

## **Reciprocal learning: the 'Waterdunen' project in the Western Scheldt, the Netherlands**

The Waterdunen Project is a joint initiative by Molecaten (campsite owner), and the Zeeland Landscape Foundation. The project is currently being led by the Province of Zeeland, with the support of Sluis Local Authority and the Zeeuws-Vlaanderen Water Authority. Within the project, 350 hectares of mildly saline nature between Groede and Breskens will be developed.

Waterdunen combines strengthening of the coastal defences with the development of natural resources and accommodation for holidaying visitors. It will create a wonderfully attractive area for recreation for the passionate naturalists and birdwatchers as well as holidaymakers and local residents. At the same time it provides a solution to the problem of ensuring the safety of the coastal area. The dunes and the dike at Breskens are one of the weak links in the coastal defences, and reinforcement of these defences is an absolute necessity. The dune has been designed so that it will meet the current safety norms as a water barrier for 200 years. Allowances have also been made for the expected sea level rises. It is a sturdy and sustainable solution.

The dunes of the Waterdunen, projecting in towards the land, have been designed to achieve the required level of defence against over-topping of the dikes for a period of at least fifty years, and also offer the opportunity for their further growth in step with the anticipated rise in sea levels.

Part of the Waterdunen project is the construction of a tidal culvert. In every tidal cycle it will allow approximately 1 million m<sup>3</sup> of seawater from the Western Scheldt to flow in and out of the intertidal zone straight through the primary flood defences.

The tidal culvert consists of a structure of four tubes running through the dyke. From 2019 onwards, water will flow in and out of the nature area from the Westerschelde through three of the tubes at high and low tide. These tubes have sliding flaps that can be operated remotely. The flaps control the water level in the area behind the dyke and they can be closed off completely in an emergency. The fourth tube is for removing excess water from the poldered areas around Waterdunen. A tidal energy station will be installed in the tidal culvert, consisting of a turbine to generate energy from the water flowing in and out.

All in all, there are remarkable overlaps between the innovative CRT's we plan to deploy in the Scheldt estuary and the ongoing development in the Waterdunen project. Both projects aim for a combination of nature, safety and sustainable recreation. Clear differences are the project status (Waterdunen is nearing the opening of the tidal culverts, the CRT areas in this project still have to be developed; Waterdunen aims for a saline ecology, this project aims for fresh water ecology).

There lies a clear opportunity for cross-border reciprocal learning. Focus points include:

- Ecological valuation of the nature-to-be-created. Currently only 30% of the nature area developed in the Waterdunen will be counted in Nature2000 area balances. The

Lippenbroek CRT (Controlled Reduced Tidal area) (LIFE Mars) however counts for 100%

- **Monitoring:** Both Waterdunen and this project will result in new nature development, and morphological development of the developed areas. There is still ample room to learn from each other's best practices in defining an optimal monitoring strategy
- **Hydraulics:** both Waterdunen and the CRT's in this project include a tidal culvert. However, the designs are fundamentally different. Where Waterdunen's tidal culvert has in- and outflow through the same culvert, and an active control of the flow rate over a tidal cycle, the CRT's proposed in this project employ a more passive approach with less steering, different in- and outflow culverts. This will result in different tidal characteristics inside the areas, and therefore other ecological development. Much insight is to be gained in comparing both design methodologies.
- **Local support and sustainable recreation.**

We strongly believe that the comparison between the two projects (Waterdunen and this project) can deliver new insights in planning, designing, building, operating and monitoring projects that employ innovative techniques to hit multiple development targets (safety, nature, recreation).

In order to seed the discussion, time will be invested in this work package to apply the "Flemish" methodologies and knowledge to the "Dutch" project. This will provide technical input to the discussion, and will make the differences in underlying assumptions more clear for both projects. The technical discussions themselves will be organised in a series of workshops.

#### **References:**

<http://www.waterdunen.com/>

<https://www.zeeland.nl/natuur-en-landschap/natuurpakket-westerschelde>



Waterdunen tidal lock and  
state of works

Source: Province of Zeeland



