CHAPTER 4

RAINFALL TO RESULTS | THE FUTURE OF STORMWATER

Better-than-expected performance transpires at Villanova University

At Villanova University (Villanova, Penn.), a mystery unfolded within the campus’ green infrastructure practices. Bioretention facilities designed to control 25 to 50 mm (1 to 2 in) of rain managed 150 to 175 mm (6 to 7 in). During Superstorm Sandy, Villanova’s sequence of stormwater controls—known as a treatment train—handled much of the storm’s intense rain despite not being designed for it.

Researchers from the Villanova Urban Stormwater Partnership (VUSP) have dived into what factors contributed to this better-than-expected performance. They began by looking at the “runoff curve.” This parameter predicts the amount of runoff generated by lawns and pavements. Based on this method, after a certain amount of rainfall, infiltration stops. However, Villanova researchers have discovered another factor at play.

They found evapotranspiration plays a much more powerful role than originally expected. Evapotranspiration refers to loss of water from soils both by evaporation and plant transpiration. Now the researchers are exploring how to exploit evapotranspiration in the design of green infrastructure practices. These findings may help alleviate concerns about the effectiveness of green infrastructure during back-to-back storm events.

As stormwater management is radically changing in the U.S., VUSP uses research to change good ideas and concepts into engineering practice. “It is good to build a rain garden but better to know how to optimize the design and what performance to expect over the long term,” said Robert Traver, VUSP director.

Kristina Twigg. “Research advances low impact development techniques.”
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