Models [#7]

This document describes the content in the "Models" folder. The folder contains two Mike Urban models and a SWMM model.

Mike Urban

The Mike Urban model is optimized to run with the Mike Urban MOUSE engine, version 2019 update 1. The model can also be run with the Mike1D simulation engine. Further details are given in (Pedersen et al., 2021).

Mike Urban has recently been decommissioned and replaced by a new simulation environment called Mike Urban+ (MU+). Run-able MU+ models version 2020 Update 1 have also been made – only two minor direction-errors in pipes were discovered and fixed – but otherwise not checked.

Mike Urban model of the system anno 2009

The old system represents the system before the construction in 2010 of a large underground storage-pipe and basin. The conceptual sketch of the system in 2009 is illustrated in Figure 1 (a redrawing of Figure 3 in Pedersen et al. (2021)). The Mike Urban model of the system in 2009 is based on the model from app. 2020 and main pipes are redrawn following the structure of Figure 1. The Mike Urban model anno 2009 is therefore not entirely as it was in 2009, as pipes could have been relined etc. during the years.
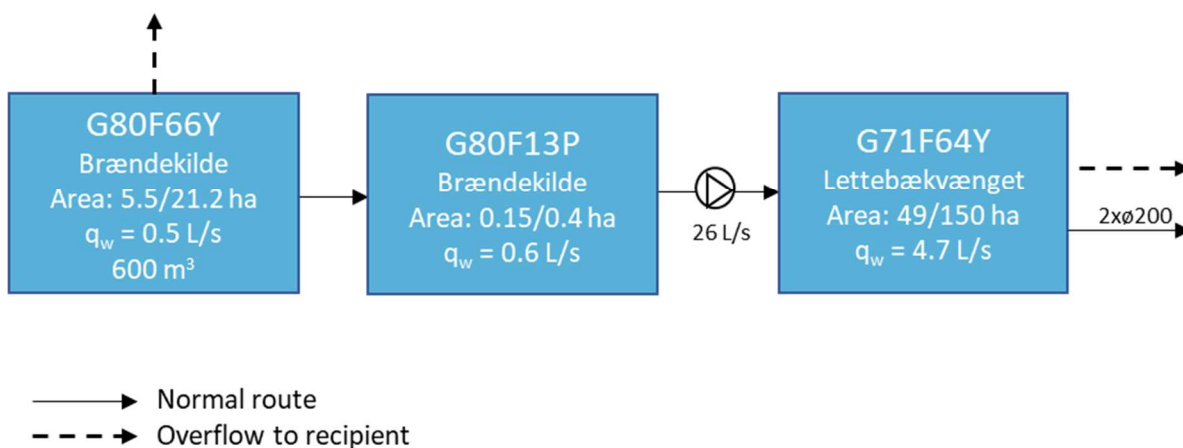

Figure 1: System description of the area in 2009.

Mike Urban model of the system anno 2020

This model represents the system as it looked medio 2020, but it is a good representation of the system from 2010 and onwards.

SWMM

The SWMM model is a re-creation of the Mike Urban model of the system anno 2020, created using SWMM version 5.1.014. Details about the models can be found in (Pedersen et al., 2021). Note that the parameters for the infiltration is currently set extremely high so that runoff pervious areas will not appear. This was done in order to make the model response to rainfall similar to the Mike Urban model.

Geodetic reference system

The data provided is in coordinate system ETRS89 UTM 32N and with reference level DVR90 (DADSE (Danish Agency for Data Supply and Efficiency), 2020). For the levels in the urban drainage system the system was earlier measured in DNN (Danish normal zero) but is now converted to DVR90. The difference in these two reference levels is 0.081 m (DVR90 = DNN – 0.081m).

References

DADSE (Danish Agency for Data Supply and Efficiency): Geodetic coordinate systems used in Denmark, [online] Available from: https://eng.sdfe.dk/product-and-services/professional-users/ (Accessed 30 November 2020), 2020.

Pedersen, A. N., Pedersen, J. W., Vigueras-Rodriguez, A., Brink-Kjær, A., Borup, M. and Mikkelsen, P. S.: The Bellinge data set: Open data and models for community-wide urban drainage systems research, Earth Syst. Sci. Data, doi:10.5194/essd-2021-8, 2021.