

# Nicholas C. Olson

Civil Engineering, IT, 2008

*Mentor: John S. Gulliver, Ph. D., P.E.,*

Department of Civil Engineering

## *Performance of Infiltration Measurement Devices*

Rain gardens are bio-retention basins that are commonly used as a stormwater best management practice (BMP). BMPs are used to reduce stormwater run-off that can cause flooding, pollutant transport, etc., and thus the ability of the basin to infiltrate water is paramount. The capacity of the basin can be determined from measuring surface infiltration rates. Changes in these rates are used to assess whether the BMP needs operational changes or maintenance.

Two infiltration measurement devices used in this research were the Modified Philip-Dunne Infiltrometer (MPD) and the Minidisk Infiltrometer (Decagon Devices). The two infiltrimeters were used to determine the hydraulic conductivity ( $K_s$ ) of the soil.  $K_s$  is a constant derived from Darcy's Law that is empirically found for a soil and determines how fast water can infiltrate. The performance of the infiltrimeters was determined by their ability to measure  $K_s$  compared to a baseline measurement technique (flood test). The MPD and Minidisk were tested under homogeneous and non-homogenous conditions by increasing the level of macroporosity in the soil.

It was determined that up to 0.3% level of macroporosity the two infiltrimeters behaved similarly and consistently. The infiltrimeters, however, were unaffected by a restrictive layer in the soil that became present after increasing levels of compaction were found. The presence of this layer was found from the decreasing levels of  $K_s$  measured by the flood test.



Poster Number:

Session: