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Sediment Management in Port Areas, illusion or fact?

Realistic and sustainable sediment management in Belgian Seaports

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DEC NV (DEME Environmental Contractors), www.decnv.com

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DEME Structure

DREDGING

- Dredging International — Marine & Waterway Contractor
- Baggerwerken Decloedt & Zn — Baggerwerken & Waterbouw

HYDRAULIC ENGINEERING

- Tideway — Offshore Contractors
- GeoSea — Geotechnical Offshore Contractor
- SCALDIS — SALVAGE & MARINE CONTRACTORS N.V.

ENVIRONMENTAL TECHNIQUES

- DEC — Environmental Contractor
- Ecoterres — Travaux Environnementaux
- GRC — GROND RECYCLAGE CENTRUM
- de Vries & van de Wiel — Milieu, GWW- & baggerwerken

BUILDING MATERIALS

- DBM — Building Materials

PROJECT DEVELOPMENT & CONCESSIONS

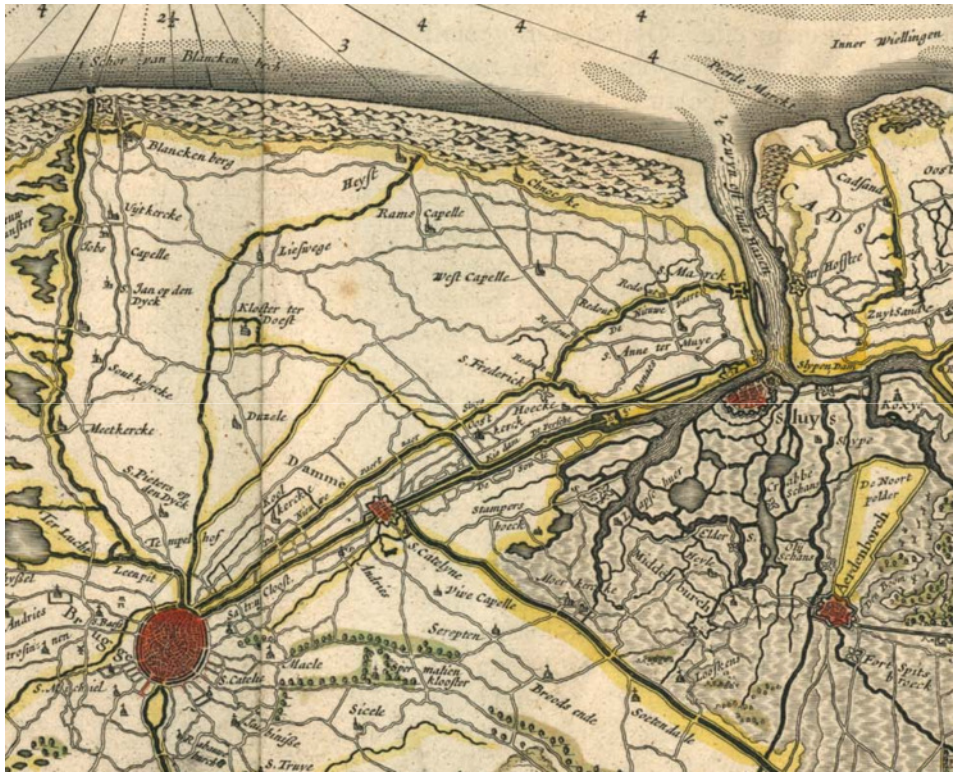
- Power@sea
- C-Power

Seaports: pillars of economic power since Middle Ages

Bruges: clothmaker's hall

Bruges: office of the Hanseatic League
Hanza Town

Seaports: pillars of economic power since Middle Ages



Zwin silted up: 1520 move office to Antwerp
Flourish and decline in trade determined by quality of waterway connection to North Sea

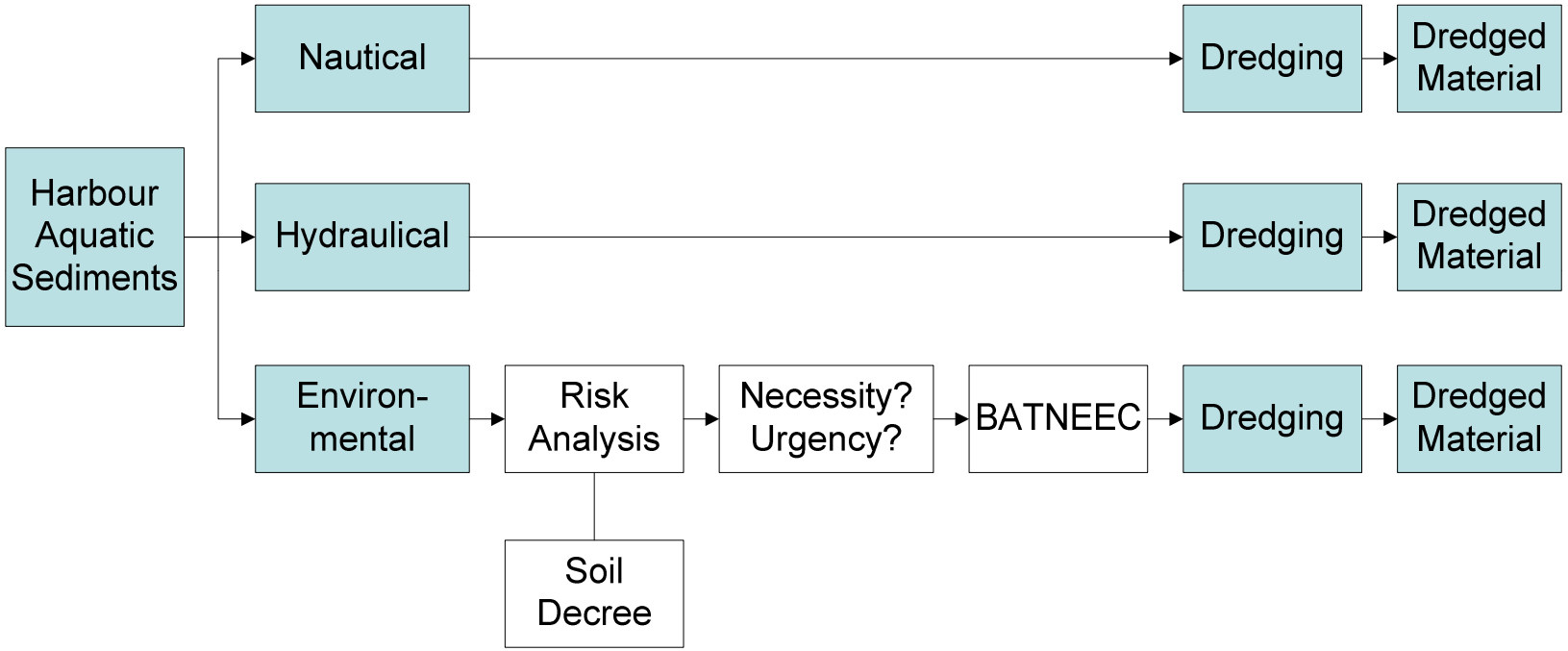
Seaports: pillars of economic power since Middle Ages

Seaports: pillars of economic power since Middle Ages

- Assurance of marine accessibility
  Concern of harbour policy
- Maintenance of the sea and waterway approach to the seaports and port areas requires major dredging works

• Zeebrugge + access channels North Sea	7,000,000 m^3/y
• River Scheldt	11,000,000 m^3/y
• Port of Antwerp	1,500,000 m^3/y
• Ghent	150,000 m^3/y

Reasons for dredging



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Environmental dredging

- Equipment meeting stringent needs
  - Turbidity
  - Accuracy
  - Spillage
  - Mixing
  - Dilution
  - safety

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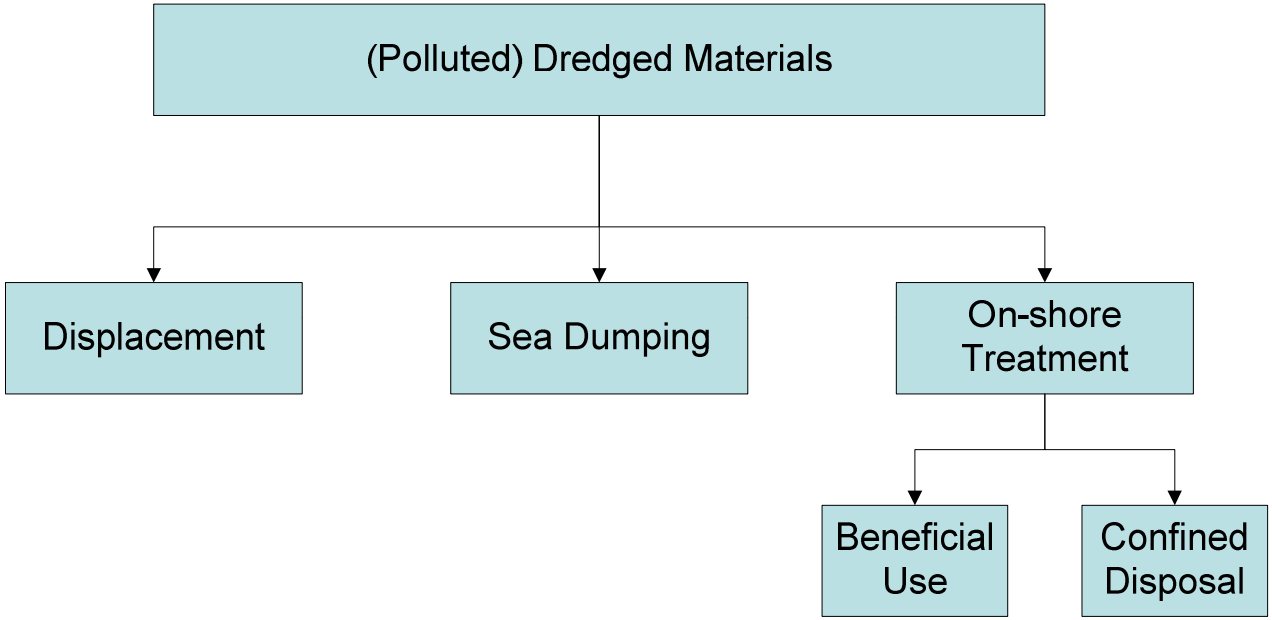
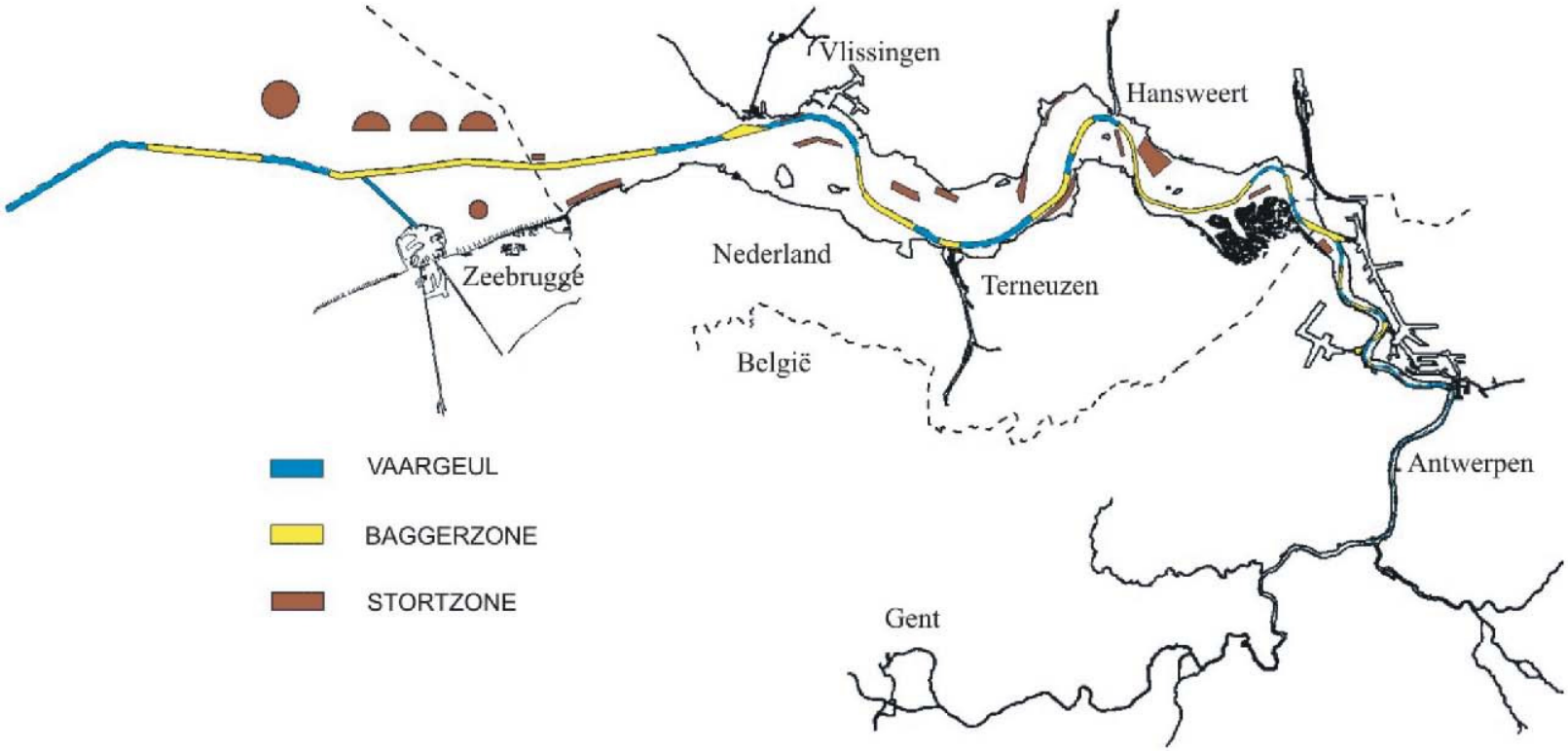
Environmental dredging

Management options dredged materials



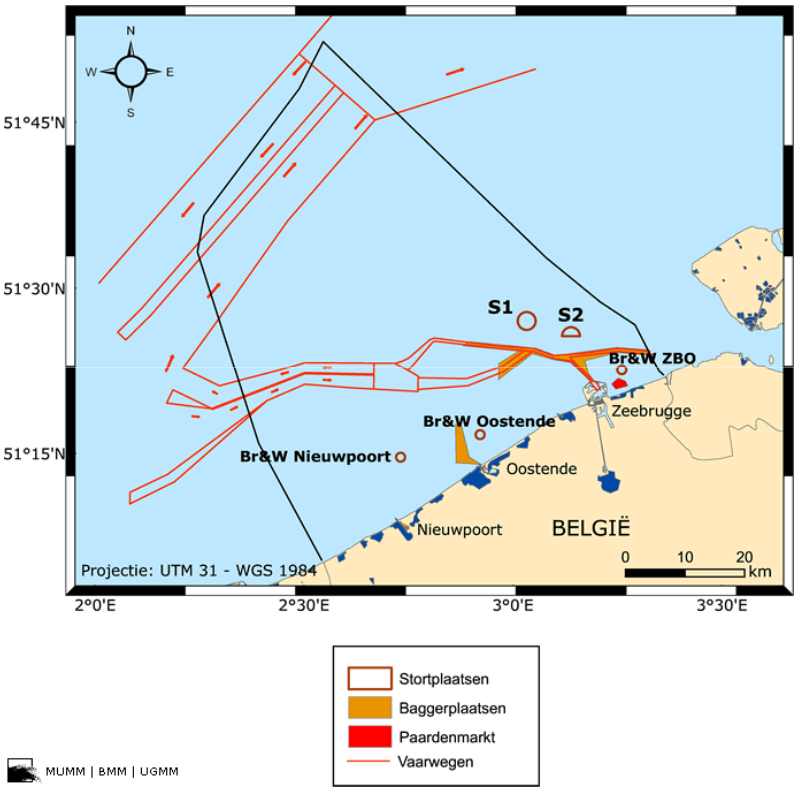
DM → Displacement



DM → Displacement

- Western Scheldt:
  - Permit delivered by Dutch Authorities
- Lower Sea Scheldt:
  - Permit delivered by Flemish Authorities
  - Target and limit values based on ecotoxicological data
  - Under water displacement
  - Under water cells

DM → Sea Dumping



- Access channels & Port of Zeebrugge
- Law on protection Marine Environment
- According to the OSPAR Convention “Guidelines for the Management of Dredged Material”
- Permit delivered by Federal Authority
- Dredged Material should meet SQC

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DM → Sea Dumping

Sediment quality criteria (SQC)		
	Target value	Limit value
Hg	0.3 ppm	1.5 ppm
Cd	2.5 ppm	7 ppm
Pb	70 ppm	350 ppm
Zn	160 ppm	500 ppm
Ni	70 ppm	280 ppm
As	20 ppm	100 ppm
Cr	60 ppm	220 ppm
Cu	20 ppm	100 ppm
TBT	3 ppb	7 ppb
Mineral oil	14 mg/g_{oc}	36 mg/g_{oc}
PAH	70 $\mu g/g_{oc}$	180 $\mu g/g_{oc}$
PCB	2 $\mu g/g_{oc}$	2 $\mu g/g_{oc}$

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DM → On-Shore Treatment

- Ports of Ghent – Antwerp – Brussel
- Dredged materials are mostly (slightly) contaminated
- DM considered as waste
- Permit delivered by regional authorities
- Treatment and beneficial use mandatory

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DM → On-shore Treatment

Treatment Objectives

- Production of geotechnical suitable products
  - Beneficial use (recycling path)
  - Confined disposal (dumping path)
- Reduction of mass and volume
  - Dewatering
  - Separation
- Reduction of contaminated load
- Fixation of pollutants
  - Reduction of environmental risk

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DM → On-shore Treatment

AMORAS

1. underwater cell

2. sand separation

3. discharge line

4. consolidation ponds

5. dewatering plant using filter presses

7. deposit site

6. water purification plant

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AMORAS

- DBOT contract
- 600 000 tonnes DM per year
- DM from Port of Antwerp

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DM → Disposal

- Only for non-treatable dredged material
- Application of environmental taxes

Disposal Centre Silvamo, Kortemark, Belgium

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DM → Beneficial Use

- Flemish legal concept of “secondary raw material”
  “end of waste” criteria (environmental)
- Beneficial use
  - As building material
  - As soil
- Use certificate
  - Waste legislation no longer applies, can be treated as products
- New European Waste Directive (Eur. Parl. June 2008)
  Art. 6 “end of waste” after recycling
  - Countries can define “end of waste” criteria
  - Recycling higher ranked than elimination

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DM → Beneficial Use

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Conclusion

- Huge quantities of different types of sediments under different conditions are managed efficiently and effective

- Through sustainable sediment management plans
  Key elements:
  - Adapted legislation
  - Realistic goals
  - Appropriate methods
  - Promotion of best fitted technology

→ **Sediment Management in Port Areas is a FACT.**