

## Villanova University Stormwater Best Management Demonstration and Research Park

Villanova University has worked with the Pennsylvania DEP to build a Stormwater BMP Park. The BMP Park has been the host of many educational tours. Currently the park consists of three sites; a Stormwater Wetlands, Bio-Infiltration Traffic Island and a Porous Concrete site. There are plans to soon expand the park with the addition of an infiltration trench and a rooftop garden. The BMP Park plays an important role in advancing stormwater management practices in Pennsylvania and beyond. Innovative stormwater practices like those in the Demonstration Park are relatively new technologies that are not yet fully accepted by the engineering community. The purpose of the BMP Park is to serve as both an example of successful BMP implementation, and as a research facility to quantify the performance of the BMPs. The BMP Park also provides valuable insight into the design and construction considerations of such BMPs. This information will be used in the development of design criteria and guidelines for stormwater BMPs. The goal is that through demonstration and research the BMP park will help innovative stormwater practices become commonplace in engineering design.

The Stormwater Wetlands, constructed in 1999, was the first site built. It is a retrofit of a traditional dry detention basin. The site has a steady year round baseflow. Previously this baseflow was piped through an underdrain below the detention basin. Now this same baseflow provides the much needed flow to sustain a wetland. The wetland consists of a sediment forebay, meandering flow paths and the outlet structure from the original detention basin. The outlet has been slightly modified to both sustain the wetland water surface elevation and still maintain the original flood control hydraulics of the original detention basin design. Currently the site is being monitored for both water quality and water quantity data. There is also storm event based sampling occurring at the Wetlands.



The Bio-Infiltration Traffic Island was the second research and demonstration site built. It was constructed in 2001. The site was once a typical mounded grassy median in a parking lot. The existing



soil was simply dug out to a four foot depth and mixed with sand to increase the void space and hydraulic conductivity. The mixed soil was placed back in the Traffic Island and a depression for additional surface storage was created. Runoff is directed into the Traffic Island by two curb cuts and a modified storm sewer inlet which now both diverts the storm sewer's

flow into the BMP and permits flows which exceed the capacity of the BMP to bypass the BMP and flow downstream to an existing dry detention basin. The Traffic Island is being monitored for water quantity data with plans for a future water quality study. The ongoing research of this BMP has shown it to be an extremely effective low cost BMP.

The Porous Concrete site is the most recent addition to the BMP Park. Porous Concrete is similar to a regular concrete mix with the fines removed to create void space. The site was a retrofit to a courtyard area between two dormitories on campus. The area was previously paved with standard asphalt which created large amounts of stormwater runoff and



and piped it directly to a local first order stream. Now there is nearly no runoff from the site even in larger storms of 2 inches or more. Rainfall now flows through the porous concrete and into rock filled infiltration beds where the water slowly soaks into the ground. The gutters of the adjacent buildings are piped directly into these infiltration beds. The runoff that once impacted local streams now helps maintain baseflow in these same streams.

To learn more about the individual BMPs please browse our stormwater BMP websites. Contact Dr. Robert Traver at [robert.traver@villanova.edu](mailto:robert.traver@villanova.edu) for more information.