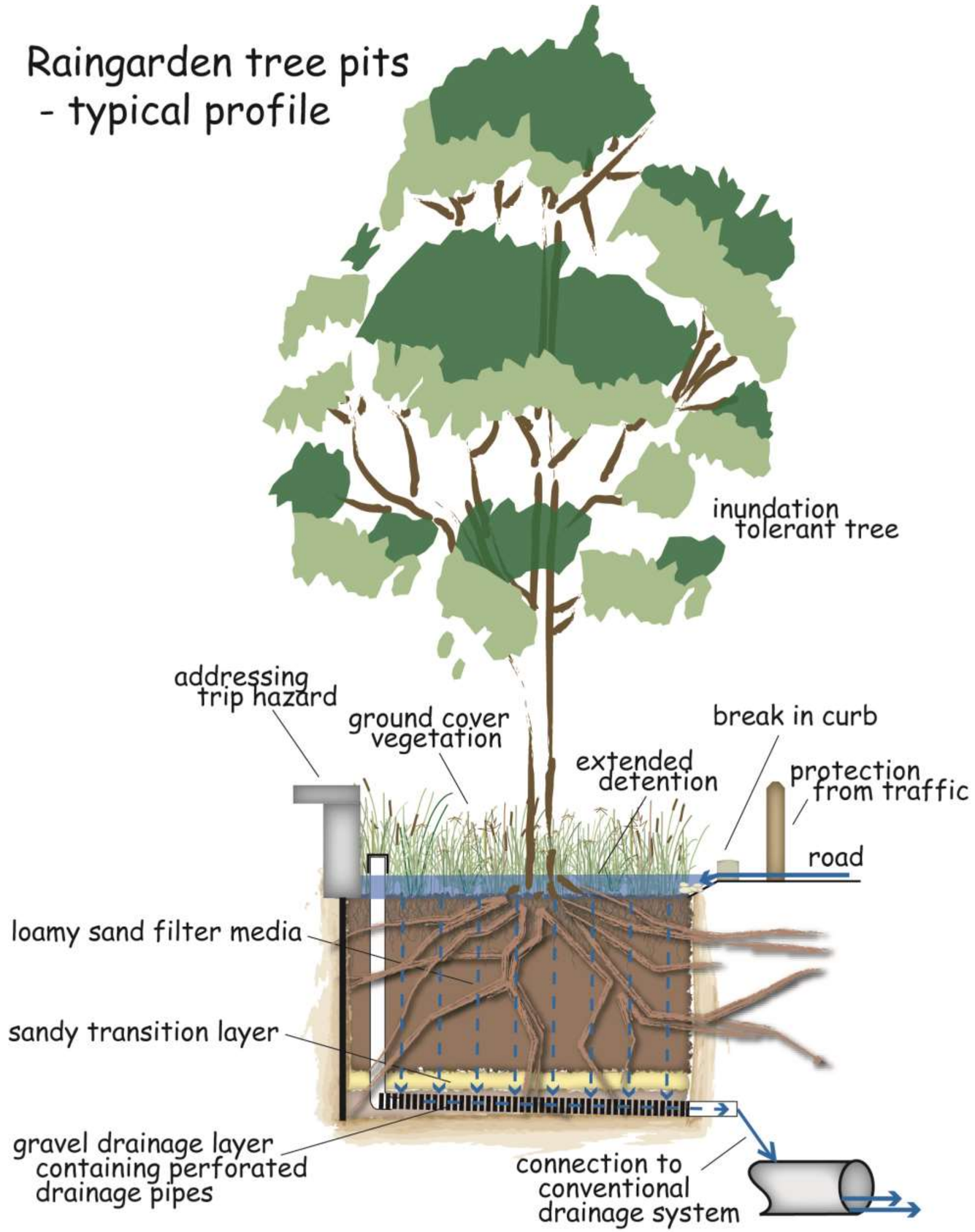




Co-benefits:

- ✓ Wastewater recycling & economic opportunities
- ✓ Environmental protection (including fisheries etc)
- ✓ Resilience through diversification of water supplies

Raingarden tree pits - typical profile

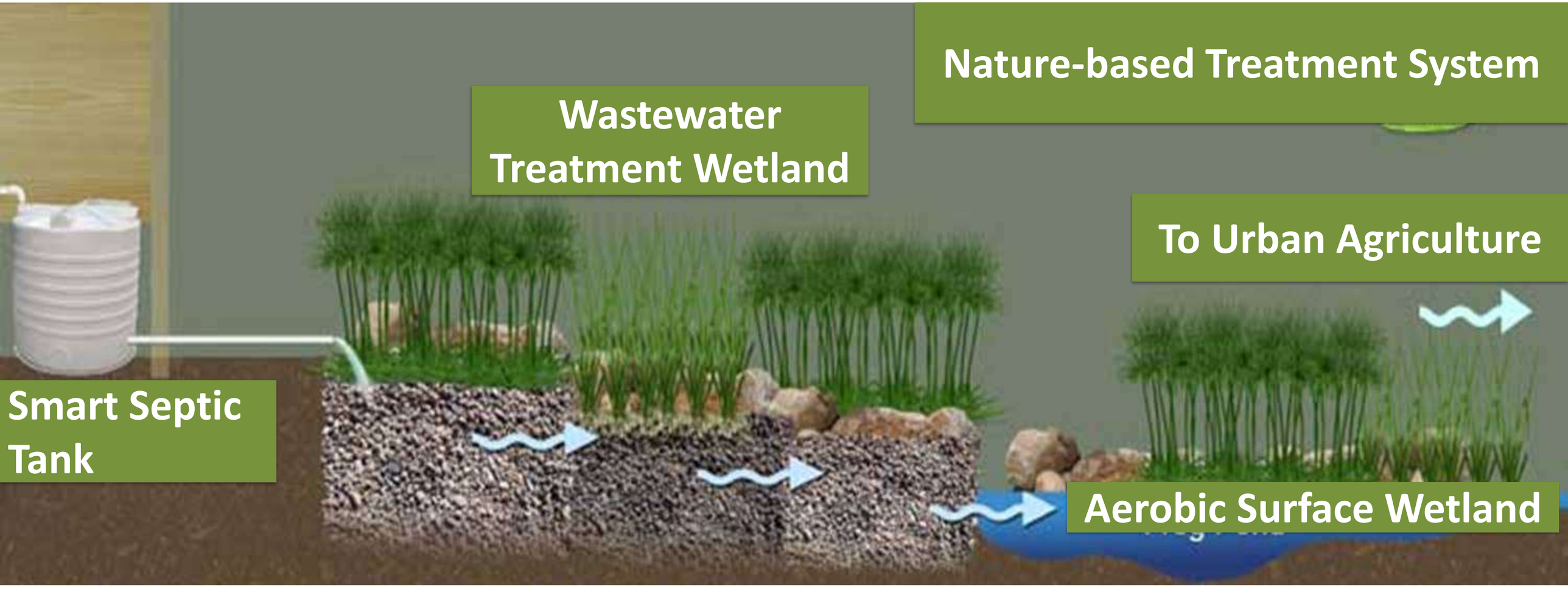


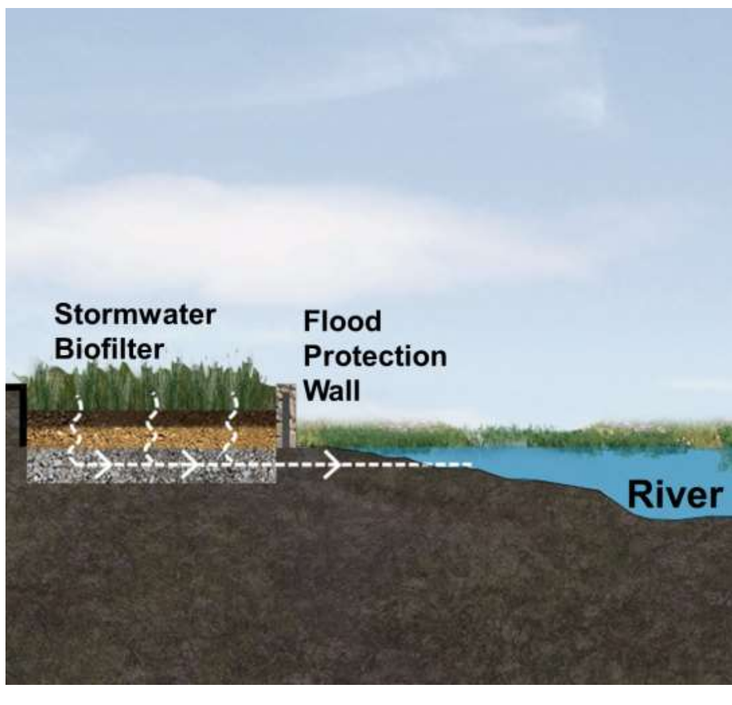
A Water Sensitive Approach in Informal Settlements

- **Low-cost** and easy to maintain and operate
- **Well understood**, and not experimental
- **Decentralised**, not requiring connection to large centralised infrastructure
- **Flexible in scale** and be able to fit into relatively dense urban environments
- Appropriate for the **specific conditions**
- Increase **climate resilience**

- Most importantly the approach should aim to deliver solutions that have multiple benefits, ensuring multiple challenges are addressed together wherever possible

Water-Sensitive Revitalisation Tool Box





rise

REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

- WSC approach to infrastructure delivery
- Suva, FIJI and Makassar, INDONESIA
- 5 year action research programme
- RCT – environment and human health assessments

MONASH University
CRC for Water Sensitive Cities
STANFORD GLOBAL HEALTH
EMORY UNIVERSITY
THE UNIVERSITY OF MELBOURNE
UNHAS Hasanuddin University
FNU FIJI NATIONAL UNIVERSITY
USP THE UNIVERSITY OF THE SOUTH PACIFIC
UNIVERSITY OF CAMBRIDGE
UNITED NATIONS UNIVERSITY UNU-IIGH
OXFAM
WaterAid
Melbourne Water
South East Water
wellcome trust sanger institute
wellcome
ADB

www.rise-program.org

rise

REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

The connection between human health and environmental health

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REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

SUVA, FIJI

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REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

MAKASSAR, INDONESIA

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REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

Demonstration Project
March – June 2017

Batua, Makassar

Tamavua-i-wai, Suva

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REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

STAGE 1 **STAGE 2**

STAIRS + STREET LIGHT + WIDER STREET + TREES + BENCHES + WASTE COLLECTION

STAIRS + STREET LIGHT + WIDER STREET + TREES + BENCHES

STAIRS + STREET LIGHT + WIDER STREET

4 House
Renovated toilet
Wetpod = rainwater tank + sink + toilet
Rainwater tank
Pressure tank
Septic tank
Biofilter for cleaning water from kitchen and shower
Flood wall
Subsurface wetland for cleaning toilet water
Surface wetland for cleaning toilet water
Street light
Bench
Tree pot
Waste collection

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REVITALISING INFORMAL
SETTLEMENTS AND
THEIR ENVIRONMENTS

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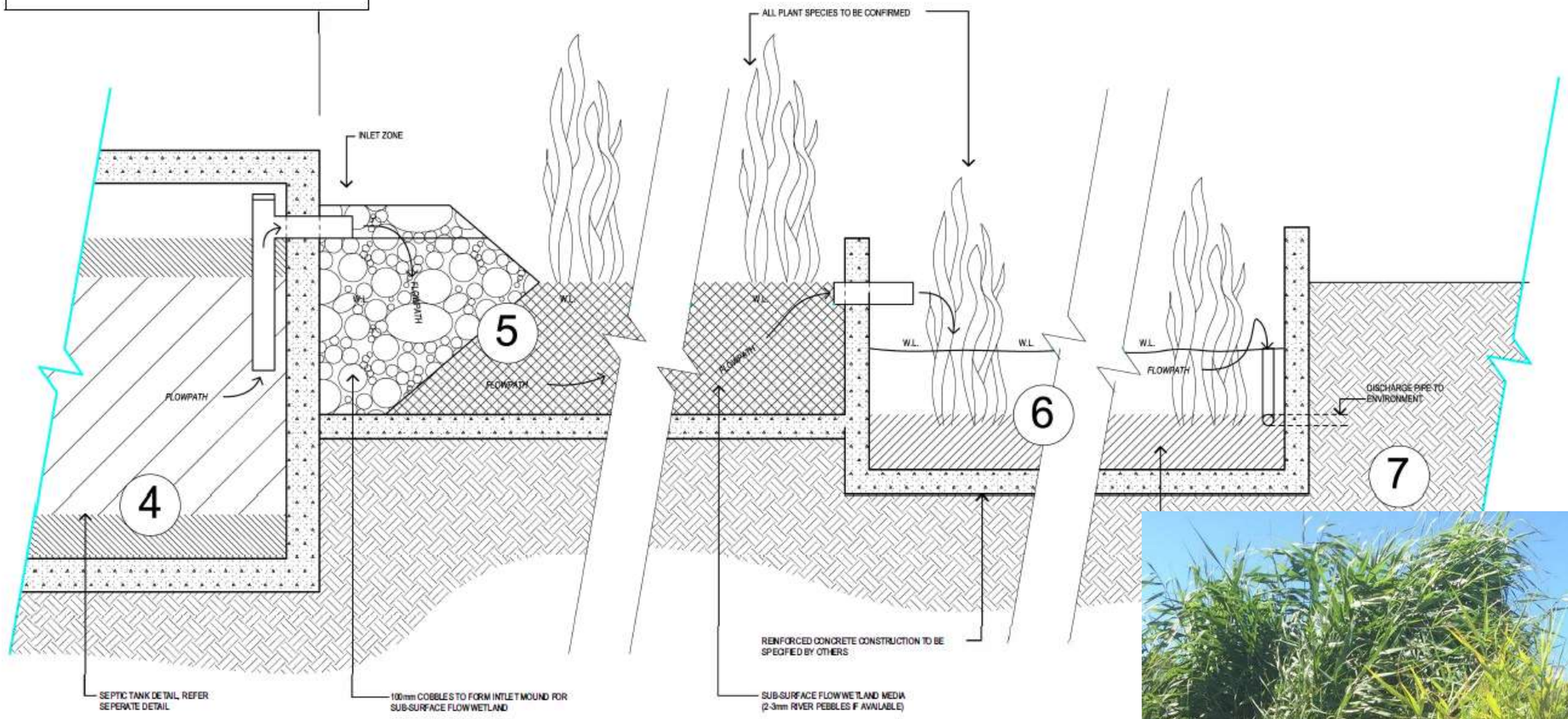
REVITALISING INFORMAL
SETTLEMENTS AND
THEIR ENVIRONMENTS

5. Effluent from the septic tank will drain via a small aerobic trickle flow inlet to a sub-surface flow wetland. No human contact with any wastewater being treated is possible in this zone. Wastewater in this zone is treated by flowing through a vegetated gravel matrix that is activated by the root zone of the wetland plants. This system is a natural secondary wastewater treatment system.
6. Effluent from the sub-surface flow wetland will gravity drain to a surface flow wetland. The surface flow wetland will further treat residual BOD, nutrients, and bacteria. Surface flow wetlands are densely vegetated and access to the water surface is limited. Discharge of water from the surface flow wetland will typically be piped out of the immediate community. This system is a natural tertiary treatment system.
7. Treated effluent is of sufficient high quality for safe discharge into the environment.

SUB-SURFACE FLOW WETLAND | SURFACE FLOW WETLAND | ENVIRONMENT



TITLE

FLOWPATH FROM SEPTIC TANK TO ROAD DRAIN

LEGEND

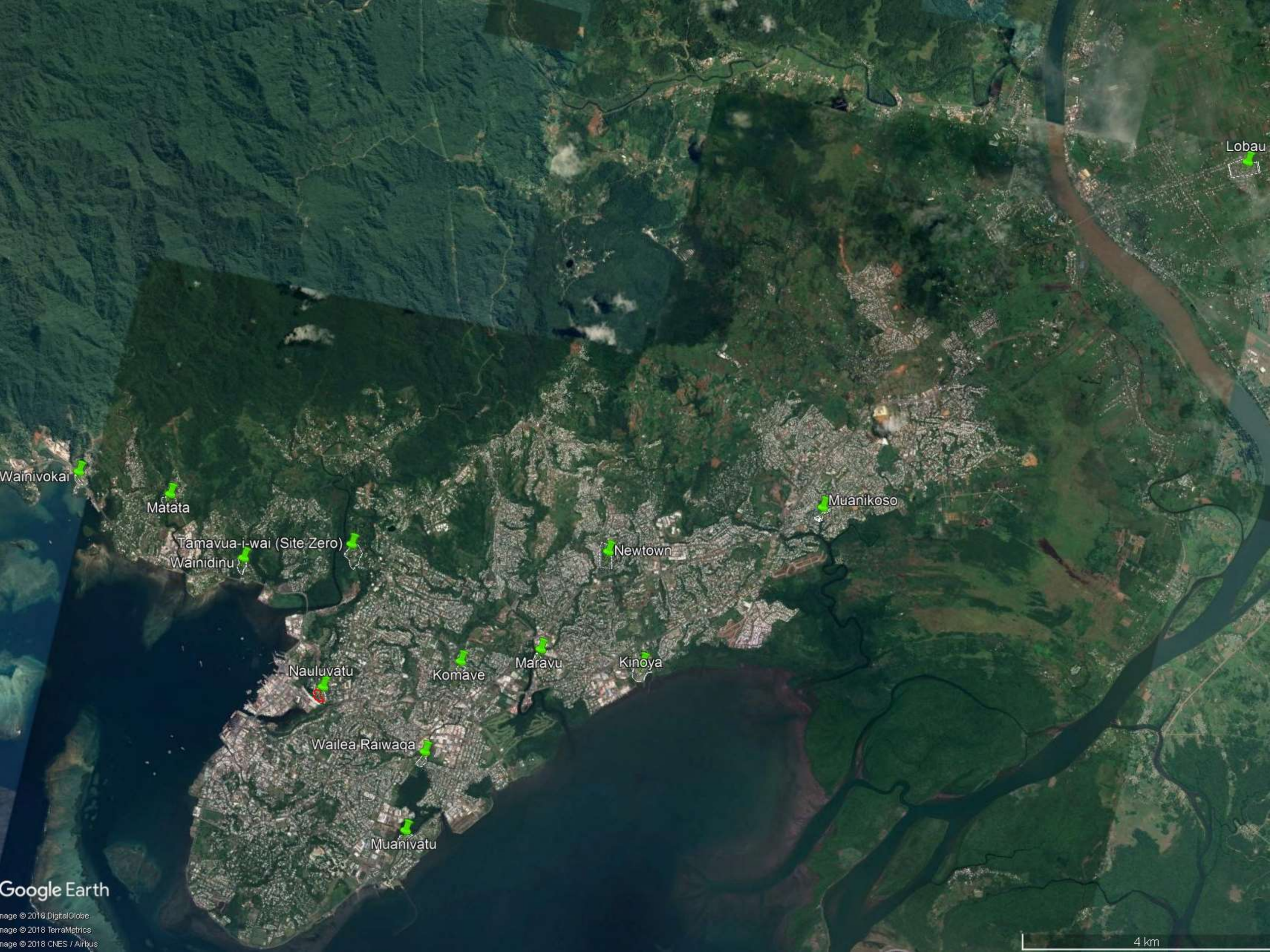
FLOWPATH FROM SEPTIC TANK TO ROAD DRAIN

SCALE 1 : 20

RISE Revitalising Informal Settlements and their Environments

rise

REVITALISING INFORMAL
SETTLEMENTS AND
THEIR ENVIRONMENTS


Lobau
Wainivokai
Matata
Muanikoso
Tamavua-i-wai (Site Zero)
Wainidinu
Newtown
Nauluvatu
Komave
Maravu
Kinoya
Wailea Raiwaqa
Muanivatu
Google Earth
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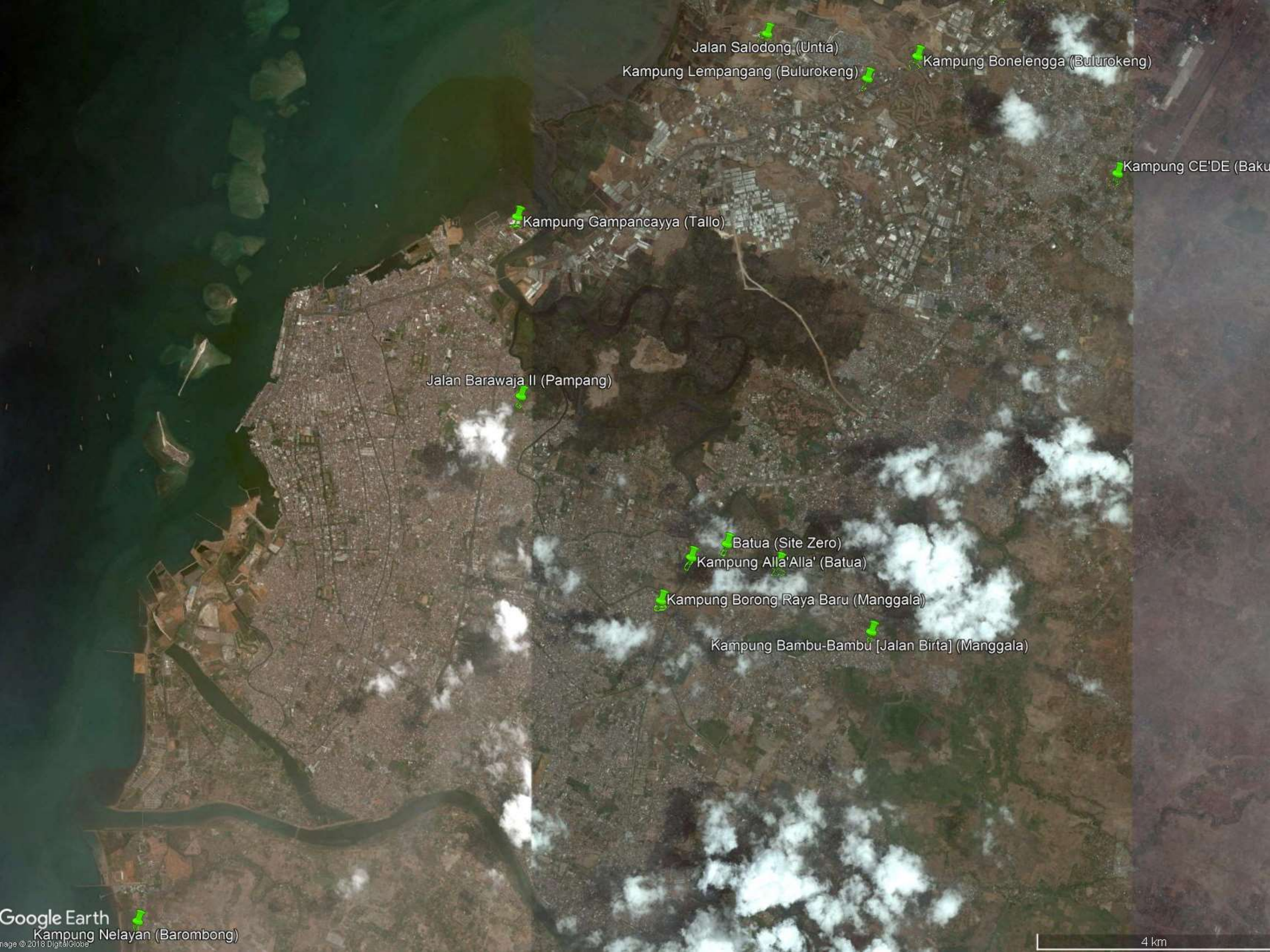
4 km


Jalan Salodong (Untia)
Kampung Lempangang (Bulurokeng)
Kampung Bonelengga (Bulurokeng)
Kampung CE'DE (Baku
Kampung Gampancayya (Tallo)
Jalan Barawaja II (Pampang)
Batua (Site Zero)
Kampung Alla'Alla' (Batua)
Kampung Borong Raya Baru (Manggala)
Kampung Bambu-Bambu [Jalan Birta] (Manggala)
Kampung Nelayan (Barombong)
Google Earth
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4 km

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