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INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

Demonstrating Net Zero green infrastructure technologies on Fort Riley, KS

What is Green Infrastructure?

Increasing pressure on the nation's water supply and infrastructure have prompted the development and implementation of new stormwater management practices referred to as green infrastructure (GI). GI practices are designed to reduce stormwater runoff by increasing the amount of water that infiltrates through land surfaces or by capturing runoff for reuse or retention. In areas where water is limited, an additional GI benefit is the replenishment of ground water supplies. Examples of GI water management technologies include permeable pavement, rain gardens, and green roofs. GI approaches can be a cost-effective way to reduce stormwater runoff and associated pollutants and protect local waterways.

Green Infrastructure on Fort Riley

On Fort Riley, Kansas, EPA is working with the U.S. Army, U.S. Army Corps of Engineers, Kansas Unified School District 475, and other partners to demonstrate and assess green infrastructure technologies. The Army is installing a permeable pavement parking lot behind Seitz Elementary School on Fort Riley. The lot's permeability is due to the gravel-filled spaces between the pavers, not the pavers themselves.

Left: The completed permeable pavement parking lot behind Seitz Elementary School on Fort Riley. Right: When it rains, stormwater infiltrates through the gravel-filled spaces between these pavers into the ground below.

EPA researchers are monitoring the parking lot to gain information on permeable pavement performance over time. One performance measure is clogging rate, i.e., how fast spaces between pavers clog, impeding infiltration. Another is rainfall capture, i.e., the volume of rainfall runoff that passes through the pavement. An area of particular interest is the potential change in ground water chemistry associated with increased infiltration through the GI pavers into the ground below.

Another component of the project is monitoring the school's existing stormwater capture-and-use system, which is a set of storage tanks that capture rooftop runoff for use in toilet flushing and the cooling tower. The system reduces the potable water demand and simultaneously reduces the site runoff.

Researchers are taking measurements to determine the amount of rooftop runoff captured and changes in the chemistry of the water stored in the tanks.

The project has an educational element. Students at Seitz Elementary School will be given access to the data collected, and the data will be incorporated into the school's curriculum to support learning and lessons aligned to the Next Generation Science Standards.

The EPA-Army collaboration's goals are to further understanding of GI technologies for sustainable water resource management, reduce Fort Riley's water footprint, and explore how GI can be used as an educational platform within schools and communities.

EPA-Army Net Zero Partnership

EPA's Office of Research and Development has a Memorandum of Understanding (MOU) with the U.S. Army as part of their Net Zero Initiative. The initiative calls for installations to produce only as much energy as used, limit freshwater use, increase water reuse, and reduce solid waste generation, i.e., attain "net zero" energy, water, and waste. Under the MOU, EPA is working to demonstrate new and innovative technologies, methods, and approaches that will not only help Army installations achieve Net Zero sustainability goals, but also advance the state of science. Successes will be transferred to other military installations and civilian communities across the country.

Working toward Net Zero Water on Fort Riley

One aspect of achieving Net Zero Water is limiting the consumption of water and returning captured stormwater to the same watershed so that the quality and quantity of regional water resources can be maintained. The EPA-Army Net Zero partners are collaborating with the U.S. Geological Survey and Kansas State University on several other research projects at Fort Riley that work toward the Net Zero Water goals. The projects include demonstration of water reuse technologies; water education and conservation; and containment and control of wastewater for improved water security.

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