



Experimental Analysis of Green Roof Substrate Detention Characteristics

Marcus HN Yio¹, Virginia Stovin², Jörg Werdin³ and Gianni Vesuviano⁴

¹ Former Undergraduate Student, University of Sheffield, UK

² University of Sheffield, UK, v.stovin@sheffield.ac.uk

³ ZinCo, Germany, joerg.werdin@zinco-greenroof.com

⁴ University of Sheffield, UK, cip09gmv@sheffield.ac.uk

ABSTRACT

Green roofs may make an important contribution to urban stormwater management. Rainfall-runoff models are required to evaluate green roof responses to specific rainfall inputs. The roof's hydrological response is a function of its configuration, with the substrate – or growing media – providing both retention and detention of rainfall. The objective of the research described here is to quantify the detention effects due to green roof substrates, and to propose a suitable hydrological modelling approach.

Laboratory results from experimental detention tests on green roof substrates are presented. It is shown that detention increases with substrate depth and as a result of increasing substrate organic content. Model structures based on reservoir routing are evaluated, and it is found that a one-parameter reservoir routing model coupled with a parameter that describes the delay to start of runoff best fits the observed data. Preliminary findings support the hypothesis that the reservoir routing parameter values can be defined from the substrate's physical characteristics.

KEYWORDS

Detention, green roof, modelling, substrate, SUDS, Urban drainage