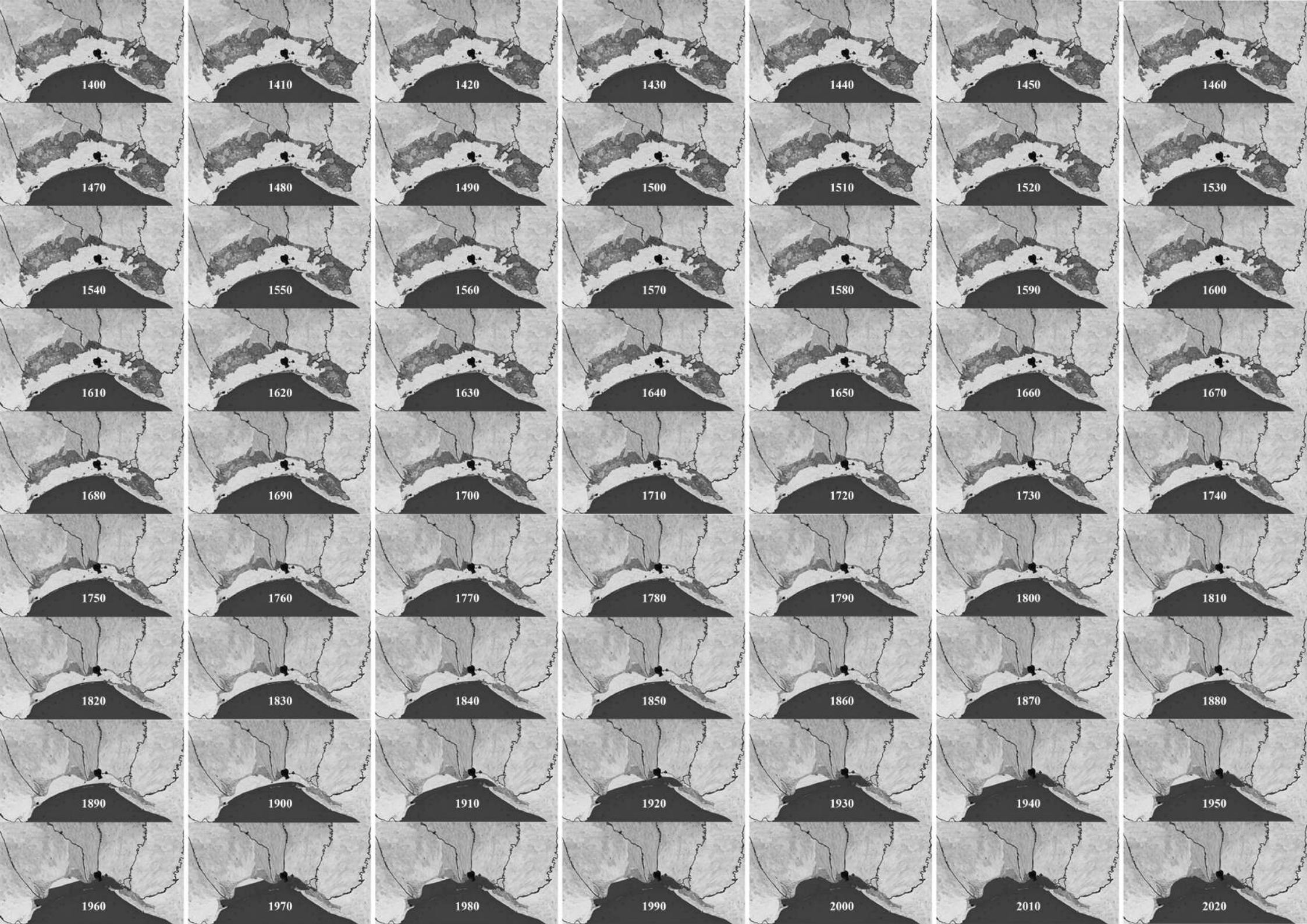
Why engineers should cooperate with spatial designers… and the other way around!

Luca Iuorio

Climate Action Program

TU Delft

2nd March 2023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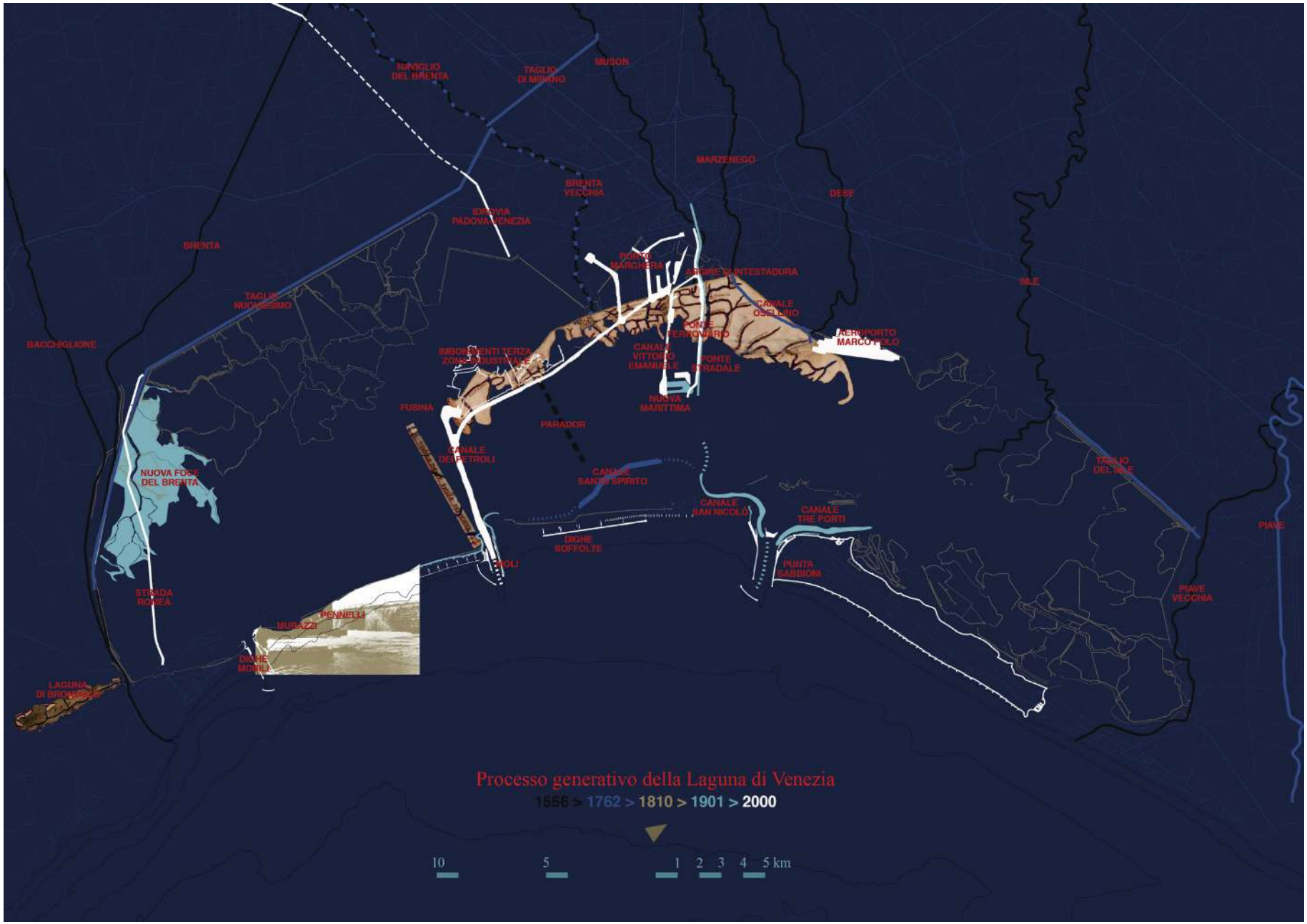
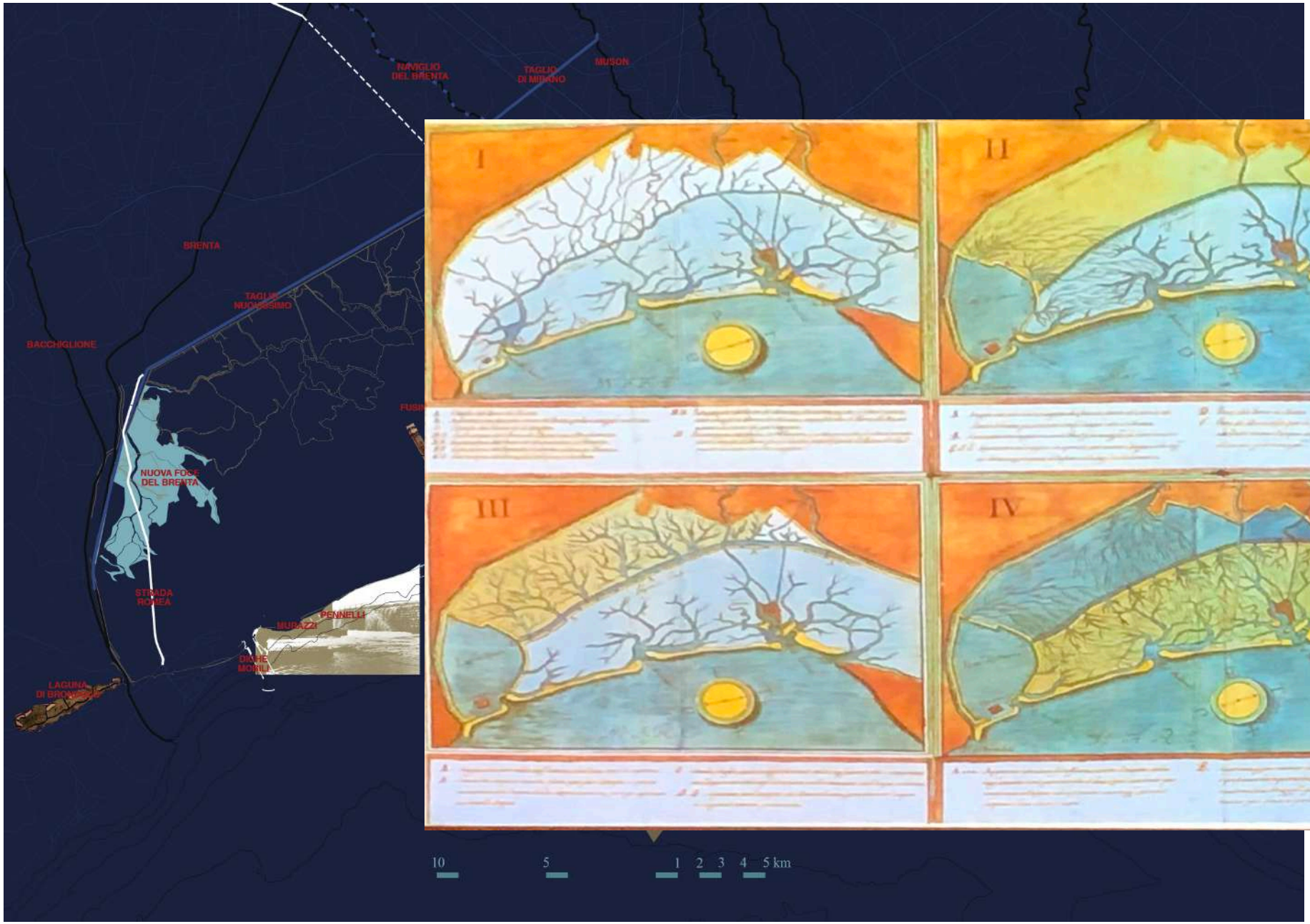


Generative process of the Lagoon of Venice.
Synoptic map of the major infrastructural interventions initiated in the lagoon during the last five centuries (1556 > 2000). Map by Luca Iuorio


NAVIGLIO DEL BRENTA
TAGLIO DI MIRANO
MUSON
BRENTA
TAGLIO NUOVISSIMO
BACCHIGLIONE
NUOVA FOCE DEL BRENTA
STRADA ROMEA
MURAZZI
PENNELLI
DIGHE MOBILI
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II
III
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10
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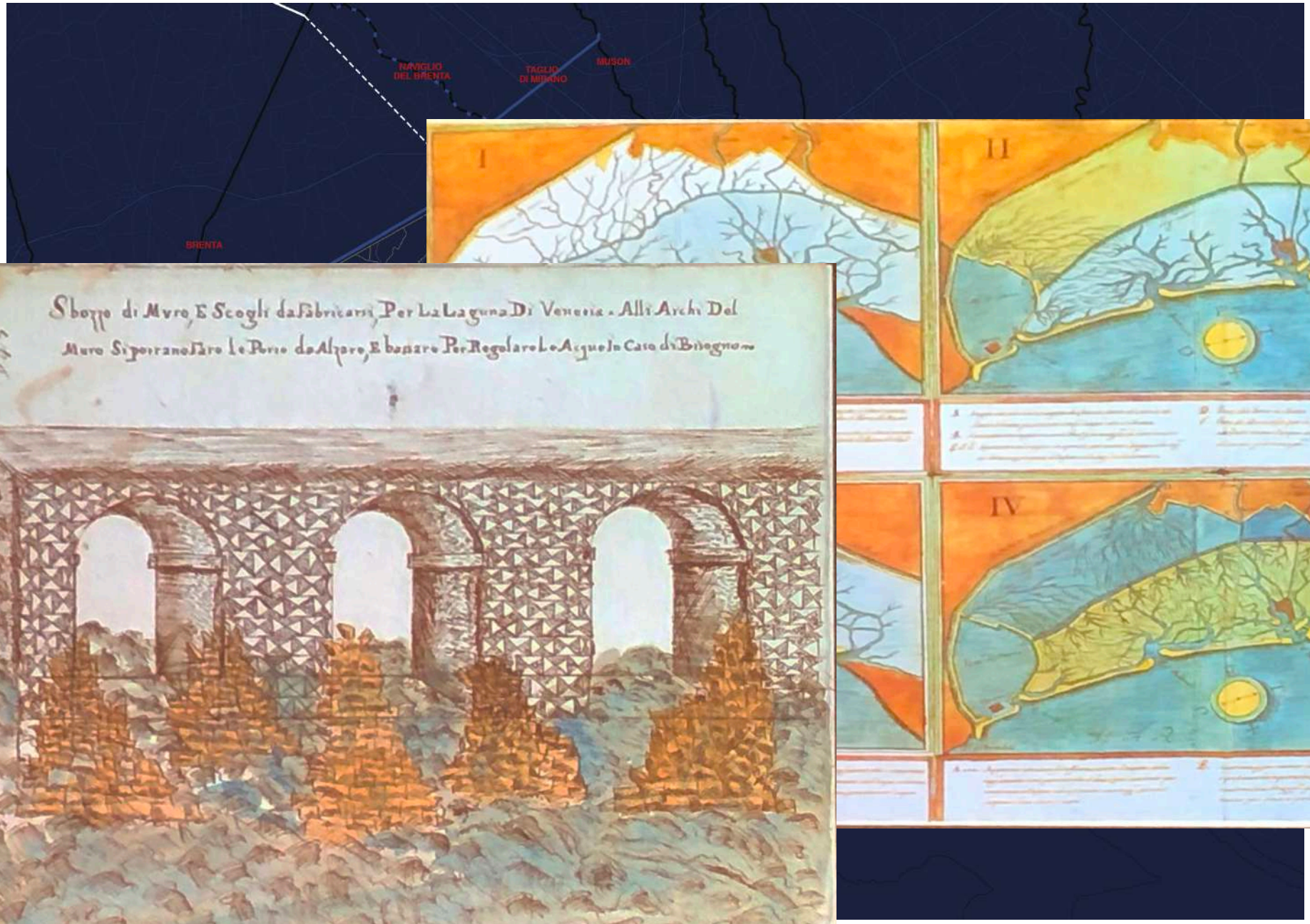
1 2 3 4 5 km


NAVIGLIO DEL BRENTA
TAGLIO DI MIRANO
MUSON
BRENTA
I
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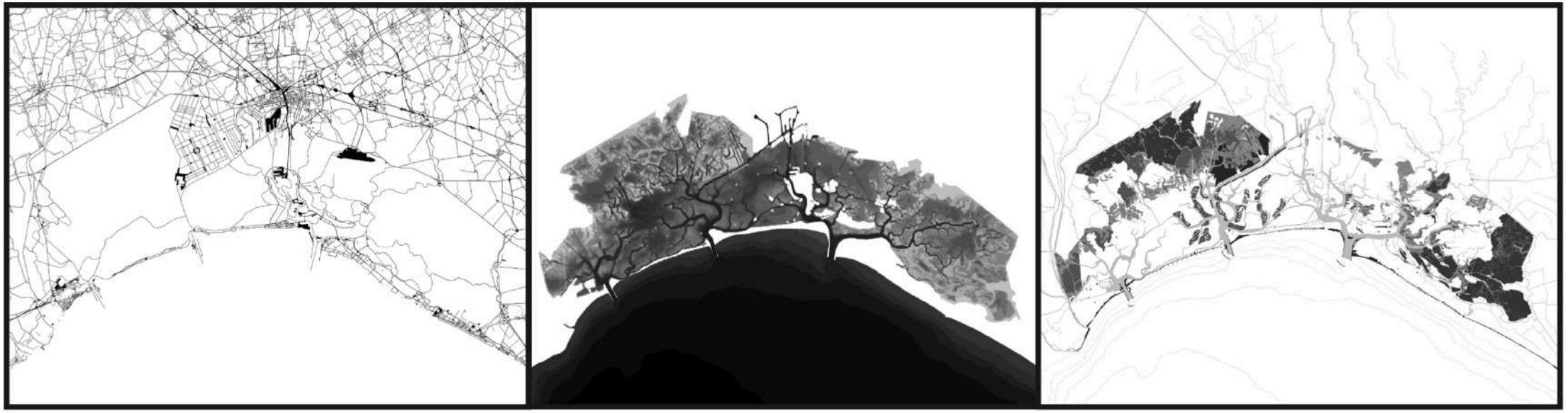
Sbozzo di Muro, E Scogli da Fabricarsi, Per La Laguna Di Venetia. Alli Archi Del
Muro Si potranno fare le Porte da Alzare, E bonare Per Regolare Le Acque In Caso di Bisogno.

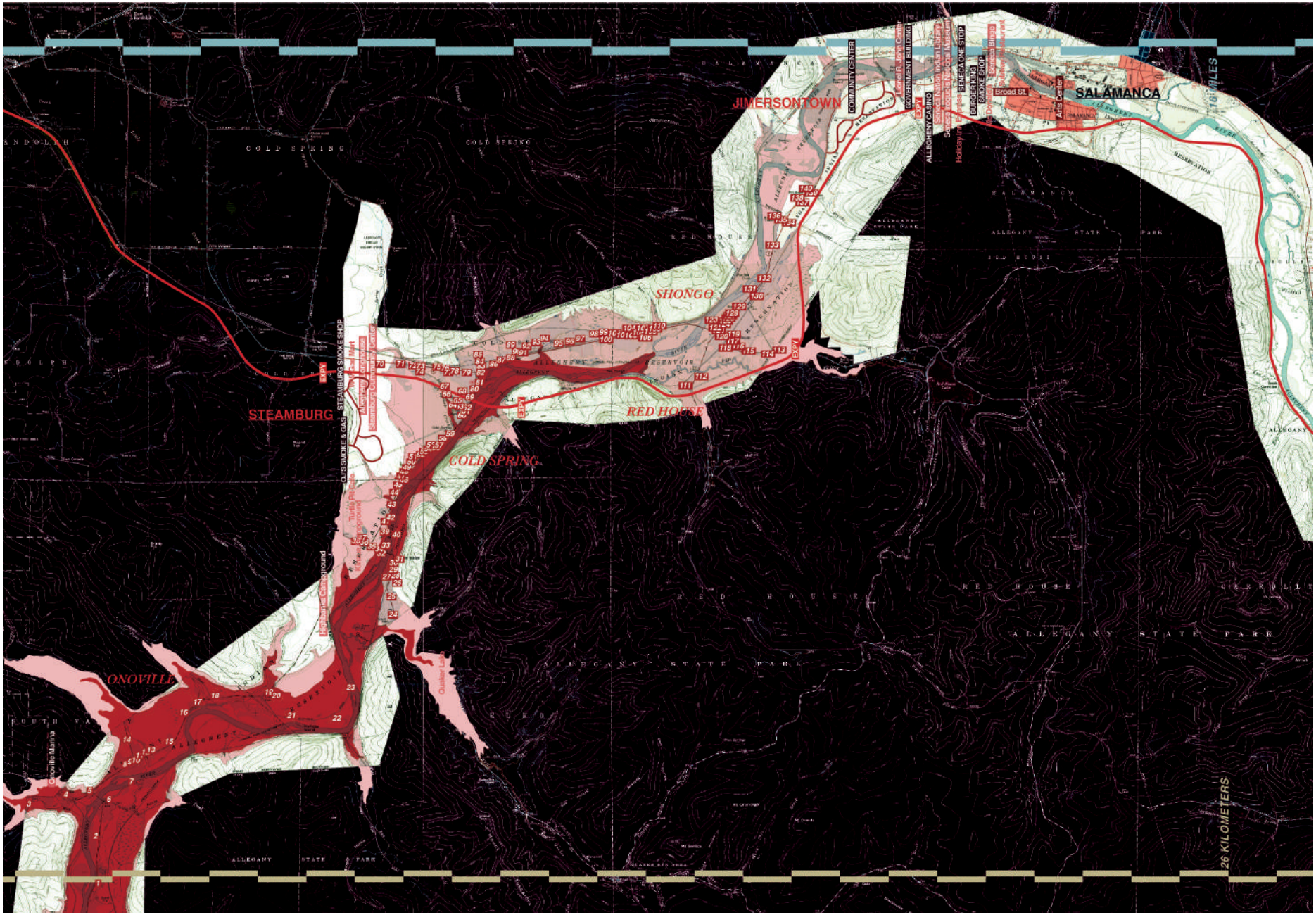
Spatial Interpretation of Infrastructure



Three techonolgical projects have been explored in order to report how specific models of rationalization of the territory came in succession and how they interpreted the Venice lagoon during last century. In the specific, it has been demonstrated how distinct and punctual projects translate the lagoon environment within relations of a wider geographic context. Maps by Luca Iuorio


COMUNE DI VENEZIA - UFFICIO TECNICO
1
CASTELFRANCO-TRENTO
TREVISO CADORE FRIULI
TRIESTE
MIRANO-PADOVA
AUTOSTRADA VENEZIA-PADOVA
PADOVA
RAVENNA POLESINE
COMUNE DI VENEZIA
PROVINCIA " "
" " DI TREVISO
STRADE
FERROVIE
SCALA 1 : 25000

Allegheny Reservation 1963 > 2017



The map shows relationship between flooded land and the contemporary boundary of the Allegheny Reservation, NY. Red area corresponds to the actual reservoir shoreline perimeter, pink area represents the planned limits which controlled floods would occur in, during exceptional run-off events. Numbers coincides with the removed, burnt or flooded houses previously shown. Texts coincides with places where main photographs have been taken during the Allegheny Expedition. Graphics by Luca Iuorio

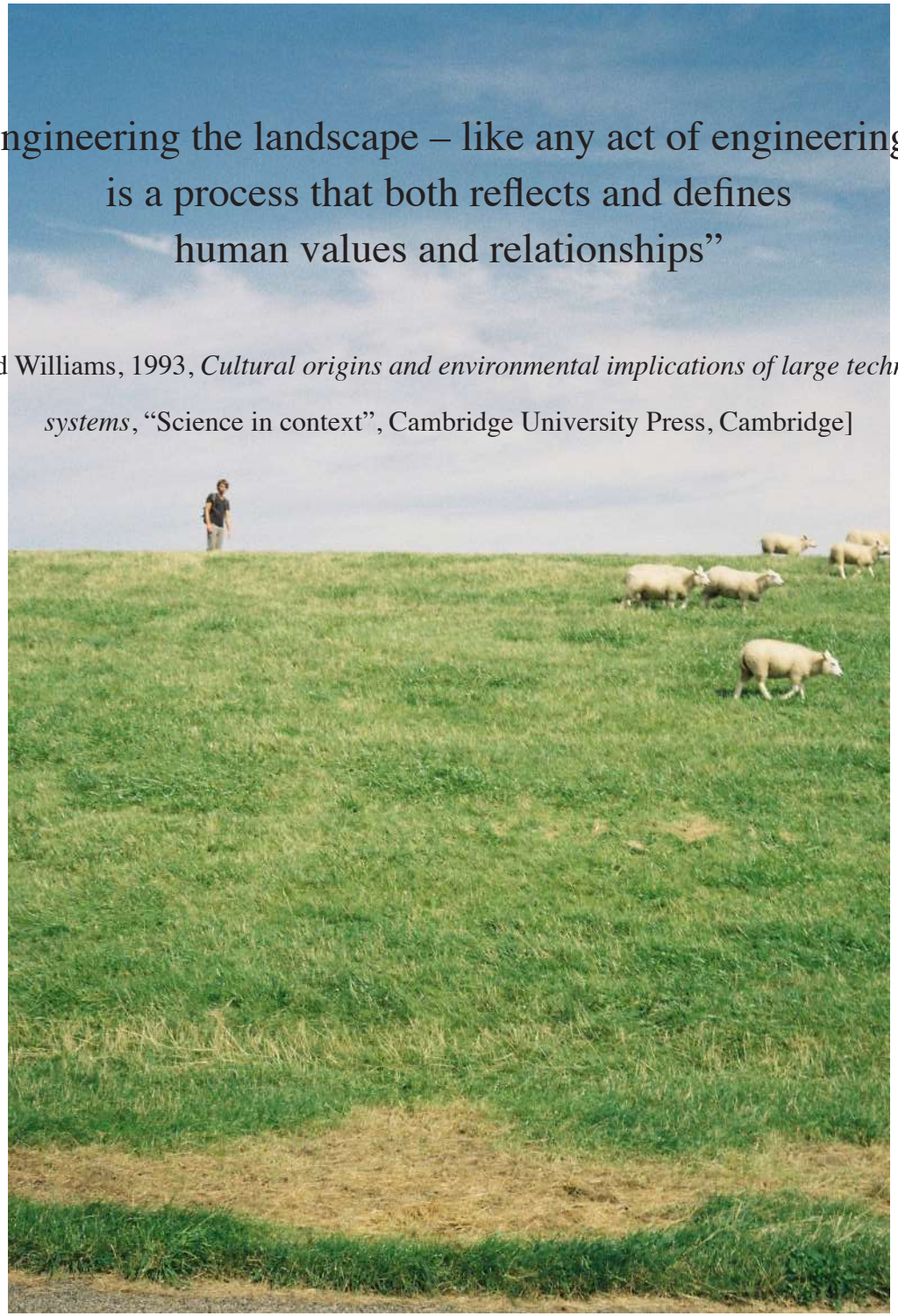
Several photographic surveys, managed by Senecas in the Sixties, report 140 removed and burnt structures describing pre-dam Allegheny rural landscape. Dislocation, in this case-study, represents a fundamental issue and this archive of pictures and captions offers the possibility to think of the initial indirect spatial (and social) consequences of dam construction.

Reporting ‘space, time and everyday life’ in the Delta has the aim to re-discover and make visible the considerable Dutch inheritance of digital archival records and use this to create public awareness on how – in the past – specific technical solutions have been able to affect current social, spatial and ecological conditions.

Climate Action Program Seed Fund 2023, TU Delft

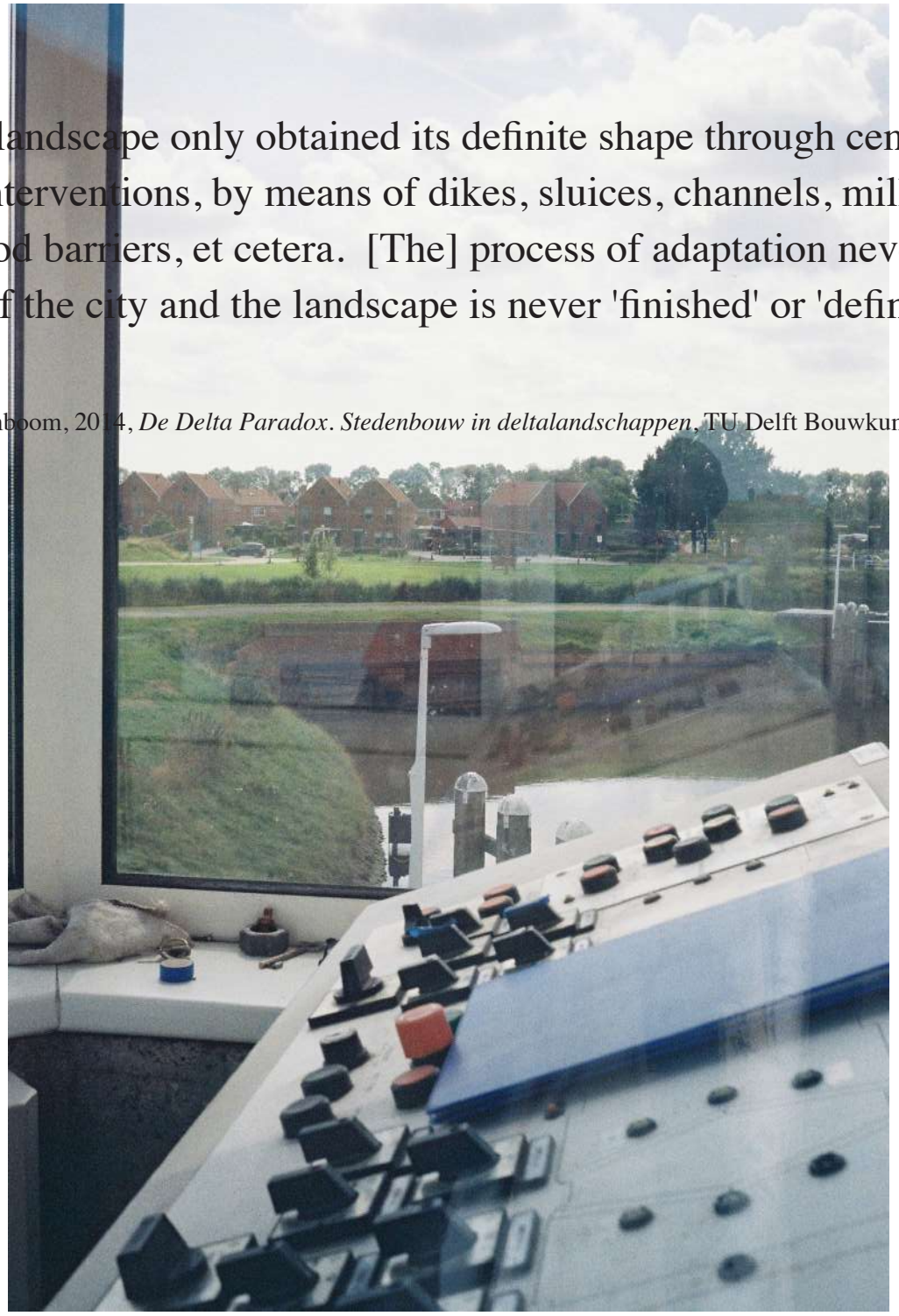
“Engineering the landscape – like any act of engineering –
is a process that both reflects and defines
human values and relationships”

[Rosalind Williams, 1993, *Cultural origins and environmental implications of large technological systems*, “Science in context”, Cambridge University Press, Cambridge]



“The landscape only obtained its definite shape through centuries of human interventions, by means of dikes, sluices, channels, mills, pumping stations, flood barriers, et cetera. [The] process of adaptation never stops, the form of the city and the landscape is never 'finished' or 'definitive.”

Frits Palmboom, 2014, *De Delta Paradox. Stedenbouw in deltalandschappen*, TU Delft Bouwkunde, Delft.



Markermeer and Ems-Dollard bay, 50*50km. Maps highlight spaces where public mobility and dike systems overlap.
[All Risk Programme, Project A3, Post-doc research, TU Delft, 2021, Luca Iuorio].

Dam Removal

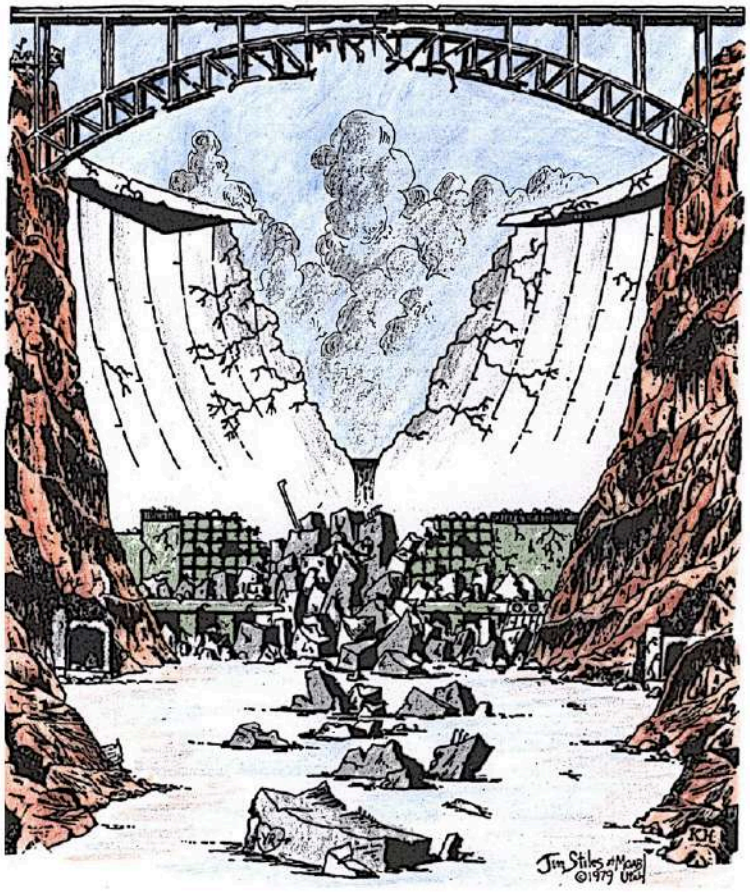
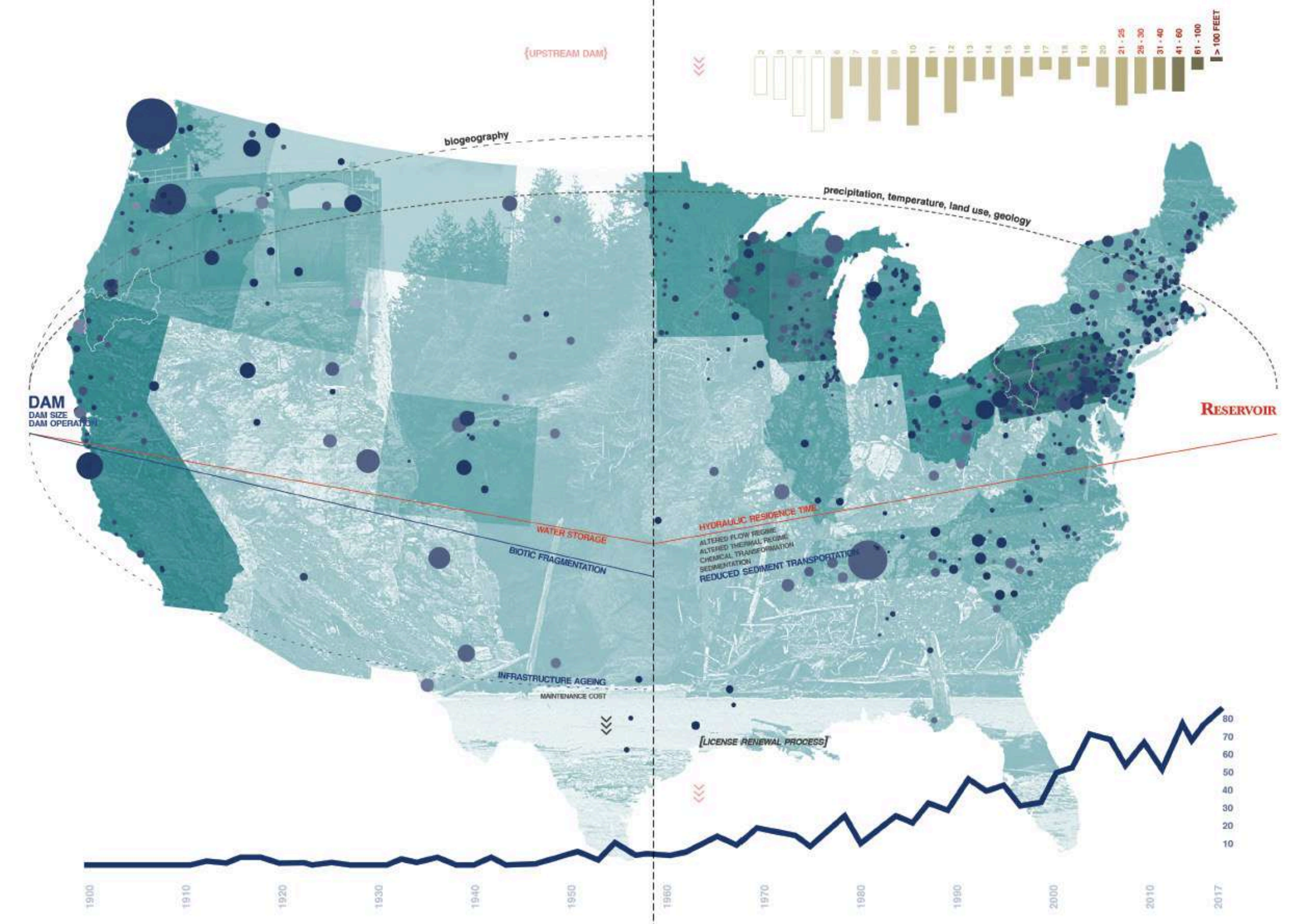


Illustration by Jim Stiles, drawn in 1979, inspired by the Edward Abbey's book The Monkey Wrench Gang (Abbey, 1975).
The image of the collapse of Glen Canyon Dam became the front cover of the successive book The Journey Home (Abbey, 1977);
it was also used for a series of prints and t-shirts to advocate the "defense of the American West".


{UPSTREAM DAM}
1
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7
8
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11
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13
14
15
16
17
18
19
20
21 - 25
26 - 30
31 - 40
41 - 60
61 - 100
> 100 FEET
biogeography
precipitation, temperature, land use, geology
DAM
DAM SIZE
DAM OPERATION
RESERVOIR
WATER STORAGE
BIOTIC FRAGMENTATION
HYDRAULIC RESIDENCE TIME
ALTERED FLOW REGIME
ALTERED THERMAL REGIME
CHEMICAL TRANSFORMATION
SEDIMENTATION
REDUCED SEDIMENT TRANSPORTATION
INFRASTRUCTURE AGEING
MAINTENANCE COST
[LICENSE RENEWAL PROCESS]
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70
60
50
40
30
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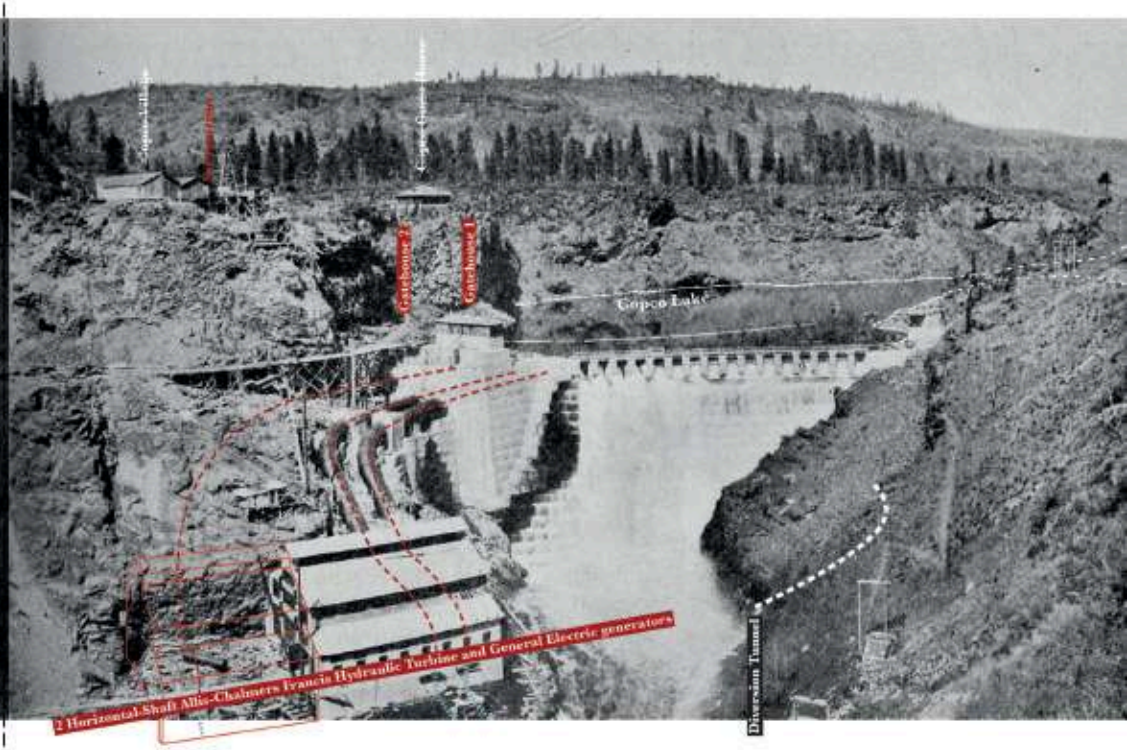
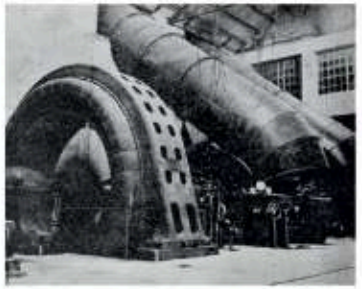
1990
2000
2010
2017

Copco No. 2 Dam

Copco No. 1 Dam and Powerhouse

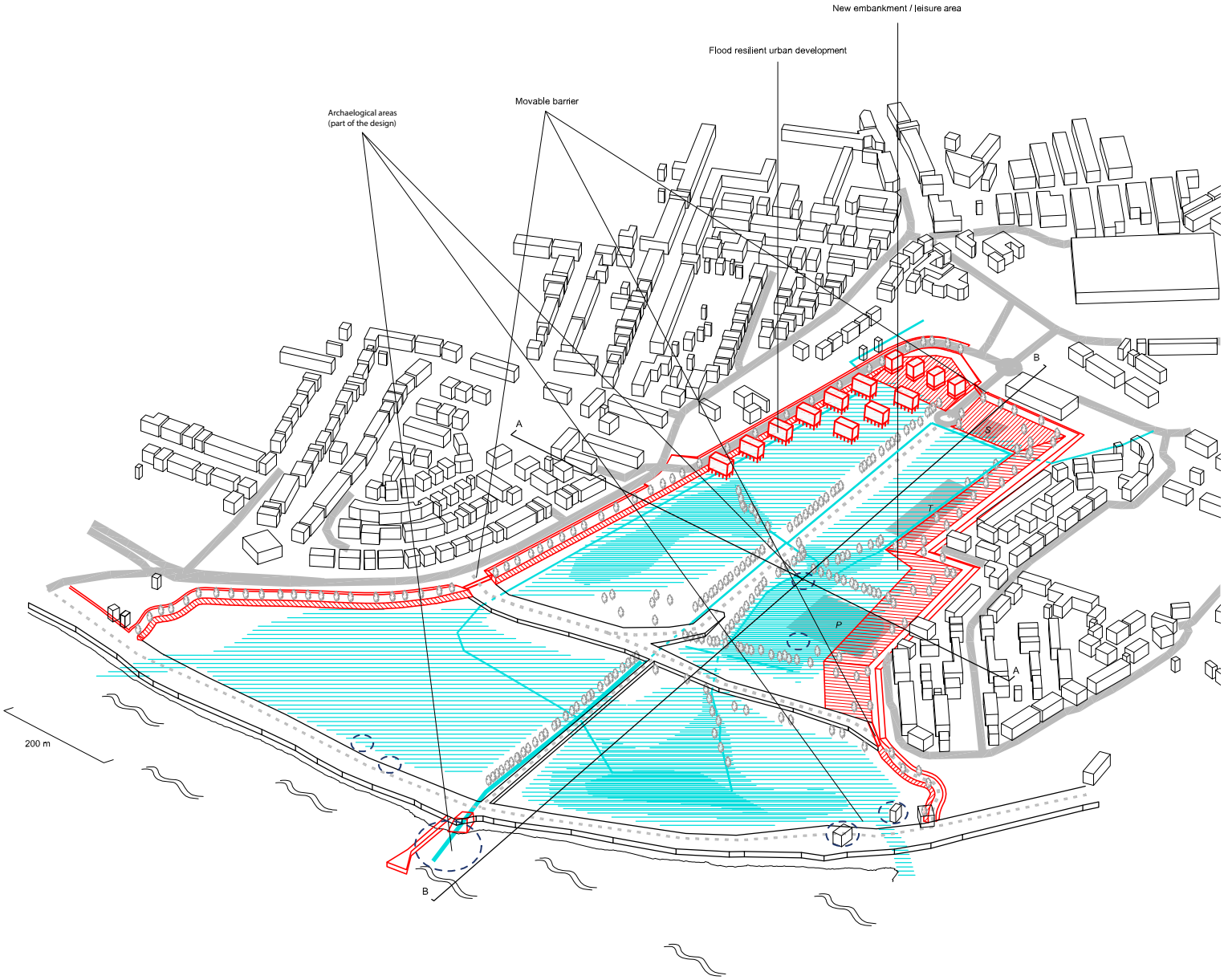




After The Dam... A River Again!

In the first aerial image, Copco Lake built by the construction of the Copco No.1 Dam. In the second illustration, final visual geographical recostruction of the Klamath River is expressed at the end of the environmental restoration processes.

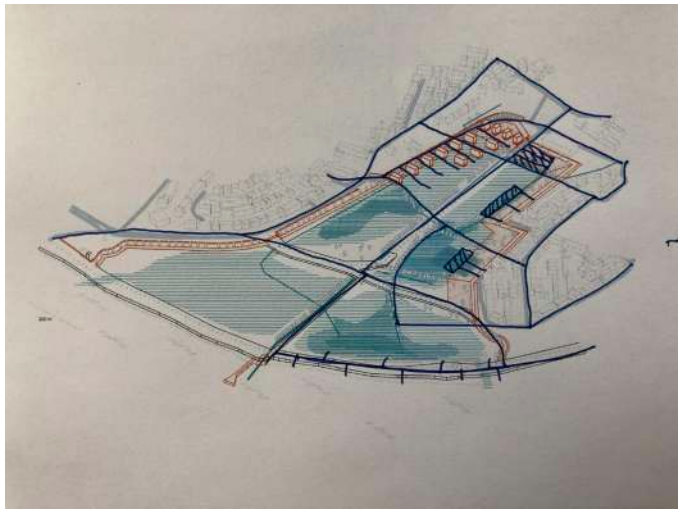
Southend-on-Sea Gunners Floodable Park

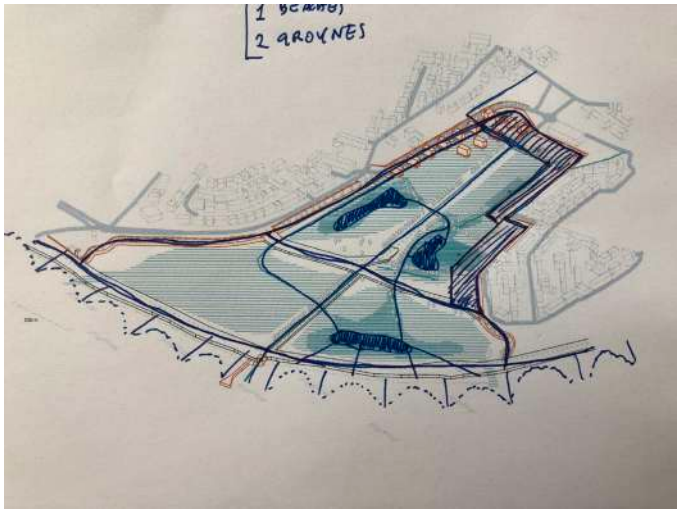


In Southend-on-sea it is proposed to accept water overtopping and build a secondary defense line along the existing margin between the open and built-up areas. In such a way, the area is adapted to function as a retention basin for excess water in the case of extreme events, while the existing and enhanced drainage network is used to drain the area at the end of the storm. Drawings: A. Bortolotti and L. Iuorio, 2021

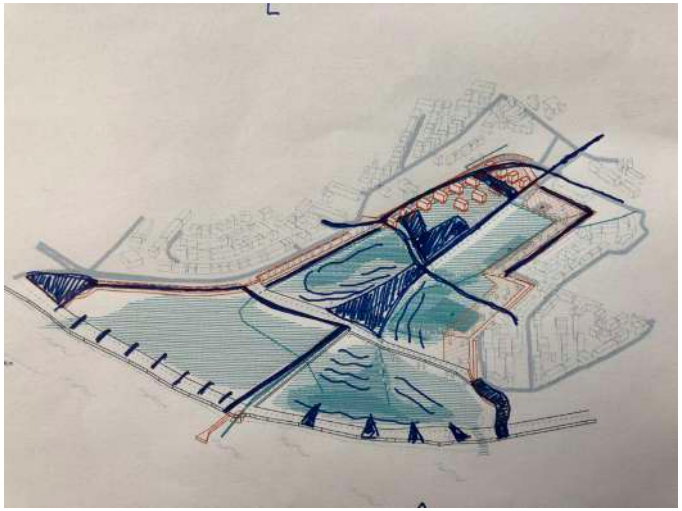
Southend-on-Sea Gunners Floodable Park

MOBILITY
spaces: parkings
flows: path (1cars; 2 persons; 3 bikes)

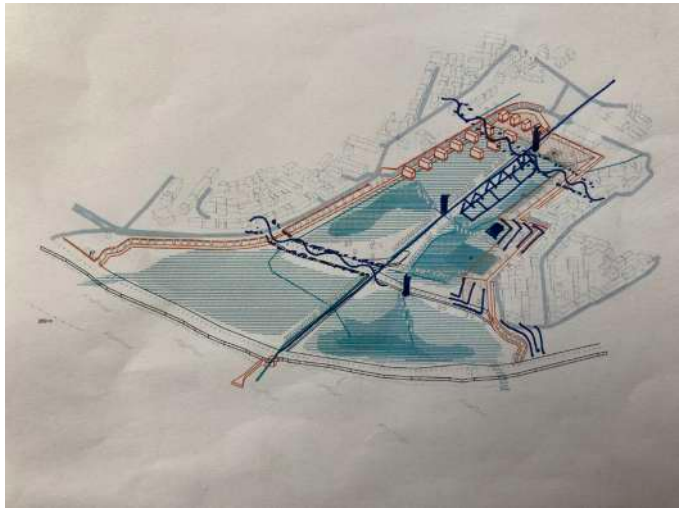




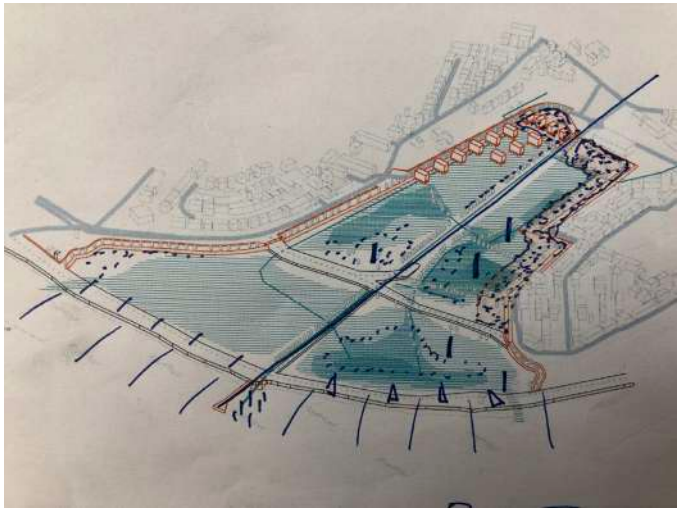
WATER
spaces: basin; dike; beach
flows: canals; groyne, embankment



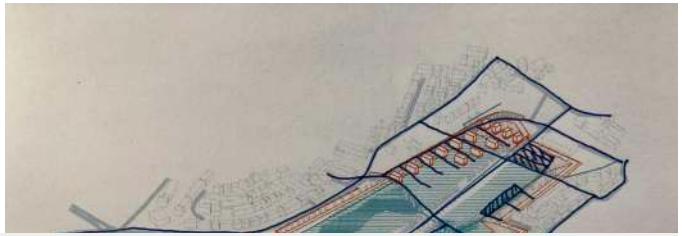
ECOLOGY
spaces: buffer zones (forest; wetland; saltmarsh)
flows: ecological corridors (trees, etc.)

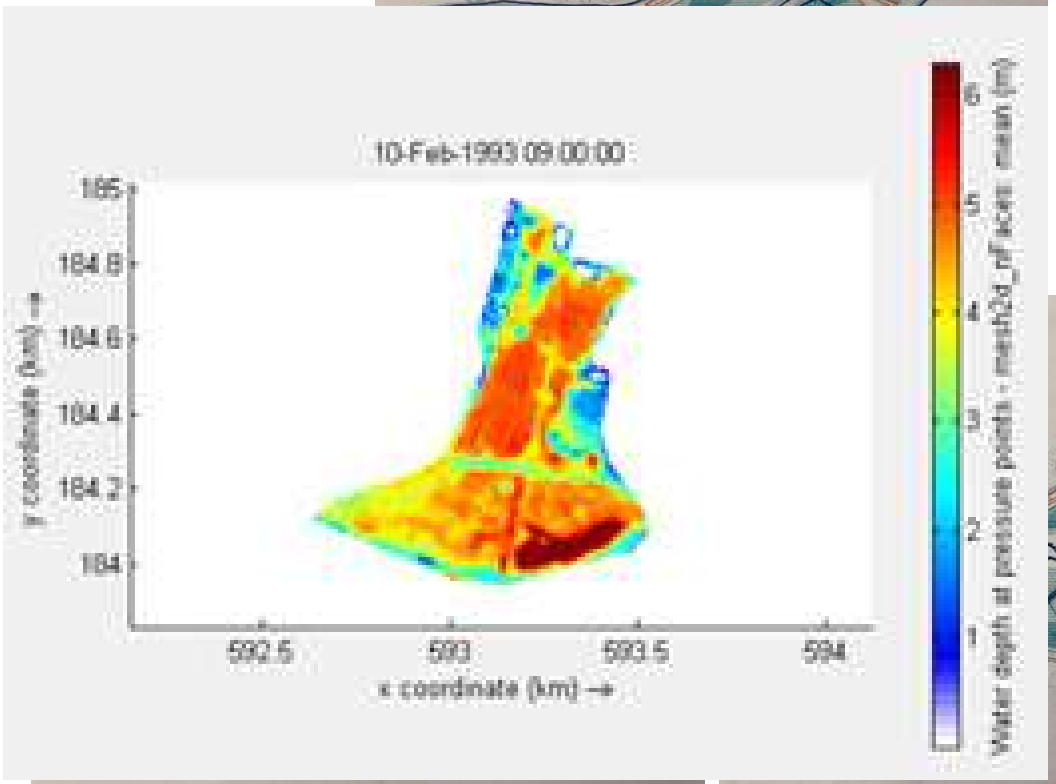


PUBLIC SPACE
spaces: sport fields; theaters; squares; buildings covers, connection with existing urban fabric
flows: paths, covers



PALEO-SCAPE
spaces: historic vegetation; "soil column"; buildings
flows: tree rows at main dike (fortification-Scoebyrig); groynes (historic tech); water-outlet (re-use of historic remains); paths




10-Feb-1993 09:00:00
185
184.8
184.6
184.4
184.2
184
y coordinate (km) →
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593
593.5
594
x coordinate (km) →
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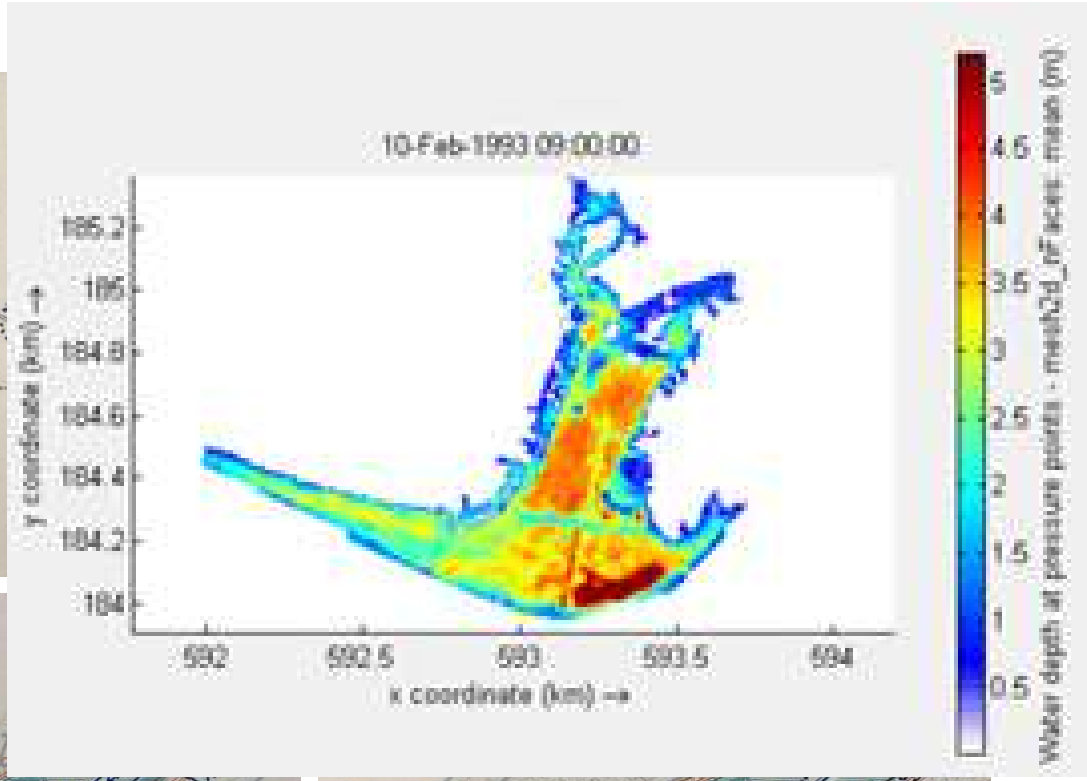
Water depth at pressure points - mesh2d_nFaces mean (m)


10-Feb-1993 09:00:00
185.2
185
184.8
184.6
184.4
184.2
184
y coordinate (km) →
592
592.5
593
593.5
594
x coordinate (km) →
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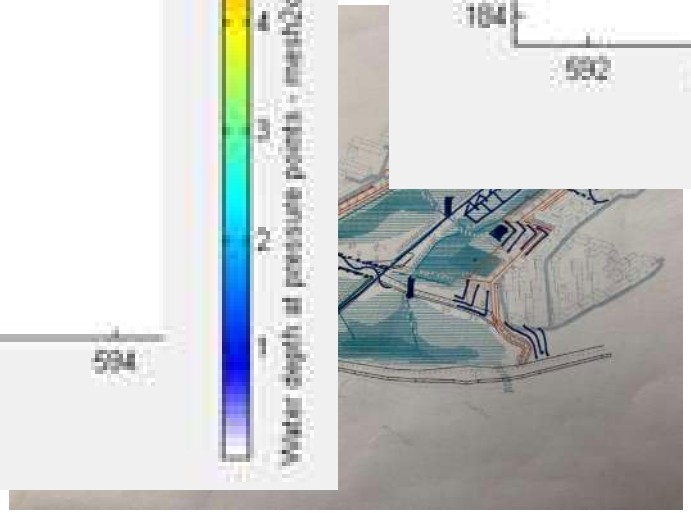
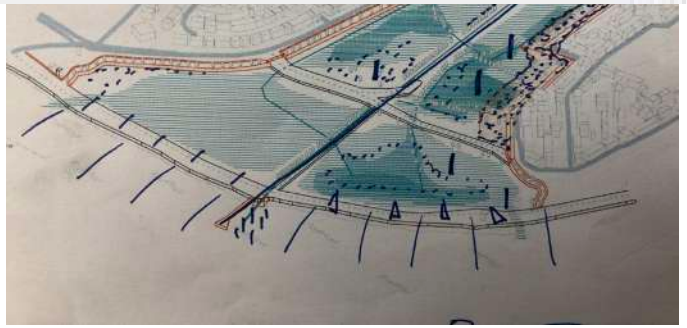
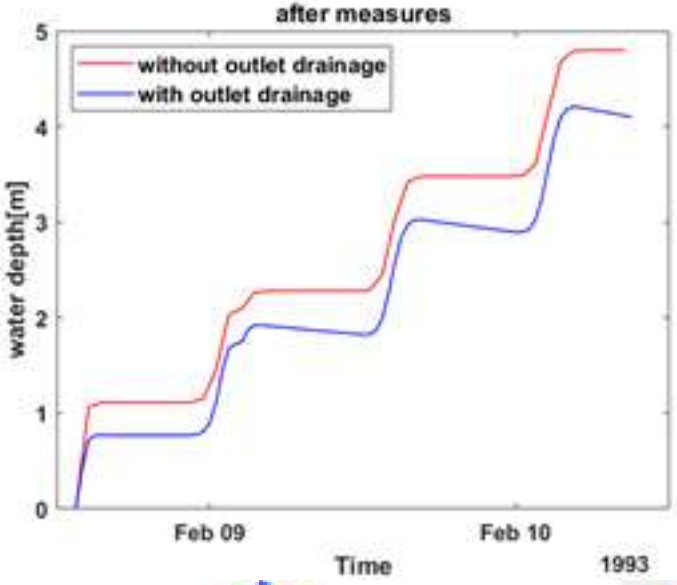
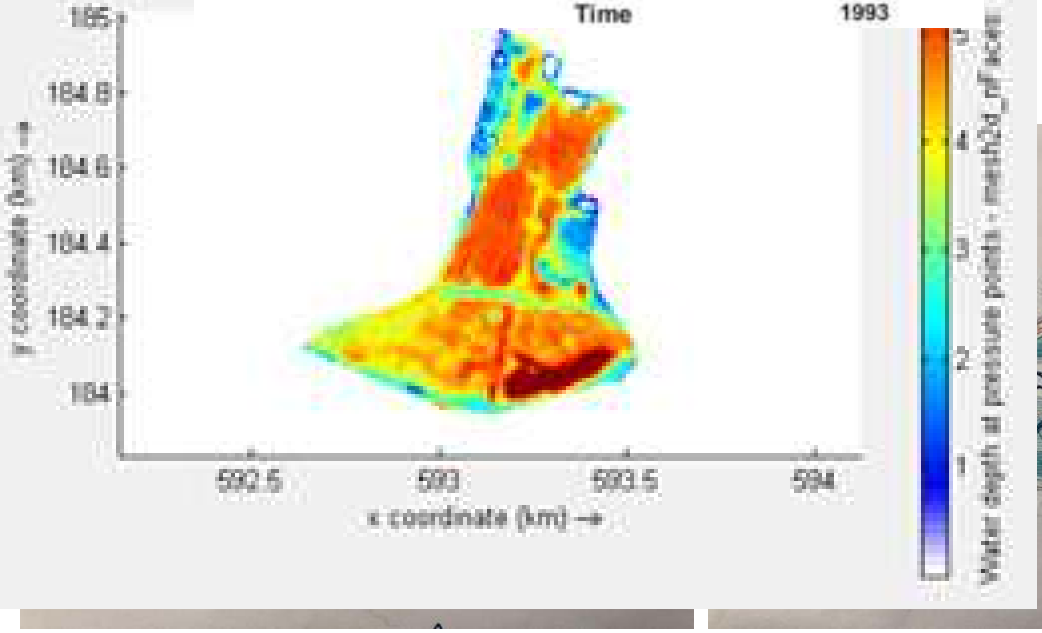
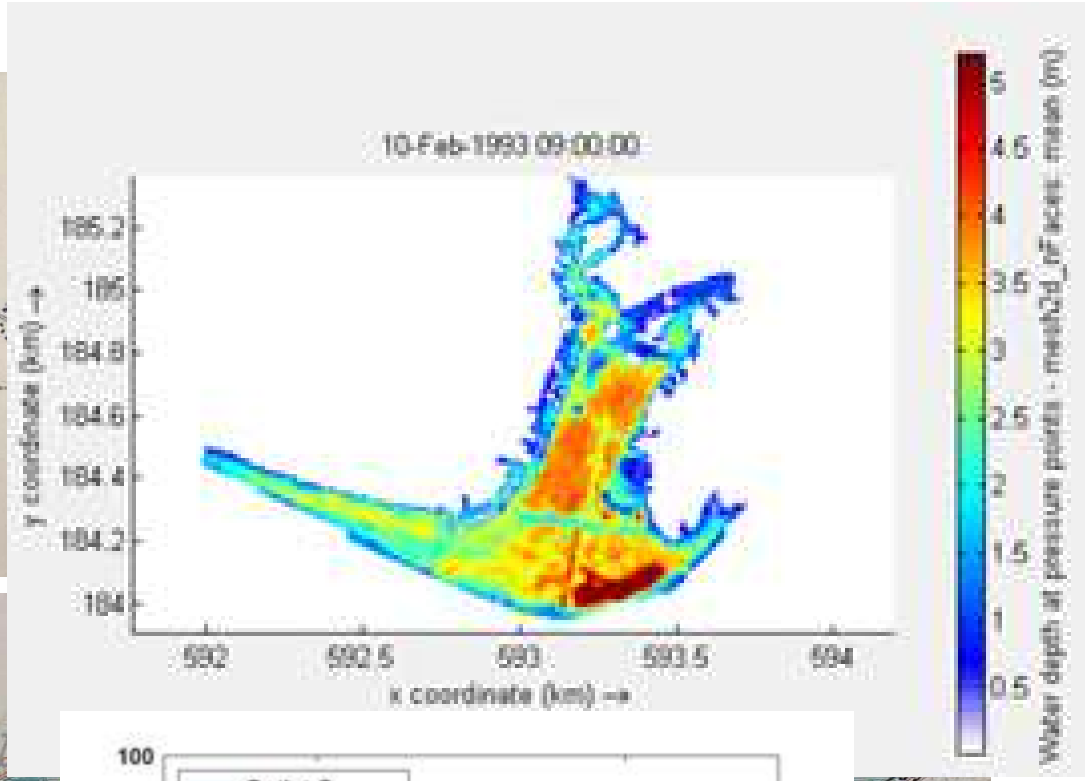
0.5
Water depth at pressure points - mesh2d_nFaces mean (m)

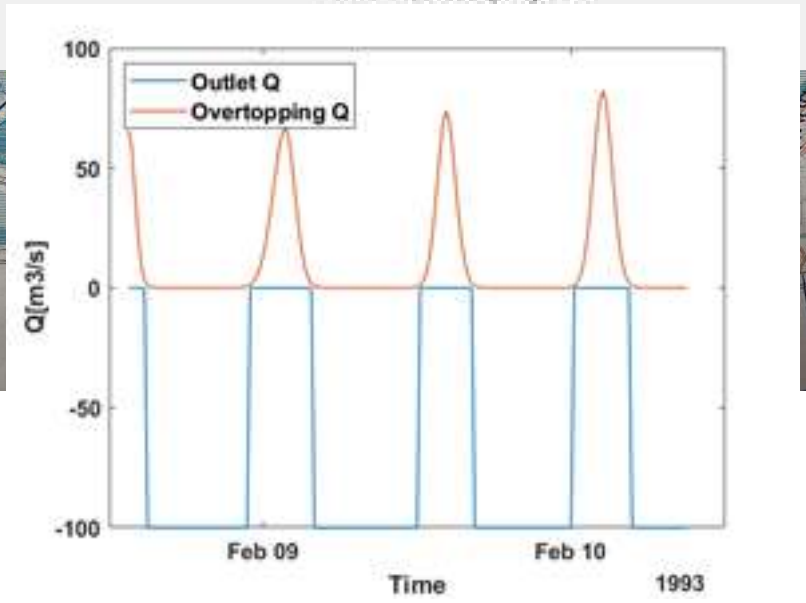




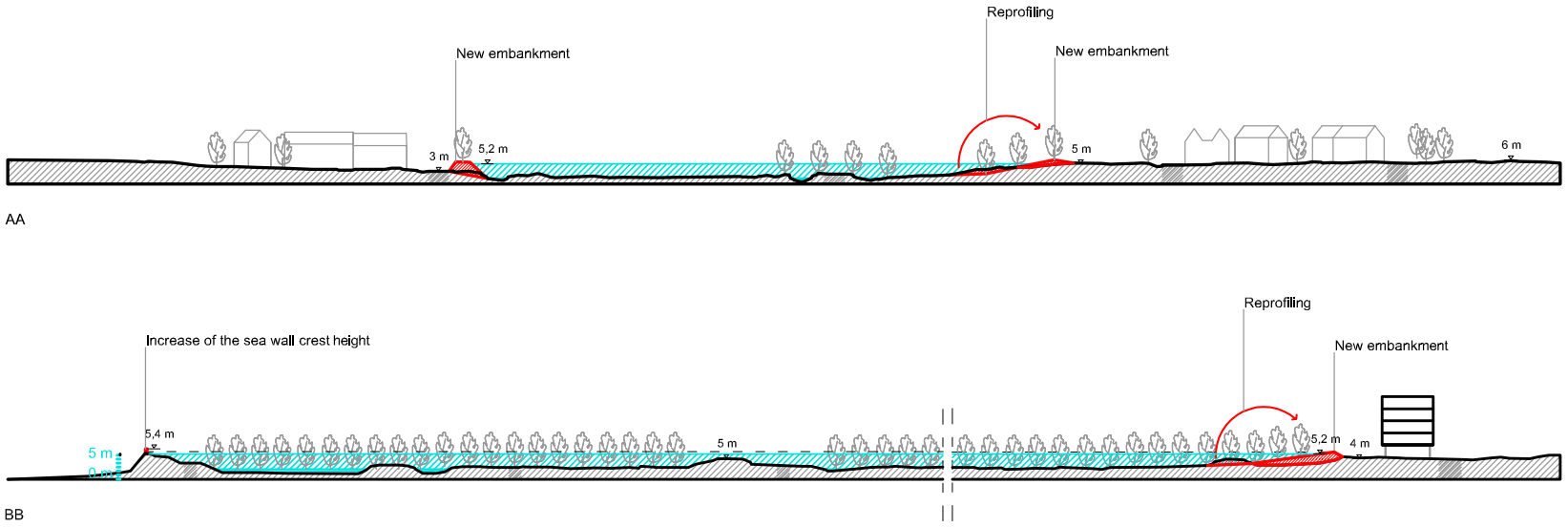

after measures
without outlet drainage
with outlet drainage
water depth[m]
Feb 09
Feb 10
Time
1993


y coordinate (km) →
x coordinate (km) →
Water depth at pressure points - mesh2d_nFaces mean (m)

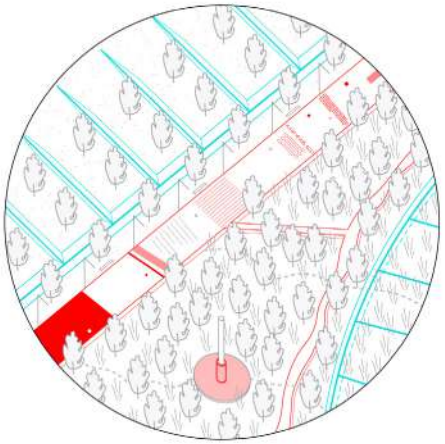
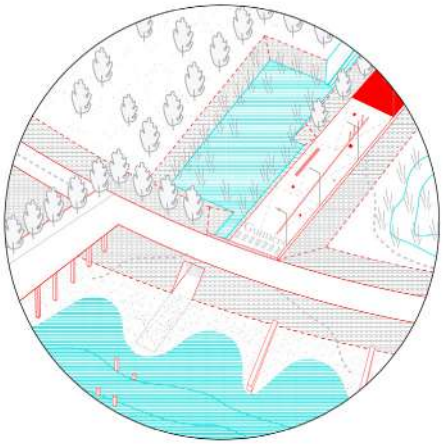
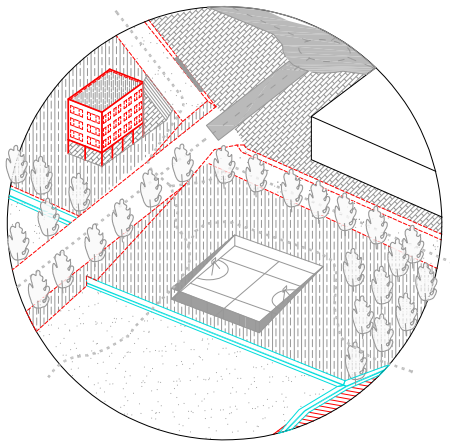
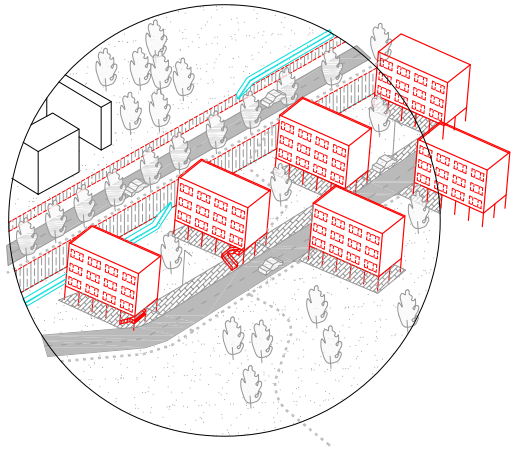
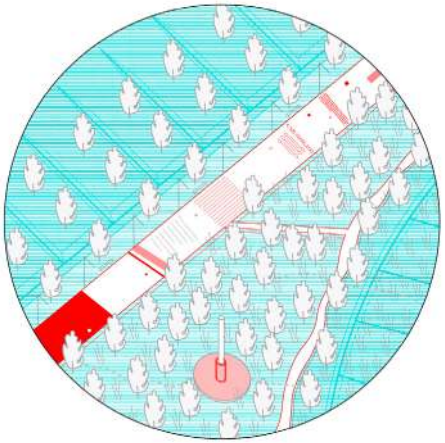
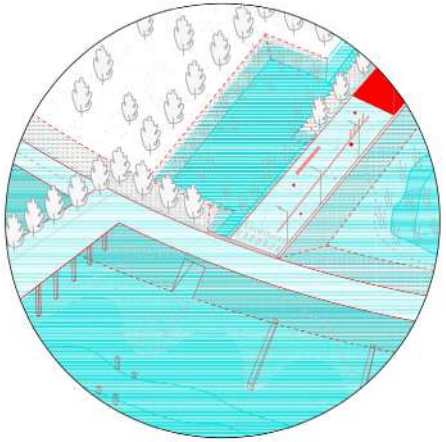
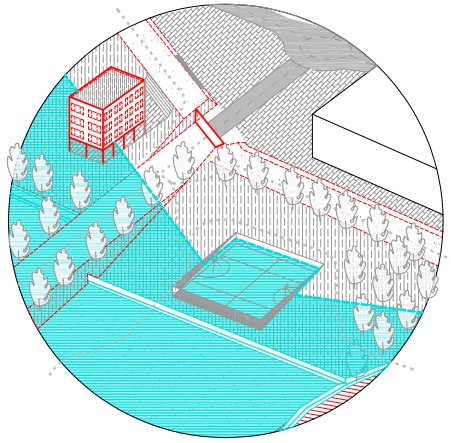
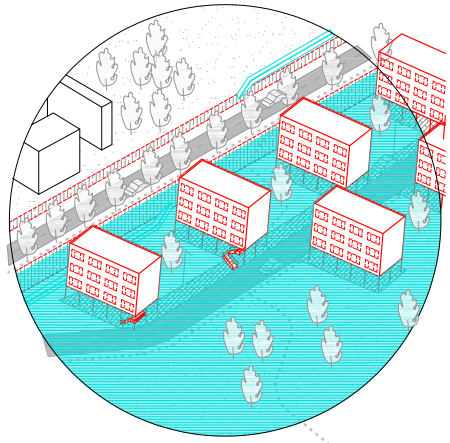

10-Feb-1993 09:00:00
y coordinate (km) →
x coordinate (km) →
Water depth at pressure points - mesh2d_nFaces mean (m)

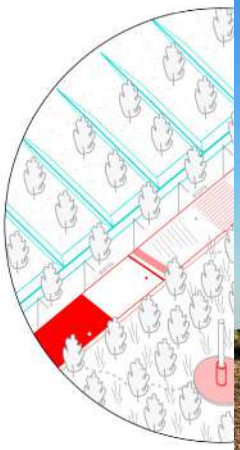

Outlet Q
Overtopping Q
Q[m3/s]
Feb 09
Feb 10
Time
1993

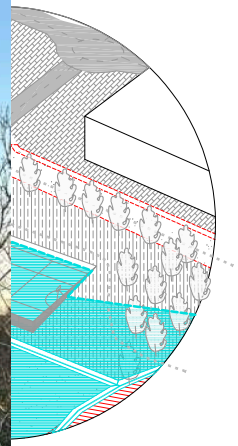
Southend-on-Sea Gunners Floodable Park

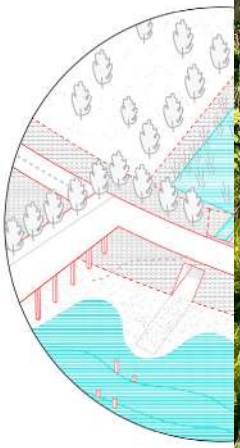


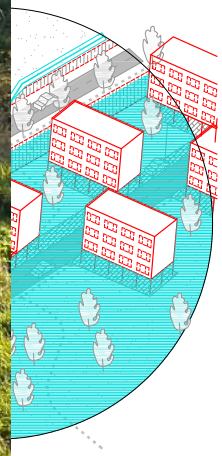
The principle of building a new embankment that can serve both as protection, leisure space and connection, while the new urban development inside the area is designed to be flood-proofed (e.g. by being raised on piles, or by giving ground floors to functions such as car parks).Drawings: A. Bortolotti and L. Iuorio, 2021







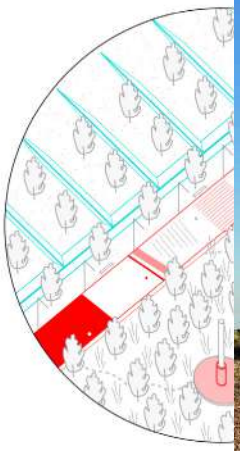


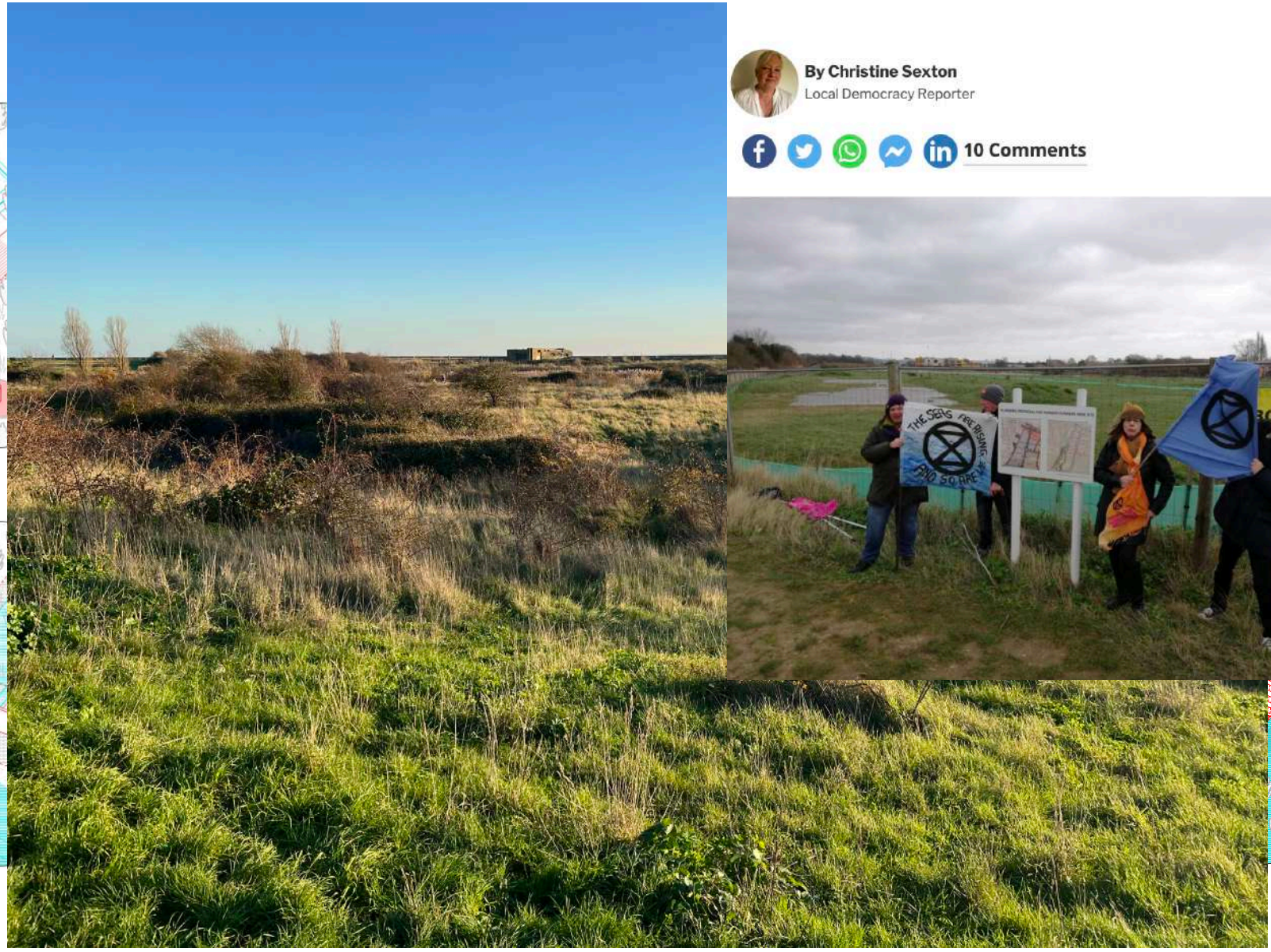
Protest over new homes on Gunners Park, Shoebury at risk of flooding

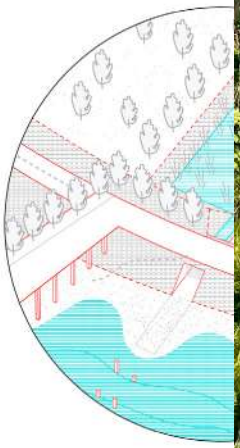
19th February 2020

By Christine Sexton
Local Democracy Reporter

10 Comments







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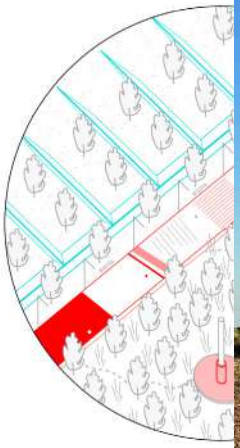
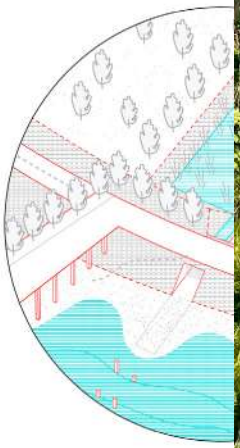
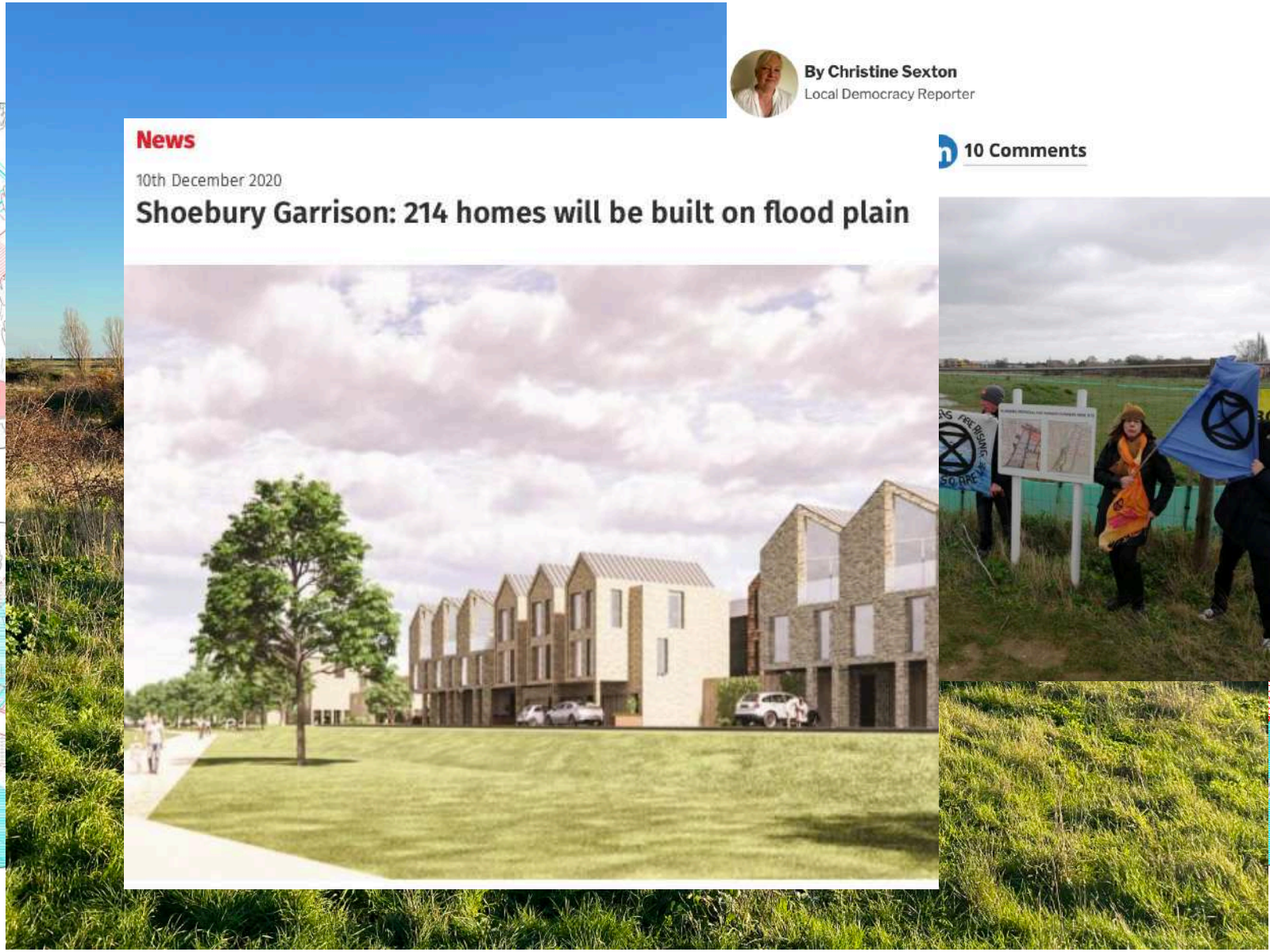
Local Democracy Reporter





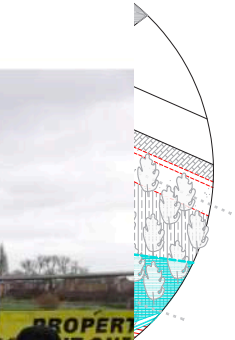


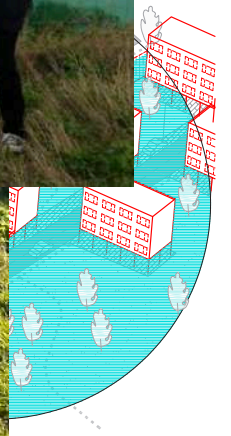
News

10th December 2020

Shoebury Garrison: 214 homes will be built on flood plain

10 Comments





Thank You!

l.iuorio@tudelft.nl

Firs aid proceudre on a dike, Delfzijl, Groningen. Archaeological site of Oterdum Groningen. [August 2021, Luca Iuorio].