
Interdisciplinair ontwerponderzoek in de delta

Symphony No. 9 in D Minor, Op. 125

Presto. d. m.

Flauti. *ff*

Obol. *ff*

Clarinetti in B. *ff*

Fagotti. *ff*

Contrabasso. *ff*

Presto. d. m.

Corni in D. *ff*

Corni in B. *ff*

Trombe in D. *ff*

Timpani in D.A. *ff*

Presto. d. m.

Violino I.

Violino II.

Viola.

Violoncello e Basso.

The image displays a page of a musical score for the final movement of Beethoven's Symphony No. 9 in D Minor, Op. 125. The score is arranged in a standard orchestral format with multiple staves. The woodwind section (Flutes, Oboes, Clarinets in B-flat, Bassoons, and Contrabassoon) and the brass section (Cornets in D and B-flat, Trombones in D, and Timpani in D) are shown with active musical notation, including complex rhythmic patterns and dynamic markings such as *ff* (fortissimo). The string section (Violins I and II, Viola, and Violoncello e Basso) is shown with empty staves, indicating that their parts are not visible on this page. The tempo is marked *Presto. d. m.* (Presto, mezzo). The key signature is D minor, and the time signature is 3/4.



Ontwerpend Onderzoek

Types of design-related study.

CONTEXT		
Determined	Design Research	Design Study
Variable	Typological Research	Study by Design
	Determined	Variable
OBJECT		

De Jong, T.M.; Van der Voordt, D.J.M. (Eds.) (2005) Ways to Study and Research Urban, Architectural and Technical, Design; IOP Press BV: Amsterdam, The Netherlands, 2005.

R

REDESIGNING
DELTAS



Hoe kan ruimtelijk ontwerp een (transformatief) handelingsperspectief bieden voor de toekomst van de Nederlandse Delta waarin het bewerken/tekenen wordt gedaan in synergie met het bewijzen/rekenen?

Resilient Delta

Deltares
Enabling Delta Life

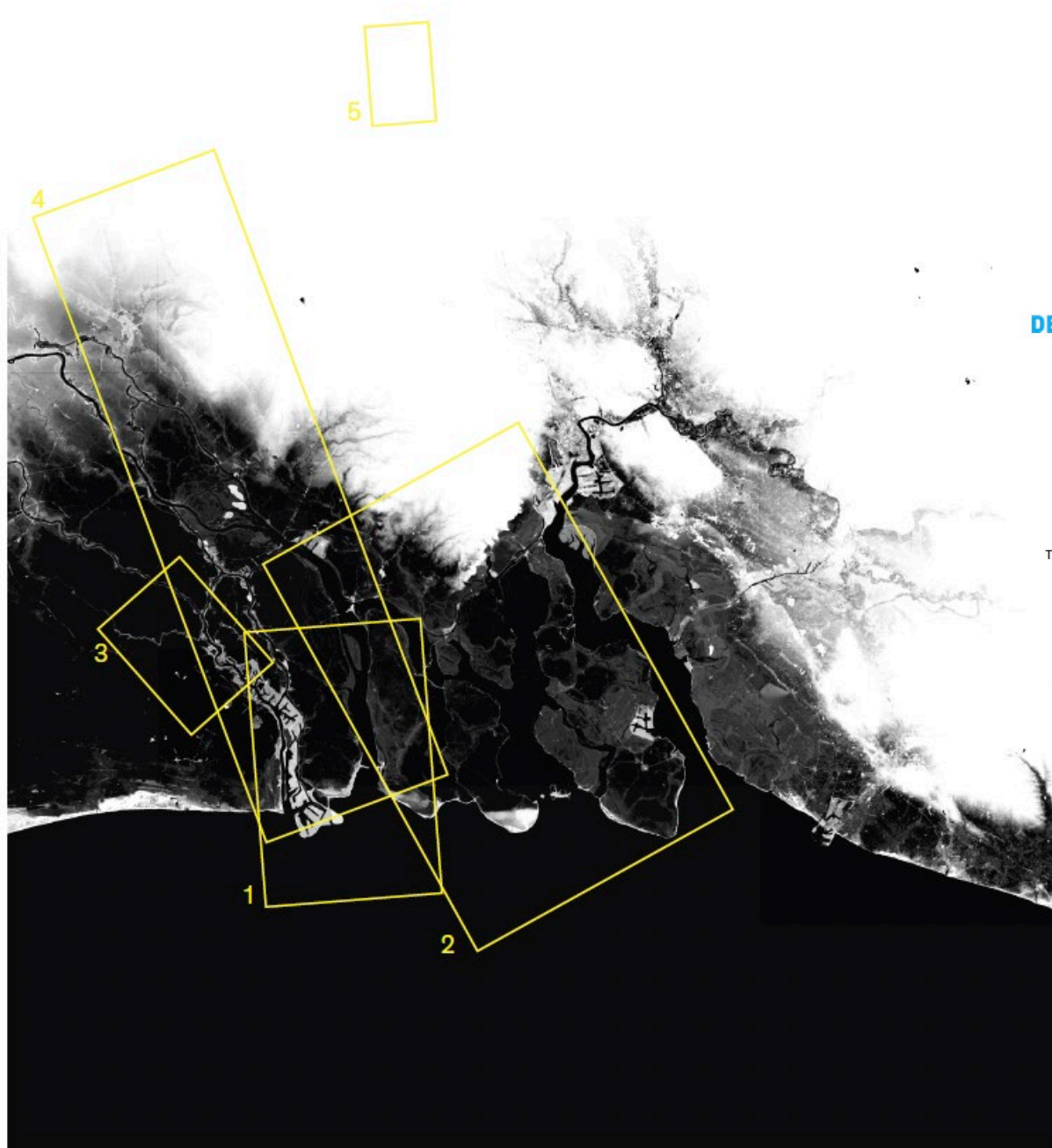
**NATIONAAL
DELTAPROGRAMMA**

TU Delft
Delft University of Technology

Erasmus
ERASMUS UNIVERSITY ROTTERDAM

 Planbureau voor de Leefomgeving

 **WAGENINGEN**
UNIVERSITY & RESEARCH



DE URBANISTEN

LO
LA

Royal
HaskoningDHV
Landscape Architecture

TEAM ROTTERDAM PORT/CITY

Witteveen+Bos

S
TU
DIO.
HART
ZEMA.

FEDDES/DLTHOF

TEAM ZELANDIA

ZUS
ZONES
URBANES
CONCIBILES

SWECO

flux
LANDSCAPE ARCHITECTURE

TEAM DELFTLAND

FABRICations.

TAUW

Bosch
Slabbers

TEAM RIVEREN

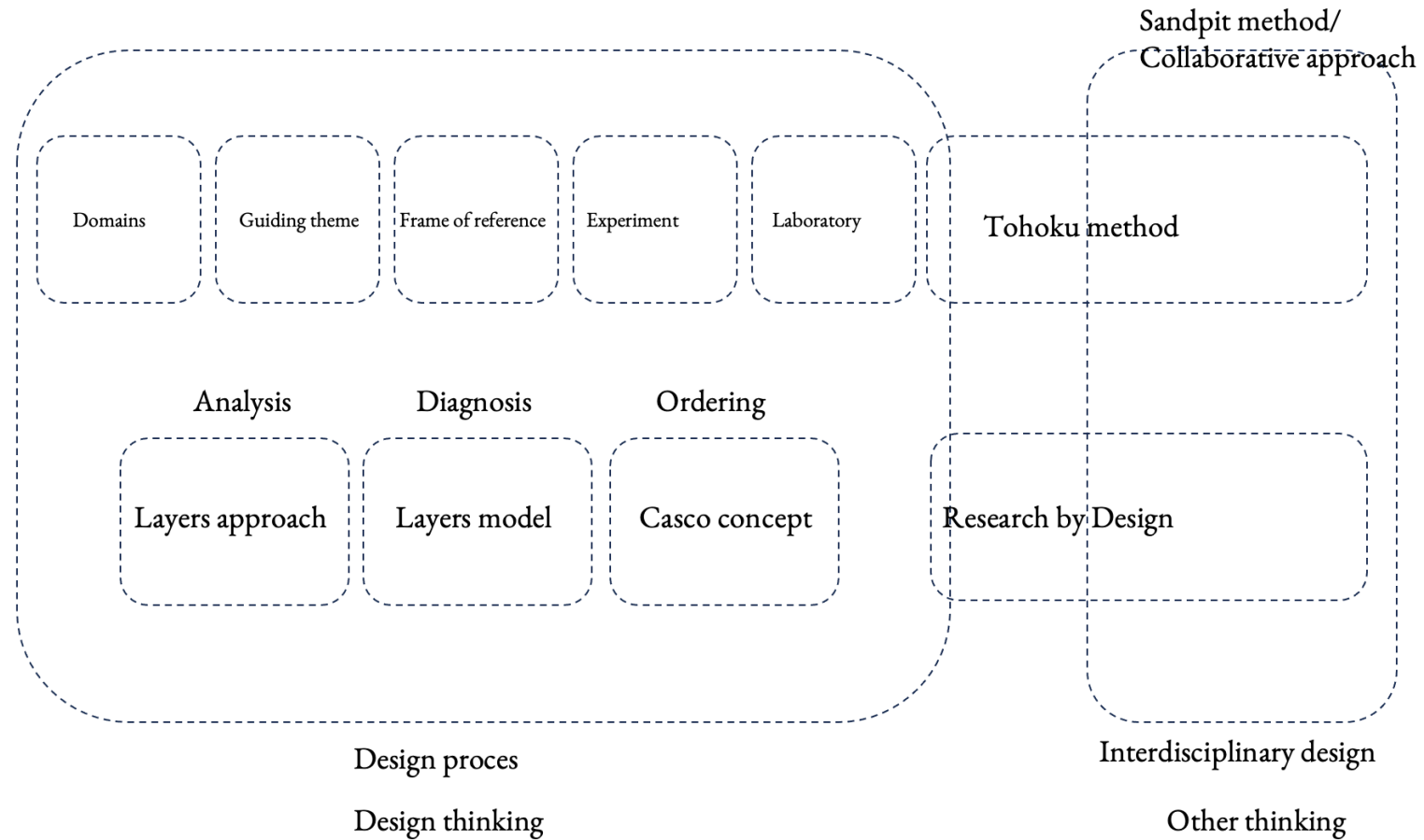
ARCADIS

Defacto
urbanism

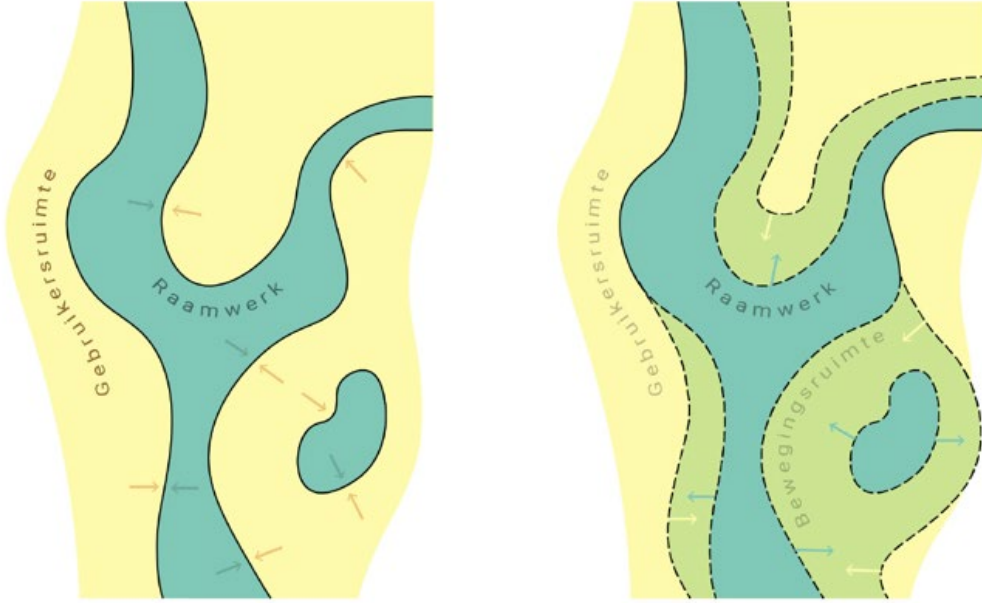
VISTA

TEAM LIMBURG

Ontwerpend onderzoek



#We gebruiken de delta paradox, reguleren binnen dynamiek

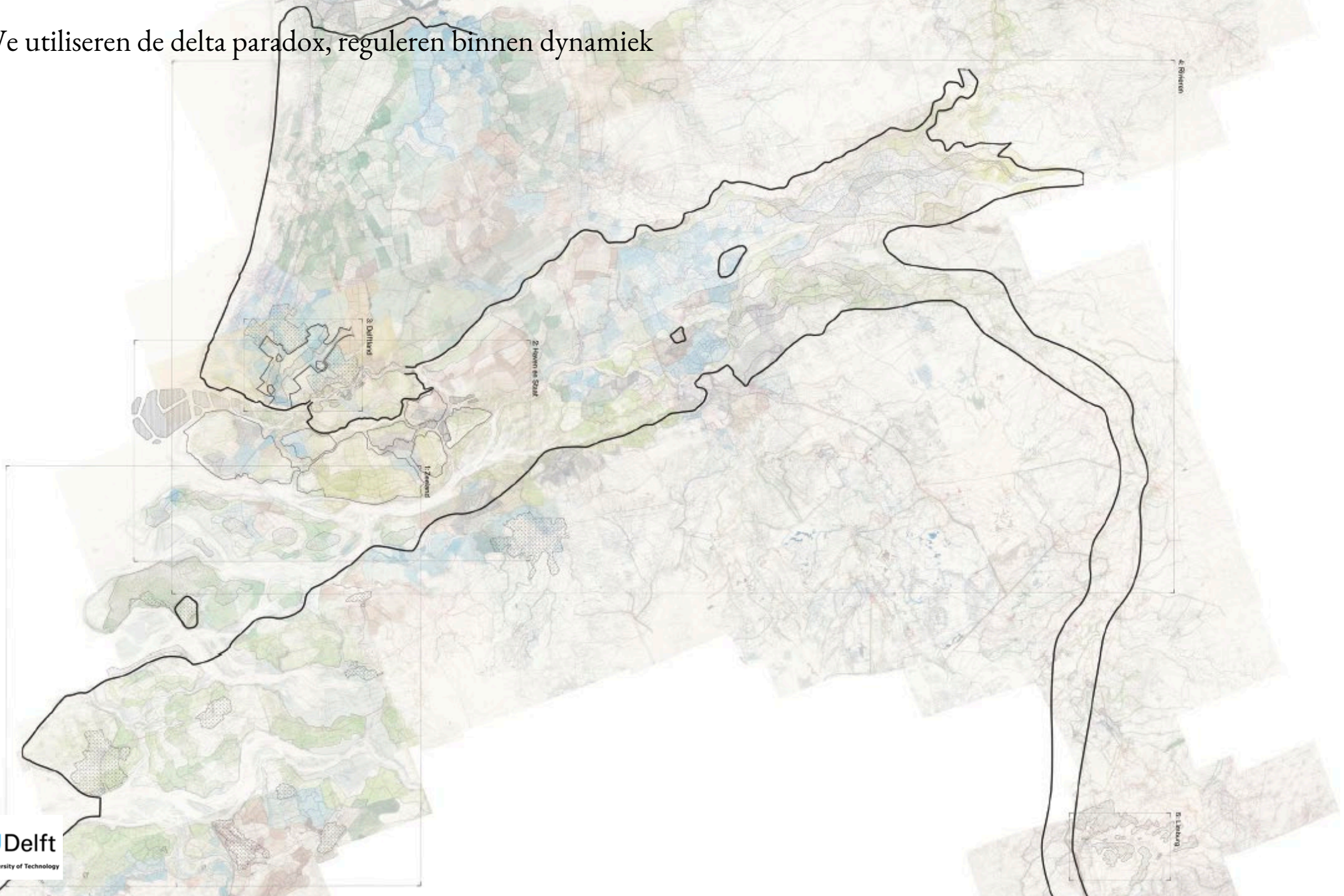


H+N+S 2023



Houtskool – ZUS, Flux, Sweco

#We gebruiken de delta paradox, reguleren binnen dynamiek



Onderlegger Ontwerpend Onderzoek

Ontwerpen is uitvinden

Elke mm² is bedacht

Het systeem is onder controle

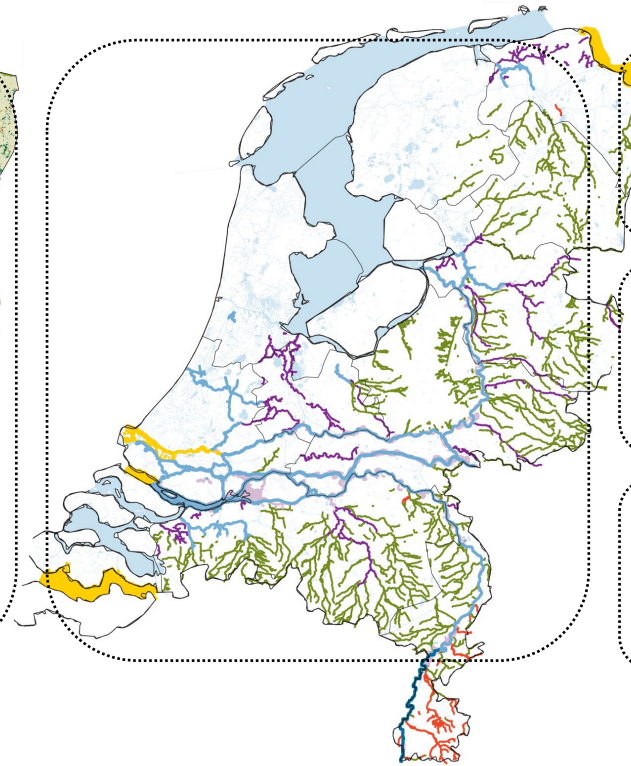
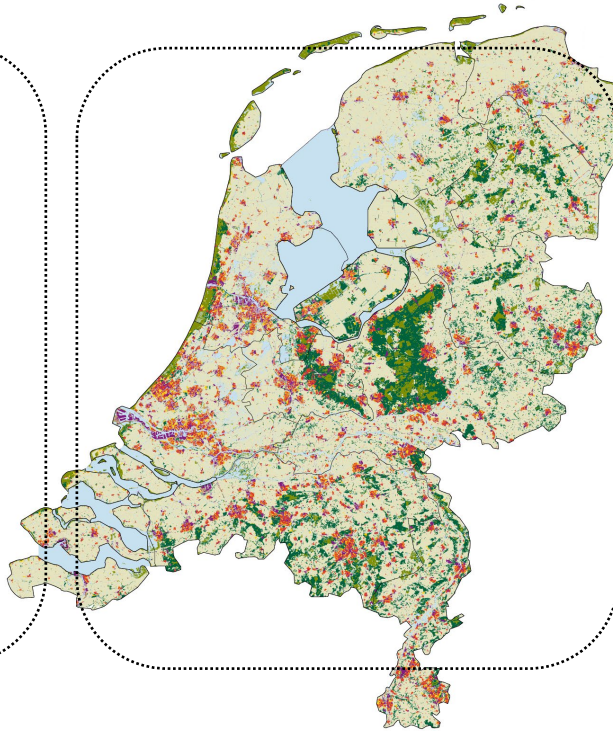
Hoe passen we ons
aan aan een onzekere
toekomst

Observeren

Hoofdlijnen
Feiten
Samenhang
Interpetetatie
Betekenis

Experimenteren

Ontleden
Varianten
Testen



Analyse

Begrijpen en onderbouwen

Diagnose

Prioriteren en regisseren

Ordenen

Scheiden en verweven

Multi en Inter

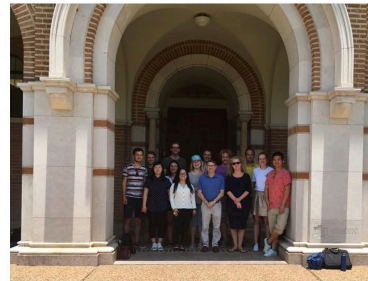
Multidisciplinair wordt beschouwd als een groepsproces en niet als een uitkomst, en vooral communicatieve vaardigheden zijn belangrijk.

Interdisciplinair wordt beschouwd als de uitkomst en verwevenheid van kennis en producten. Interdisciplinair ontwerpen is de integratie van sectorale verantwoordelijkheden, doelen en oplossingen.

Table 1. Solution strategies for different types of problems (Van de Ven et al., 2009 derived from Thompson and Tuden, 1964).

Measures ↓	Problems and goals →	
	Familiar and with existing agreement	Unfamiliar and there is no agreement
Known	Optimization	Negotiation
Unknown	Innovation	Design

interdisciplinaire condities
interdisciplinair proces
interdisciplinaire methoden



Houston



The Hague



Sediment Lab



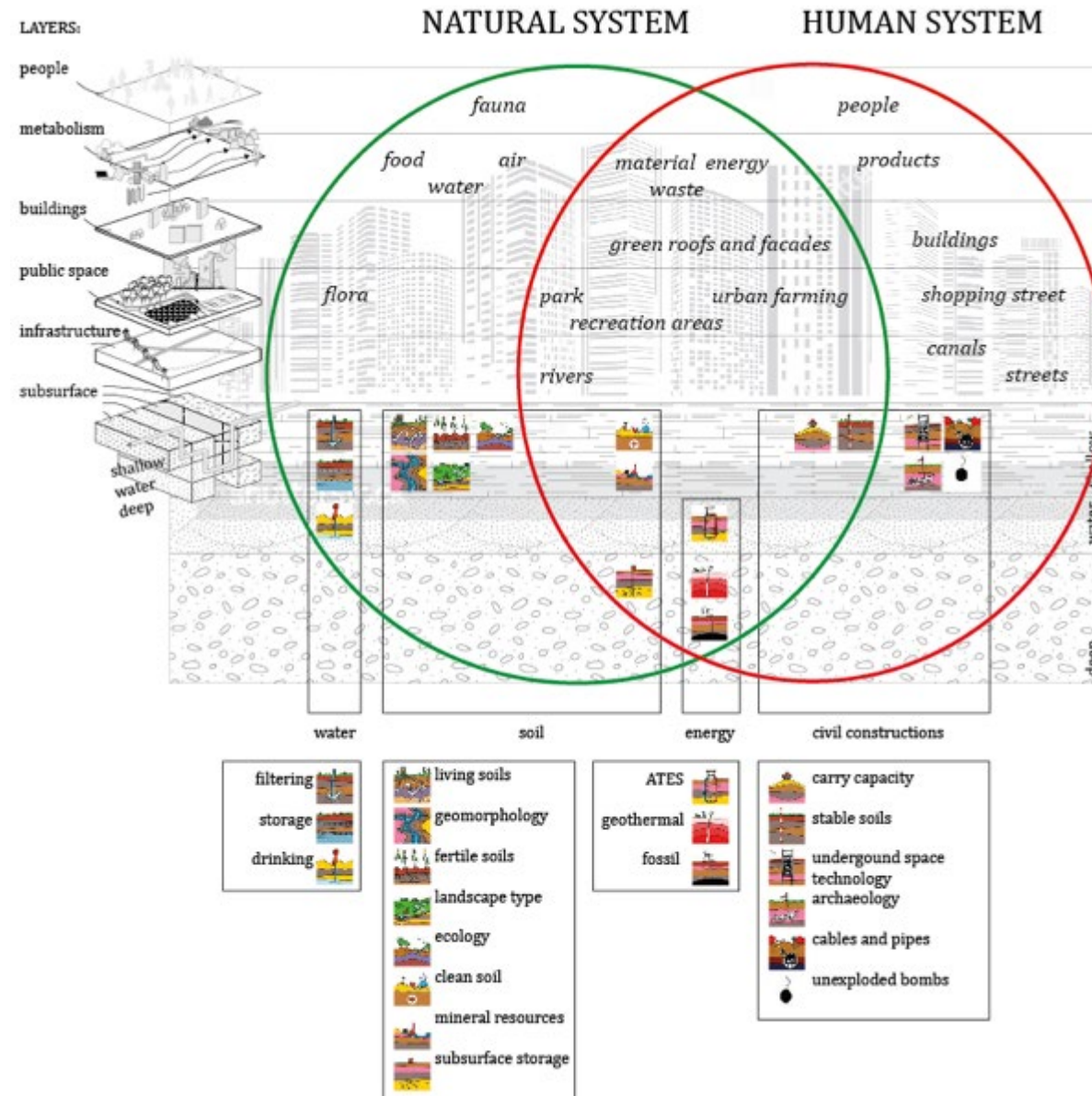
interdisciplinaire condities

Betrekken van de technische expertise vooraan het ontwerp proces

Programmeren van workshops met iedereen om data te bespreken

Systeem benadering ten aanzien van de data

Integrale tekeningen

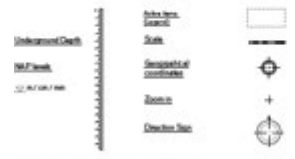


Technical Profile

Rotterdam Bloemhof Zuid

Authors:
 F.L. Hooimeijer
 F. Filippo Lafleur
 Drawings:
 F. Filippo Lafleur
 Jesse Dobbertman
 Eren Yap

Cartographic indication

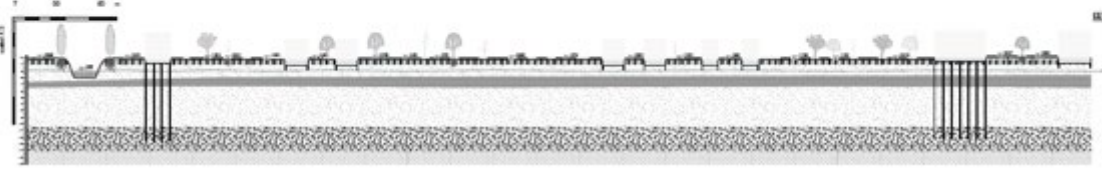
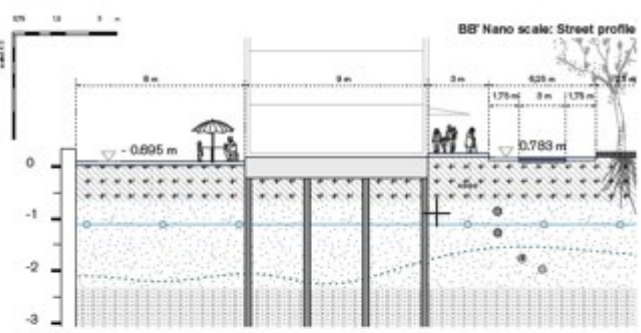
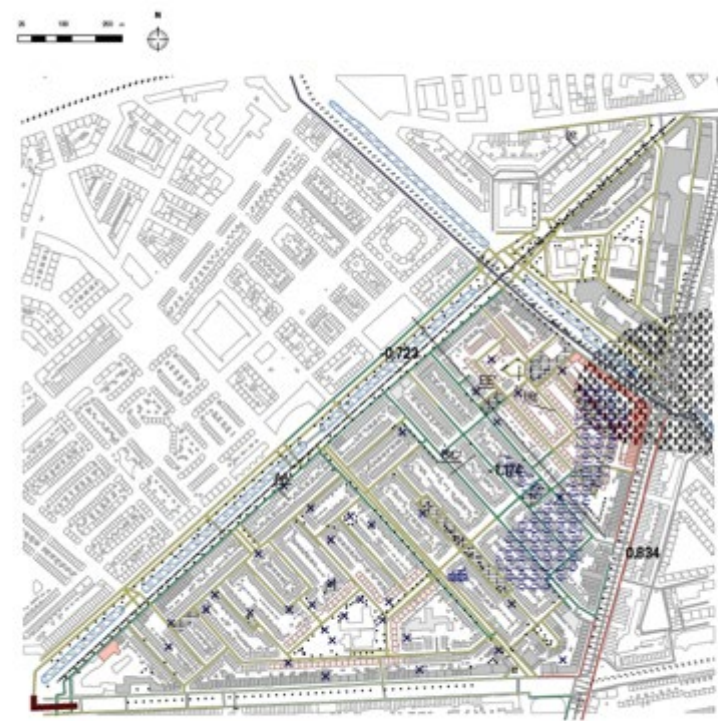


Urban
 Urban
 Urban

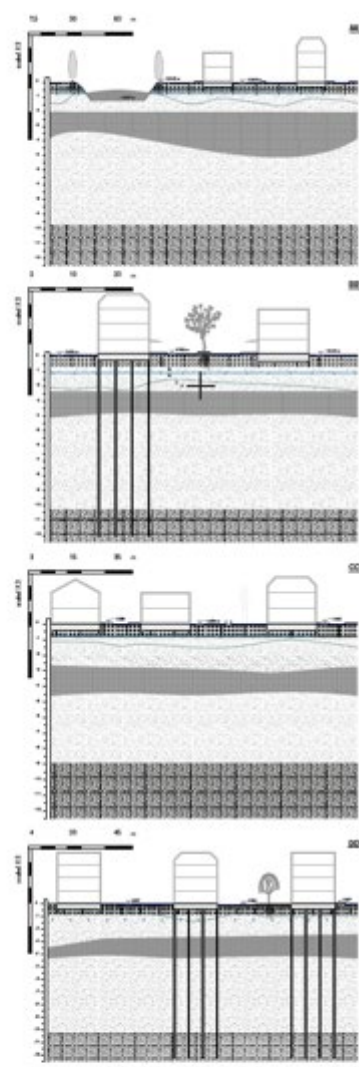
Macro scale: Territorial condition



Meso scale: Plan, site investigation



Micro scale: Technical profile



The legend: Reading sites and territories

Conditions present in the area

- Land subsidence (natural areas in the Rotterdam Design) (existing and future)
- Other conditions where past events are reflected in the ground (e.g. water level, groundwater, large-scale geology due to its proximity with all the nearby built environment) (since 1900)
- Condition in the largest historical process that leads to subsidence (former interwar urbanization and post-war urbanization) (since 1900)

Subsidence

- Subsidence (natural areas in the Rotterdam Design) (existing and future)
- Other conditions where past events are reflected in the ground (e.g. water level, groundwater, large-scale geology due to its proximity with all the nearby built environment) (since 1900)
- Condition in the largest historical process that leads to subsidence (former interwar urbanization and post-war urbanization) (since 1900)

Condition

- Condition in the largest historical process that leads to subsidence (former interwar urbanization and post-war urbanization) (since 1900)

Public use

- Public use (existing and future)

Monuments or monuments plan

- Monuments or monuments plan (existing and future)

Design

- Design (existing and future)

MBF score

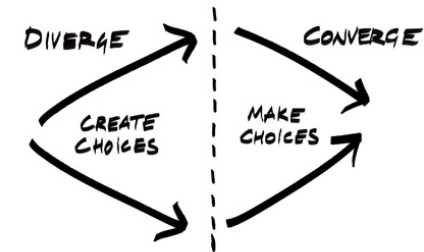
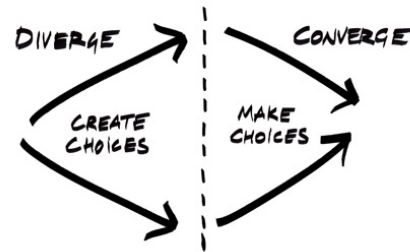
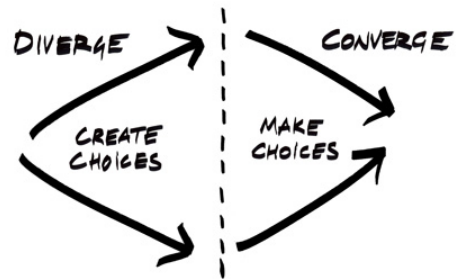
- MBF score (existing and future)

Static and dynamic conditions

Static / dynamic conditions	Processes						
People							
Materialization	<table border="1"> <tr> <td>Existence</td> <td>Process</td> </tr> <tr> <td>Future potential</td> <td>Process</td> </tr> </table>	Existence	Process	Future potential	Process		
Existence	Process						
Future potential	Process						
Buildings	<table border="1"> <tr> <td>Existence</td> <td>Process</td> </tr> <tr> <td>Future potential</td> <td>Process</td> </tr> </table>	Existence	Process	Future potential	Process		
Existence	Process						
Future potential	Process						
Public space	<table border="1"> <tr> <td>Low medium vegetation</td> <td>Process</td> </tr> <tr> <td>High vegetation</td> <td>Process</td> </tr> </table>	Low medium vegetation	Process	High vegetation	Process		
Low medium vegetation	Process						
High vegetation	Process						
Infrastructure	<table border="1"> <tr> <td>Subsidence</td> <td>Process</td> </tr> <tr> <td>Water</td> <td>Process</td> </tr> <tr> <td>Public transport</td> <td>Process</td> </tr> </table>	Subsidence	Process	Water	Process	Public transport	Process
Subsidence	Process						
Water	Process						
Public transport	Process						
City infrastructure	<table border="1"> <tr> <td>Water</td> <td>Process</td> </tr> <tr> <td>Public transport</td> <td>Process</td> </tr> <tr> <td>Energy</td> <td>Process</td> </tr> </table>	Water	Process	Public transport	Process	Energy	Process
Water	Process						
Public transport	Process						
Energy	Process						
Energy	<table border="1"> <tr> <td>Energy</td> <td>Process</td> </tr> </table>	Energy	Process				
Energy	Process						
Water	<table border="1"> <tr> <td>Water</td> <td>Process</td> </tr> </table>	Water	Process				
Water	Process						
Soil / vegetation	<table border="1"> <tr> <td>Soil</td> <td>Process</td> </tr> <tr> <td>Vegetation</td> <td>Process</td> </tr> </table>	Soil	Process	Vegetation	Process		
Soil	Process						
Vegetation	Process						

Interdisciplinair ontwerp proces

- Analyse
- Diagnose
- Ordenen



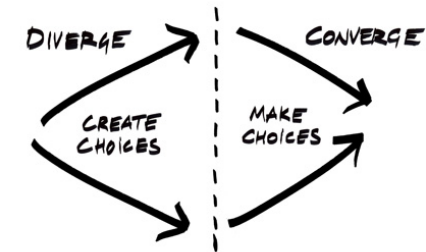
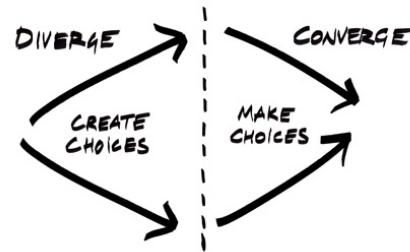
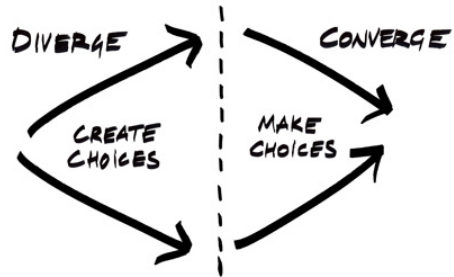
Interdisciplinaire methode

Analyse → Diagnose → Ordenen

disciplinair – interdisciplinair

disciplinair – interdisciplinair

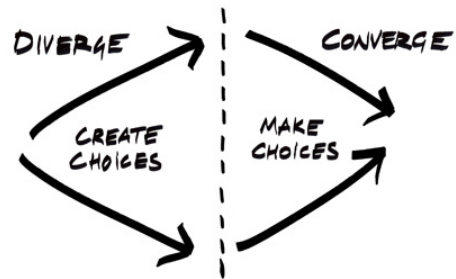
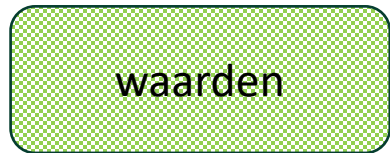
disciplinair – interdisciplinair



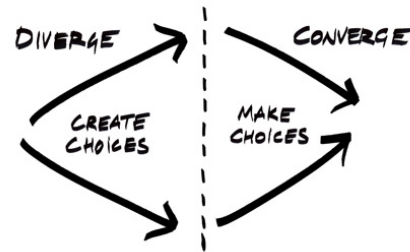
Interdisciplinaire methode

Analyse → Diagnose → Ordenen

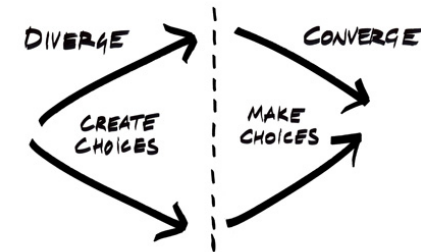
disciplinair – interdisciplinair



disciplinair – interdisciplinair



disciplinair – interdisciplinair



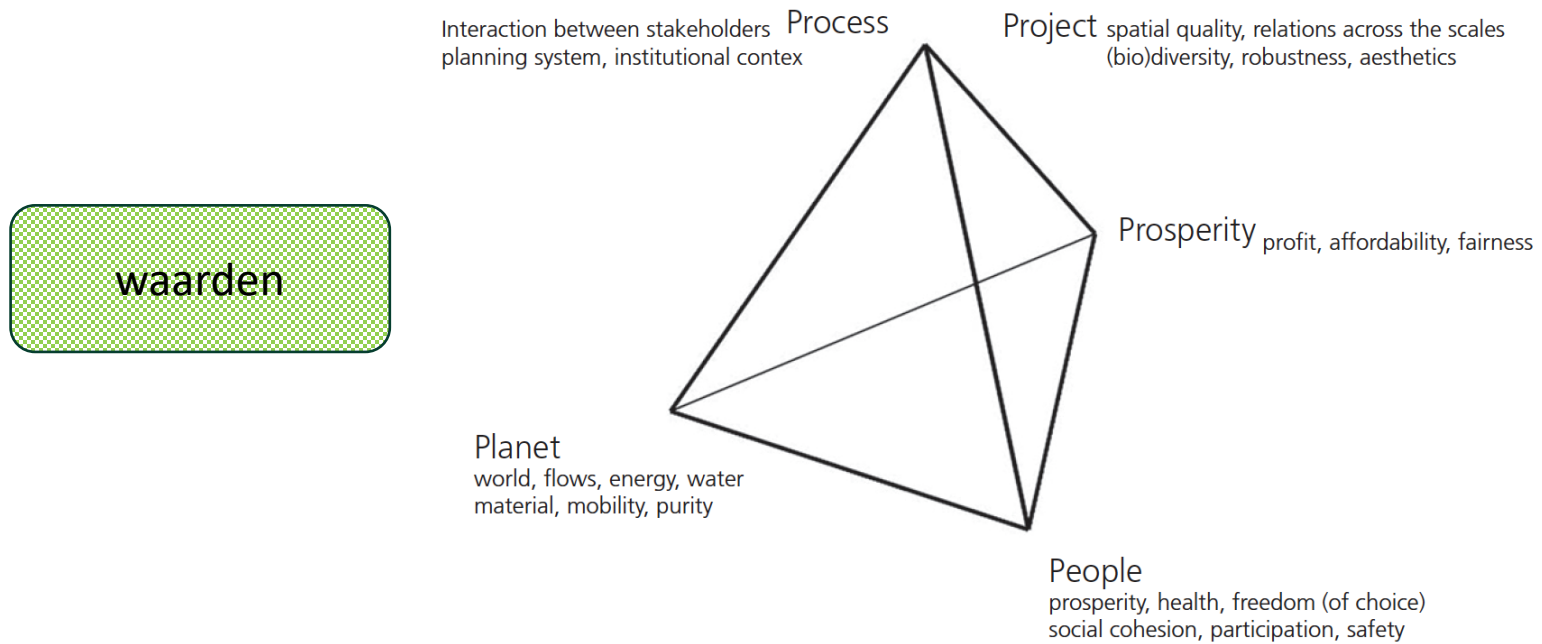


Figure 1. The tetrahedron of sustainable construction (van Dorst and Duijvestein, 2004)

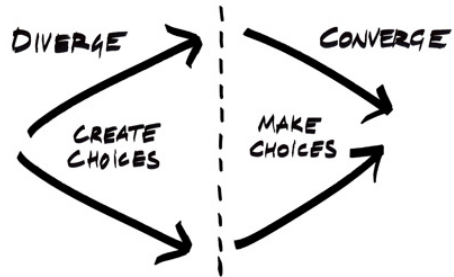
Interdisciplinaire methode

Analyse → Diagnose → Ordenen

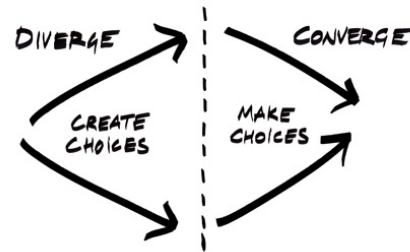
bandbreedte

disciplinair – interdisciplinair

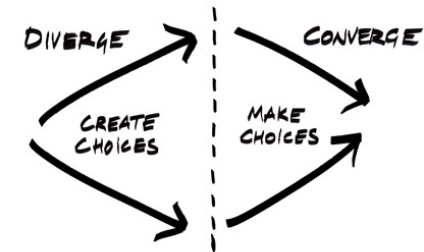
waarden



disciplinair – interdisciplinair



disciplinair – interdisciplinair



HYDRO

- Multi-functional dike/ landfill/ flooded area/ bldg as energy diss. (highlighted)
- Multi-functional dike/ landfill/ coastal forest
- Multi-functional dike/ landfill/ flooded area
- Multi-functional dike/ landfill
- Dike and sea wall (multi-functional)
- Dike and sea wall (mono-functional)
- Landfill and coastal forest
- Coastal forest/ bldg as energy diss.

GEO

- Retaining wall
- Shotcrete
- Geotextile (highlighted)
- Drainage
- Earthworks
- Bio-engineering

UD

- New bld typologies/ comprehensive design guidelines (highlighted)
- Communal built approach/ developer and municipality led
- Build quality incentives/ developer led, municipality input
- Some incentives/ municipal zoning
- No change/ no guidelines

TR

- Multi-modal (highlighted)
- Increase Pub. trans. services
- Reduced car network
- Pub. trans. hubs
- Network heirarchy
- Mono-modal

WM

- Living with water (highlighted)
- New technology
- Nature based treatment
- Harvest and re-use
- Visible water
- Extra storage
- Access to the sea
- Retreat/ protection from water

bandbreedte

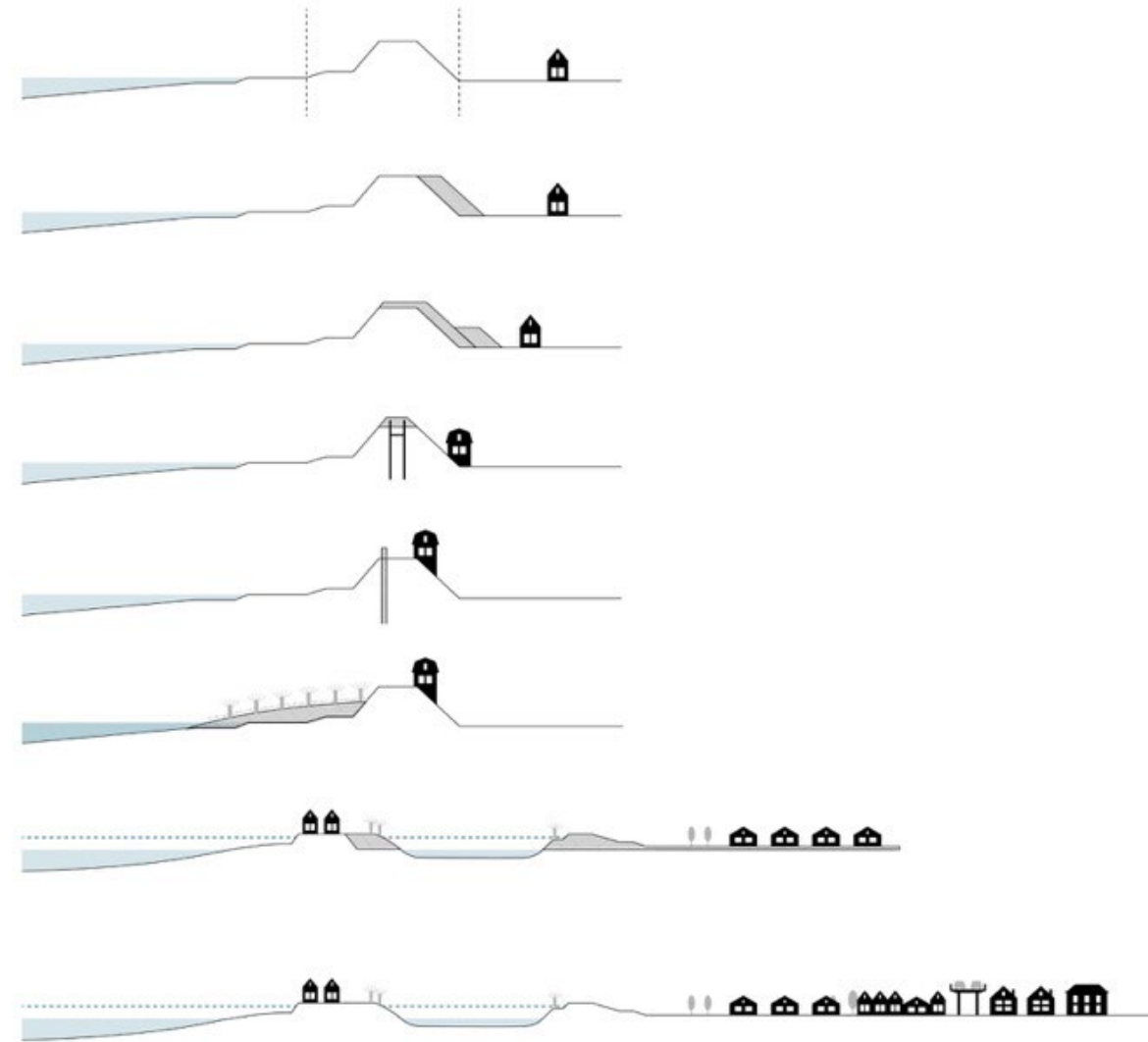


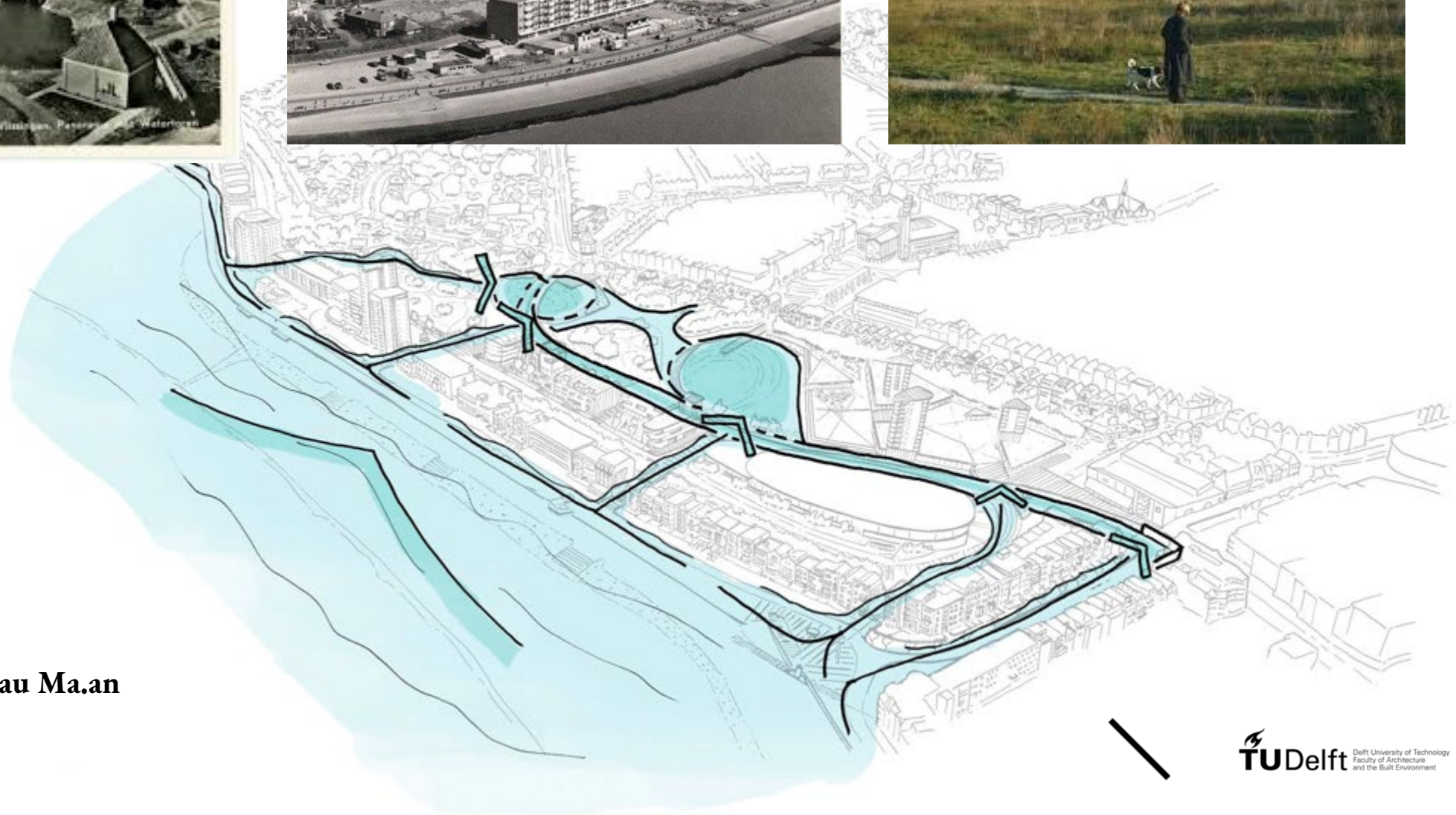
Risico = Kans **x** **Consequenties**

kracht schade

sterkte slachtoffers

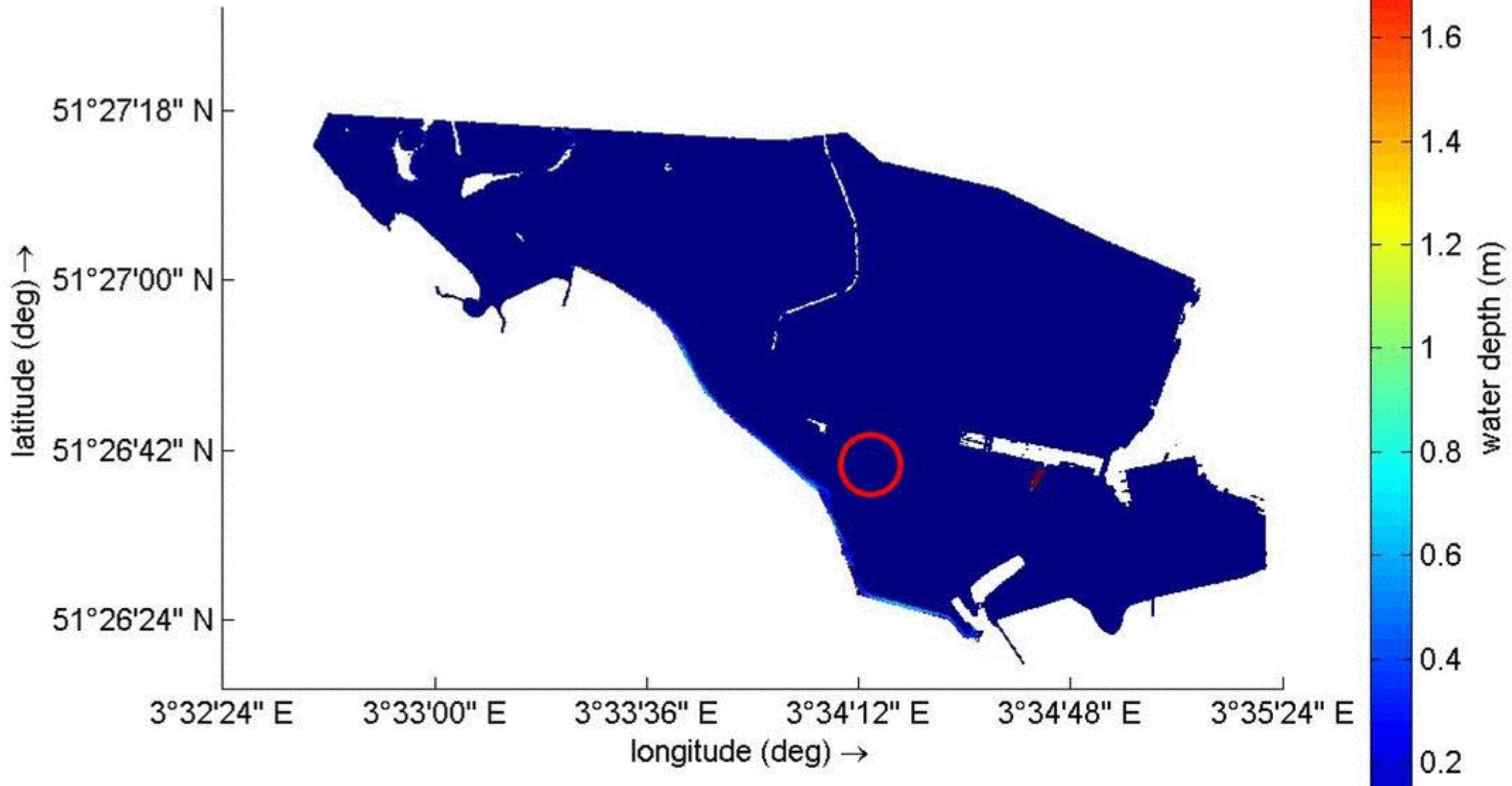
 maatschappelijke impact

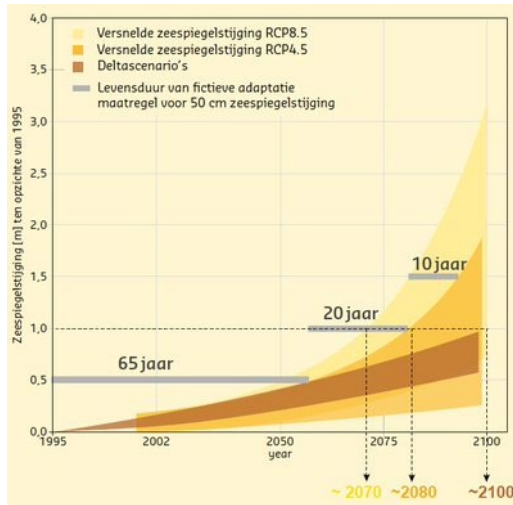




Bureau Ma.an

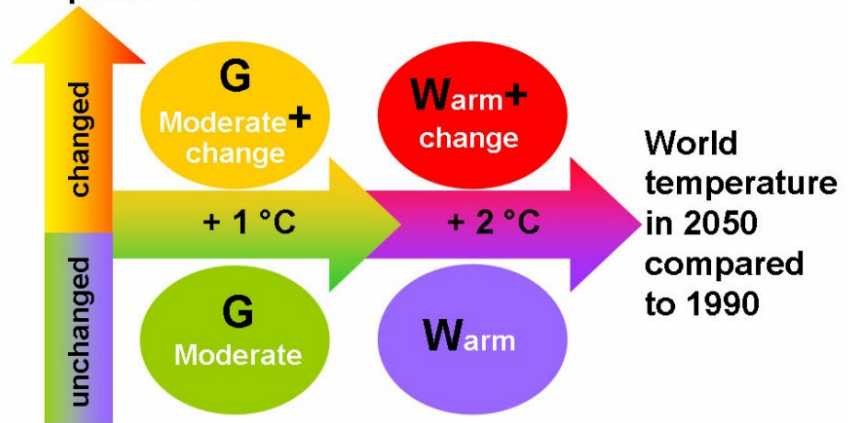
13-Dec-2019 09:00:00

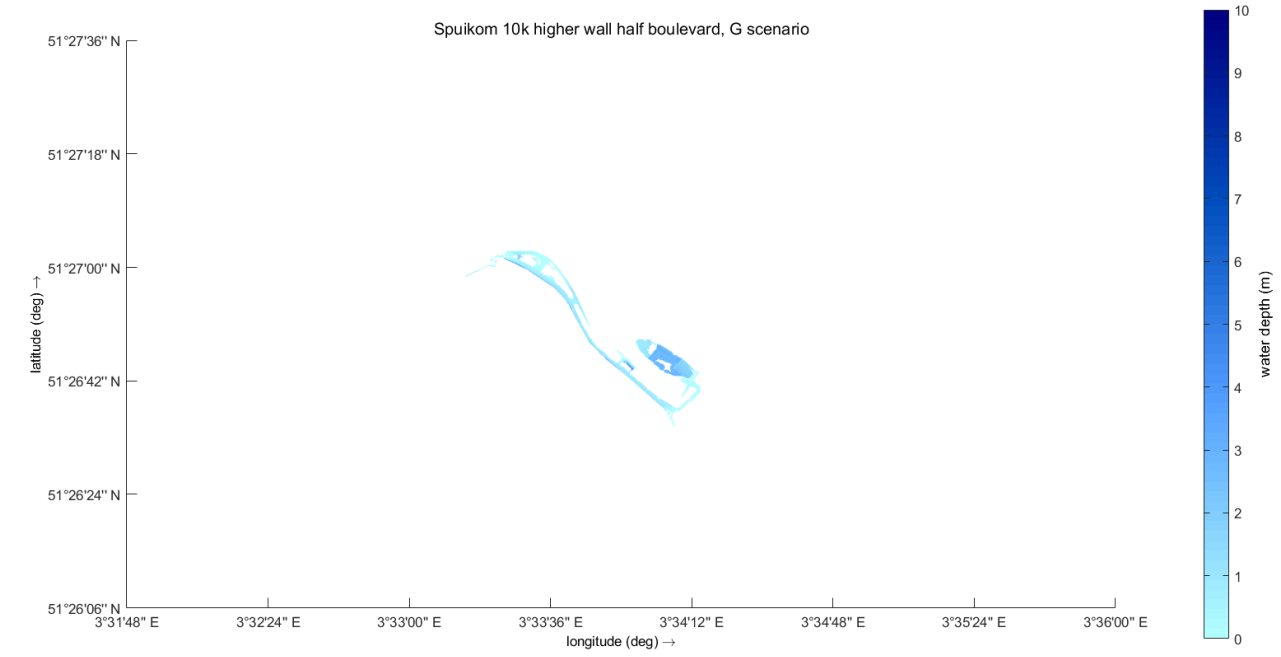
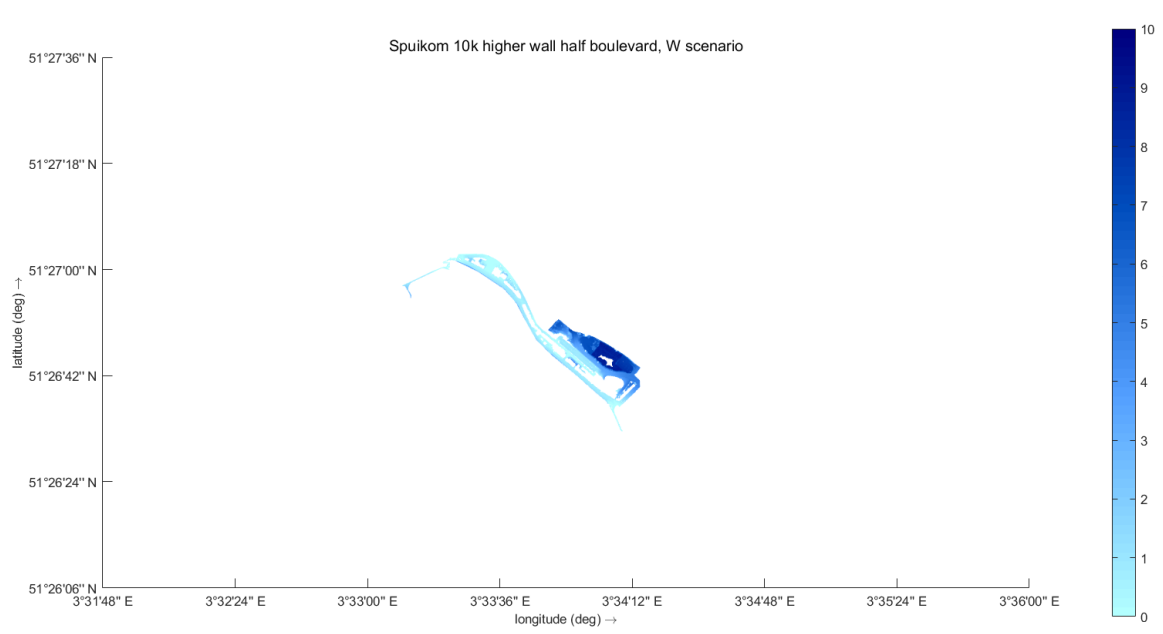




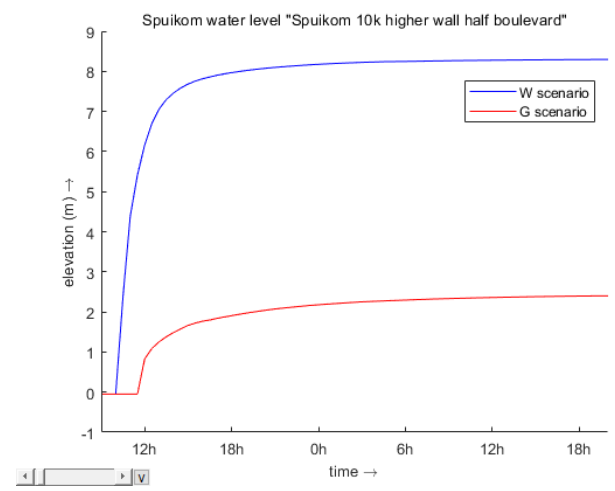
Figuur 1 Gevolgen van extra versnelde zeespiegelstijging geïllustreerd aan de hand van de bandbreedte van de Deltascenario's en de projecties voor 2 en 4°C opwarming in 2100 (RCP4.5 en RCP8.5). De functionele levensduur van adaptatiemaatregelen wordt kleiner (links). Bijvoorbeeld: de functionele levensduur van een maatregel voor 50 cm zeespiegelstijging kan bij een versnellende zeespiegelstijging afnemen van circa 65, naar 20, naar 10 jaar. Knikpunten treden eerder op. Bijvoorbeeld: Een knikpunt bij 1 m treedt volgens de bovenwaarde van de Deltascenario's op rond 2100, maar komt bij extra versnelde zeespiegelstijging op zijn vroegst 20 tot 30 jaar eerder. Een knikpunt bij 2 m treedt in de Deltascenario's op ver na 2100, maar komt bij extra versnelde zeespiegelstijging al voor in deze eeuw (op zijn vroegst rond 2090).

Air circulation patterns



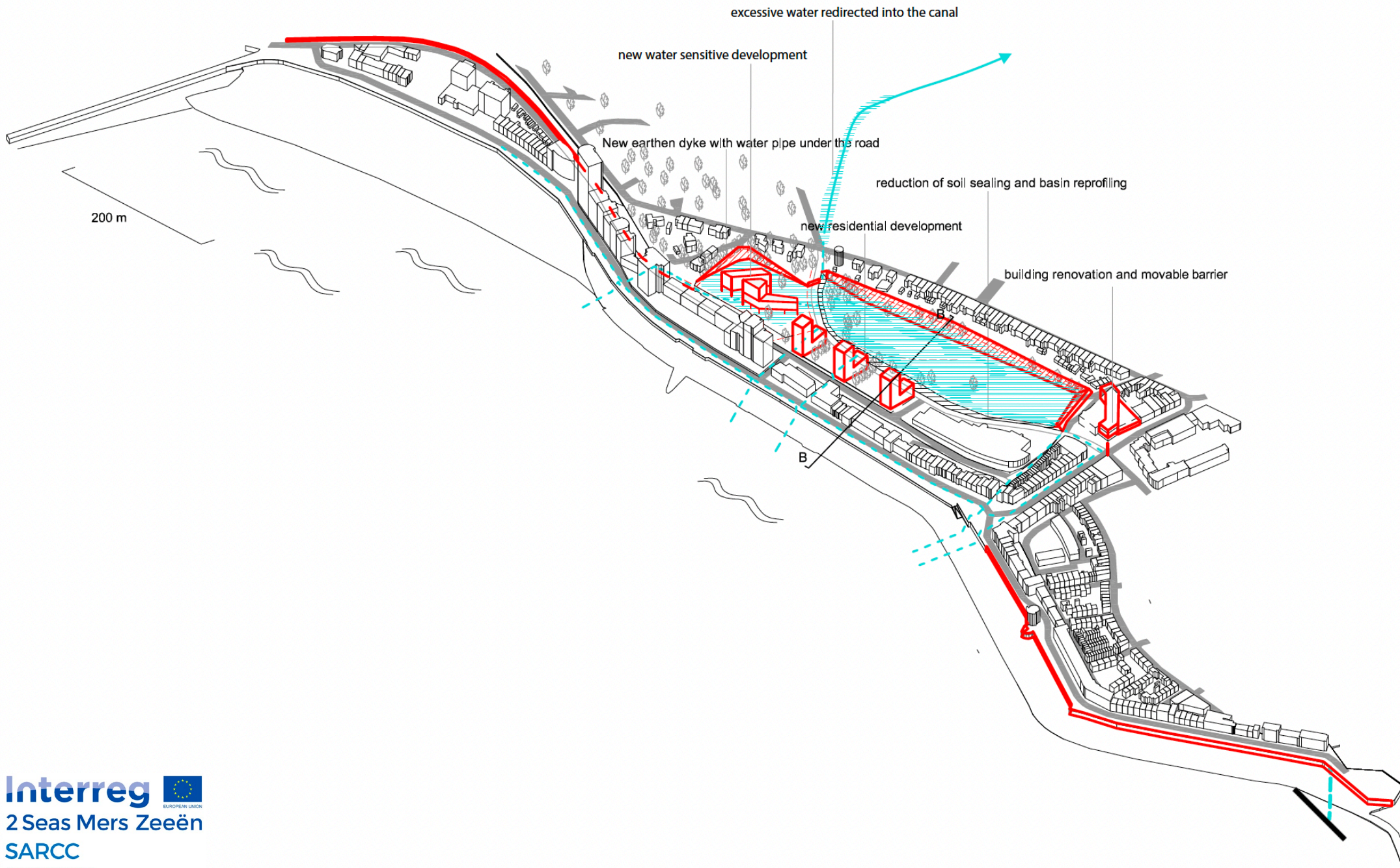


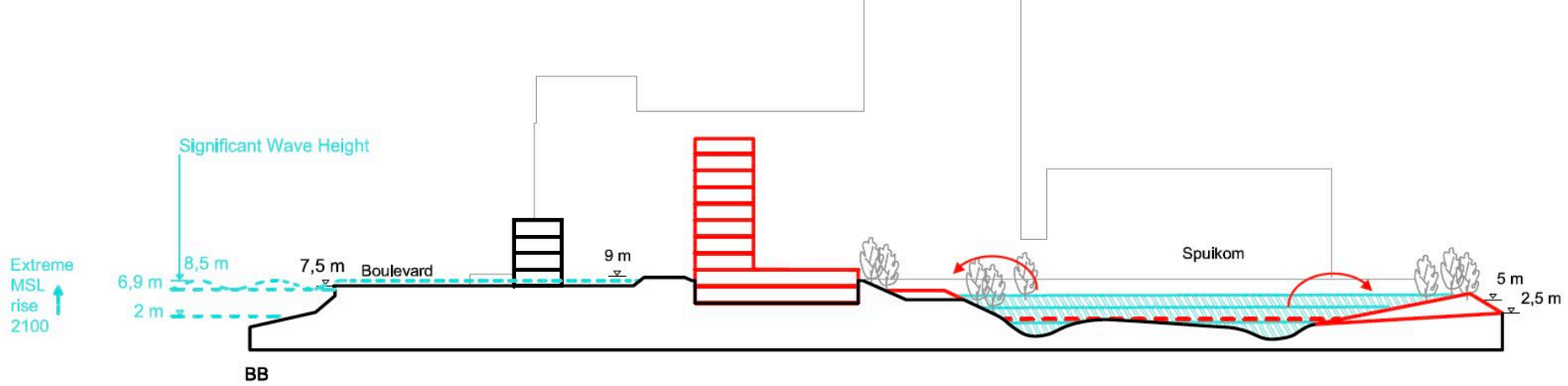
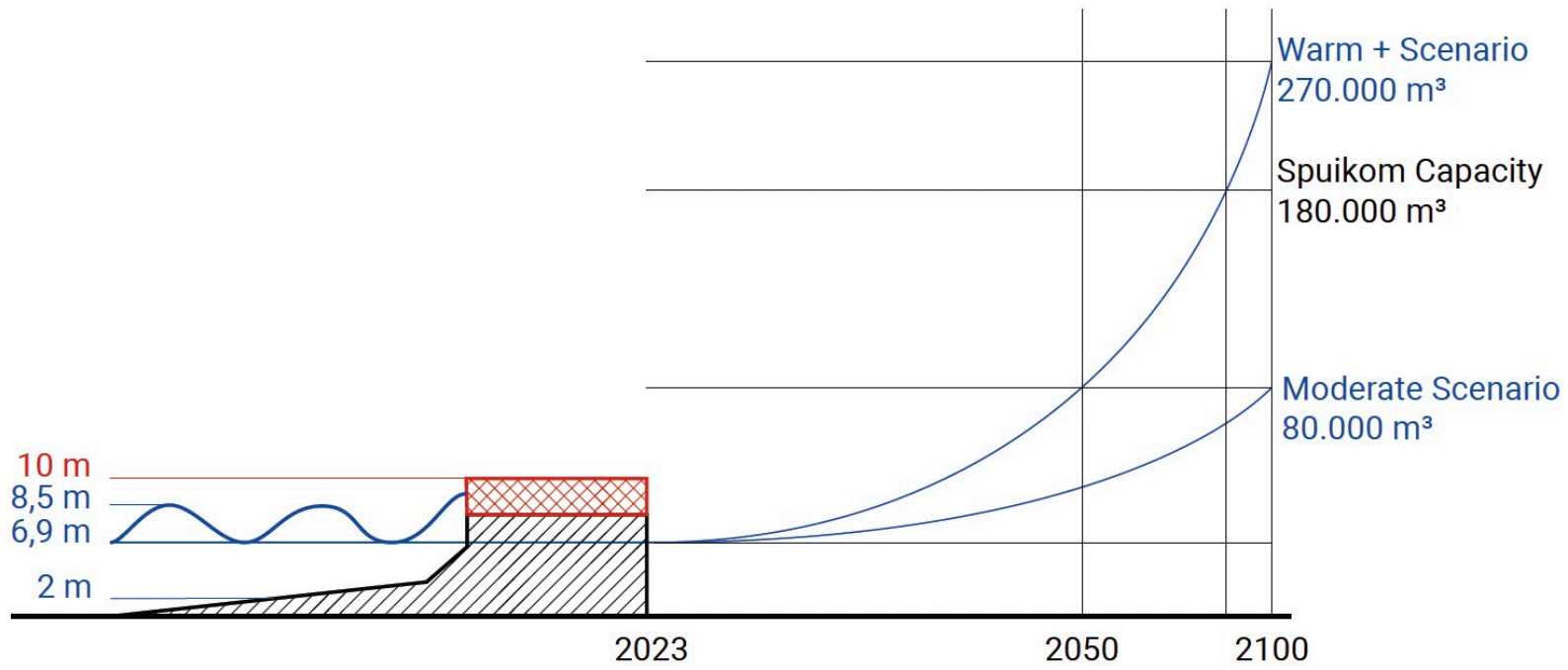
Warm+ scenario
 Risk 1:10.000 Spuiikom Model
 S6
 Total 267.200 m3 water in W+



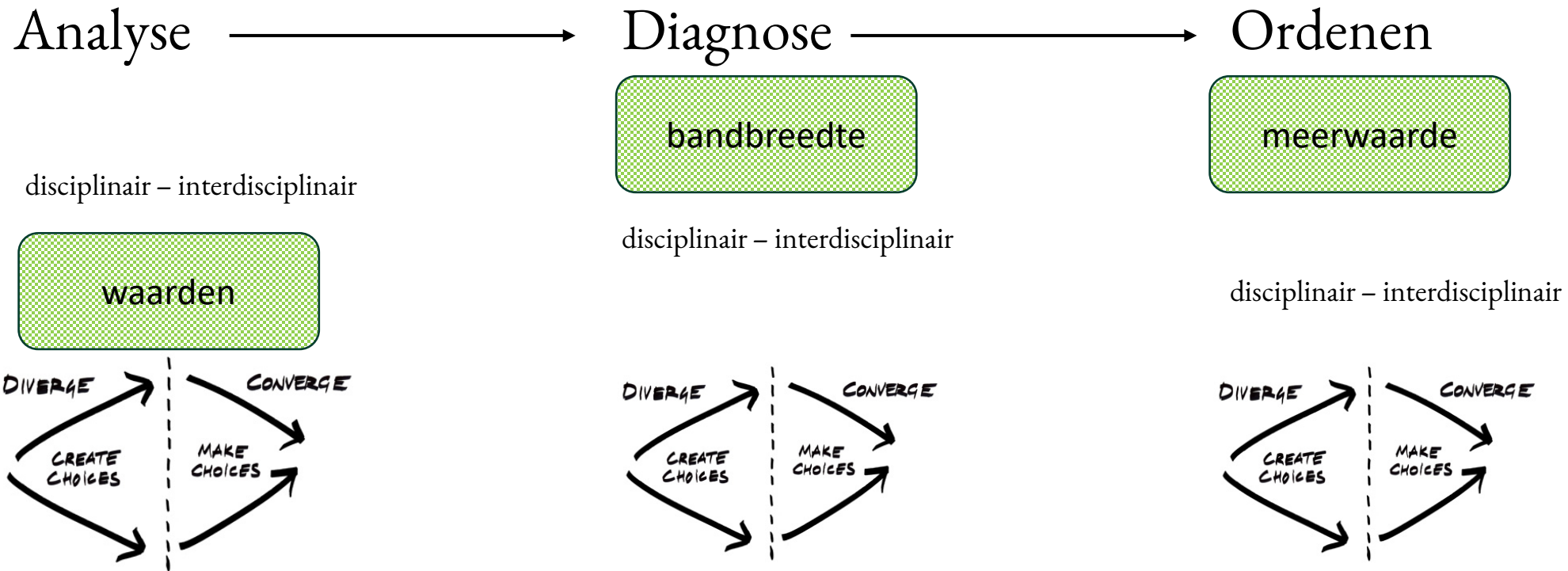
Moderate scenario
 Risk 1:10.000 Spuiikom Model
 S6
 Total 78.400 m3 water in G



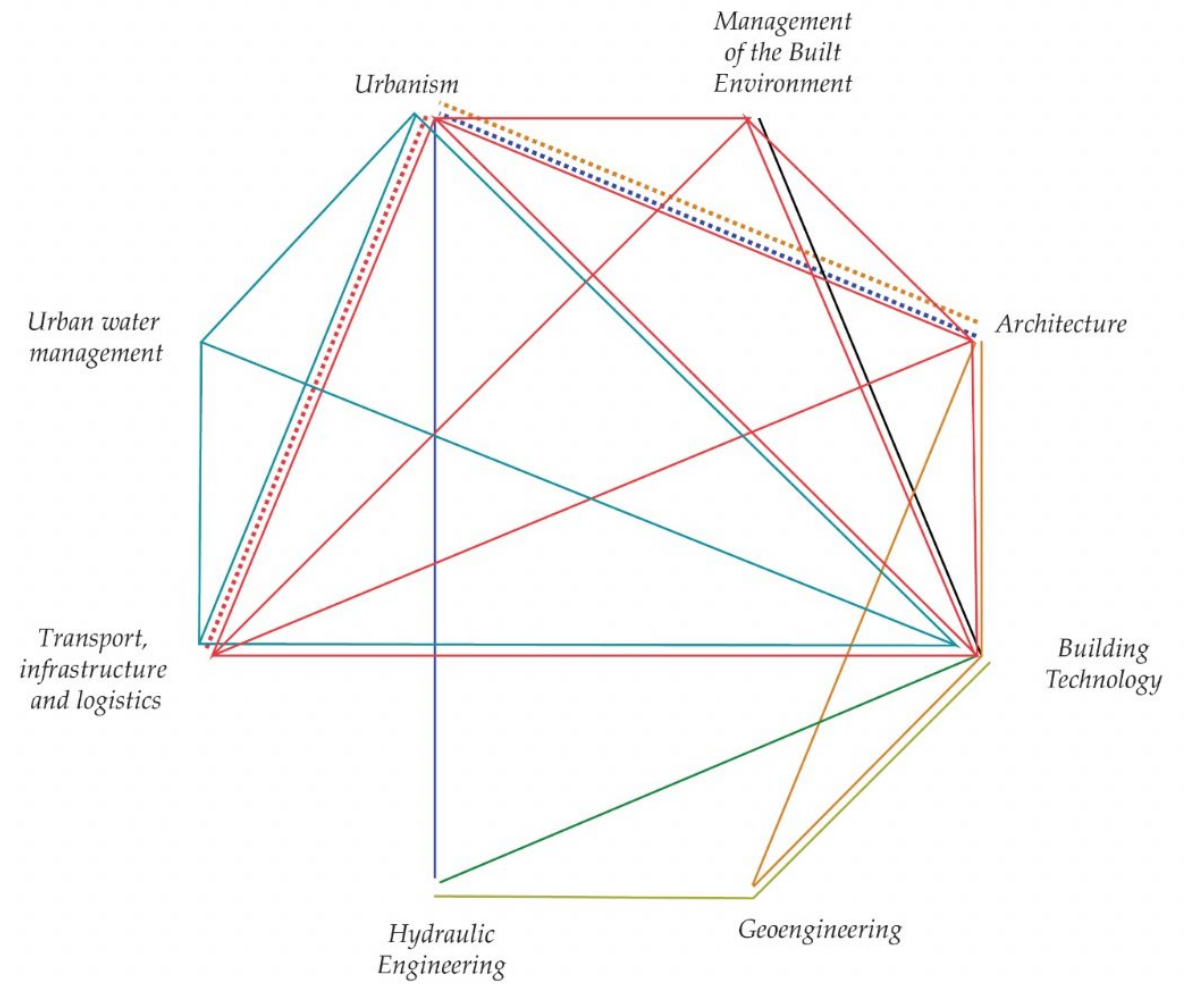




Interdisciplinaire methode

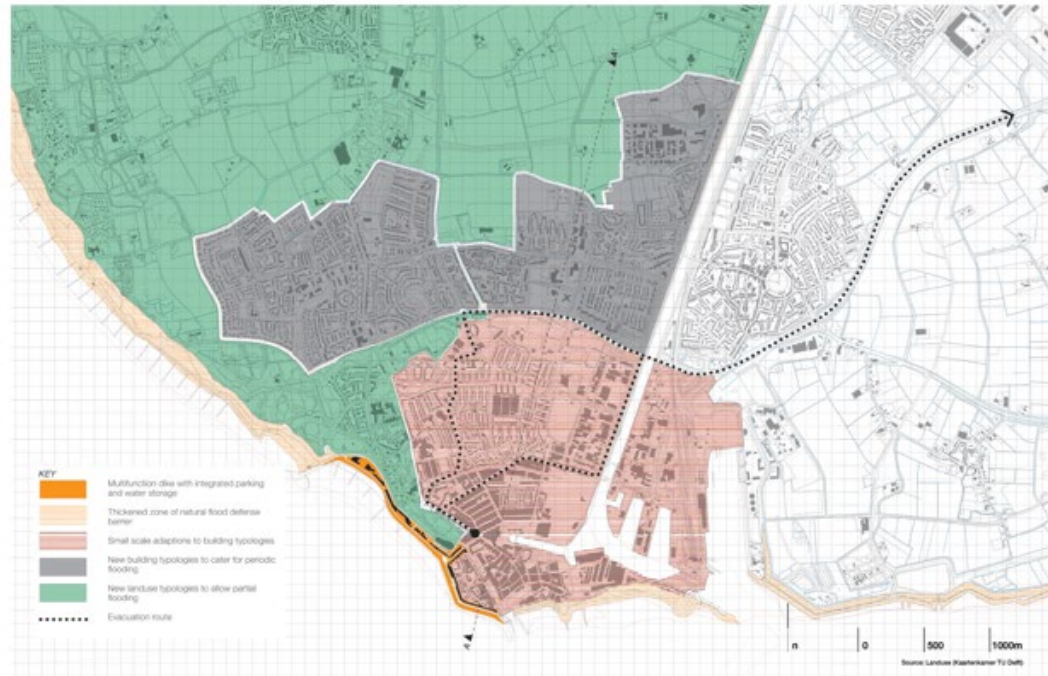


- Recovery speed
- Land use
- Density of the tissue
- Vertical and horizontal evacuation
- Distribution of evacuation centers
- Water storage
- Construction principles
- Building typologies
- Foundations





Interdisciplinair ontwerp: Vlissingen



Interdisciplinair ontwerp: Vlissingen

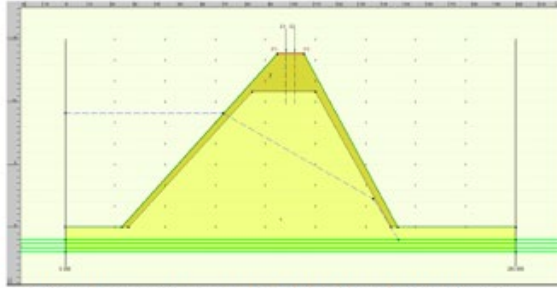


Figure B4. Geometry of the dike for Vlissingen
Light yellow = sand, Dark yellow = clay

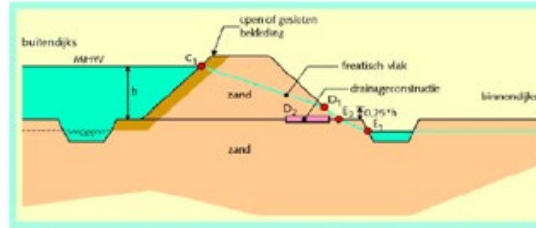


Figure B5. Phreatic surface in a dike with clay cover (TAW, 2004)

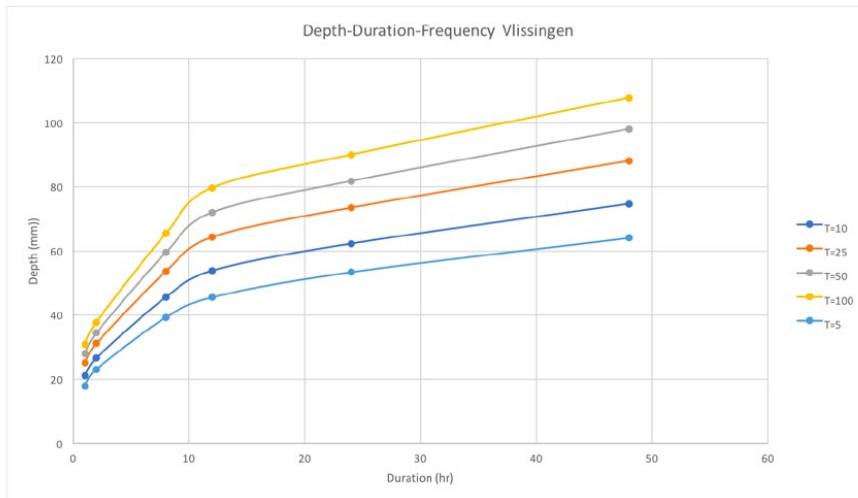


Figure D1. Depth-Duration-Frequency curve

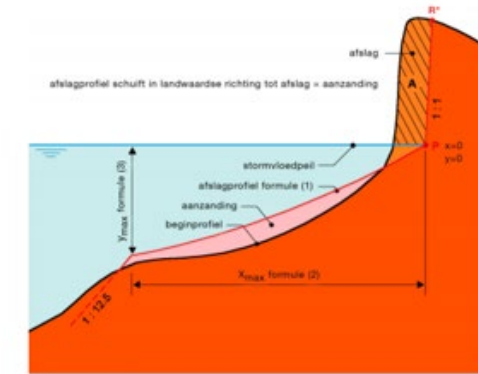


Figure B1. Afslagprofiel design guidelines

$$\left(\frac{7.6}{H_{0s}}\right)y = 0.4714 \left[\left(\frac{7.6}{H_{0s}}\right)^{1.28} \left(\frac{12}{T_p}\right)^{0.45} \left(\frac{w}{0.0268}\right)^{0.56} x + 18 \right]^{0.5} - 2.0 \quad (1)$$

$$x_{max} = 250 \left(\frac{H_{0s}}{7.6}\right)^{1.28} \left(\frac{0.0268}{w}\right)^{0.56} \quad (2)$$

$$y_{max} = \left[0.4714 \left[250 \left(\frac{12}{T_p}\right)^{0.45} + 18 \right] - 20 \right] \left(\frac{H_{0s}}{7.6}\right) \quad (3)$$

The values used for these calculations are determined by the hydraulic student (Appendix C1). The used values are:

H_{0s}	=	5 m
T_p	=	12 s
w	=	0.35 m/s
Stromlevel	=	9.1 m

Interdisciplinair ontwerponderzoek in de delta

- Ontwerp is een onderzoekinstrument
- Dialoog is niet genoeg
- Integratie van informatie en concepten van een ander karakter
- Werken aan integratie protocollen