Committee Hearing to Review Stormwater Fees and Implementation

Pennsylvania Senate Environmental Resources and Energy Committee

Statement of

Robert G. Traver, Ph.D., PE, D.WRE, F. EWRI, F. ASCE
Director, Villanova Urban Stormwater Partnership Villanova University
Director, Villanova Center for Resilient Water Systems

25 January 2020

Good morning, Chairman Yaw, Chairwoman Comitta, and committee members. My name is Robert Traver, a professor specializing in Water Resources Engineering at Villanova University, and Director of both the Center for Resilient Water Systems, and the Villanova Urban Stormwater Partnership. I have been involved with education, design, construction, operation, and research of resilient Green Infrastructure Stormwater Control Measures on a day to day basis for at least the last 24 years, and overall stormwater management for over 40 years. My experience includes being a member of the National Research Council (NRC) Committee that authored the report *Urban Stormwater Management in the United States* as well as multiple American Society of Civil Engineering initiatives to include the Hurricane Katrina External Review Panel. The focus of my testimony will be on what is called green infrastructure.

Combined Sewers were created in many urban centers around the world to protect the health of our citizens. Unfortunately, even during small thunderstorms, the mixing of stormwater and wastewater creates a challenge, as the volume generated by the rain falling on roofs and streets is way too large for any treatment system, resulting in overflows. Reviewing some news articles for this testimony, I see that there are 58 separate outfalls here which in 2020 released 584 million gallons of wastewater directly

to the Susquehanna. This is not unique to Pennsylvania. In the US alone over 860 municipalities have combined sewers.

There is good news for the Capitol District and the Commonwealth. Research at Villanova and from others around the world on green storm water infrastructure (GSI) shows that they are effective and resilient when designed, built, and maintained correctly. By GSI, I am referring to rain gardens, green roofs, pervious pavements and other practices that incorporate natural processes to include infiltration and evapotranspiration. We have learned that these processes are a powerful engineering tool, and they have greatly added to our abilities to address issues created by current or past urbanization.

When building GSI in CSO watersheds, every gallon removed is one less gallon that overflows or needs to be treated. Most of our rainfall occurs during smaller storms, so that capturing the runoff from the first inch or so of rain and keeping it out of the combined sewers is effective. So even in storm events that do not overflow, you are still reducing the volume that is required to be treated and the resulting cost. The Philadelphia Water Department has tied their water bill to water used and the impervious surface due to the high cost of treating the stormwater runoff. Nonresidential users can reduce their fees by reducing the impact of impervious surfaces through GSI construction. While this approach by itself will not solve our flooding or stream erosion issues, it does contribute to the solution, and adds substantial benefits to include air quality, heat island, and simply greening an urban core, which are not gained through grey measures.

Villanova Bioinfiltration Traffic Island following a storm event

As an example, one site at Villanova has operated for over 20 years and today is

working as well if not better then when built. Maintenance consists of cutting grasses and raking out leaves once a year, removing invasive species, and eventually will require removal of built up soil. As with any engineered system GSI practices require maintenance. Balance that cost versus the millions of gallons the practice has removed from the runoff, reducing pollutants, erosion, and flooding downstream. Our experience from researching practices at Villanova and in the city of Philadelphia, is that the volume reduction performance regularly outperform their design, leading to reduction of impacts from larger storms. One site at Villanova designed for small rainfalls even removed the great majority of runoff from Superstorm Sandy. Several days of rain means several days of infiltration. Clearly GSI when designed, constructed, and maintained is an effective strategy to address Combined Sewer Overflows.

PWD Bioinfiltration GSI

Thank you for the opportunity to testify. I would be happy to address any questions the Committee might have.

Biographical Sketch

Robert G. Traver, PhD, PE, D.WRE, F. EWRI, F.ASCE

ROBERT TRAVER is a Professor in the Department of Civil and Environmental Engineering at Villanova University and founding Director of the Villanova Center for Resilient Water Systems. His over thirty years of research on green stormwater infrastructure is aimed to improve our engineering practices through understand of the interaction of the climate with the engineering unit processes. He has been the main force in creating a Stormwater Green Infrastructure Demonstration and Research Park on the Villanova Campus and founded the Villanova Urban Stormwater Partnership to enable continuing long-term stormwater research. Many highly cited publications have resulted from the faculty and students through this initiative. Dr Traver believes that research supports and enhances the undergraduate and graduate educational experience. He teaches graduate courses in hydrology, hydraulics, urban storm water management, and undergraduate courses in all facets of water resources

Dr Traver served on ASCE's External Review Panel (ERP) of the Corps investigation of Hurricane Katrina and was a member of the National Academies Committee entitled *Reducing Stormwater Discharge Contributions to Water Pollution*. In 2014 he was honored as the ASCE William H. Wisley American Civil Engineer Award "recognized for his leadership of ASCE's Task Committee on Flood Safety Policies and Practices and editor of the Committee's report, Flood Risk Management: Call for a National Strategy." Dr Traver received his BSCE degree from the Virginia Military Institute, his MCE from Villanova, and his Ph.D. from The Pennsylvania State University. He was honored to receive the Villanova Outstanding Faculty Research Award and continues to serve the profession as an associate editor of the ASCE Journal of Sustainable Water in the Build Environment.