

The Walsoorden pilot project: a first step in morphological management of the Western Scheldt, conciliating nature preservation and port accessibility

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Acknowledgements: Antwerp

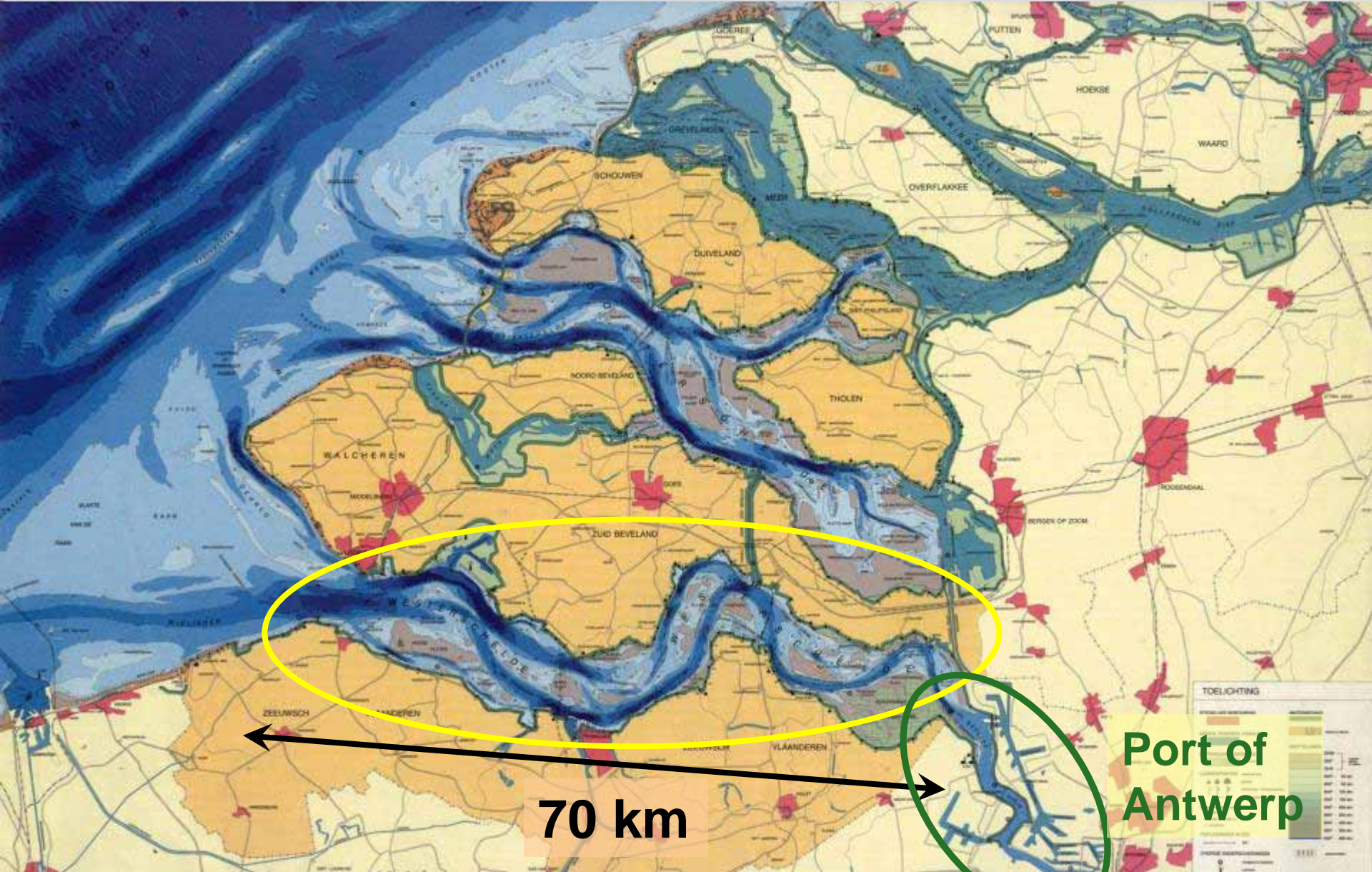
Port Authority

Maritime Access Division

SEDNET 2009 – October 2009

Flemish Government – Flanders Hydraulics Research

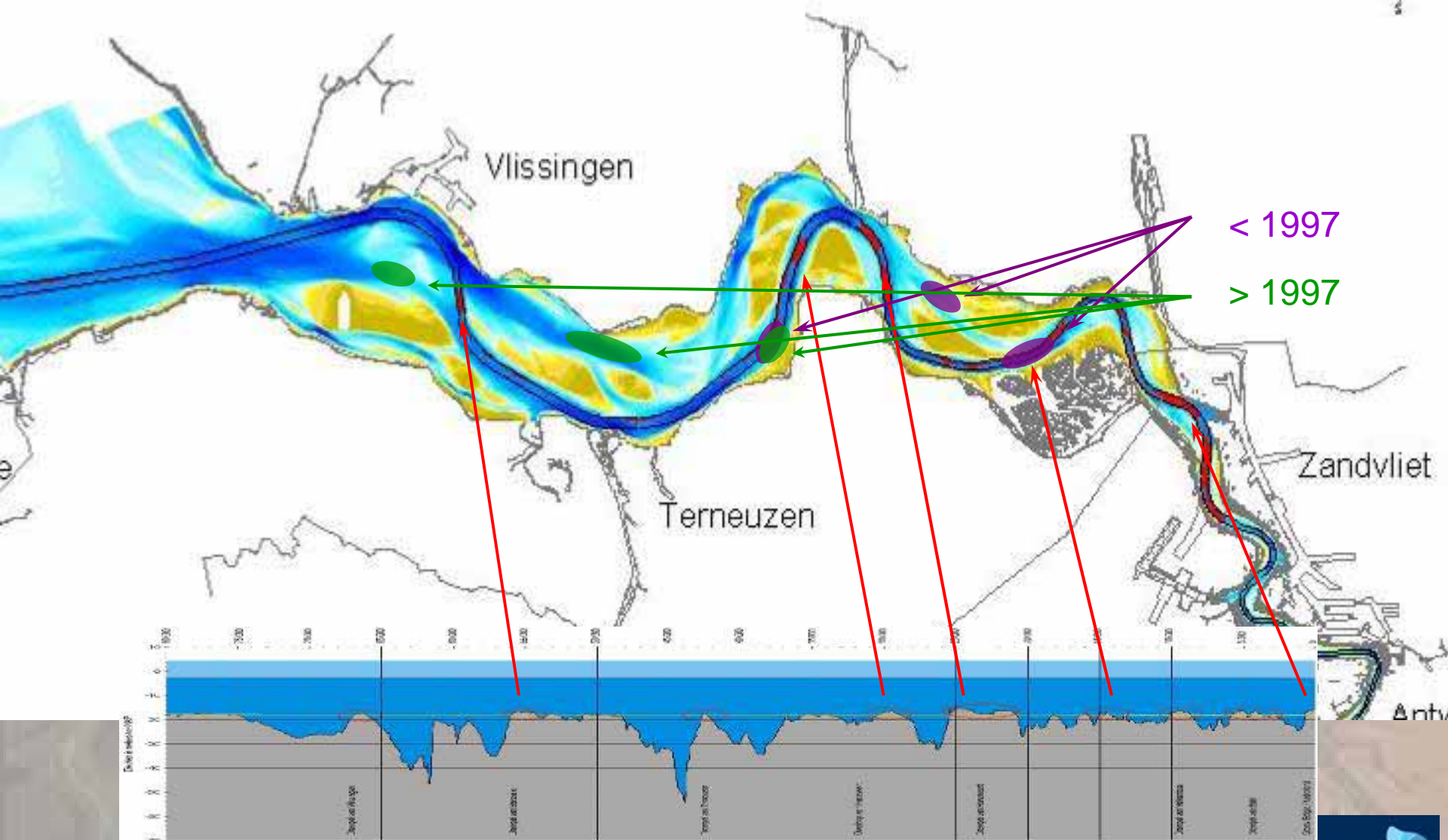
The Western Scheldt

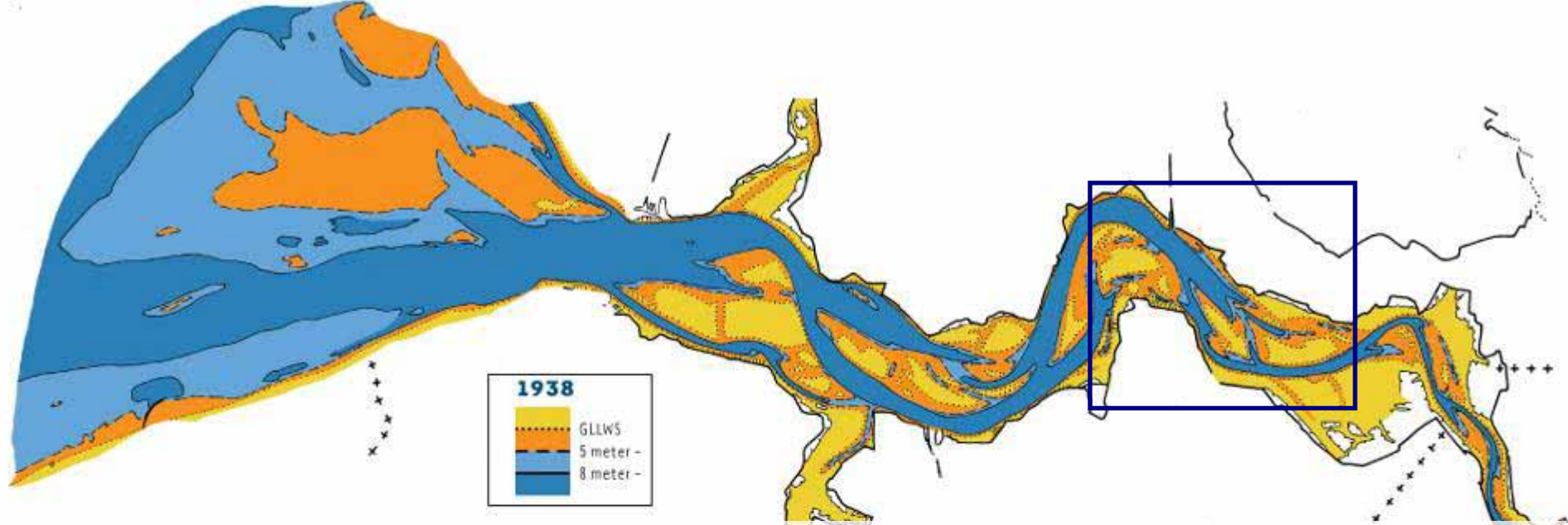


70 km

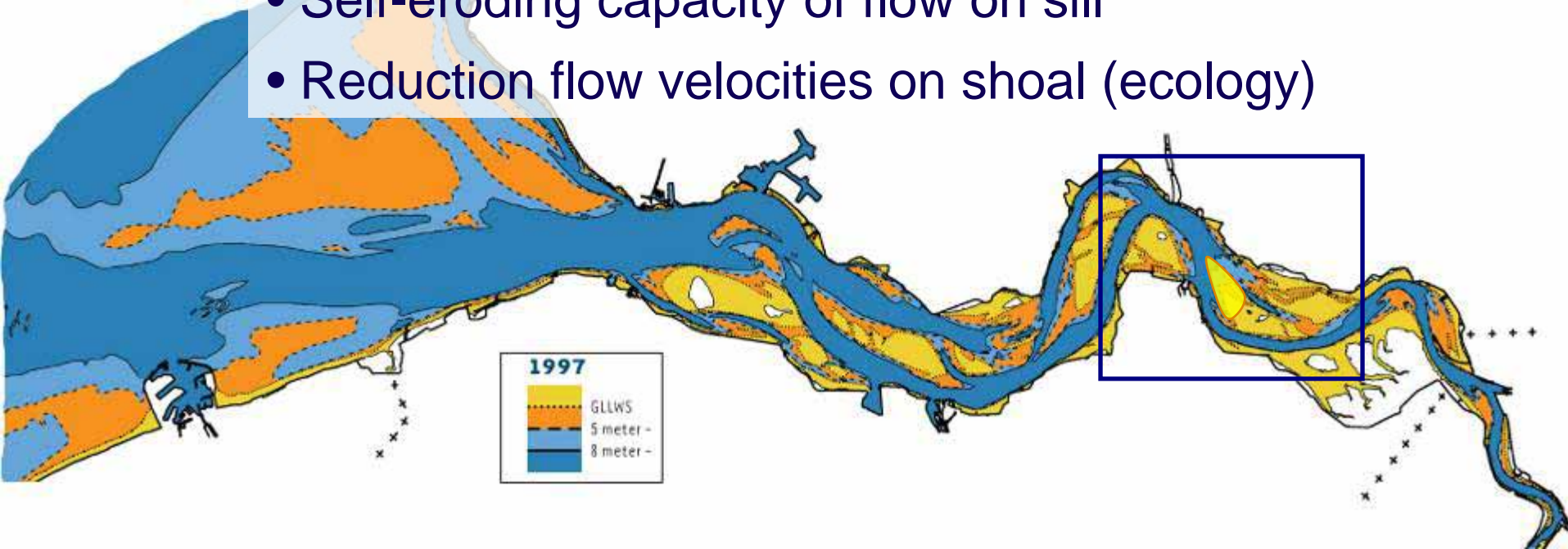
Port of Antwerp

Dredging and Disposal





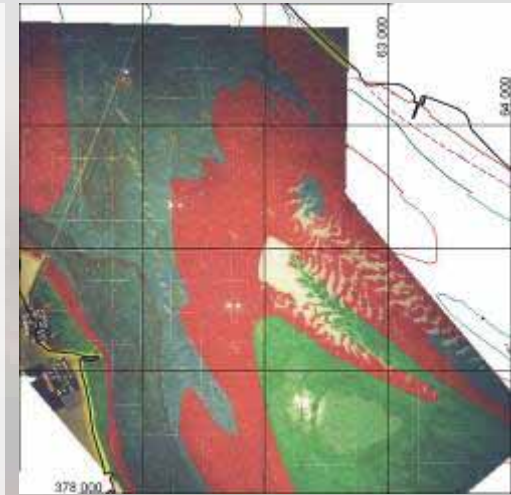
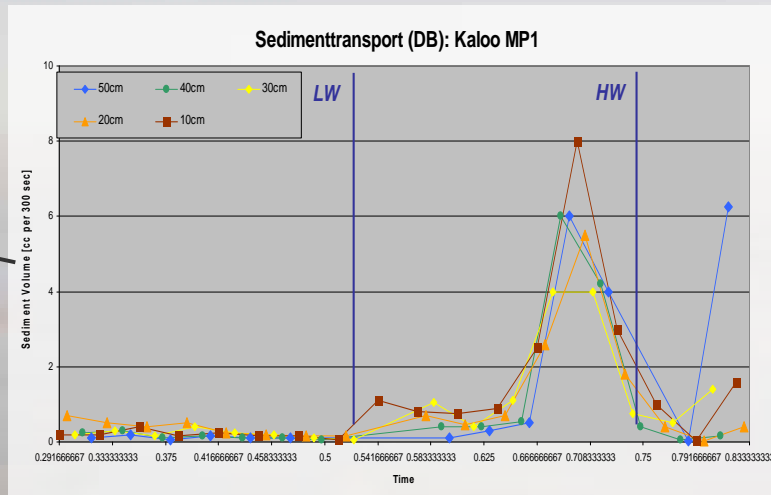
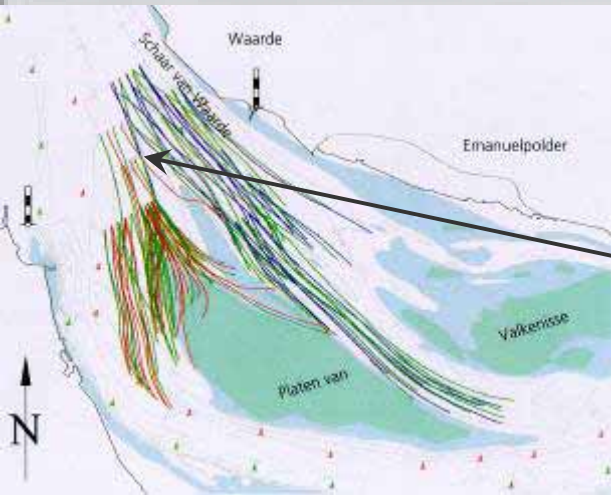
- Distribution of flood current (multiple channel system)
- Self-eroding capacity of flow on sill
- Reduction flow velocities on shoal (ecology)



Walsoorden project

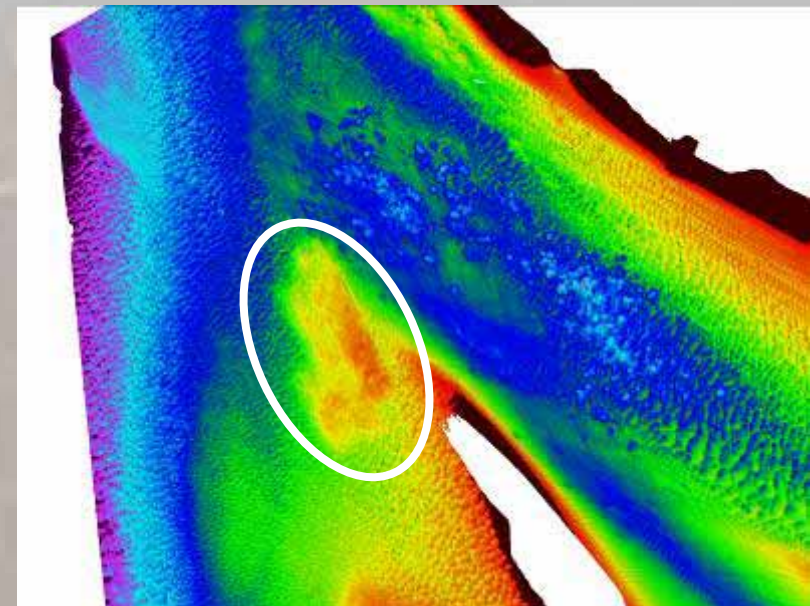
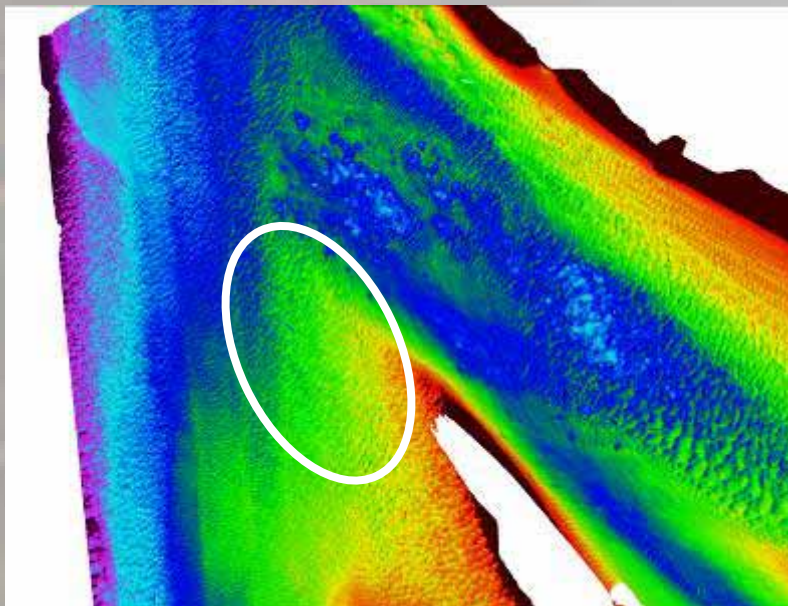
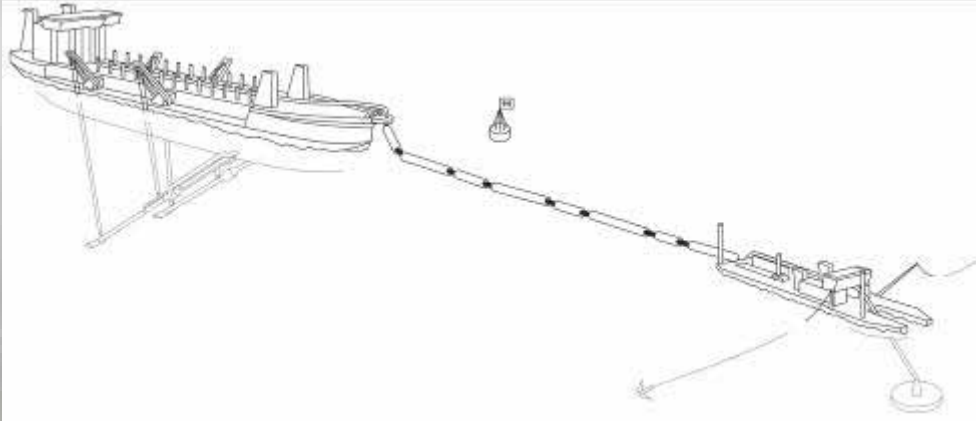
- Feasibility study (2002 – 2003)
 - Combination different tools
- In situ disposal test – diffuser (2004)
- Monitoring (2004 – 2005)
 - Morphology
 - Ecology
- In situ disposal test – through doors (2006)
- Monitoring (2006 – 2007 – 2008)
 - Morphology
 - Ecology

Feasibility study : results

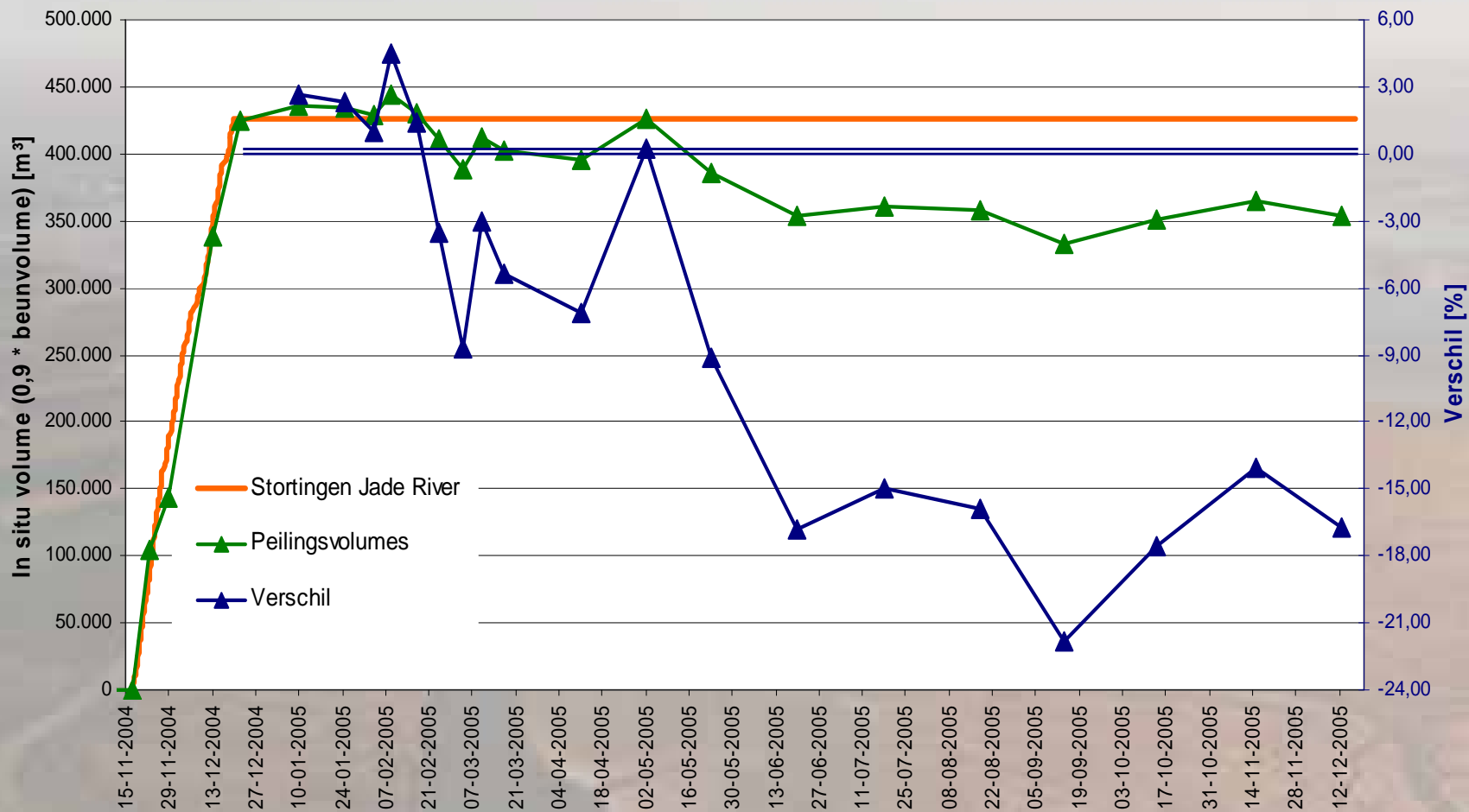


- Field surveys, scale and numerical modelling
- Morphological feasibility
 - NO indications that method is NOT feasible
 - final prove only by in situ disposal test (500.000 m³)
 - Authorities requested “second opinion”

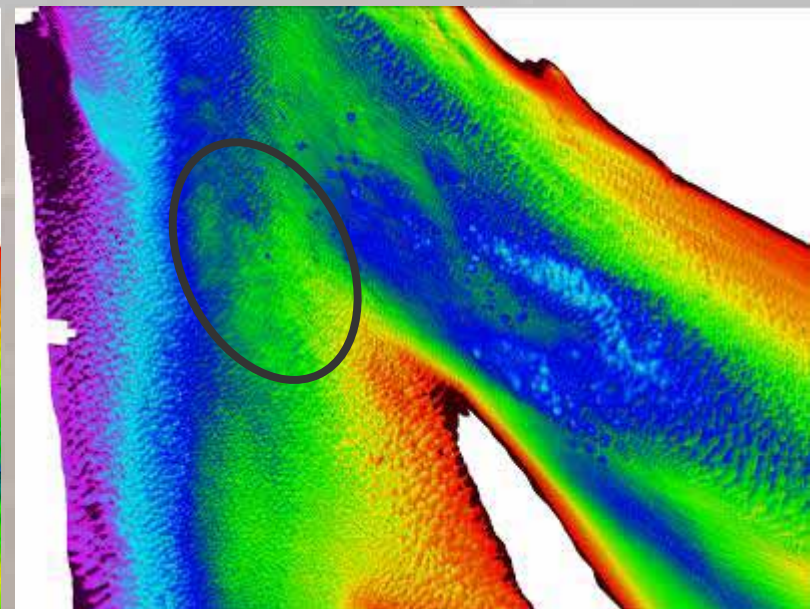
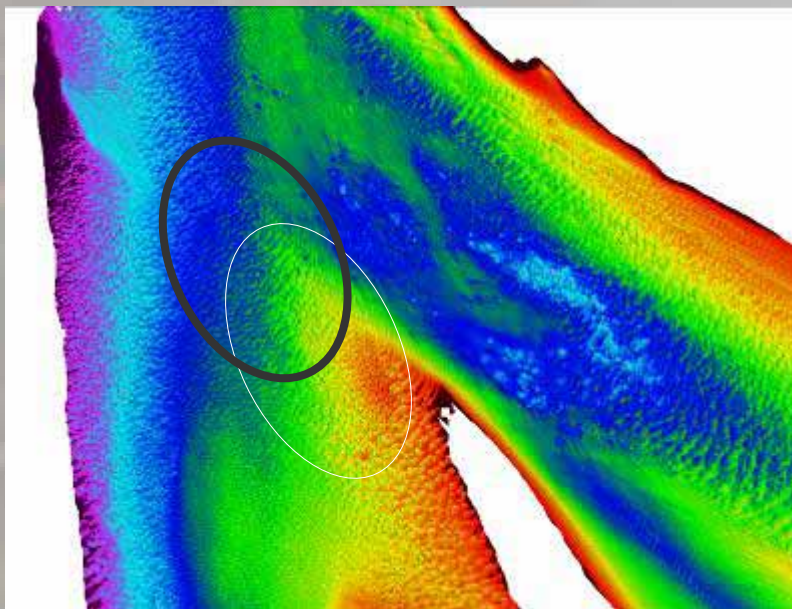
Disposal test 2004 – with diffuser system



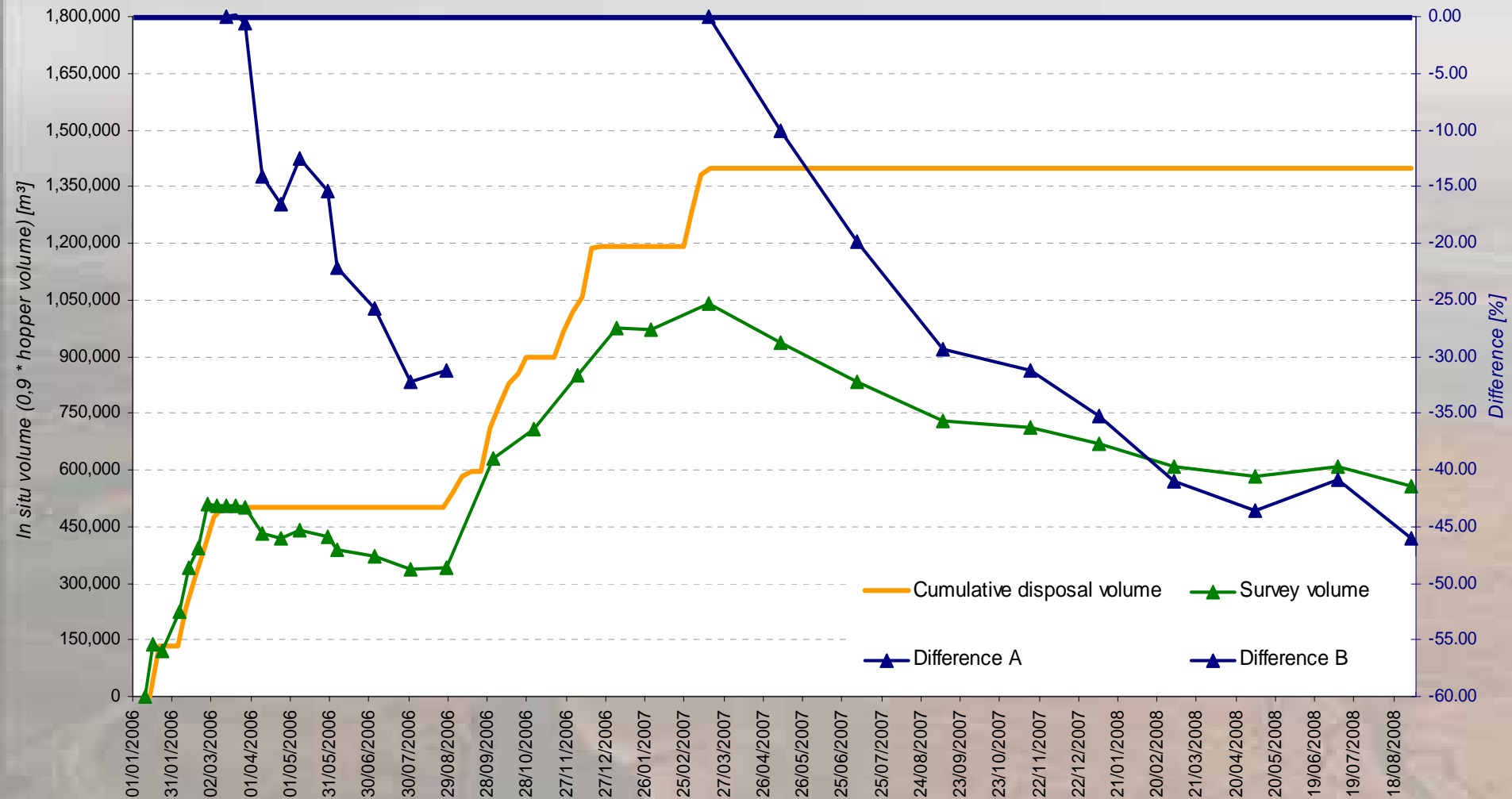
Monitoring – Bathymetry 2004



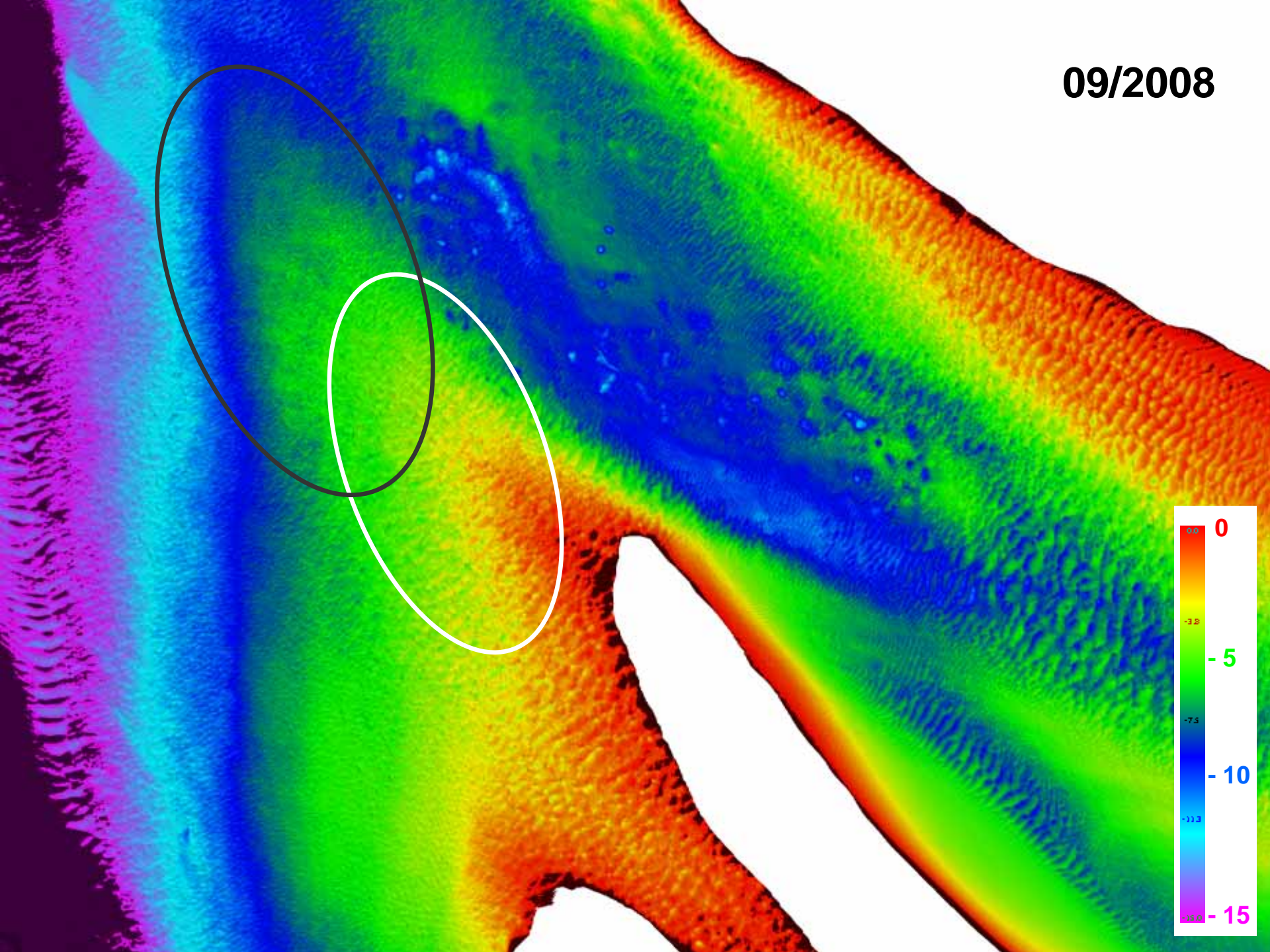
Disposal test 2006 – through doors



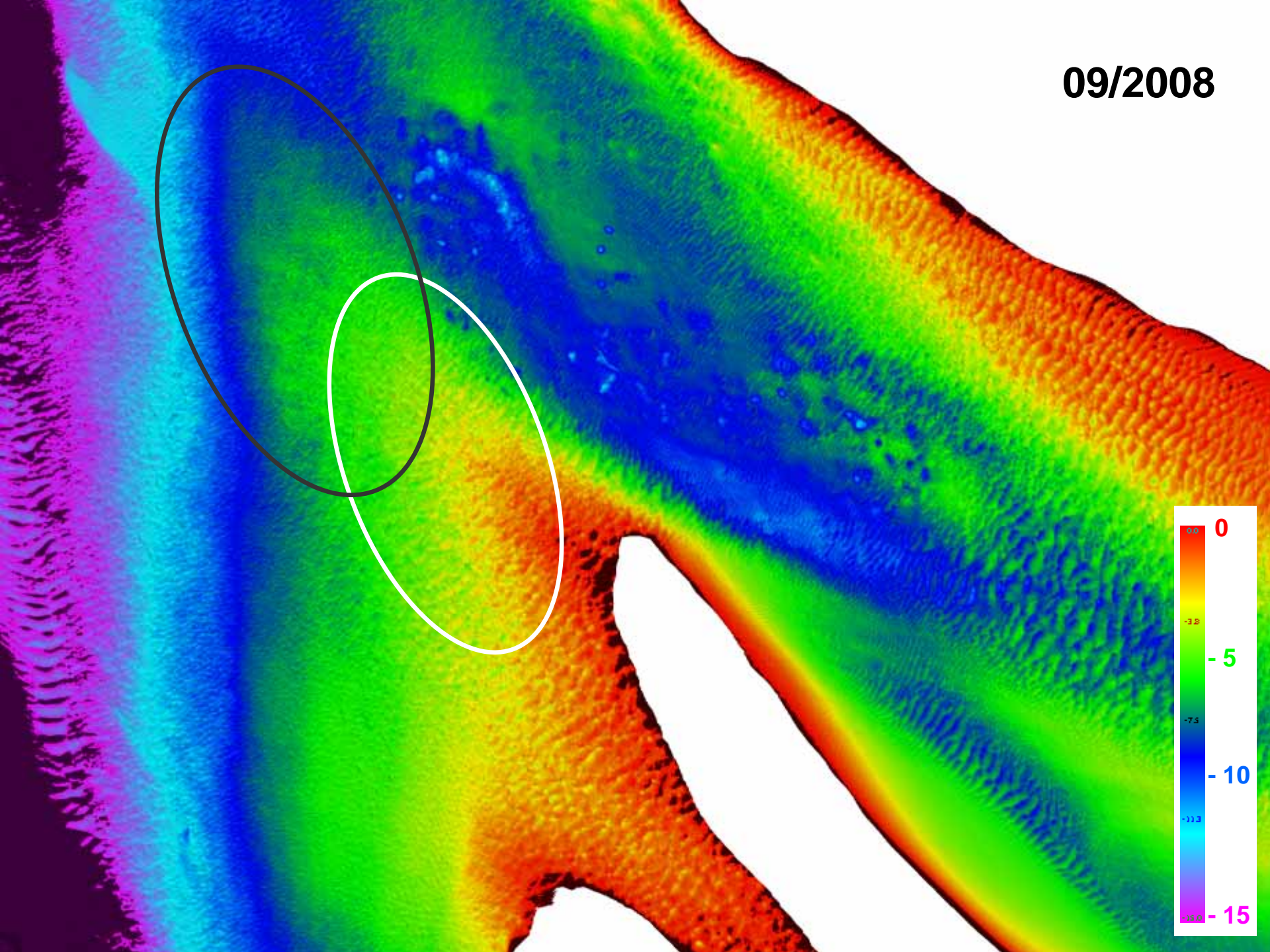
Monitoring – Bathymetry 2006



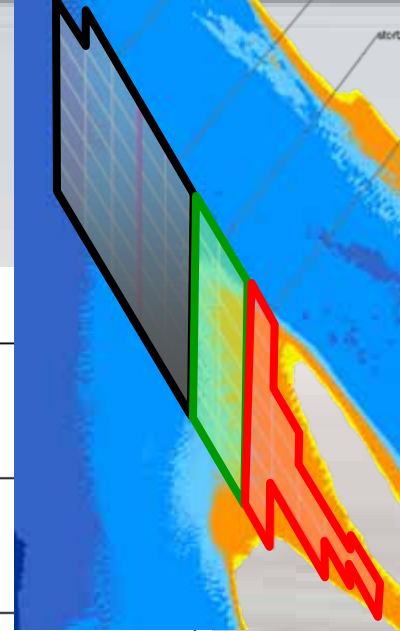
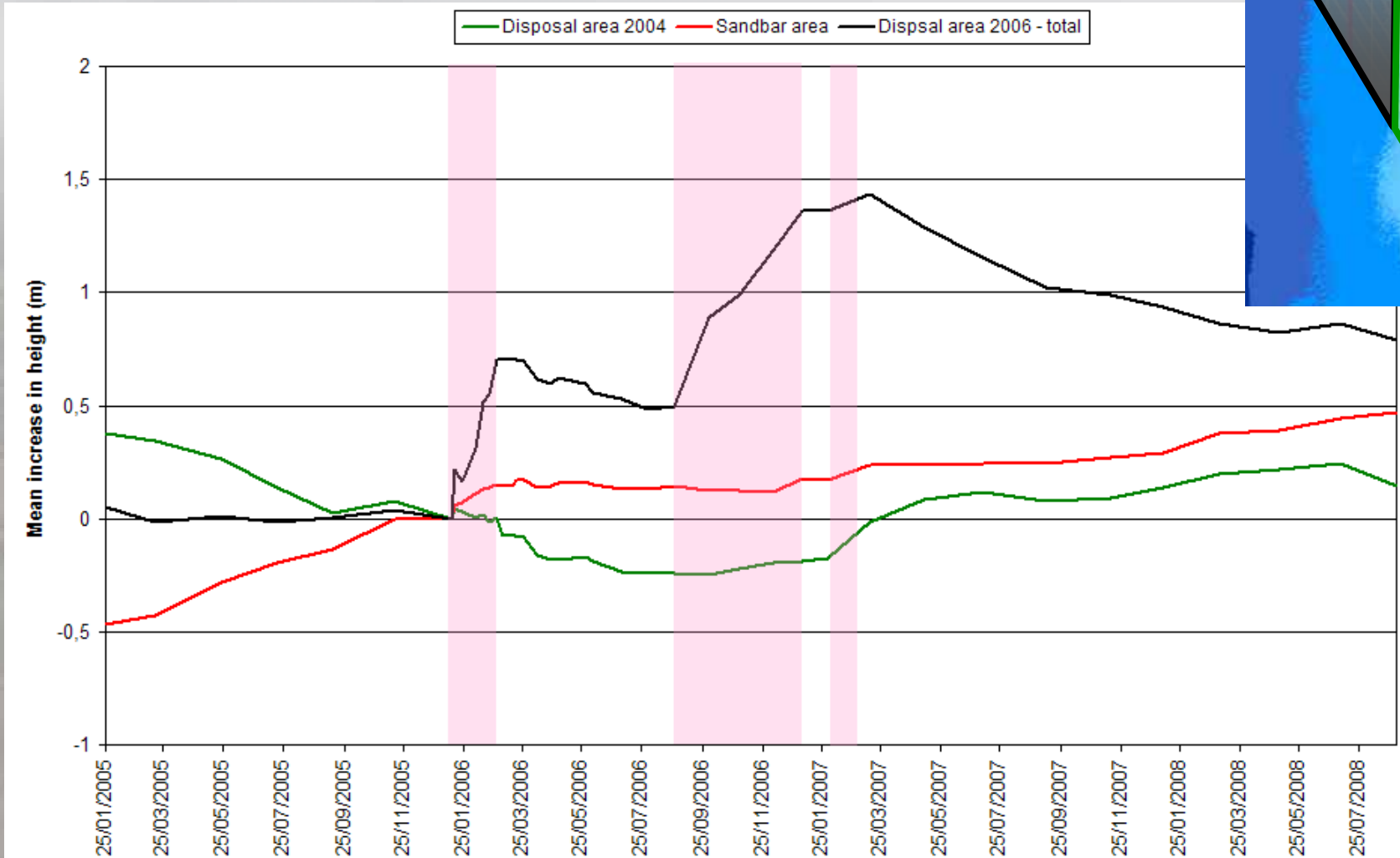
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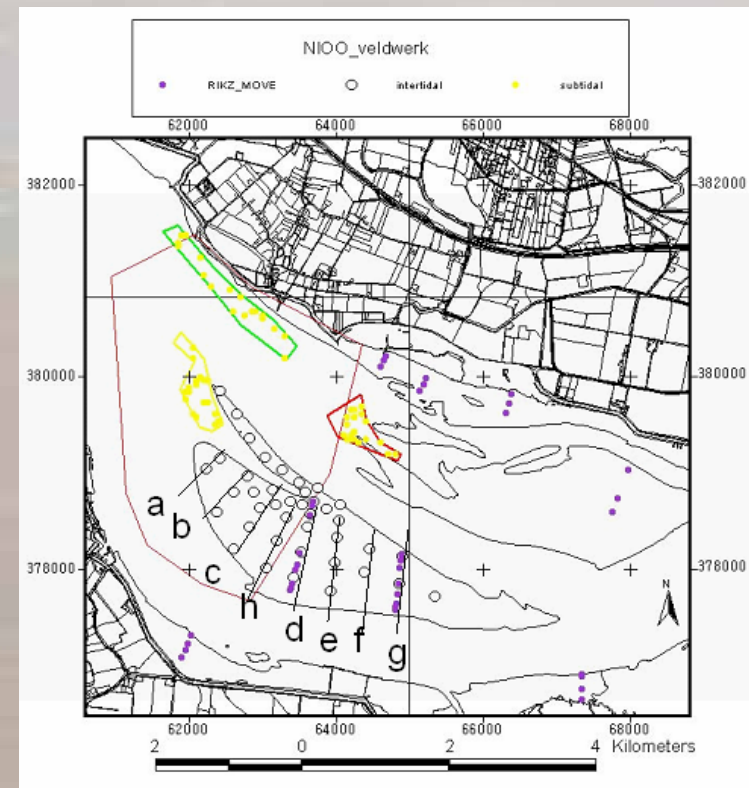


Volume computations



Monitoring – Ecology

- Remote sensing & hyperspectral flights
- Intertidal monitoring
 - Elevation
 - Grain size distribution
 - Macrobenthos
- Subtidal monitoring
 - Grain size distribution
 - Macrobenthos



Conclusions

- Morphology
 - 2004: after 1 year: 83% remains within control area
 - 2006: after 1 year: 60% remains within control area
=> sediment moves towards Walsoorden sandbar
 - Ecology
 - No significant negative effects (2004 & 2006)
- => SUCCESS!**
- Causes of past erosion?
=> estuary requires morphological management

Project deepening navigation channel

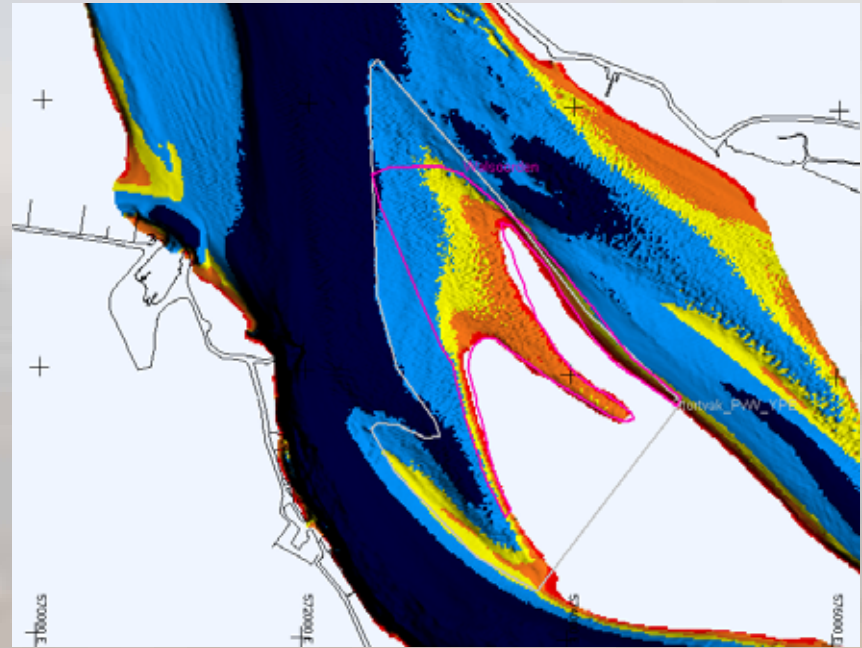
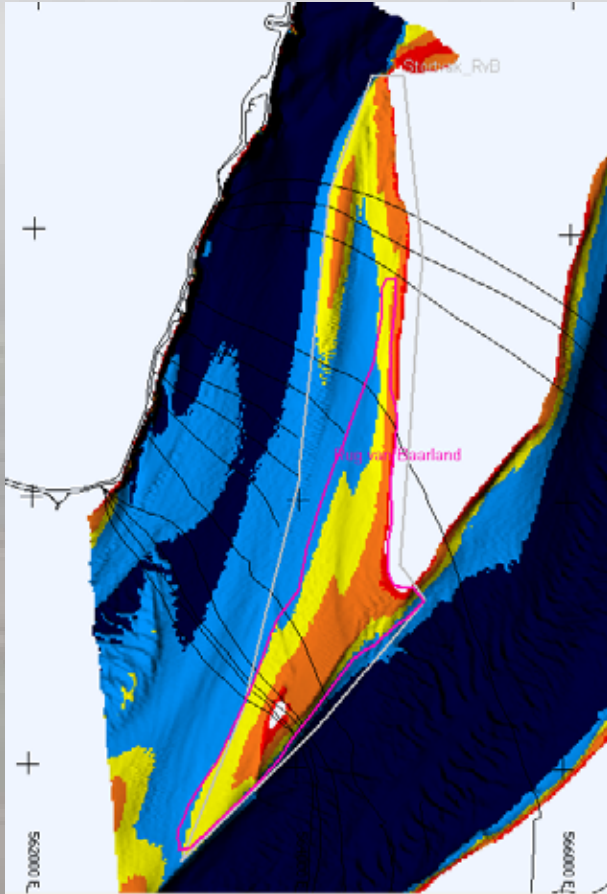
- Tide independant accessibility to port of Antwerp for ships with draught up to 131 dm
- Dredging depth of 147dm (12,5% keel clearance)
- Capital dredging works: 7,7 Mm³ in Western Scheldt
- EIA => material used to reshape/extent sandbars



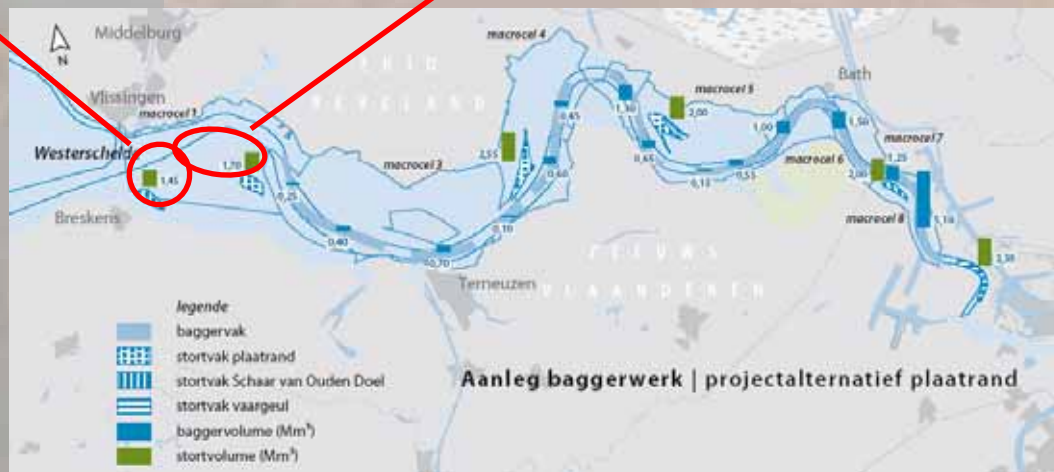
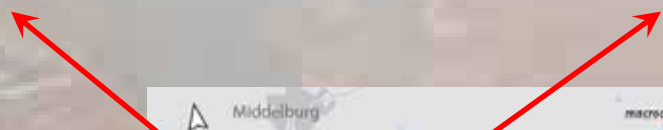
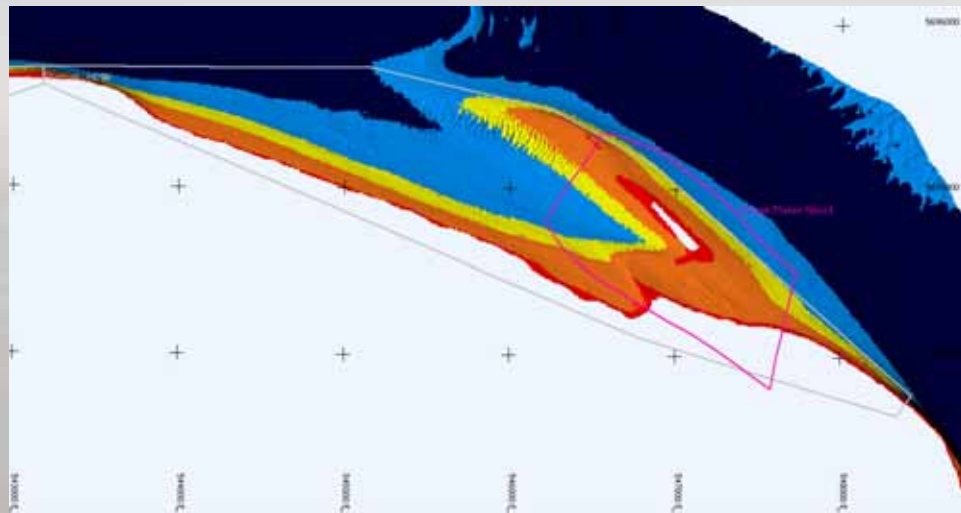
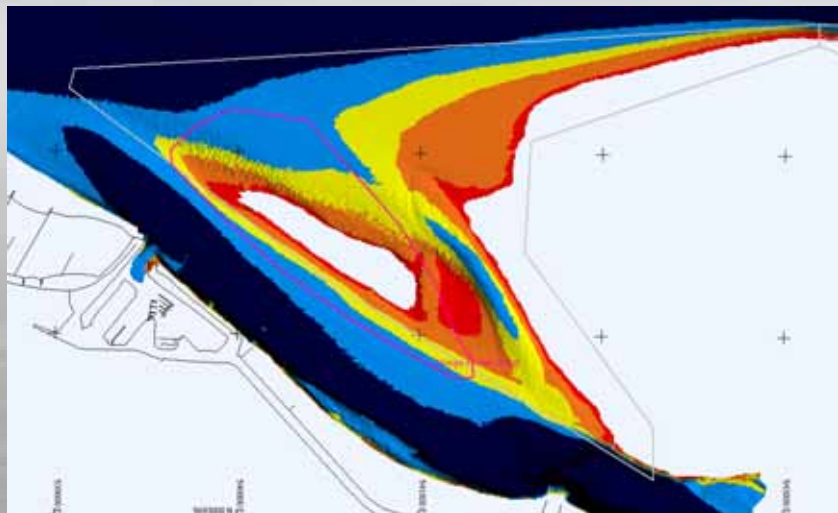


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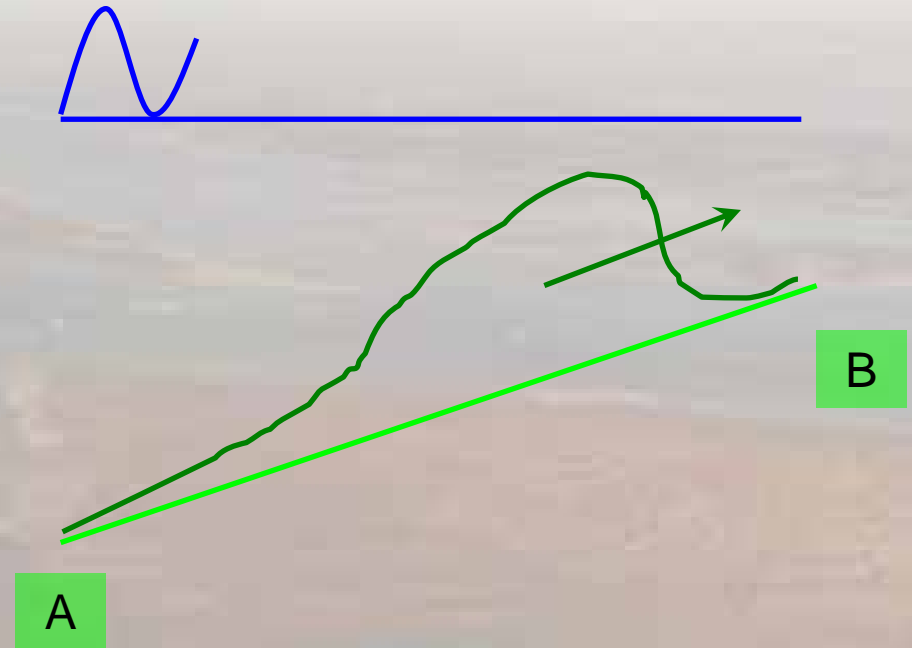
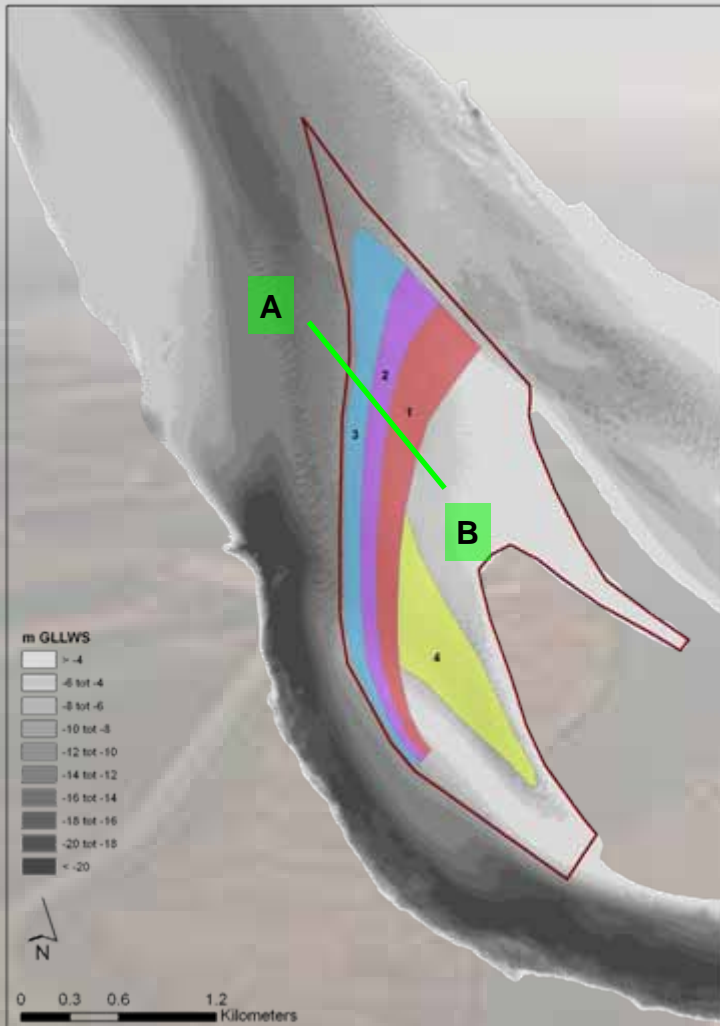
Disposal locations



Disposal locations



Sandbar of Walsoorden (6,5Mm³)



Tides

