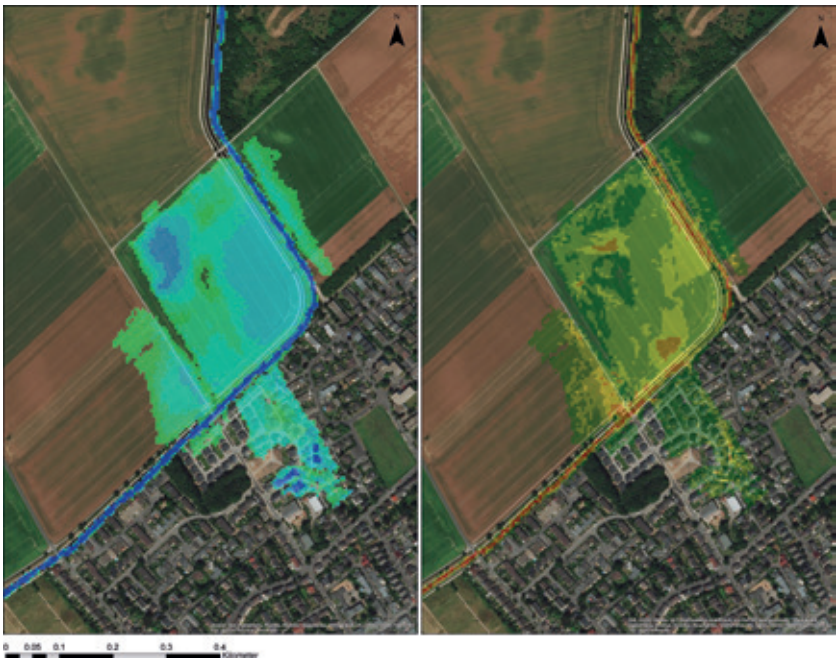
Research. Transfer. Sustainabilty.

Combined modeling in the area of Cologne

Cologne boundary canal – Hydrodynamic calculation of the Cologne boundary canals on the left bank of the Rhine for Planhorizonte 2030



Potential flooding area in the area of the Cologne edge canal made by 2D modelling.
*Left: water level [m] (max. >2,1 m), right: water flow velocity [m*s-1] (max. >1,06 m*s-1). FiW e. V.*

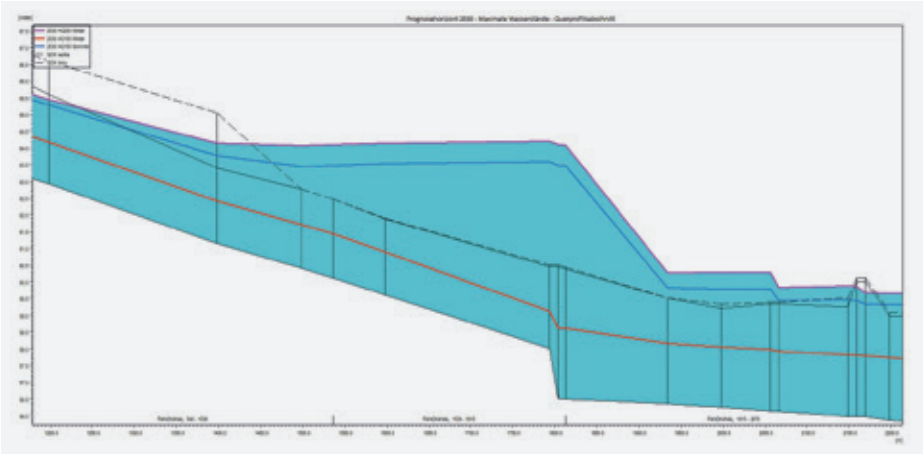
In the context of climate change and urbanisation, it is important to keep the capacity limits of existing drainage systems under continuous review. With regard to the increase in extreme weather events such as heavy rainfall and droughts in combination with increasing land sealing, coupled modelling offers a good opportunity to run through various future scenarios by changing influencing factors.

Overall objective

On behalf of the Zweckverband Kölner Randkanal and the Zweckverband Südlicher Randkanal, the inspection and assessment of a backwater risk was carried out. This involved the localised overflow areas of the Cologne peripheral canals on the left bank of the Rhine, which had been identified in 2004/2005. For the project Planhorizont 2030, three heavy rainfall scenarios were considered, taking into account future land development, climate change and demographic change. Based on specific data from the Federal Statistical Office and the official real estate cadastre (ALKIS), the development of land sealing was integrated into the model. The development of the regional climate models and different cases are based on the fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and the results of KOSTRA-DWD-2010. This enabled assessments of the impacts of precipitation events and their development up to 2030, even in case of heavy precipitation levels.

Results

Two particularly flood-prone areas within the catchment area could be modelled by the coupled sewer network surface modelling „MIKE Flood“. The effects on acutely



Cross section of the 1D modeling of a station section along the Cologne boundary canal. Comparison of the forecast horizons for 2030 for a one hundred year and a two hundred year summer and winter.
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threatened areas in the event of a two-hundred-year heavy rainfall event were presented and evaluated for Planungshorizont 2030. The number of areas at risk of flooding in the drainage area of the Cologne edge canal is notable increasing.

Project overview

PROJECT TITLE

Cologne boundary canal – Hydrodynamic calculation of the Cologne boundary canals on the left bank of the Rhine for Planhorizonte 2030

PROJECT PERIOD

10/2017 – 06/2021

CUSTOMER

Zweckverband Kölner Randkanal; Zweckverband Südlicher Randkanal; Stadtwerke Hürth AöR

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STATUS

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