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DESIGN COMPARISON OF EXPERIMENTAL STORM WATER DETENTION SYSTEMS TREATING CONCENTRATED ROAD RUNOFF

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Abstract:

Urban drainage systems are vital infrastructure assets, which protect our cities from flooding and transmission of waterborne diseases. The objective of this research was to assess the treatment efficiencies of experimental stormwater detention (extended storage) systems receiving concentrated runoff that had been primary treated by filtration with different aggregates. Five detention systems with different packing order arrangements of aggregates and plant roots were used in the system to test the effects of gravel, sand, ecosoil, block paving and turf on the water treatment performance. Inflow water, polluted by road runoff, was collected by manual abstraction with a 2 liter beaker from randomly selected gully pots the near by main roads. Several parameters such as BOD5, NO3, PO4, NH4, SS, TS, DO, pH, EC, NTU and temperature were examined based on standard method book. Results showed that concentrations of biochemical oxygen demand (BOD5) in contrast to suspended solids (SS) were frequently reduced to below international secondary wastewater treatment standards. The BOD and SS concentrations within the outflow from the planted system compared to the unplanted gravel and sand systems were similar. However, BOD in the outflow of system 5 was lower than other systems. The denitrification process was not completed. This resulted in higher outflow than inflow nitrate-nitrogen concentrations. An analysis of variance indicated that some systems were similar in terms of most of their treatment performance variables including BOD and SS. It follows that there is no need to use additional aggregates with high adsorption capacities in the primary treatment stage from the water quality point of view.

Keywords:

[Environment](#) , [hydrology](#) , [water resources](#) , [infrastructure planning](#) , [storm water](#)

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