



THE FREE AND HANSEATIC CITY OF HAMBURG, THE GREEN WATER CITY OF SPLENDOR AND BEAUTY ON THE RIVER ELBE

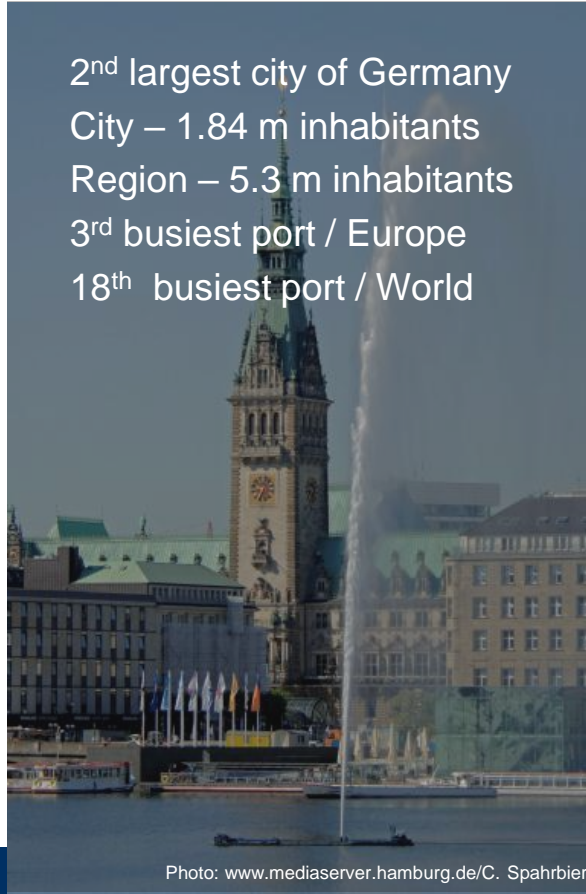
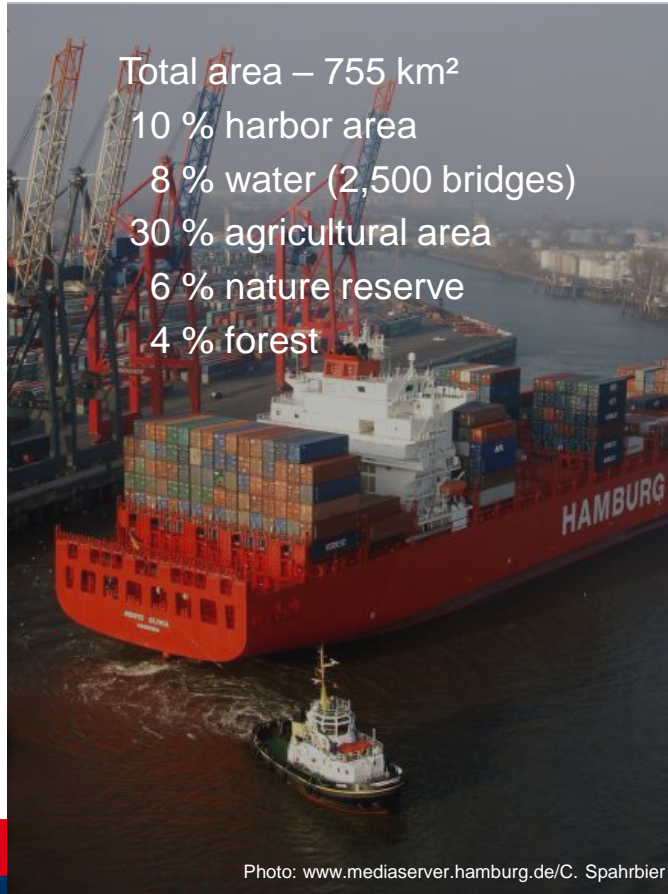
by Christian Ebel
Ministry of Environment, Climate, Energy and Agriculture (BUKEA)
4 th of May 2023, Delhi Video Conference RCA

HAMBURG GENERAL FACTS



Figures: GoogleMaps, LGV

HAMBURG GENERAL FACTS



LEGAL BASIS FOR ACTION

Federal Water Act by the federal government

Article 5 general duty of care

→ everyone within a flood prone area has to take action for protection and to prevent damages

Legislation by the 16 federal states

(water act, waste water act, ordinances)

→ additional specification



Figure: Katapult magazin, 2016

WATER MANAGEMENT HAMBURG



BUKEA

- Flood and water protection (surface and groundwater)
- **Storm water management**
- Contaminated sediments
- Water conservation

7 District Councils

- Management of water bodies
- **Planning and realization** of measures/ river restoration
- Maintenance of the smaller water bodies



HAMBURG WASSER

(public law institution)

- Water supply
- Waste water disposal
- **Storm water management**
- **Planning and realization**



BWVI



BSW



LSBG



...

BUKEA = Ministry of Environment, Climate, Energy and Agriculture

/ Andreas Vallbracht

MAIN CHALLENGE IN HAMBURG WATER IS COMING FROM ALL SIDES



... Climate change is affecting the citizen's safety and quality of life

... Regional Climate Models (REMO) forecast increase of stormwater amount and intensity in summer

... Sea level rise > risk of flooding increases

... The sewage system is constantly being expanded, but capacities remain limited > flooding of sewers

CHALLENGES

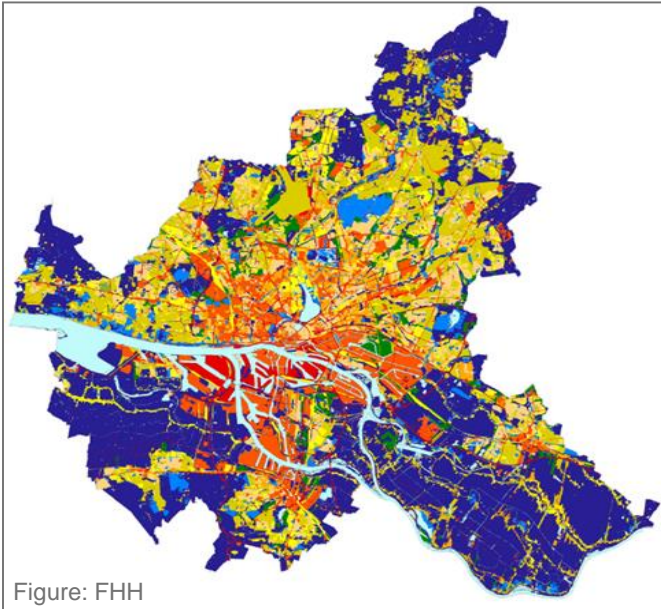
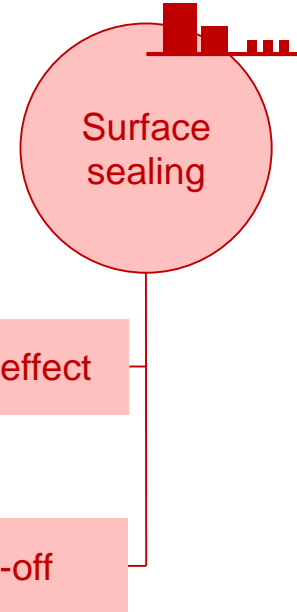


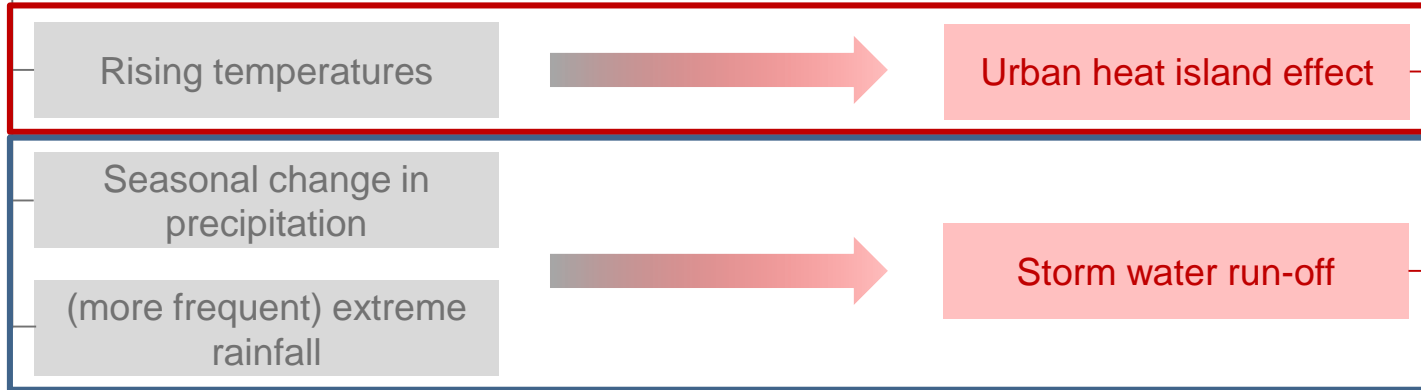
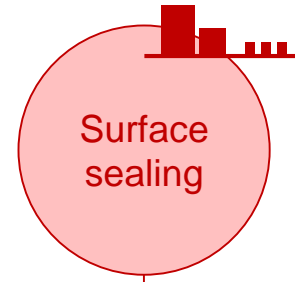
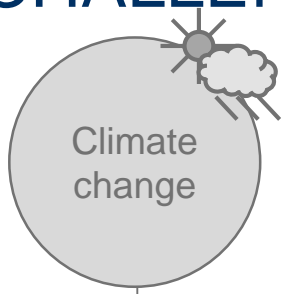
Figure: FHH



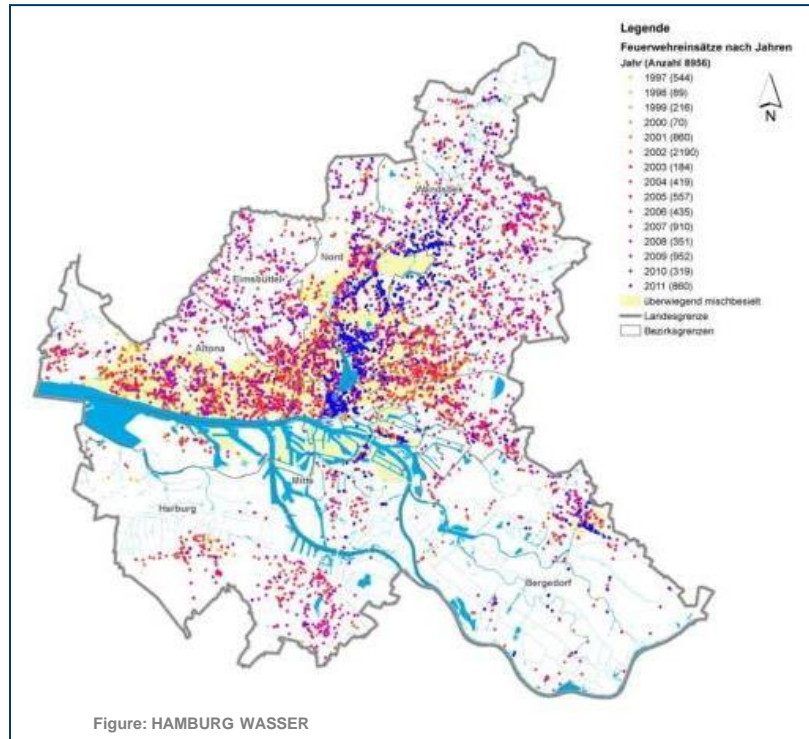
37% (~ 280 km²) of the total area of Hamburg is already sealed.

On average, more than 1 km² (100 ha) of sealed area is added each year.

CHALLENGES



FLOODING ALREADY HAPPENS!



fire brigade operations in Hamburg (1997 – 2011)

Heavy rainfall events can happen everywhere!

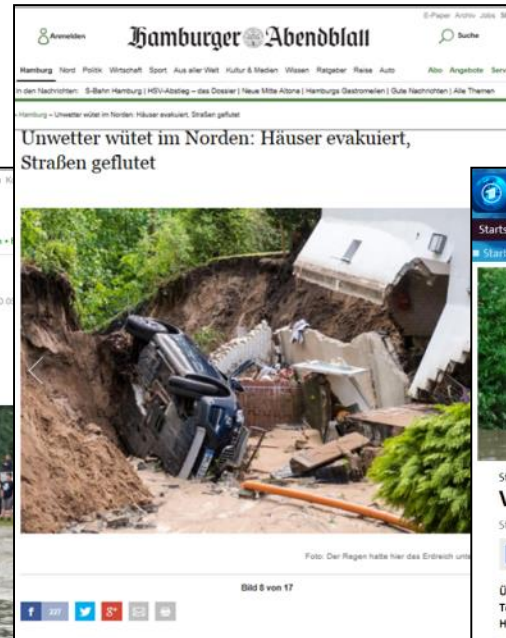
Financial damages in Hamburg:

8.2 Mio. € (08/01/2002)

(source: Bundesministerium für Bildung und Forschung: URBAS – Fallstudie, 2008)

FLOODING ALREADY HAPPENS!

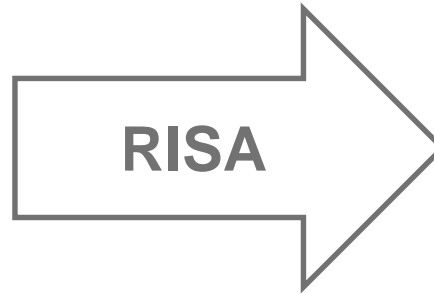
Hamburg-Bergedorf, May 2018 → 80 mm to 125 mm in 30 min. to 90 min.



No absolute protection possible!

Rain – **InfraStructure** - Adaptation

... a (municipal) common task!!



Figures: Atelier Dreiseitl

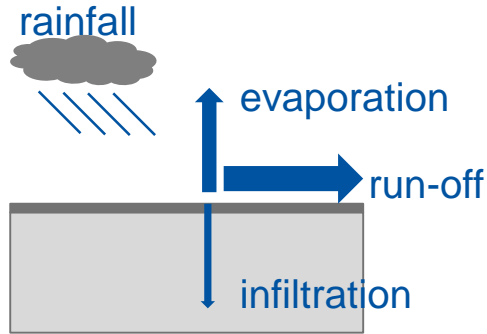
Greater goals...

- Strengthen Flood protection → flash floods
- Conservation of water bodies
- Approximate to near-natural water balance

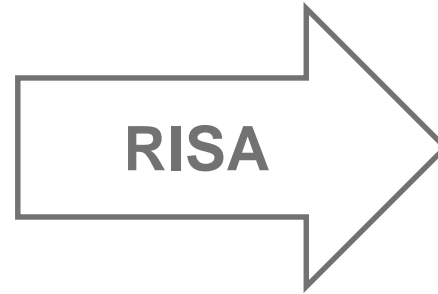
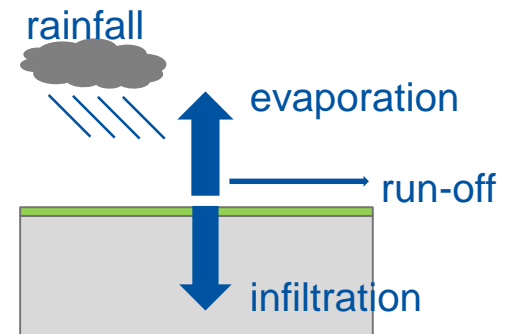
**LIVING WITH
WATER!**

THE RISA PROJECT

urban hydrological processes



natural hydrological processes



Rainwater at site...

- | | |
|--------------------|----------------------------------------------|
| - drain/infiltrate | e.g. in troughs |
| - evaporate | e.g. trees, roof / facade greening |
| - use | e.g. for irrigation, toilet flushing |
| - store (between) | e.g. in troughs, on multifunctional surfaces |

DECENTRALIZATION

- Retain water on site
- Re-use stormwater (toilet, irrigation,...)
- Promote evaporation → cooling
- Promote infiltration → groundwater recharge
- Filter and clean through natural soil filtration (throttled to water body or discharge trough drain)
- Multifunctional spaces (heavy rainfall)

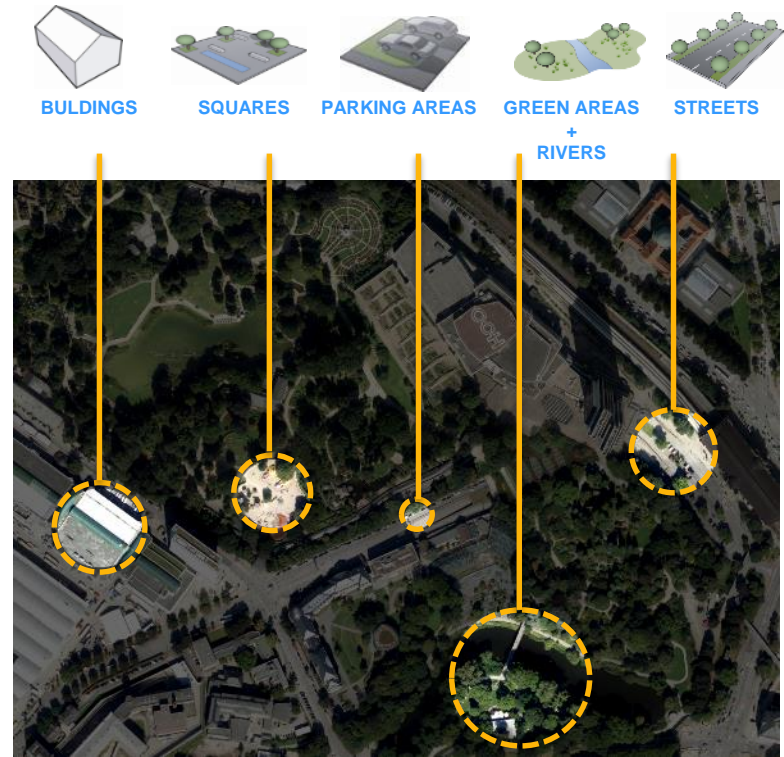


WHAT HAS TO BE DONE?

Water sensible solutions for all elements of city planning

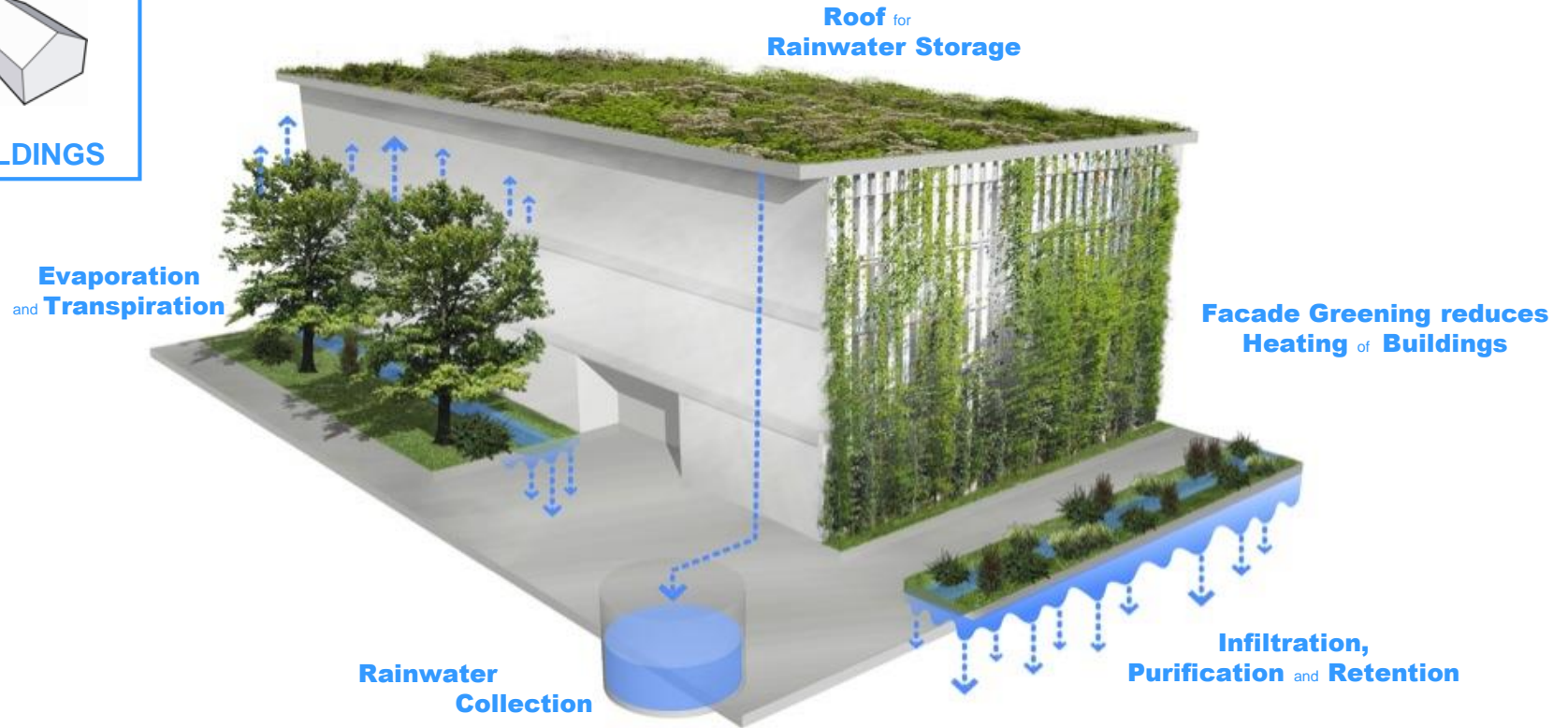
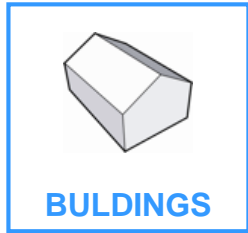
Development areas and existing urban structure

- Instruments for (spatial) planning
- New technology
- Communication
- Finance + Control
- Law + organization



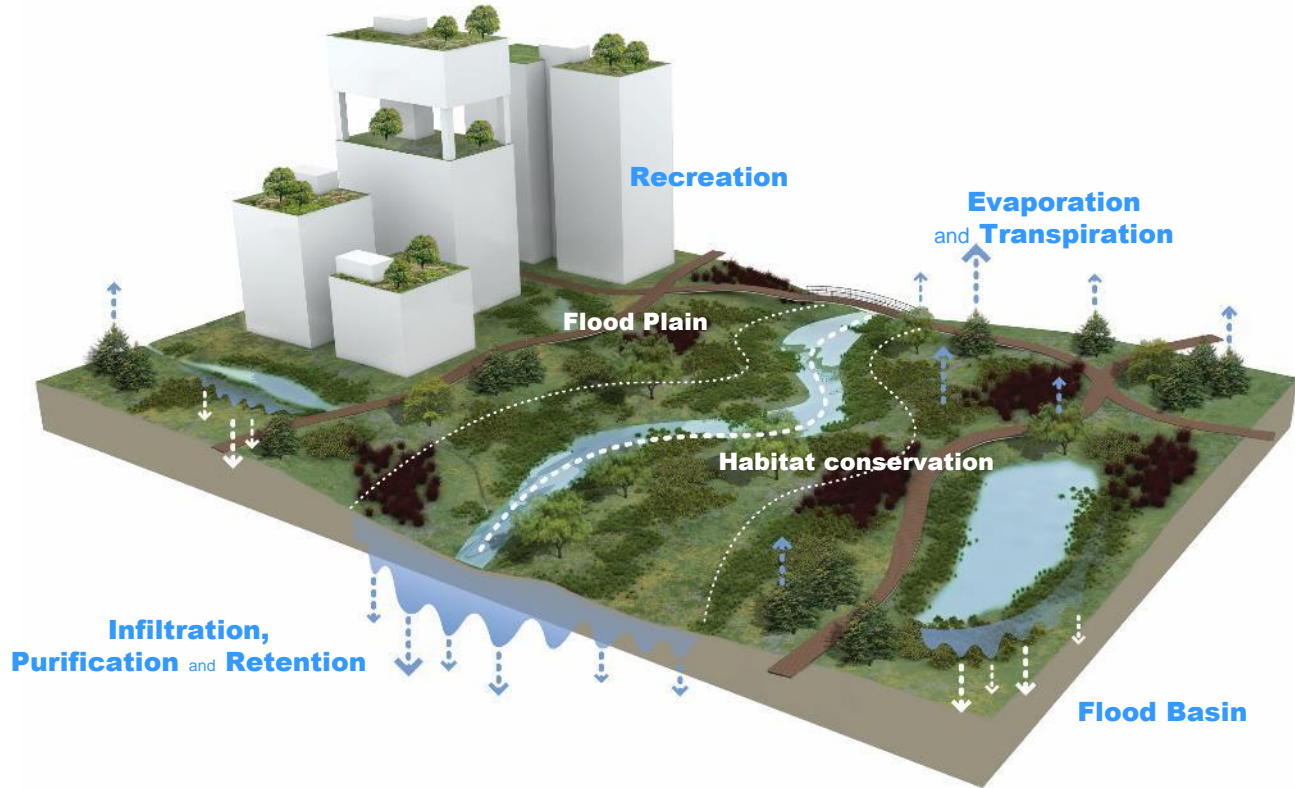
Figures: LGV, Atelier Dreiseitl

WATER SENSIBLE SOLUTIONS



Figures: Atelier Dreiseitl

WATER SENSIBLE SOLUTIONS



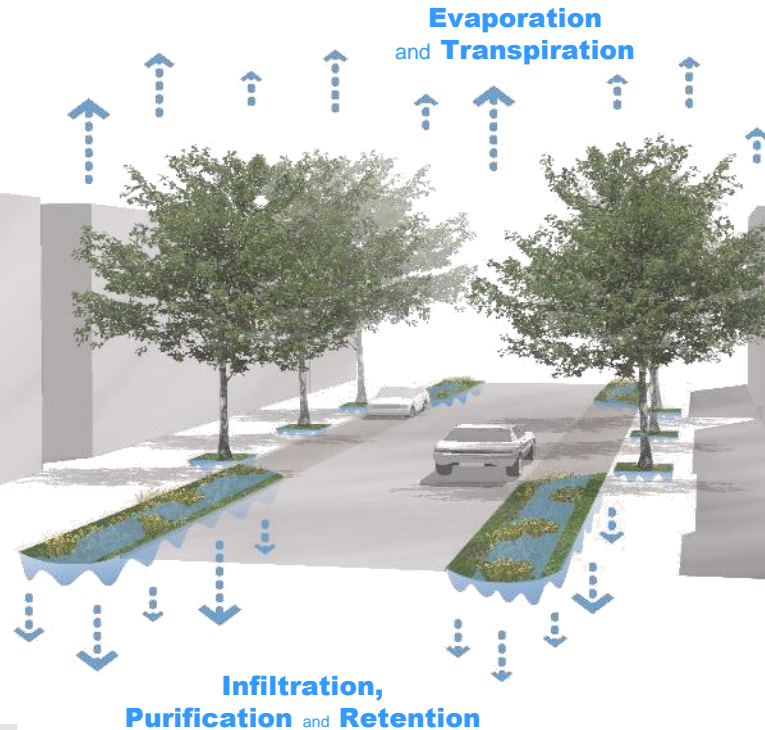
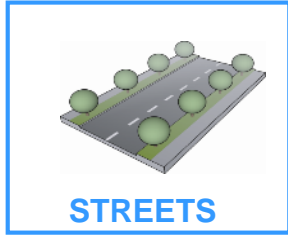
WATER SENSIBLE SOLUTIONS



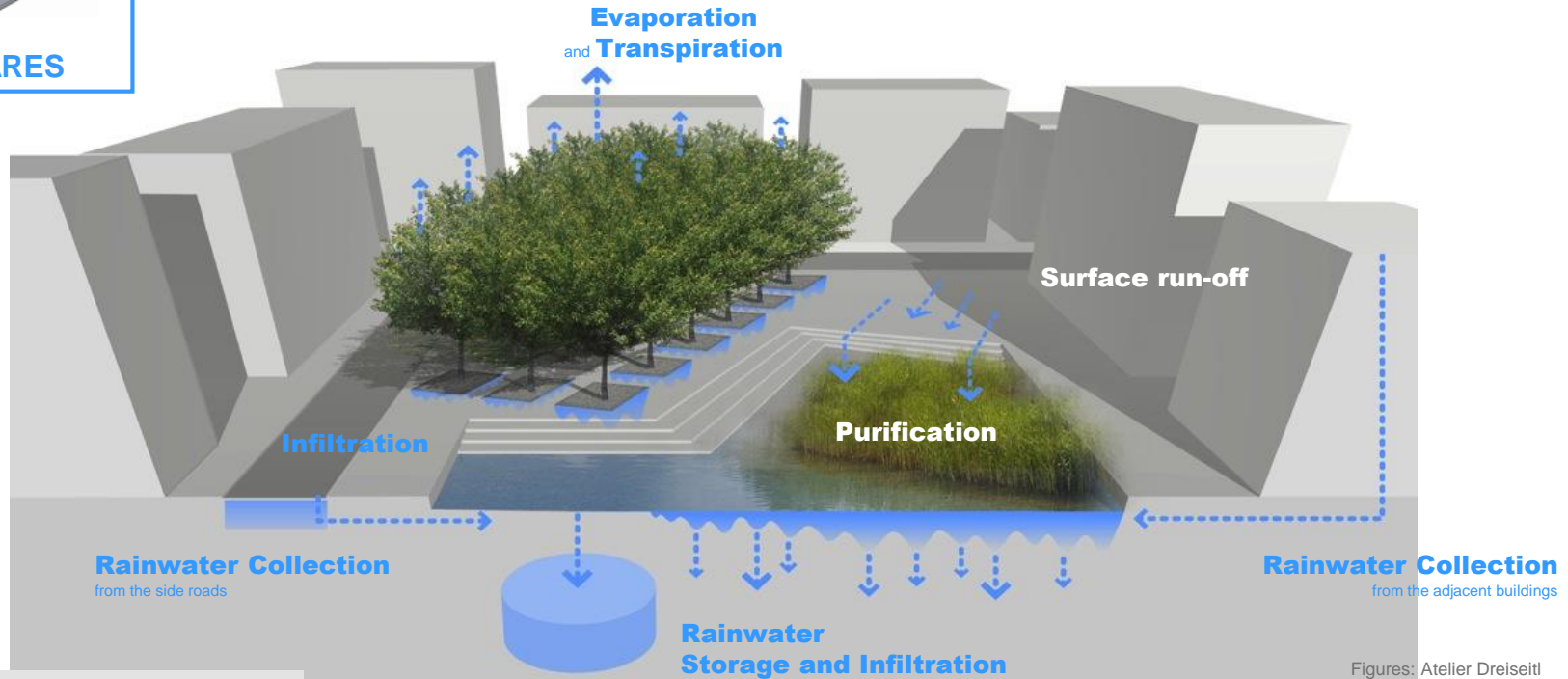
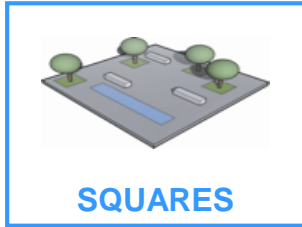
RISA – Hamburg, Germany

Figures: Atelier Dreiseitl

WATER SENSIBLE SOLUTIONS



WATER SENSIBLE SOLUTIONS



RISA – Hamburg, Germany

Figures: Atelier Dreiseitl

THE RISA PROJECT

Initiators → **BUKEA and HAMBURG WASSER**

2009 – 2015

Budget: 1.78 Mio. €



WG Urban Drainage

WG Urban and Spatial Planning

WG Traffic Planning

WG River Basin Management

CS Technical Basics

CS Costs & Finance

CS Institution & Law

CS Communication & Publicity

LESSONS LEARNT

- **Single interests are often stronger than common interests**
- **The necessary space for technical measures is competing with the required space by housing, development of commercial areas, natural monuments or nature conservation etc.**
- **Investors are taking decisions in order to maximise profit**
- **Implementation of RISA still requires „Lobby work“ with political decision takers and land owners.**
- **RISA is still not seen as a chance but as something that produces additional costs**
- **The cost of initial investments are higher ranked than the costs of maintenance or the mitigation of stormwater damage costs.**

But do not forget:

The „**human factor**“ in water management:

„Changing the mind set i. e. „mental reframing“ (turning away from conventional solutions) to innovative concepts lasts longer than the development of innovative solutions.“

NATURE BASED SOLUTIONS

EU RECONNECT Project → effective nature-based solutions for reducing hydro-meteorological risks

Regenerating ECOsystems with Nature-based solutions for hydro-meteorological risk rEduCTion

Time period: September 2018 – August 2023

Participating nations: Netherlands, Germany, UK, Belgium, Taiwan, Austria, Spain, Malaysia, Denmark, Italy, Poland, Croatia, Serbia

Coordinator: Delft University of Technology, The Netherlands

Total budget: 13,520,690 €

Website: www.reconnect.eu



HOW? NATURE BASED SOLUTIONS!

NBS Design Ideas



Optimization of the retention volume management of the surface water system of Bille, Dove-Elbe, Gose-Elbe and the ditch system including the installations of the drinking water provider.
(Development and installation of the NBS, approx. 700.000 Euro).

NBS approach of demonstrator (hybrid)

Proactive automated control of weirs and sluices and subsequent drainage installations, supported by wheater forecasts.

Activation of additional retention areas by suitable modification of the topographic setting of the outer dike area. Enhancement of retention volume by connecting isolated water surface water bodies in the working area.

Evaluation/estimation of the effects of the NBS measures by hydrodynamic numeric modelling of different settings (control of water levels).

Specific Challenges

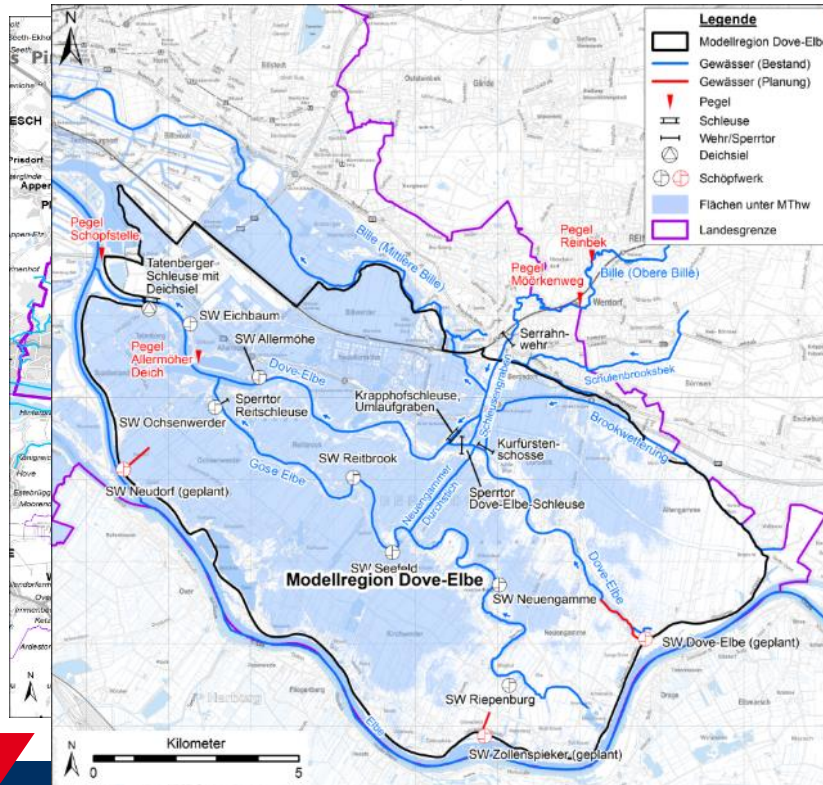
Aspects triggering the decisions of integrated water resources management and their corresponding measures:

M 1 Prevention of flooding of the area by precipitation & run off by the Bille River & the necessity of a safe drainage at any time

M 2 Avoidance of critical low water levels in the drainage ditch system and reduced discharge rates of the Bille River in summer (droughts)

M 3 Guaranteeing constant water levels of the surface waters

Demonstrator Elbe Estuary, Location Hamburg, Vier- und Marschlande



- situated in the southwest of Hamburg
- total surface of the area: 175 km²
- catchment area: tide free Gose-Elbe, Dove Elbe & River Bille and ditch system of the drinking water provider
- dominated by natural and agricultural areas

Figure: LSBG

Thank You for your attention

→ www.risa-hamburg.de

→ www.reconnect.eu

Mr. Christian Ebel

Ministry of Environment, Climate, Energy and Agriculture
christian.ebel@bukea.hamburg.de

