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Design and Construction Experiences With Three Variations of Austin Style Sand Filters in the Transportation Environment

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DESIGN AND CONSTRUCTION EXPERIENCES WITH THREE VARIATIONS OF AUSTIN STYLE SAND FILTERS IN THE TRANSPORTATION ENVIRONMENT

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ABSTRACT

The California Department of Transportation (Caltrans) has initiated a three year pilot project to investigate the water quality performance of two Austin Sand Filters designed incorporating alternative configurations and/or alternative construction materials to reduce capital costs while maintaining water quality performance. Two test sites in Northern California have been selected for the pilot project. Caltrans designed and constructed a gravity, earthen embankment, partial sedimentation Austin Sand Filter (EPSF) to treat storm water runoff from a highway site. A partial sedimentation Austin Sand Filter has one basin that serves as the sand filter and the sedimentation area. Additionally, Caltrans designed and constructed a gravity, earthen embankment, full sedimentation Austin Sand Filter (EFSF) to treat storm water runoff and snow melt runoff from a maintenance station facility. A full sedimentation Austin Sand Filter has separate sedimentation and filtration basins. Similar filter media was placed in each sand filter. At each sand filter site, storm water collection systems were installed at influent and effluent points and equipped with automated samplers. Water quantity and quality data from flow-composite samples of the storm water runoff were collected and evaluated during representative storms. The quantity and quality of the effluent was compared to influent runoff to assess removal efficiency. The three year pilot project is one of two projects by Caltrans that investigates the water quality performance of Austin Sand Filters. In an earlier study, Caltrans investigated the water quality performance of two gravity, concrete-boxed, full sedimentation Austin Sand Filters (CFSFs). The construction and operating costs along with the water quality performance of these two sand filters were documented. This paper presents: (a) a discussion of the design methodologies for the full and partial sedimentation Austin Sand Filters; (b) comparison of construction costs between three variations of Austin Sand Filters (EPSF, EFSF, and CFSF); (c) the preliminary water quality data for the Northern California pilot project; and (d) a preliminary comparison of water quality performance between the Northern California pilot project and the Southern California pilot project.