

SEDIMENTATION CHAMBER

Due to the nature of the work at the DPW site, the facility has excessive sediment, which during normal activities may be more than the swale can handle.

The volume of stormwater runoff from the impervious surface and peak runoff rate (7.3 cubic feet per second) is also significant.

Therefore, the sedimentation chambers act as pre-treatment for the swale, reducing volume and sediment. The sand filters then release water slowly over time.



COSTS

- The cost of the sediment chambers was significantly reduced by the willingness of the Parsippany-Troy Hills DPW staff to assist with the installation
- The cost of the materials was \$13,693
- The cost of the engineering as conducted with the grant through the Rutgers Cooperative Water Resources Program was \$2,500



MAINTENANCE

The sediment chambers must be emptied on a regular basis. These chambers must be vacuumed out, a task often performed for catch basins by DPW staff. To dispose of the sediment, the DPW would typically mix the sediment with leaf litter at their composting facility.

- By the nature of their function, sediment chambers and pipes may clog.
- Regular inspections are required after each storm to determine how often the chambers need to be cleaned.
- Keeping records of required cleaning will enable the DPW to anticipate when maintenance may need to be done.
- The piping in the sediment chamber system may need to be flushed to clean out the sediment in the pipes.

For more information please contact:

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

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SEDIMENTATION CHAMBER Greening the Department of Public Works (DPW) Facility in the Troy Brook Watershed



The Parsippany Department of Public Works (DPW) facility is approximately three acres. Most of the area consists of impervious surfaces. During the 1.25 inch two hour water quality storm, an estimated 71,275 gallons (9,801 ft³) of stormwater runoff are generated at the facility.

Implementation Project completed by
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NJ Department of Environmental Protection

THE SITUATION



Sediment loading at DPW facilities is often very high. This photograph illustrates sediment at one DPW maintenance yard
Photo credit Pat Rector

The Troy Brook is adjacent to the Parsippany-Troy Hills Department of Public Works (DPW) facility. The parking lot is 66,300 square feet and the entire facility is approximately three acres, the majority of which is impervious surfaces. Approximately 72% of the runoff drains to one corner of the parking lot. A vegetated swale has been installed to help remove pollutants and slow the flow of water into the Troy Brook, but the flow of water into the swale with the sediment the water carries would clog the bioswale. The amount of runoff to this area is approx. 1,600,000 gal/year.



Photo credit Pat Rector

Truck washing material from the parking lot causing erosion prior to the swale entrance.

THE SOLUTION



This area at the mouth of the vegetated swale of the Parsippany Troy-Hills DPW was excavated by the DPW staff to install sedimentation chambers.
Photo credit Pat Rector

The Rutgers Cooperative Extension (RCE) Water Resources Program and Cooperative Extension of Morris County, working with partners at the Township of Parsippany-Troy Hills DPW, installed sediment chambers at the entrance to the vegetated swale.

Sediment chambers are excellent retrofit devices for highly developed sites as they utilize small spaces, can be placed underground and covered with a grate, and usually have two or three chambers. The first chamber is for settling of larger particles, mostly sediment particles. The second chamber may have filters which help to remove pollutants such as total suspended solids and fecal coliform bacteria. The third chamber is where the treated filtrate is discharged through an underdrain system to either a storm drainage system or directly to surface water (U.S. EPA Fact Sheet, 1999)¹.

¹US EPA (1999). Stormwater Technology Fact Sheet.:Sand Filters. Fact Sheet 832F99007. US Environmental Protection Agency, Office of Water, Washington, D.C.

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The Parsippany DPW sediment chamber was modified from the “typical” system due to the nature of stormwater runoff at the DPW Yard.



These concrete boxes were utilized for the sedimentation chambers. They were laid four across and connected by perforated pipes. Water enters the first and slowly continues to the next box, dropping more and more of the sediment as it passes through each box.

Photo credit Pat Rector

These four chambers each allow settling and reduce flow velocity. The water from the parking lot enters the first chamber and will slowly be released to the next chamber and ultimately to the vegetated swale. Each chamber also provides additional filtration and pollutant removal. The chambers are a suitable substitute for sand filters when there are large sediment loads in stormwater runoff like at the DPW site. If sand filters were used, they would quickly clog and require excessive maintenance to be effective at reducing pollutant loads.

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Installation of the sedimentation chamber boxes by Parsippany-Troy Hills DPW staff.
Photo credit Pat Rector

The sedimentation chambers provide a pre-treatment for the vegetated swale, removing sediment prior to the entrance to the swale, which is important for the proper functioning of the swale. Vegetated swales are designed to reduce sediment entry to the stream, and the swale does have several check dams (see Vegetated Swale brochure) to reduce the velocity of water moving through the swale. This allows for sediment to fall out of suspension and settle in the bottom of the swale.



Photo showing the perforated pipes that were used to connect the four chambers.

Photo credit Pat Rector