

Jalur Air Sosial: A Design Toolkit for Flood-Resilient Kampung Alleys

Interactive Urban Flood Micro-Intervention for Kampung Context

Hack4Resilient Jakarta 2025
Gang Up Team



Issue and Problem Statement

Flooding in Jakarta's Narrow Alleys



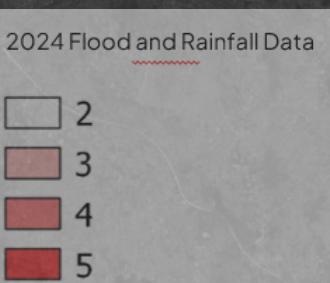
0 2,5 5 7,5 10 km

Jakarta's kampung neighborhoods face recurring floods every year.

Gang Flooding^[1]



Narrow alleys known as Gang, often turn into flood paths but are also critical social spaces.



Poor drainage and impermeable concrete surfaces worsen local flooding.

Residents cope by raising house floors, which is costly and unsustainable.

Clogged Drainage^[2]



Raised House Floors in Pela Mampang



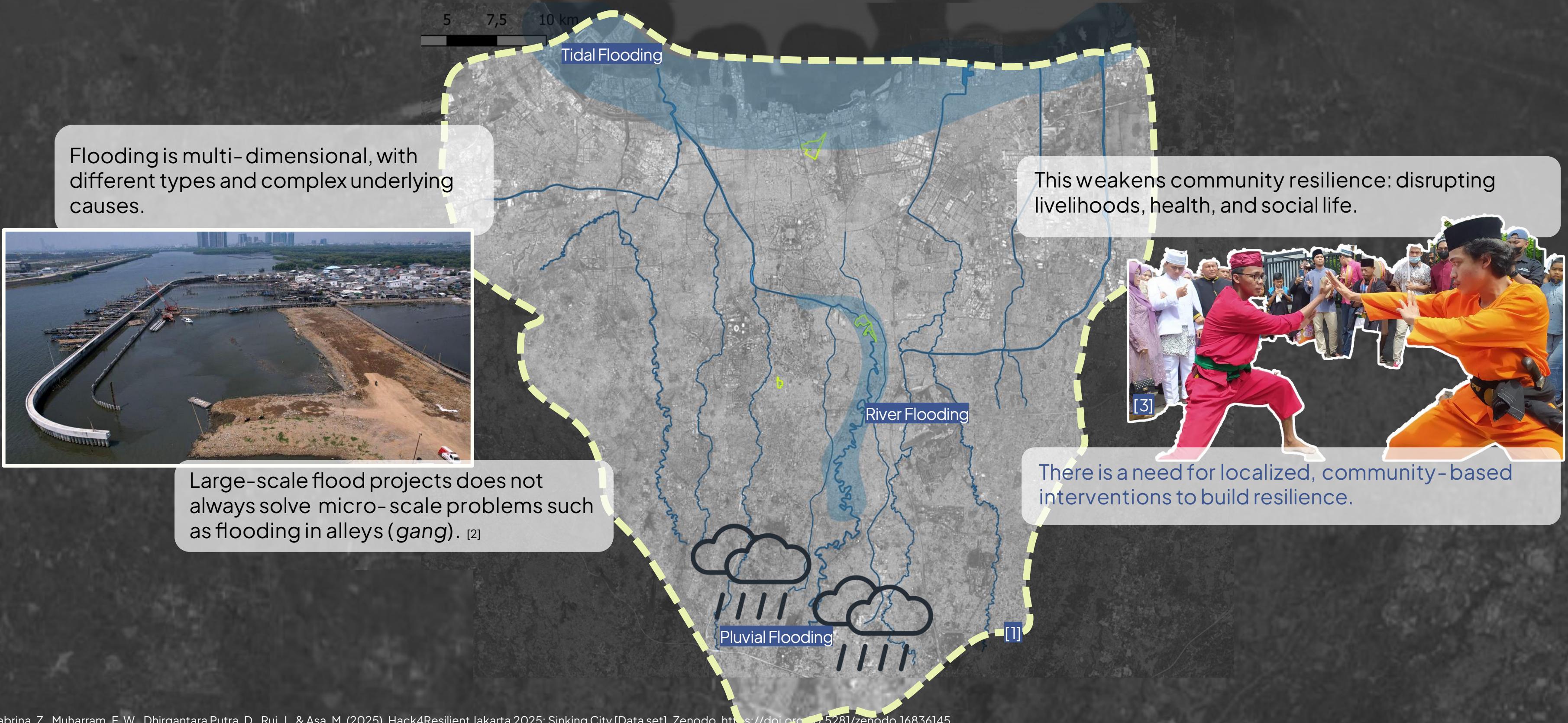
[1] Shabrina, Z., Muhamram, F. W., Dhigantara Putra, D., Rui, J., & Asa, M. (2025). Hack4Resilient Jakarta 2025: Sinking City [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.16836145>

[2] <https://kupang.tribunnews.com/2017/07/02/tersumbat-sampah-drainase-di-jalan-pemuda-matawai-waingapu-tak-berfungsi>

[3] <https://www.tempo.co/arsip/-muara-angke-jadi-langganan-banjir-rob-dki-jakarta-843532>

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Flooding in Jakarta's Narrow Alleys



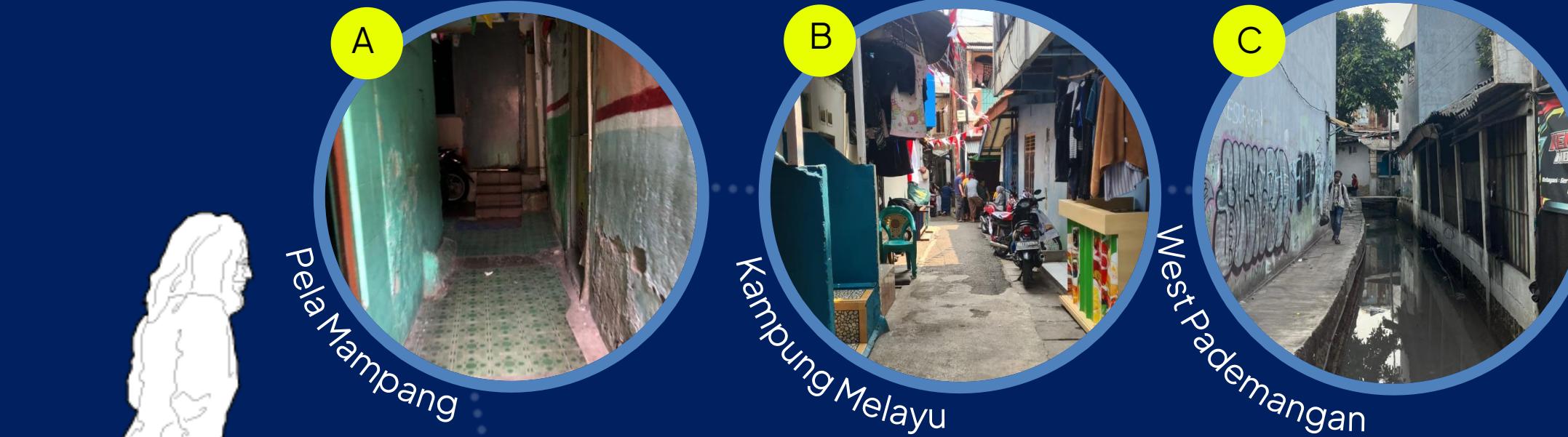
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[2] Farid, Mohammad, et al. "Study on Effectiveness of Flood Control Based on Risk Level: Case Study of Kampung Melayu Village and Bukit Duri Village." MATEC Web of Conferences, vol. 101, 2017, p. 05003, www.matec-conferences.org/articles/matecconf/pdf/2017/15/matecconf_sicest2017_05003.pdf, <https://doi.org/10.1051/matecconf/201710105003>. Accessed 4 Jan. 2022.

[3] <https://www.senibudayabetawi.com/6576/tak-hanya-setu-babakan-inilah-tiga-kampung-betawi.html>

Evidence and Data

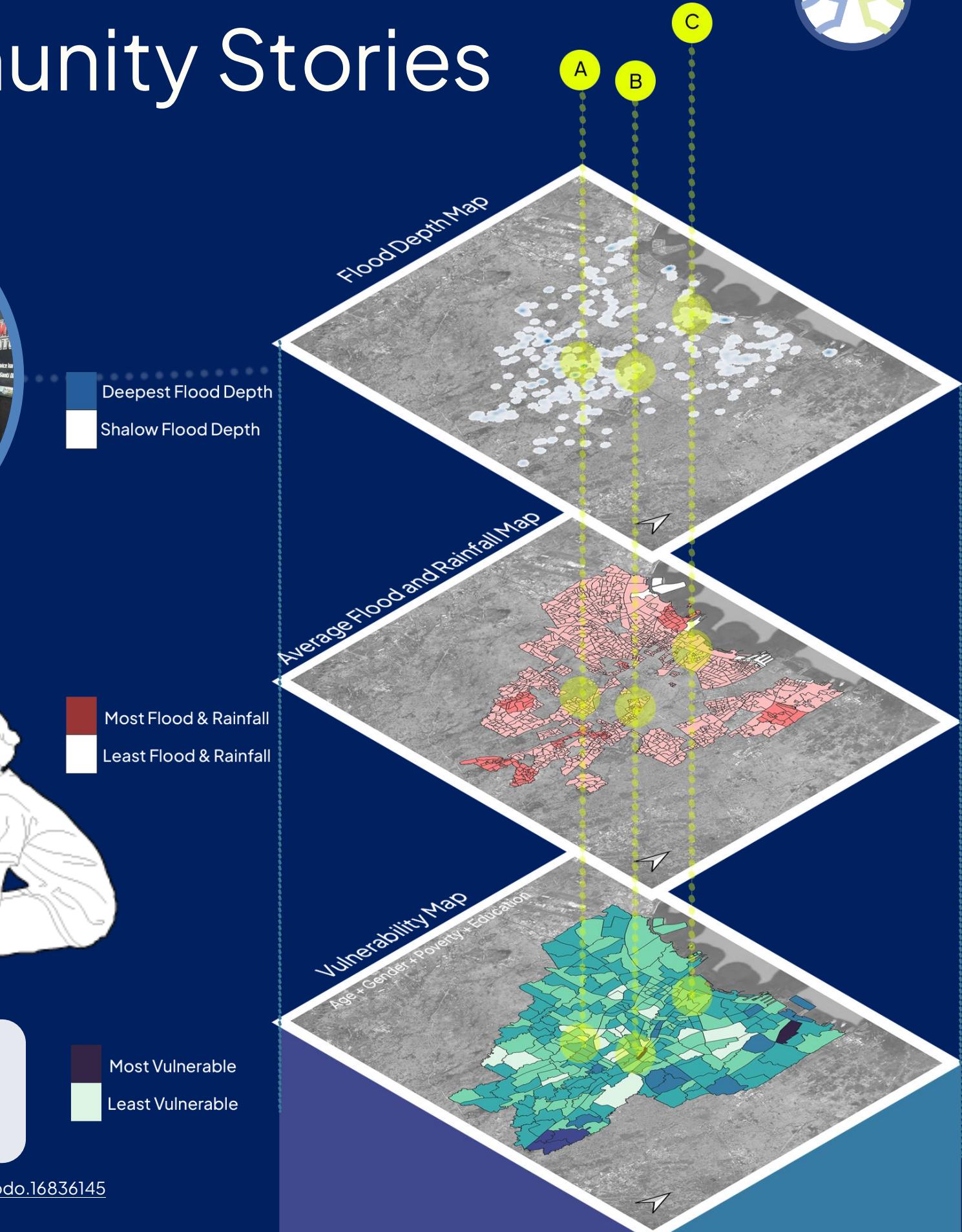
Combining Spatial Data and Community Stories



"If possible, the road should just be paved with asphalt so it looks better." -Head of Household at Kampung Melayu

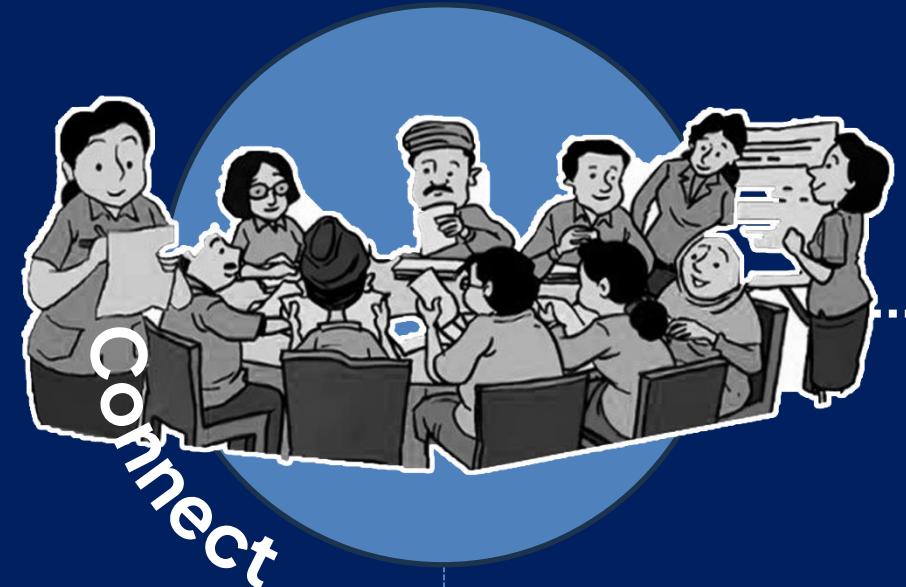
"The kampungs that get flooded badly are the ones down below, since it's downhill. Here, our kampung is higher." – Pela Mampang Warung Clerk

This reflects how many residents still prioritize visible improvements such as paved roads, rather than flood-adaptive infrastructure. It shows a gap in awareness about how surface treatments like asphalt can actually worsen water absorption and flood risk.



Objective

Goals and Idea Framework



Connect

Bridge communities and various stakeholders through solutions grounded in evidence and lived experience.



Create

Deliver adaptable design guidelines with cost estimation for diverse flood-risk typologies across Jakarta.



Commit

Strengthen kampungs by centering community voices in design and decisions.

Engagement
Participatory Design

Understanding

Co-Creation
Design Toolkit

Refinement

Implementation

Guided by the website (BedahGang)

Methodology

Who are the Users?



Non-Profit Organizations



RT/RW Leaders



Community
Participatory
Planning Forum
(MusRenBang)



University Students



Private Companies



Community Empowerment
Programme

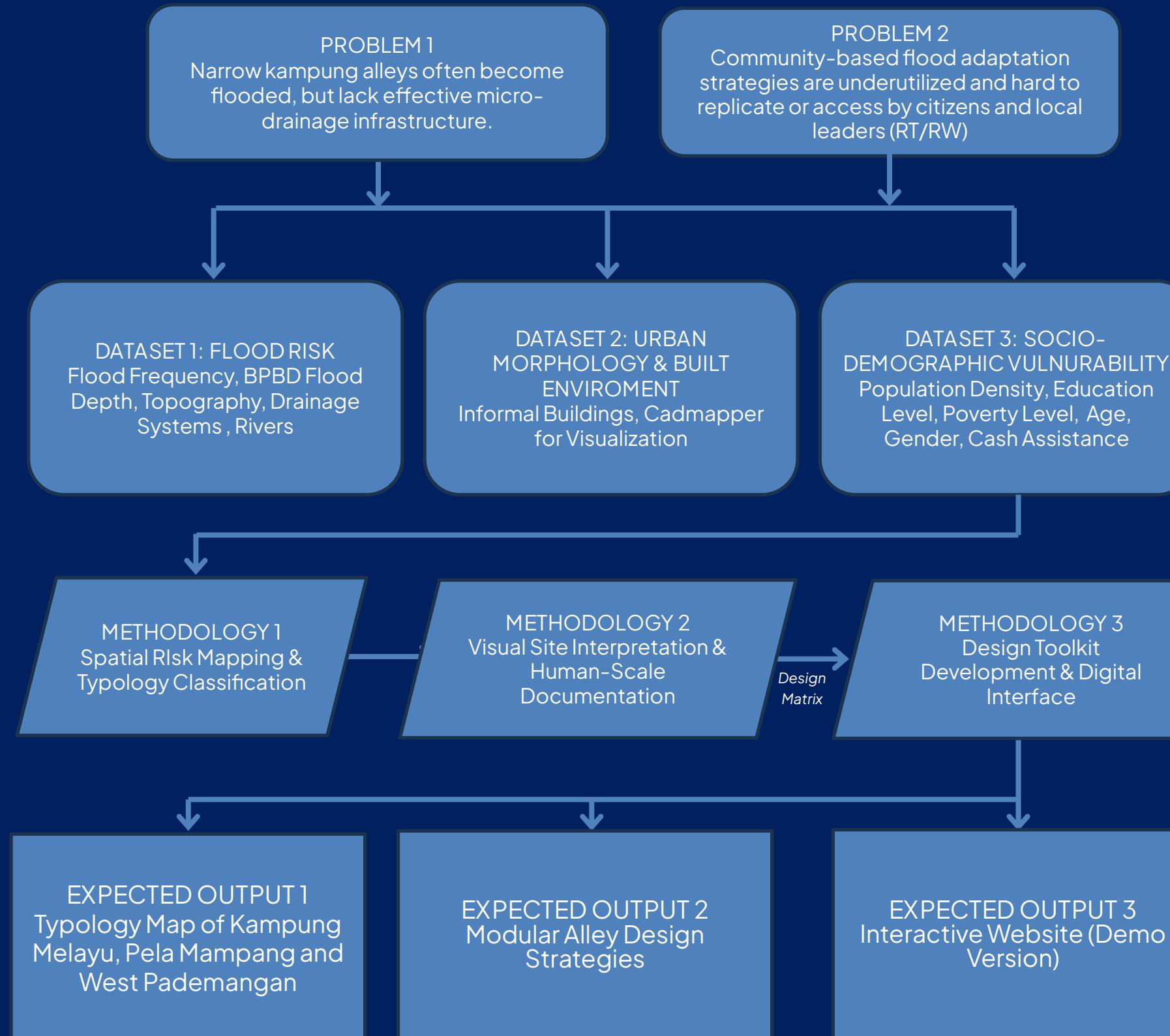
Corporate Social
Responsibility (CSR)

Each user has a role in sustaining flood-resilient kampungs.

From residents who live in the kampung, to local leaders, NGOs, and private sectors, our toolkit is designed to be usable and adaptable by all stakeholders.

Methodology

Project Workflow



Design Matrix

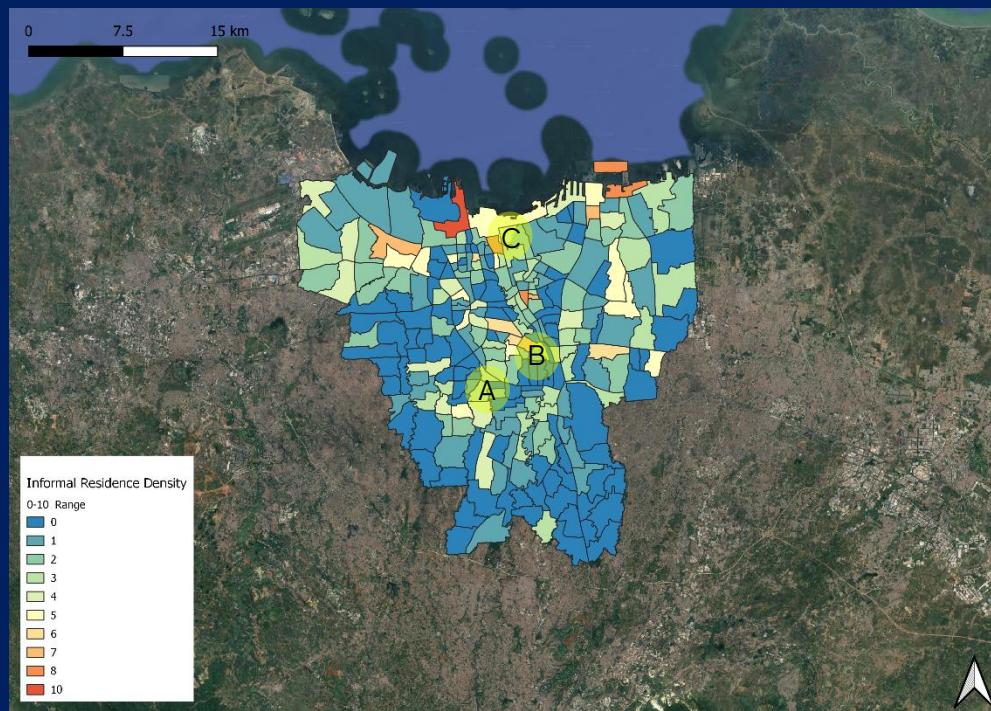
Length	Width	Surface	Drainage	Flood Risk	Activity	Design Module
5m	1	Concrete	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	1.5	Concrete	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	2	Concrete	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Infiltration Tank
5m	1	Asphalt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	1.5	Asphalt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	2	Asphalt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Infiltration Tank
5m	1	Dirt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	1.5	Dirt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	2	Dirt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	1.5	Concrete	Yes	Low (1-2)	Sosial, Komersial	Vertical Garden
5m	2	Concrete	Yes	Low (1-2)	Sosial, Komersial	Vertical Garden
5m	1	Asphalt	Yes	Low (1-2)	Sosial, Komersial	Mitigation (Signage)
5m	1.5	Asphalt	Yes	Low (1-2)	Sosial, Komersial	Vertical Garden
5m	2	Asphalt	Yes	Low (1-2)	Sosial, Komersial	Vertical Garden
5m	1	Dirt	Yes	Low (1-2)	Sosial, Komersial	Permeable Paving + Drainage
5m	1.5	Dirt	Yes	Low (1-2)	Sosial, Komersial	Permeable Paving + Drainage
5m	2	Dirt	Yes	Low (1-2)	Sosial, Komersial	Permeable Paving + Drainage
5m	1	Beton	No	Low (1-2)	Sosial, Komersial	Permeable Paving + Drainage

Made into a 5m² module for Cost Estimation Feature on the website

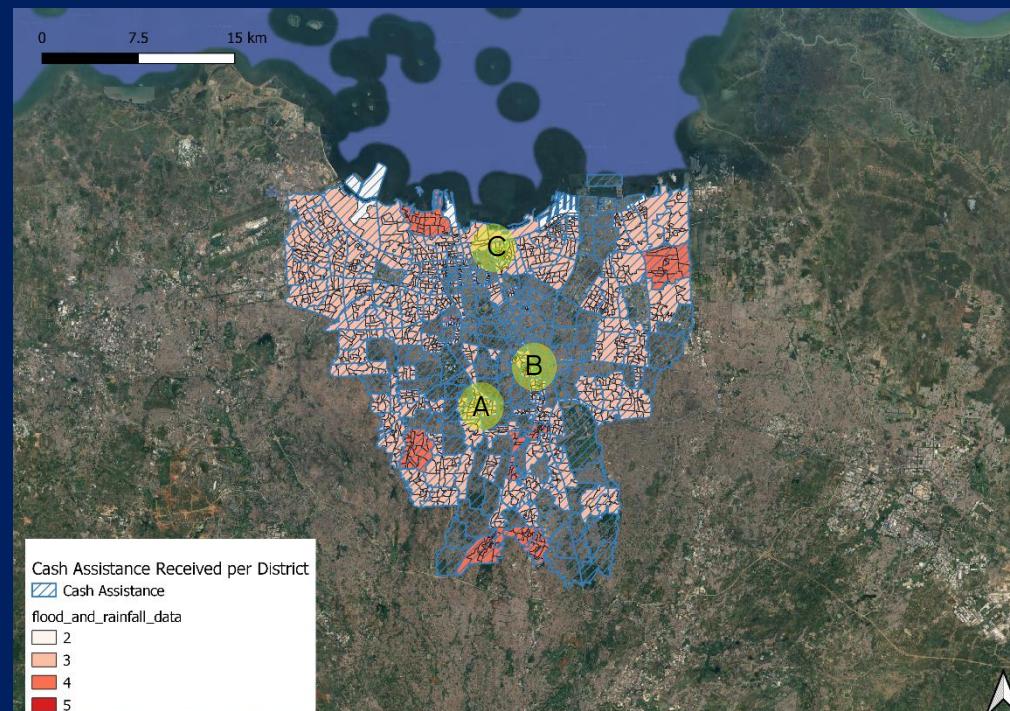
Data to input on the website

Output Design Solution

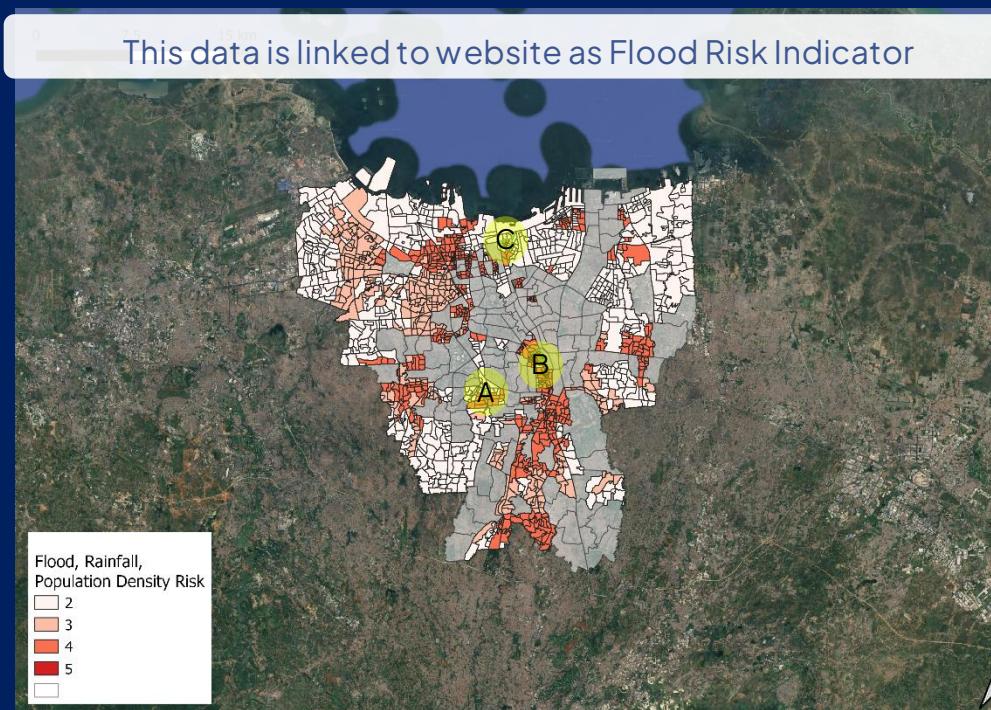
Macro Analysis Prioritizing Kampungs at City Scale



Informal Residence Map



Cash Assistance, Flood and Rainfall



Flood, Rainfall, Population Density Risk



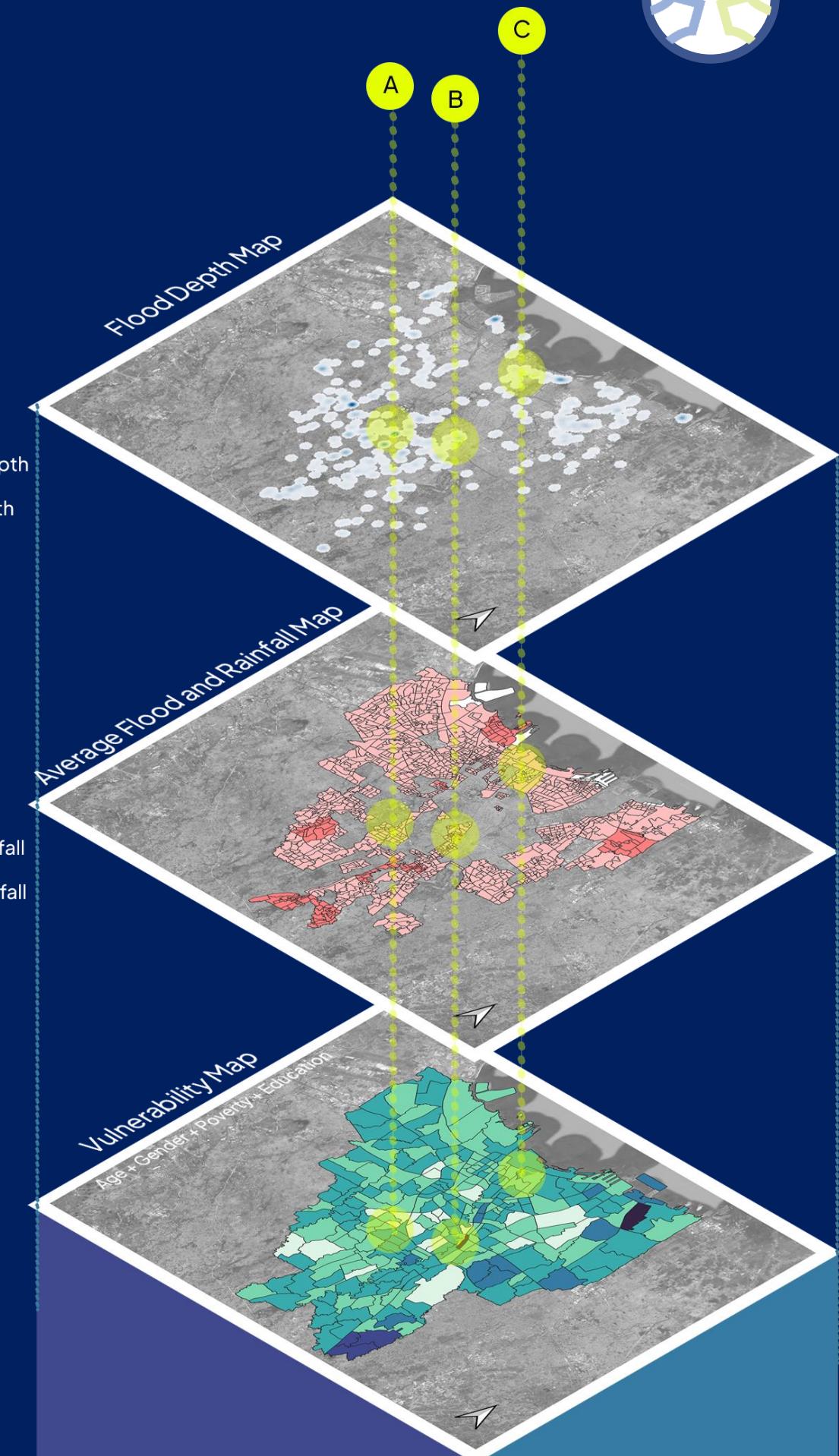
Pela Mampang Kampung Melayu West Pademangan

This analysis examines three kampungs with distinct characteristics and challenges, highlighting patterns of informal settlements, flood exposure, population density, and social vulnerability to guide intervention priorities.

Deepest Flood Depth
Shallow Flood Depth

Most Flood & Rainfall
Least Flood & Rainfall

Most Vulnerable
Least Vulnerable

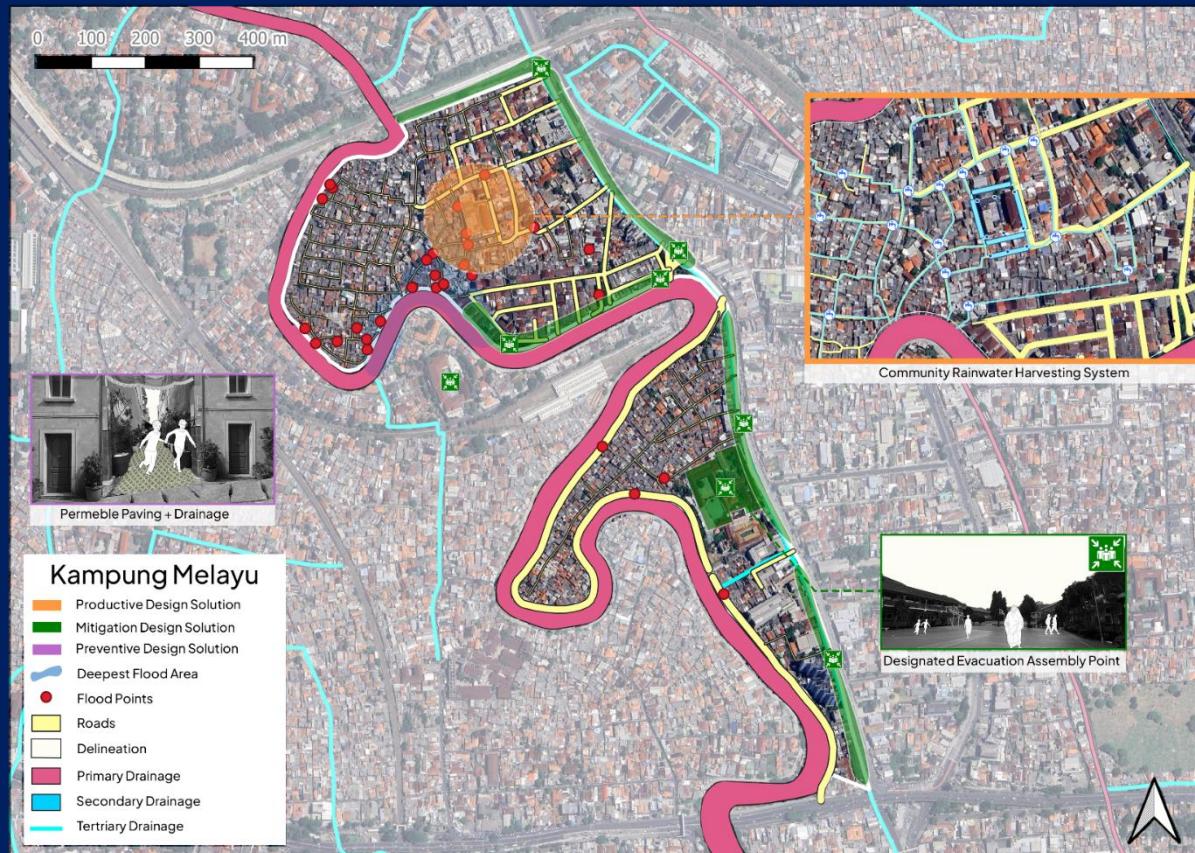


Meso Analysis

Meso-Scale Vulnerability & Opportunity Mapping

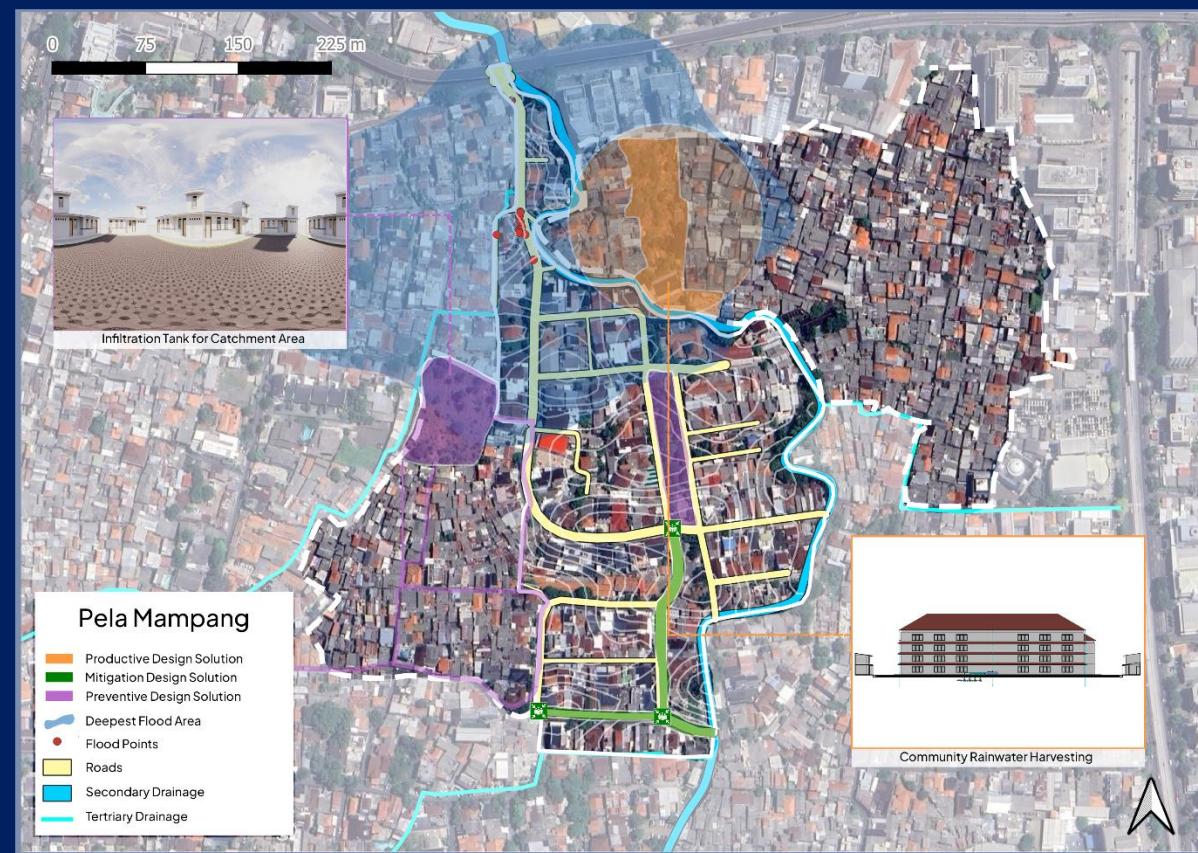


Kampung Melayu



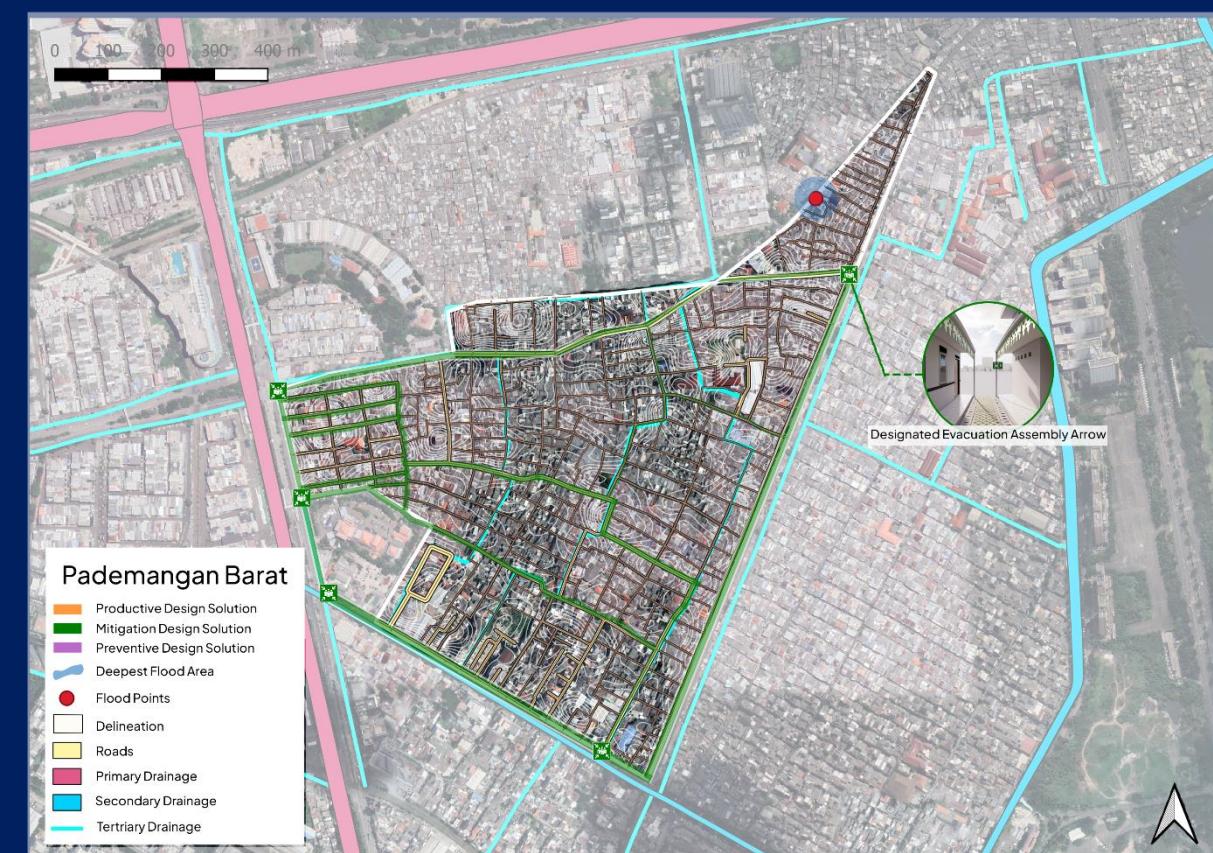
Near the River, Medium Depth of Flood, Yearly Flooding

Pela Mampang



Formal housing between 2 dense Kampungs, very deep flooding in the north

West Pademangan



Low flood depth, Flood source mainly from Tidal Flooding

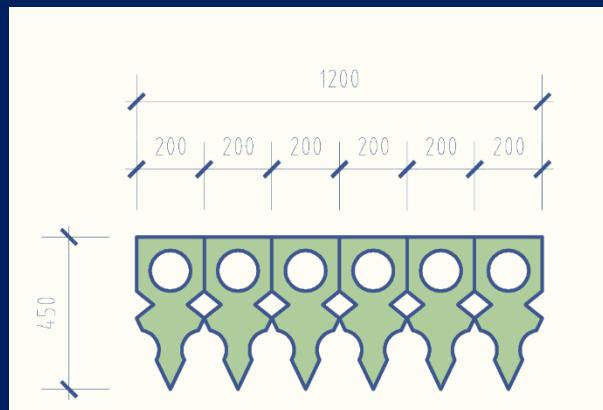
Viewing meso-scale maps across three kampungs helps reveal different constraints and risk patterns. This broader perspective guides the development of context-sensitive micro-scale design solutions.

Micro Analysis Alley Design Solutions



Through the meso-level analysis of the three kampungs, we identified five key design solutions. To make them more structured, these solutions are classified into three categories: Mitigation Solutions, Preventive Solutions, and Productive Solutions. Importantly, these solutions are not fixed; they are designed to be adaptive and can be further developed or expanded over time in response to changing needs and contexts.

Mitigation Solutions Signage and Assembly Points



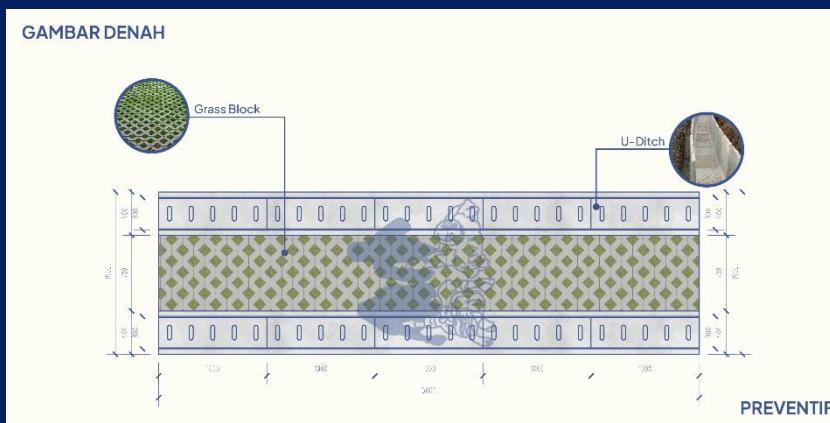
Detail Gigi Balang



Detail Penunjuk Arah

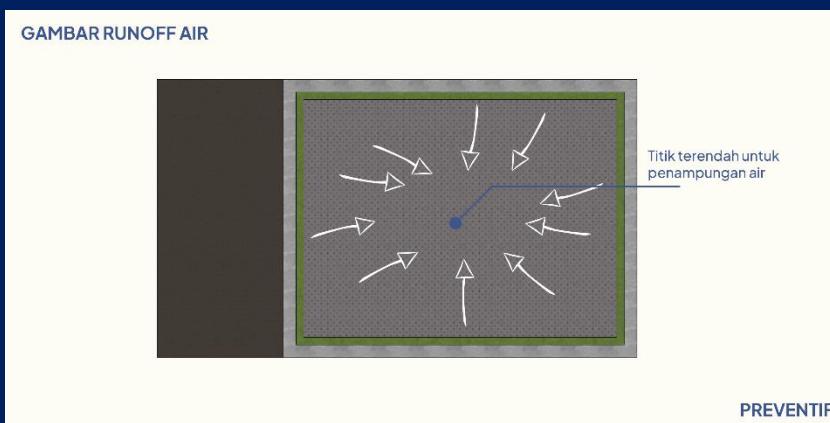
Sign Titik Kumpl

Preventive Solutions Permeable Paving



PREVENTIF

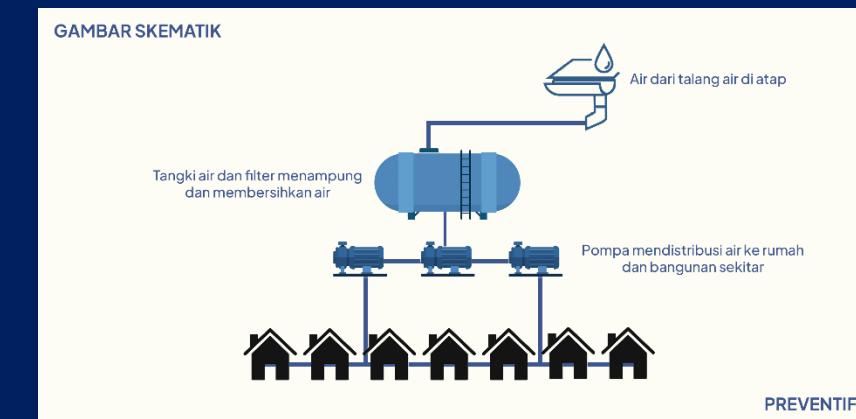
Infiltration Tank in Catchment Area



PREVENTIF

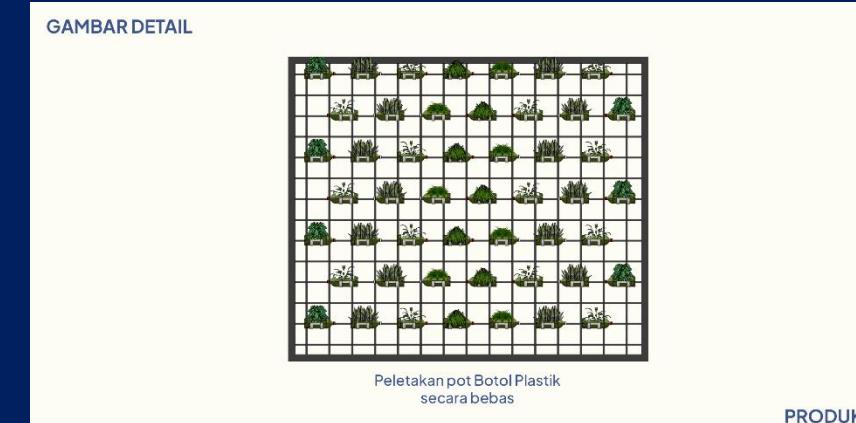
Productive Solution

Community Rainwater Harvesting



PREVENTIF

Vertical Garden



PRODUKTIF

Demo

Interactive Web Tool kit



About the BedahGang

The platform bridges communities and various stakeholders by providing evidence-based, adaptable design guidelines for diverse flood-risk typologies, while centering community voices in decision-making.

Data to Input

BedahGang

Step 1 Alamat Step 2 Dimensi Gang

Location

map

Surface

Kota/Kabupaten
Kota Kabupaten

Kecamatan
Kecamatan

Kelurahan
Kelurahan

Alamat
Jl. Melati No. 80

Konfirmasi Alamat

BedahGang

Step 1 Alamat Step 2 Dimensi Gang

Lebar Gang 1.0 m Panjang Gang 5.0 m

Permukaan Jalan Beton

Drainase Tidak ada

Penggunaan Gang Aktivitas Sosial Aktivitas Komersial

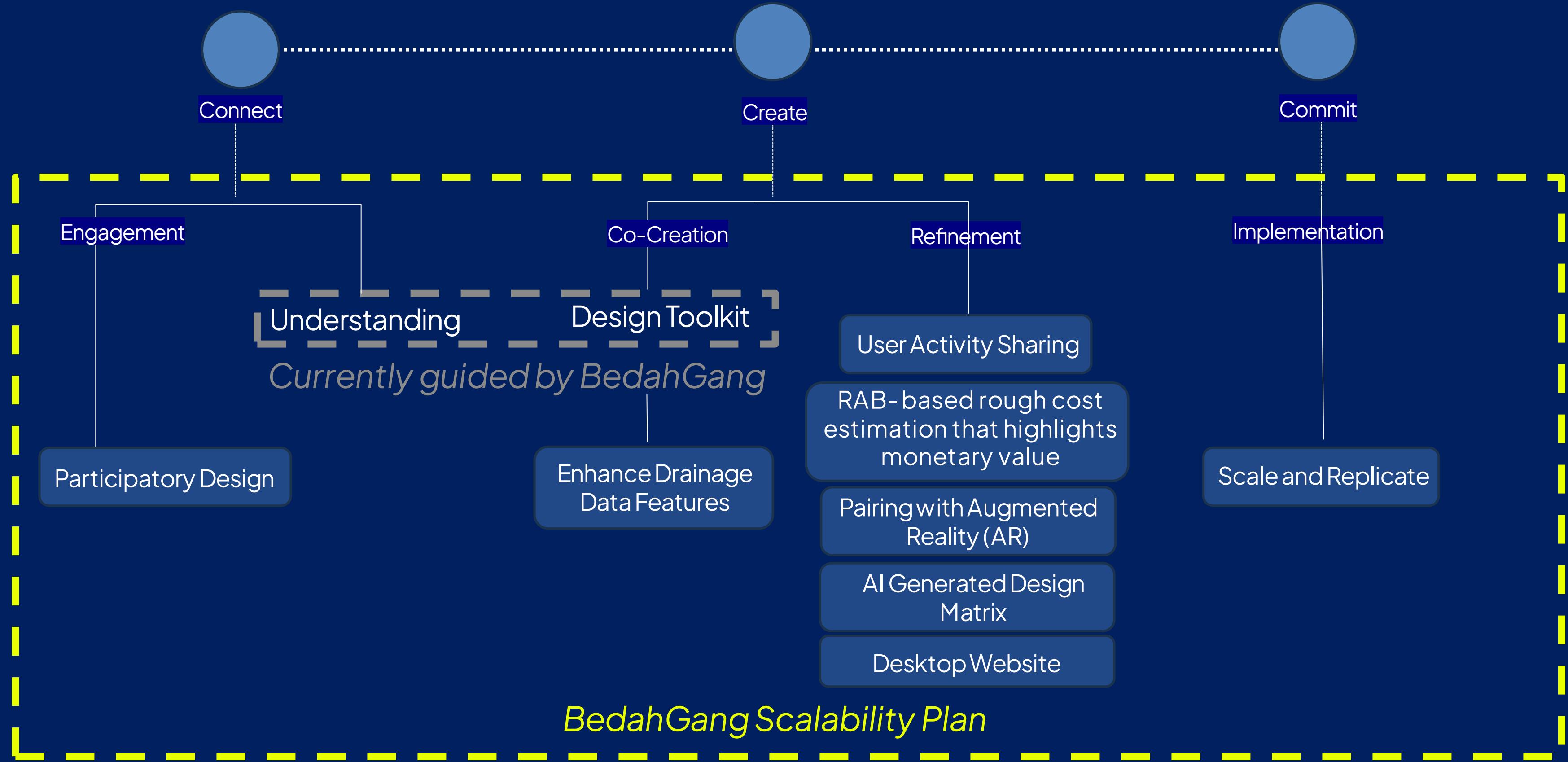
Jalur Kendaraan Jalur Pejalan Kaki

Konfirmasi Dimensi Gang



Scalability Plan

What's Next?





Beyond floods, towards resilience

Jalur Air Sosial opens pathways not only for water, but for people to live and grow together.

