Sandscaping Inspired by the Sand Motor
International Case: Bacton, United Kingdom

Luijendijk, Arjen; Vikolainen, Vera

Publication date
2019

Document Version
Final published version

Published in
The Sand Motor: A Nature-Based Response to Climate Change

Citation (APA)
Luijendijk, A., & Vikolainen, V. (2019). Sandscaping Inspired by the Sand Motor: International Case: Bacton, United Kingdom. In *The Sand Motor: A Nature-Based Response to Climate Change: Findings and Reflections of the Interdisciplinary Research Program NatureCoast* (pp. 166-167). Delft University Publishers.

Figure 1 (left). The cliff coast at Bacton Terminal showing small-scale protection works. (Photo by Royal HaskoningDHV)

Figure 2 (right). Cliff erosion threatening residences. (Photo by Maurice Gray)

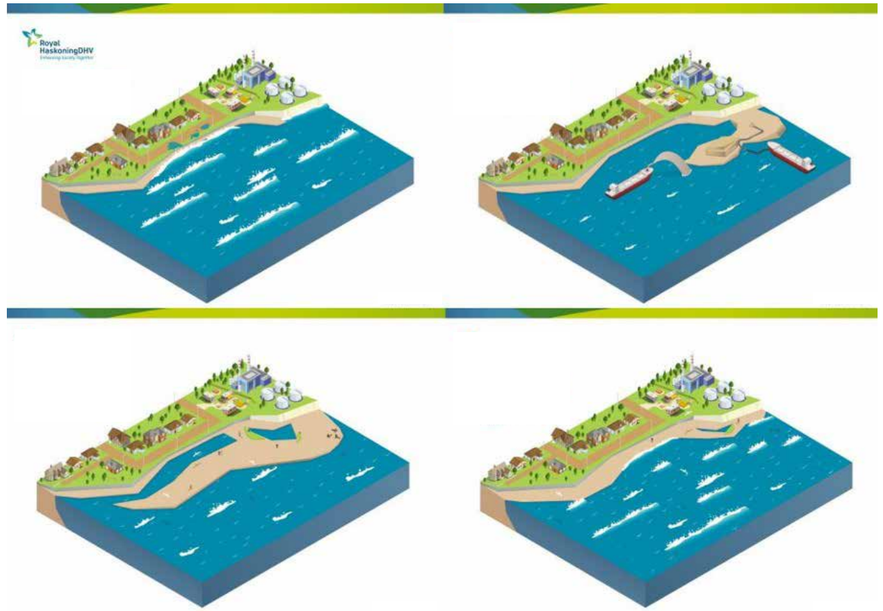

Figure 3. The four stages of the Bacton nourishment: present situation, construction of the nourishment, and the situation after 5 and 20 years. (Figures by Royal HaskoningDHV)

Arjen Luijendijk and Vera Vikolainen

SANDSCAPING INSPIRED BY THE SAND MOTOR

INTERNATIONAL CASE: BACTON, UNITED KINGDOM

The challenge
Coastal management in Europe is shifting toward soft coastal protection strategies to deal with flood risk and erosion. An interesting example of this transition is the coastal enforcement project for the Bacton Gas Terminal (operated by Shell and Perenco) at Bacton, North Norfolk. The terminal is threatened by cliff erosion, and "Sandscaping" was included as an option to protect the terminal and nearby villages from coastal erosion. In this initiative, with Sandscaping being akin to "Building with Nature", British partners collaborated to translate the Dutch Sand Motor to the different physical and socio-political context of the UK. Royal HaskoningDHV, one of the partners in the Sandscaping initiative, was responsible for the design of the long-term sandy solution. Jaap Flikweert, Flood Resilience Leading Professional at Royal HaskoningDHV, invited the postdocs of NatureCoast to share the latest findings of the Sand Motor during the design phase of the Bacton coastal enforcement. Besides the technical challenges of making accurate morphological forecasts of the sandy solution, the main challenge lay in establishing the public-private venture of Bacton Gas Terminal and the North Norfolk District Council.

The system
Long-term coastal erosion is depleting the beaches of North Norfolk, leaving cliffs and seawalls exposed. Severe storms in 2007 and 2013 caused significant cliff erosion and flooding along the coast of East Anglia, underlining the project's urgency. The Bacton Gas Terminal is an important energy asset for the UK as it provides about a third of the UK's gas supply. To protect the terminal and the associated pipelines, a sustainable solution was preferred that will allow the terminal to continue operating into the future. Due to its nature-friendly and green nature, Sandscaping created a great opportunity for Bacton Terminal and neighbouring villages to collaborate.

In 2017 it was decided that the coastal enforcement would be based on the long-term solution of Sandscaping. Royal HaskoningDHV was appointed to design the solution whereby over 1.5 million m^3 of sand will be placed along the coast to protect a 5 km coastal stretch including the terminal and its neighbouring communities. The solution will enhance the natural coastline without leaving a permanent mark and can also be easily adapted and extended if needed in the future. The Bacton solution is a great example of a design that provides multiple functions and generates benefits for different stakeholders while also receiving multi-party funding.

The way forward
The nourishment is scheduled to be constructed in 2019, after which a multidisciplinary monitoring program will observe its evolution in detail. During design sessions in the UK, we shared our ideas on the dispersive behavior of the sand, the aeolian transports to be expected after construction, and the relevance of the sediment composition. In addition, the interdisciplinary NatureCoast project inspired those involved with the Bacton re-enforcement to also develop a knowledge program around the project.

Our research on governance in the UK showed that the context in England is generally restrictive for coastal innovations like Sandscaping. In the UK, coastal protection is simply not an issue of national importance, and the scale of the issues is regional. Therefore, an overarching coordinated approach would not be realistic in the British context, although it might make things easier. The Bacton case shows that flexibility is essential when complex and dynamic governance situations make a fully planned development risky and a more adaptive management style inevitable. Here, all the project partners worked together and the private actors play an active role; both civil service and ministerial levels have been involved in the case, and different funding sources have been combined, with a flexible division of responsibilities.

The Bacton case clearly illustrates that many aspects of the pilot Sand Motor and NatureCoast can serve as valuable input and inspiration to sand replenishment projects elsewhere.