PROJECT
A14 Hotspot
Zuidplaspolder

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Zuidplaspolder: An example of an integrated approach

The Zuidplaspolder is located north of Rotterdam. It is one of the deepest polders of the Netherlands, and vulnerable to climate change. Because major housing developments are planned for it a hotspot research project was initiated to evaluate whether the plans could take full account of future risks. First an analysis was made of the area and the effects climate change would have on the area. Then based on the identified impacts of climate change, adaptation options were identified through workshops, consultation of stakeholders and design sessions. The options relate to water safety, inundation due to extreme rainfall, water shortage and heat stress caused by climate change. The workshops yielded over 50 adaptation options, for example:

- no construction in the lowest areas of the polder, but on the higher, more stable ground;
- aggregation of surfaces water management areas;
- expansion of peak rainwater storage space;
- seasonal storage of rain water for dry periods;
- placing of compartmental dikes;
- building waterproof houses;
- connecting and strengthening natural conservation areas;
- utilizing green areas and water as anti-"heatstress" measures.

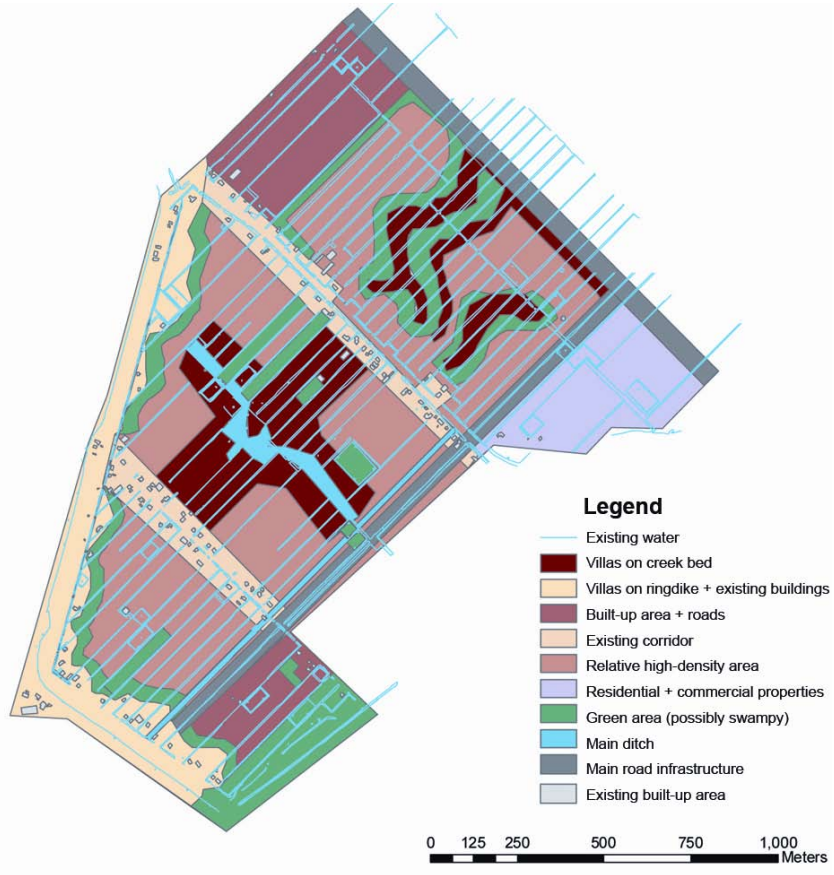
The long-list of options was used to develop an adaptation strategy, being a coherent set of combined measures aimed to 'climate proof' the Zuidplaspolder. The strategy was developed in interactive sessions with stakeholders, in which the outcomes of the various impact studies were used. This led to the reduction of the list of 50 options to one integral adaptation strategy. This strategy consists of five concrete adaptation projects for climate proofing in specific areas of the Zuidplaspolder. Three of them are described below.

North Nieuwerkerk

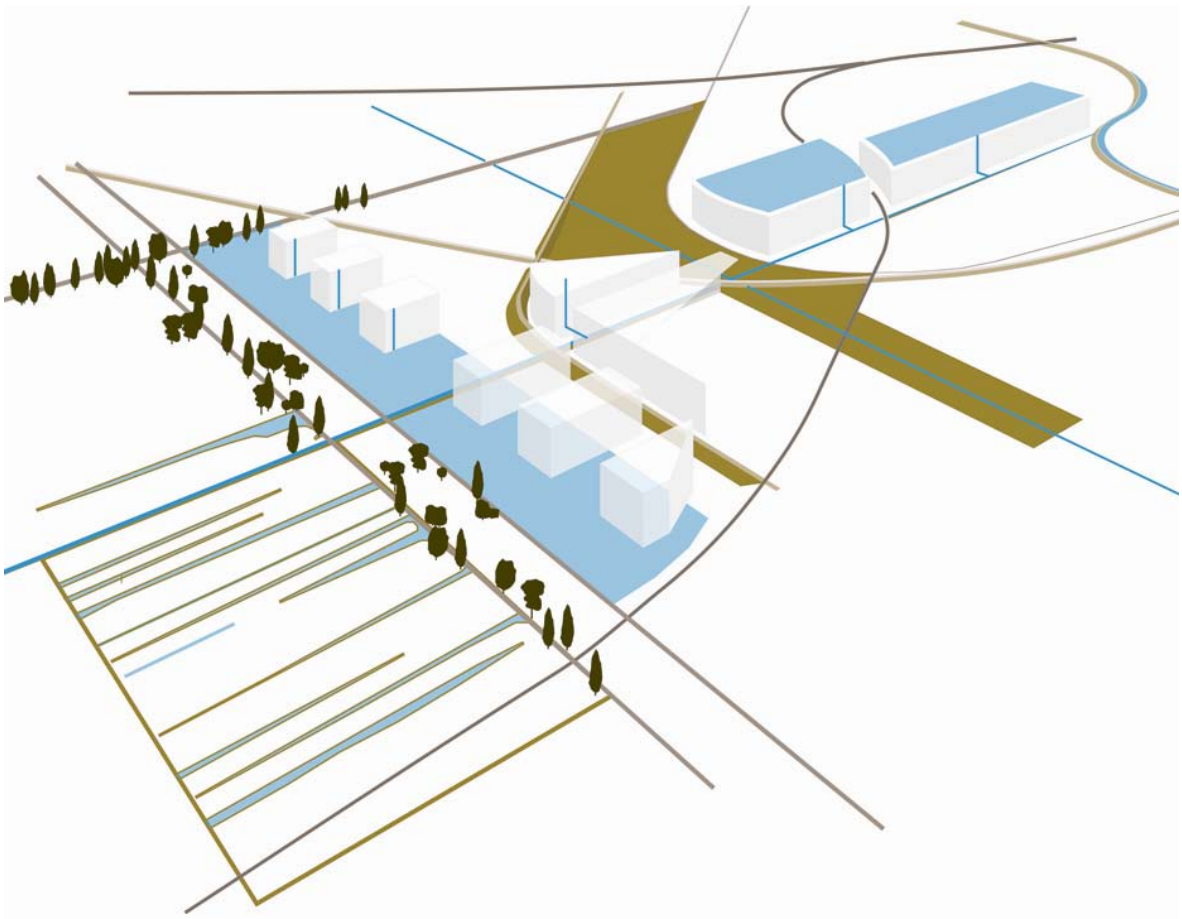
Flooding and water safety: In total 1800 houses will be built, some close to the river the Hollandsche IJssel, some on weak peat soil. The new provincial road, the N219, on the eastern side of the housing development will be raised by 1.5 meters, creating an enclosed basin. The ground doesn't need to be raised within the basin. A unique residential environment can be created with a substantial amount of water which takes the natural peat landscape into account. This solution will stop subsidence of the peat soil. However, this construction method will involve more risks and investment in the initial phase, but savings are expected since there is no need for sand and maintenance will be cheaper.

Crystal clear water - dwellings

Flooding: This concept for a high quality residential environment caters for 1300 houses in the Rode Waterparel area (Red Water pearl), where water plays a prominent role. The water level will be raised by one meter, whereby the contours of the ridges of the original creek bed will become more visible. Rainfall can cause parts of the area to flood periodically. Three types of houses have been developed, each tailored to its typical geomorphologic structure and with additional technological features.



Overall picture of the concept masterplan according to the compartmentalization method at Nieuwerkerk Noord, incorporating the raised N219 to the east and maintaining the existing watercourse structure within the area.



Birds eye view of the "Climate Engine Gouweknoop" with blue-green cross, water reservoir and water storage on rooftops.

Climate Engine Gouweknoop

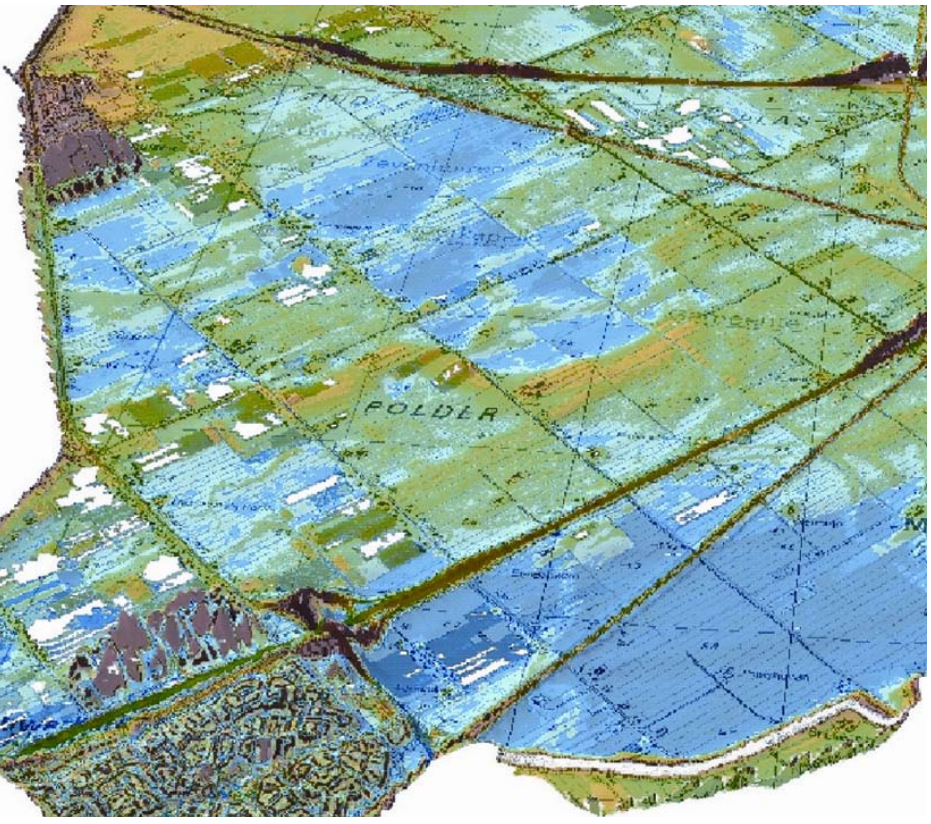
Robust, climate proof natural reserves, water shortages and increase in temperature: The Gouweknoop is designated for intensive housing development. A park and a canal through the Gouweknoop are crucial in linking the various elements in the ecological structure within and outside the polder. Rainwater can be stored on a large scale in seasonal storage facilities and in "water towers" within buildings. When drought hits, this water can be used to keep natural reserves within the Waterparel wet and to provide cooling in the Gouweknoop itself.

Estimation of costs and benefits

The costs of these adaptation strategies include the direct investment cost, related to direct costs of flood protection measures (sand suppletions, creation of raised infrastructure) and the purchase of land to create additional water storage or nature areas. Avoided damages were estimated by taking the discounted sum of the expected annually avoided damage costs over a period of 100 years. A stated-preference valuation study was conducted to elicit values (of characteristics in the Zuidplaspolder) from residents living in or close to the Zuidplaspolder. When considering the total area of the Zuidplaspolder, the main factors in the cost-benefit analysis (CBA) proved to be the avoided damage costs and avoided costs of sand suppletion to elevate the area. Also the benefits from creating additional nature and water areas were considerable. Overall, the adaptation strategy had a positive net present value. Therefore the Hotspot project recommended the development of adaptation projects as one integrated adaptation strategy.

Results

Despite this net positive result, implementation of these supplementary climate-related measures cannot be taken for granted on the lower scale. Merging long term interests into development plans demands close attention right up to the implementation stage. Using a "workshop" like Xplorelab is a tried and true method for achieving this. Climate resilience is not a standard, but a way of working. Involving the right partners at an early stage and a creative attitude is crucial. Recently the national government decided to support this way of working by granting 24 million euro for implementation of sustainable and climateproof pilots, including in the south western (Nieuwerkerk) and central part (Rode Waterparel) of the Zuidplas.



Zuidplaspolder after raising water level until the seepage pressure in all areas is lowered

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