

KONFERENCE

počítáme  
s vodou



# POČÍTÁME S VODOU 2016

MEZINÁRODNÍ KONFERENCE O HOSPODAŘENÍ SE SRÁŽKOVÝMI VODAMI V ZASTAVĚNÝCH OBLASTECH

PRAHA • 23. 2. 2016

## Examples and Experiences with Decentralized Stormwater Management in Germany

Dr. Harald Sommer



THE STORMWATER EXPERTS  
INGENIEURGESELLSCHAFT  
PROF. DR. SIEKER MBH

Hoppegarten b. Berlin  
Germany

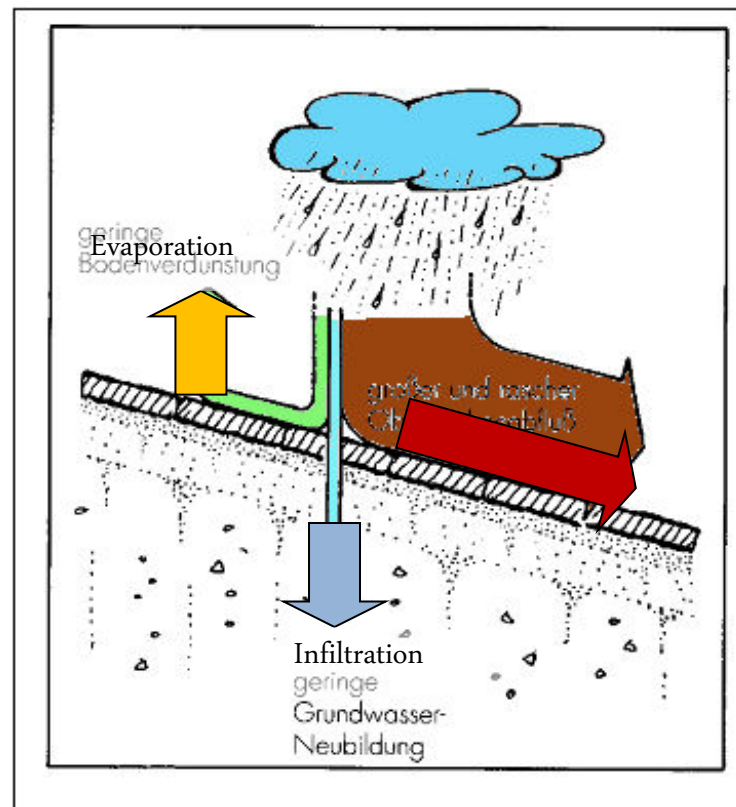
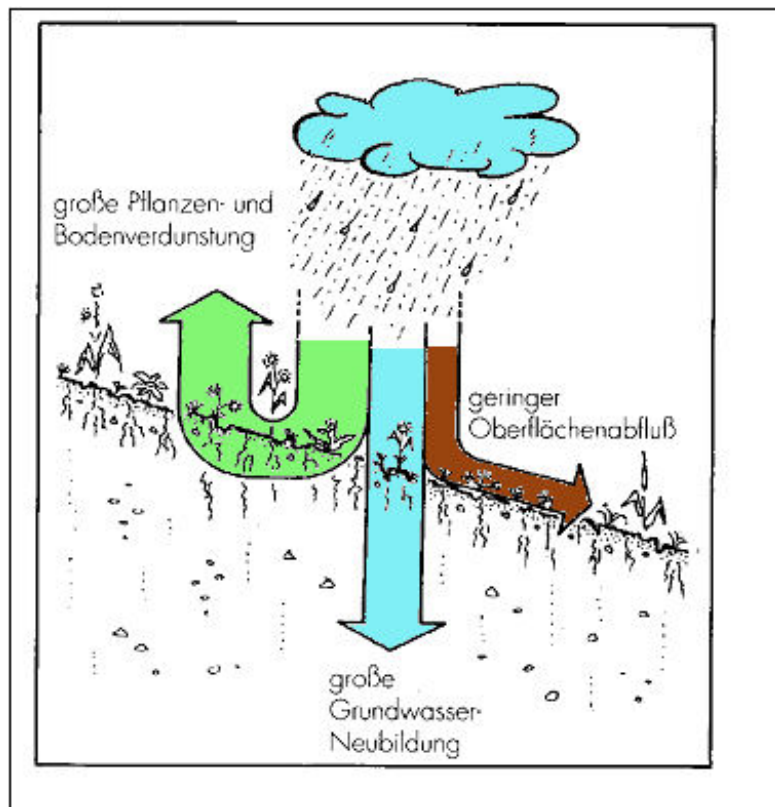


# Content

- Storm water management with SUDS/LID/BMP
  - Water retention in the catchment with SUDS/LID/BMP
  - Strategy and Future

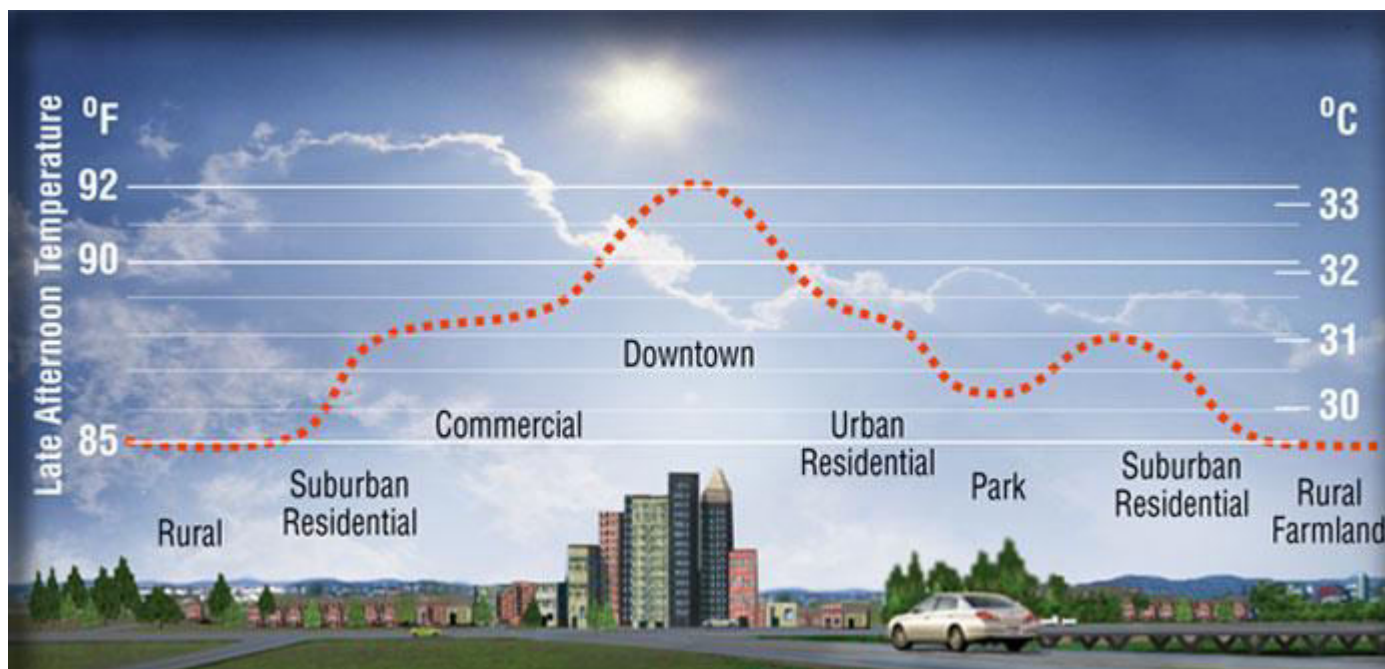


# Compensation of Effects for Water Balance





# Heat Island Effect



Quelle: cnx.org

- Urban Heat Stress => Stress for people
- Reasons for Heat Island Effect:
  - High heat storage and radiation
  - Low evaporation => low cooling

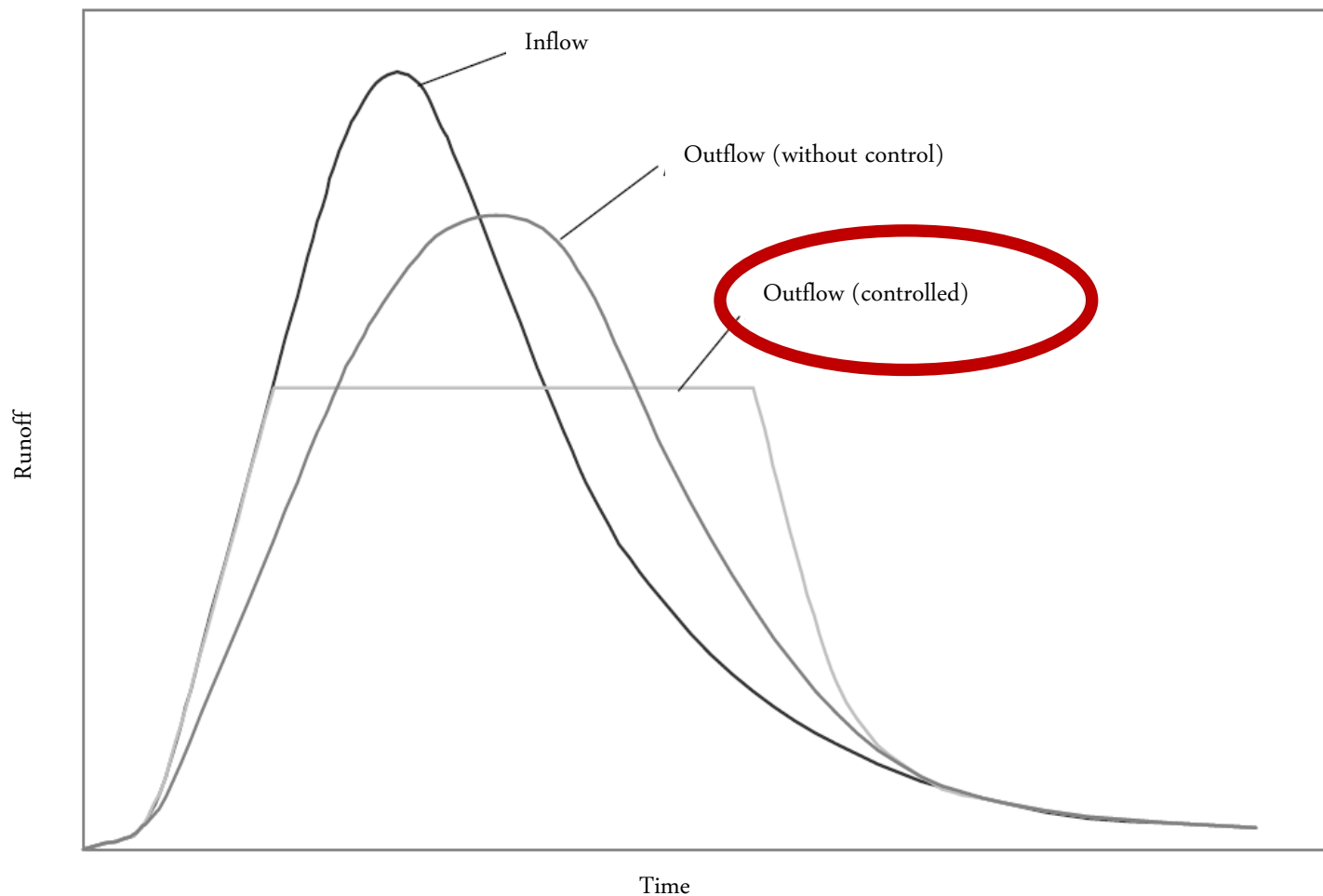


# Concept of Measures





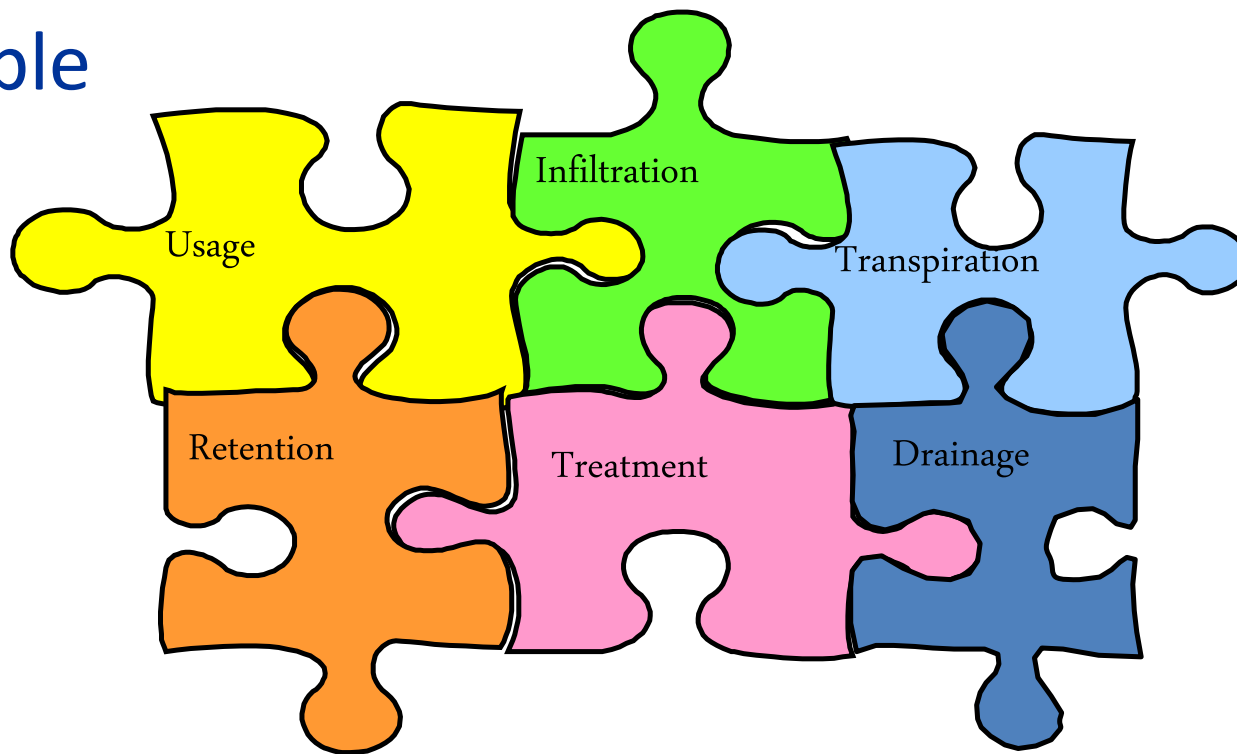
# Inflow/Outflow





# Water retention in the catchment Storm Water Management with SUDS (or LID, WSUD and BMP)

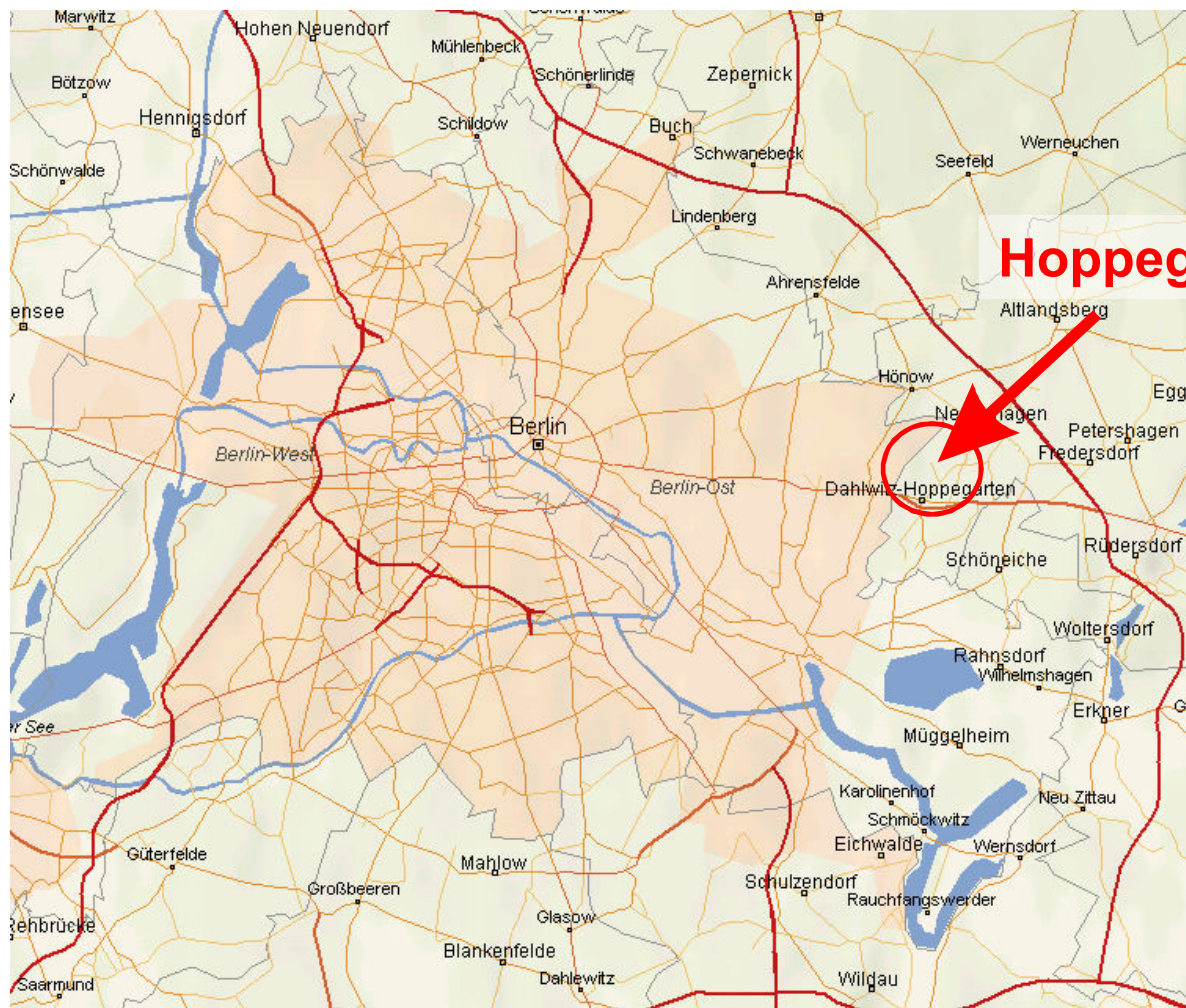
- Lot of technical solutions for SWM are available







# Example: Hoppegarten (1992-....)







# Example: Hoppegarten





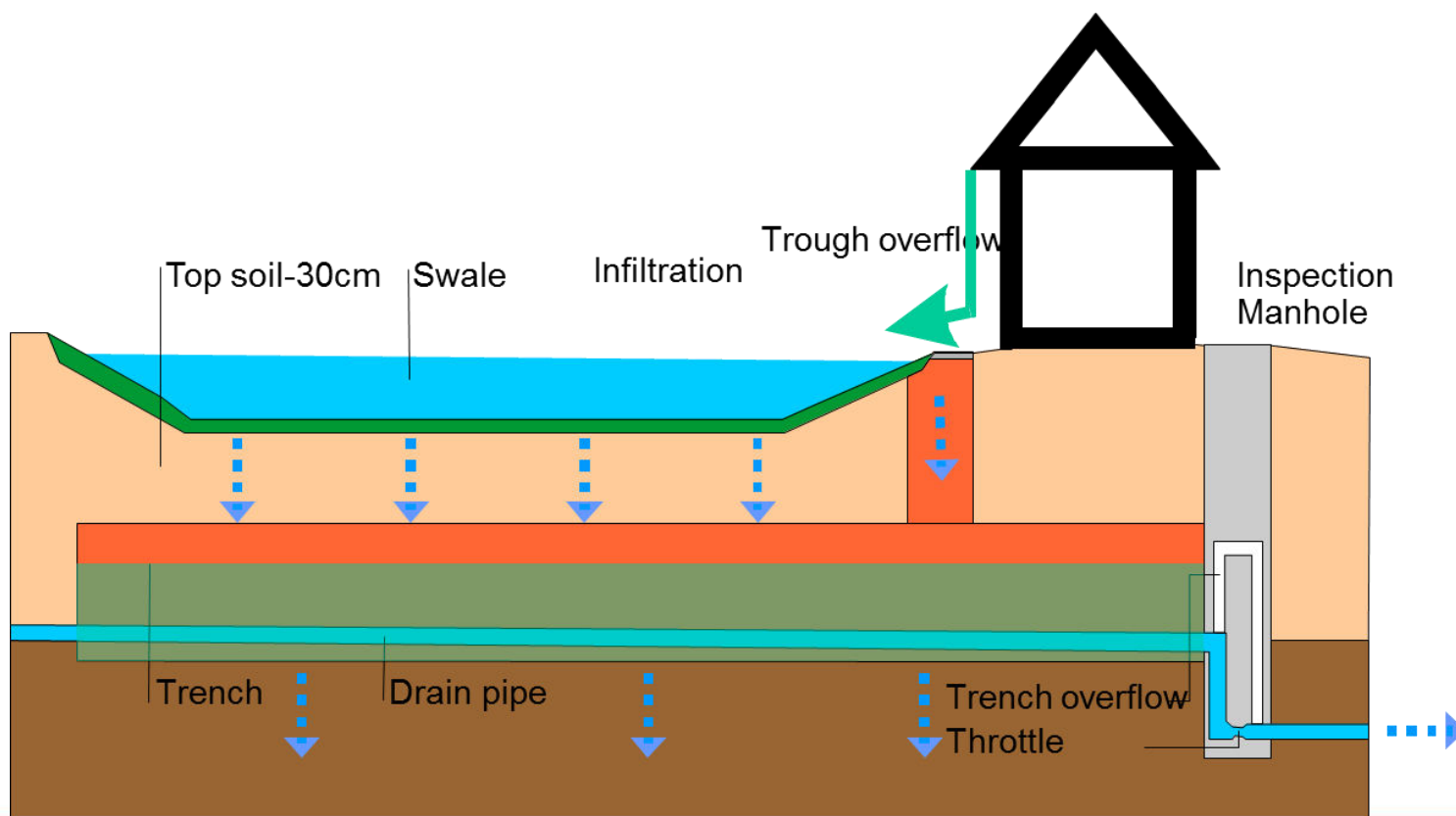
# Example: Hoppegarten

- Difficult hydrological conditions
  - Receiving waters with low capacity
  - max. discharge allowed: 40 l/s for 100 hectare development area
  - One year design storm for 100 hectare: leads to 10-15 m<sup>3</sup>/s
  - Retention necessary
- Difficult geological conditions
  - Glacial loamy soils from iceage: poor infiltration capacity
  - Storm water infiltration only partly possible



# Example: Hoppegarten

- Swale Trench Element for Storm Water Management







# Example: Hoppegarten







# Example: Hoppegarten





# Example: Hoppegarten

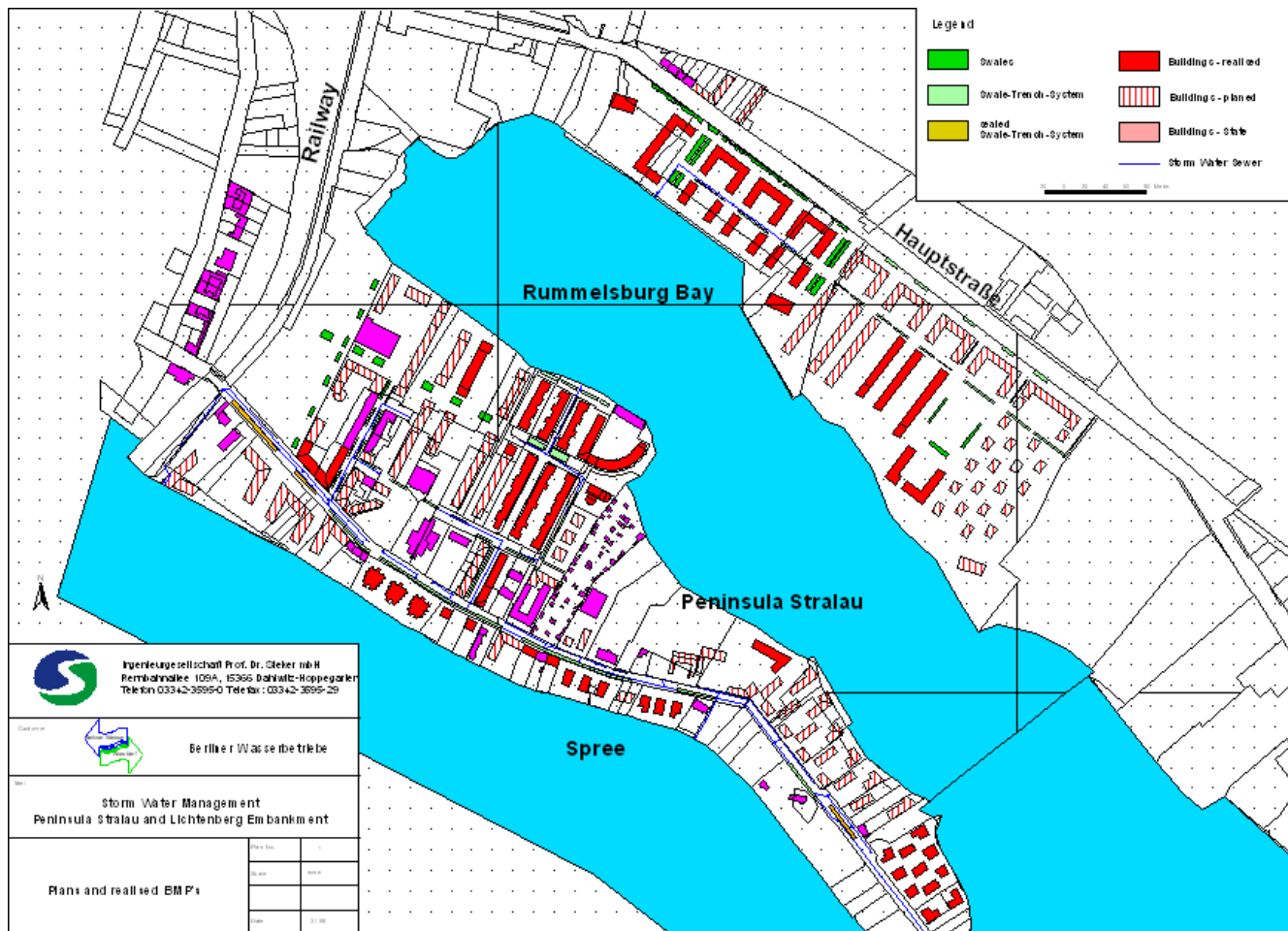


Fa. Schlei





# Example: Berlin-Rummelsburg (1995-....)





# Example: Berlin-Rummelsburg

- Area
  - total: 73 ha
  - houses: appr. 14 ha
  - Streets: appr. 10 ha
- Storm water elements
  - swales and swale-trench-elements 13900 m<sup>2</sup>
  - hereby: appr. 1000 m<sup>2</sup> sealed swale-trench-elements (no infiltration, only temporary storage)

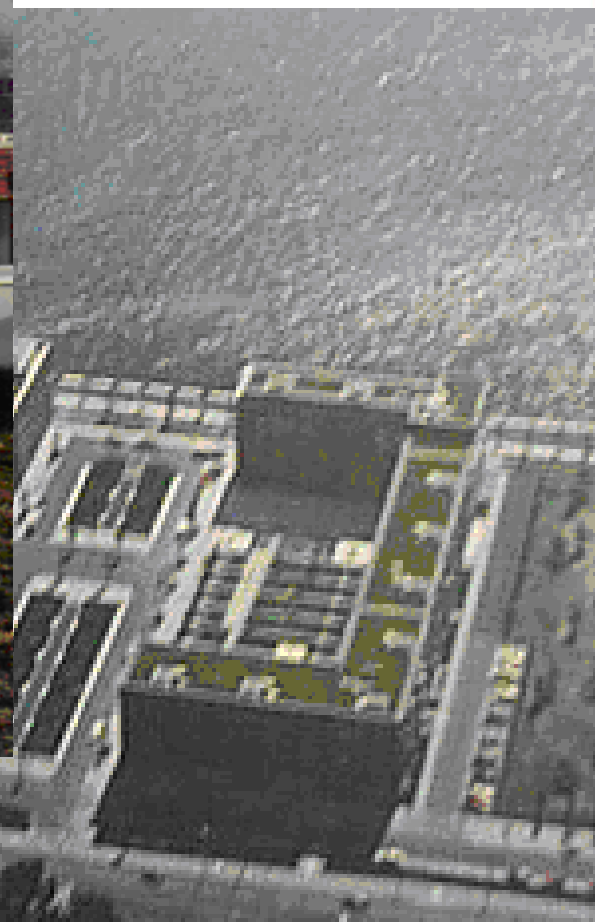


# Example: Berlin-Rummelsburg





# Example: Berlin-Rummelsburg





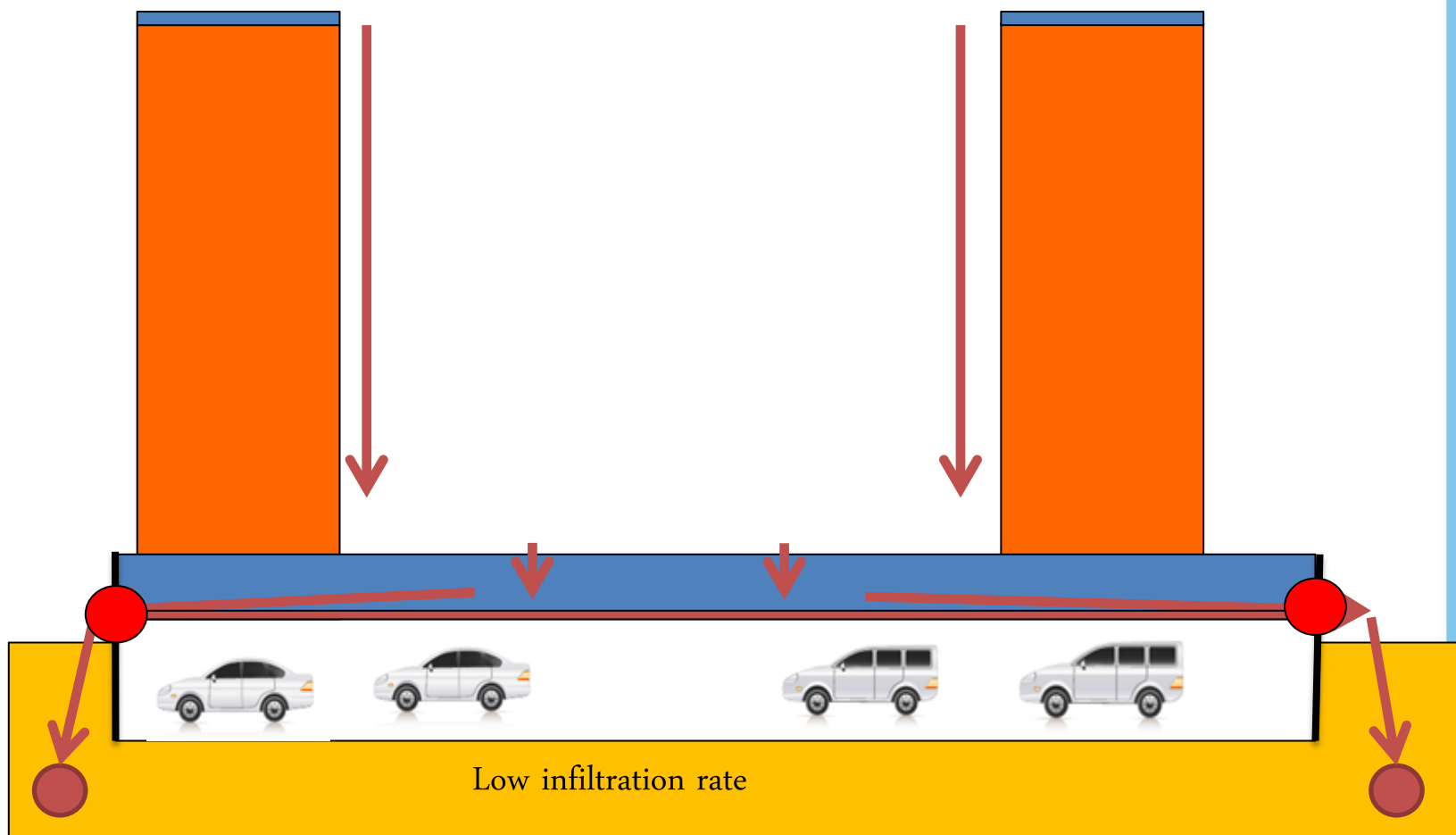


# Example: Berlin-Rummelsburg





# Example: Rummelsburg, modified



- Connected with sewer with controlled runoff







# Solon AG (2008)

- Fa. Solon AG in Berlin Adlershof
- Solar Cell Company





# Solon AG, Berlin Adlershof

- Plan

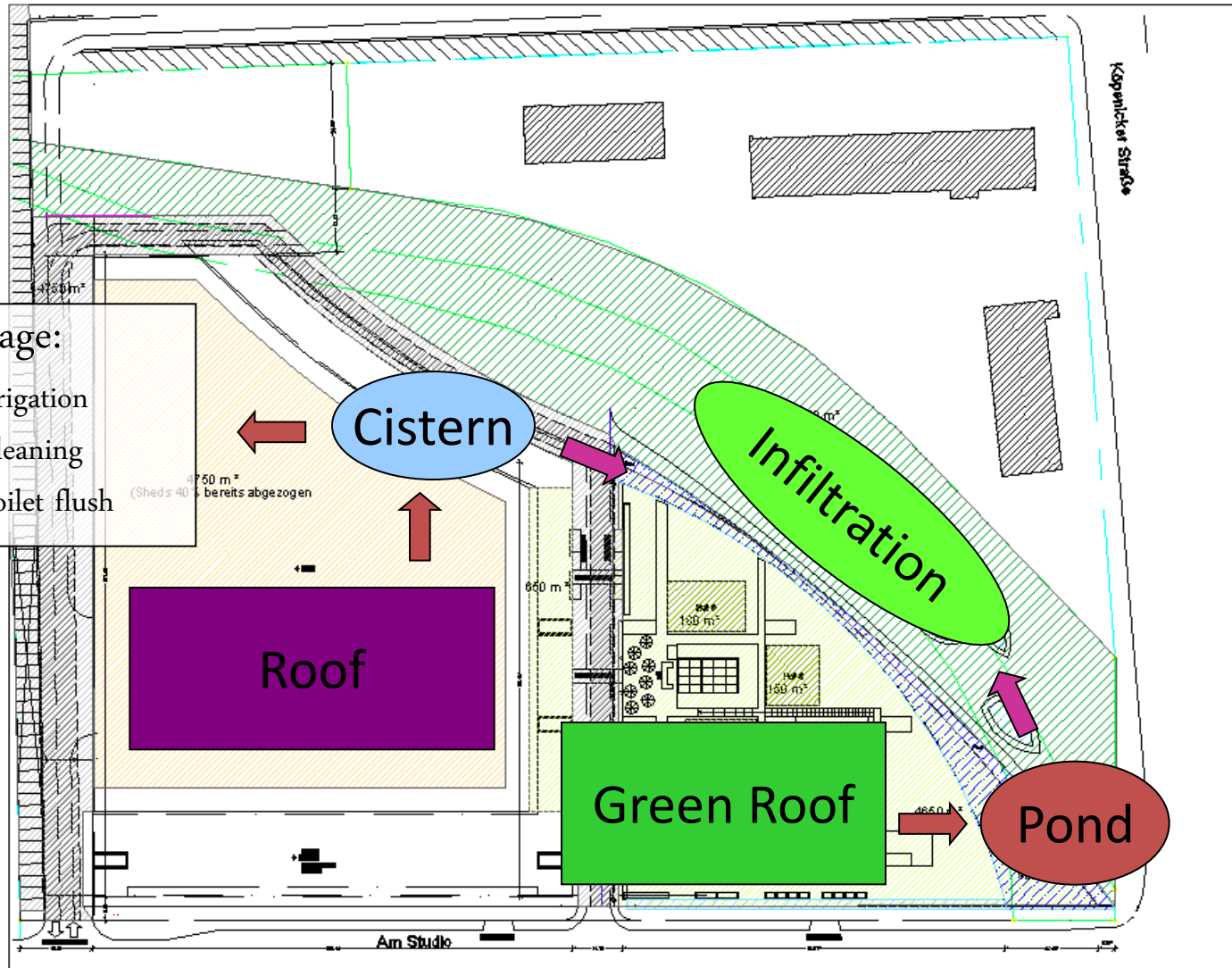
- Land

- Surface

- Structure

Usage:

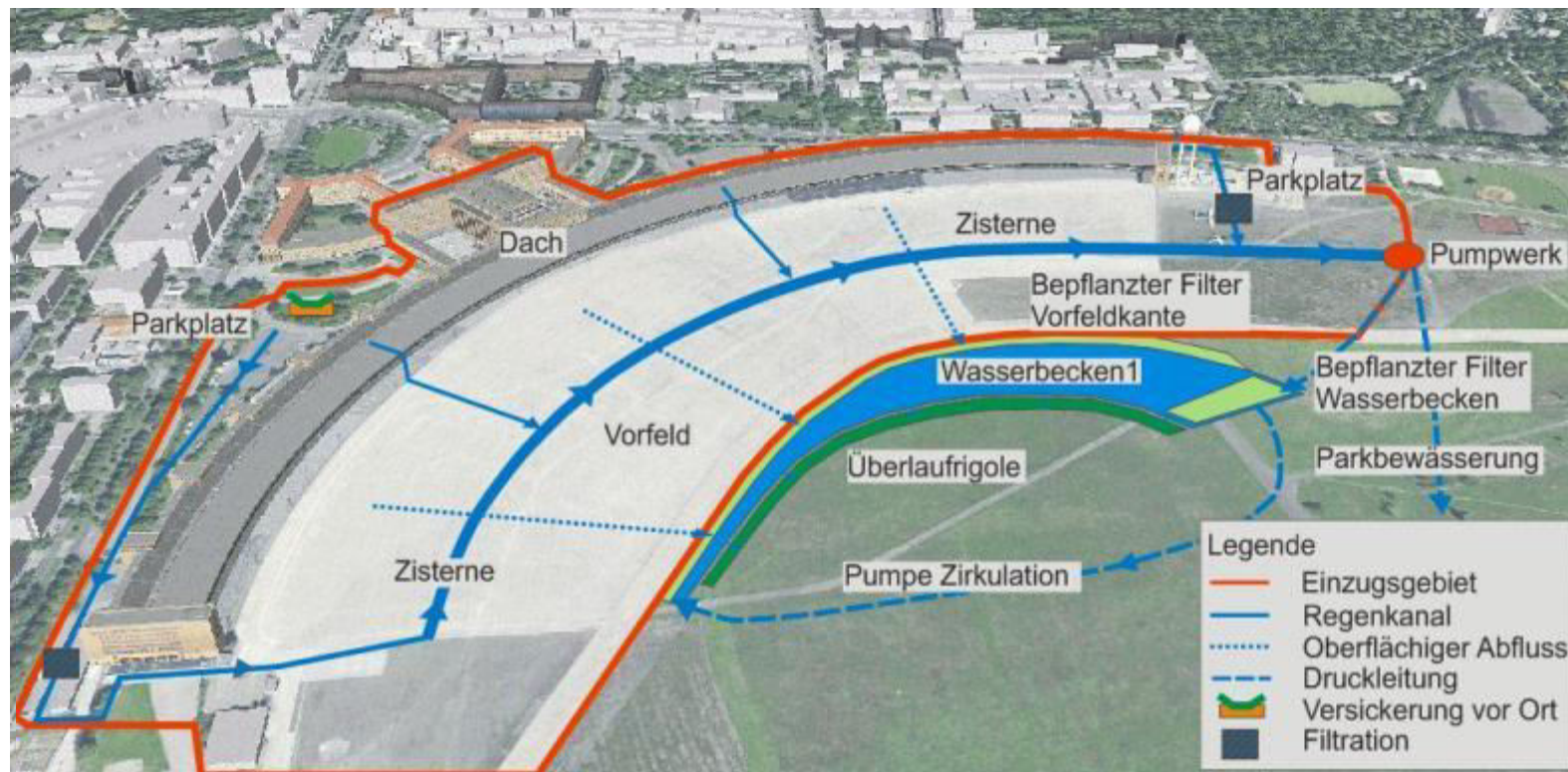
- Irrigation
- Cleaning
- Toilet flush







# Example Tempelhof (2014)



TEMPELHOFFER  
FREIHEIT

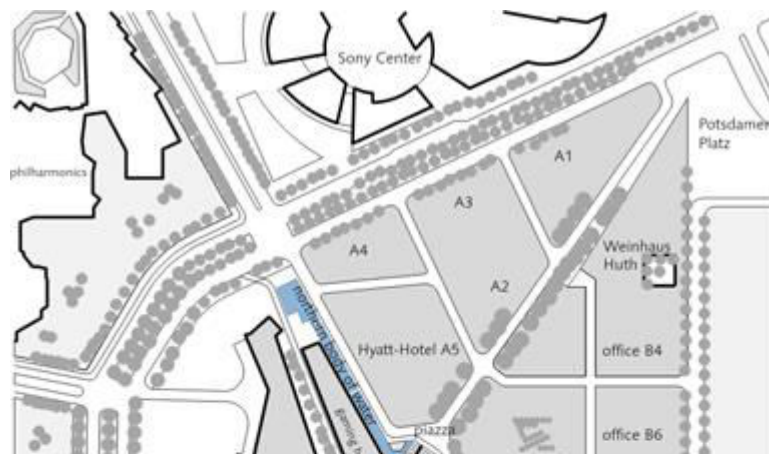
Tempelhofer Freiheit  
Niederschlagsentwässerung  
Konzeption



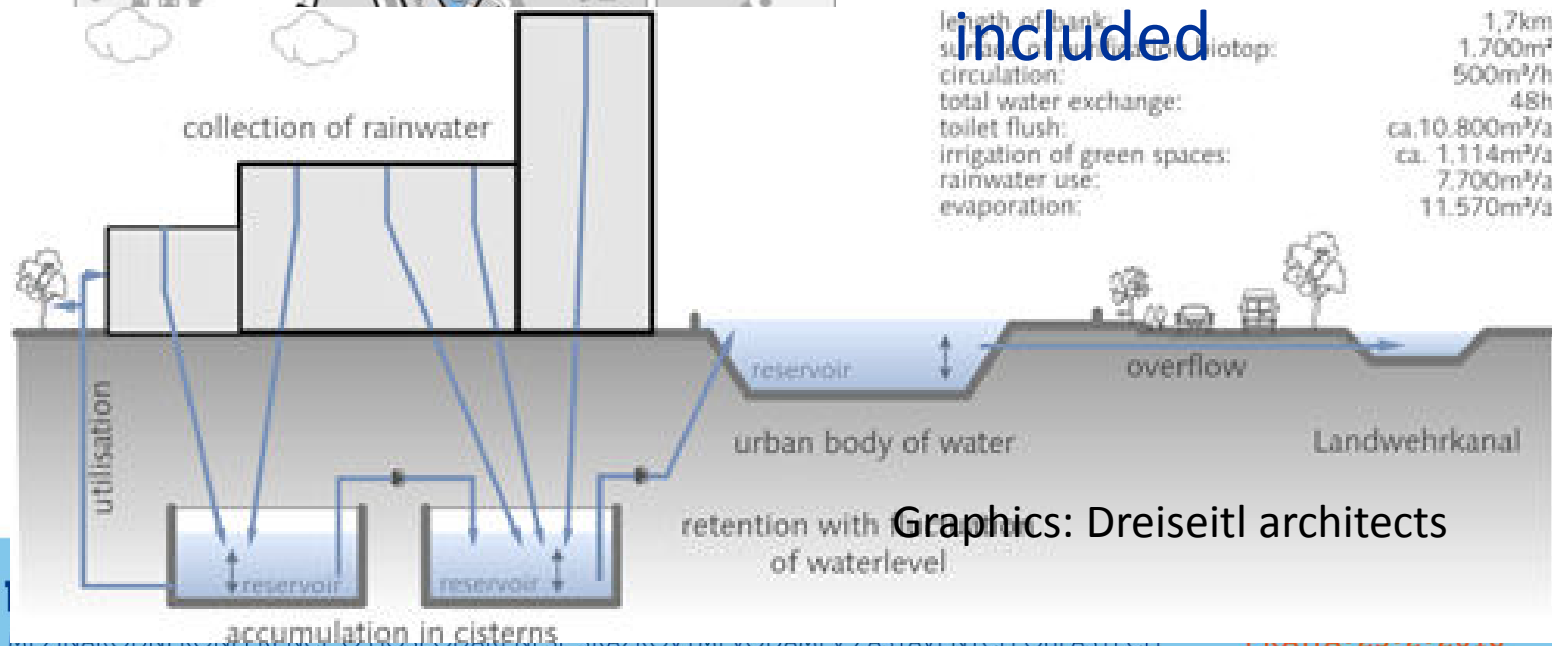
THE STORM WATER EXPERTS  
INGENIEURGESELLSCHAFT  
PROF. DR. SIEKER MBH



# Potsdamer Platz, Berlin (1995)



- Roofs and Greenroofs with ponds, filtration and water reuse, 1995
- ~ 5 ha
- Streets not included





# Potsdamer Platz, Berlin



Potsdamer Platz, Berlin







# Potsdamer Platz, Berlin

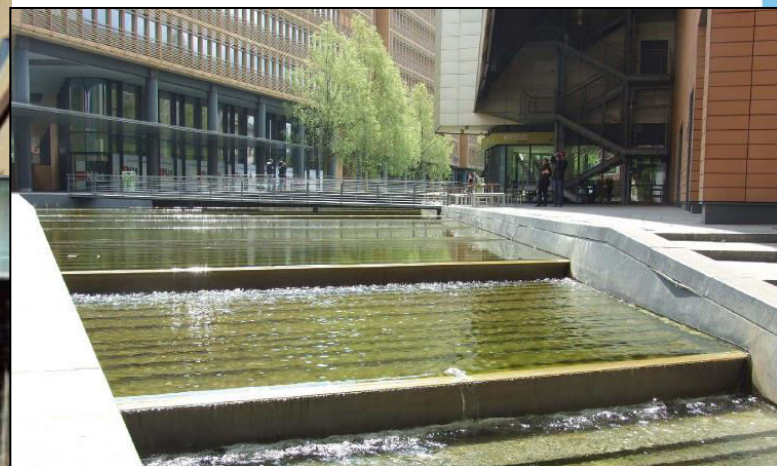


Foto: Katharina Teschner





# Berlin, Hellersdorf (1995)

- Collected stormwater from 3500 m<sup>2</sup> roof for filling up a pond and infiltration of non used part of the water





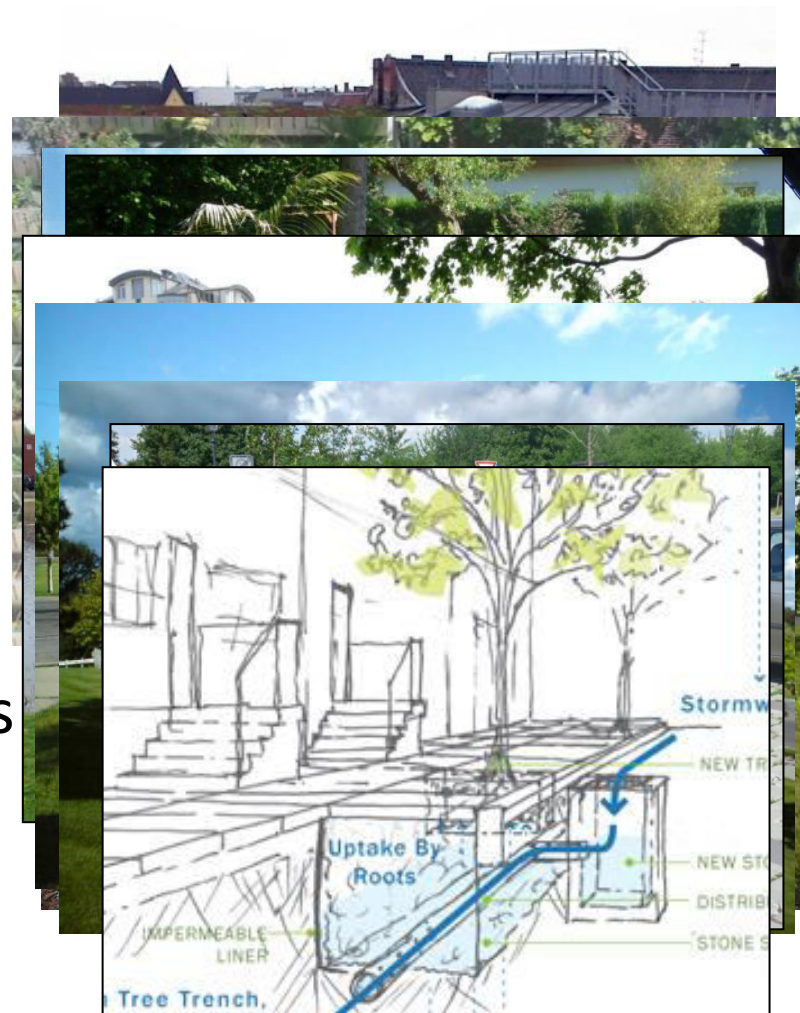
-





# Blue Green Solutions

- Storm water management
  - Green roofs
  - Green Facades
  - Cistern
  - Water bodies
  - „Rain Garden“
  - Retention areas
  - Infiltrative Pavements
  - Tree trenches (pits)
  - ...





# Content

- Storm water management with SUDS/LID/BMP
  - Water retention in the catchment with SUDS/LID/BMP
  - Strategy and Future



# Emscher Genossenschaft

## Route of storm water





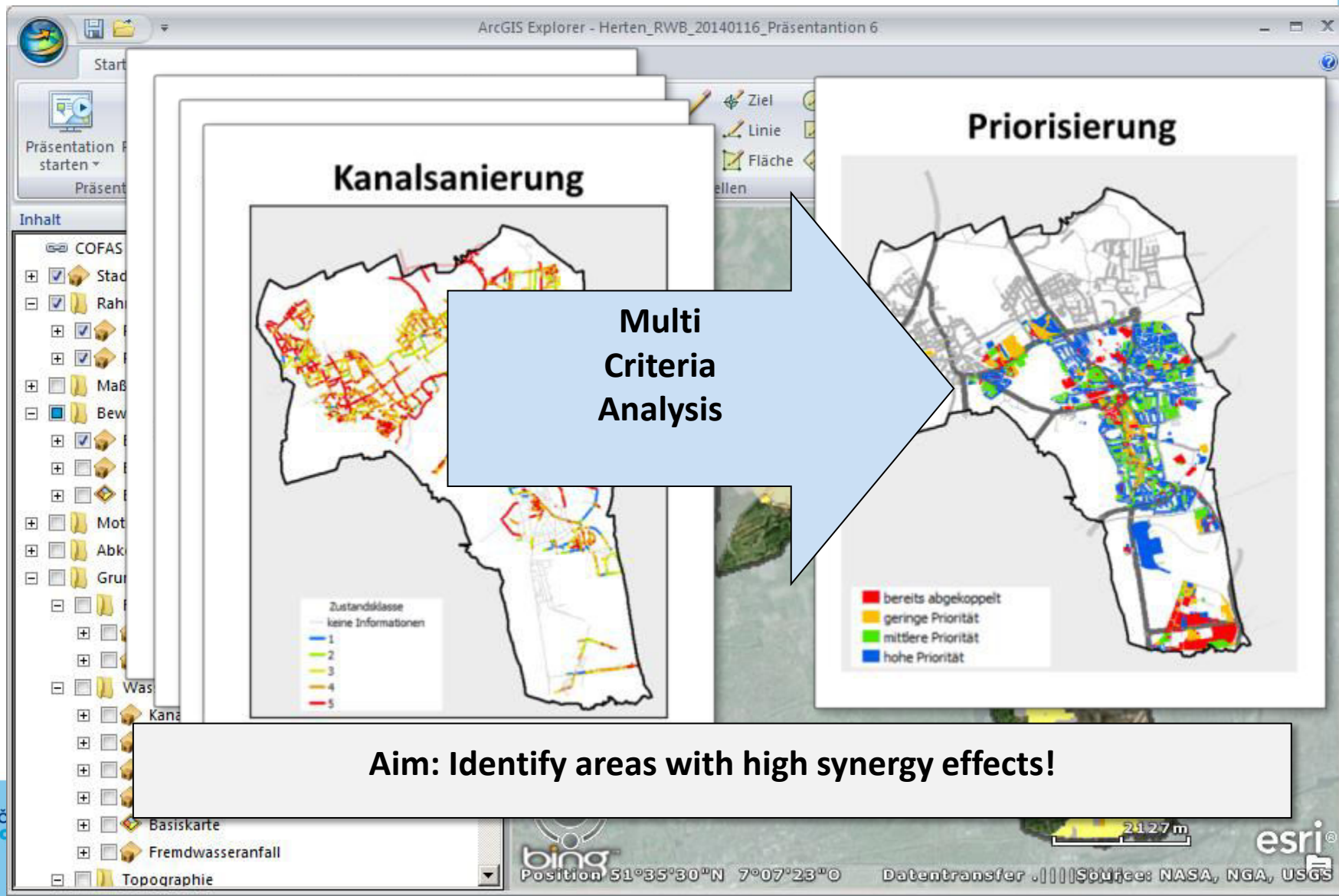
# Cooperation module ZUGABE

- Tool for Emscher Genossenschaft to enhance disconnection on public properties
- Integration of all relevant stakeholders in the city
  - Sewer department
  - Road department
  - Green department
  - .....
- Maps of all plannings in the city have to be provided
- Crucial points have to be indentified
- Priority areas have to be indentified and agreed
- Automatic decision assessment and cost estimation can applied





# ZUGABE Prioritising -> Strategical Planning Tool

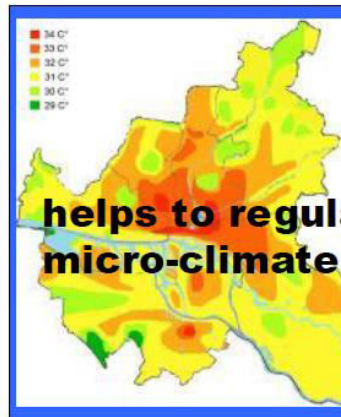




# RISA Hamburg

## Rainwater InfraStructure Adaption

### Integrated catchment management



- Rainwater InfraStructure Adaption
- From 2010 until 2014
- Adaption of all relevant authorities and planning levels into cities storm water management plan
- Quantity and quality
- SUDS and centralised measures





# Berlin

- „Concepts for urban storm water management and sewer systems“
- Ongoing Research project, funded by BMBF (German Ministry of education and research)



GEFÖRDERT VOM



Bundesministerium  
für Bildung  
und Forschung





# KURAS Berlin

Application on 3 levels in the city:

Building / Property



Quarter



Catchment



Effects of measures?

- 1 Building/techniques
- 2 Landscape and quality of space
- 3 Urban and Bio climate

Inhabitants

- 4 Biodiversity
- 5 Groundwater/Soil passage
- 6 Emission into ponds/creeks/rivers
- 7 Immission into ponds/creeks/rivers

Environment

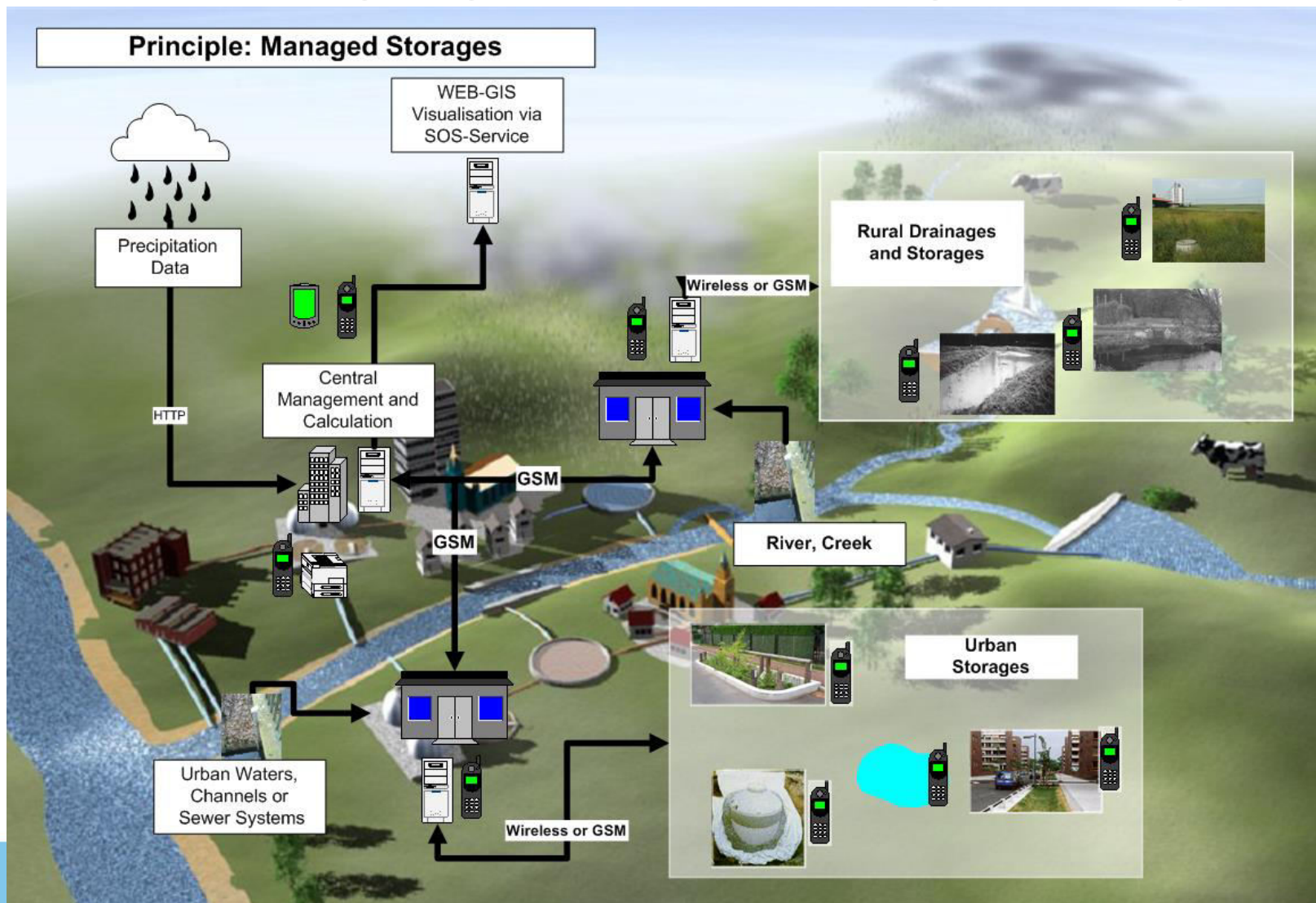
- 8 Costs for measures
- 9 Use of resources
- 10 Economical Analysis

Economy





# Future implementation: Managing and Steering Storages



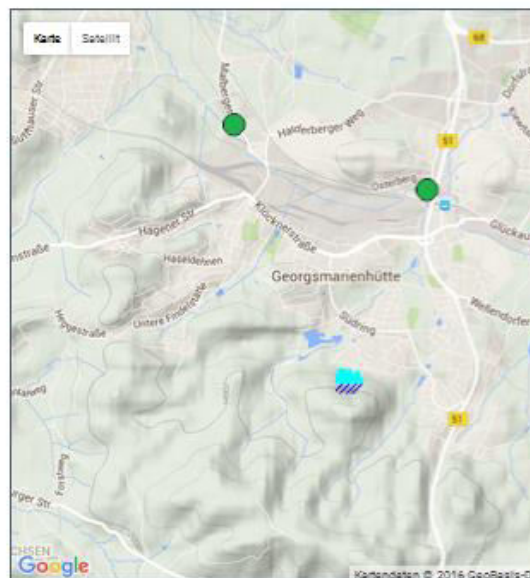


# Flood Warning Systems with rainfall forecast

**GEORGS  
MARIEN  
HUETTE**

Flood Warning System Georgs

Home Map Diagram Info

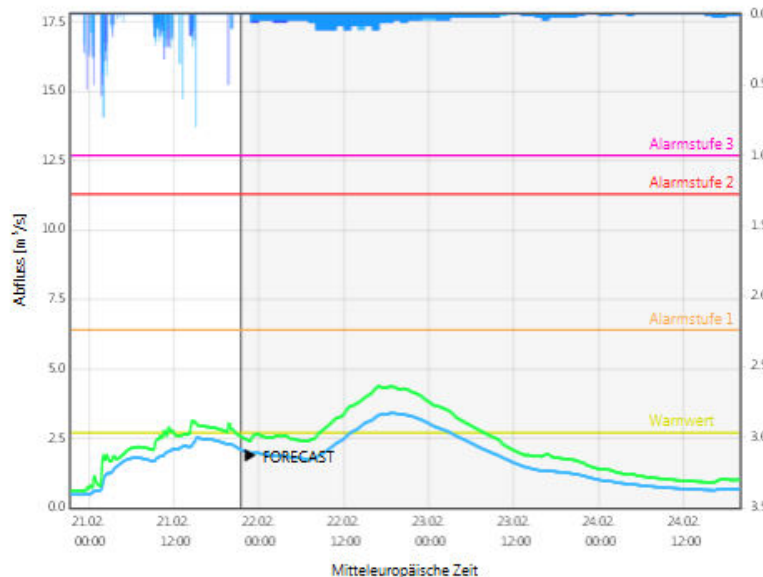


Symbol	Definition Alarm Level
<span style="color: red;">●</span>	Alarmstufe 3
<span style="color: orange;">●</span>	Alarmstufe 2
<span style="color: yellow;">●</span>	Alarmstufe 1
<span style="color: lightgreen;">●</span>	Warnwert
<span style="color: green;">●</span>	Normal
<span style="color: gray;">●</span>	keine Werte im aktuellen Zeitraum

**GEORGS  
MARIEN  
HUETTE**

Flood Warning System Georgsmarienhütte

Home Map Diagram Info



choose period

previous day or enter period from tt.mm.jjjj hh:mm to tt.mm.jjjj hh:mm Submit

Time Series

name of service	measuring point	measured value	
SOS-GMH-Abfluss	Pegel 177	Abfluss-Messung	<input checked="" type="checkbox"/>
SOS-GMH-Abfluss	HRB Suttmeier	Abfluss-Simulation	<input type="checkbox"/>
SOS-GMH-Abfluss	Schlöchterbach	Abfluss-Simulation	<input type="checkbox"/>

Welcome hsummer!  
[ Log Out ] [ Change Password ]



Legend

- Breenbach - Abfluss-Simulation m³/s
  - Oeseder Bach - Abfluss-Simulation m³/s
  - 177\_2833 - Niederschlag mm/5min
  - 177\_2836 - Niederschlag mm/5min
- Kleinstes messbarer Wert am Pegel: 0,28 m³/s

choose warning level

measuring point	
Pegel 177	<input type="radio"/>
Breenbach	<input checked="" type="radio"/>
Oeseder Bach	<input type="radio"/>

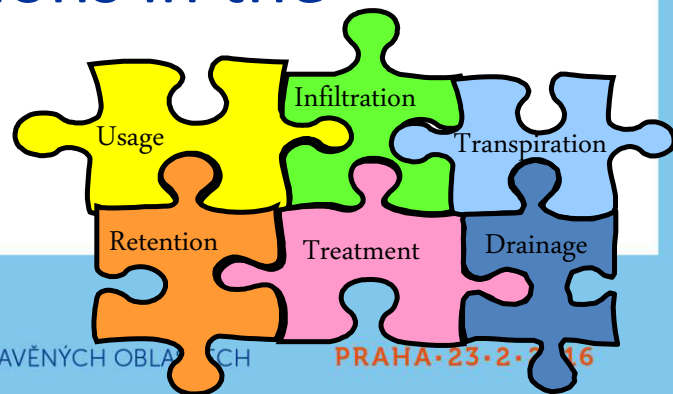
Reset Zoom

Disable Warnlevels



# Lessions learned

- A variety of possibilities and answers to storm water management was shown
- A close look at the local situation is needed
- Solutions with blue green infrastructure
- With SUDS/LID/BMP quantity and quality problems can be solved
- Runoff has to be controlled!
- Managing these storages with rainfall prediction will enhance solutions in the future





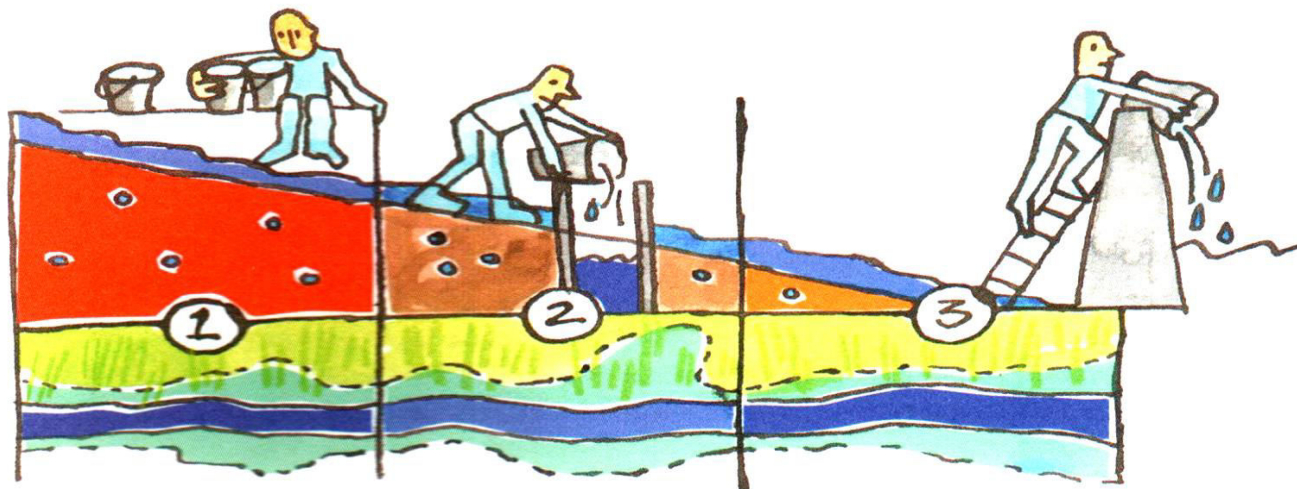


# Lessions learned

- Integrated planning of all planning sectors has to be achieved
  - Urban Climate
  - Urban water cycle
  - Flood protection
- Future water quantity and quality level has to be identified and integrated into water management planning
- Early integration in planning phase is needed
  - Definition and control of allowed and accepted runoff quantity and quality have to be identified
  - General storm water management planning



# Thank you for your attention !



Retain

Store

Discharge



**THE STORMWATER EXPERTS**  
INGENIEURGESELLSCHAFT  
PROF. DR. SIEKER MBH

Bruins, NL

**Dahlwitz-Hoppegarten b. Berlin**  
[www.sieker.de](http://www.sieker.de)