

# Impact and Research

- Studies have shown that swales can significantly **improve the quality of runoff**.
- Other studies have shown that swales are very effective at **increasing infiltration rates**.
- This swale is equipped with monitoring equipment to document how effective the project has been at improving the water quality of the runoff:
  - ⇒ Two automatic samplers have been set up by the inlet and outlet of the bioswale to monitor the elevation of the water at the inlet and outlet. Researchers will calculate the amount of water that travels through the inlet.
  - ⇒ The automatic samplers are programmed to collect water samples every thirty minutes during a rain storm. The samples from the inlet and the outlet will be analyzed for nutrients and bacteria.
  - ⇒ The results from the nutrient and bacteria tests will be compared (inlet versus outlet) to look at improved water quality as the runoff travels through the bioswale. The flow calculations at the inlet and outlet will be used to measure any infiltration that occurs in the bioswale.



Monitoring equipment at the inlet of the swale

## Demonstration Horse Farm

In 2005, a team of Rutgers researchers affiliated with the Equine Science Center and several state and federal agencies began a multi-year collaboration. They sought to develop a demonstration working horse farm on the George H. Cook Campus that would use agricultural Best Management Practices (BMPs) to provide solutions to many of the problems facing farm owners and stable managers today.

Our researchers have identified numerous environmental issues, such as preserving water quality, proper nutrient and waste management, farm and pasture management, weed control, fencing, pasture rotation, and soil enrichment. These are just a few of the many facets of farm management that the project will address.

### Goals of the Project:

- To develop and maintain the facility as a Demonstration Horse Farm by implementing BMPs that address pasture management, stormwater, and manure issues.
- To conduct educational programs at the Demonstration Horse Farm that demonstrate the implementation of BMPs to enhance and maintain pasture and water quality.
- To utilize the farm site to conduct research on new forage varieties.
- To provide learning experiences and educational programs for the public.

For more information, visit <http://esc.rutgers.edu>.

The project was funded by:



## Best Management Practice Demonstration Horse Farm



## Construction of the Biofiltration Swale



## Situation

- Stormwater management is a growing concern for equine facilities.
- Regulators are concerned that stormwater runoff carries nutrients and pathogens from these facilities into local streams and lakes.
- Equine facilities can be considered a potential source of bacteria and nutrients for non-point source pollution.
- As the runoff water travels over the surface of an equine facility it collects soil, nutrients and bacteria from the surface.
- The runoff from the Demonstration Horse Farm flowed through a pipe that led directly to Weston's Mill Pond. The runoff was not treated before it was discharged. The runoff carried the soil, nutrients and bacteria with it when it flowed into the pond, thereby threatening the health of this waterway.



*Before the bioswale*

## Action

- A **bioswale** is a shallow channel of graded soil with vegetation. The swales are graded at a shallow slope and often have meandering paths. This is meant to lengthen the distance that stormwater runoff travels before it hits a local waterway, increasing the chance it will infiltrate before discharging into the waterway.



*Shortly after bioswale construction*

The Demonstration Horse Farm bioswale was designed and constructed to collect the stormwater runoff from the surrounding paddocks and treat it before the water is discharged to the local waterway.

- The bioswale is 33 feet wide and 850 feet long. The swale begins upstream of the roadway and travels underneath the road to the end of the farm to a stormwater sewer inlet.
- A sandy soil mix with a 10 to 15% organic content was used in the bottom of the bioswale, which was covered with erosion control matting.
- Native grasses (soft rush and switchgrass) were planted along the berm and bottom of the swale.
- The bioswale was designed to handle the stormwater runoff from the paddock that would result from a New Jersey Water Quality Design Storm (1.25 inches of rain over two hours).

## Construction



*Two pipes allow the swale to go under a farm road*



*Digging the channel*



*The channel has been graded, seeded, and had erosion control matting added*