



Eastern Mennonite University Harrisonburg, Virginia Water

SCHOOL

Eastern Mennonite University, private, 4-year, 1500, Harrisonburg, Virginia.

ABSTRACT

In June of 2012 Eastern Mennonite University completed construction of a 100,000 gallon storm water management cistern. The \$90,000 project harvests water runoff draining from houses, buildings, roads, and parking lots across 15 acres of university property. The storm water collected in the cistern provides water for four athletic fields in addition to other campus vegetation. The cistern also acts as an aid in flood control for the Park Woods forest which currently suffers from large quantities of storm water that erode intermittent streams running through the woods. Use of the cistern is predicted to collect around 1.7 million gallons of storm water for use as irrigation, saving EMU a projected \$3825 annually, versus purchasing city water for irrigation.

GOALS AND OUTCOMES

The goals of the cistern project are to 1) Minimize erosion in Park Woods, a 6-acre university-owned urban forest on campus 2) Improve water quality from Park Woods that eventually flows to the Chesapeake Bay 3) Collect water for irrigation of athletic fields and landscaping and 4) Aquifer recharge.

As a result of these grant projects University facility planning has taken a much more proactive approach to ensure that Low Impact Design and Best Management Practices are incorporated into project site plans. Future plans anticipate green roofs, created wetland, pervious pavers and possibly additional cisterns for irrigation and/or sanitary flushing.

EMU has just begun to use the cistern, so we cannot say with certainty that all four of our goals will be met, but excepting significant design failure, the first three goals should easily be met. Projected figures from an engineer's study include about 1.7 million gallons of storm water collected in the cistern, meeting just over 40% of athletic field irrigation demand, and about a 50% reduction in storm water runoff volume from the associated 15 acres draining into the cistern.

Positive impacts on the natural environment on campus and downstream include slowing down and reducing the volume of storm water fed into Park Woods and Blacks Run. This will help stabilize stream banks in the forest and lessen the impact heavy flooding has on vegetation in the small urban forest. On a larger scale the project will aid in the restoration of the Chesapeake Bay and in improving water quality in our watershed.

Challenges and Responses

The major challenges were coming up with a design mostly from scratch that addressed the dual functions of water storage for irrigation and waterway protection. Additionally, navigating the

permitting and paperwork required by various government agencies took much more time and was more complicated than initially anticipated.

We met the challenges by calling together a cistern design meeting with a dozen city and state engineers, planning and development officials, as well as a local engineering firm, a contractor, six undergraduate students, and three EMU physical plant employees. This meeting helped identify the trouble spots in the design process and the university chose to contract out the design work rather than do the design in-house as was originally planned. In the process we identified an engineer with specialty in Low Impact Design who we have since employed to consult on a variety of projects.



Campus Climate Action: Your School's Carbon Footprint

No, the project was mostly framed around watershed protection. Reducing the city of Harrisonburg's water treatment volume by 1.7 million gallons would reduce greenhouse gas emissions related to water pumping and treatment, but the limited research done on greenhouse gas emissions related to water treatment seemed to point to a relatively small savings compared to other parts of the university's carbon footprint.

Commentary and Reflection

While the cistern project may not provide an attractive return on investment it does afford the opportunity to maintain green space which is a high value for the campus without excessive use of treated municipal water. Furthermore, a companion concern is both the health of the woods and the stream which eventually flows into the Chesapeake Bay. This cistern will help to manage both the quantity and quality of runoff from our campus and neighborhood. An added benefit has been the knowledge gained by both staff and students who worked on the project.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

EMU Physical plant staff led the planning process, including Director of Physical Plant Eldon Kurtz, Grounds Supervisor Will Hairston and Physical Plant Administrative Assistant Stella Knicely. Professors Tara Kishbaugh and Steven Cesna were consulted on stormwater management issues particular to the university. Student research was conducted by Jakob Zumfeldy (bio-filtration beds) and Katherine Derstine (cisterns and water quality). Virginia Department of Conservation Resources personnel provided technical assistance.

Funding and Resources

Project cost: \$90,000. The cistern project was originally proposed by Plant Director Eldon Kurtz and it quickly garnered support from interested faculty and administrators.

EMU applied for and received a 3-year, \$85000 grant from the National Fish and Wildlife Federation (NFWF) Chesapeake Bay Stewardship Fund awarded through the Virginia Department of Conservation Resources (VADCR) in 2009. The majority of that grant financed the design and construction of the cistern, with EMU matching \$93000 in mostly labor for the several projects funded by the grant including the cistern.

Education and Community Outreach

The NFWF grant was awarded jointly to seven entities in the Harrisonburg Virginia area which necessitated a new collection of partnerships working on watershed protection. Grantees including three city departments, both small private (EMU) and large public (James Madison) universities, and two state affiliated agencies.

EMU is looking for additional funds both internal and grant-sourced to create an educational and recreational trail through campus that will pass nearby the cistern and a half dozen other sustainability projects which will facilitate engagement of local school groups, already coming to the campus natural history museum, in discussions on climate change and watershed protection. The trail will also link an adjacent high school and retirement community to campus, local businesses and a city greenway currently being designed.

CONTACT INFORMATION

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MORE ABOUT YOUR SCHOOL

Campus Sustainability History

The EMU campus features the first LEED-certified “gold” residence halls in Virginia; one of the largest solar installations in the state; edible landscapes featuring asparagus, fig and crab apple trees, grape vines and berry bushes; and a nationally recognized recycling program. Majors like [environmental sustainability](#) and [peacebuilding and development](#) incorporate sustainable conservation practices into real-life studies of our world and global community. In addition, campus initiatives include a campus garden and compost project, creation care council, bike co-op, sustainable food initiative and a student-organized group, Earthkeepers, which focuses on simplifying and implementing environmentally-friendly practices. See more at emu.edu/sustainability.

Image Credit: Jon Styer