

Using Sediment As a Resource (USAR): Renovation of a controlled flood area in the Scheldt estuary using dredged material from the Durme River

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Introduction: Within the framework of the Flemish flood protection program „SIGMAPLAN“ [1] for the river Scheldt estuary, the Flemish Waterways plans to renovate the Controlled Flood Area (CFA) „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 program, „Using Sediments as A Resource“ [2], USAR (Using Sediment as A Resource, Interreg 2 Seas Mers Zeeën).

The project covers the complete design of a new ring dyke and the adaptation of the existing dykes along the Durme river to an overflow dyke in order to realize a Controlled Flood Area. Around 2,5 km of overflow dyke and 3,5 km of ring dyke will have to be realized. The river recovery plan for the Durme comprises maintenance dredging works, producing 260.000 m³ of dredged sediment

The design includes all required works to the watercourses in the area, as well as the construction of two new pumping stations. Works are planned to start by the end of 2018 and will take approximately three years.

Methods: The geotechnical and environmental quality of the dredged material has been investigated and treatment techniques are proposed to be able to re-use the dredged material within the new dyke bodies, including contaminated material, in accordance with all safety regulations. Treatment techniques include cleaning, dewatering and stabilization techniques in order to obtain the required geotechnical and environmental characteristics for reuse in the dykes, according to Flemish legislation (VLAREMA).

Results: One of the most important parameters of the sediment with respect to dredging, re-use and evaluation of possible treatment procedures is the fines fraction (<63 µm), which varies from 20 % to 90 %, with an average of 45 - 60 %. Both Procter tests and results on plasticity and methylene blue values show that the sediments are loamy to clayey. Based on the analytical results, increased levels of heavy metals, TPH, PAH, PCB and PFAS are

measured in the sediments. From the in 260.000 in-situ m³ of sediments to be dredged, in total approximately 26.000 in-situ m³ is unsuitable for direct re-use, based on the levels of TPH and heavy metals. Cleaning of these sediments is required.



Fig. 1: Environmental quality of sediments: green being acceptable as building material, red meaning there is exceedance of certain parameters.

The dredging is designed based on the restoration plan of the Durme Valley, part of the actualization of the SIGMAPLAN. Another main purpose of the project is the restoration of the CFA Potpolder IV by building a new ring dyke with a crest level of +8,0 m TAW to prevent flooding beyond the CFA limits, and adapting the existing Durme dyke to an overflow dyke with a crest level below +6,8 m TAW in order to obtain efficient filling of the CFA and an overflow frequency of at least once a year.

Discussion: The Flemish Waterways already has prepared the EIA, the archeological investigation and the environmental and building permit. Maximum reuse of dredged sediments into the dyke bodies is requested. The selected contractor will be obligated to start with a feasibility study and design phase for the geotechnical, environmental and juridical aspects.

References

- [1] Flemish flood protection programme SIGMAPLAN, <http://sigmaplan.be/nl/projecten/durmevallei/>
- [2] USAR-webpage: <https://www.vlaamsewaterweg.be/usar>.