

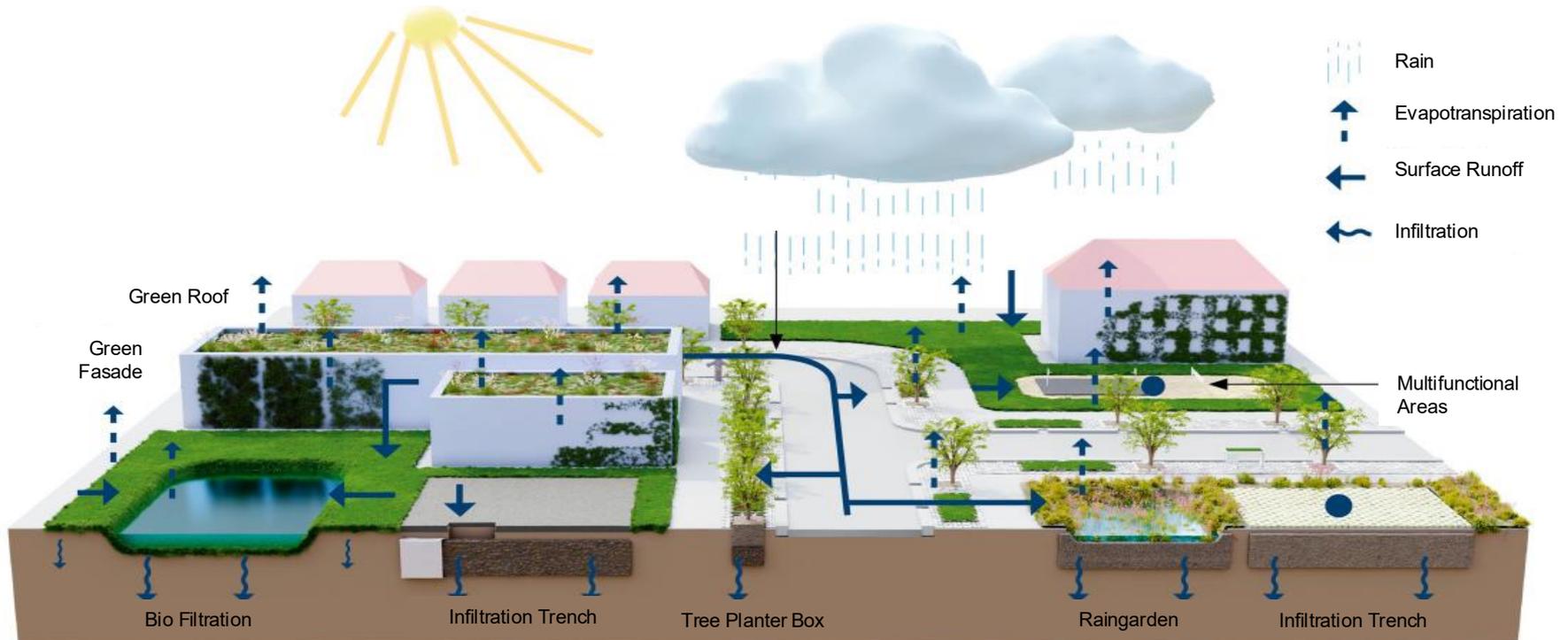
Potential analysis of NBS for urban areas

Ganbaatar Khurelbaatar



New Orleans, Oct. 09, 2025

What is NBS within Urban Areas?

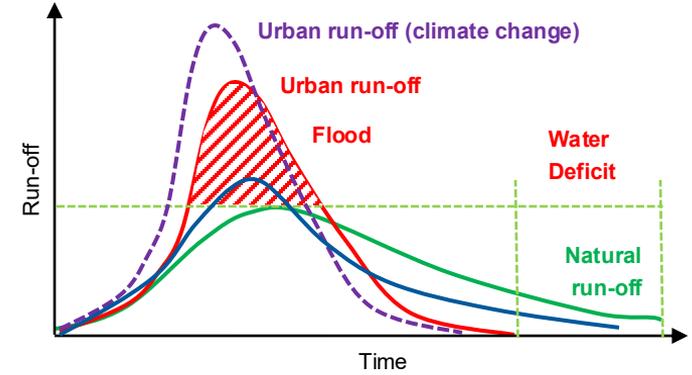
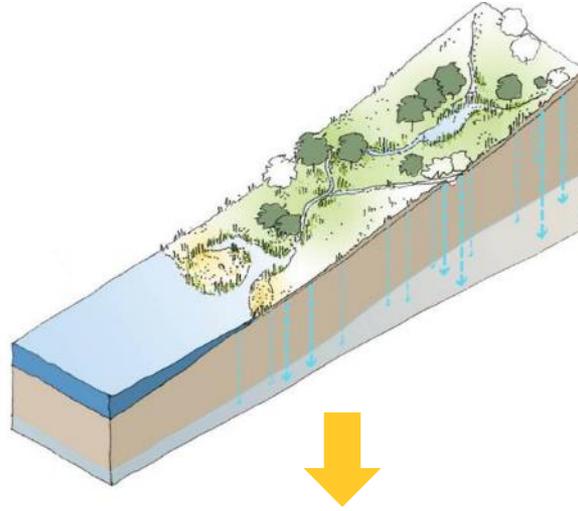


Green Infrastructure: incorporating natural landscapes into urban (public) spaces.
Blue-Green Infrastructure is combining **green** spaces alongside water management.

Problem Statement

Stormwater

- Flood
- Pollution
- Restoration of natural water cycle



Planning platform modules for urban stormwater management

- Pre-planning | Masterplan urban water management



Green Infrastructure incorporates natural landscapes into urban (public) spaces.

Blue-Green Infrastructure combines green spaces alongside water management.

- Along the **Centralisation gradient**

- Along the **Technology**

Decentralized

- On-Site infiltration/storage
- Roof | Streets
- Decentralized treatment

Centralized

- Combined | Separate sewer
- Sewer

Grey | Conventional

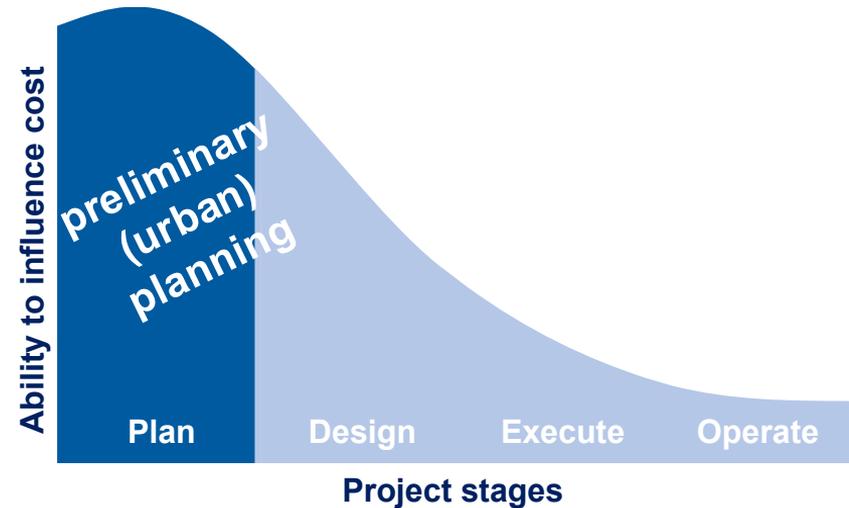
- WWTP/ Sewer
- Storage

Blue Green | NBS

- BRC / Greenroof
- Raingarden/ Infiltration

Scenario-based pre-planning approach

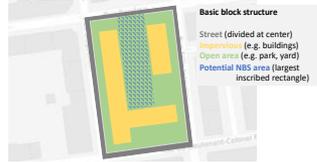
- **Preliminary planning** tools provide impact & cost estimates of urban water management scenarios.
- Scenario evaluations can provide a **basis for stakeholder discussion**. Development of **plausible scenarios** can already be a result of early stakeholder involvement.
- Scenarios include baseline (business-as-usual) or **guideline-based** (e.g. DWA* standards) but also **resource-efficient versions** that may not yet conform with local standards.



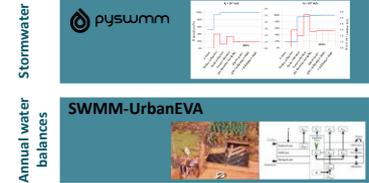
Planning low impact developments at the block scale

LID | BGI | SUDS | NBS

Block
aggregation



(Un)Developed
Stormwater &
Water demand

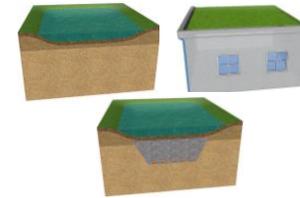


Scenario
development

BGI potential impact/
cost assessment



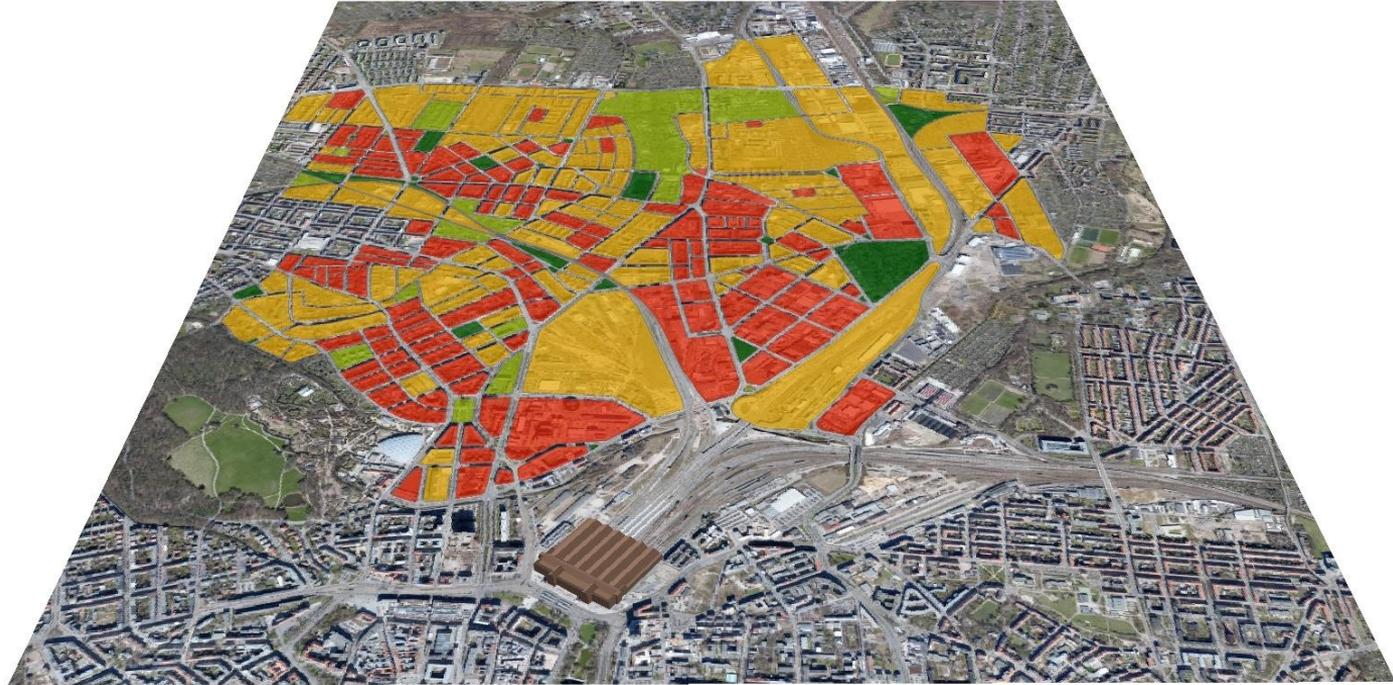
NBS
dimensioning



NBS
Stormwater &
Water demand



- No Rain



Rain simulation : Current situation

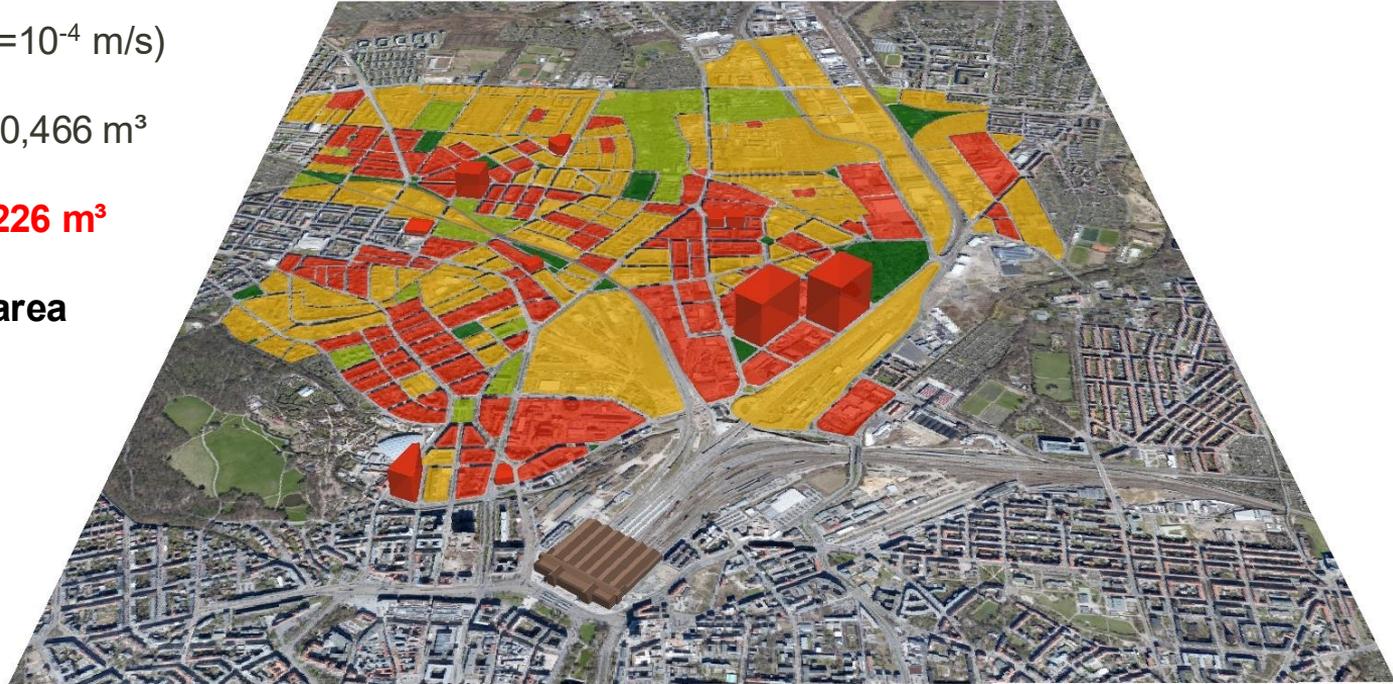
- 30 years rainevent (2 h, 50mm)
- Soil permeability ($k_f=10^{-4}$ m/s)
- Rain volume 320,466 m³
- Runoff volume 151,895 m³



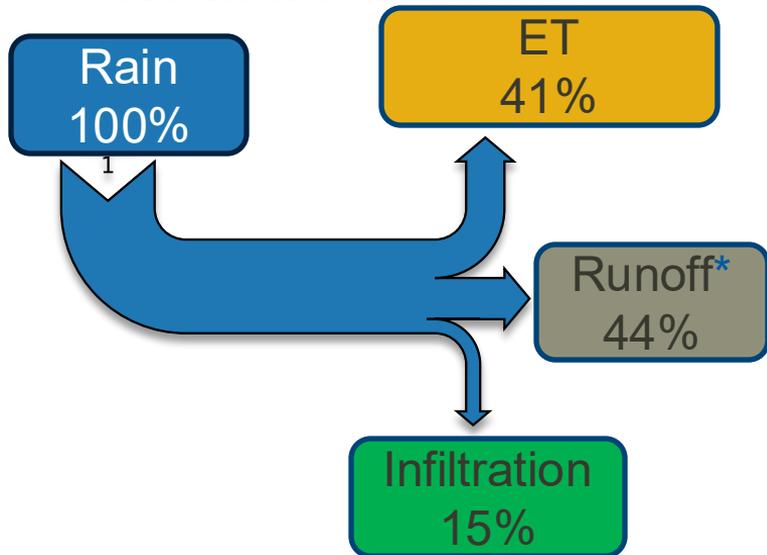
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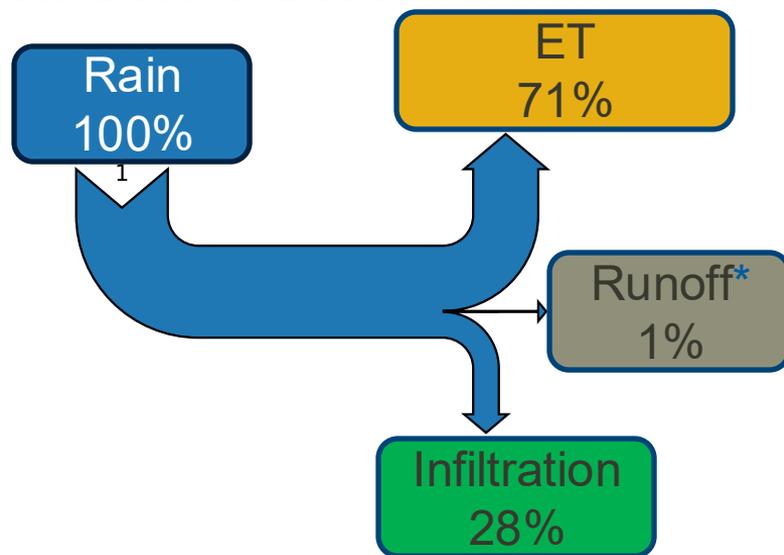
- 30 years rainevent (2 h, 50mm)
- Soil permeability ($k_f=10^{-4}$ m/s)
- Rain volume 320,466 m³
- **Runoff volume 1,226 m³**
- **14% of available green area**



Urban Water Balance



Near Natural Water Balance



Restoration of natural water Balane. (Nationaler

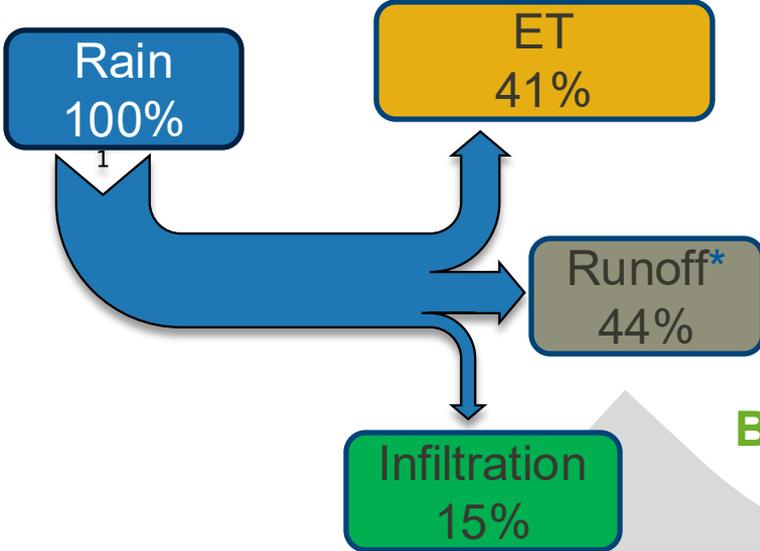
Wasserstrategie, DWA 100, DWA 102) | Resource efficient

* Surface Runoff

Towards the a near natural water balance

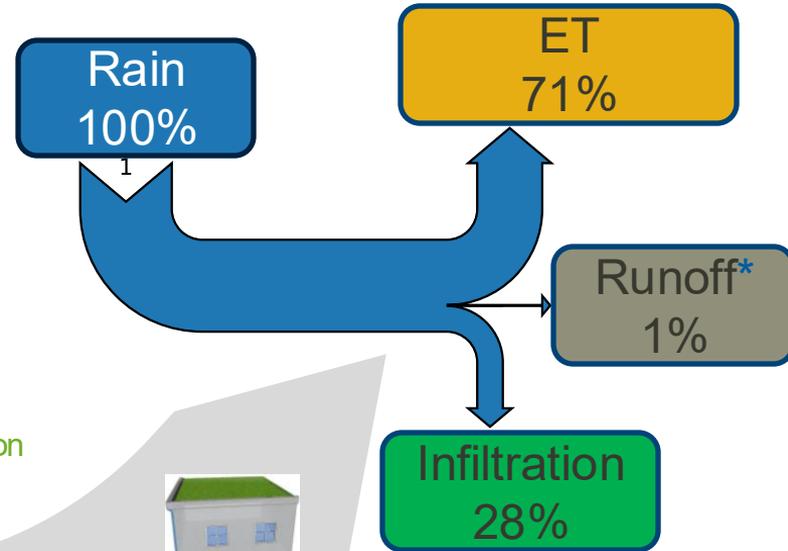
Urban Water Balance

BGI Irrigation

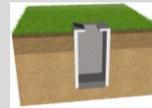
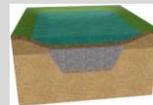


Near Natural Water Balance

BGI Stormwater

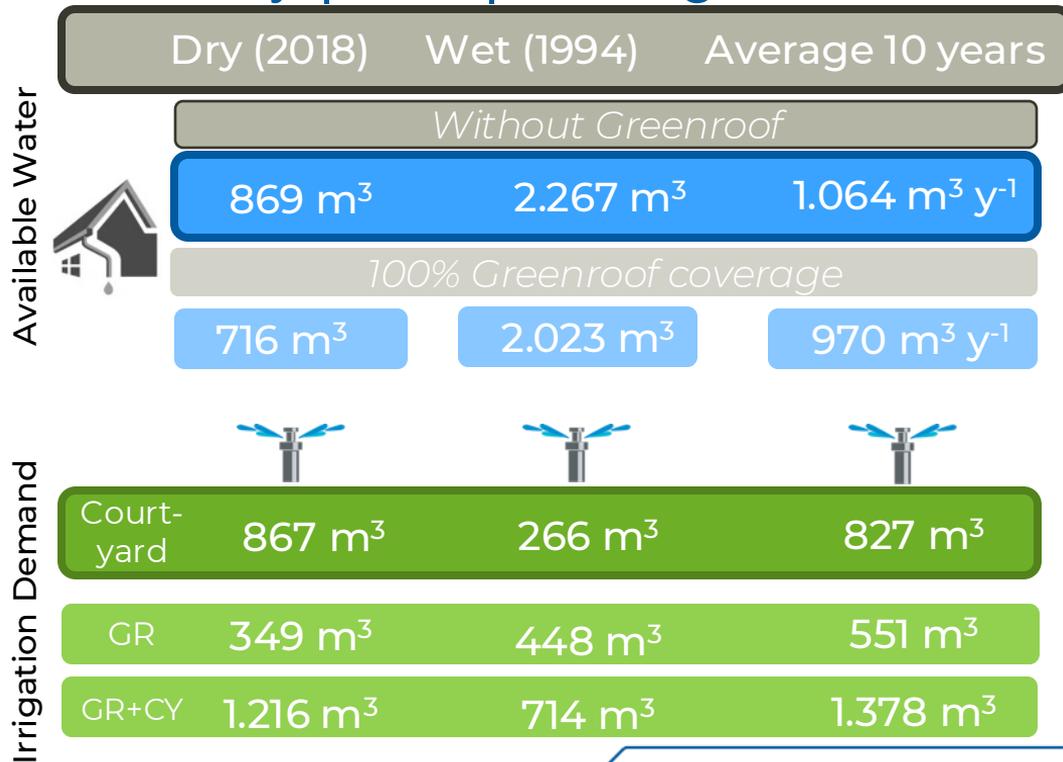
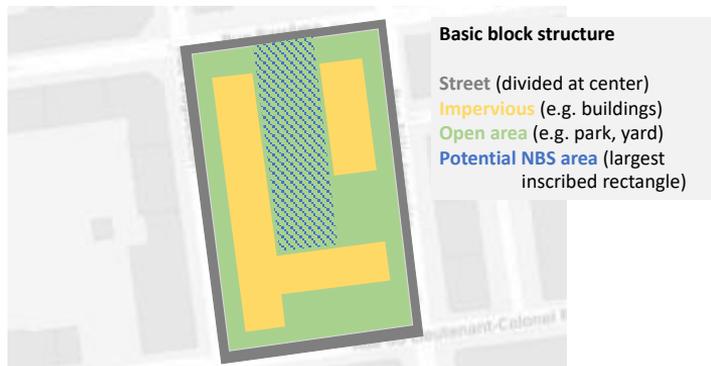


BGI Stormwater / Irrigation



Restoration of natural water Balane. (Nationaler Wasserstrategie, DWA 100, DWA 102) | Resource efficient

Water requirement for Dry | Wet | Average



Sewer generator

Scenario-based modelling

Co-Design

Short- and Longterm Water Balance

Block-based Infrastructure planning

NBS Dimensioning

Data reduced & Transferable

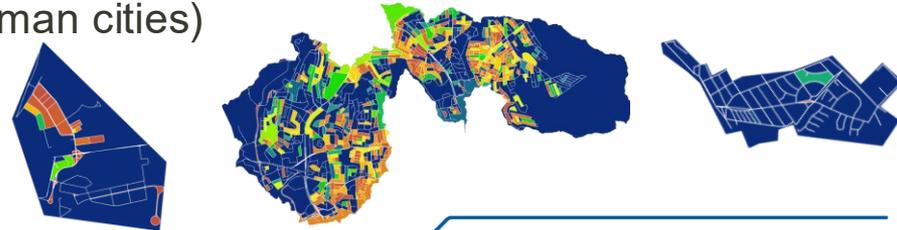
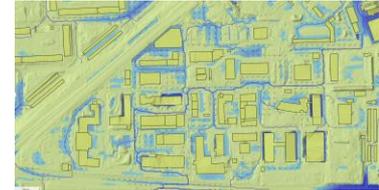
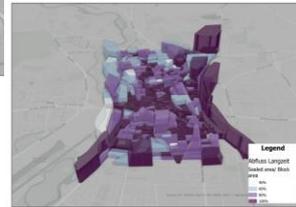
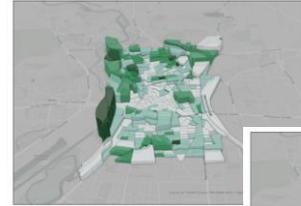
Cost-module



Model 2:
Lumped Model

Model 3:
Block connection
Our approach

- NBS Potential Analysis in **City of Halle** (Germany), Santiago de Compostella (Spain), Aarhus (Denmark), Amman (Jordan), Lyon (France), Ho Chi Mihn (Vietnam).
- **Sustainable Campus Development Strategy** (Helmholtz 17 Campi)
- **New establishment projects in Leipzig**
- **Blue Green City Coaching** (10 Mid-sized German cities)



Are you a city or municipality that...

...is facing challenges from heavy rainfall or drought?

...is looking for solutions for sustainable urban development?

...would like to explore the blue-green potential of your city?

...wants to compare and strategically evaluate different scenarios?

...requires sound preliminary planning for the next steps in (planning) implementation?

Then we will be happy to work with you

Reach out to us - and help us shape the path to a climate-resilient city.



www.ufz.de/stadt-buero
stadtbuero@ufz.de



Vielen Dank für die Aufmerksamkeit!

Foto: A. Zehnsdorf

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