

# Rainscaping in the Sligo Watershed: *A Tour Book*



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This book was produced by the Friends of Sligo Creek, a volunteer-led non-profit organization committed to restoring the water quality, natural habitat and ecological well-being of the watershed. *Sligo Friends*, as a registered 501c3 charitable organization, bring neighbors together to educate, advocate and conduct hands-on work in collaboration with county and state agencies.

## Welcome

Outlined on the following pages, you will find descriptions of raingardens and rainscaping projects which have been installed within the Sligo Creek watershed of Maryland. Sligo Creek is a tributary of the Anacostia and the Potomac Rivers which runs through lower Montgomery and northeastern Prince George's Counties. The area is one of intense urbanization, where apartment buildings, commercial development, school buildings, single family homes and houses of worship have been built very close to the creek bed.

Despite its proximity to urban development, or perhaps because of it, the Creek is beloved by many and forms a giant, green backbone of open space in an area where people are hungry for opportunities to experience nature. A paved hiker/biker path runs parallel to the creek and a tree-lined two lane road runs the complete distance of the park. Playgrounds, ball fields and picnic areas sit at many of the park's busiest intersections. Pathways connect the park to nearby suburban subdivisions. For these and other reasons, the Sligo is always filled with people who visit the creek either by car, bike or foot.

The park is pretty and the park is a great place to play, but the stream inside of it plays an important role in the cityscape, too. Many kinds of wildlife depend upon its water and the trees which line much of its banks. Unfortunately, much of the stormwater in the area is channeled or piped to its banks, and as urbanization in our watershed has increased, stressors on the Creek have increased, too. Each time a new slab of concrete is laid in the watershed, more rainwater heads to creek at a faster rate. Fast water picks up more pollution and carries it farther. Fast moving water also cannot support as much wildlife as slow water, and fast water is more likely to jump the banks unexpectedly. As the variety of wildlife diminishes, water quality begins to suffer. The stream is not able to function as well as it could or should.

No one wants to live near a polluted stream which floods dangerously each time it rains and constantly emits strange smells or is full of disease-causing bacteria. We must act now. By implementing low impact design practices, known as LIDs, residents and building owners near the creek can make a huge difference in the overall health and well-being of the entire urban area. If we can help the creek recover from some of the damage done by more than a century of intense development and ameliorate some of urbanization's negative environmental impacts, we will provide habitat for wildlife, places for families to play and a higher quality of life for all citizens in our area.

By supporting, promoting and publicizing the efforts of those who are using LID practices in the area, we hope to encourage more property owners to try these practices on their own. Towards that goal we hope that these projects will inspire and demystify the process of helping the creek through the use of LIDs.

## **But what is LID?**

Scientists have long marveled at the ability of forests to slow down, filter and even absorb water. Healthy, strong trees and rich soils have the amazing power to clean out pollutants that pass through their root zones. Streams and rivers which are surrounded by such forests often team with life and rarely flood, because the forests themselves act as flood buffers.

In areas where forests have been destroyed or disturbed, water in nearby streams often becomes quickly polluted. In addition, fast moving water can cause erosion problems and flooding begins to occur more frequently.

Low Impact Design (LID) is an innovative stormwater management approach with a simple basic principle at heart: to manage rainfall by mimicking nature instead of fighting against it. One of LID practices is called Rainscapes. Rainscape techniques as described by the Montgomery County Department of Environment seeks to recreate natural ecosystems to help soil capture and filter rain water, which prevents pollution runoff and erosion, while also recharging groundwater supplies. From simple rain barrels to elaborate raingardens, Rainscapes are a wonderful mix of innovative approaches which help conserve our natural resources while creating habitat areas full of beauty and life.

With the exception of the Wheaton Branch Stormwater Management Ponds, all the stormwater management practices within this tour incorporate LID principals. The Wheaton Branch Stormwater Management Ponds were included as an example of a centralized or more traditional development practice to compare with the LID practices. Although the acronym is new, the concepts of LID are based on processes as old as the forests themselves.

## A Quick Glossary

**Rain gardens/Bio-retention systems:** Rain gardens and bio retention systems are specially designed depressions which are filled with plants and designed to collect and store rain water. The vegetation helps cleanse the polluted runoff. Underneath these gardens, layers of rock, soil and sand can act as natural filters. Retaining stormwater allows it either to slowly soak into the soil or get soaked up by plants. For larger gardens like bio-retention systems, a drainage system is installed under the garden. Rain gardens and bio-retention systems are frequently referred to as “bio-filters” or “sponges” that soak up and filter out pollutants such as sediment, fertilizers, heavy metals and petroleum products.

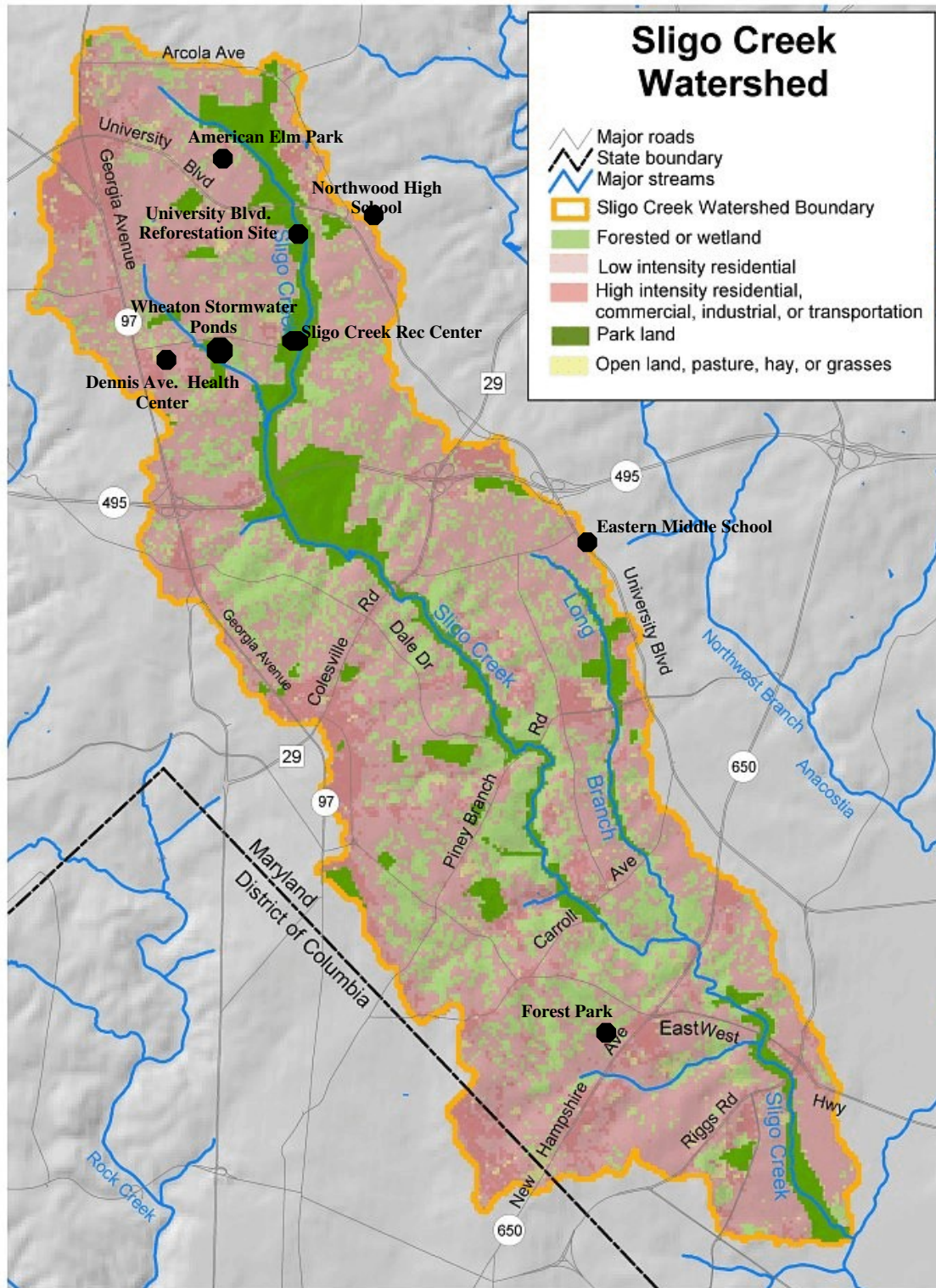
**Permeable Paving:** According to the online resource Wikipedia, “permeable paving, also called *pervious paving* or *porous pavement*, is a term used to describe paving methods for roads, parking lots and walkways that allow the movement of water and air through the paving material. Although some porous paving materials appear nearly indistinguishable from nonporous materials, their environmental effects are qualitatively different. Their effects are important because pavements are two-thirds of the potentially impervious surface cover in urban areas.”

**Green Roofs:** Green roofs are rooftops planted with vegetation. Intensive green roofs have thick layers of soil (6 to 12 inches, or more) that can support a broad variety of plant or even tree species. Extensive green roofs are simpler green roofs with a soil layer of 6 inches or less to support turf, grass, or other ground cover. Not only do green roofs help manage stormwater runoff, but they also provide thermal insulation and habitat for birds and insects. The roofs also last longer due to less sun exposure.

**Trees & Riparian Buffers:** The word *riparian* refers to anything connected with or immediately adjacent to the banks of a stream or other body of water. Streamside forests are riparian forests. Riparian areas, which encompass the flood-plain and a portion of the adjacent upslope area, are complex ecosystems, connecting a stream system and a people-based system such as agriculture, housing, or industry. The ability of these areas to function naturally is crucial to the protection of the streams and rivers. A buffer is an area managed to reduce the impact of adjacent land use. A riparian forest buffer, therefore, encompasses the area from the streambank in the floodplain to, and including, an area of trees, shrubs, and herbaceous vegetation located upslope from the body of water. (Taken from the University of Maryland Cooperative Extension Fact Sheet An Introduction to Forest and Riparian Buffers [www.riparianbuffers.umd.edu/fact/FS724.html](http://www.riparianbuffers.umd.edu/fact/FS724.html)) In order to be effective in stormwater management, tree groves and riparian buffers must be fully integrated into the stormwater drainage design, including use of proper grading, and level spreading devices, so that runoff disperses and soaks into the ground.

**Stormwater Management Ponds:** Stormwater management ponds are a centralized temporary storage of runoff that is designed to address flooding by reducing peak flows. Unlike the LID practices, stormwater management ponds are not intended to reduce the volume of runoff and do little to improve the water quality. Stormwater management ponds are an “end-of-pipe” stormwater practice that uses gutters, curbs and pipes to collect and convey runoff from residential and commercial properties as quickly as possible. While LID practices addresses runoff close to the source, the ponds are intended to address the symptoms excessive runoff.







### **American Elm Park**

For centuries, the land now called American Elm Park was a wet woodland. Those wet areas helped to naturally filter pollutants and slow the speed of flood water from storms. In the early 1990s a developer was allowed to clear cut the woodlands and remove topsoil at the area. When houses near the site were completed, all that remained here was a sticky non-porous clay and some buried construction debris, which caused serious drainage problems.

In 2003, the Izaak Walton League, the Montgomery County Department of Environmental Protection (DEP), and local civic groups collaborated to restore the site. Four disease-resistant Valley Forge Elms have since been planted and are continually monitored by volunteers. A natural habitat garden consisting of nectar and host plants has also been planted for native birds, butterflies and other pollinators. Friends of Sligo Creek continues to sponsor the site now with local civic associations and the DEP. The Chesapeake Bay Trust has also helped to fund the installation of a raingarden here.

*Directions: From University Boulevard going east (toward Takoma Park), turn left onto Inwood Ave. Proceed two blocks and turn left on Ladd Street. The park is directly across from 1701 Ladd St.*





## Northwood High School

The Northwood High School site uses various LID techniques to manage stormwater. A green roof for the Courtyard and a pervious pavement parking lot were both installed as “pilot projects” at the school. Students, the Department of Environmental Protection, and volunteers from Friends of Sligo Creek and the Neighbors of Northwest Branch joined forces to build raingardens on the schoolyard. In 2006 the first raingarden built on the east side of the school. A second raingarden was built soon afterwards in the Courtyard. The schoolyard site is located on the ridge that divides the Northwest Branch watershed from the Sligo watershed. Please note, for security reasons the Courtyard is not accessible to the general public.

*Directions: Northwood High School is located at 919 University Blvd (close to the corner of Arcola Ave.)*



## **University Boulevard Reforestation Site**

Over the years, the Friends of Sligo Creek have been actively involved with restoring and protecting riparian buffers all along the Creek. Such buffers should ideally include shrubs and trees, and when robust will act as natural water filters and provide habitat for animals. When a creek lacks sufficient buffers, water often jumps the banks during large storms and flooding can become a serious issue. Repairing these buffers is difficult, however, in an urban area where a great deal of ecological disturbance continues to occur. The University Blvd. site is no exception. Construction projects, the nearby road traffic and heavy use by park visitors have all eroded the buffer's potential in this area. In the fall of 2003, a tree planting was held to reverse some of these problems, but unless they are regularly maintained these trees will be quickly become enveloped by invasive exotic vines and may be destroyed by grazing deer. Friends continues to seek workable solutions to these problems and is monitoring the health and viability of the new trees. We are also encouraging others in the watershed to reforest other riparian buffers along the creek's banks.

*Directions: The University Boulevard Reforestation Site is located by the corner of Sligo Creek Parkway and University Boulevard. Parking is available about 1/8 mile downstream of the site.*





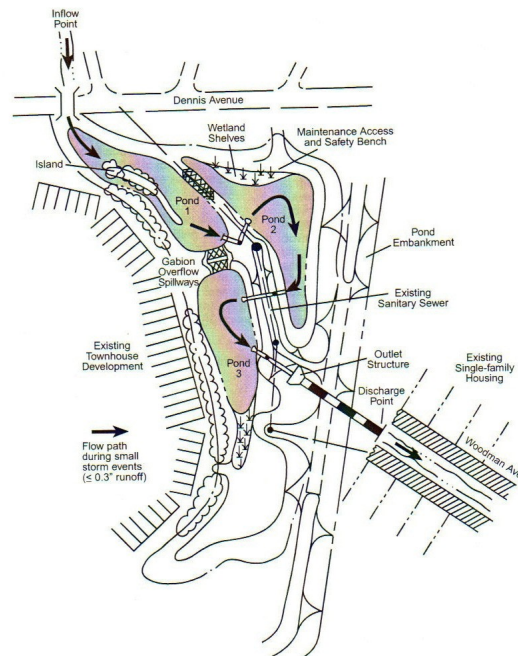
## **Sligo Creek Recreation Center at Dennis Avenue**

The Sligo Creek-Dennis Ave. Recreation Center site, installed in 2005, uses three bio-retention systems in which water-loving plants, shrubs and trees have been planted in a specially designed soil mix. This property is a Department of Environmental Protection (DEP) demonstration site and is intended to showcase stormwater management methods which are less invasive than traditional gutters, pipes and holding ponds. As it grows, this raingarden will reduce pollutants as water filters through the area and the system acts like a giant sponge.

Collecting stormwater in this manner -- in multiple locations near parking lots and driveways -- has several advantages compared to the large stormwater water pond systems that are being used just down the street (see next page for location info). First of all, the smaller amount of water collected at locations like this is easier to manage. Also, the plants here are actually helping to clean or filter out the pollutants which often accumulate in the nearby parking lot. Unlike stormwater ponds, raingardens also help maintain the water table.

Sometimes people are concerned that such sites will encourage the spread of diseases like West Nile Virus. But a well-designed and well-maintained raingarden will only hold standing water for four to six hours, and mosquito eggs need three days in water before they can hatch so this is not an issue.

*Directions: Traveling south on Sligo Creek Parkway from University Blvd., turn right onto Dennis Ave. The Dennis Ave. Health Center is approximately 1 mile on the left.*



## Wheaton Branch Stormwater Management Ponds

This is an aerial photo of the Wheaton Branch Stormwater Management Facility. This Facility, constructed in 1990, significantly improved stormwater control to over 800 acres of developed drainage in the headwaters of Sligo Creek. It controls runoff from a large shopping mall and commercial complex in the Wheaton Central Business district, and other commercial and residential development between Wheaton and Dennis Avenue along the intensively developed Georgia Avenue corridor. The stormwater ponds control runoff from small, frequently occurring storms as well as from the larger storms which occur every 1-2 years. During heavy and sustained rains, the three ponds become one large stormwater pond. Runoff from these storms is detained for a period of 24-40 hours and released slowly, to minimize erosion damages downstream in the Wheaton Branch tributary of Sligo Creek. This project was part of a still on going larger watershed restoration effort which includes downstream habitat improvements (including vernal pools) and restocking native fish and amphibians.

Conventional stormwater management practices such as stormwater ponds are designed to reduce peak (maximum) flows to minimize downstream flooding. Stormwater ponds, however, haven't been able to successfully mitigate stormwater or keep up with the effects of increased paving and development in cities around the country. While stormwater ponds can be effective in minimizing flooding locally, they are not effective in filtering stormwater from the streets or recharging our ground water levels. They instead send large amounts of untreated water into Sligo Creek. Since the Sligo Creek watershed depends primarily on stormwater ponds like the Wheaton Branch Stormwater Management Ponds for managing stormwater, stormwater runoff is by far the biggest problem Sligo Creek faces.

Directions: Traveling south on Sligo Creek Parkway from University Blvd. turn right onto Dennis Ave. The Stormwater Pond Facility is approximately  $\frac{3}{4}$  mile on the left.



## **Dennis Ave Health Center**

This site contains a rain garden which is very similar to the plantings at the Sligo Creek Recreation Center at Dennis Avenue shown earlier. This property is a Department of Environmental Protection (DEP) demonstration site and is intended to showcase methods which are less invasive than traditional gutters, pipes and holding ponds. University of Maryland researchers will also be monitoring this location one year as a part of a study on stormwater pollution and runoff.

*Directions: Traveling south on Sligo Creek Parkway from University Blvd., turn right onto Dennis Ave. The Dennis Ave. Health Center is approximately 1 mile on the left.*





### **Sustainable Landscaping at Eastern Middle School**

Not too long ago, the schoolyard of Eastern Middle School was comprised almost entirely of grass. Now the location boasts a showcase of sustainable landscaping techniques, including some lovely gardens. The plantings are helping to address stormwater problems, but have also improved the overall appearance of the school. Native flowers, shrubs, and trees, have been planted where once there was only lawn. As the trees grow they will also help to keep the school building and schoolyard cool, improve air quality, and provide habitat for wildlife. Ideally, such areas could also be used by teachers for outdoor education in subjects such as science, art and history. To obtain support for sustainable landscaping in public institutions like Eastern Middle School, Friends of Sligo Creek piloted a Green Landscaping Partnership between the local watershed groups, the Eastern Middle School PTSA, and the Montgomery County Public School's Green Schools Program. The Goals of the Green Landscaping Partnership include:

- A. To reduce the negative environmental impacts of unchecked stormwater run-off and to boost the environmental contributions that can be made through sustainable landscaping.
- B. To educate students, parents, and the community at large about the problems of stormwater runoff and about the benefits of Sustainable Landscaping (i.e. Bayscaping, Rainscaping) and other LID practices for both public and private facilities and back yards.
- C. To enhance the appearance and interest of the schoolyard through high quality landscaping at the site. To show the community that LID and use of native plants can be a beautiful solution to stormwater runoff.
- D. To use this partnership and its resultant landscaping as a model for other schools and other private and public institutions in the region.

*Directions: Eastern Middle School is located at 300 University Boulevard (about ½ mile East of Four Corners).*



### **Forest Park Raingarden**

Forest Park is a small community recreation area within City of Takoma Park. An upper section of this park includes of a blacktop play area and a very compacted grassy area. The lower end of the park once consisted primarily of bare, compacted soil interspersed with a few mature trees. Stormwater runoff and soil erosion were a tremendous problem there until a partnership between the Friends of Sligo Creek, Takoma Park Public Works, the South of Sligo Civic Association (SoSCA), and the Montgomery County Department of Environment (DEP) was formed to implement several Environmentally Beneficial Landscaping techniques at the site.

The first phase of the project involved the installation of a raingarden at the lowest portion of the park in order to slow down and filter water before it reaches nearby stormdrains. This raingarden features a curving, heavy stone walkway that encourages visitors to walk through the middle of the garden without trampling the plants or compacting the soil. Native shrub species planted here, such as aronias and winterberries, produce beautiful berries which will feed migrating and over-wintering birds. A second raingarden was also added in the spring of 2006 to retain the runoff from the ball field at the upper end of the park.

*Directions: Traveling on Carroll Ave towards Takoma Park, turn left on Ethan Allan Road and then right on Prince Georges Ave. Forest Park is located at the corner of Prince Georges and Elm Avenues.*