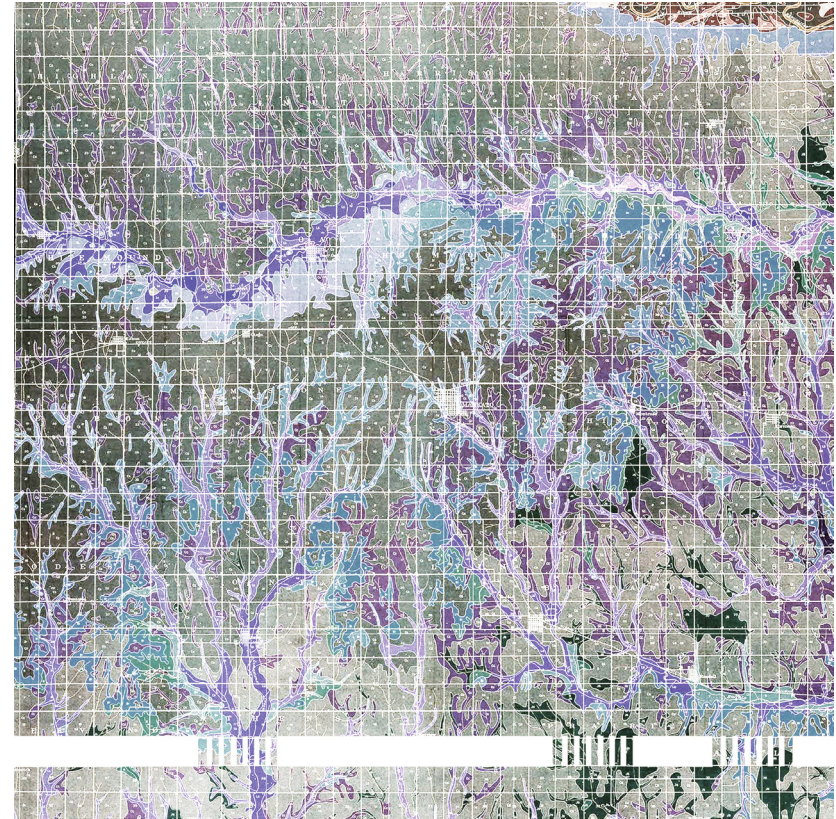


Zeeland Earthworks

P5 Presentation 09/07/2019
Zoe Panayi 4747062

Mentors: Stefano Milani, Sjaap Holst, Taneha Bacchin
Board of Examiners Delegate: Dan Vitner

Transitional Territories Studio
Department of Architecture
Faculty of Architecture and Building Sciences
TU Delft



[Materialism]:

the theory or belief that nothing exists except matter and its movements and modifications.

[New materialism]:

a theoretical turn away from the persistent dualisms in modern and humanist traditions whose influences are present in much of cultural theory. It seeks a repositioning of the human among non-human actants, questions the stability of an individuated, liberal subject, and advocates a critical materialist attention to the global, distributed influences of late capitalism and climate change.



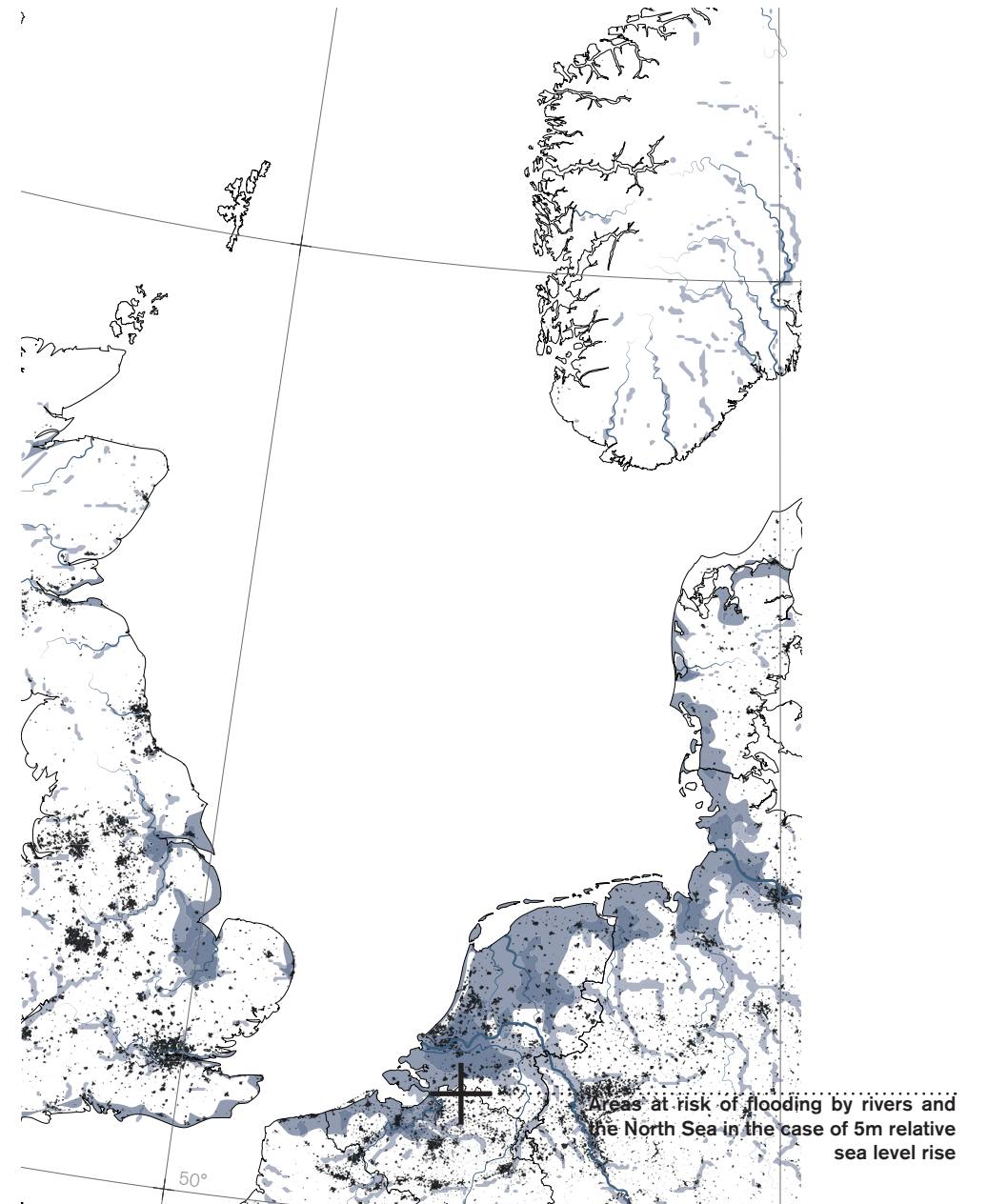


The North Sea Perspective

Flood Risk



Oosterscheldekering



North Sea Perspective

Industrial Coastlines, Ecological Exclusion



Port of Rotterdam



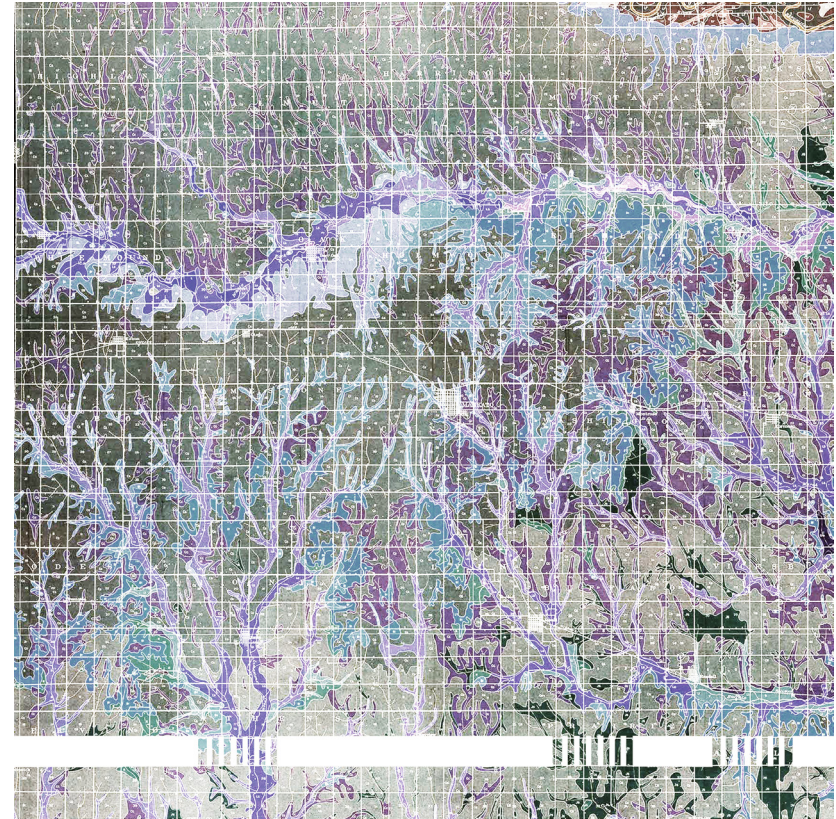
Ecological Analysis of the Schelde

Material as a Strategy

Earthworks: A Performative Landscape

Earthworks: A Performative Facade

Ripple Effects in a Wider System



Ecological analysis
Schelde Estuary, Zeeland, NL



Ecological Analysis

Flood Protection

"Every Euro can only be spent once, so investments are the most effective if they are targeted at the weakest flood defence structures that protect large population centres."

Rijkswaterstaat, *Dutch Safety Map* (2014)

Fewer assets are at risk but an increasingly **fortified** and **inflexible** infrastructure is required to protect them. Being the only tidal inlet in the Southwest Delta the **Western Scheldt is the most exposed** to storm surges and sea level rise. If the primary dikes and dunes do not withstand a storm surge 90% of the land would flood.

Given these circumstances the coastline should be designed to provide **storm water retention areas** which allow for **adaptation to changing physical and economic pressures**.



Risk map showing annual individual loss-of-life risk in Zeeland
Source: VNK, National Flood Risk Analysis for the Netherlands (2014)

Ecological Analysis

Industrial Coastlines, Ecological Exclusion

We ought to consider **returning some land to the sea**. This could be done by increasing the area of foreshore flooded by the tide.

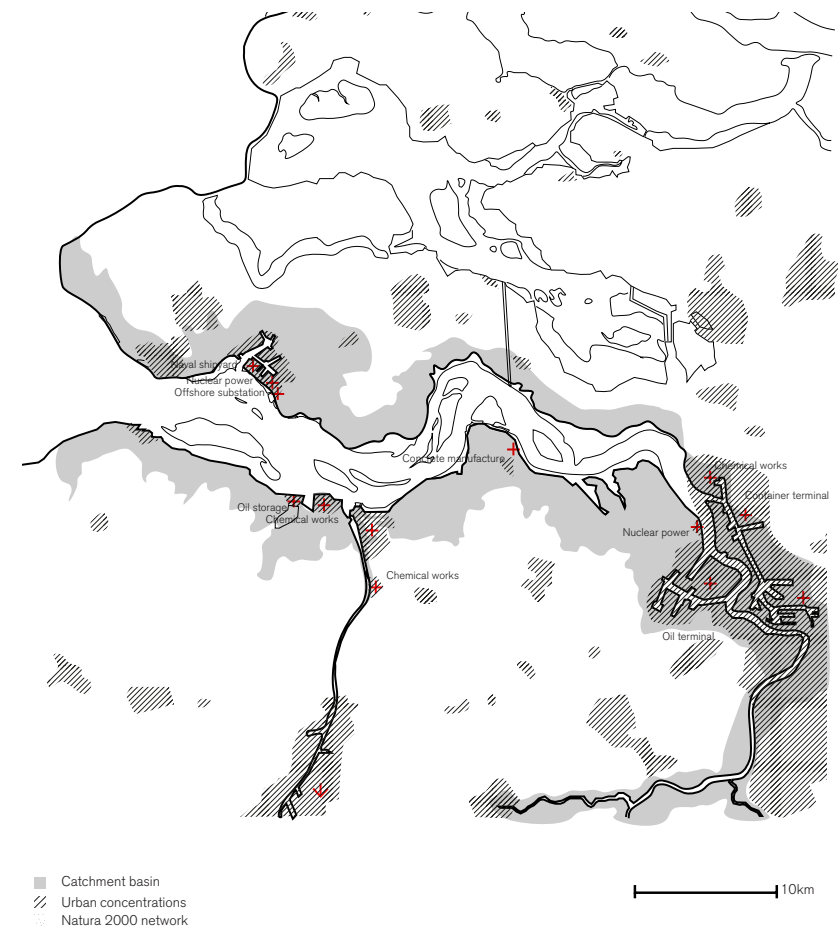
This would have several **major advantages**:

With an enlarged estuary, more water would enter on each tide, therefore ebb and flow velocities would be high enough to maintain channel depth partly by natural scour and **less dredging** would be needed.

The **risk of a flood** caused by the river overtopping its banks would be **reduced** because mean high water at Antwerp would be lower.

Sites of great ecological value would be created. In the lower Scheldt particularly, the **existing tidal freshwater habitats** - unique in western Europe - **could be expanded significantly**.

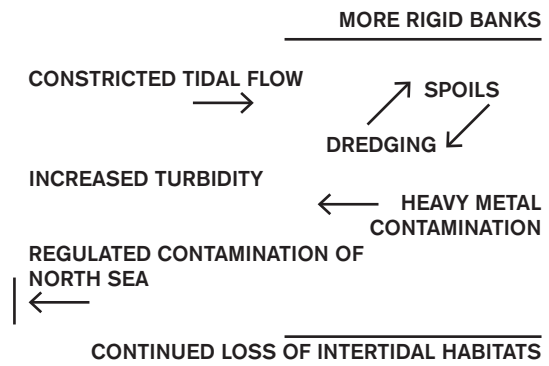
Prospects for the Scheldt Estuary, Rijkswaterstaat
Tidal Waters Division



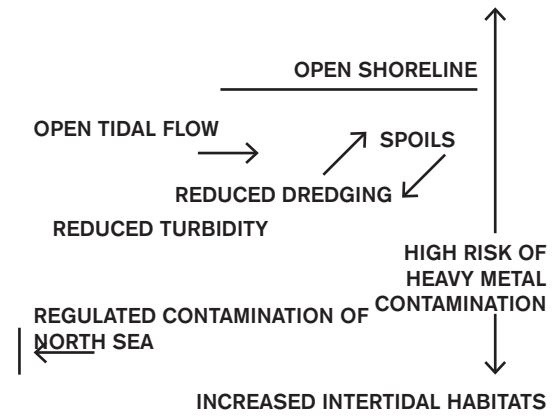
Source: <https://overstroomik.nl/>

Location of Industry in the Catchment Basin of the Schelde

Ecological Analysis
Scenario-based Response



Scenario 1:
Raise the Dikes



Scenario 2:
Inundate the Land

Ecological Analysis

Scenario-based Response

Scenario:

The dominant actor in the Schelde Estuary, the **Port of Antwerp continues to expand**. According to the Statute of the Western Scheldt dating from 1839, the Netherlands guarantees the necessary works to maintain access to the port, including continued dredging to give access to ever-larger ships.

The port continues to compensate for ecological damage by pushing for the depolderisation of land bordering the Western Scheldt, often in Dutch territory, arguing along three lines; **flood defence** (through a decrease in tidal height variation at Antwerp); increased **intertidal habitats** and the **reduction in dredging** as a result of increased tidal velocities.

However, in a departure from the current model, this compensation fund is imagined to be **locally managed** by individual communities where they sustain some loss of farmland for their own **protection and benefit** through a **site specific adaptation of the existing dike and polder system**.



Scenario 3:
Controlled Inflow of Elements

Strategy
Material Analysis



Jos de Putter, *Zeeland Klei* (2013)

Material as a Strategy

The Performative Landscape

[Dutch landscape painting] serves and energises a system of **values** in which **meaning** is not 'read' but 'seen,' in which new knowledge is **visually recorded**.

Svetlana Alpers, *The Art of Describing* (1983)



Jos de Putter, *Het is een schone dag geweest!* (1995)

Material as a Strategy

The Performative Landscape



Acclimative systems, recomposed elements

Plants have developed complex defenses to resist salt stress that rely on a variety of **mechanisms**. Induction of these pathways through brief exposure to low levels of salt stress, a process called salt **acclimation**, can improve a plants resistance to salinity. Generally, halophytes follow three mechanisms of salt tolerance; **reduction** of the Na⁺ influx, **compartmentalization**, and **excretion** of sodium ions.

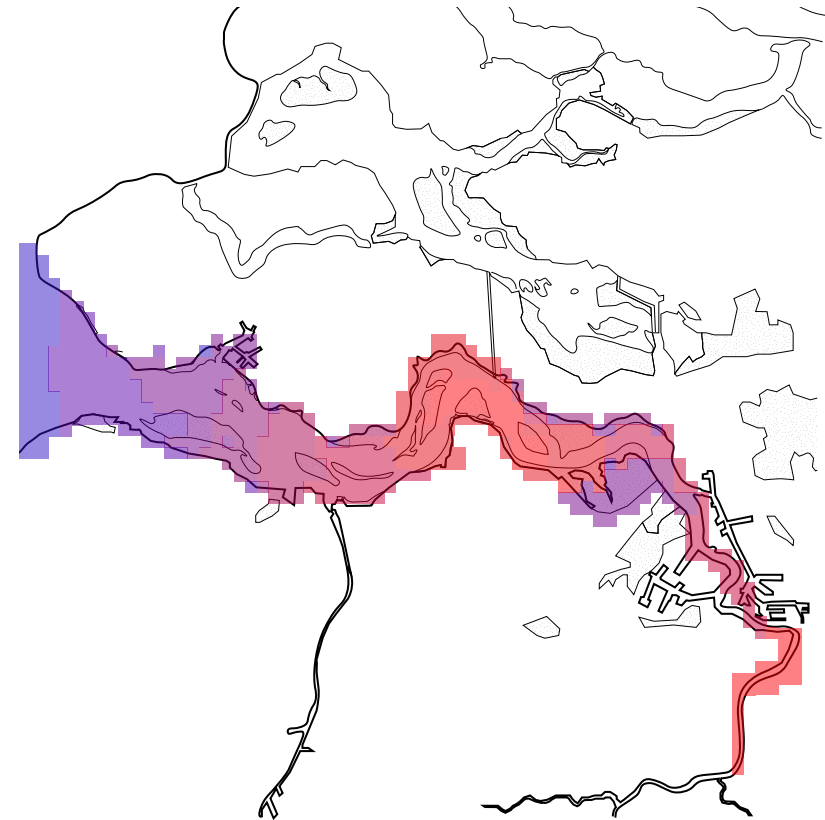
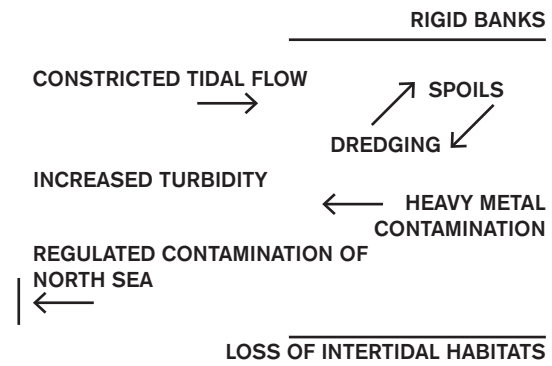
Mechanisms of Salt Tolerance in Halophytes: Current Understanding and Recent Advances
Xiaoqian Meng / Jun Zhou / Na Sui



Agne Kucerenskaite, *Ignorance is Bliss* (2016)

Material as a Strategy

Altered Flows



Copper contamination of the Schelde



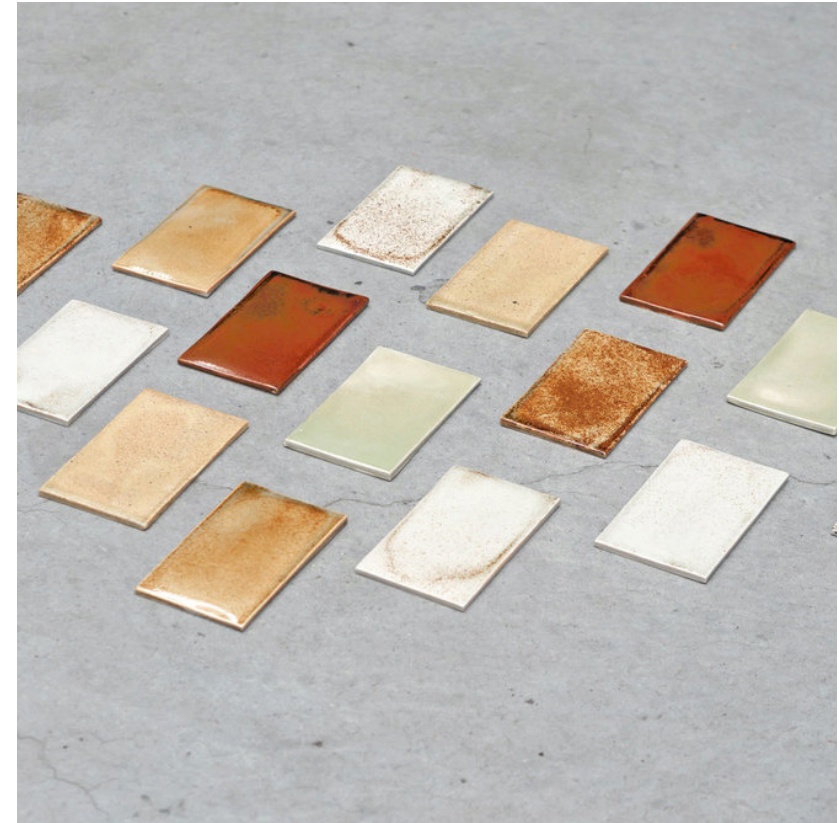
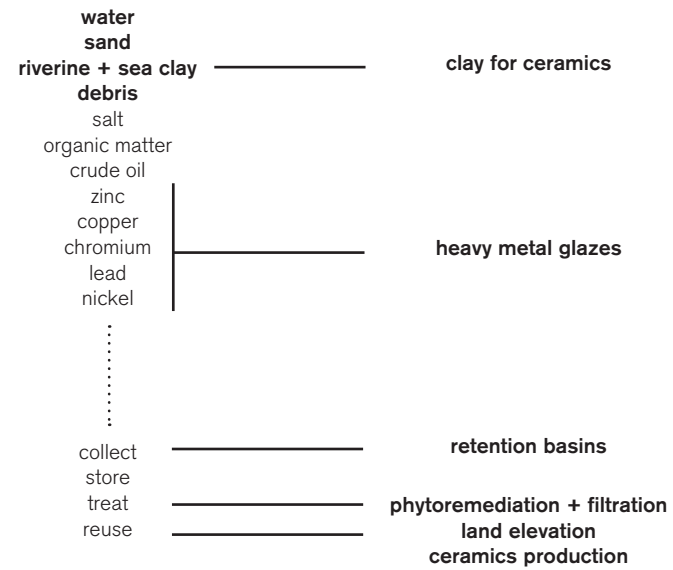
Material as a Strategy
Elements of the Schelde

water
sand
riverine + sea clay
debris
salt
organic matter
crude oil
zinc
copper
chromium
lead
nickel
:
:
:
:
:
:
collect
store
treat
reuse



Material as a Strategy

Re-composition

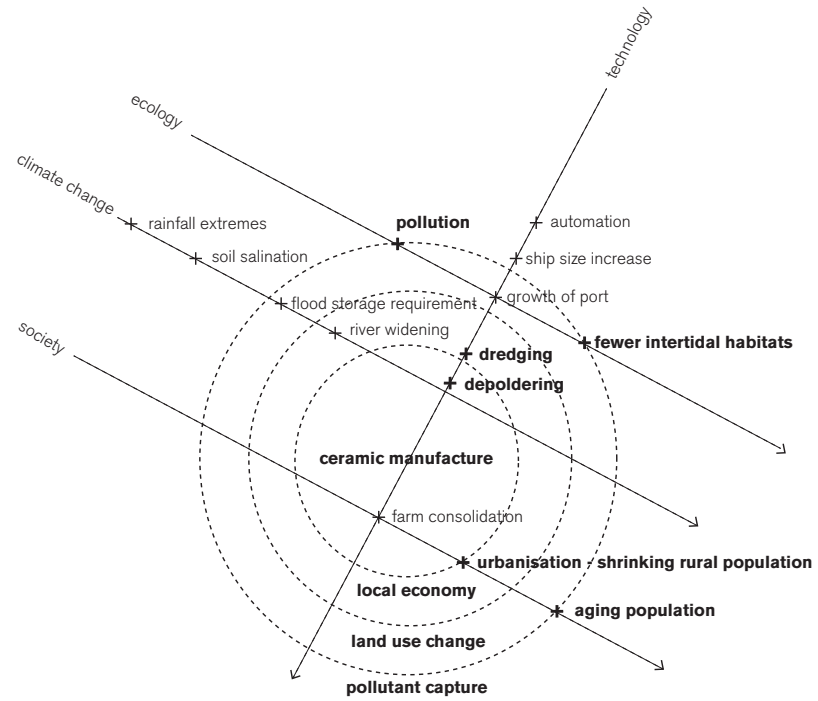


Agne Kucerenaite, *Ignorance is Bliss* (2016)

Ceramic material is proposed for incorporating toxic heavy metals into a solid form **resistant to chemical degradation and leaching**. In its inert form the pollutants of the Scheldt become both **visible and a part of a new local economy**, creating a functional landscape which accepts an altered condition.

Material as a Strategy

Re-composition

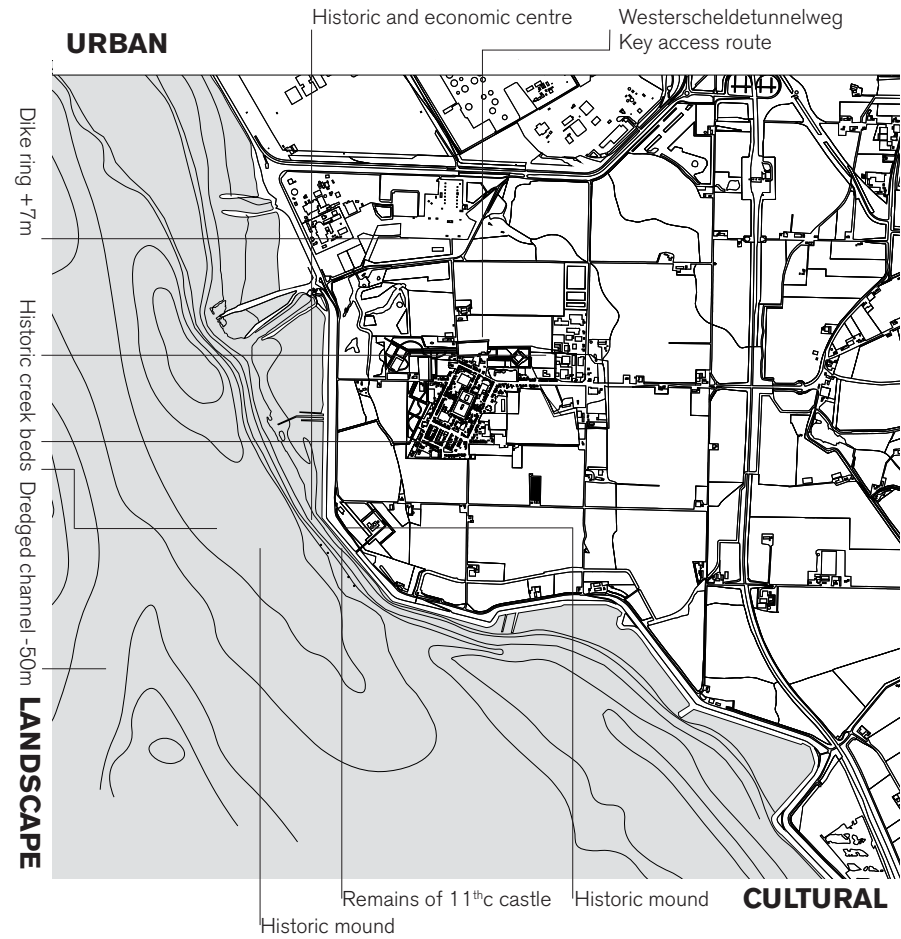
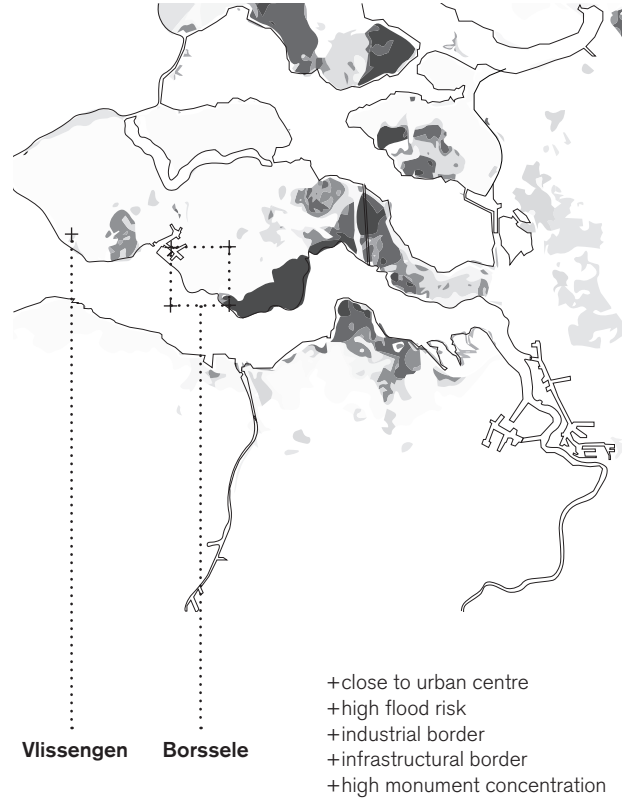


Scenario 3:
Controlled Inflow of Elements



Earthworks: A Performative Landscape

Test location: Borssele, Zeeland



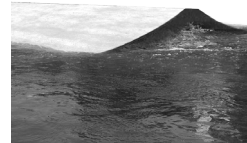
Earthworks: A Performative Landscape
Landscape Typologies Lexicon



FUNCTION
PERFORM



FUNCTION
PROTECT



FUNCTION
INHABITAT



LAND
FIELD



LAND
DIKE



LAND
MOUND



WATER
BASIN



WATER
CHANNEL, MOAT



WATER
ISLAND



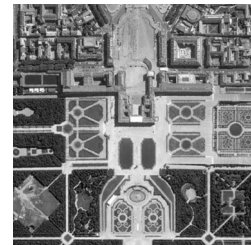
GARDEN
LAKE



GARDEN
WALL



GARDEN
HOUSE



Earthworks: A Performative Landscape
Landscape System

nature

water

sky

performance

protection

perspective

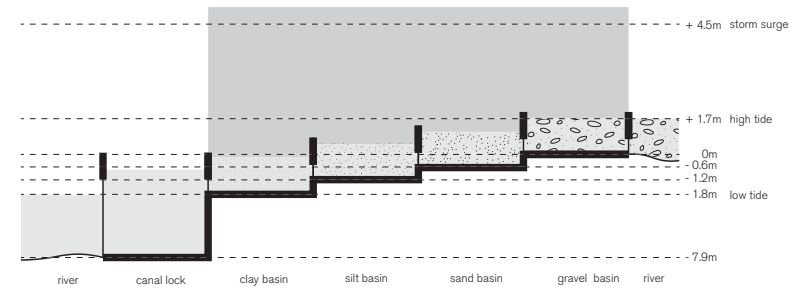
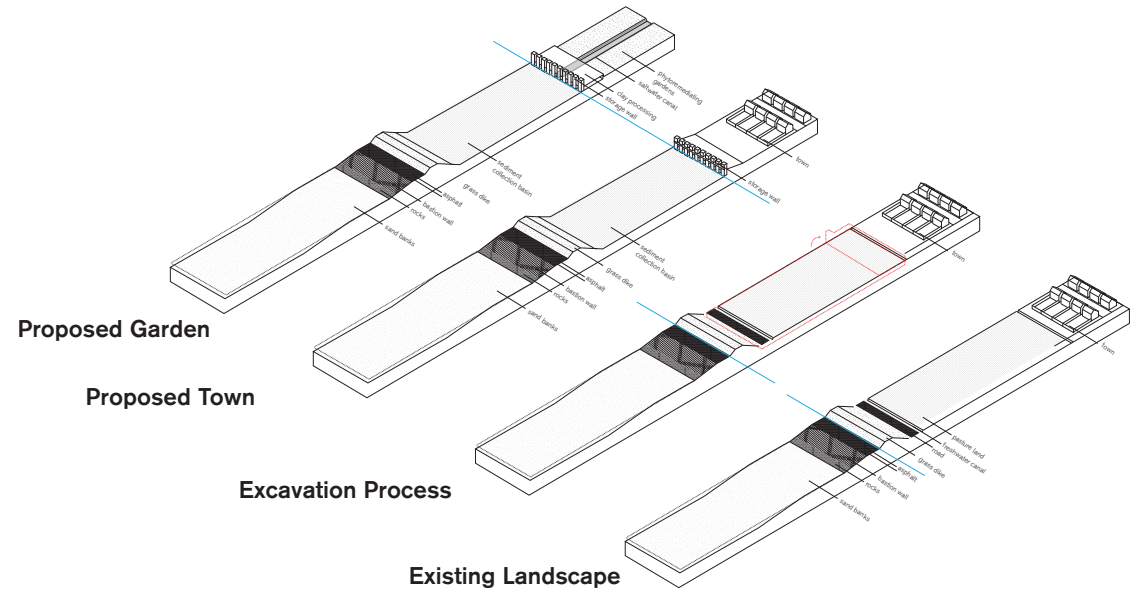
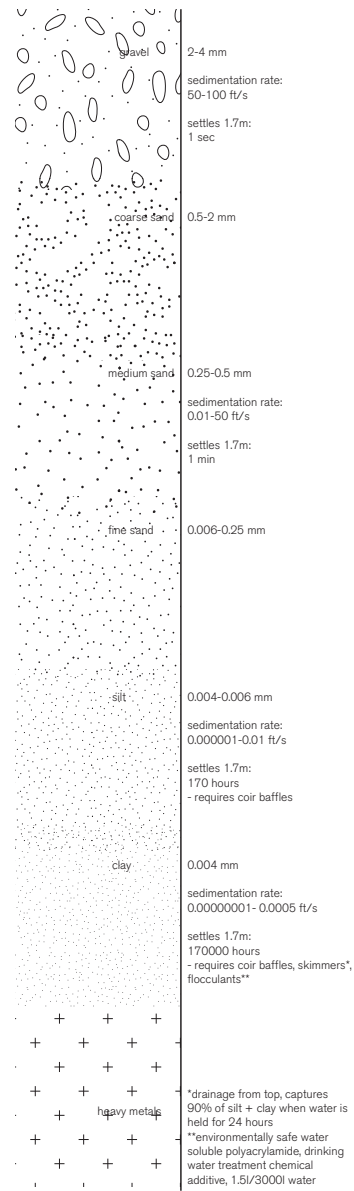
culture

land

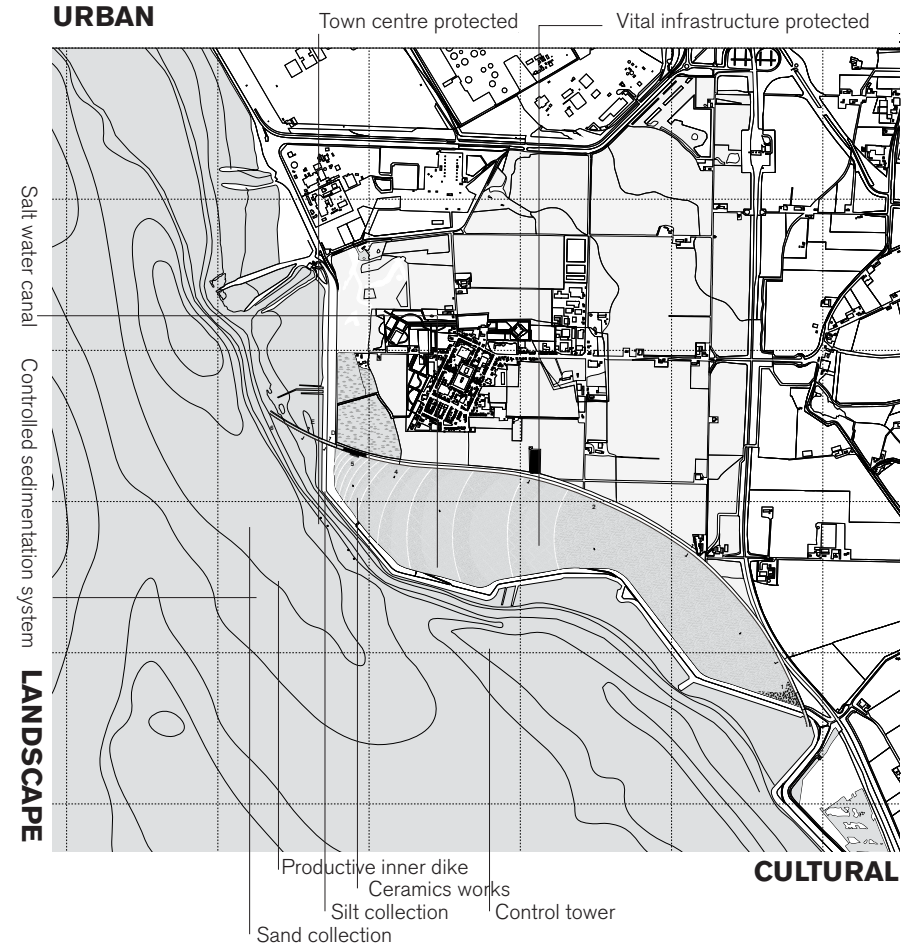
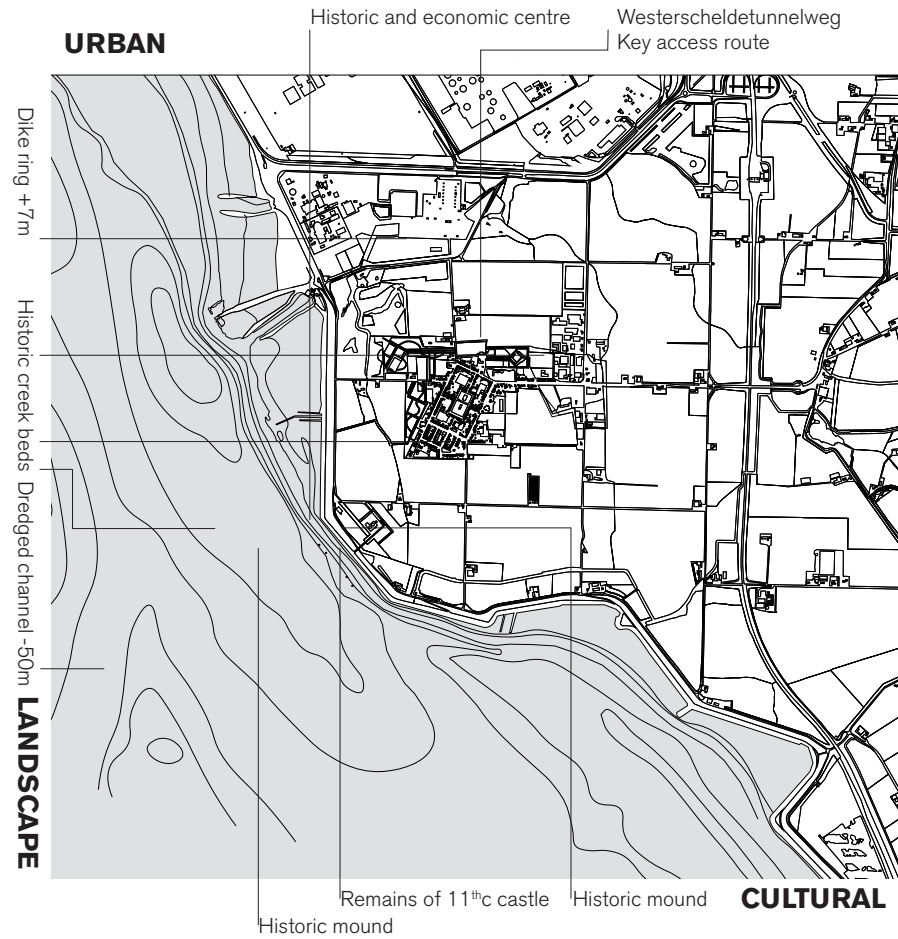
earth

Earthworks: A Performative Landscape

Landscape typologies lexicon



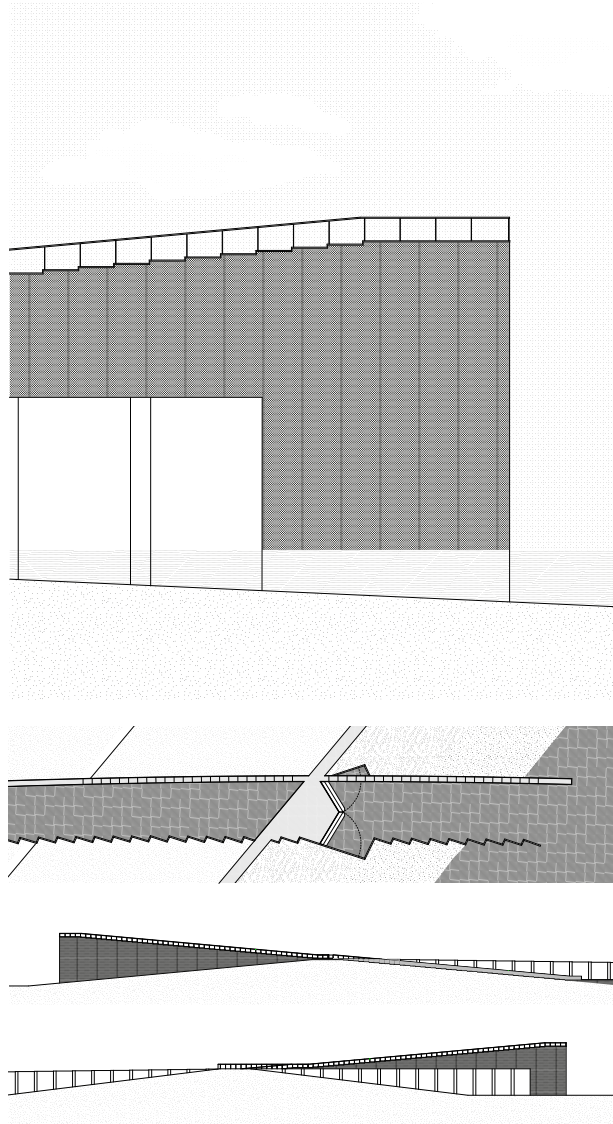
Earthworks: A Performative Landscape
Landscape System



wall as protective dike, inhabited mound, above performative basin

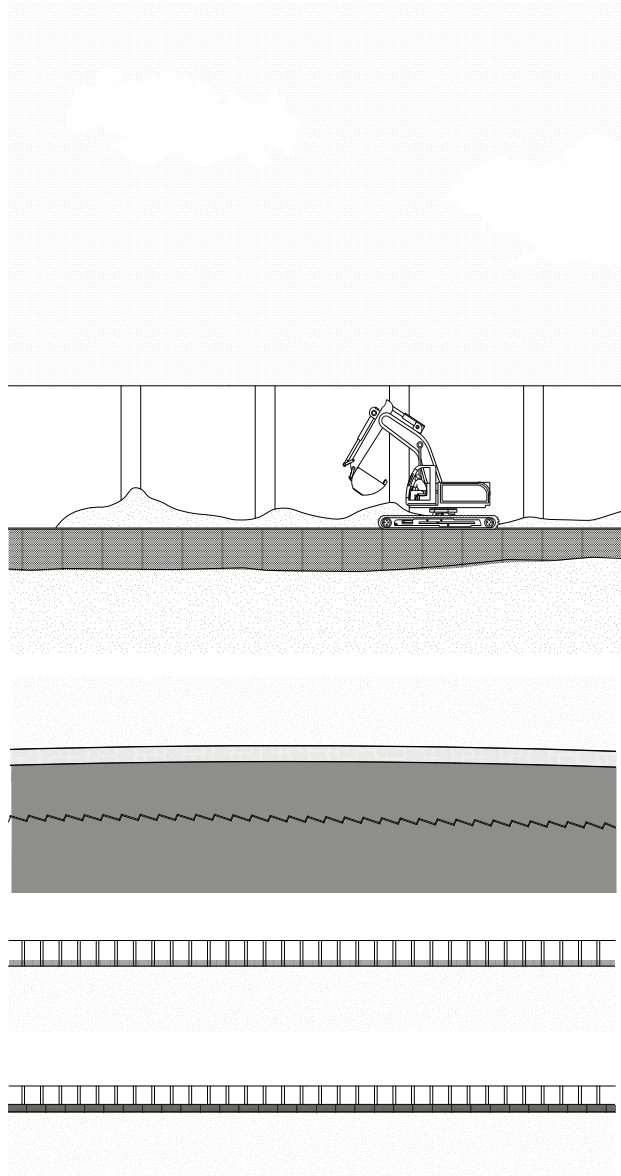
Earthworks: A Performative Landscape

Landscape System: Tidal Inlet



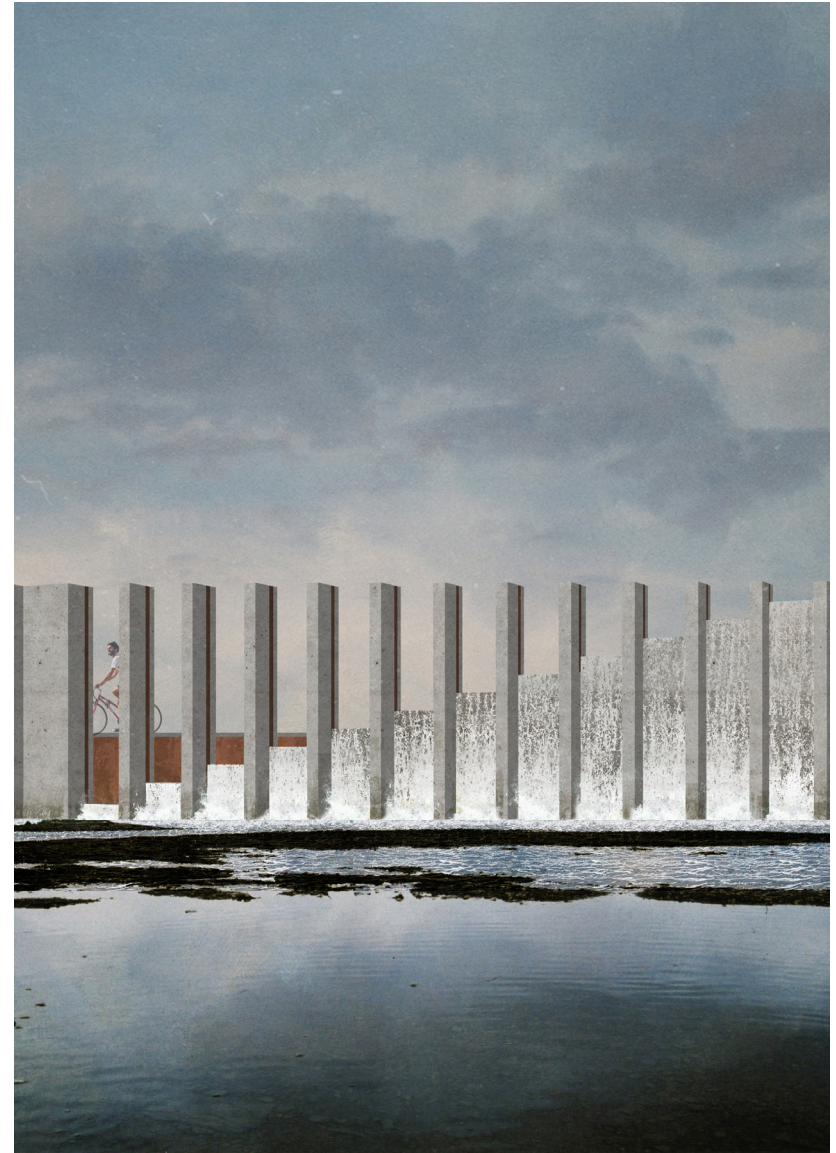
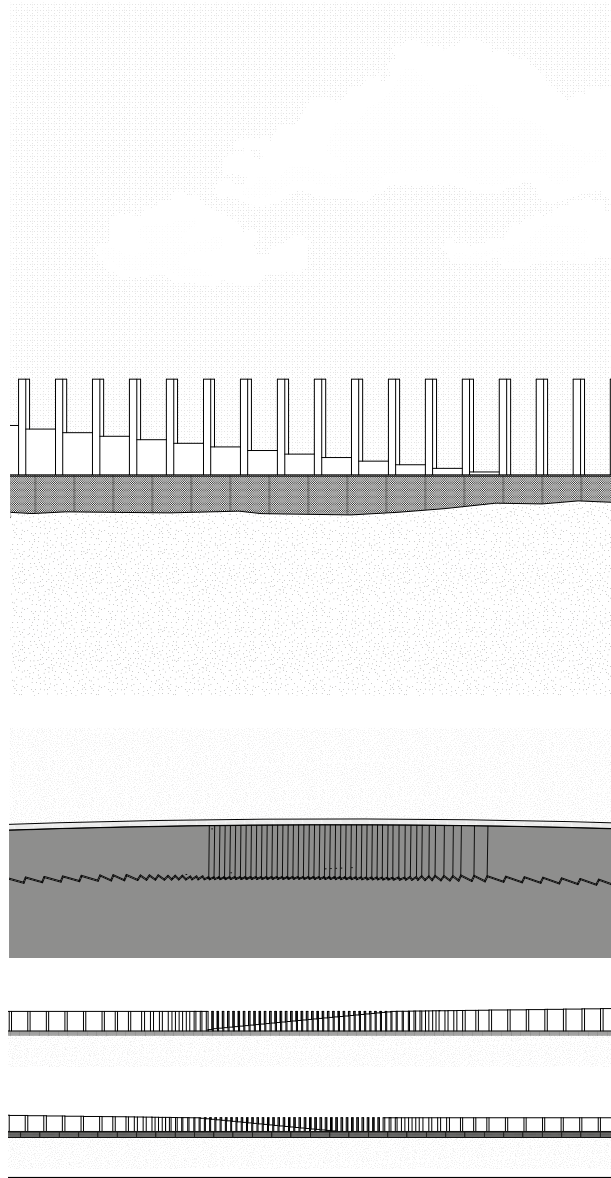
Earthworks: A Performative Landscape

Retaining Wall, Material Collection

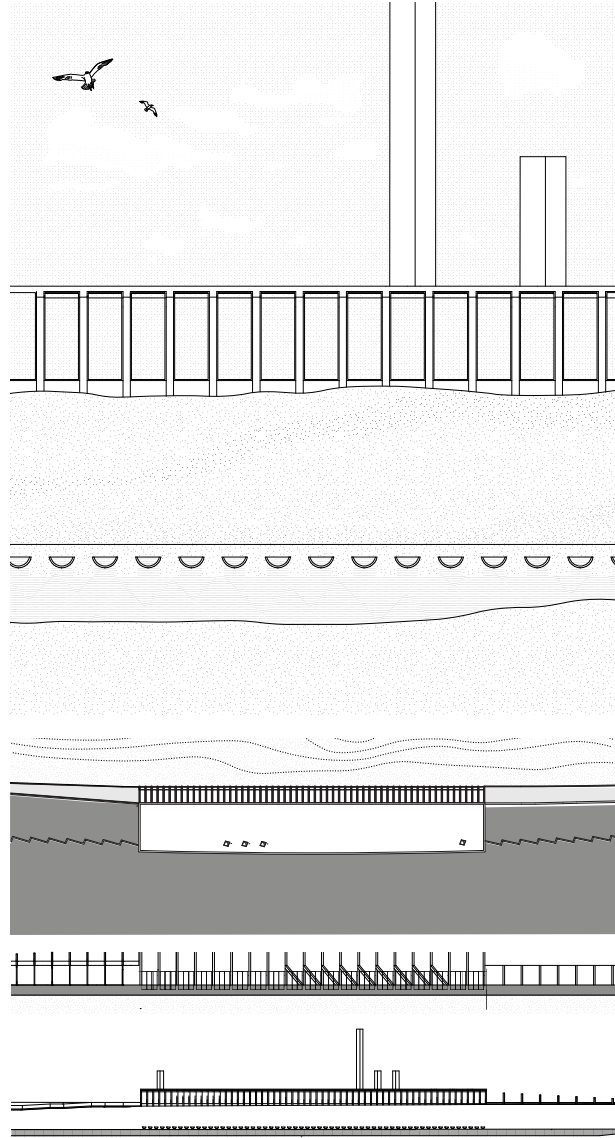


Earthworks: A Performative Landscape

Sluice Spillway

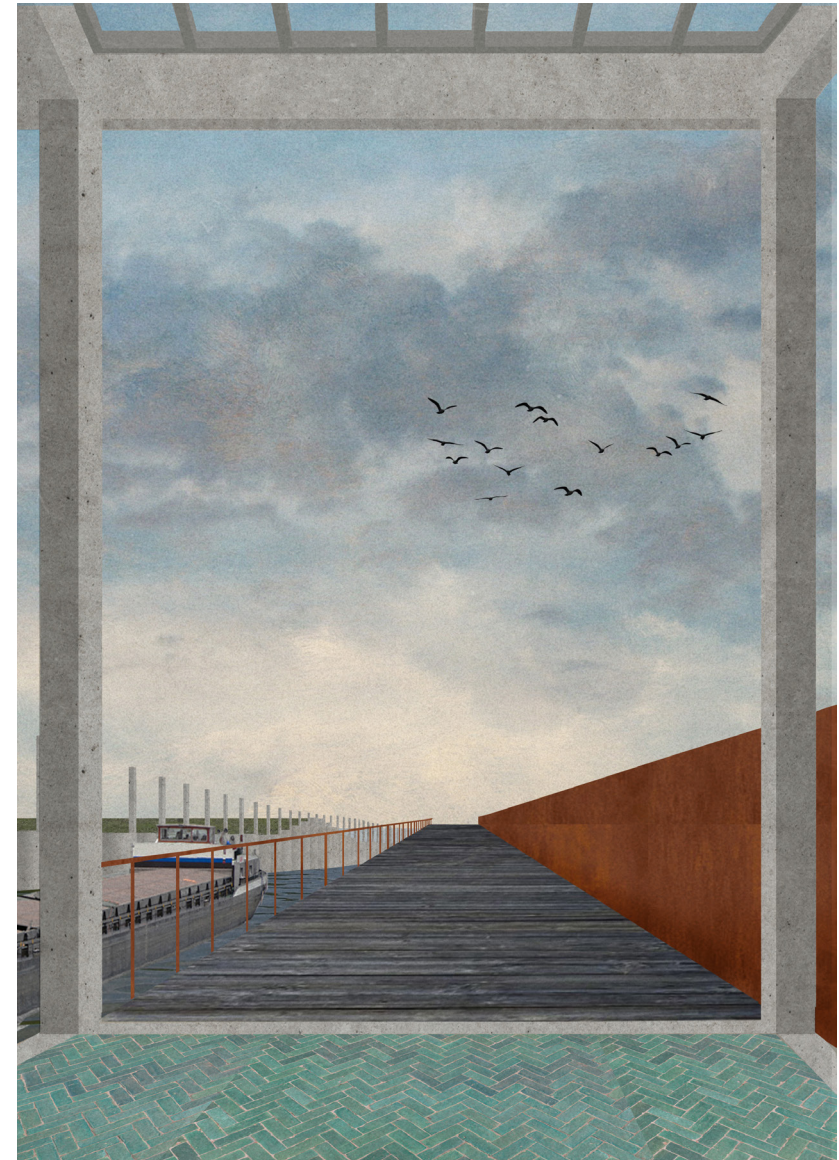
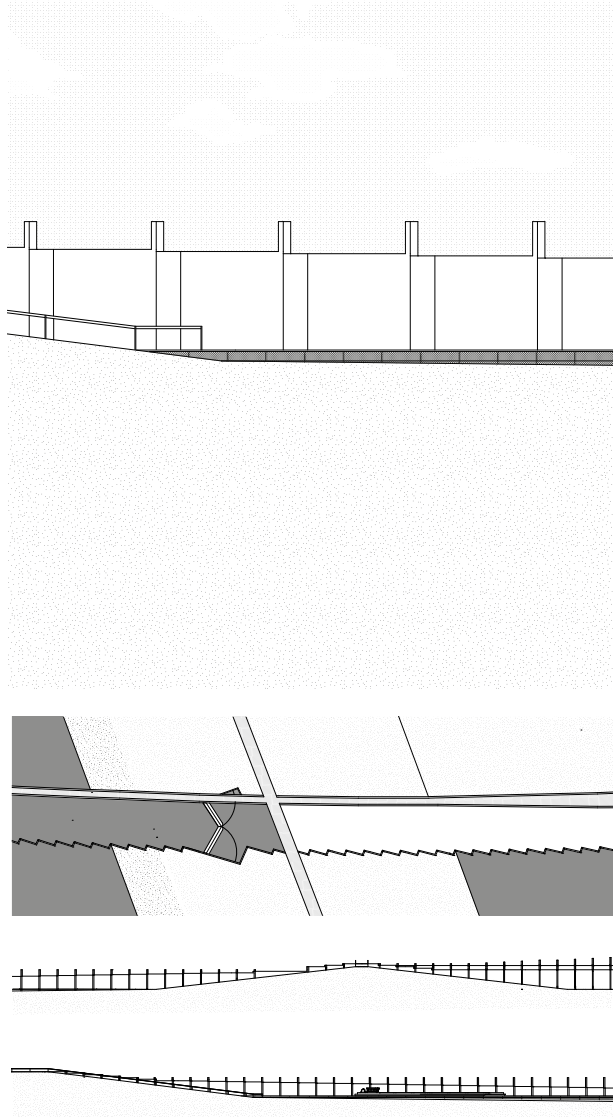


Earthworks: A Performative Landscape
Earthworks Factory Exhibition



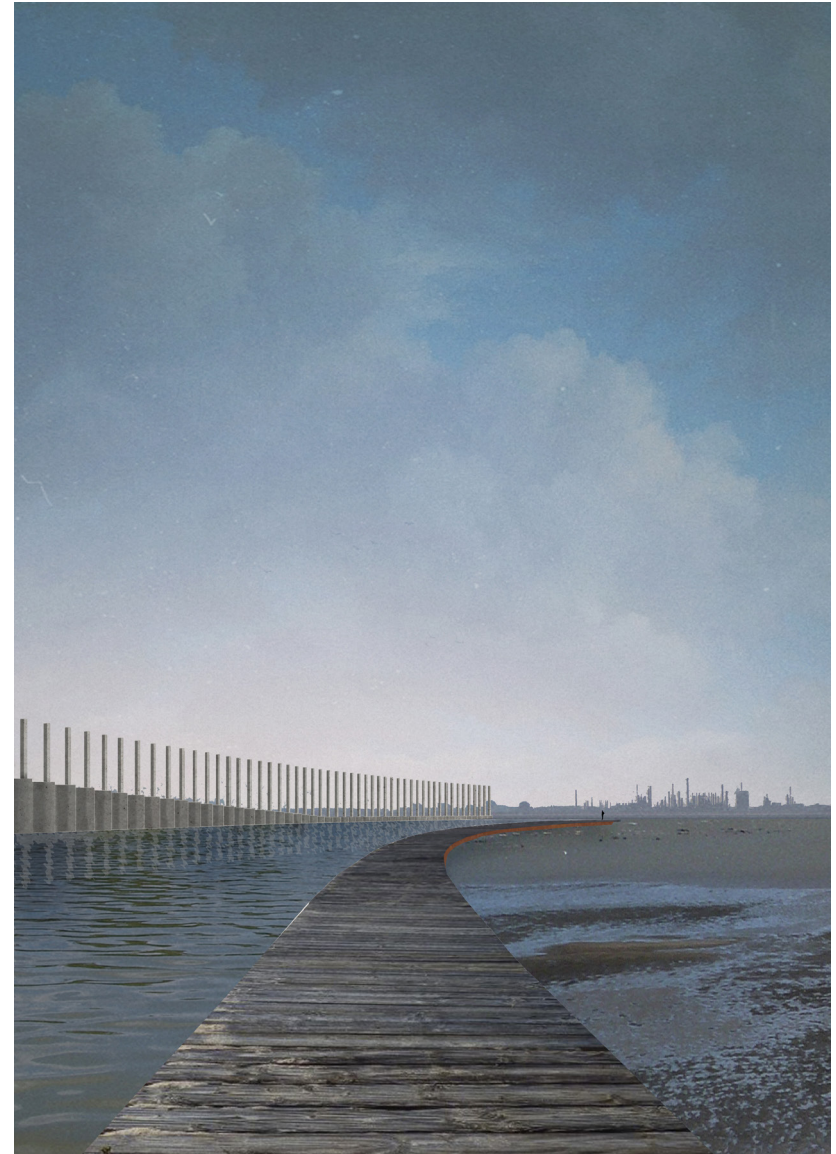
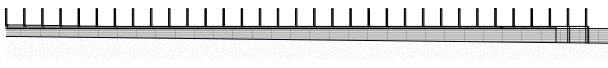
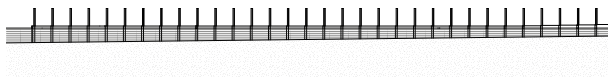
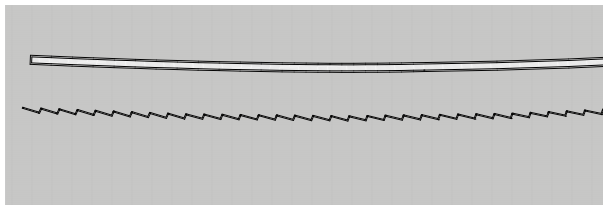
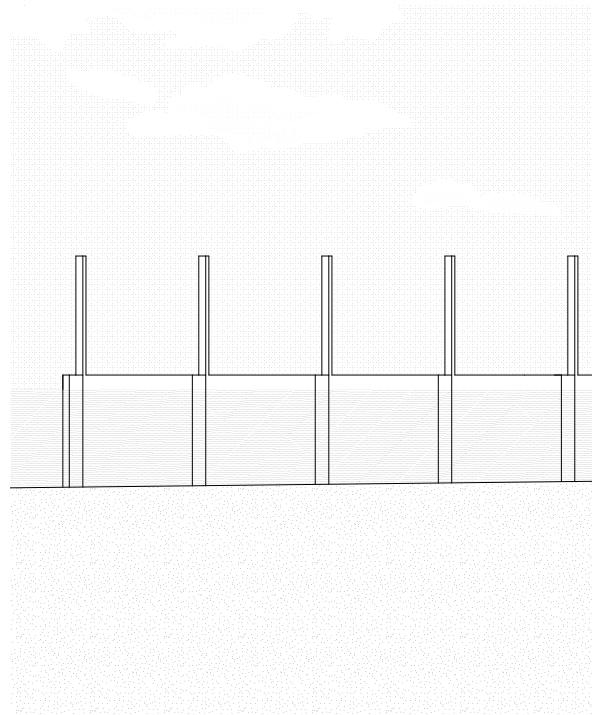
Earthworks: A Performative Landscape

Walkway Across the Dike



Earthworks: A Performative Landscape

Pier into the Estuary





Earthworks: A Performative Facade

Programme of requirements based on material elements of Schelde

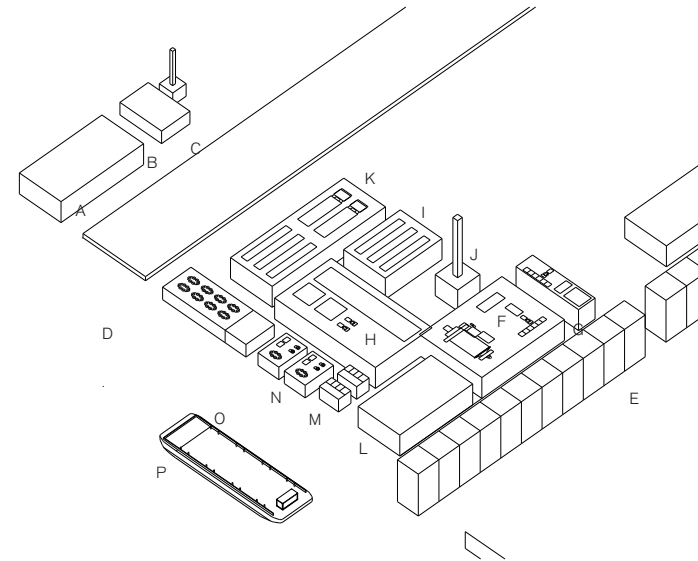
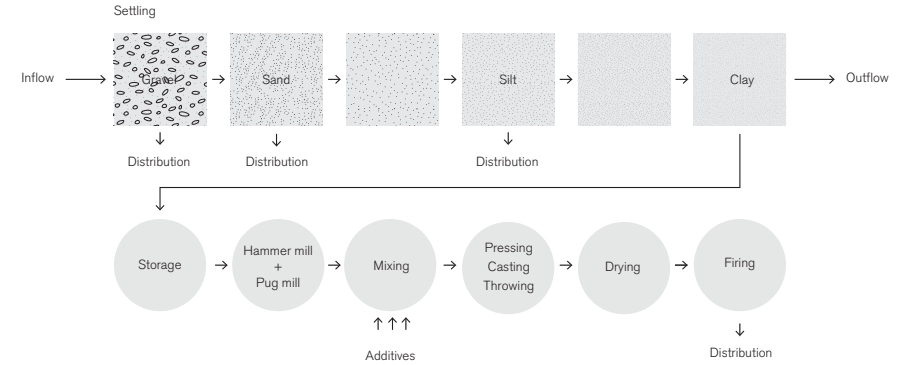
sediment volume inflow/tide

area of basins: 500,000m²
 water depth: 1.7m
 volume water inflow: 850,000,000l
 approx 350mg suspended sediment /l
 sediment volume: 300m³
 approx clay composition 10%
clay volume: 30m³
 clay weight: 30 tonnes

silos 5x6x6m volume:180m³
 clay curing 2 months

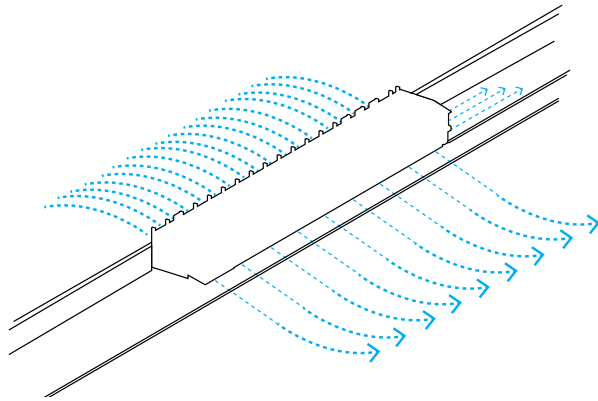
9 silos for storage of clay

- A Biomass storage
3 Gardeners
Tools, vehicle storage
 - B Glaze production lab
1 Soil researcher, artist
 - C Biomass burner
 - D Phytoremediation gardens
 - E Storage silos
125m³
 - F Clay milling
5 Controllers
 - G Clay mixing
3 Controllers
 - H Extrusion and printing
 - I Drying space
 - J Kiln
2 Controllers
 - K Storage and distribution
5 Drivers
 - L Exhibition
3 Artists in residence, 1 curator
 - M WCs
 - N Print design labs
2 Permanent technicians
 - O Kitchen + dining
5 Staff
 - P Distribution by barge
1 Hydrologist, 2 crew
- 28 Permanent staff

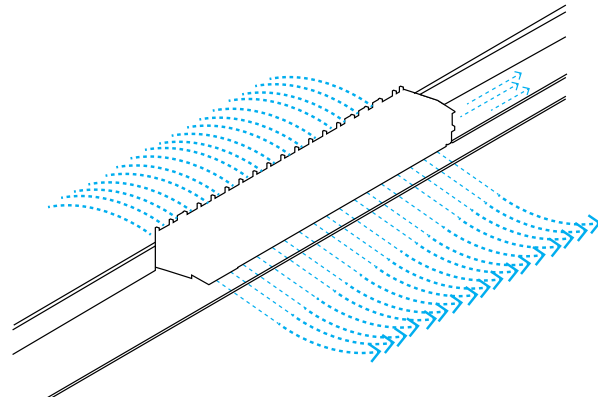


Earthworks: A Performative Facade

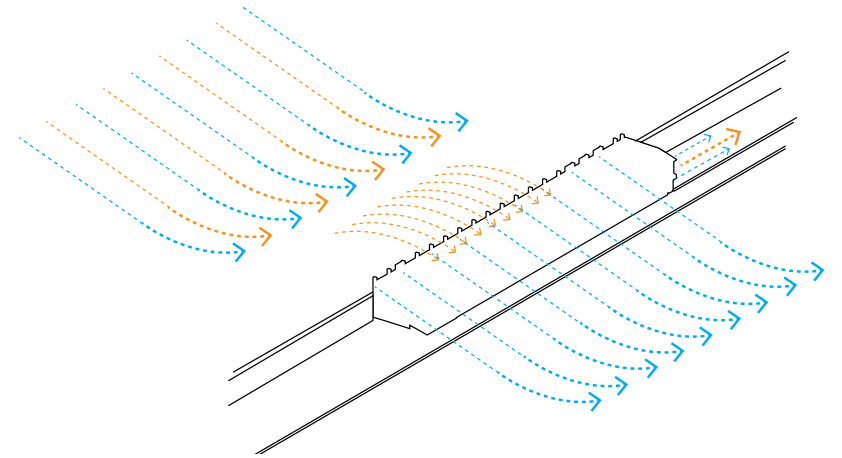
Building as a Membrane



protection - water flows
wetland creation



protection - water flows
storm surge storage



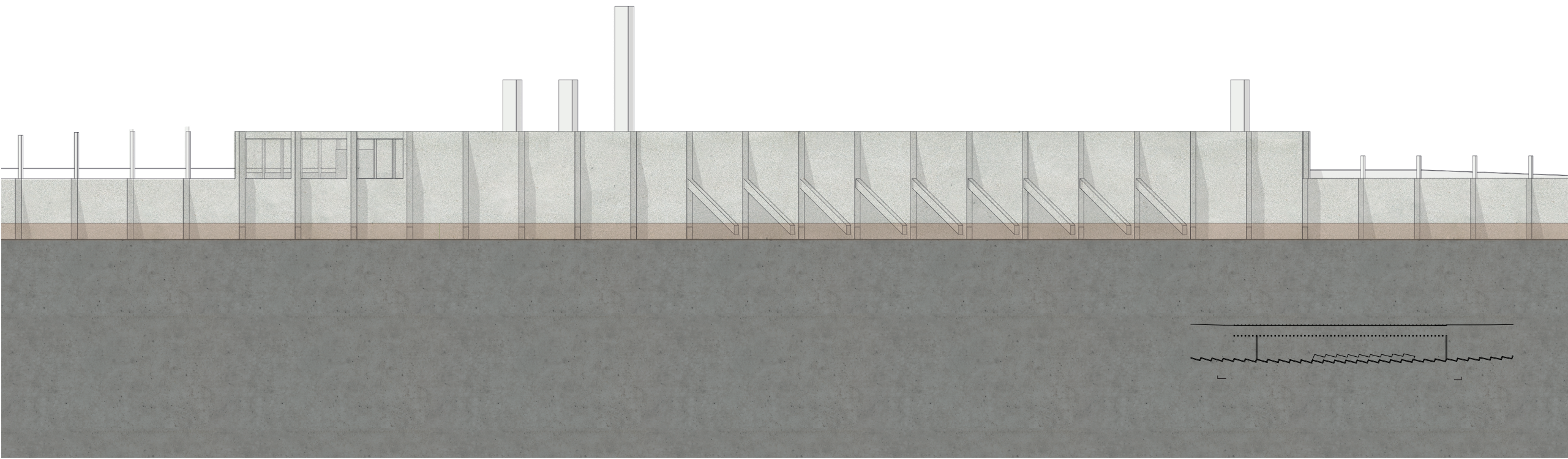
production - material flows
clay collection, transformation, distribution

Earthworks: A Performative Facade
Building as a Membrane



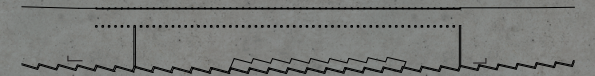
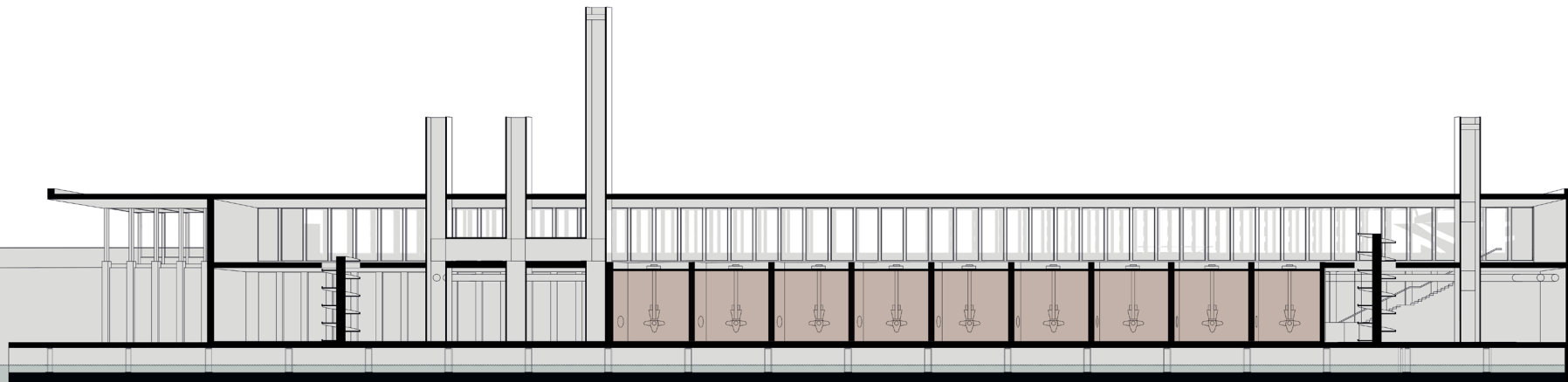
Earthworks: A Performative Facade

A Performative Wall: Protective and Productive Facade Seen from the Scheldt



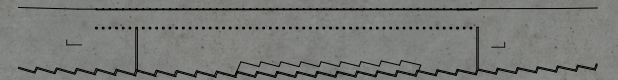
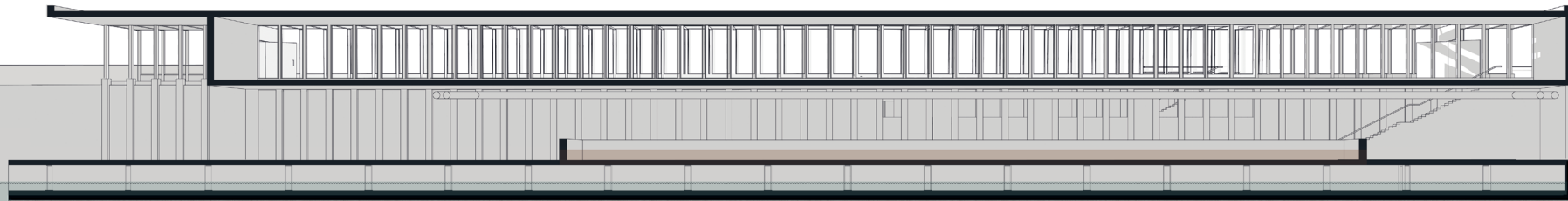
Earthworks: A Performative Facade

A Performative Wall: Deep Active Facade, Controlling the Flow of Water and Clay



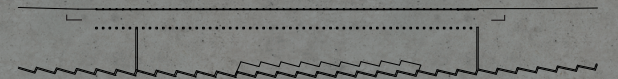
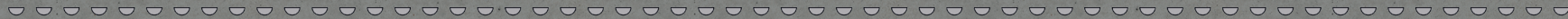
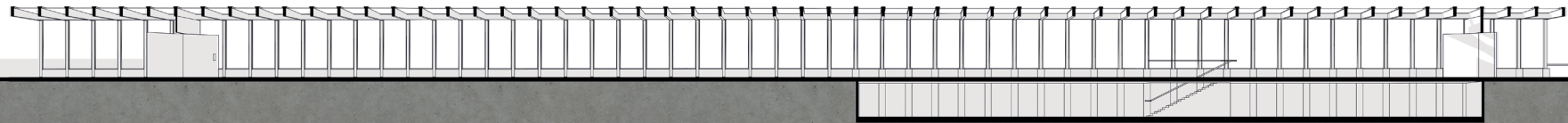
Earthworks: A Performative Facade

A Performative Wall: Machine Hall and Drying Basin, Oriented to the Flow of Air



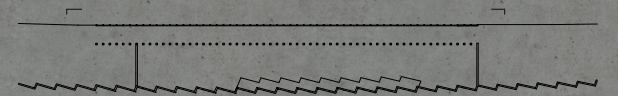
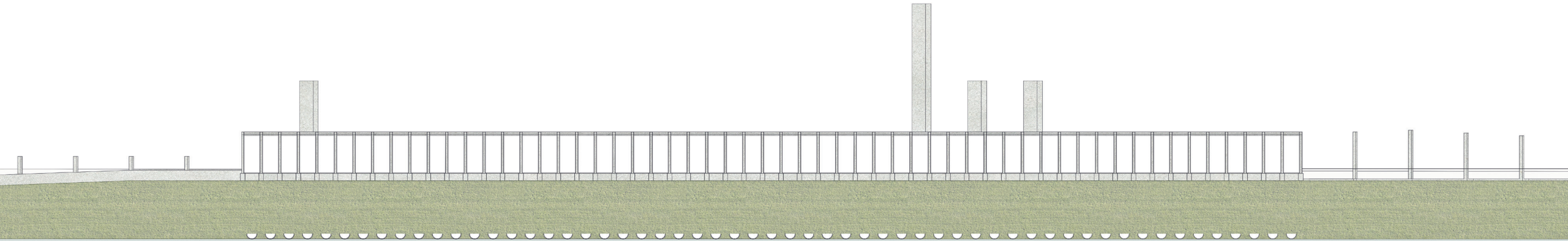
Earthworks: A Performative Facade

A Performative Wall: Landscape Length Facade , Open Towards the Transforming Polderscape



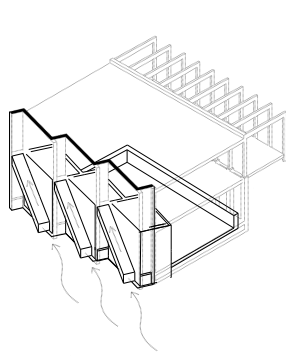
Earthworks: A Performative Facade

A Performative Wall: Landscape Length Facade , Open Towards the Transforming Polderscape

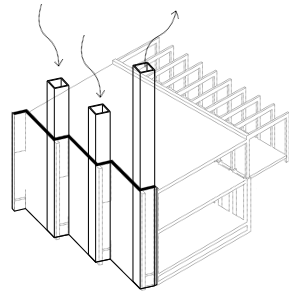


Earthworks: A Performative Facade

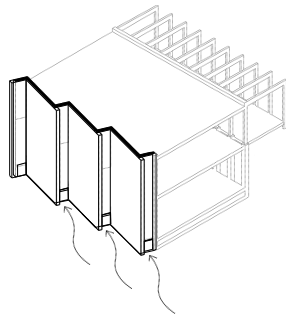
The Productive Ground: Negotiating the Heights Dictated by the Tides



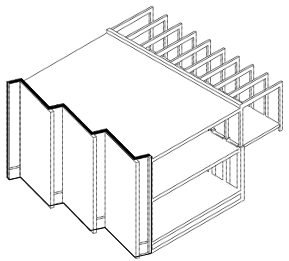
a) angled to orientated pumps to collect sediment from the incoming flow into the basin



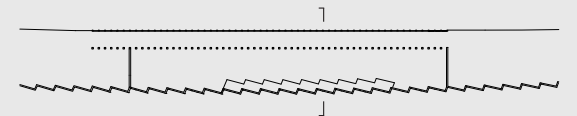
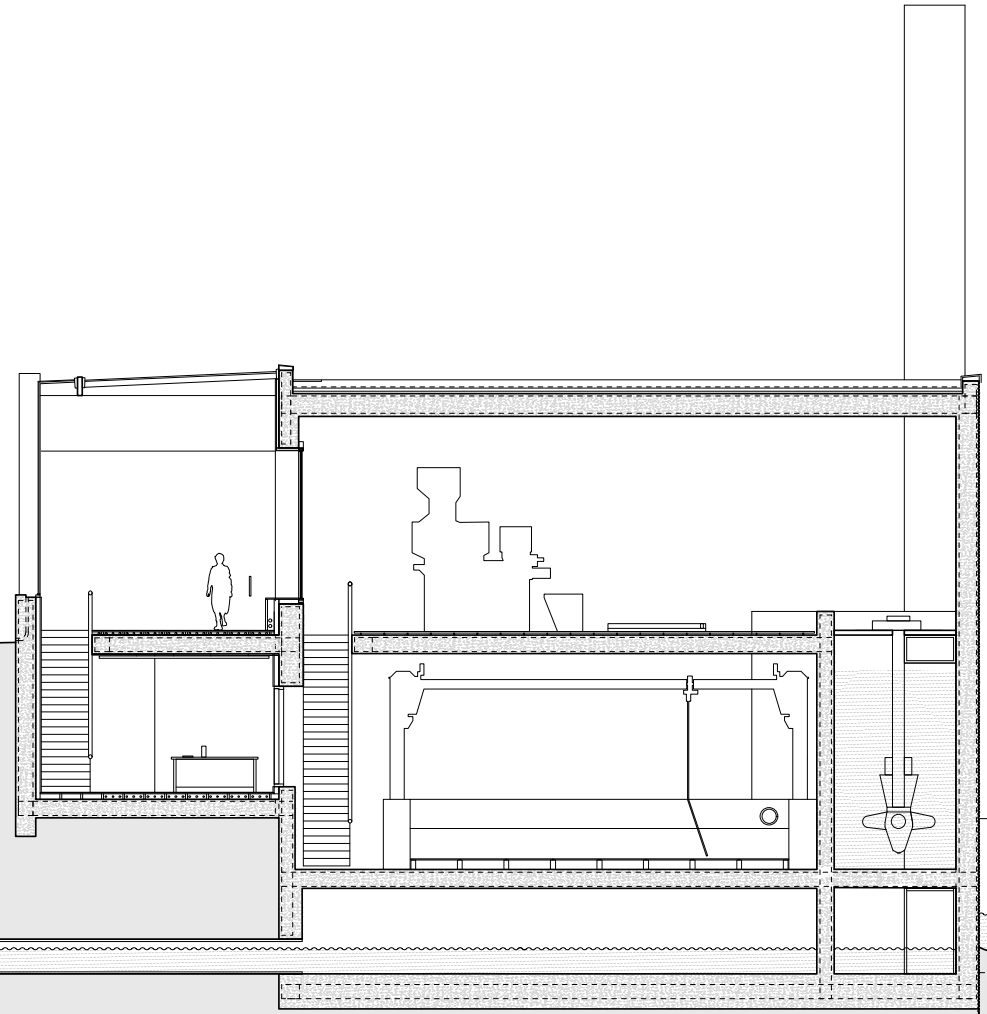
b) holds industrial chimneys to ventilate and cool machinery



c) holds sluice gates to drain basin



d) corrugated form creates stiffness to withstand hydrostatic force



Ripple Effects in a Wider System
A New Horizon Line



Ripple Effects in a Wider System
New Landscape Conditions



Ripple Effects in a Wider System
New Landscape Conditions



Ripple Effects in a Wider System
New Landscape Conditions

