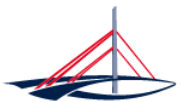




Floods in Hamburg

Klaus Kluge



Landesbetrieb
Straßen, Brücken
und Gewässer

28 September 2012, Riga



The agency of roads, bridges and waters (LSBG)

Facts about Hamburg

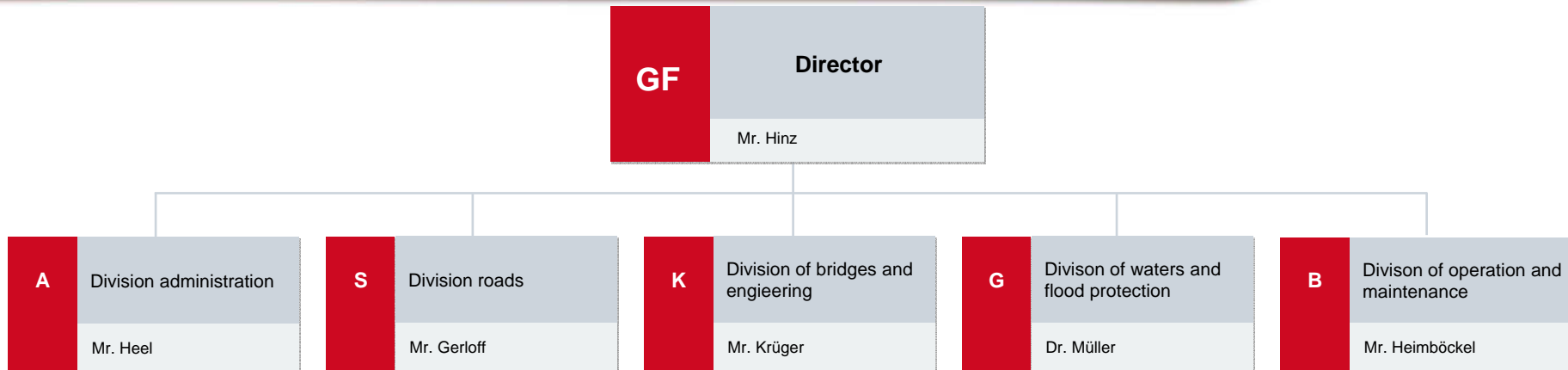
Protection against storm surges

Protection against precipitation runoff

Questions to science and policy



Landesbetrieb Straßen, Brücken und Gewässer - LSBG (Agency of roads, bridges and waters)



- ▶ Inside the public administration of Hamburg, the Agency of roads, bridges and waters (LSBG) is a service provider for the implementation and maintenance of technical infrastructure.
- ▶ The LSBG has about 550 employees.
- ▶ The LSBG develops a business plan due to § 26 LHO and has an own work council.
- ▶ The LSBG administrates about 200 Mio. € construction and operational resources in trust.



The agency of roads, bridges and waters (LSBG)

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Protection against storm surges

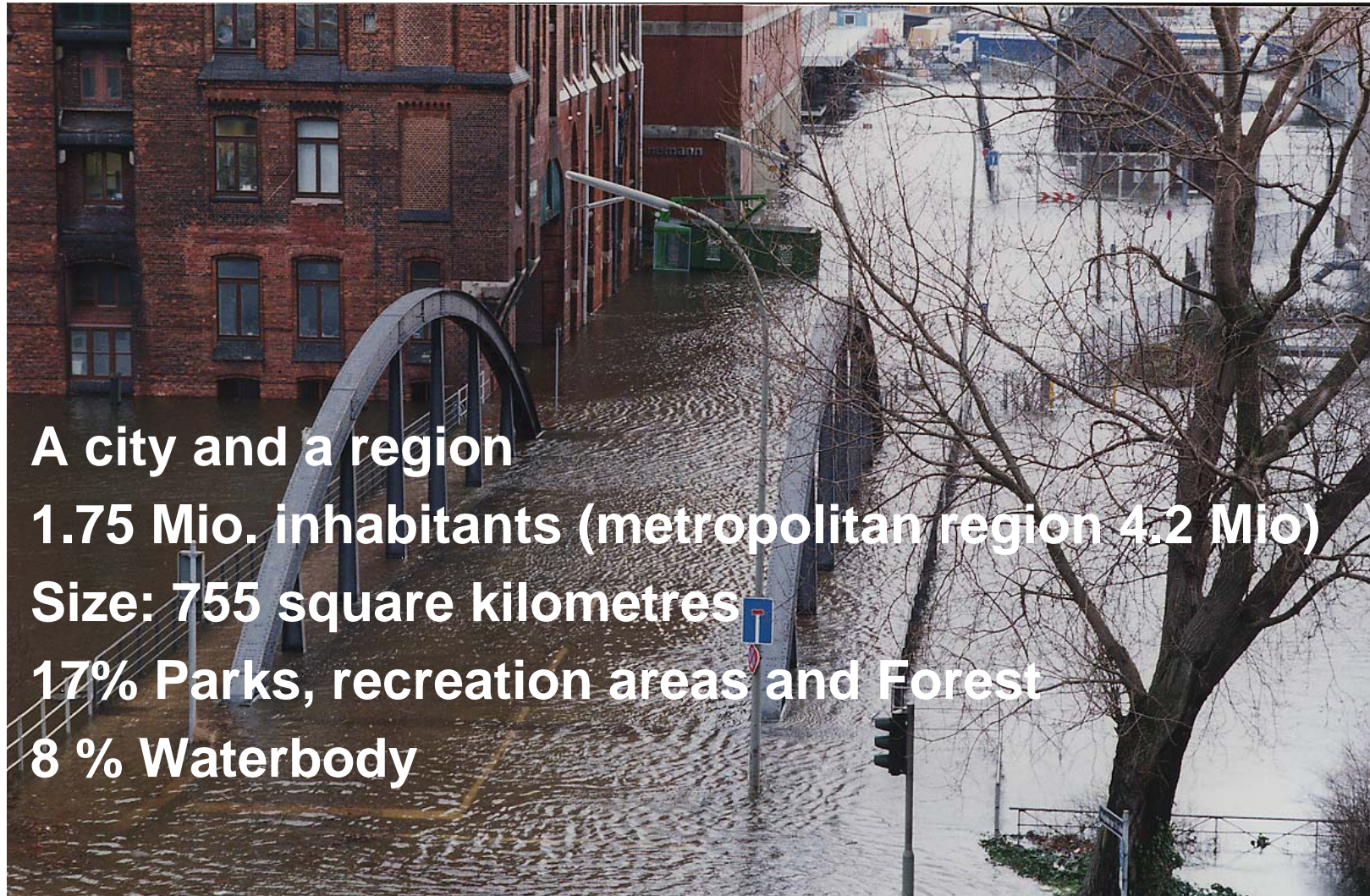
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Living with water in Hamburg





A city and a region
1.75 Mio. inhabitants (metropolitan region 4.2 Mio)
Size: 755 square kilometres
17% Parks, recreation areas and Forest
8 % Waterbody

**2 flood related problems:
storm surges**



& heavy rains

The agency of roads, bridges and waters (LSBG)

Facts about Hamburg

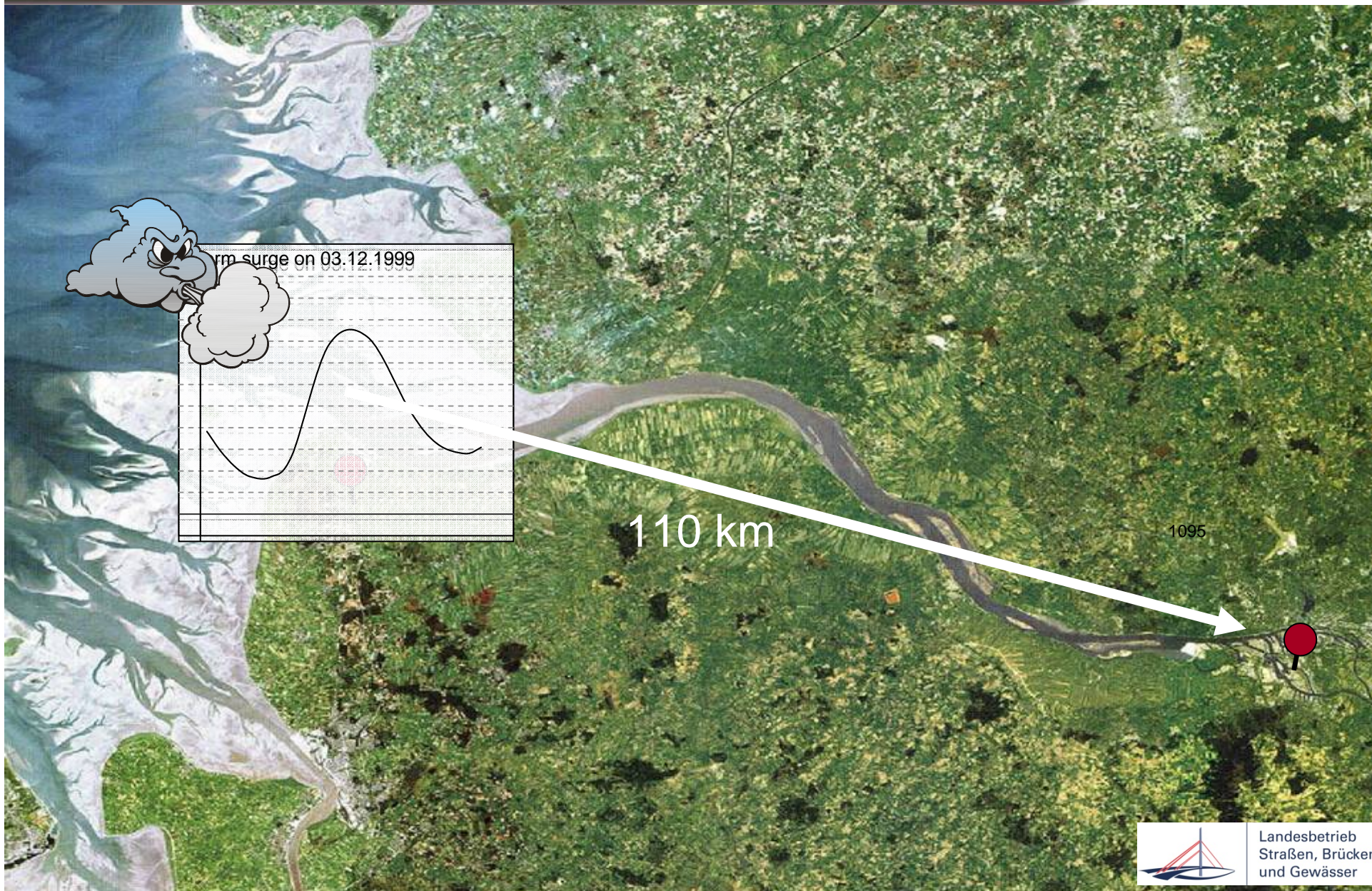
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Hamburg at the Elbe River



270 km² = 36 % of the city area

Floods

16/17th February 1962

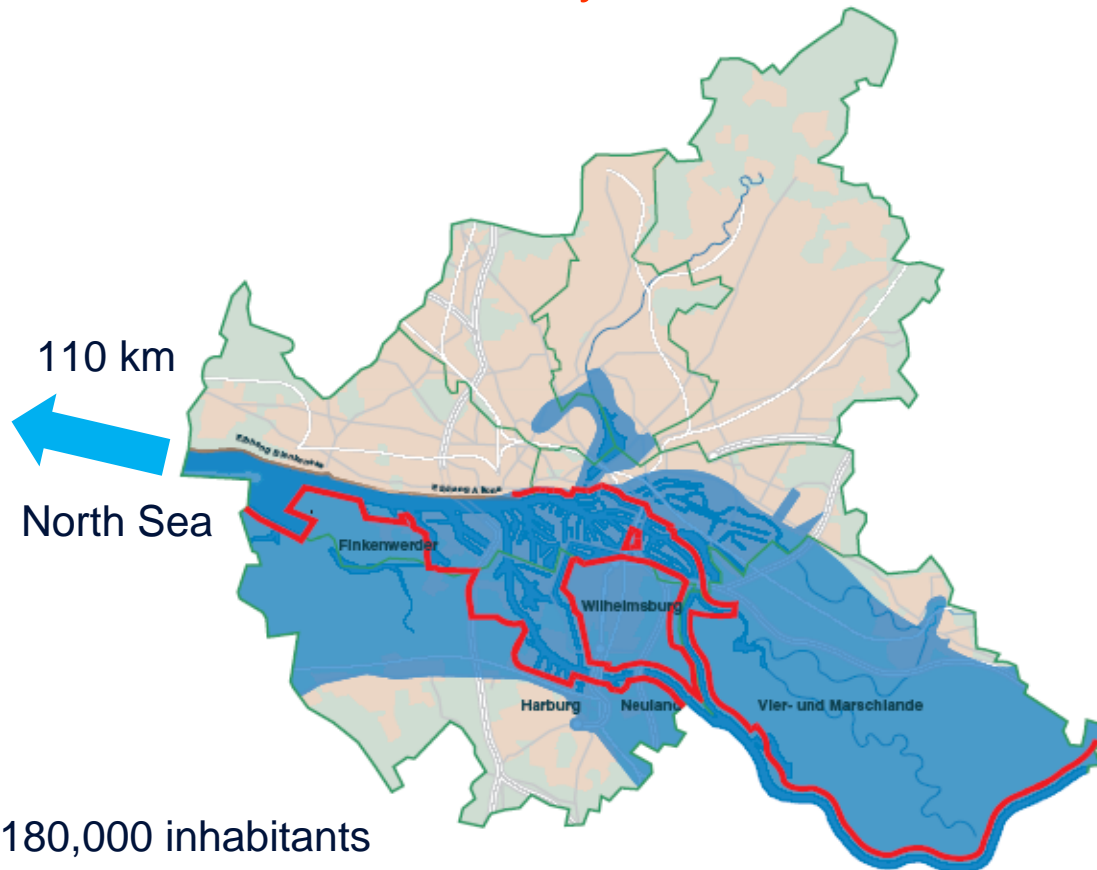
- waterlevel NN + 5.70 m
- 61 crevasses
- 30 % of the city area flooded
- 315 death in Hamburg

3rd January 1976

- water level NN + 6.45 m
- harbour area was flooded

Characteristics

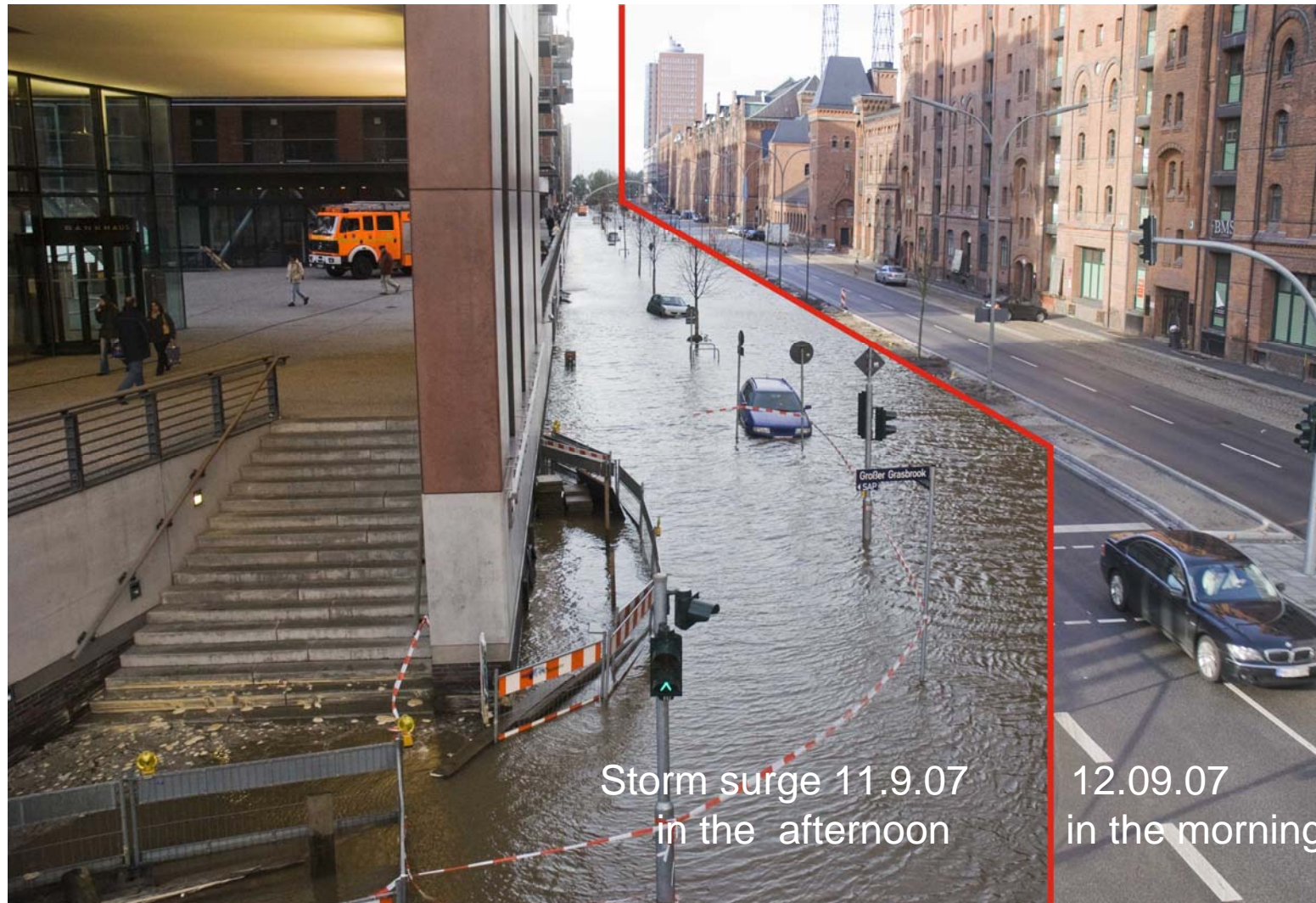
- forecast of the storm tide
8 bis 12 h in advance
- rising 6 m with 1.5 m/h
velocity



- 180,000 inhabitants
- 165,000 workplaces
- 10 Billion EUR worth of goods

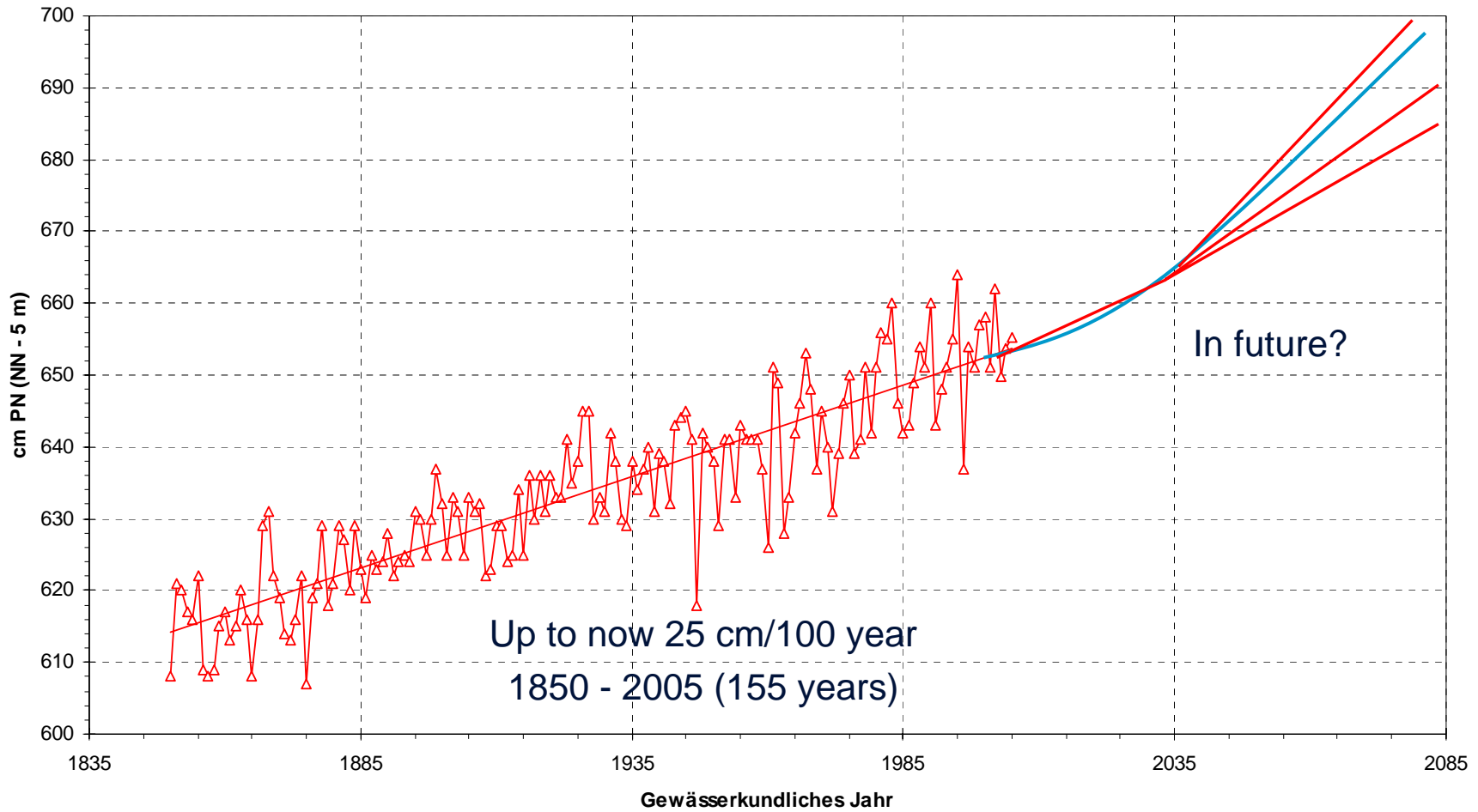


Strategy – living with water

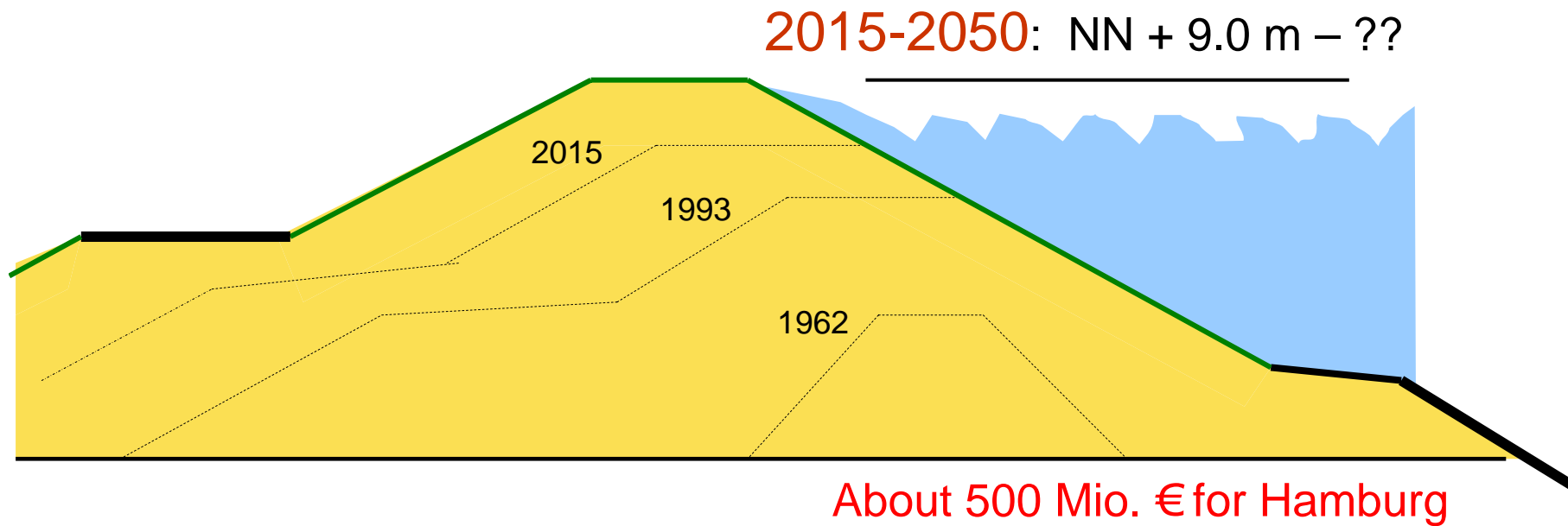


Climate Change: Increasing Sea Level ?

MThw Cuxhaven

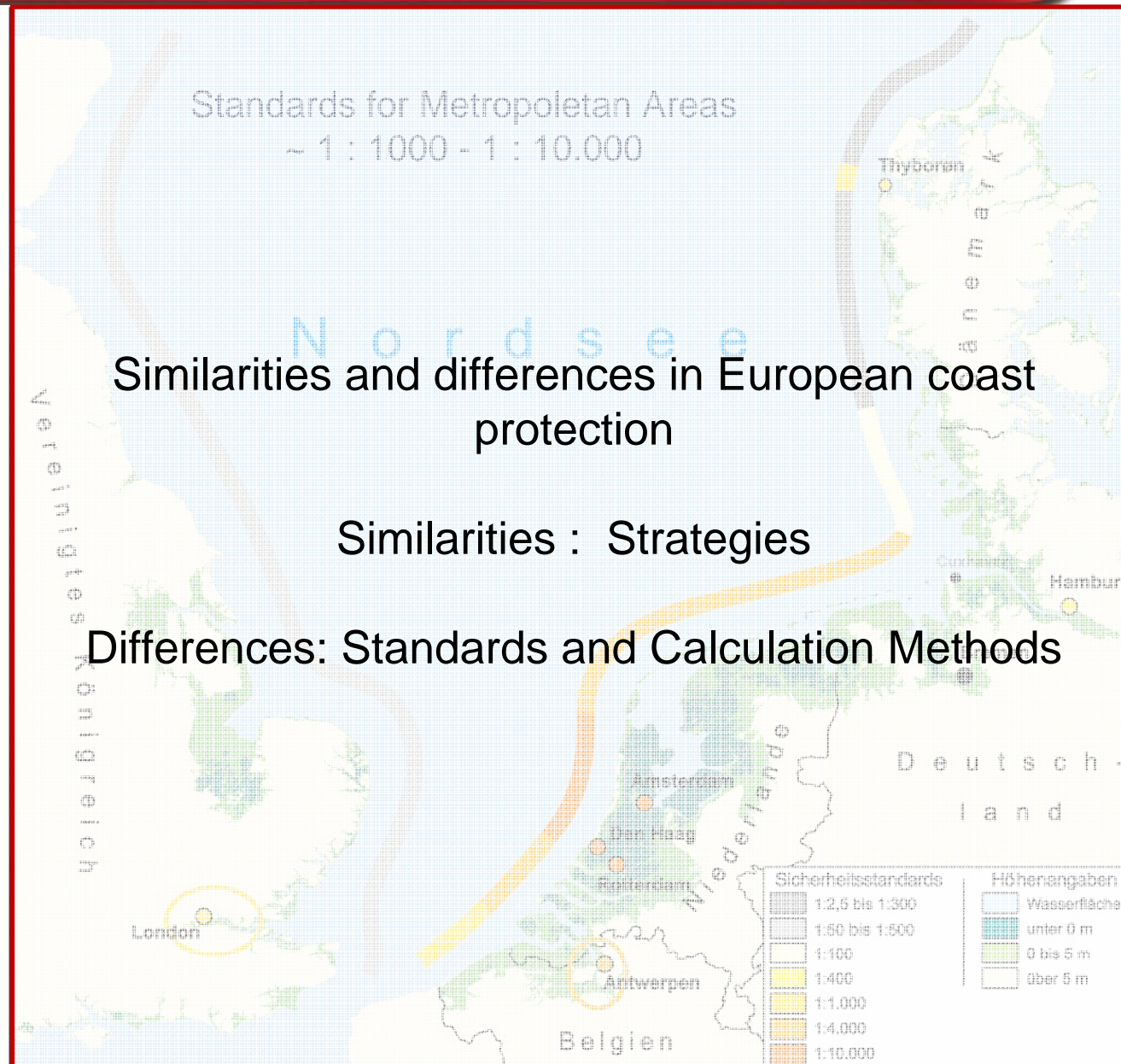


Adaptation of the main public flood protection



Strategies against flooding by storm surges





Standards for Metropolitan Areas
- 1 : 1000 - 1 : 10.000

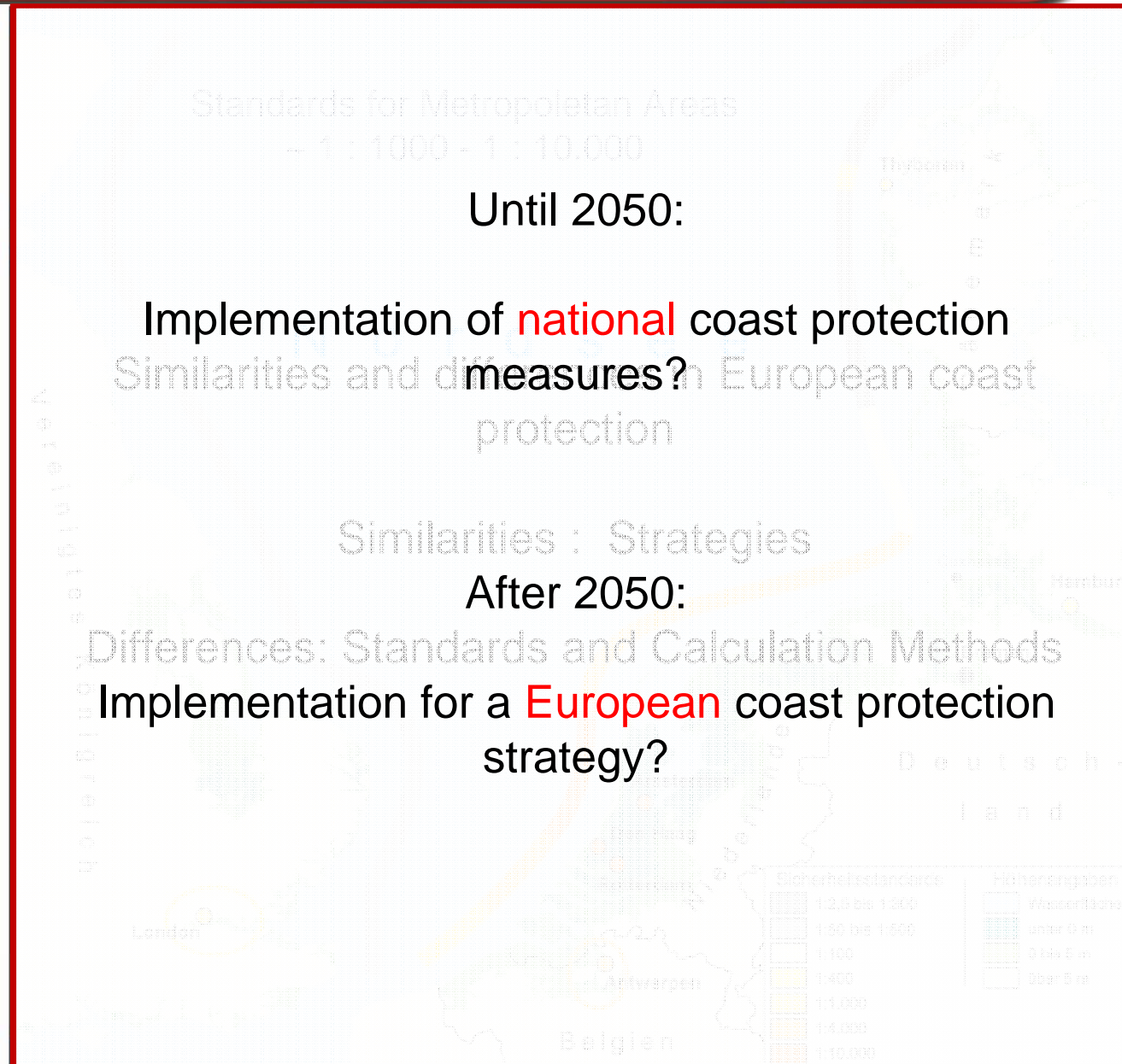
Until 2050:

Implementation of **national** coast protection
measures? Similarities and differences European coast
protection

Similarities : Strategies

After 2050:

Differences: Standards and Calculation Methods
Implementation for a **European** coast protection
strategy?



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- **Precipitation increases**

climate change is expected to amplify this trend.

- **Sealing of areas increases**

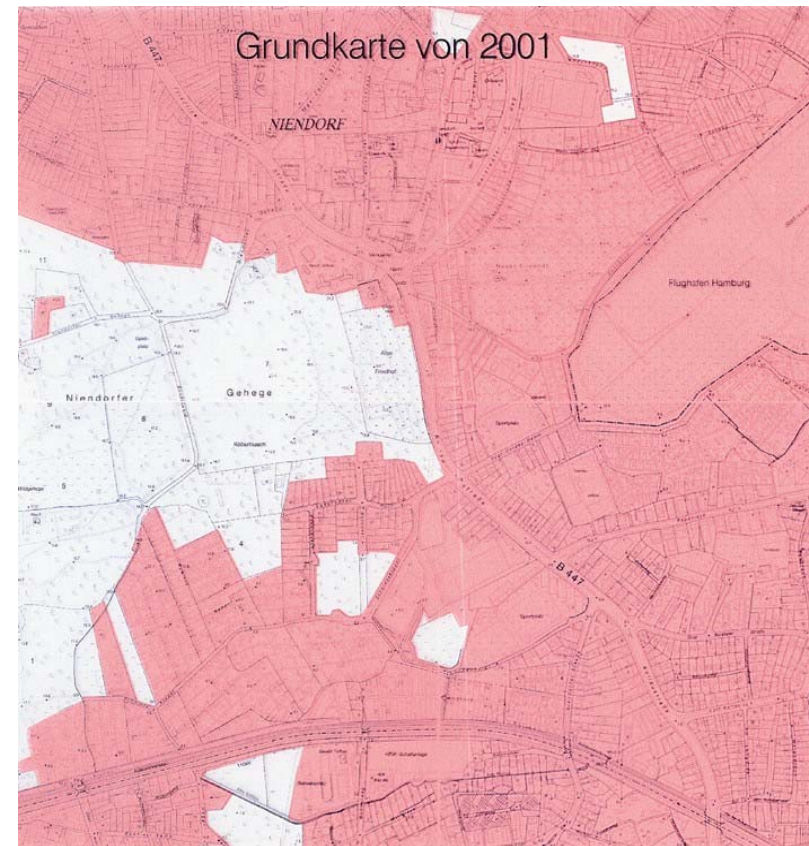
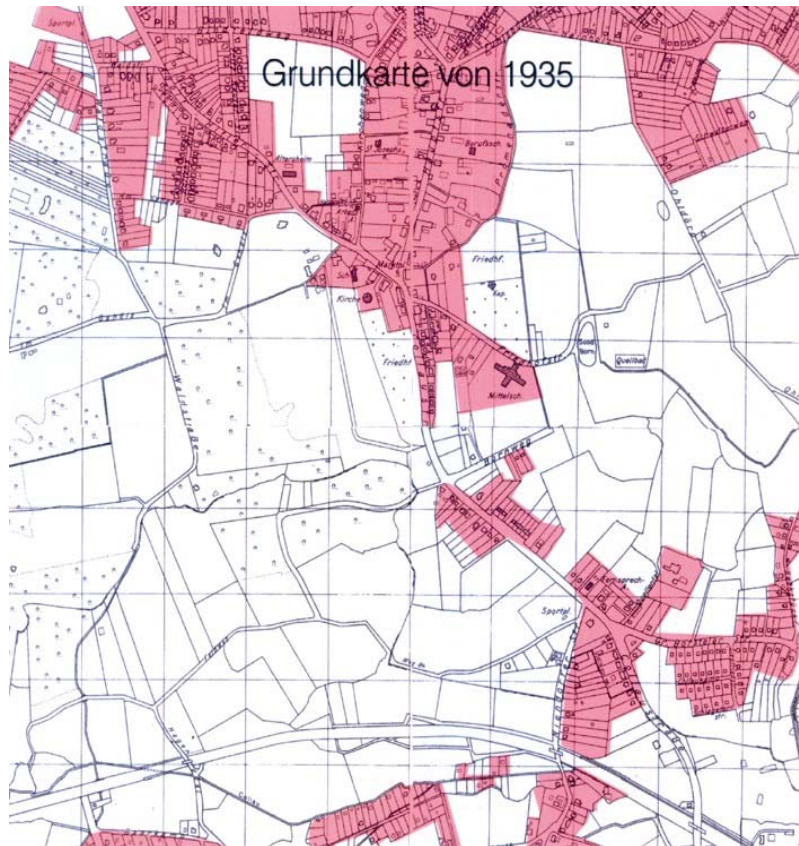
The growing city of Hamburg generates a need in new residential and industrial areas. It is aimed to build 6,000 new accommodations every year.

Densely populated areas like Hamburg provide specific characteristics of water management:

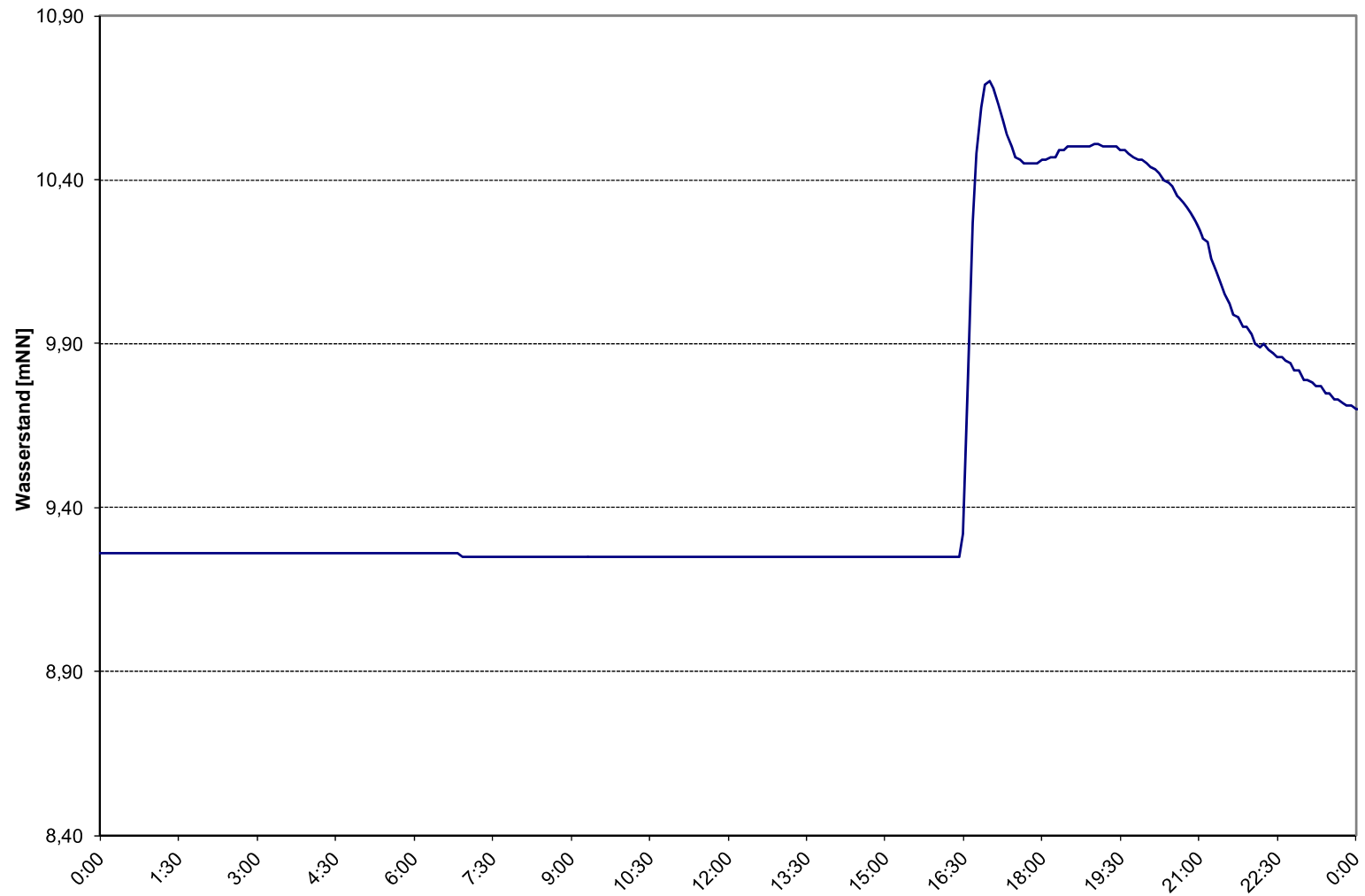
- high density of water ways
- small waters with small catchment areas



Increase of sealed areas between 1935 and 2001



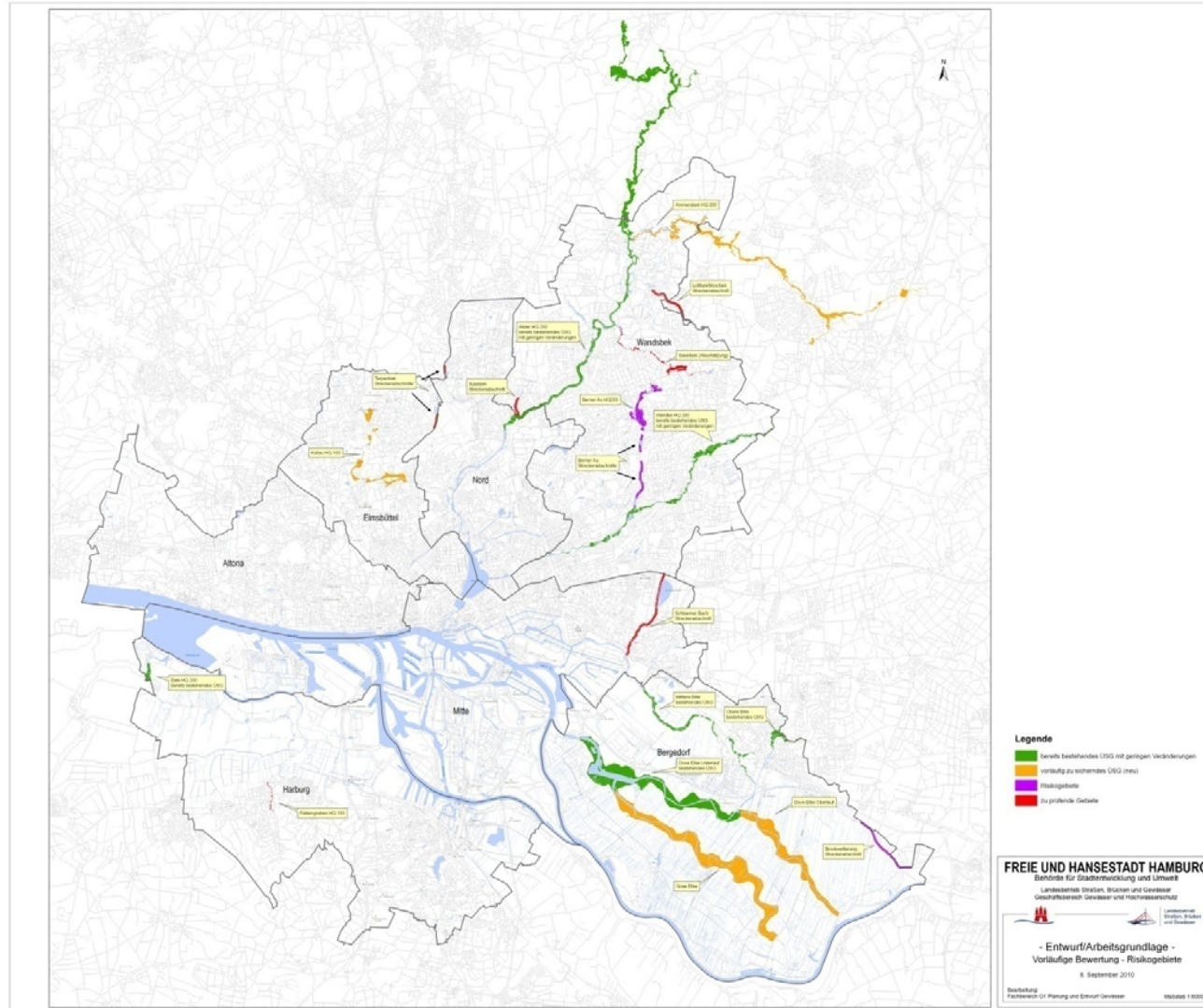
Flash flood



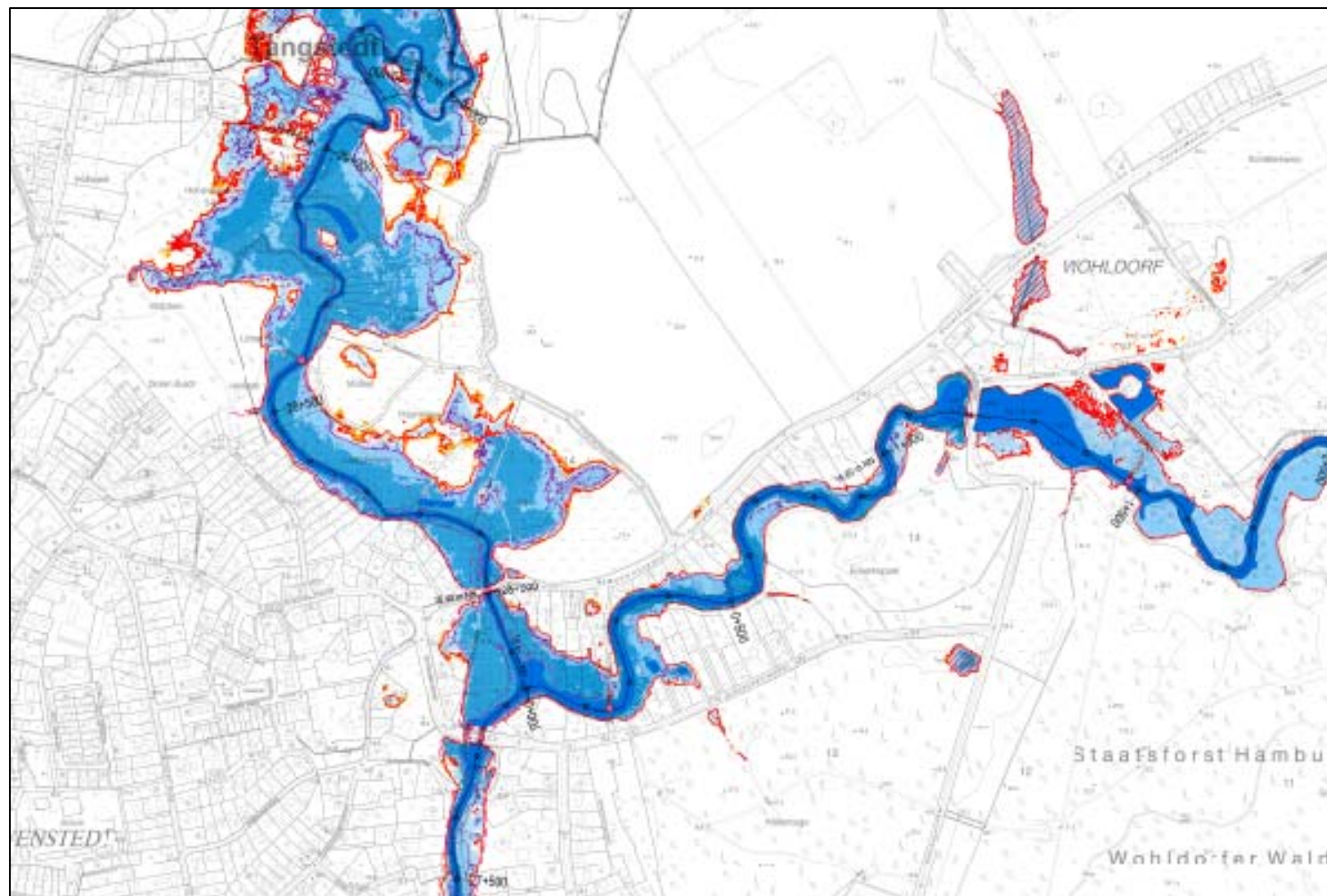
Narrowed retention areas



Areas of potential significant flood risk in Hamburg



Flooded area with HQ 200



provisions for floodplain development

- restrictions for the designation of new settlement areas

natural retention areas

- reduction of new sealed areas
- increase of storage capacities for precipitation runoff
- reactivation of former retention areas

technical flood protection measures

- improvement of drainage infrastructure
- maintenance of waters
- removal of bottlenecks
- object protection



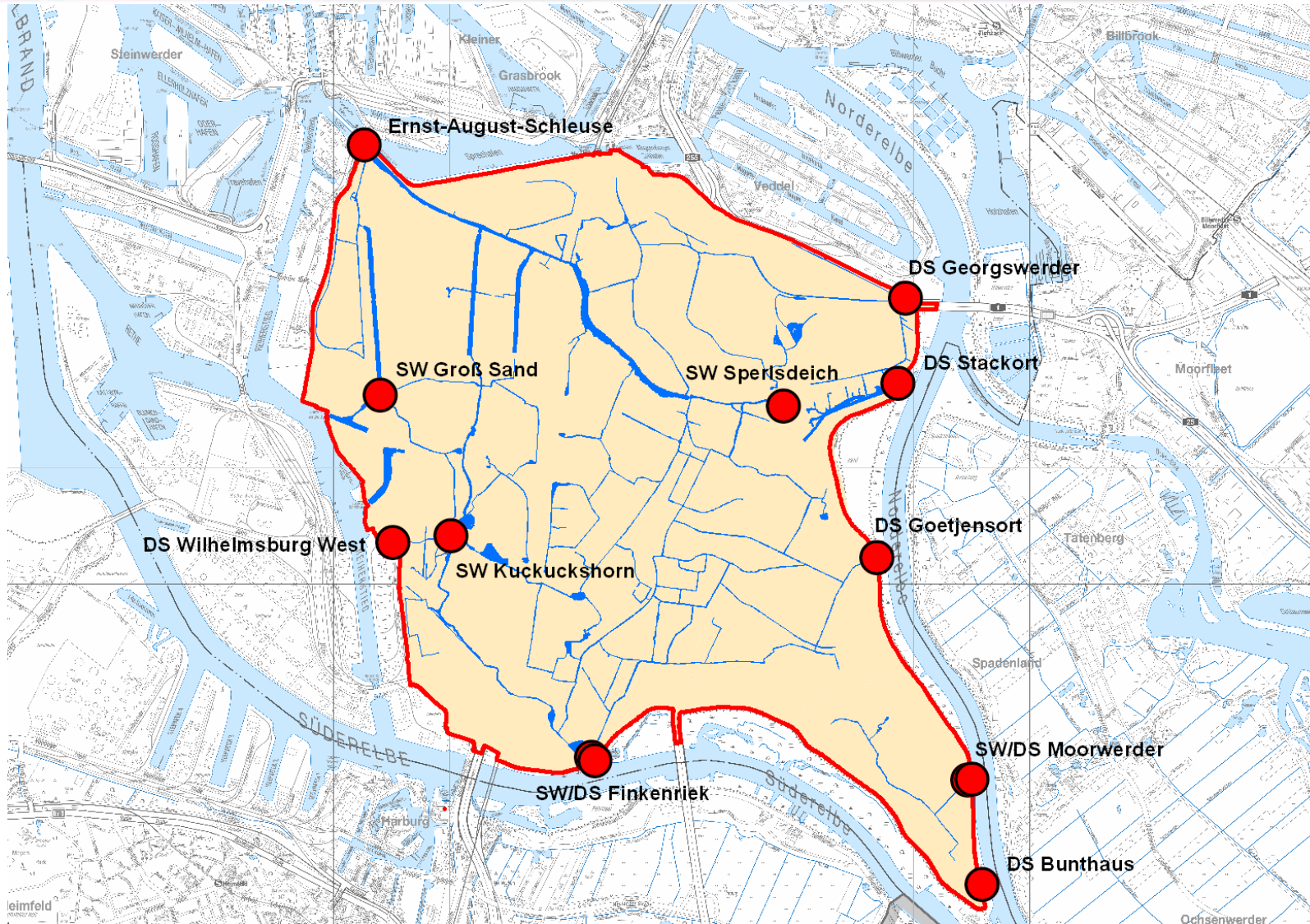
www.sawa-project.eu

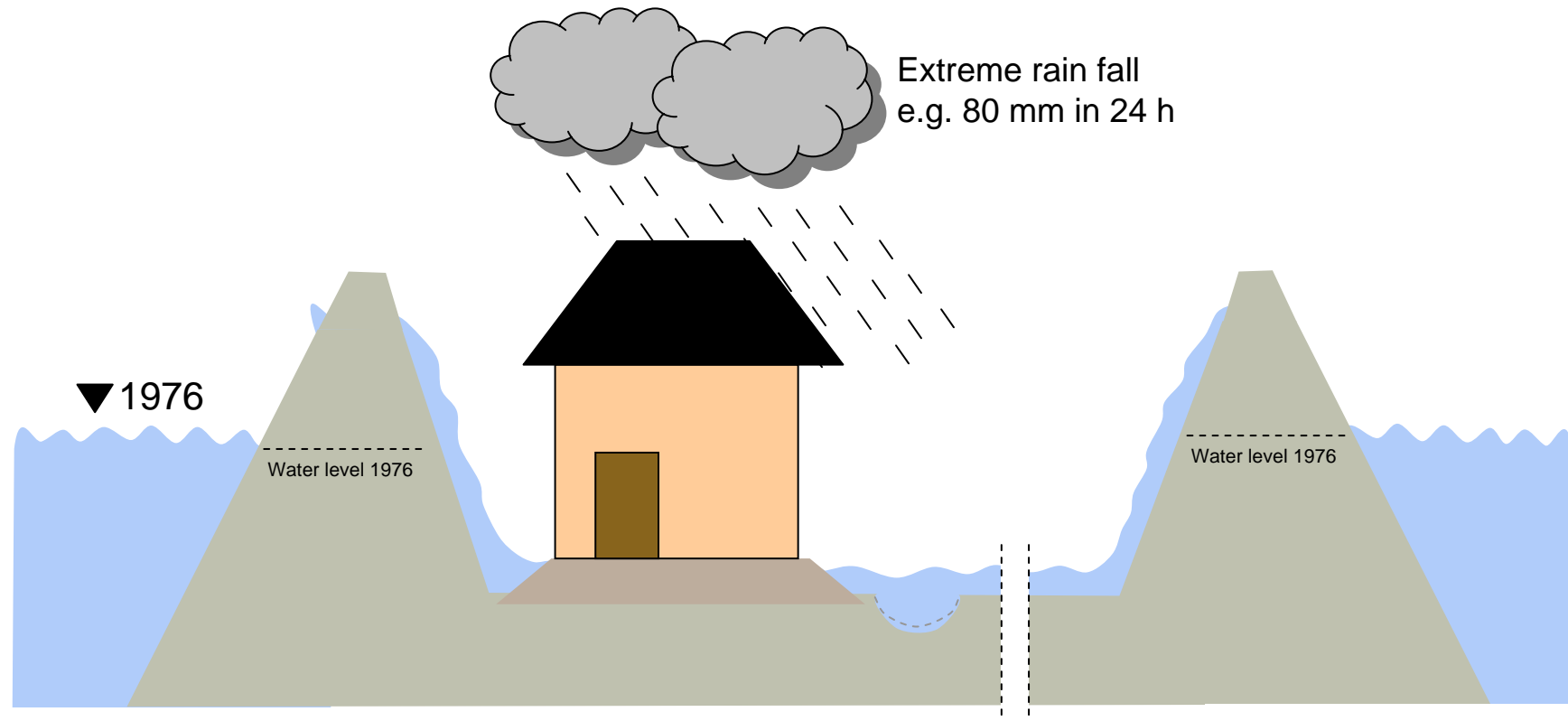


Retention basins in urban areas



Inland water drainage infrastructure in Wilhelmsburg





- Height of buildings (dwelling mount)
 - Pumping station
 - Retention area
 - Drainage
 - Evacuation paths
- + dike heightening!

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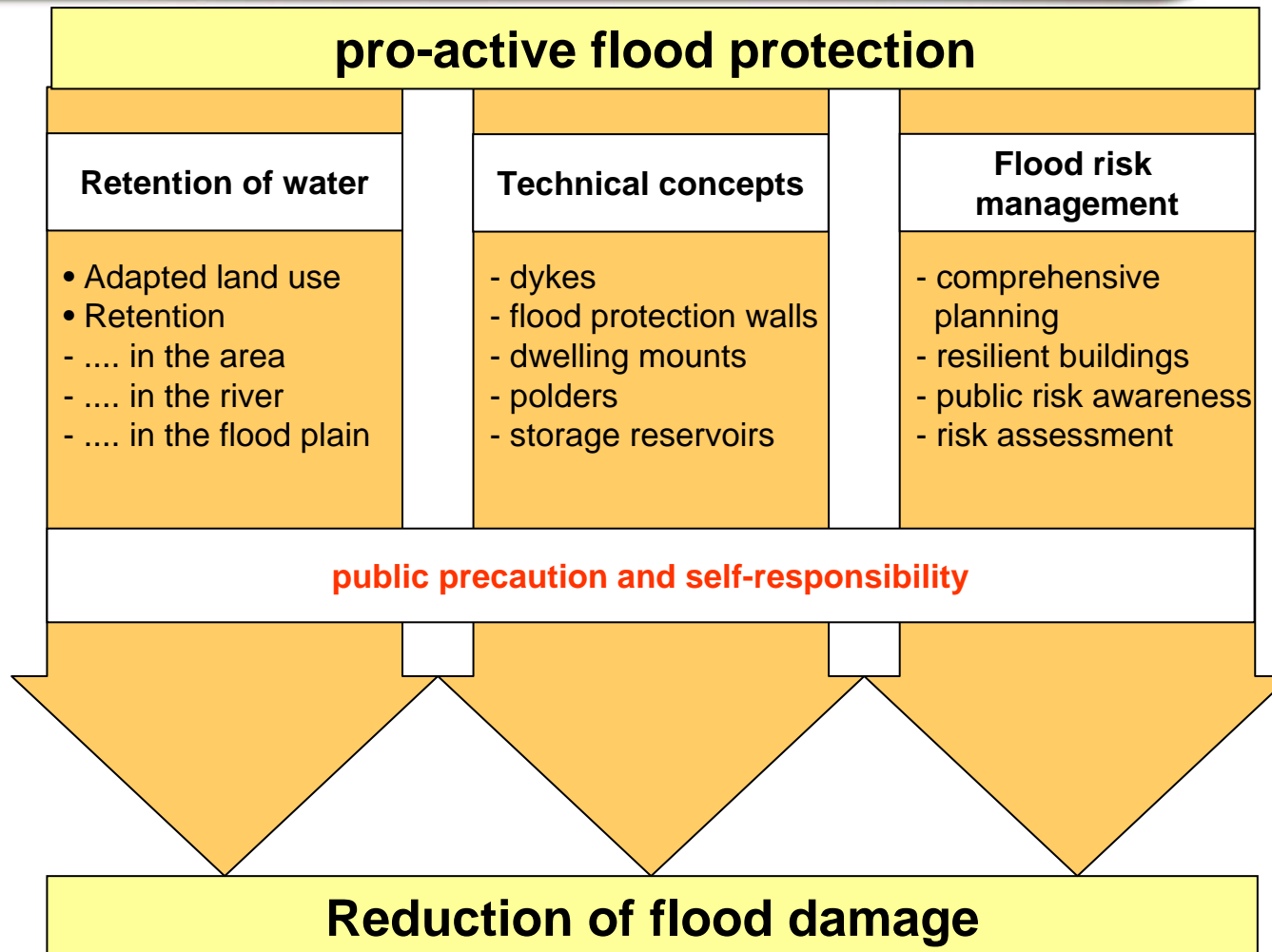
Protection against storm surges

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Questions to science and policy



Measures against flooding by precipitation



- How will the sea level develop in future?
- Will the precipitation increase in future?
- Will the probability of high river run-off and storm surges at the same time rise in future?
- Will the inland water storage capacity for three tides be sufficient in future?



- Which strategies for coastal flood protection will be needed in the future?
- Development of coordinated methods for consistent risk assessment and protection strategies on a European scale
- Transnational coastal defense strategies and concepts
- Financing and effort-sharing of coastal protection

