In-Channel Sediment Basin Performance Evaluation using Large-Scale Testing

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Abstract: Under the National Pollutant Discharge Elimination System Construction General Permit, construction developers must implement stormwater pollution prevention plans to minimize downstream implications from site discharge. Sediment basins are a temporary sediment control practice typically employed on construction site perimeters to detain sediment from stormwater runoff before discharge. Sediment basins are heralded in the construction industry for effective sediment capture; however, design and installation techniques vary nationwide. Researchers at the Auburn University Erosion and Sediment Control Test Facility (AUESCTF) are currently examining the performance of in-channel sediment basins, which minimize the site footprint and resources, and are common in the Midwest. This project follows a field-monitoring effort of sediment basins on the highway expansion of U.S. 30 in Tama County. From field data, water samples indicated negligible turbidity and total suspended solids reduction during residence. Site basins were constructed with earthen berms in the perimeter channels to minimize site footprint and dewatered through perforated riser pipes but had no other structural components.

The current project aims to quantify improvements through large-scale, controlled flow and sediment introduction testing. Treatments to the basin include (1) upstream forebay, (2) geotextile lining, (3) porous flow baffles, (4) a floating surface skimmer, (5) flocculant, and will be evaluated for the most feasible and effective combination for site implementation. The basin will be subjected to first flush and overflow events during testing. The analysis will include water quality and soil retention data. Research findings are expected to guide the design and implementation of effective, in-channel sediment basins for enhanced environmental stewardship during construction.

Key Words: sediment basin, sediment control, construction, stormwater

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