Modelling of surface run-off using SWMM and GIS for efficient stormwater management

Ram Suhawan Patel*, Sonia Taneja, Jagdish Singh and Shashikant Nishant Sharma

Department of Planning and Architecture, Maulana Azad National Institute of Technology, Bhopal 462 003, India

The management of rainwater is of utmost importance in the current climate change scenario. This study assesses the current stormwater management of the Maulana Azad National Institute of Technology (MANIT) campus, Bhopal, Madhya Pradesh, India. It examines the efficiency of the management system with the help of stormwater management model (SWMM) and geographic information system (GIS) modelling. For this study, we have adopted a regional approach (whole campus) of MANIT for stormwater analysis. The quantitative interpretation of surface run-off analysis uses the SWMM model and Arc-GIS at various outfall nodes and proposes planning interventions and strategies for sustainable stormwater management.

Keywords: Educational campus, efficient management, regional approach, stormwater modelling, surface run-off.

drainage network and rainfall drainage[7]. The negative impacts of the traditional urban stormwater management system are leading to degradation of the natural environment[8]. Paved surfaces are increasing local water flow in stormwater, which further contributes to urban flooding, and simultaneously, natural water bodies and vegetated areas are getting converted to paved surfaces in cities. It is necessary to develop an alternative urban stormwater management approach[9]. Increasing percolation of water is a long-established method of stormwater run-off management. There are many benefits of using rainwater harvesting (RWH) as an urban run-off management tool[10].

Global water governance is giving more weightage to integrated water resources management, basin approaches, decentralization and the involvement of multiple stakeholders for better management[11]. Remote sensing