



# Green Infrastructure & Stormwater Management CASE STUDY

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## The Dell at the University of Virginia

**Location:** Charlottesville, VA

**Client:** University of Virginia

**Design Firm(s):** Nelson Byrd Woltz Landscape Architects, Biohabitats of Maryland, Inc.

**Landscape architect/Project contact:** Nelson Byrd Woltz Landscape Architects, Warren T. Byrd, Jr., Principal

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**ASLA Chapter:** Virginia



*Photo: NBWLA*

### Project Specifications

**Project Description:** The Dell is an 11-acre landscape that resurrects a buried stream located at the heart of the University of Virginia, transforming derelict and unused land into a state-of-the-art stormwater pond and forebay system. It is one of three major regional facilities developed under the guidance of the Meadow Creek Stormwater Master Plan prepared by Nitsch Engineering. In addition, the park reintroduces vanishing wildlife habitat, provides

multiple recreation opportunities, mediates between the campus and an adjacent neighborhood,



*Photo: NBWLA*

serves as a memorable entrance for visitors arriving at the University, and functions as a demonstration landscape and Virginia-native ecobotanic garden for students and faculty.

The primary goals of the design were to restore Meadow Creek to a more ecologically productive and daylight condition, to create an effective stormwater treatment facility, and to develop a space that that would become a public recreational and educational amenity in the heart of the historic

campus—all in a relatively narrow corridor of open space. An additional challenge was presented by the very modest budget with which these ambitious goals were to be achieved.

In order to maximize useable field space, basketball, and tennis courts, a limited stormwater capacity was determined for the site. Two-year storm events are accommodated in the stream channel, while runoff from larger storm events is diverted by a flow-splitter into an existing underground pipe that carries the excess water to a larger stormwater treatment facility 0.75 miles downstream. In response to the modest budget, the majority of the plants were installed as plugs, small container sizes, or in seed form, but were closely spaced. This proved to be a fine, perhaps even preferable, method for installation and within a short time the plantings filled in very nicely.

Since its opening, this project has been successful beyond the University's greatest hopes. The park attracts people from the surrounding university and community neighborhoods. Wildlife sightings have been numerous – deer, red fox, ducks, frogs, turtles, fish, insects, songbirds, and great blue heron have populated the waters, edges, and meadow areas in rapid succession. As the stream and pond environment successfully respond to storms of varying intensities, the new Dell is emerging as an exemplar of innovative regional stormwater management.

**Project Type:**

Open space - park

A retrofit of an existing property

**Design features:** Bioretention facility, rain garden, and bioswale.

**This project was designed to meet the following specific requirements or mandates:**

State statute

**Impervious area managed:** 1 acre to 5 acres

**Amount of existing green space/open space conserved or preserved for managing stormwater on site:** greater than 5 acres

**The regulatory environment and regulator was** supportive of the project.

**Did the client request that other factors be considered, such as energy savings, usable green space, or property value enhancements?** The client wished to maintain and enhance the park qualities of the Dell.

### Cost & Jobs Analysis

**Estimated Cost of Stormwater Project:** \$500,000-\$1,000,000 (Public funding: State - partially funded by State of Virginia)

**Related Information:** Not available

**Was a green vs. grey cost analysis performed?** No

**Cost impact of conserving green/open space to the overall costs of the site design/development project:**

By constructing the stormwater basin upstream of the John Paul Jones Arena, the size of the pond could be significantly reduced. So it was more cost-effective to design this regional facility than to manage all the stormwater requirements for the Arena on the project site.



*Photo: NBWLA*

**Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)?** For this project, grey infrastructure was partially replaced with green infrastructure. It is difficult to assess costs/benefits. There are probably some increased costs associated with managing the greener landscape, but the benefits to people and wildlife are greatly increased.

**Number of jobs created:** 1

**Job hours devoted to project:**

Planning and Design: Not available

Construction: Not available

Annual Maintenance: Not available

Other: Project took approximately 12 months to design and 12 months to construct.

## Performance Measures

**Stormwater reduction performance analysis:**

Manages runoff from up to two-year storm events. The Dell Pond can detain up to 194,000 cubic feet (1,451,220 gallons) of stormwater, while excess runoff is diverted to an additional treatment facility.

**Community & economic benefits that have resulted from the project:** In addition to its stormwater management functions, this project is a major enhancement of an existing property from both environmental and aesthetic standpoints. The Dell is more popular than ever as a park for the University community, the neighborhood, and the community at large. Water and wetland environments have created new habitats that attract numerous species of birds and other wildlife. The Dell has served as design inspiration for numerous other institutional stormwater management projects and the Dell provides an educational resource.

## Project Recognition

2009 National ASLA Honor Award for Design; 2007 Virginia ASLA Honor Award; 2004 Maryland ASLA Merit Award; 2006 Virginia AIA INFORM Award of Honor; 2008 Society for College and University Planning (SCUP) Merit Award for Excellence in Landscape Architecture for the Meadow Creek Stormwater Master Plan

## Additional Information

**Links to images:** All photos from NBWLA website.

<http://www.nbwla.com/featured/dell.htm>

[http://www.biohabitats.com/ndg\\_newsite/projectprofiles/The\\_Dell\\_UVA.pdf](http://www.biohabitats.com/ndg_newsite/projectprofiles/The_Dell_UVA.pdf)

Additional landscape benefits:

- Daylights and restores a 1,200 linear foot section of piped stream to a more naturalized profile. The stream meander and vegetated stream banks capture sediment and solids, improving water quality by reducing sediment and nutrient loads downstream.

- Reduces and delays peak stormwater quantity discharge, as evidenced by monitoring data, resulting in a more evenly distributed rate of flow and less harmful impacts on downstream ecologies.
- Reduces Total Suspended Solids loading downstream by 30-92%.
- Reduces Phosphate loading downstream by 23-100%.
- Reduces Nitrate loading downstream by 50-89%.
- Provides habitat and sources of food for wildlife.
- Provides recreational opportunities for members of the University, adjacent residential communities, and thousands of visitors each year.
- Provides an educational resource and learning laboratory for students, particularly those in the School of Architecture, the Department of Environmental Sciences, and School of Engineering and Applied Science. The Dell has been the subject of thesis work, individual and group grant-funded research, academic design work, and is used as an outdoor classroom year-round.

#### Sustainable Features:

- Extensive areas of bioretention filters (rain gardens) upstream from the detention pond purify and increase infiltration of runoff from built upland sites.
- The 0.75-acre, 12-foot deep stormwater pond also mitigates negative impacts on water quality and manages stormwater quantity. Wetland benches and a sediment catchment forebay allow for increased water storage and the reduction in flow rate. This creates successful opportunities for suspended sediment to drop out of the captured water before continuing downstream, thereby protecting the health of downstream ecosystems.
- Highly effective in smaller storm events, the Dell is a key component of a campus-wide stormwater plan for the Meadow Creek watershed. It operates in tandem with an additional stormwater mitigation area that was designed to accommodate larger storm events and receive overflow from the Dell.
- Designed as a native botanic garden, ninety-nine percent of the plants installed at the Dell are native to Virginia. The site is organized into three zones, the upland Mountain zone, the intermediate Piedmont zone, and lower Coastal Plain zone. Each area showcases plants and plant communities indigenous to each of the three major ecological zones of Virginia.
- Many of the plant species are also food sources for native wildlife, supporting many regional species.
- The majority of the materials used in construction, including stone, wood, pavement materials, and crafted metal hardware are local to the area.
- Trees harvested on site were used in the bioengineering of the restored stream channel.

- Significant areas of wetland forest were restored through the implementation of the project.



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