

Structural Soils and Stormwater Management

Virginia Tech's Mini Parking Lot

What is this?

This two-car parking lot is one of four research sites for a larger project that is **investigating new innovations in stormwater management**. The other demonstration sites are at University of California at Davis, Cornell University, and Mount Tabor Rd. in Blacksburg.



The site was excavated 60 cm deep and geotextile was placed at the bottom.



The Stalite mixture was applied to the site and then overflow drainage pipes were installed 15 cm below the soil surface (35 cm structural soil reservoir). The mixture has 34% porosity and can hold ~4.5 inches of rain.

Traditional parking lots pose challenges to stormwater management:

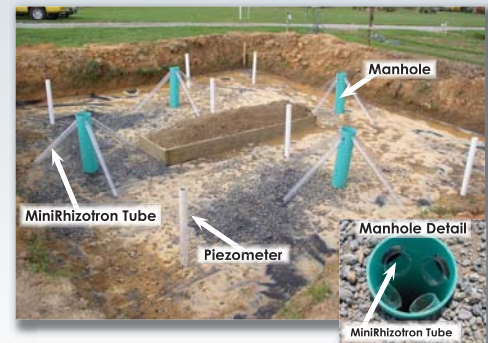
Their impervious surfaces **prevent infiltration** of stormwater and also create runoff. This runoff ultimately ends up in our lakes and rivers, contributing to poor water quality and ecosystem health.

In addition, parking lots have **compacted soils** beneath their pavement which limits tree root growth. This side effect of standard pavement construction is unfortunate because trees can assist in stormwater management by intercepting precipitation (canopy), directing water to the ground (trunks), facilitating soil infiltration (roots), and increasing uptake of stormwater (transpiration).

This parking lot is investigating the effects of structural soils on tree root growth and water drainage.

This parking lot was constructed using **structural soils**. These soils are designed to support the weight of the pavement and cars but also allow for adequate root growth and facilitate the infiltration, storage and recharge of stormwater.

The site was designed so that observation of the tree roots is possible (MiniRhizotron tubes). Water levels and drainage rate are being recorded with the piezometers.



Parking lot before the structural soil was installed showing the manhole and piezometer layout.



"Removable Asphalt" (i.e. pond liner) being installed on the final lot.

To learn more about this project or stormwater management, contact us.

Susan Day
Department of Forestry
sdd@vt.edu
<http://www.cnr.vt.edu/urbanforestry/>

Research Participants:

U.C. Davis:
Qinfu Xiao
Larry Costello
E. Greg McPherson

Cornell:
Nina L. Bassuk
Ted Haffner
Peter Trowbridge

Virginia Tech:
J. Roger Harris
Susan D. Day
Julia Bartens
Joseph Dove
Sarah Dickinson

This project was supported in part by the United States Department of Agriculture Forest Service Urban & Community Forestry Program on the recommendation of the National Urban & Community Forestry Advisory Council.

Support provided by



Poster designed by Sarah Dickinson