







2 Seas Mers Zeeën USAR

European Regional Development Fund

RENOVATION OF A FLOOD AREA IN THE SCHELDT ESTUARY USING DREDGED MATERIAL FROM THE DURME RIVER

P. Ratinckx, M. Van Rompaey, C. Boone and H. Quaeyhaegens

Within the framework of the Flemish flood protection programme "SIGMAPLAN" for the river Scheldt estuary, Waterwegen & Zeekanaal (the Flemish agency responsible for the control of around 1000 km navigable waterways in Flanders) plans to renovate the Flood Area "Potpolder IV". Dredged material from the Durme river will be used as building material for the construction of new embankments. The project is a pilot within the Interreg 2 Seas programme, "Using Sediments as A Resource", USAR.



CAUSE

• Sediment transport and deposition due to tidal movement

AIM

- Protection of the Durme valley against uncontrolled flooding
- Lowering of the maximum water levels in the Durme river

Sea Scheldt basin with project area Potpolder IV

NUMERICAL MODELLING

Hydrologic modelling of the flood area and river basin combined with a MIKE11 hydraulic modelling of the Durme river for return periods T1, T5, T40 and T100.

- Overflow frequency and volume
- Filling ratio, water depths
- T100 storm event:
- Emptying time
- Overflow volume: 1 581 950 m³
- Pumped volume: 1 836 150 m³

DREDGING WORKS

- 226 000 m³ dredged material
- 6,8 km

Dwarsprofiel 46

Scale: 1/250

Referentieniveau: 0.00 mT

- 82 samples
- Technique: Swamp excavators ?

AIM: finding a technique of "immediate" re-use with limited intermediate storage for dewatering.



- Ring dike
- Overflow dike
- 2 pumping stations
- Re-use of dredged material from the river (maintenance works) as building material for the dikes and raw material for shoaling purposes of old sand extraction ponds/wetland creation





Typical cross section of the dredging profile with new overflow dike contour



QUALITY

Local exceeding of acceptable Zn, total PCB, Cd, Cr III, Cu, Benzo(a)pyreen and mineral oil concentrations for free use of dredged material (Flemish legislation: VLAREBO Annex V). VLAREMA certificate obtainable for all dredged material as secondary raw material to be used as loose building material if the leachability criteria are met after treatment.



Dredging strategy and mobile treatment plant setup in order to obtain the VLAREMA certificate and to fulfil the requirements of minimal transport.



GRANULOMETRY



15 % < fines fraction (< 63 µm) < 80 %

The soil samples taken from the river bed and slope of the dike along the river will be analysed based on the environmental criteria (contamination of the soil sample) and/or the geotechnical criteria (mainly the grain size distribution). The flowchart will be used to decide whether the sediments along the Durme can be used for building up the core of the new dike or not.

Use of Durme sediments in dike design

- Physical location of the samples: river bed or slope
- Silt fractions (I+II) > 30%
- Plasticity index criteria
- UK-ADAS textural triangle
- Re-use of material classified as fine sand or silty to clayey sand as core material: 30%
- Treatment of all other sediments (Sandy Loam or Sandy Silty Loam): dewatering, adding additives, ...



ractions I + II of soil samples in the Durme river bed

Granulometry of sample with high silt fraction

Classification of soil samples in the Durme river bed based on the UK-ADAS textural triangle

Expertise in Water

info@imdc.be • Van Immerseelstraat 66, B-2018 Antwerp • +32 3 270 92 95