



Resilient Solutions - Perspectives

Niek Veraart

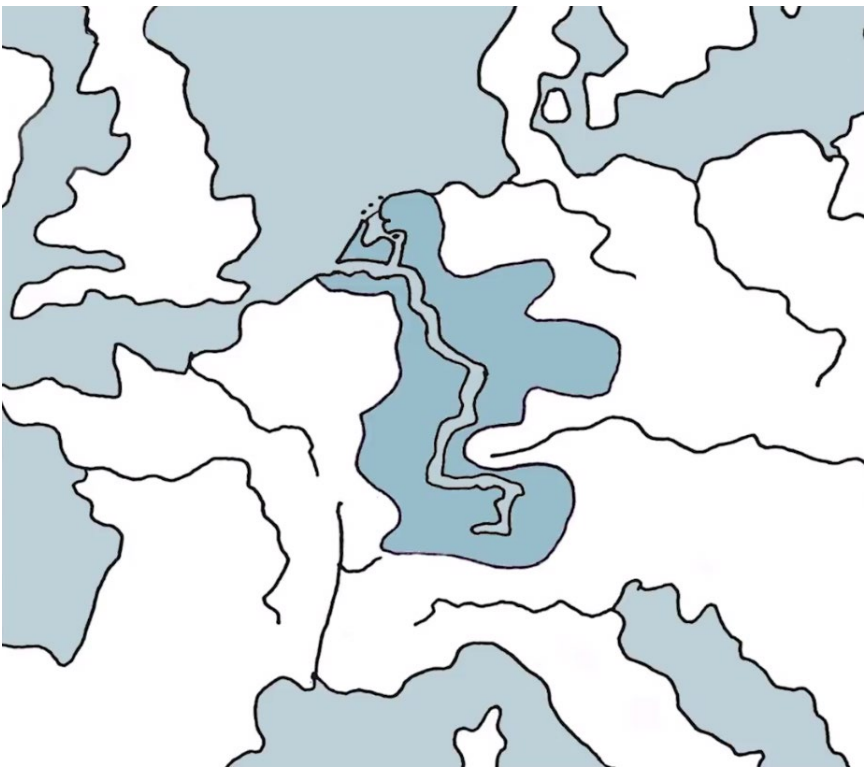
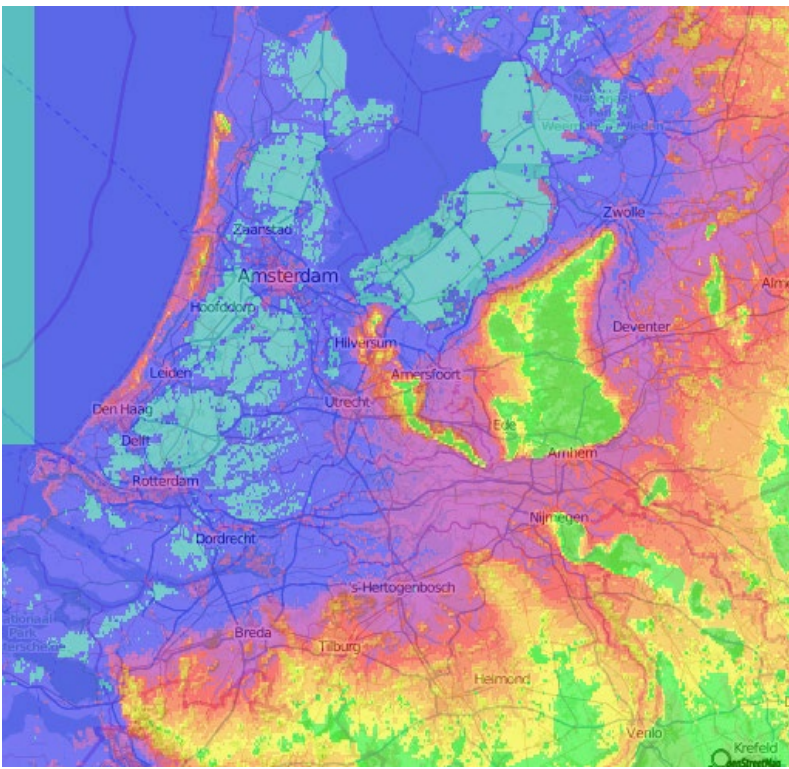


Louis Berger





Coastal & Riverine Inundation Risk

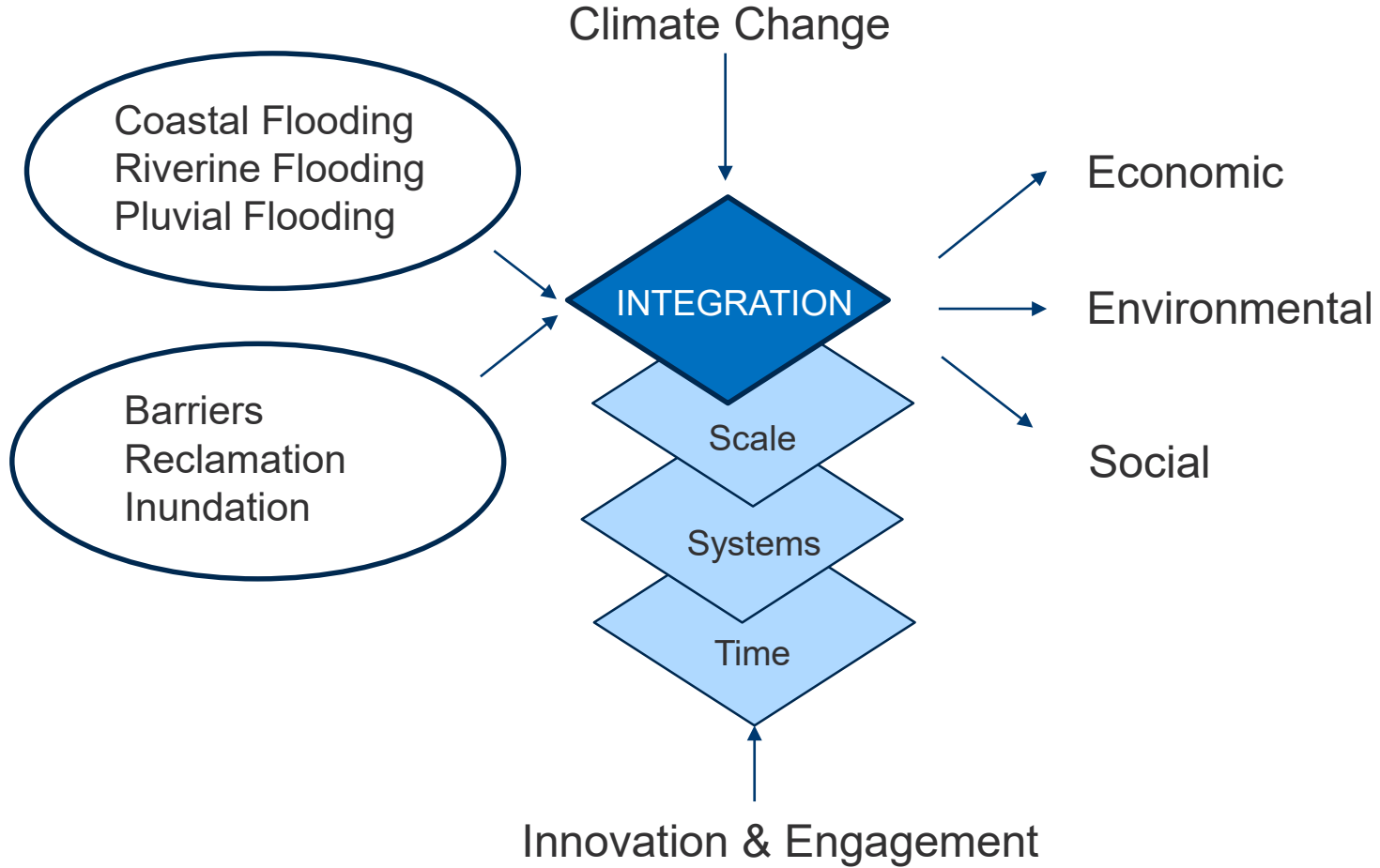




A crowd of people is silhouetted against a red background. The silhouettes are dark and appear to be standing in a line or a group, with some individuals slightly taller than others. The overall scene is a solid red field with the dark figures of people in the foreground.

“Maak van de Nood een Deugd”

“Turn a Disadvantage into an Opportunity”

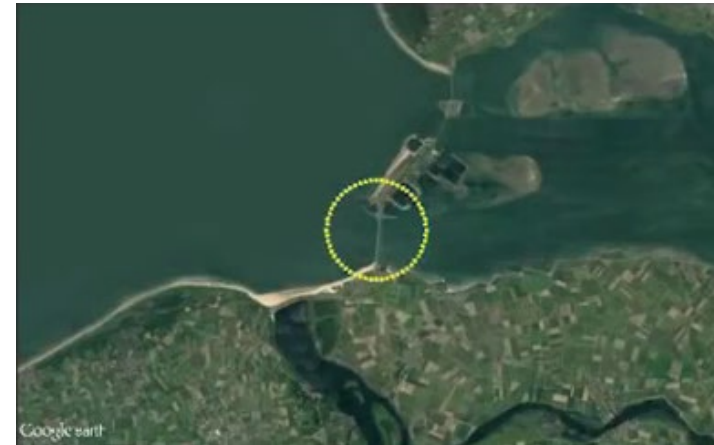


A crowd of people is silhouetted against a red background. The silhouettes are dark and appear to be walking or standing in a group. The background is a solid, vibrant red color. The overall image has a strong, monochromatic aesthetic.

Barriers & Buffers – Integration & Evolution

Solutions for a better world

Barriers

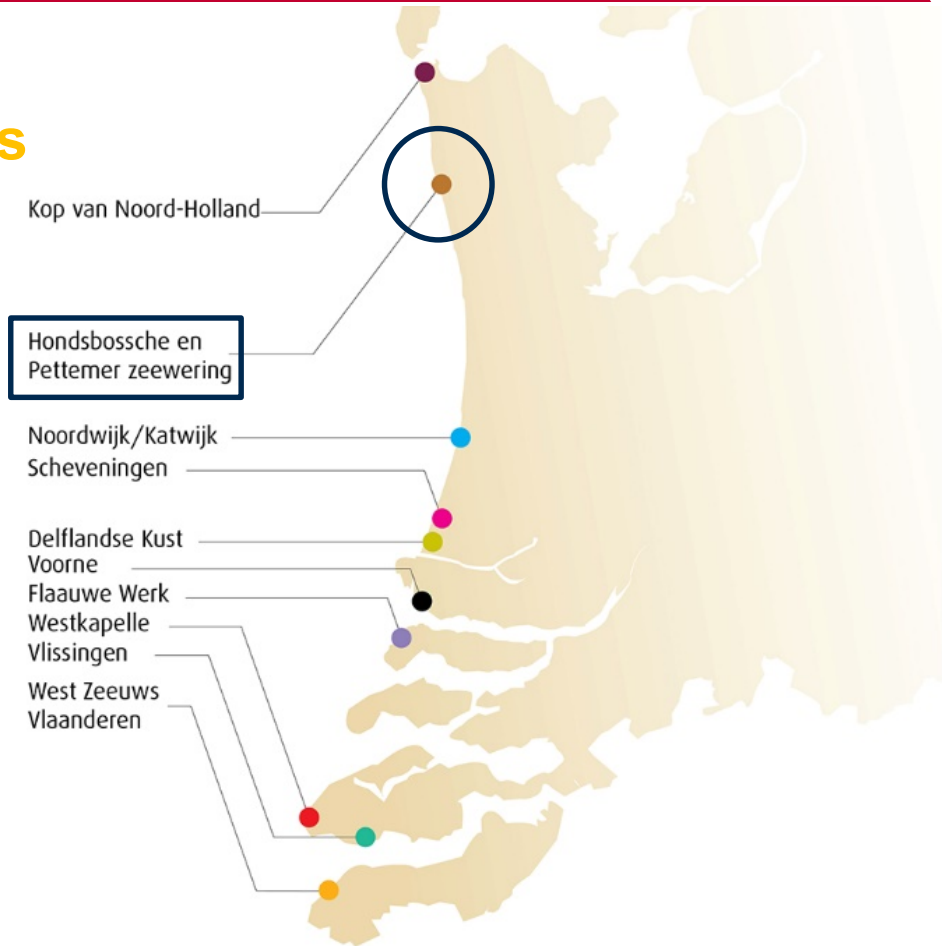


Barriers



New Barriers

New Hondsbosch Dunes



New Barriers

New Hondsbossch Dunes













The Sand Engine

Nature-driven erosion prevention, new habitat creation



The Sand Engine

Nature-driven erosion prevention, new habitat creation



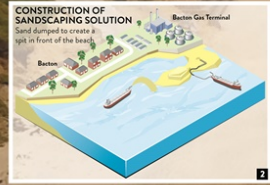
BACTON'S COASTAL MANAGEMENT SOLUTION - SAND ENGINE



5km
Length of coastline

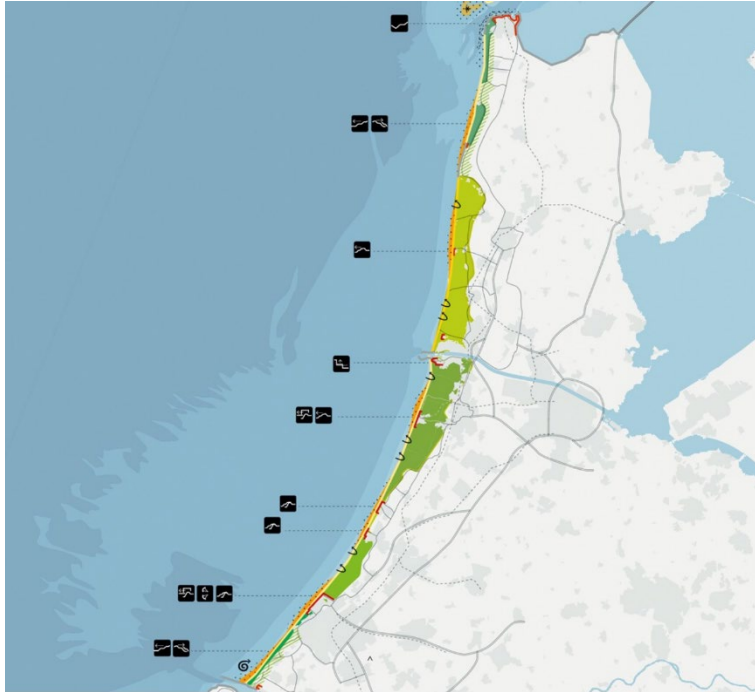
1.5M
Cubic metres of sand

200
Football pitches with 1m deep sand



Research by Design into Sea Defenses

Design as a Tool – Regional Approaches



Research by Design into Sea Defenses

Design as a Tool – Local Integration



Research by Design into Sea Defenses

Design as a Tool – Local Integration



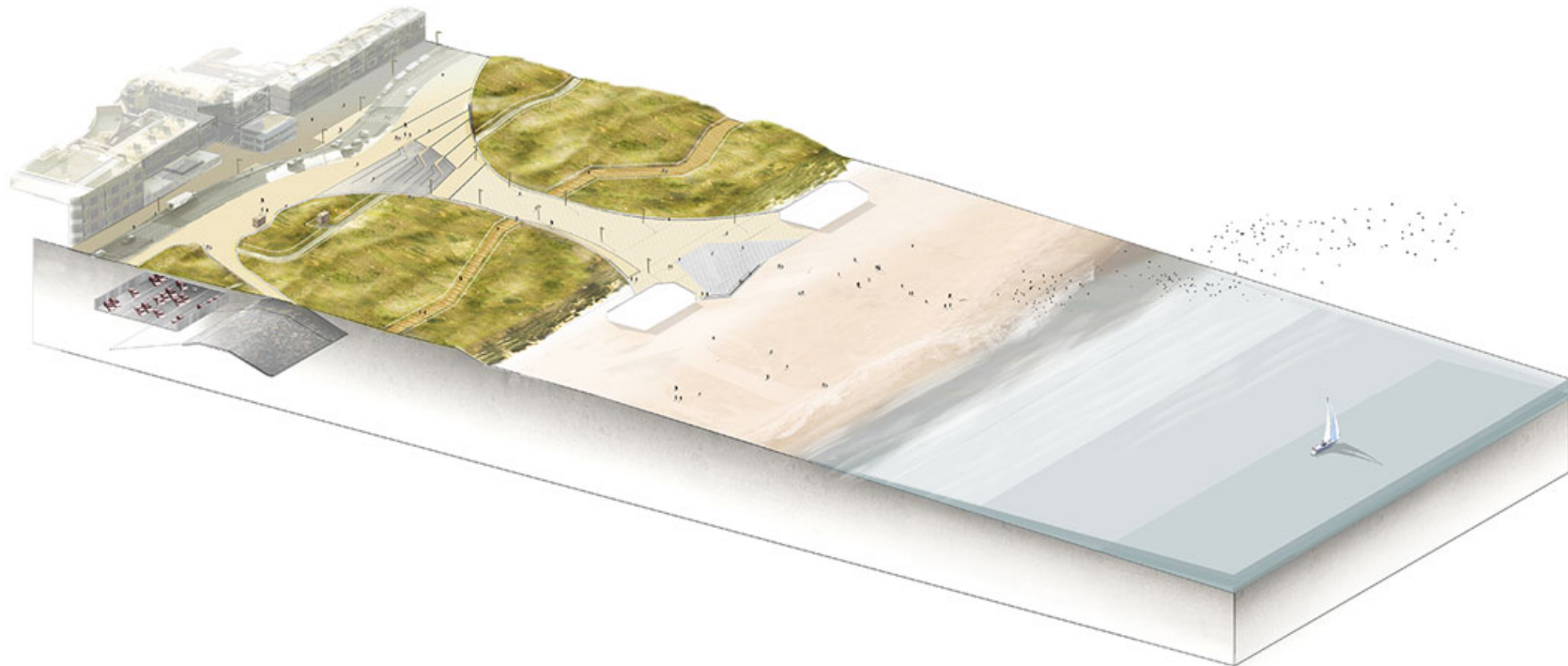
Katwijk Aan Zee



Katwijk Aan Zee



Katwijk Aan Zee



Katwijk Aan Zee



Katwijk Aan Zee



Katwijk Aan Zee



Scheveningen Boulevard

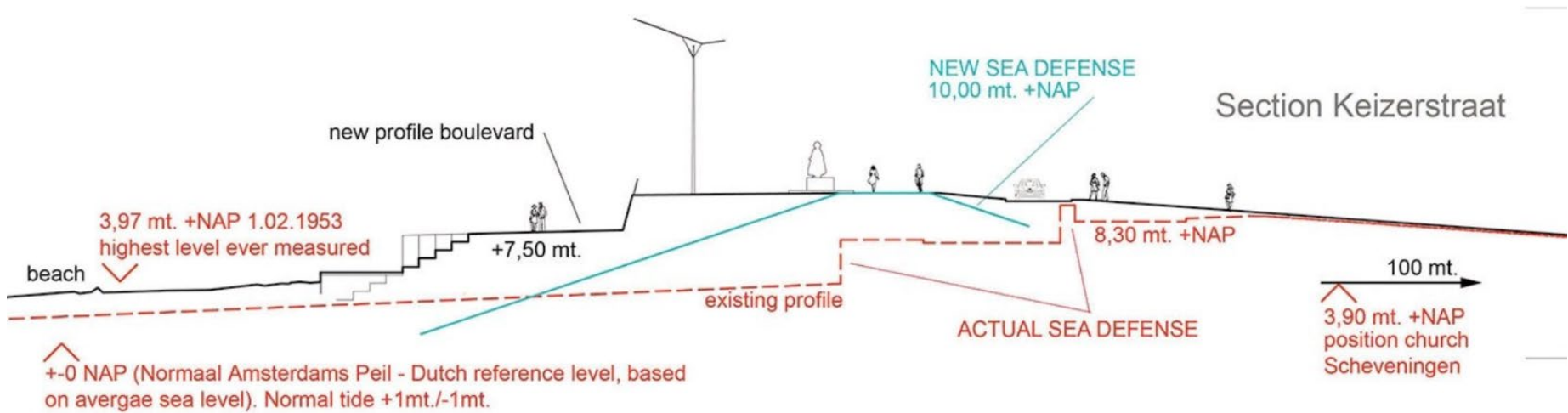


Scheveningen Boulevard





Scheveningen Boulevard





Scheveningen Boulevard



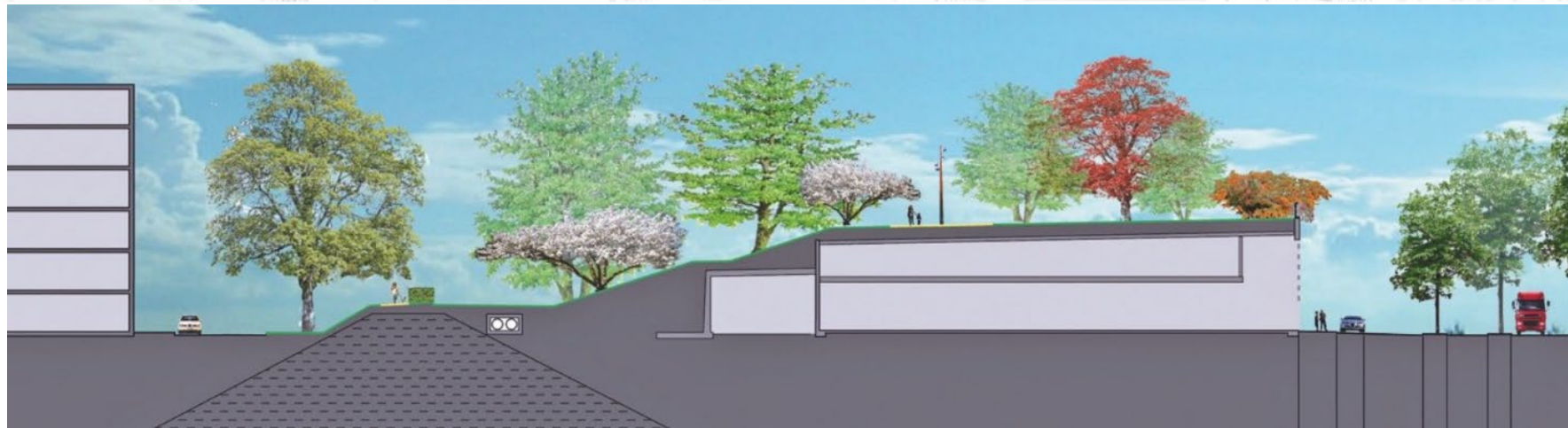
Rotterdam Dakpark



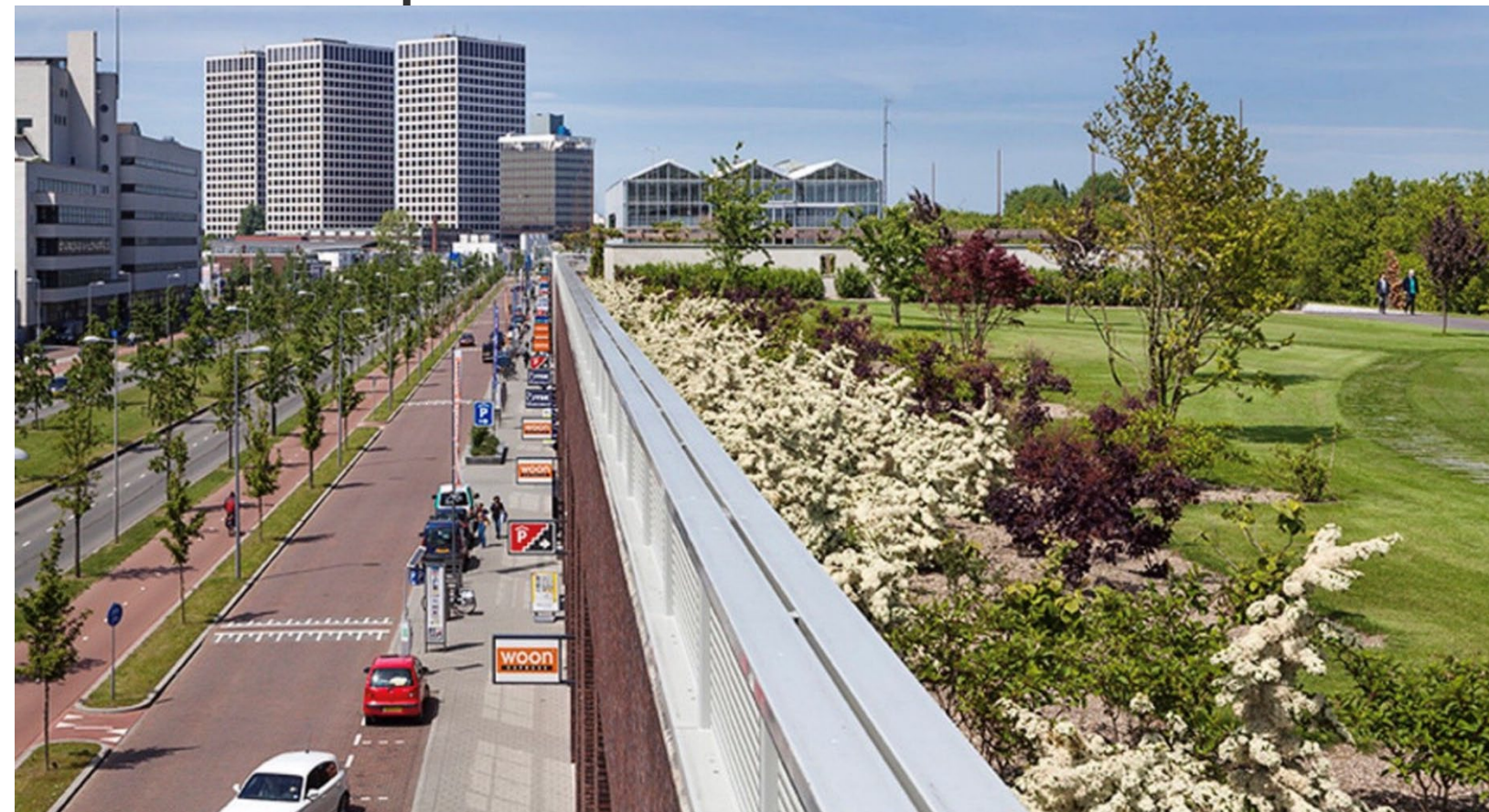
Rotterdam Dakpark

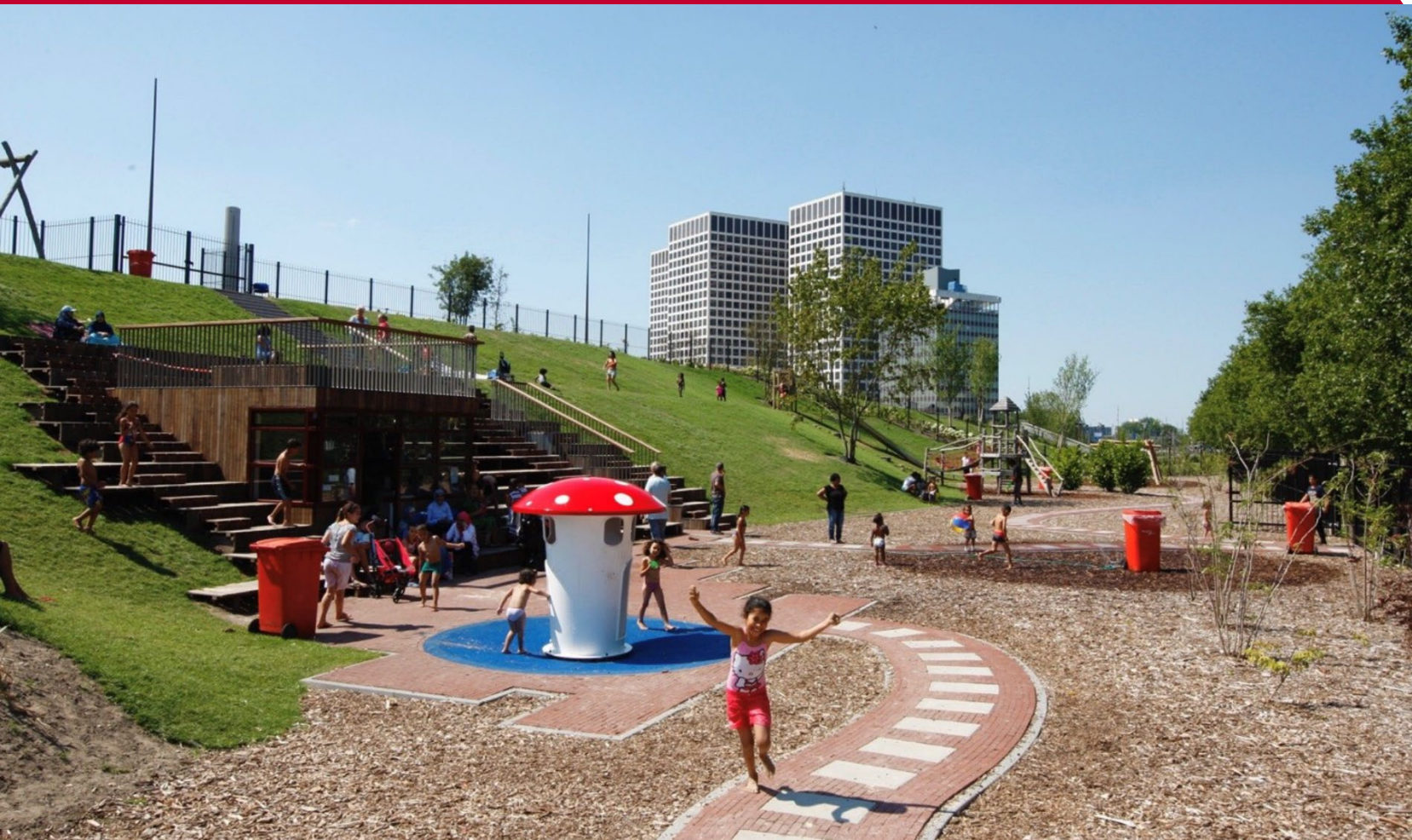


Rotterdam Dakpark



Rotterdam Dakpark







Rotterdam Dakpark



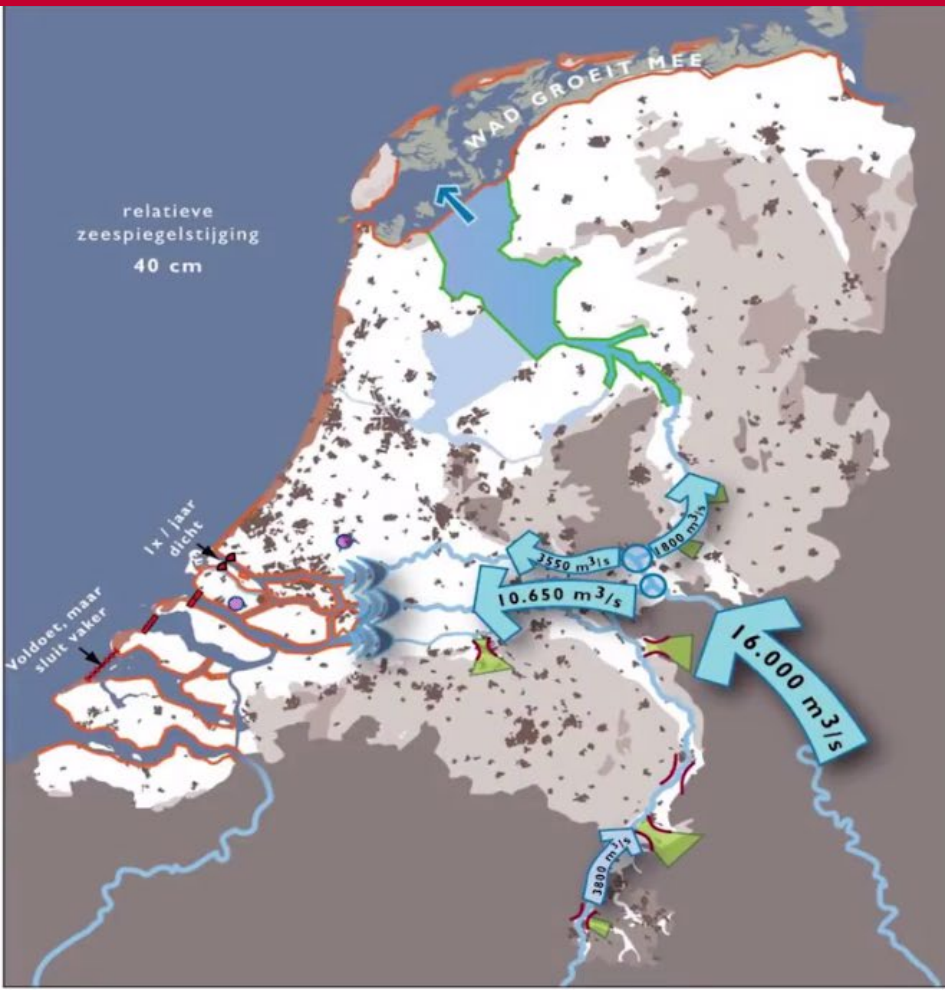
Rotterdam Dakpark





Room for the River

Solutions for a better world







Room for the River,



Lowering floodplains
Lowering/excavating part of the floodplain increases room for the river in high water situations.



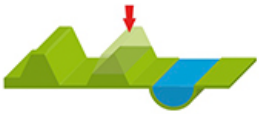
Lowering groynes
Groynes stabilise the location of the river and ensure its correct depth. However, in a high water situation, groynes may obstruct the flow to the river. Lowering groynes speeds up the rate of flow.



Dyke relocation
Relocating a dyke inland widens the floodplain and increases room for the river.



Removing obstacles
If feasible, removing or modifying obstacles in the riverbed will increase the rate of flow.



Depoldering
The dyke on the riverside of a polder is lowered and relocated inland. This creates space for excess flows in extreme high water situations.



Water storage
The Volkerak-Zoommeer provides temporary water storage in extreme situations where the storm surge barrier is closed and there are high river discharges to the sea.



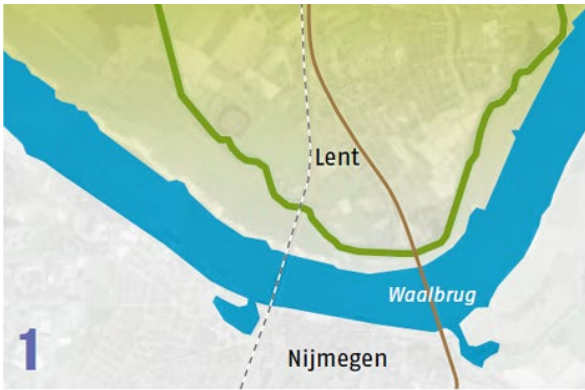
Deepening summer bed
Excavating/deepening the surface of the riverbed creates more room for the river.



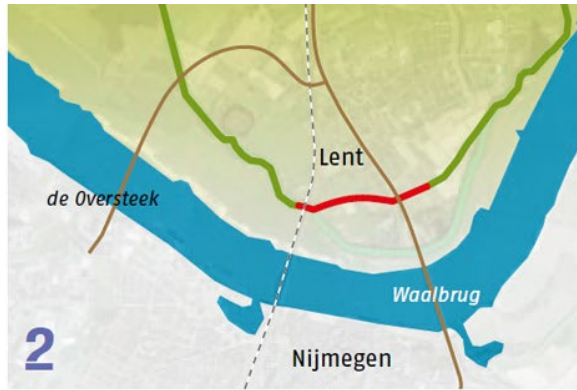
High water channel
A high water channel is a dyke area branching off from the main river to discharge some of the water via a separate route.



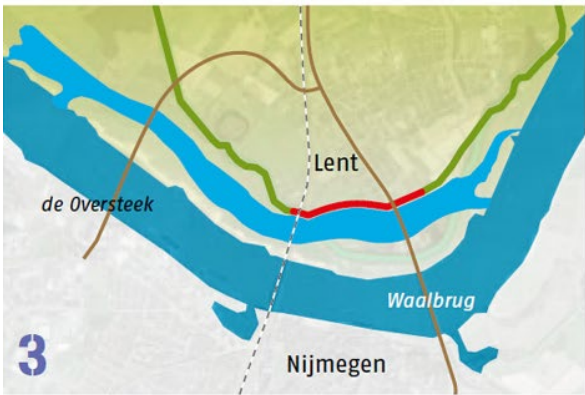
Dyke reinforcement
Dykes are reinforced at given locations where river widening is not feasible.



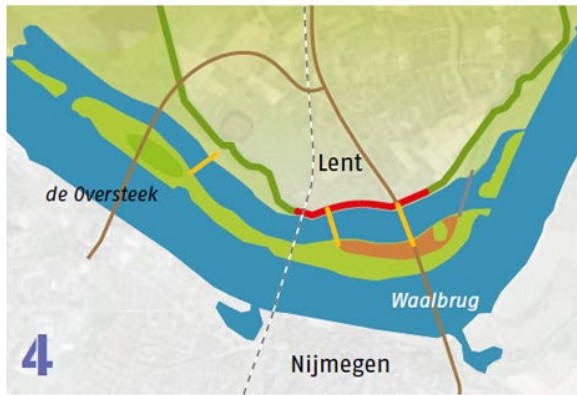
The initial situation with the existing dike.



The dike was moved 350 metres inland.

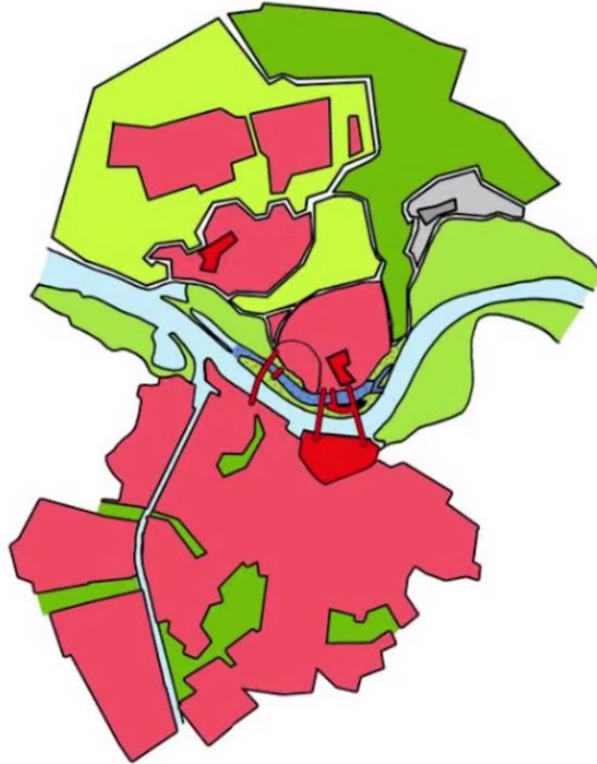
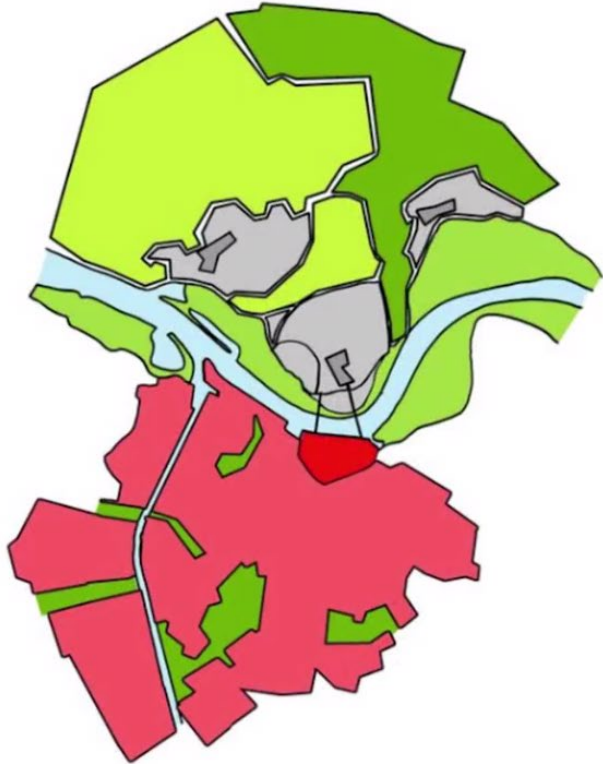


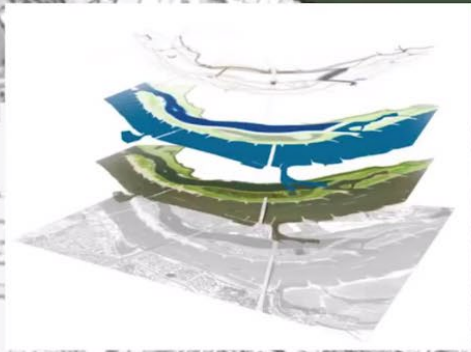
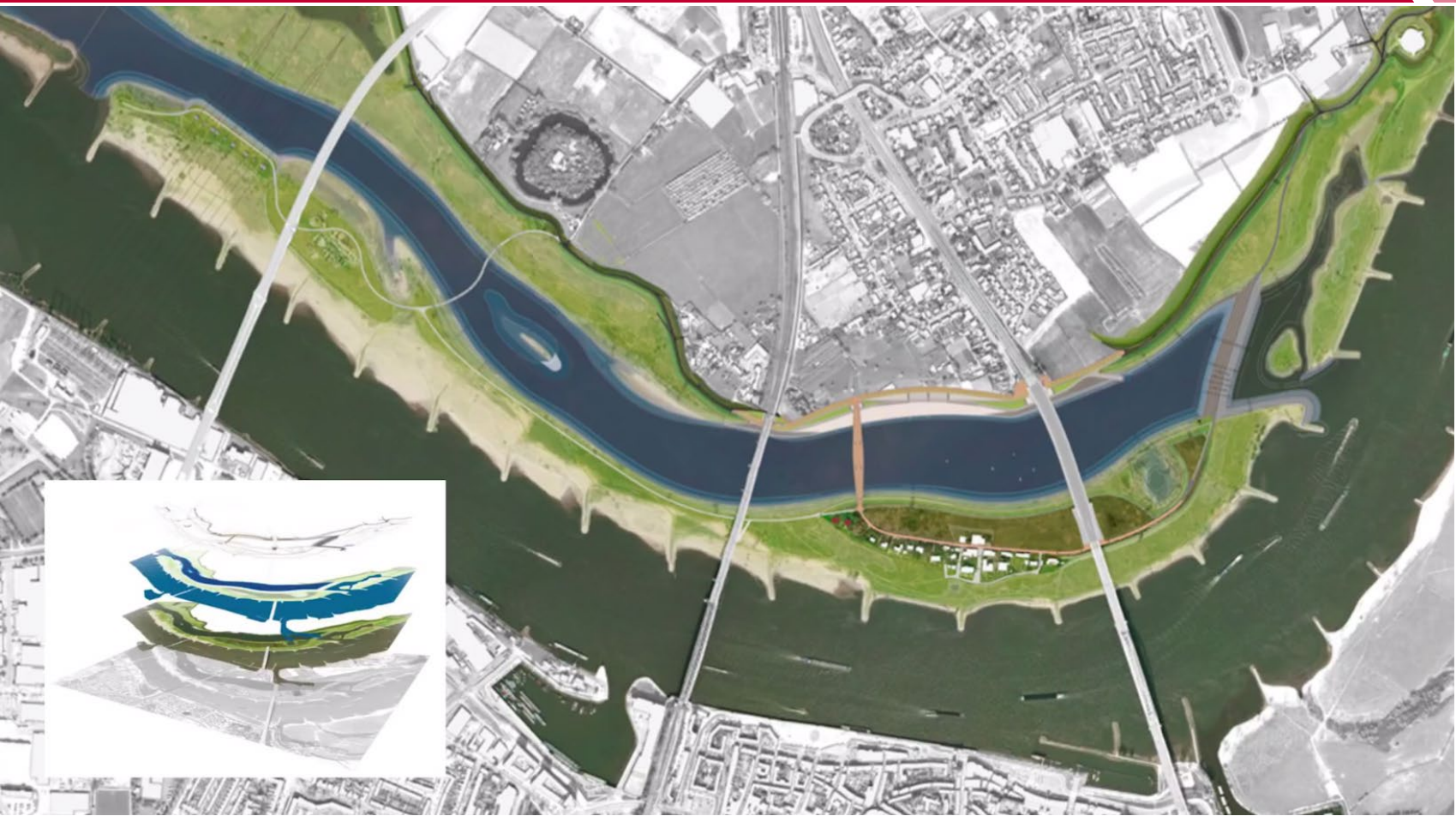
An ancillary channel is to be dug in order to give the river more room. This will create an elongated island.



Bridges across the ancillary channel.

Room for the River





Room for the River



Room for the River







Room for the River



Room for the River



The image features a background of a crowd of people walking, rendered in a dark, semi-transparent style. A horizontal red band with a slight gradient is positioned across the middle of the image. The title text is centered within this band.

Room for the Rain

Solutions for a better world

Rainproof Amsterdam

Empowering citizens, businesses and neighborhoods towards resiliency

Which projects are there already to make the city rainproof?



Room for the Rain



Room for the Rain



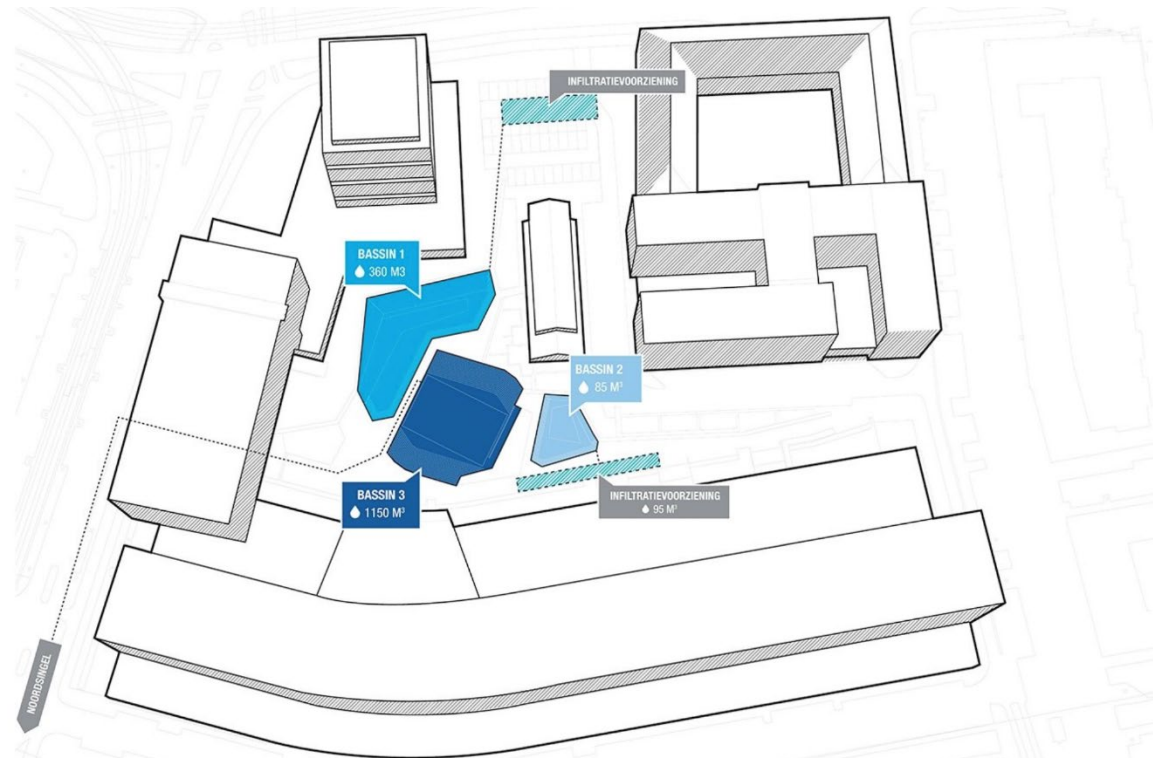
Room for the Rain

Benthemplein Water Square



Room for the Rain

Benthemplein Water Square



Room for the Rain

Benthemplein Water Square



Room for the Rain

Benthemplein Water Square

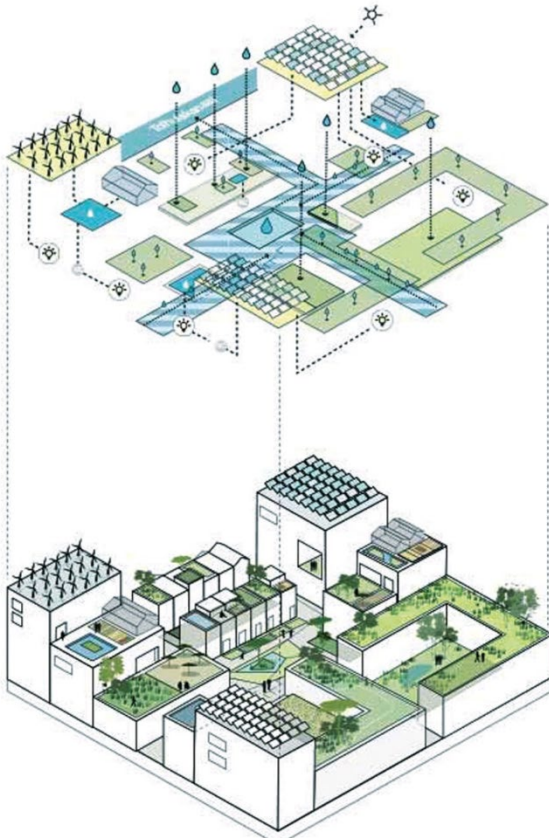


Room for the Rain

Benthemplein Water Square



Buiksloterham Plot Plan



Dordrecht, Water as Design Element



Dordrecht, Water as Design Element



Rainproof Amsterdam

Empowering citizens, businesses and neighborhoods towards resiliency





Living in Water

Turning water into space



Living in Water



Living in Water – Adapting to Sea Level Rise



The background of the slide features a dark red color with a faint, repeating pattern of silhouettes of people standing in a crowd, creating a sense of community and shared purpose.

Smart Delta – Thinking with Water

Solutions for a better world

Economic Development and Innovation

DIGITAL DELTA

USING BIG DATA TO TRANSFORM MANAGEMENT OF THE DUTCH WATER SYSTEM AND HELP KEEP THE COUNTRY SAFE



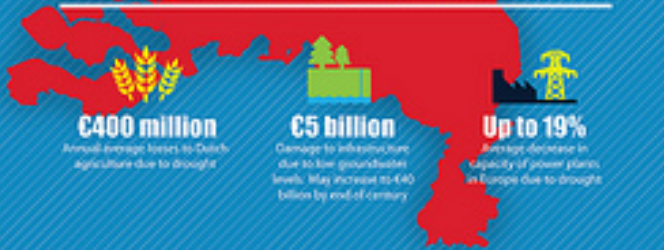
WATER AROUND THE WORLD

- €600 million**
European annual expected loss from storm surge for North Sea countries
- €37 billion**
Estimated damage of Hurricane Sandy
- €8 billion**
Germany's aid fund for June 2013 floods
- €8.7 billion**
Costs of 2003 drought to the EU economy

HOW FLOODS IMPACT NETHERLANDS



DROUGHT BRINGS CHALLENGES TOO

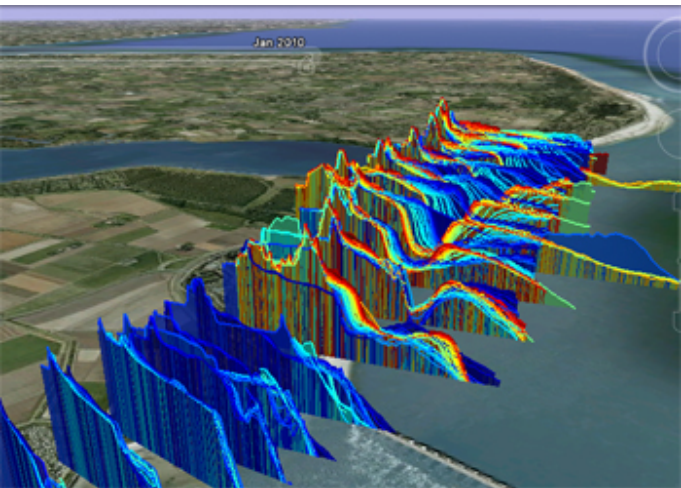


KEEPING DATA FLUID

- 20%-30%**
Potential cost reduction of managing future water projects
- 75%**
Reduction in scientific research & development time due to secure information sharing
- 32 terabytes**
Potential volume of data produced by a single water management project (approx. 7 billion pages of text)
- 2 million**
Streaming sets of data produced by 400 monitoring stations every day

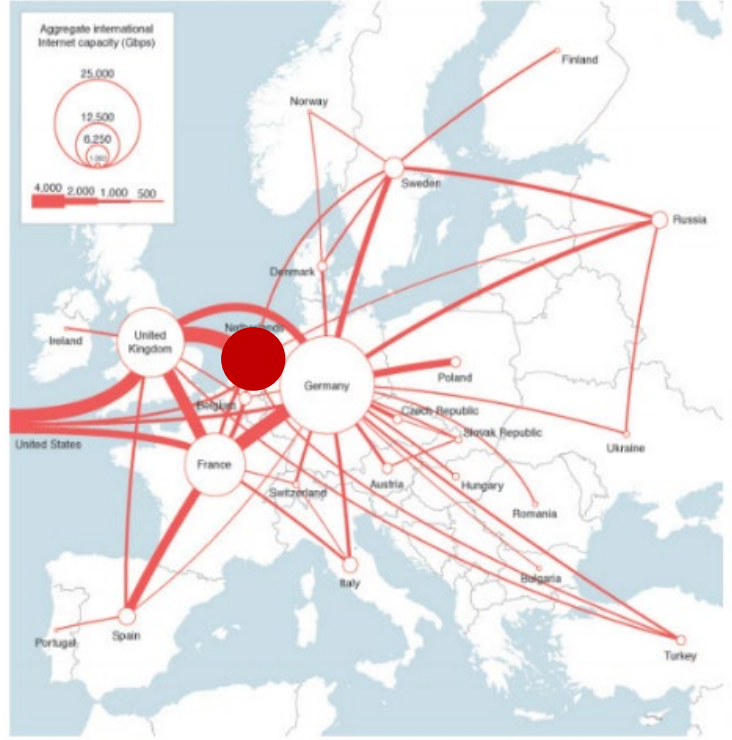
Join the conversation @IBMBigData or #BigData

Economic Development and Innovation



Economic Development and Innovation

Driver for and integrated with Resilience







Thank You



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Thank You

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Louis Berger

Solutions for a better world

Walcheren,

Using flood recovery to increase agricultural efficiency & tourism



Walcheren,

Turning flood recovery to increase agricultural efficiency & tourism



