FloodProBE

Pilot Site: Dordrecht

FACT SHEET

FloodProBE Dordrecht Pilot Site summary

The City of Dordrecht is exploring the potential for combining measures in the three safety layers (protection, prevention and preparedness) in such a way that they contribute optimally to flood safety and other spatial planning issues in the pilot site.

The document is intended for:

- Flood risk managers
- Urban planners
- Emergency planners
- Policy makers

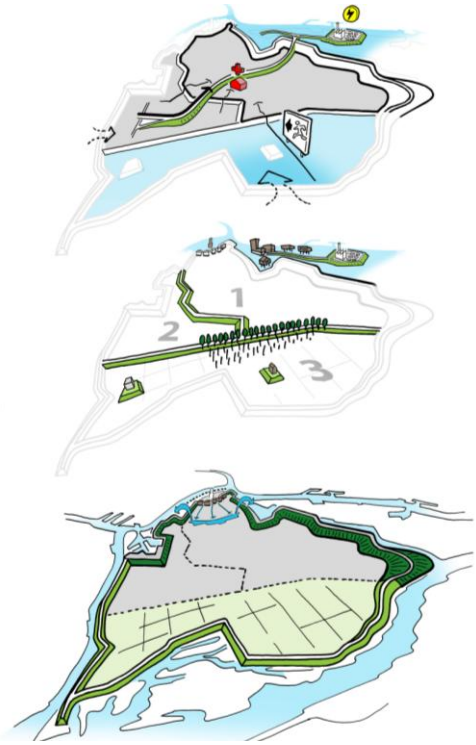

Figure 1 – Multi Level Safety strategy for Dordrecht

Context

The City of Dordrecht (CoD) is setting out to achieve sustainable urban development and is exploring opportunities to integrate flood risk management with urban development. To achieve this objective, the CoD is developing a Multi Level Safety strategy (see Fig. 1). This is a three-tier approach to flood risk management. The first tier focuses on the avoidance of flooding (i.e., protection). The other two tiers are aimed at limiting the effects of flooding: the second is intended to create a sustainable layout and design (i.e., prevention) and the third seeks to improve organisational preparations for flooding (i.e., preparedness).

Challenges or stakeholder questions

- **Protection**: What is the likelihood of breaching of the urban flood defences? What are effective design solutions to increase the reliability of the urban flood defences? What are potential design solutions for (partially) transforming existing flood defences into Multi-functional Flood Defences?
- **Prevention**: How to assess the vulnerability of critical infrastructure networks and hotspot buildings? What are potential design solutions for resilient critical infrastructure networks and hotspot buildings?
- **Preparedness**: How to assess the potential need for smart shelters, in terms of capacity and location? What is the (cost) effectiveness of smart shelters in terms of reducing the number of evacuees and casualties?

Goals of the FloodProbe work

- **Protection**: The goal of the Fp work was to explore a range of functions for potential integration into flood defence structures. Based on stakeholder input, the most promising concepts have been detailed and tested in the pilot site "Kop van t Land".
- **Prevention**: The goal of the Fp work was to develop, apply and evaluate the storyline method as a tool to develop strategies in an integrated flood risk management approach.
- **Preparedness**: The goal of the Fp work was to develop technologies that integrate a shelter function in various building types in urban areas, such as high-rise or (semi-)public buildings such as sport stadiums.

Results of the FloodProbe work

- **Protection**: Two alternatives for a Multi-functional Flood Defence have been proposed, namely (1) a hollow concrete structure (see Fig. 2) and (2) a soil bank. Cost-Benefit Analysis showed that both alternatives are economically worthwhile. The benefits of alternative 1 are realised by exploiting the hollow structure and installed functions. The benefits of alternative 2 arise from storing and reusing soil and silt from projects in the area.
- **Prevention**: Discussions about the storylines showed that the Storm Warning Service is not always able to issue a warning 31 hours in advance. High river flows can be predicted well in advance, but storm surges may result in late warnings. Furthermore, participants in the pilot noted that decisions on evacuation may take longer than anticipated. From the storylines it was concluded that preventive evacuation off the island is not feasible and that enhancing self-reliance is necessary.
- **Preparedness**: An area specific evacuation strategy has been envisioned. The proposed interventions are to designate buildings on high places as smart shelters, to improve self-reliance, and to improve crisis communication. The benefits of area specific evacuation have been calculated by expressing the casualties in terms of economic damages. Cost-Benefit Analysis showed that the investment in smart shelters cannot be justified economically.

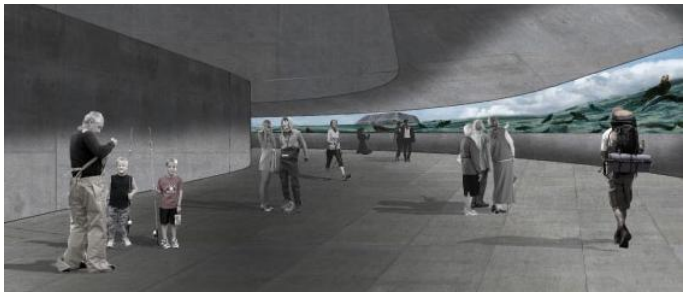

Figure 2 – Multi-functional Flood Defence for Dordrecht (courtesy of Dingeman Deijs Architects)

Lessons learned

- **Protection**: The most significant advantage of multi-functionality is that it generates financial, social and environmental benefits. By designing Multi-functional Flood Defences, the costs for dike strengthening can, in some cases, be partially funded with the revenues from the secondary functions, such as commercial functions or recreation.
- **Prevention**: It is possible to develop storylines and to use these to develop strategies within an integrated flood risk management approach. However, developing storylines is a time consuming method, as it takes time to gain all information needed to tell a story.
- **Preparedness**: In order to realise economic benefits and be sustainable, shelter structures need to be used synergistically for multiple purposes for the periods when there is no flooding. In this way, the investment in constructing shelters can be offset against a variety of normal use functions that will ensure the structures are continually maintained.

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