# Hydrological Modeling of Rainfall-Watershed-Bioretention System with EPA SWMM

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Water resources should be protected for the sustainability of water supply and water quality. Human activities such as high urbanization with lack of infrastructure system and uncontrolled agricultural facilities adversely affect the water resources. Therefore, recent techniques should be investigated in detail to avoid present and future problems like flood, drought and water pollution. Low Impact Development-Best Management Practice (LID-BMP) is such a technique to manage storm water runoff and quality. There are several LID storm water BMPs such as bioretention facilities, rain gardens, storm water wetlands, vegetated rooftops, rain barrels, vegetative swales and permeable pavements. Bioretention is a type of Low Impact Developments (LIDs) implemented to diminish adverse effects of urbanization by reducing peak flows over the surface and improving surface water quality simultaneously. Different soil types in different ratios are considered in bioretention design which affects the performance of bioretention systems. Therefore, in this study, a hydrologic model for bioretention is developed by using Environmental Protection Agency Storm Water Management Model (EPA SWMM). Part of the input data is supplied to the hydrologic model by experimental setup called Rainfall-Watershed-Bioretention (RWB). RWB System is developed to investigate the relation among rainfall, watershed and bioretention. This setup consists of three main parts which are artificial rainfall system, drainage area and four bioretention columns with different soil mixture. EPA SWMM is a dynamic simulation model for the surface runoff which develops on a watershed during a rainfall event. The model is commonly used to plan, analyze, and control storm water runoff, to design drainage system components and to evaluate watershed management of both urban and rural areas. Furthermore, EPA SWMM is a well-known program to model LID-Bioretention in the literature. Therefore, EPA SWMM is employed in drainage and bioretention modeling. Calibration of hydrologic model is made using part of the measured data in RWB System for drainage area and for each bioretention column separately. Finally, performance of the model is evaluated by comparing the model results with the experimental data collected in RWB system.