

Assessment and management of urban flood using detention ponds (case study: Rabat Karim city)

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Abstract

Urban runoff management is amongst the important discussions of the day in the area of urban infrastructure expansion and sustainable development. Flooding and contamination risks are increased following the urban development and the resultant reduction in surface waters infiltration. One challenge of the surface water collection systems pertains to the increase in the channel dimensions or the diameter of the collection network pipes for the accomplishment of which the municipalities are to make a lot of costs. The application of the best management practices (BMP) such as permeable pavement and water detention ponds causes reductions in surface runoffs, transferring of the contaminants, costs and flood damages. In the present study, surface water collection network in Robat Karim County for stormwater control is firstly simulated in SWMM Software Package using a precipitation piping network for a 10-year return period. Then, a return period of fifty years was exerted in line with the risk reduction and sustainable development. The network was simulated optimally in two states for stormwater control using pipe diameter increase and designing and construction of certain tanks. The comparison of the obtained results indicated that the application of detention tanks, as compared to the increasing of the pipes diameters, leads to the simultaneous reductions in the quantitative flood risk and economic costs and the possibility of storing water to be used in green spaces.

Key words: Flood Management; Collection Network; Surface Water; Risk; detention ponds

1. Introduction

Besides reducing the regional permeability and preventing the proper feeding of the groundwater, urban development via cutting the trees and destroying the vegetative cover