CREATING THE NEW TIDAL AREA, KREETSAND

WORKING WITH NATURE IN HAMBURG

IAPH Sustainability Awards 2023

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Agenda

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Background: The Tidal Elbe Concept

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Implementation: Creating tidal volume

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Literally: Working with nature

04
Take a tour!

New tidal area Spadenlander Busch / Kreetsand
The Tidal Elbe Concept

New tidal area Spadenlander Busch / Kreetsand
are changing…

...and are changed
Land reclamation and dykes

New tidal area Spadenlander Busch / Kreetsand
Tidal range and measures

New tidal area Spadenlander Busch / Kreetsand
Tidal pumping

New tidal area Spadenlander Busch / Kreetsand
Motivation: Increased need for dredging

Development of dredged material from the port and the river Elbe in Hamburg
Fixing the estuary: The Tidal Elbe Concept

Concept for a sustainable development of the Tidal Elbe River as an artery of the metropolitan region Hamburg and beyond

A contribution for discussion by Hamburg Port Authority and the Federal Administration for Waterways and Navigation

2006
Creating tidal volume

New tidal area Spadenlander Busch / Kreetsand
Creating tidal volume: pilot project Kreetsand

New tidal area Spadenlander Busch / Kreetsand
Pilot project Kreetsand

- former spoil area / dewatering field, dyke foreland (tidal meadow landscape)
- planning area ca. 47 hectares
- dyke realigned in 1999
- mean altitude approx. +5.50 m above sea level
Planning process: relevant criteria

Need for studies/planning processes

**Hydraulics**
- 2-D-modelling
- Assessment of the flow conditions
- Assessment of the sedimentation processes

**Nature protection**
- Compilation and assessment of the inventory
- Definition of the requirements for compensation measures
- Evaluation of the level of the target functions that need to be reached
- Impact assessments

**Earth works**
- Soil-mechanical and chemical survey
- Removal, concepts for reutilisation and disposal
- Geotechnical analysis
- Soil management

Drafting of alternatives, comparison, selection and technical planning of the selected layout option
Range of layouts and modelling

6. Vorauswahl von 8 Varianten im Hinblick auf die zu erwartenden Unterschiede bei der Strömungs- und Sedimentationsmodellierung
   E1, E2, E3, E5, E6, Z1, Z3, M3

7. „Überschlägliche“ Modellierung der vorausgewählten Varianten, Ergebnisdiskussion

8. Verbal-argumentative bzw. rechnerische Bewertung der Varianten anhand der Kriterien gemäß Punkt 5

9. Auswahl von 3 Vorzugsvarianten

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Planning process: criteria rating matrix

- Rating of the options using different criteria
- Creation of valuation units
  - target achievement
  - impact on subjects of protection
  - time line
  - costs
- To prioritize key criteria, the scoring assigns additional weight to:
  - Tidal hub attenuation
  - Sustainability of tidal low water
  - Restriction of sedimentation impacts
  - Preservation of alluvial forests and biotopes
- Sensitivity analysis to verify the results
Planning process: detailed planning of the selected option
Winner of the PIANC Working with nature award (2014)
Did we understand the environment?

- A 3D hydro-numeric model has been developed, tested, and can be utilized to closely examine the system.

- An ecological framework concept for the Elbe estuary has been established and agreed upon by authorities, stakeholders, and the EU.

→ YES!
Did we involve stakeholders and partners?

- Involvement of stakeholders from the early stages has been the cornerstone of the communication strategy.

- Local citizens, NGO’s, relevant authorities were periodically and personally addressed to contribute to the development of the project.

- Engaging the wider public has been a pivotal aspect, both historically and in the future trajectory of the project. Notably, the project has been integrated into the International Building Exhibition (IBA 2013), fostering numerous excursions tailored towards students and schools. Furthermore, an innovative permanent information booth has been established to deliver valuable insights.

→ YES!
Did we identify “win-win” solutions?

- The project goes beyond legal requirements, creating valuable estuarine habitat. It aligns with the Natura 2000 management plan for the Elbe estuary and will contribute to a larger nature protection site. The new tidal area will particularly benefit fish species and the endemic Oenanthe conioides.

- The project increases knowledge (it is the first of its kind!) and awareness on tidal systems, sediment management and estuarine habitats.

- The site will be an attractive location for nature observation and recreation.

→ YES!
Did we enable nature to play a significant role in the design process?

- The project aims to establish an initial state and subsequently allows natural processes to shape the site.
- The project is strategically designed to leverage the assistance of nature in sediment management.
- However, periodic maintenance work, such as water injection, will be essential to remove excessive sediments from the site.

→ YES!
Did we adhere to the planning principles of Working with Nature, and was it effective in achieving our goals?

- The project was carefully planned from the beginning, involving an integrated process:
  - The project's objectives were established through extensive discussions with authorities, stakeholders, and the public.
  - A comprehensive understanding of the environment and its functioning was gained well before the project commenced, considering the estuary as a unified system.
  - The site selection process involved evaluating various options, considering multiple factors in a balanced manner.
  - The initial project design was chosen from a diverse range of possibilities.
  - Importantly, the project obtained legal approval without significant objections or delays

→ YES!
Dike Shed: An Information and Viewing Point

- Information about the construction phase
  Kreetsand
- Information-center for the tidal Elbe concept
- Point of reference for IBA 2013
- Project within the EU-Project „TIDE“
- Costs: about 100,000 EUR; EU-funding rate: 15 %
Take a tour

New tidal area Spadenlander Busch / Kreetsand
Change the landscape

- **Create 30 hectares of shallow water**
  - Remove deposited soils: ~ 1.2 million m³
  - Remove natural ground: ~ 0.8 million m³

- **Sum of excavation material:**
  - ~ 2.0 million m³
  - Soil for utilization: ~ 0.8 million m³
  - Soil for disposal: ~ 1.2 million m³
Interventions in tidal floodplain forest
Compensation for tidal floodplain forest

New tidal area Spadenlander Busch / Kreetsand
Soil excavation
Soil management
How it happened – Aug. 2014
How it happened – Aug. 2015

New tidal area Spadenlander Busch / Kreetsand
How it happened – June 2016
How it happened – July 2017
How it happened – April 2018
How it happened – May 2020
How it happened – May 2021

New tidal area Spadenlander Busch / Kreetsand
How it happened – Feb. 2022

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