



A Generic Hydrological Model for a Green Roof Drainage Layer

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ABSTRACT

A rainfall simulator of length five metres and width one metre was used to supply constant intensity and largely spatially uniform water inflow events to 100 different configurations of commercially available green roof drainage layer and protection mat. The runoff from each inflow event was collected and sampled at one-second intervals. Time-series runoff responses were subsequently produced for each of the tested configurations, using the average response of three repeat tests.

Runoff models, based on storage routing ($dS/dt = I - Q$) and a power-law relationship between storage and runoff ($Q = kS^n$), and incorporating a delay parameter, were created. The parameters k , n and $delay$ were optimized to best fit each of the runoff responses individually. The range and pattern of optimized parameter values was analysed with respect to roof and event configuration. An analysis was performed to determine the sensitivity of the shape of the runoff profile to changes in parameter values. There appears to be potential to consolidate values of n by roof slope and drainage component material.

KEYWORDS

Urban drainage, SUDS, green roof, drainage layer, detention, modelling