

Impact of urbanization on flood vulnerability in a shallow groundwater catchment

AMILA P. BASNAYAKA¹, R. SARUKKALIGE¹ & I. WERELLAGAMA²

1 Department of Civil Engineering, Curtin University, GPO Box U1987, Perth, Australia

a.basnayak@postgrad.curtin.edu.au

2 Department of Civil Engineering, University of Peradeniya, Sri Lanka

Abstract Rapid urbanization of modern cities has changed their urban hydrology leading to urban floods. Assessment of flood vulnerability in urban catchments is complicated with urban infrastructure. Urban hydrology of the Central Catchment, size 248 ha in a rapidly urbanizing city, Canning Vale in Western Australia was assessed using a numerical model. The study combines 2D overland flow elements and 1D drainage networks to represent urban catchment. The model was used to investigate the impact of the land use changes, presence of shallow groundwater, and urban infrastructure on urban hydrology. Results show that shallow groundwater plays a main role in urban flood process in Canning Vale. Results of the study were used to develop flood vulnerability maps while recommending the necessary improvements to the urban storm water system, and will assist local city council decision-makers in coming up with better land management concepts to minimize anthropogenic stress.

Key words stormwater management; 2D modelling; urban hydrology; flood mapping; Western Australia