

Sustainable Innovations:

Renovation and Water Cistern at Washington Quad

Construction began in the summer of 2007 on the 2.3 acre quadrangle within the South Hill residential community. By Spring 2008, the \$3 million renovation project was complete. Where previously there had been primarily brick and concrete, Washington Quad now has open green space with more trees and shrubs than before. In the center of the quad is an underground 10,000 gallon water cistern that collects rainwater from downspouts off of each of the adjacent buildings. The cistern is connected to an automatic drip irrigation system that provides water to perennial garden beds in the Quad.



Photo credit: Department of Residential Facilities

Environmental

In an effort to actively demonstrate a commitment to the University's larger environmental objectives, the Department of Residential Facilities reused and recycled construction materials throughout the renovation process. Over 3,100 tons of concrete, asphalt, brick, and various tree and plant materials removed during demolition were diverted to reprocessing centers to become crushed stone, mulch, and other supplies for re-use in other construction projects. Approximately 6,400 original sidewalk brick pavers were salvaged and reused in the new brick plazas at each of Washington Quad's three main entrances. The new site design removed over 30 percent of the former impervious concrete and asphalt surfaces, significantly increasing green space in the quad and reducing stormwater runoff. Such runoff is further reduced by collecting the rain water from the 16,500 square feet of roof surfaces from the surrounding buildings. The water is sent through gutters and downspouts to a web of underground collection lines before reaching the 10,000 gallon water cistern. Because the collection surface is so large, it only takes an inch of rainfall to completely fill the cistern.

Economic

In planning, funding, and executing innovative sustainability-related projects such as the Washington Quad landscape restoration, the Department of Residential Facilities intends to better understand practical applications and future costs. For instance, the water from the cistern is dispersed to nearly 5,600 square feet of planting beds with the help of the system's automatic sensors. The buried irrigation piping in each planting bed is designed to allow water to slowly drip into the surrounding soil. Thanks to this system, no potable water irrigation will be needed for trees, plants, or turf. Additionally, many of the trees and shrubs selected for the quad are adaptive to the local climate and therefore require less fertilization and watering to thrive. Had the 2.3 acre area needed to be irrigated, the water bill associated with the quad could average \$1,000 a year.¹

Social

The planting beds were created with a mixture of top soil and organic compost made from food waste. Purchasing the compost from a local supplier whose goal is to recycle organic materials in order to achieve zero waste² helps support a local business and bolster the market for sustainable materials. The renovated space itself provides a more welcoming community gathering place for the residents of the nearby buildings. Washington Quad now includes a volleyball court, barbecue grills, bicycle racks, and benches for people to enjoy the outdoors. There are documented physical and psychological benefits from access to nature and outdoor recreation³ such as lower stress levels and improved quality of life. Residents of the South Hill Community will now be able to reap more of these benefits while strengthening friendship and community ties.

¹ Assuming an average cost of municipal water to be \$2.30 per hundred cubic feet; irrigating between 0.5 and 1 inch per month spring through fall

² "Chesterfield Farms Organic Recycling, LLC." 2008. 26 Feb. 2009. <<http://www.chesterfieldfarmsorganic.com>>

³ Hung, C.-C. and Chang, C.-Y. 2004. A Study of the Restorative Effects of Urban and Natural Recreational Settings. *Acta Horticulturae* (ISHS) 639:235-239