

# An evaluation of 15 years lowered disposal sites at sea and a perspective to the future

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## **Introduction:**

In the 90's of the last century the Port of Rotterdam Authority and Rijkswaterstaat Sea & Delta started a pilot project for 6 lowered disposal sites at the North sea. This was an unique concept which combines sand mining with reallocation of sediment. During the pilot project al lot of information was collected.

## **Methods:**

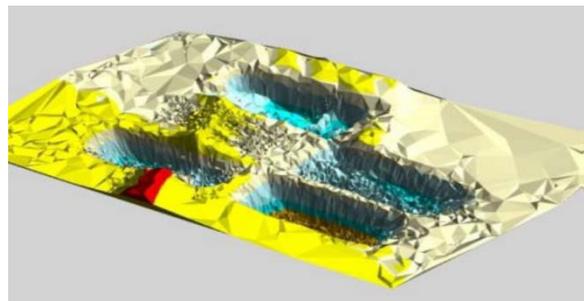
Before the start of lowered disposal sites at sea, the Port of Rotterdam Authority relocated the dredged material at loswal Noordwest. This location had two important disadvantages. The first disadvantage was that there was a backstream of sediment to the port entrance. The second disadvantage was that the hoppers sail empty back from loswal Noordwest to the port of Rotterdam. Empty sailing of hoppers costs a lot of money. A solution to solve the disadvantages could be to combine sand mining and relocation. The concept of lowered disposal sites was born.

The lowered disposal sites are 6 pits from about 1000 meter length, 500 meter wide and about 10 meter depth. After building the pits, they were filled with dredged sediment originating from maintenance dredging in the Rotterdam area. The idea was that after filling a pit the backstream would substantially decrease.

Before starting with the pilot project, permits for sand mining and reallocation were necessary. Part of these permits was an environmental effect report. In this report the state of the art knowledge about the impact on the environment was presented. The fact that a lowered disposal site was a new form of management principle at sea meant that the authorised supervision stipulated an obligation of monitoring and reporting.

The monitoring obligation was aimed at the gap in knowledge like the behavior of sediment in the lowered disposal sites, the effectiveness of coverage with sand of the pits after filling, the impact on the benthic fauna, the backstream of sediment and the economic impact.

The pilot project consisted of two phases. At the first phase 2 pits were build and used for relocation of dredged material. After the first phase an evaluation took place. The results from the first phase gave the motivation for the next four pits (the second phase).



**Fig. 1:** 3d simulation of the lowered disposal sites.

## **Results:**

The pilot produced a great deal of information on the construction, the use, the management and the surrounding area of the lowered disposal sites.

The outcome of the evaluation lead to an improved and successful continuation of the lowered disposal sites.

## **Discussion:**

The outcome of the evaluation in combination with recent studies about the ideal locations of new lowered disposal sites is input for the discussion for the future of new lowered disposal sites at sea.