Highlights Flood management in Rotterdam

Fourfold flood protection: sea, rivers, precipitation and groundwater

Corjan Gebraad
Strategy Advisor
Urban Management Dept.

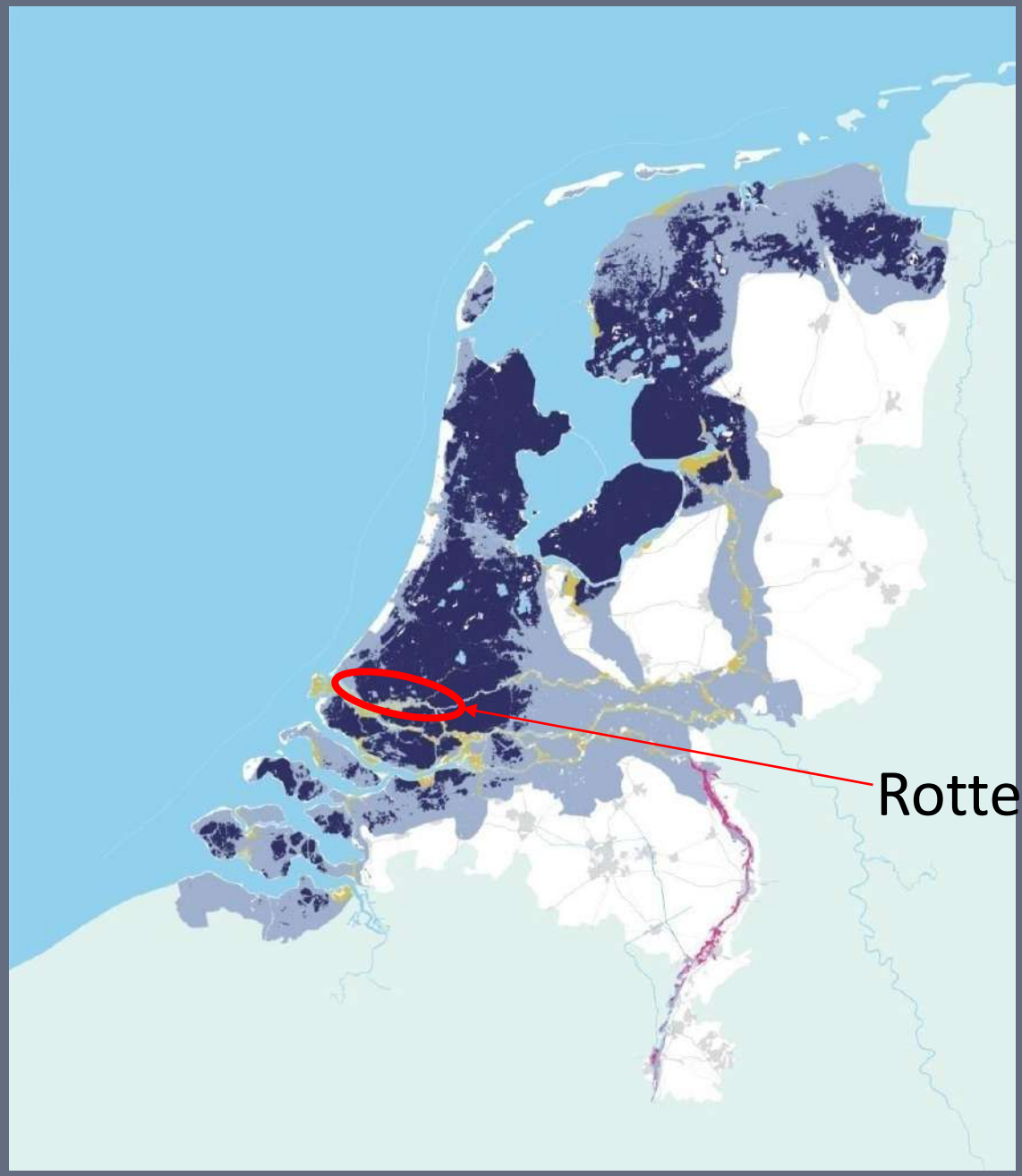
Dutch Delta

The Netherlands is a delta of 4 rivers: Rhine, Meuse, Schelde and Eems

Prone to flooding: 59%

- Below sea level: 26%
- Above sea level: 29%
- Outside dikes: 3%

More than 22.000 km of dikes
Coastline of 880 km



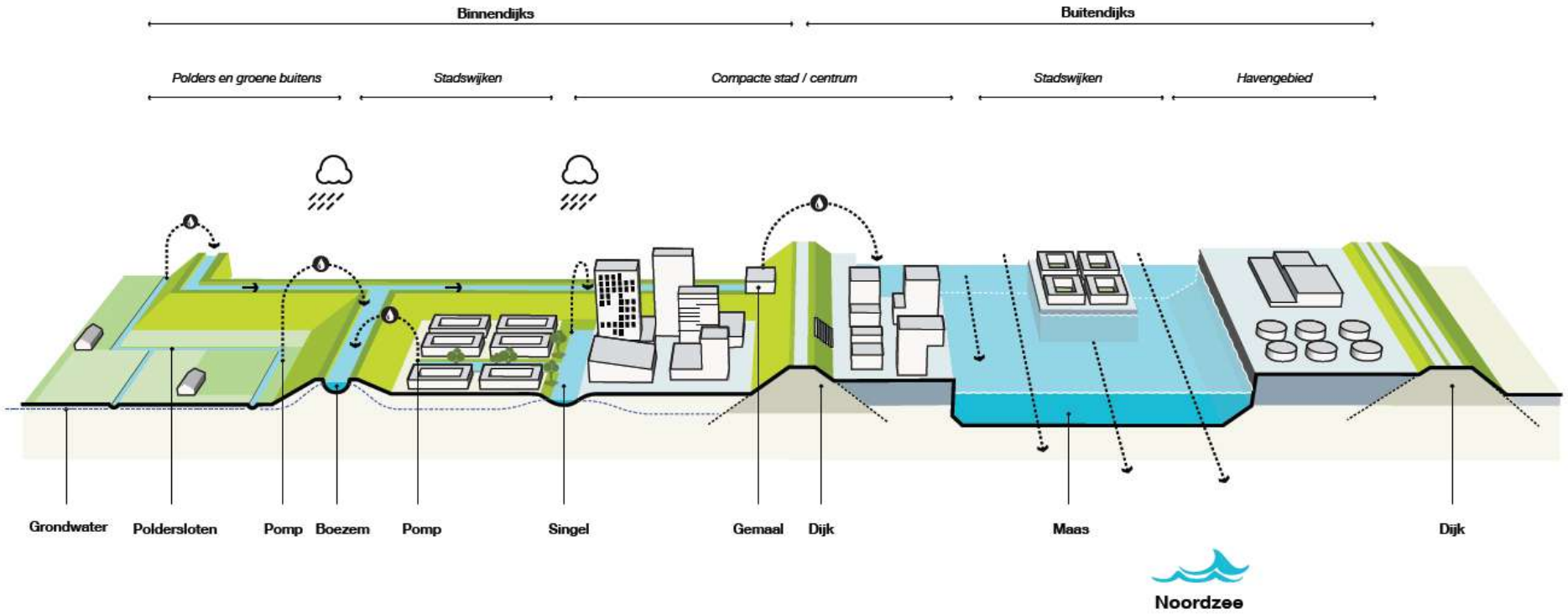
Height map: above (brown) and below (blue) sea level

bbink TU Delft/RCP

Flood management: sea & river

Rotterdam: polder area and raised grounds

> 1000 pumping stations: rain and sewage water has to be pumped out



Storm surge barrier *Maeslantkering*

Regular flooding of quay's


De Esch, Nautilus (datum onbekend)


Noordereiland 04/2019 (Roel Dijkstra)


Bolwerk 04/2019 (Hendrik Munnik)

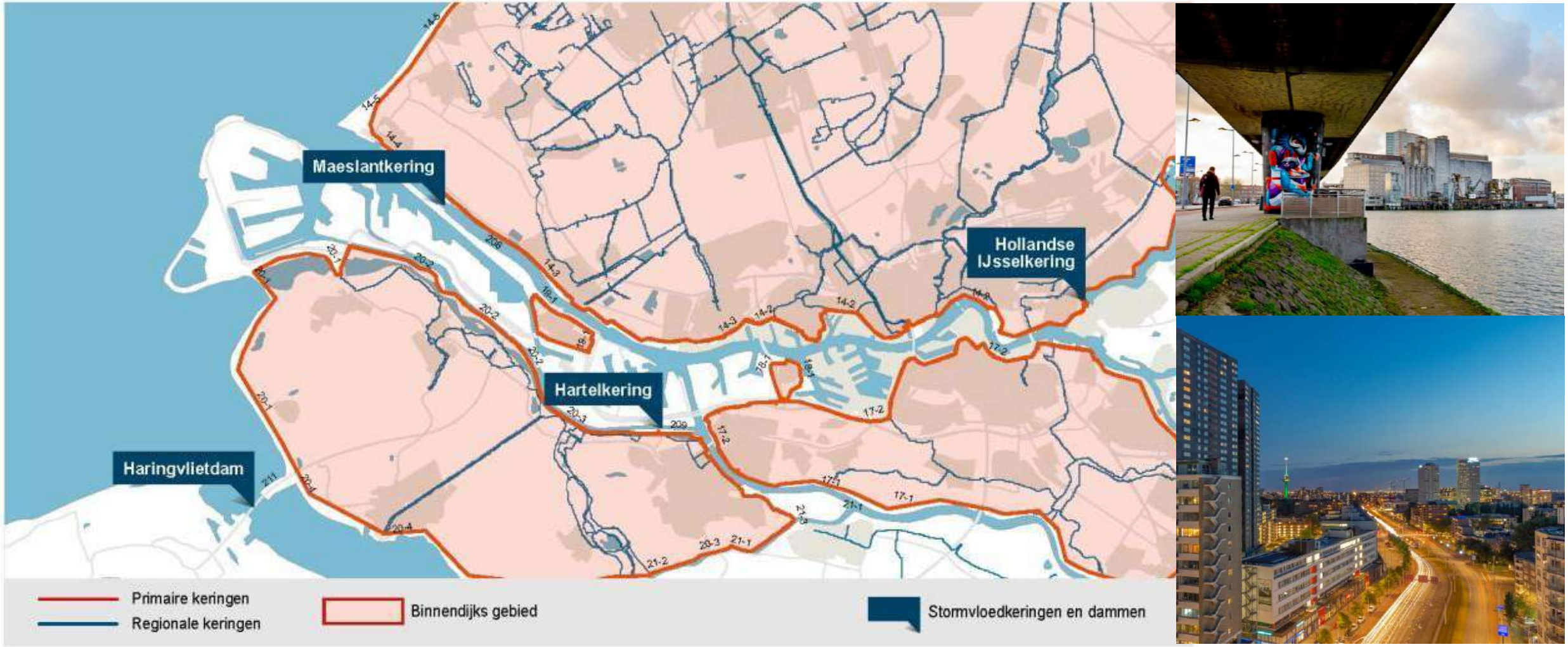

Bolwerk 09/12/2011


Noordereiland 19/11/2020

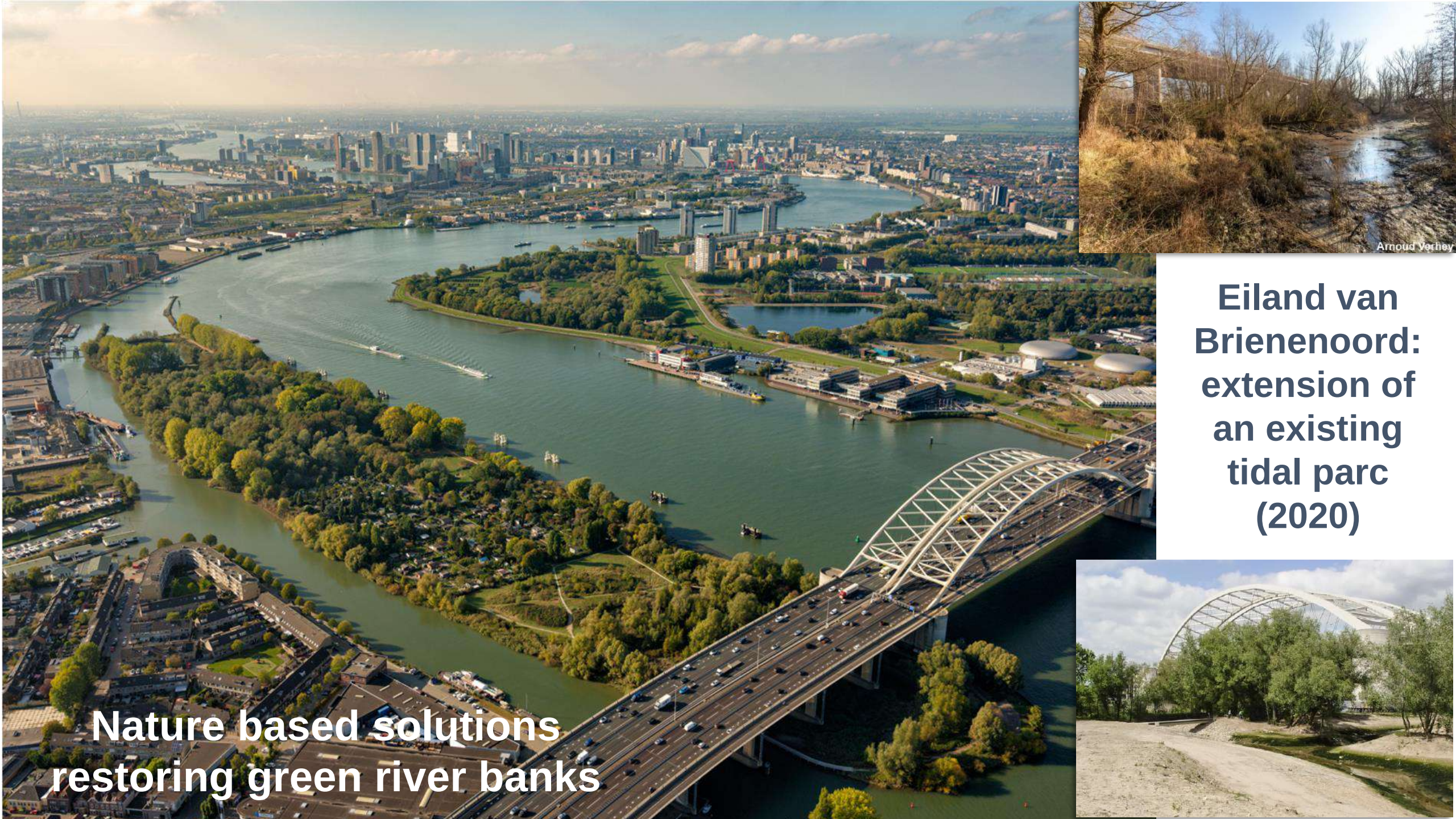
Noordereiland 06/12/2013


Noordereiland 20/10/2021


Noordereiland 09/12/2011



Primary (red) and secondary (blue) dikes and dams and barriers



Nature based solutions restoring green river banks

Eiland van Brienenoord: extension of an existing tidal parc (2020)

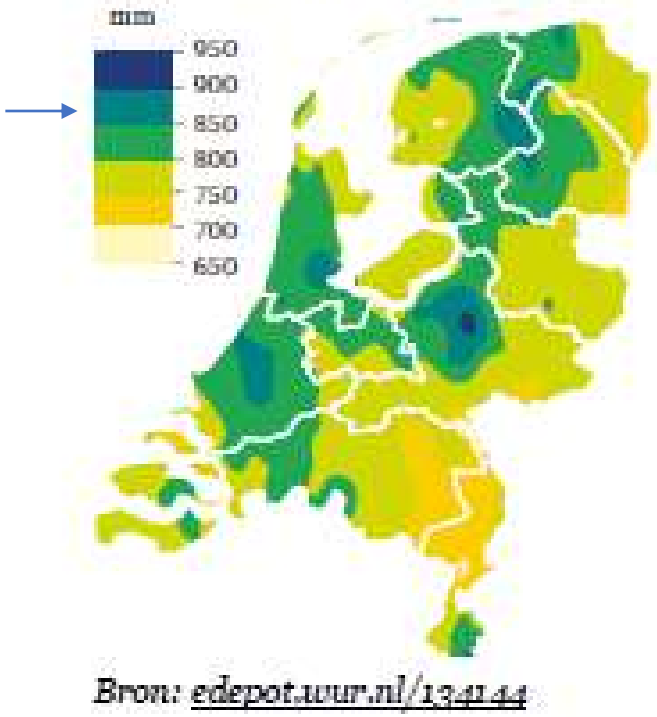
Every type of landscape it’s own bankprofile

Every type of landscape has its own type of bank

Flood management: urban drainage

Average yearly precipitation

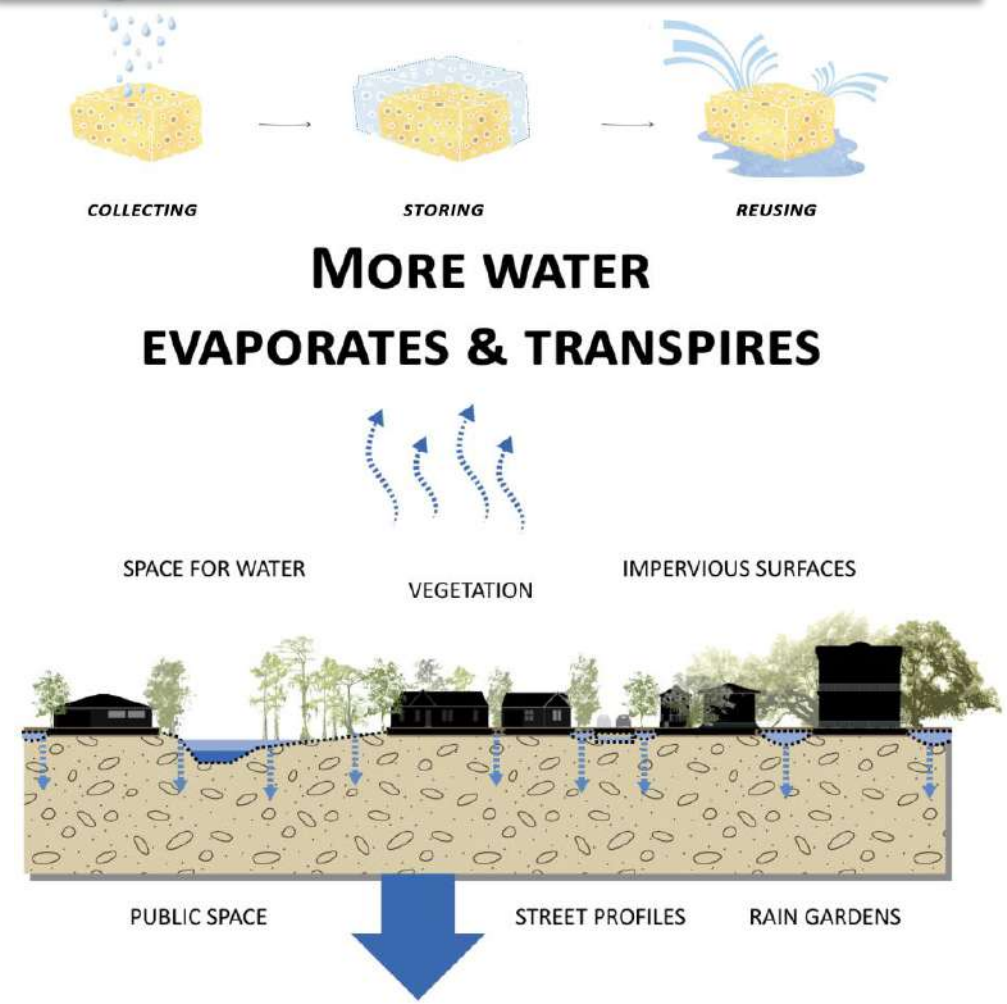
(1971-2000)

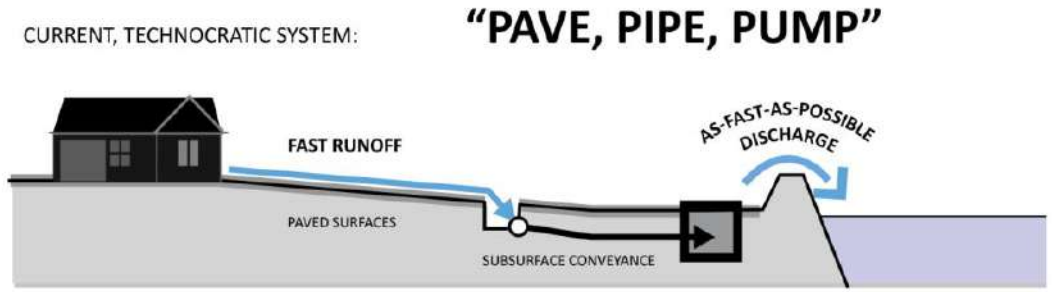


Bron: edepot.wur.nl/134144

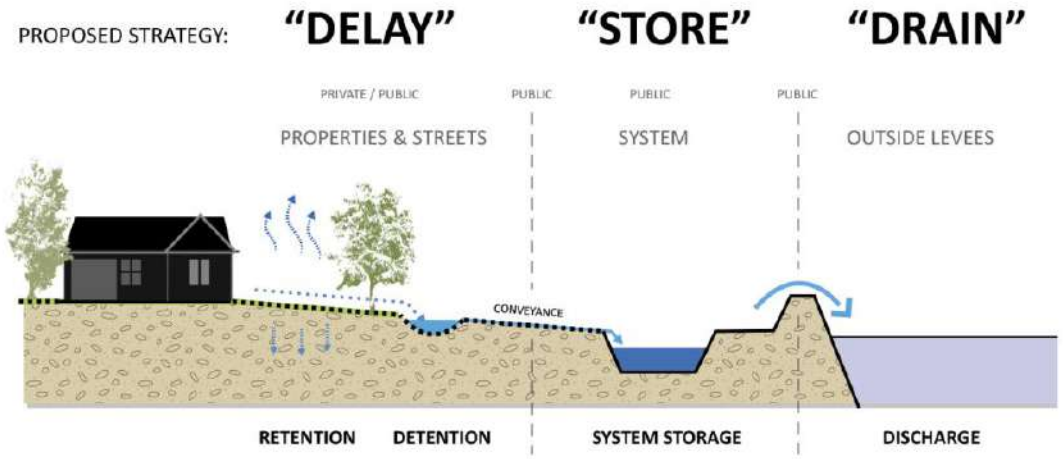
Precipation winter	+28%	188 – 240 mm
Precipation spring	+22%	148 – 180 mm
Precipation summer	- 24%	224 – 170 mm
Precipation automn	+12%	245 – 275 mm

City as a sponge





past



now

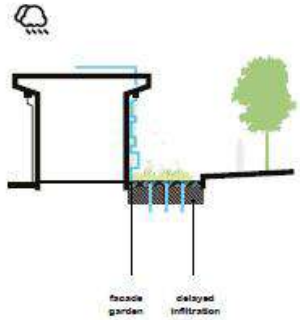
'living with water' principle

1998 Dutch 4th Water Management memorandum

GREENING HOFBOGEN

Greening Hofbogen aims at climate proofing the monumental structure of the 'Hofpleinlijn'. While waiting for a long term vision, the Hofbogen are approached from a bottom up perspective, starting at street level. Analyses show, that there is a potential for a substantial greening of the facades and sidewalks. Rain water from the roof is used for irrigation purposes and local infiltration. Moreover, Greening the Hofbogen is about placemaking. Illustrative in this is the Post-Office (SCHOP) project. The intervention on their 'Hofboog' facade addresses issues like restoring urban ecosystems, edible growth, rainwater reuse and public urban furniture.

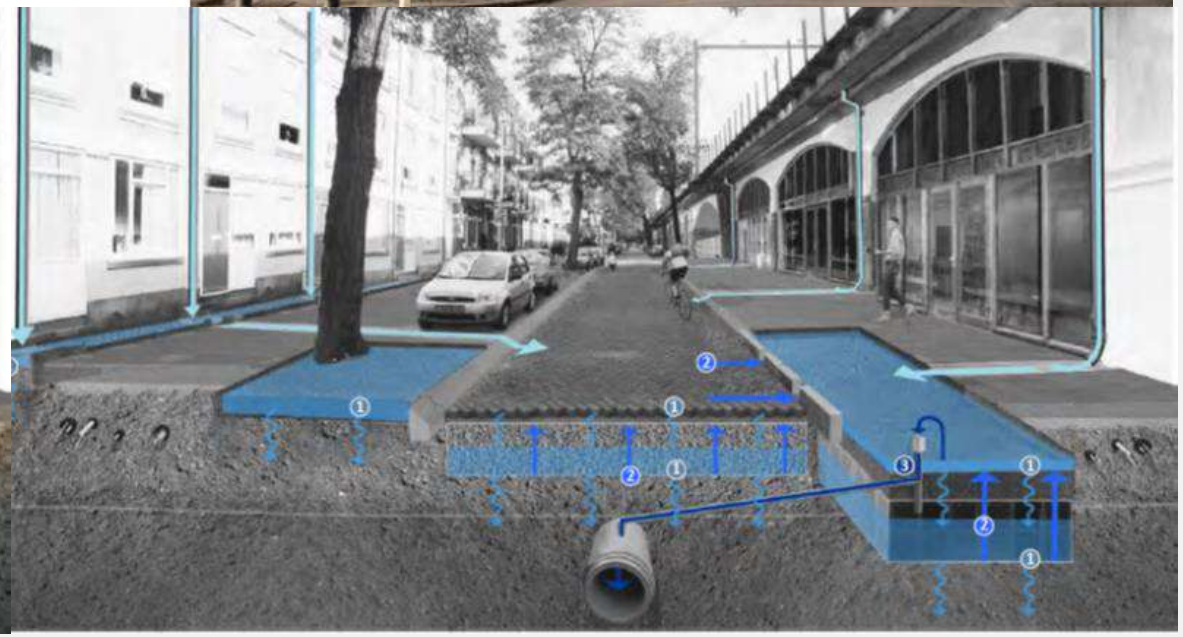
Year	2014-ongoing
Client	City of Rotterdam
Design	DE URBANISTEN Post-Office (SCHOP)
Status	Study and test-site
Collaborators	Post-Office 7 seasons Hofbogen BV
Costs test site	700 euro (material costs)
DE URBANISTEN	Research by design, support of test-site

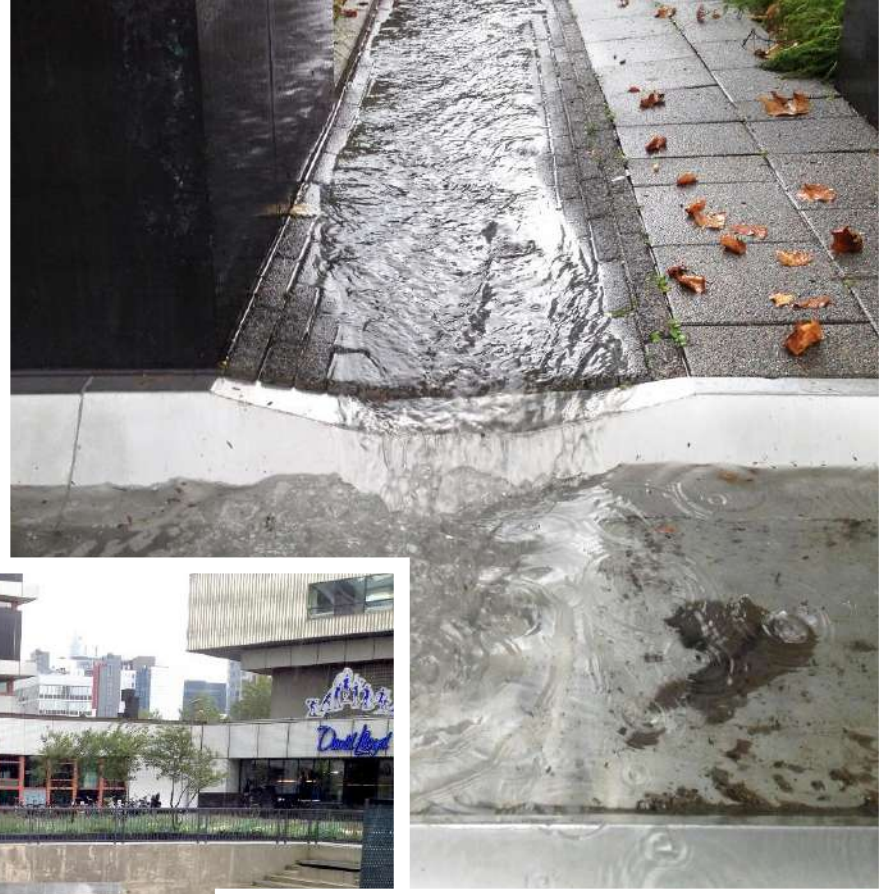


Gemeente Rotterdam HOFBOGEN

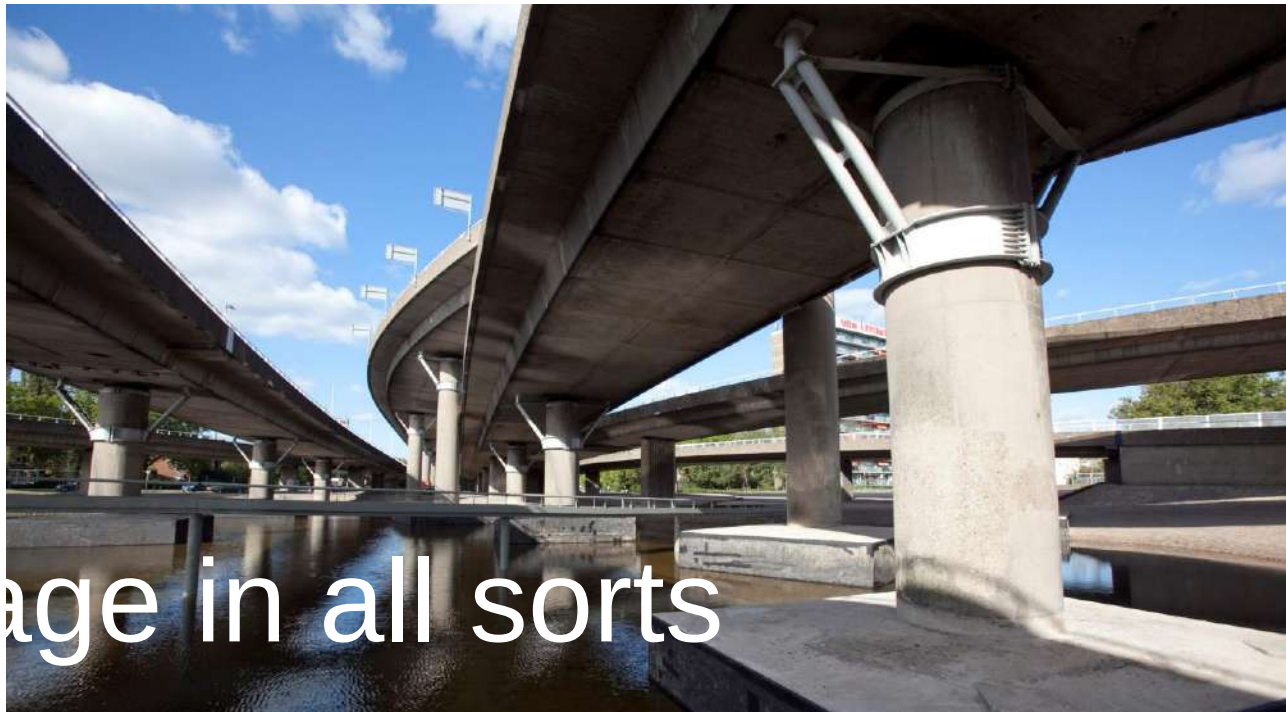
7SEASONS DE URBANISTEN


Current situation of the 'Hofbogen'





Multifunctional public space: water plaza



Water storage in all sorts

Extended canal: waterstorage Kruisplein

Rooftop Landscape Program

Rotterdam: 18.500.000m^2 of flat rooftops

Rooftop typology

- Greening & biodiversity
- Water retention
- Renewable energy
- Social interaction
- Mobility
- Living
- Technical

Greening on all levels

Roofpark Delfshaven

Thank you
for your attention