Pulo Geulis

The island of Pulo Geulis is an informal settlement located in the middle of the Ciliwung River's catchment area, with major environmental issues related to water management and sanitation. However, Pulo Geulis also has great potential to become more water sensitive if Water Sensitive Urban Design concepts are adopted.

Only around 60% of the island has access to city water service, and waste water management is poor, and most houses on the island's perimeter discharge untreated black and grey water and other domestic waste directly into the river via small pipe. This is the result of dense configuration of small houses, often without sufficient room for individual septic tanks, and a lack of awareness of environmental impacts of such actions.

The Cluster aims to provide the necessary infrastructure to improve the community health and environmental performance of the island and their liveability with new multifunctional public space. The revitalisation proposal also aims to uplift the local economy by providing additional food sources in vertical gardens and open spaces for the community and tourists to visit the island and support the local economy by acquiring the local handcrafted products. Also the island has important cultural landmarks (Vihara and others), diverse local food offers and the striking landscape of the island in the Ciliwung River.

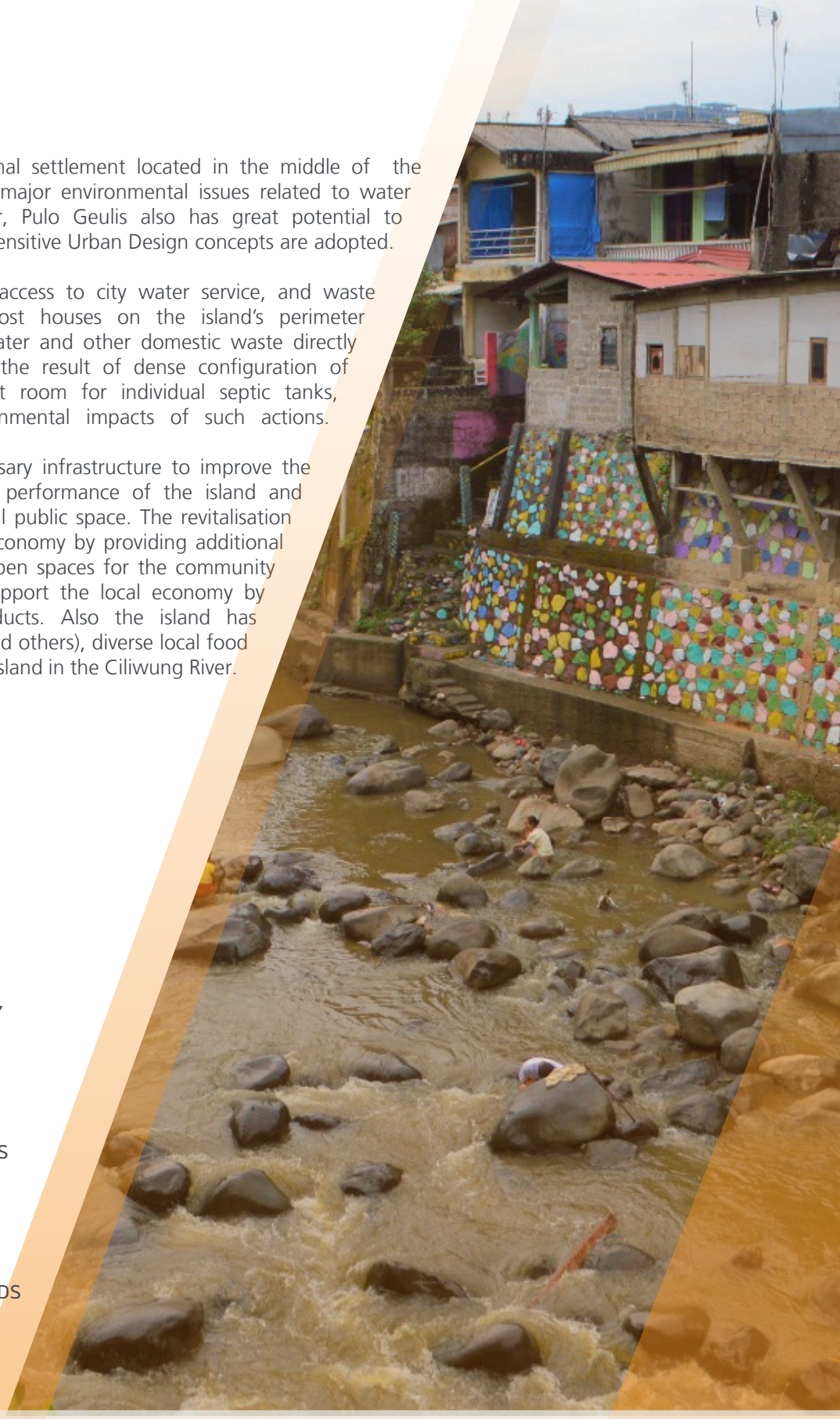
POPULATION
2,640

AREA
3.04 Ha

POPULATION DENSITY
700 / Ha

NUMBER OF BUILDINGS
624

NUMBER OF HOUSEHOLDS
681



ISSUES

RIVER POLLUTION
Direct discharge of waste water into the river, open defecation, and other pollutants are polluting the river.

INSUFFICIENT WATER MANAGEMENT SYSTEMS
Pulo Geulis is in need of an efficient wastewater treatment system.

LIMITED ACCESSIBILITY
There are only 2 vehicular access points to the island.

RETAINING WALL EROSION
River flow is constantly eroding the retention walls of the island.

LIMITED PUBLIC SPACES
The settlement lacks open, green spaces, with the only green space in existence being a private property.

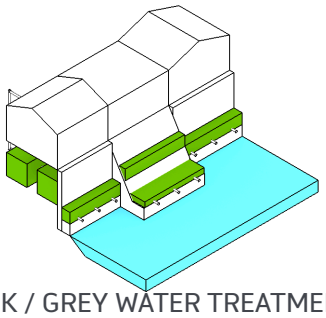
SPATIAL ANDSOCIAL ANALYSIS TOOLS

1. **VISIONING FGD**
   - » Community Mapping,
   - » Problem-solution Tree,
   - » Transect Walk,
   - » SWOT Analysis
2. **DRONE MAPPING**
   - » Ortho-rectified Imagery
   - » Digital Elevation Model
3. **DRONE MAPPING RESULTS POST-PROCESSING**
   - » 3D Model Pix4D
   - » Site Sections (Revit)
4. **HYDROLOGY MODELLING**
   - » Water Balance Model
   - » Rainwater Tank Sizing and Reliability Analysis
5. **URBAN SCENARIOS FGD**
   - » Feedback on Scenarios for Public Space Allocations and Uses
6. **SCENARIOS FOLLOW-UP SURVEYS AND INTERVIEWS**
   - » Refining the Scenarios and Selection of Sites for Pilot Projects
7. **URBAN DESIGN FGD / WSUD MASTERCLASS**
   - » Feedback on Proposals
   - » Feedback on Development, Implementation and Maintenance
8. **LEAPFROGGING SHOWCASE**
   - » Showcase of Project Findings and Strategies
   - » Display of Pilot Site Designs

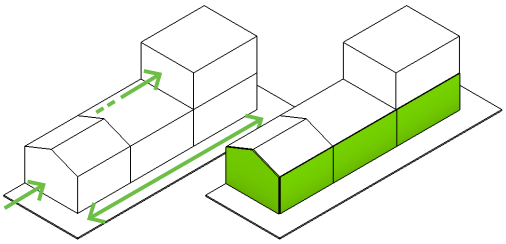
Social Analysis Tools

Spatial Analysis Tools

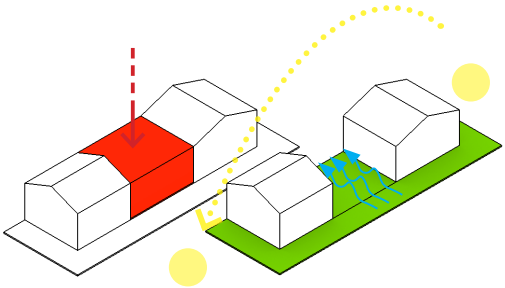
URBAN DESIGN STRATEGIES



BLACK / GREY WATER TREATMENT:
Integration of Green Infrastructure into the Existing and Proposed Urban Fabric



GREENERY INTENSIFICATION:
Integration of Green Elements such as vertical gardens into the existing and proposed buildings and public spaces



EXPANSION OF PUBLIC SPACE NETWORK:
Addition of Multi-functional Public Spaces to improve access to sunlight and wind flows

NETWORK OF PULO GEULIS INTERVENTION SITES
The design interventions form a network of well-connected public spaces

GREEN INFRASTRUCTURE RECOMMENDATIONS

- ✓ Harvest roof runoff for urban farming, non-portable or outdoor uses
- ✓ Biofiltration systems with climbing plants and / or constructed treatment wetlands
- ✓ Biofiltration or treatment of stormwater-runoff and light domestic greywater
- ✓ Vertical gardens (Self-standing)
- ✗ Green roofs and greywater treatment green walls

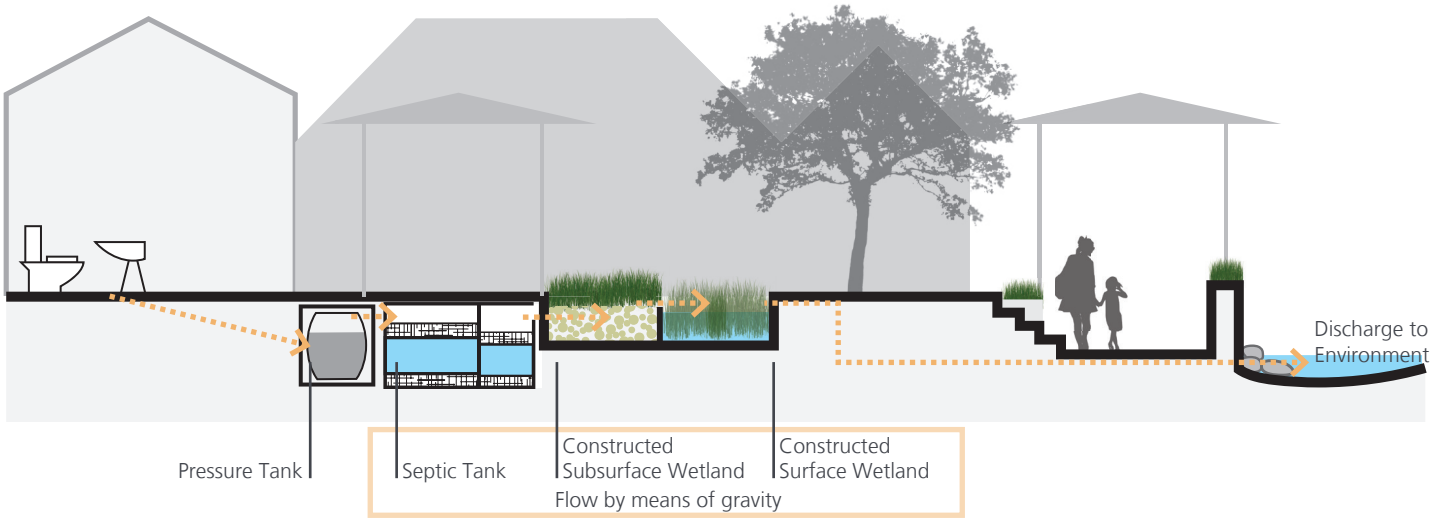
PLANNING RECOMMENDATIONS

- » Integrate informal settlements in the Local Government Implementation Plans (RKP) and Regional Medium-Term Development Plans (RPJM)
- » Take existing local communities under consideration and integrate them into the process when transforming informal settlements in order to utilise their local knowledge in the social construction of their habitats
- » Standardise methods used to elaborate Environmental Impact Assessment (EIA) studies and include a review of the larger impact of human activities in a given area when preparing EIA studies

URBAN DESIGN RECOMMENDATIONS

- » Take into consideration the social impacts of relocation when transforming communities into more water sensitive ones
- » Understand the value of social capital in the collective construction of communities and explore options to reduce massive relocation
- » Governments can benefit from working with the communities to use their potential as agents for positive transformation of their environments
- » Understand the importance of public spaces in very densely populated areas, and ensure they are multifunctional to accommodate social, environmental, and economic functions
- » Establish guidelines for designing public spaces such as parks, sidewalks and riverfronts, and ensure they comply with Water Sensitive Urban Design concepts adapted to the Indonesian context

PROPOSED CONSTRUCTED WETLAND SYSTEM



SITE 1

Service Area: 1,416 m2
Buildings Served: 15
Wetland Area: 32 m2
Wastewater Treated: 5.47 m3 (5,470 L) / day

SITE 2

Service Area: 1,024 m2
Buildings Served: 10
Wetland Area: 23 m2
Wastewater Treated: 3.67 m3 (3.670 L) / day

SITE 3

Service Area :1,273 m2
Buildings Served : 13
Wetland Area: 29 m2
Wastewater Treated: 4.75 m3 (4,750 L) / day

The Australia-Indonesia Centre

URBAN WATER RESEARCH CLUSTER

Full report will be available in early 2019: urbanwater.australiaindonesiacentre.org/