

Site Selection and Design of a Conservation Landscaping Workshop

Final Products for Task 56 of NOAA Grant
#NA13NOS4190135

Northern Virginia Regional Commission

April 2015



This project was funded in part by the Virginia Coastal Zone Management Program at the Department of Environmental Quality through FY 13 Task 56, Grant # NA13NOS4190135 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended. This report satisfies the deliverable requirements set forth for FY13 Task 56, NOAA Grant # NA13NOS4190135

1 Introduction

As development continues to increase in Northern Virginia, important native plant communities and habitats that support wildlife and provide valuable ecosystem services are becoming fragmented, depleted, and altered. Maintaining intact, connected natural areas and areas that serve as stepping stones between large, intact habitat cores is essential for basic ecosystem and watershed services, such as clean air and water and sustaining biodiversity.

Since 2010, the Northern Virginia Regional Commission (NVRC) has been engaged in a series of projects, studies, and efforts related to helping the region identify green infrastructure or conservation corridors, and promote the use of native plants in the urban and suburban landscape. These efforts have been funded in part by the National Oceanic and Atmospheric Administration (NOAA) through the Virginia Coastal Zone Management Program (VCZMP). This work resulted in three Conservation Corridors reports which identify a network of the most regionally-significant and ecologically-sensitive open and forested green spaces across the region as well as an on-going native plant campaign known as Plant NoVA Natives.

These reports have laid the foundation for NVRC to continue working to provide technical assistance to local governments working to implement green infrastructure projects and utilize more native plants in the landscape. This project reinforced and expanded upon the efforts of the Plant NoVA Natives Campaign and the Conservation Corridors Project by demonstrating an on-the-ground application of these two projects.

Additionally, an issue that was identified during the Collaborative Summit to Protect Water Quality through Actions on Urban-Suburban Properties held in Williamsburg in February 2013, was the lack of landscape industry professionals that were knowledgeable about native plants and qualified to implement conservation landscaping practices such as rain gardens, bio-swales, conversion of turf into native plantings, pervious pavement, buffer plantings, and rain barrels. In light of the recent development of local stormwater incentive programs that encourage homeowners to construct and maintain voluntary stormwater management techniques on their own property, there was a need to educate landscape industry professionals and the general public about conservation-based landscaping practices. Local governments in Northern Virginia have repeatedly expressed the need for trusted and skilled contractors who will properly design, install, and maintain these practices so that they are functional as well as beautiful.

This project also served as an opportunity to promote the use of native plants so that these small landscape practices could serve as stepping stones and facilitate movement of wildlife across the vast suburban lawn-dominated areas that dominate the regional landscape between large patches of intact habitat cores. This concept not only allows for more connectivity for wildlife but also

provides water and air quality benefits, as well as social and economic benefits such as improved aesthetics and time and cost savings through reduced landscape maintenance.

The funding received for this project allowed NVRC to form a collaborative workgroup and host a hands-on technical workshop for landscape professionals to learn how to design and build conservation landscaping practices, illustrate the importance of native plants, and select a site for restoration that will restore a missing connection in part of a larger greenway, and help to re-create ecosystem functions in a developed area.

The selection of the site and installation of the demonstration landscape will not only provide a model for maintaining the balance between conservation and development interests in the Northern Virginia coastal region, but also offer an opportunity to educate industry professionals about how environmentally sensitive landscapes can reduce polluted runoff, conserve water and benefit wildlife habitat.

This report satisfies the deliverable requirements set forth for FY13 Task 56, NOAA Grant # NA13NOS4190135, which are summarized below:

Product #1: Workgroup Outcome Report

Product #2: Site Selection Analysis and Report

Product #3: Conservation Landscaping Technical Design Workshop

Product #4 : 306A Documentation

2 Project Summary

2.1 Workgroup Outcome Summary

NVRC engaged a multi-disciplinary work group of watershed specialists and engineers from local and state governments and from conservation organizations in the region to collaborate on a training workshop and select a site for restoration. Stakeholders in the workgroup included Arlington County, Northern VA Soil and Water Conservation District, George Washington University, Chesapeake Stormwater Network, Wetlands Watch, Chesapeake Conservation Landscaping Council, and City of Falls Church.

This workgroup met three times to develop the goals of the workshop, identify the target audience, develop the agenda and associated presentations, compile training materials, develop an advertising strategy and select the site.

Since three of the participating jurisdictions either offer an incentive program for residents in the form of grants or tax credits or encourage their private property owners to voluntarily implement

stormwater management techniques, it was decided that the goals of the training should be to develop a cohort of landscape professionals who can:

- Design plans for homeowner best management practices (BMP's) in accordance with local jurisdiction criteria;
- Install homeowner BMP's in the residential landscape;
- Identify and select native plants for conservation landscapes, riparian buffer plantings, rain gardens, and tree plantings;
- Maintain residential BMP's in accordance with local requirements;
- Add to the list of qualified professionals who can work with homeowners in Northern Virginia; and
- Assist clients in understanding the role of practices in reducing stormwater pollution and utility fees if applicable

It was also decided that the agenda should contain an overview of the various incentive programs and the target audience should be landscape professionals or stormwater inspectors. These planning meetings resulted in a document titled "Scope of Work for Residential BMP Training for the Landscape Professional, Part 1". This document can be found in Appendix A. Members of the workgroup also helped to advertise and implement the workshop. The workshop advertisement can also be found in Appendix A. Information about the workshop was posted on the NVRC website <https://www.novaregion.org/index.aspx?NID=1311>. Although the workshop was free, participants were required to register in advance through the NVRC website. A list of registered participants is included in Appendix A.

2.2 Site Selection and Analysis Summary

The goal of this deliverable was to select a turf or hardscape area and restore it using native plants and the eight elements of conservation landscaping to enhance the regions green corridors by restoring a degraded connection and re-creating ecosystem functions in a developed area.

A site located in the City of Falls Church at the corner of South Maple Ave. and Route 29 was selected for restoration for a variety of reasons (Figure 1).

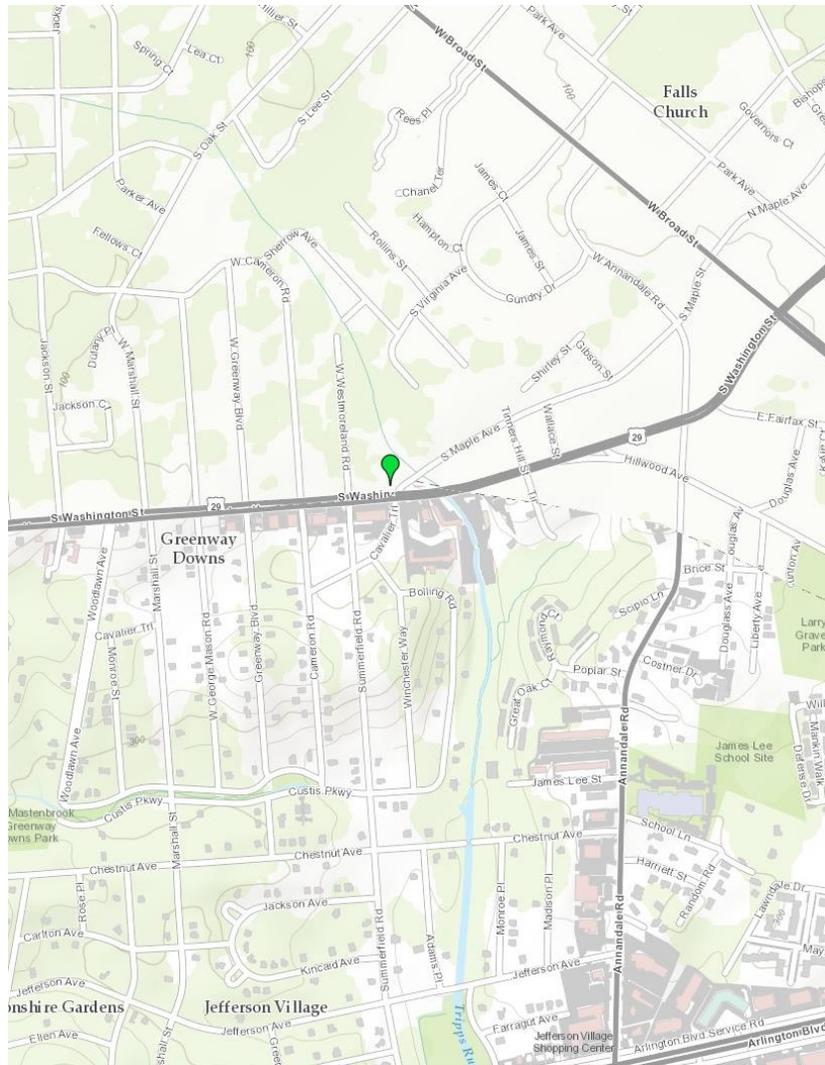


Figure 1. Location of site selected for restoration at corner of South Maple Ave and Route 29

The small, city-owned parcel had previously been paved and the City had recently removed the pavement and put down mulch and grass seed. Where vegetation was growing on the site, it was dominated by alien invasive plants such as winged euonymous and Japanese honeysuckle (Figure 2).



Figure 2. Condition of site after pavement removal

The parcel is located in the 100 ft. Resource Protection Area of an impaired stream (Tripps Run). Tripps Run, a Potomac River tributary, is impaired for aquatic life - benthic macroinvertebrates. The benthic impairments are related to a combination of stressors including, elevated nitrate and total nitrogen concentrations, flashy flows, channel modifications, and sediment.

The site also provides an excellent example of how to enhance the green infrastructure of an urban landscape. The site is adjacent to Cavalier Trail Park which has a native pollinator garden (Figure 3) and provides additional connection to an established trail along Tripps Run that was planted with native plants almost thirty years ago (Figure 4).



Figure 3. Native Plant Butterfly Garden at Cavalier Trail Park



Figure 4. Existing native plant trail and greenway that restoration site will connect to

The demonstration site will not only enhance and enlarge the adjacent park and trail, but will also capture and treat runoff from the neighboring paved parking lot and provide more connectivity for wildlife. The workgroup decided that the installation of a rain garden, conservation landscaping, and a trail connection at the site will reduce runoff volume that contribute to flashy flows as well as reduce the nitrogen, phosphorous, and sediment load that enters Tripps Run.

The site is also highly visible from the roadway and is a prime location for educational signage. Plus the City offered to provide \$7,000 in matching funds, install an irrigation system, and maintain the site in accordance with their maintenance standards.

For these reasons, the workgroup agreed that this site was the best candidate to demonstrate how to connect green infrastructure corridors, utilize native plants in a conservation landscaping, and provide water quality benefits to streams in an urban area.

2.3 Conservation Landscaping Technical Design Workshop Summary

NVRC coordinated with the workgroup to design the agenda and conduct the workshop. The Conservation Landscaping Workshop was divided into two parts. Part 1 took place on July 16 at the Fairfax County Herrity Building located at 12055 Government Center Parkway, Fairfax, VA 22035 from 9:30 am – 2:30 pm. Part 1 of the workshop focused on how to select and design conservation landscape practices for homeowners in Northern Virginia. The target audience for the workshop was landscape professionals (designers, architects, contractors), stormwater BMP inspectors, or general public that have a strong background in gardening/landscaping but wanted to learn more about creating a habitat and stormwater friendly landscape. Forty-two landscape professionals and municipal stormwater inspectors attended the workshop.

Part 2 of the workshop which was funded under Task 57 of NOAA Grant # 13NOS4190135 was scheduled for October 8, 2014. The second part of the workshop was focused on installation and maintenance and contained a hands-on learning component. The final report for Part 2 will be developed in November of 2015.

Since Arlington County, Fairfax County, and the City of Falls Church all have unique incentive programs for their residents to install various conservation landscaping practices or stormwater best management practices (BMP's), the first portion of the workshop consisted of an overview of each of these programs and why they were developed. A representative from Falls Church explained their incentive program for property owners to reduce their stormwater fees by removing turf or hardscape and installing rain gardens or conservation landscaping and went through their credit manual. Arlington County staff presented on their program called Stormwater Wise Landscapes that provides grants to homeowners to install residential scale BMP's on their property and Fairfax County staff presented an overview of their forthcoming incentive program.

The second portion of the workshop consisted of a presentation from the Chesapeake Stormwater Network on how to design, construct, and maintain a variety of BMP practices at a homeowner's property. The textbook for this portion of the class was 'Homeowner Guide For a More Bay-Friendly Property' <http://chesapeakestormwater.net/2013/04/homeowner-bmp-guide/>

The third portion of the workshop was presented by an instructor from the George Washington University Landscape Architecture program. This presentation focused on native plants and the principles of Conservation Landscaping as well as design recommendations.

Finally, NVRC led participants through a hands-on design exercise to apply what they learned and design a landscape for the selected site in Falls Church.

The presentations from the workshop are included in Appendix B. At the end of the workshop, participants were asked to fill out an evaluation form so that future efforts can improve and represent the needs of the community. The evaluations are included in Appendix B.

2.4 306 A Documentation Summary

Construction projects using CZM funding are required to obtain 306A Clearance. Since the second portion of this project involved installation of plants, it was considered construction. Because 306A projects are federally funded actions, NOAA is subject to the requirements of the National Environmental Policy Act (NEPA) for these projects. Completion of the 306A checklist on each 306A project meets these NEPA requirements.

The 306A checklist was completed in consultation with the VA CZM project manager for this project. By completing the checklist, we determined if there were any potential environmental, cultural and social impacts of the project.

In addition to the checklist, NVRC submitted a Scope of Work to the Virginia Coastal Zone Management Program and received approval, obtained State Historic Preservation Officer Clearance from the Virginia Department of Historic Resources, obtained clearance from VA Natural Heritage Program, and secured the legal paperwork showing that the property for the proposed project is publicly owned.

The completed the 306A documents for the selected site are attached as Appendix C.

Appendix A

Scope of Work for the Training

Registration List

SCOPE OF WORK FOR CONSERVATION LANDSCAPE TRAINING PART I

RESIDENTIAL BMP TRAINING FOR THE LANDSCAPE PROFESSIONAL

Goals:

Develop a cohort of landscape professionals who can:

- Design plans for homeowner BMP's in accordance with local jurisdiction criteria
- Install homeowner BMP's in the residential landscape
- identify and select native plants for conservation landscapes, riparian buffer plantings, rain gardens, and tree plantings
- Maintain residential BMP's in accordance with local requirements
- Add to the list of qualified professionals who can work with homeowners in Northern Virginia
- Assist clients in understanding the role of practices in reducing stormwater pollution and utility fees if applicable

Audience:

The target audience for this workshop are landscape professionals (designers, architects, contractors), stormwater BMP inspectors, or general public that have a strong background in gardening/landscaping but would like to learn more about creating a stormwater friendly landscape.

Target number: approximately 30-40 landscape professionals

Advertising:

Invitations will be extended to APLD, ASLA, VNLA, Virginia Society of Landscape Designers, GWU's Sustainable Landscape program graduates?, landscape professionals who have worked with Arlington Stormwater Wise landscapes and Falls Church program, NVRC Plant NoVA Natives Community Leaders Program, NVCC Horticulture Program, CCLC members

Partners will post the workshop advertisement on website and send out to listserves.

Working Agenda:

- 1. Welcome and Introduction (Corey Miles, NVRC– 2 Minutes) 9:30**
- 2. Why are local governments investing in residential landscapes? Case Study Overview of Falls Church and Arlington County Incentive Programs (Aileen Winquist and Jason Widstrom) 9:32 – 10:10**
 - 2.1. Brief explanation of why local governments are investing in residential landscapes for stormwater management and local examples
 - 2.2. Falls Church program
 - 2.3. Arlington program
 - 2.4. Fairfax program
 - 2.5. Prince William

3. Homeowners Guide to BMP's (Chesapeake Stormwater Network – Use Guide to Homeowner BMP as text for this section) 10:10 – 12:00

3.1. What is a Homeowner BMP

3.2. Selected practices in detail

3.2.1. Conservation Landscaping

3.2.1.1. Eight Essential Elements of Conservation Landscaping (will provide slides to Cecilia and Tom)

3.2.2. Rain Gardens

3.2.3. Tree Planting

3.2.4. Cisterns and Rain Barrels

3.2.5. Permeable Hardscapes

3.2.6. Impervious Cover Removal

3.2.7. Bay-Friendly Lawn Care

3.2.8. Riparian Buffer Planting

BREAK 12:00 – 12:45

3.3. Spotlight on selected Native Plants for Conservation Landscapes (if the Native Plants for Northern VA Guide is ready than we will use it as a text for this section)

12:45 – 1:15

3.3.1. Herbaceous Perennials

3.3.2. Grasses

3.3.3. Vines

3.3.4. Shrubs

3.3.5. Trees

4. Site Design and Planning (Aimee Vosper, NVRC Landscape Architect) 1:15 – 2:30

4.1.1. Hands on design exercise for site selected for Part 2:

4.1.2. Site constraints

4.1.3. Budget

4.1.4. Landscape Plan Preparation

Dates and Locations:

Dates and Locations are as follows:

Part 1

July 16 9:30 am – 2:30 pm

Fairfax County Herrity Building

12055 Government Center Parkway, Fairfax, VA 22035

Room 107

9:30 am – 2:30 pm

Part 2: Maintenance and Installation:

October 8, 2014

Location and other details TBD

Equipment Needs:

- Laptop (NVRC will provide- presenters will make arrangements with Corey to load presentation on laptop in advance of class)
- A/V Equipment – NVRC has a projector but no amplification

Materials for Participants:

- Homeowners BMP Guide by CSN – CSN can provide a few copies, NVRC can provide a few copies,
- Native Plants for Northern Virginia Guide (if it is ready) – NVRC will provide
- Arlington Stormwater Wise Landscapes – Arlington will provide
- Falls Church Stormwater credit criteria – Falls Church will provide
- List of native plant vendors in Northern VA – NVRC can provide with partner input
- List of other reference materials – NVRC can provide with partner input
- Comment: The RiverWise Guide may be available

References for Training Materials:

- Native Plants of Northern Virginia Guidebook
- Regional Market Research Survey – Amplitude Research
- Flora of Virginia <http://www.floraofvirginia.org/>
- Slattery, Britt E., Kathryn Reshetiloff, and Susan M. Zwicker. 2003. Native Plants for Wildlife Habitat and Conservation Landscaping: Chesapeake Bay Watershed. U.S. Fish & Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD. 82 pp. <http://www.nps.gov/plants/pubs/chesapeake/>
- Homeowner BMP Guide by CSN
- Eight Essential Elements of Conservation Landscaping by the CCLC

What are Residential Stormwater Best Management Practices?

What incentives are local governments offering to install them?

How do I design, install, and maintain these practices in accordance with local regulations?

How can I ensure my client's landscape is eligible for the incentive?



The Northern Virginia Regional Commission is hosting a FREE two workshop series for landscape professionals on residential stormwater management practices. These **FREE** workshops are for landscape designers, architects, engineers, installers or inspectors who would like to learn about the landscape practices being promoted by local governments such as rain gardens, conservation landscapes, rain barrels, and tree planting. To learn more or to register visit the website: Residential Stormwater Best Management Practices Workshop page <http://www.novaregion.org/index.aspx?NID=1311>

Best Management Practices are land-management and landscaping practices that control stormwater and erosion by capturing and/or encouraging runoff from rooftops and pavement to infiltrate into the ground. Local city and county government are promoting these practices because they reduce flooding and the amount of polluted runoff that flows into local waterways during rainstorms. This series of two workshops will provide introductory information to landscape professionals on residential-scale best management practices to reduce stormwater runoff and prepare landscape professionals to offer design, installation, and maintenance services to clients.

Part I of the training includes a classroom overview of local incentive programs available for homeowners, an overview of commonly used best management practices, a session on using native plants, and hands-on design exercise for a site that will be constructed during the second session.

Part II includes a classroom session geared towards maintenance of these practices and a hands-on field experience building one or more of these practices.

The target audiences for these workshops are landscape designers, architects, engineers, inspectors, or installers who would like to learn more about the practices that are currently being promoted by local governments, how to incorporate native plant species into these practices, and how to maintain them in the typical residential landscape.

Certificate of Completion: Attendees who attend both training days will receive a Certificate of Completion from the Northern Virginia Regional Commission, certifying attendance at the full program.

Registration includes the following workshop materials:

Chesapeake Stormwater Network's Homeowner Guide For a More Bay-Friendly Property <http://chesapeakestormwater.net/2013/04/homeowner-bmp-guide/> , City of Falls Church Stormwater Utility Fee Credits Manual, Arlington County StormwaterWise Landscapes 2014 Manual <http://environment.arlingtonva.us/stormwaterwise/> , and a list of native plant vendors in the Northern Virginia area.

To Register:

Workshop space is limited; please pre-register at <http://www.novaregion.org/forms.aspx?FID=99> by Thursday July 10, 2014. For more information, please contact Corey Miles at cmiles@novaregion.org.

Dates and Locations are as follows:

Part I: July 16, 2014
Fairfax County Herrity Building
12055 Government Center Parkway, Fairfax, VA 22035
Room 107
9:30 am – 2:30 pm

Part II: October 8, 2014
Fairfax County Herrity Building
12055 Government Center Parkway
Fairfax, VA 22035
Room 107
9:30 am – 2:30 pm

Lunch will **not** be provided. There is a cafeteria on site where attendees may purchase lunch.

Workshops are offered in partnership with the Virginia Coastal Zone Management Program, City of Falls Church, Arlington County, Northern Virginia Soil and Water Conservation District, and Wetlands Watch

First	Last
Roberto	Carvallo
Siu	Wong
Elaine	Pugh
Sherry	McDonald
Elizabeth	Thompson
Tom	Thompson
Irene	Zarenchnak
Susana	Altmann
Felipe	Alonso
Nicole	Brait
Tony	Marquez
Ralph	Chao
Nancy	Berlin
Cheryl	Corson
Quirico	Perando Jr.
Marlo	Watson
Noah	Israel
Evan	Johnson
Jeff	Reynolds
Brandon	Copeland
Kim	Hosen
Virginia	Rockwell

Brice	Boyd
Dillon	Connor
Christina	Alexander
Beth	Polak
Patricia	Ceglia
Mimi	Faha
John	Mattie
Boyd	Church
Alex	Belano
Amber	Ellis
Thomas	Miles
Cathy	Nelson
Diana	Clopton
Sung Jin	Chung
Troy	Davis
Richard	West
Gem	Bingol
Charlie	Lively
Jennifer	Giles
Damir	Grljevic

Appendix B

Presentations from the Training

StormwaterWise Landscapes

Arlington County, VA



Aileen Winquist
awinquist@arlingtonva.us

About StormwaterWise Landscapes

- Sustainable stormwater incentive program for Arlington private property owners.
- Pilot year – 2012
- HOA program - 2014
- Reimbursement/matching grant program
- An education and outreach initiative
- MS4 permit requirement
- 40-60 residential participants, 5 HOAs



Stormwater is rainfall that runs off roads, rooftops and driveways to the nearest stream, instead of soaking into the ground. Stormwater picks up pollutants such as oil, bacteria from pet waste, sediment, and lawn chemicals, and carries them to our local streams. Stormwater runoff also causes erosion in local streams, resulting in damage to trees and trails near the stream.

The StormwaterWise Landscapes Program provides residents with technical resources and a financial incentive to reduce runoff from their property. County staff will conduct a stormwater assessment of each participant's property. Participants will then receive a written report with a property map, a list of site-specific recommendations for reducing stormwater runoff, and appropriate references as needed.* As a participant your project may be featured in an Arlington County case study.

The installation of the following practices are eligible for the reimbursement program:

- Conservation landscapes— the conversion of lawn or non-native, invasive plants to native plantings.**
- Pervious surfaces to include permeable interlocking pavers and pervious concrete for driveways, walkways, and patios. Pervious asphalt, ribbon driveways and turf driveways are not eligible.
- Rain gardens.**
- Removal of impervious pavement. Following the pavement removal, the soil must be amended and planted with native plants to be eligible for reimbursement.**

* Only projects that are recommended within the written report are eligible for the program. Projects completed outside of the program are not eligible.

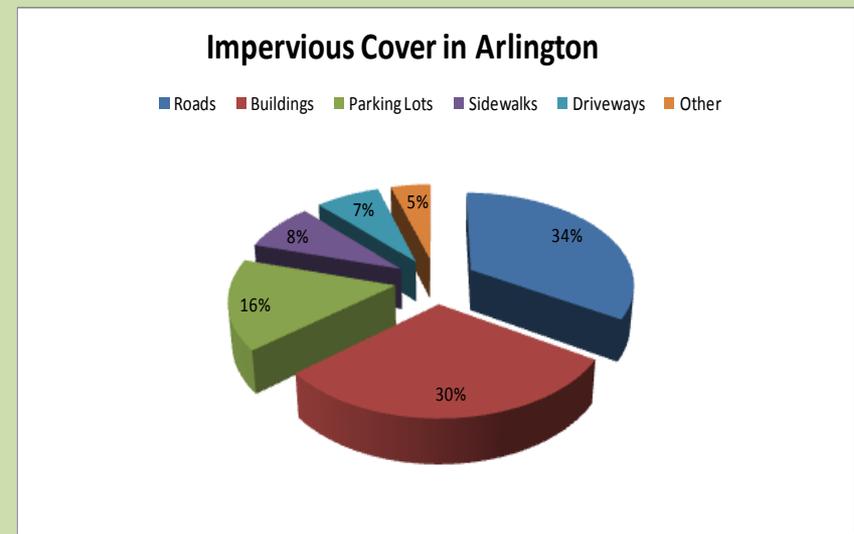
** Only native plants are eligible for the StormwaterWise program.



Stormwater runoff is the largest water quality problem in the US today (top). Excessive quantities of stormwater flow into Arlington's streams, causing severe erosion and undercut trees (middle and bottom).

Why StormwaterWise Landscapes?

- Arlington's impervious cover is 50% privately owned
- Expectations/requests from residents
- Northern Virginia Rain Barrel Program & survey results
- Increase capacity of conservation landscaping industry
- Opportunity for outreach
- MS4 Permit requirement
- Staff & expertise available



Show Me the Money

- Fiscal agent – Arlingtonians for Clean Environment (ACE)
- Sole source agreement and MOU
- \$80,000 NFWF grant for 2013-14
- County Stormwater Fund (tax)
- 2012 Budget - \$44,000; Actual - \$19,177
- 2013 Budget - \$112,000; Actual - \$70,697
- 2014 Budget - \$114,500
- 3 staff, 30% FTE??, 1 Ipad



How Does StormwaterWise Work?

Application Period	• January 1 - February 15
Site assessments	• March-April
Property owner selects practices	• End of May
Project plan submitted	• End of June
Projects installed	• November 1
Inspections	• Through early December
Reimbursements	• Through early January
Second Round	• July to following June

How do we help property owners?

- Site assessment by County staff
- Fact sheets and on-line resources for practices
- A “living” list of area contractors
- Ongoing technical and moral support
- Interim and final deadlines
- Reimbursement grant



2014 Practices

Reimbursement is 50% of the project cost or the incentive, whichever is less.



Lessons Learned

- Staff time is the largest cost.
- Practices are expensive!
- Drainage problems and property improvement motivated both participation and follow-through.
- Financial resources, family concerns and bewilderment are obstacles.
- Connecting with qualified contractors is difficult.











09/17/2013 16:29



For Further Questions Contact

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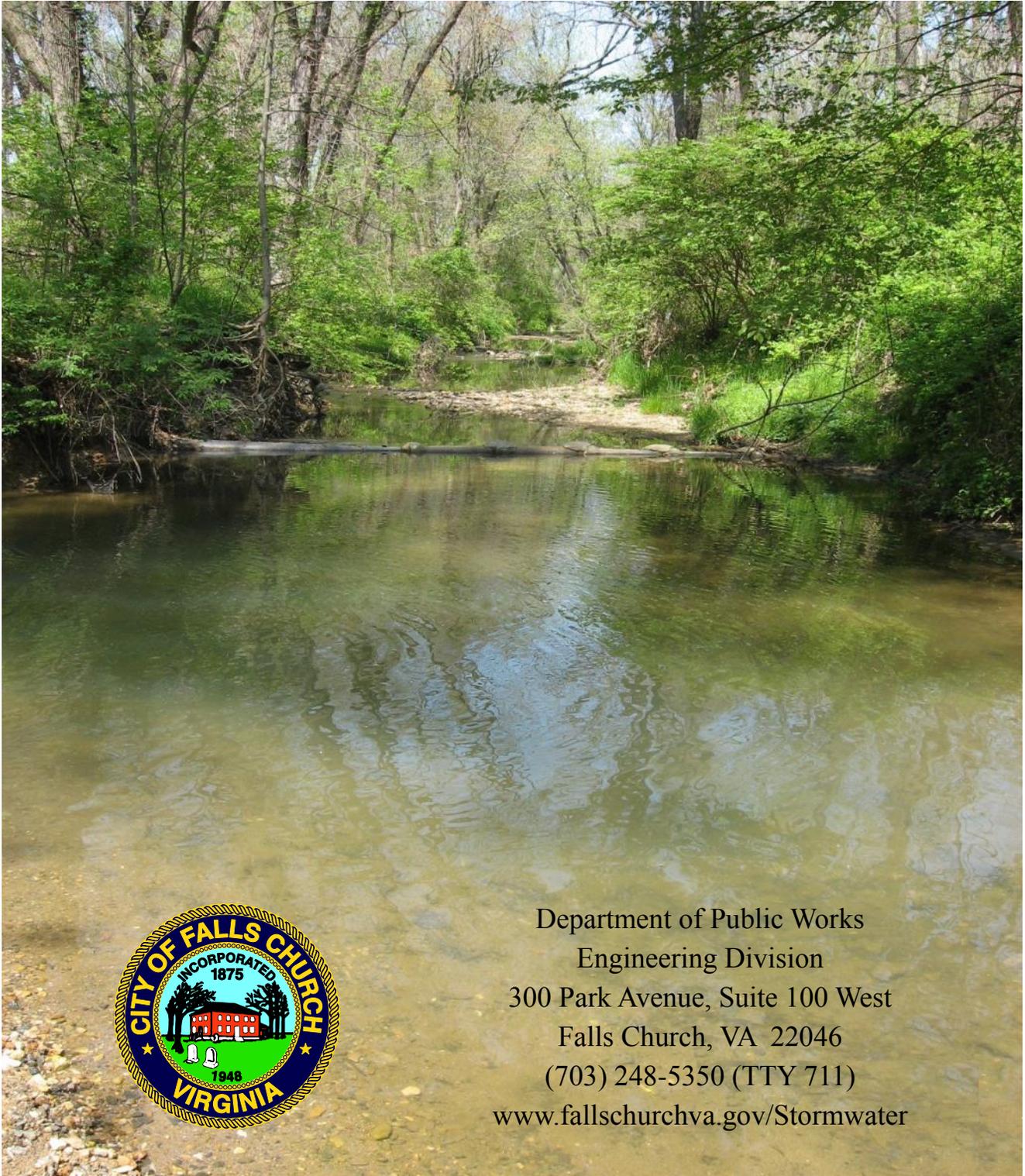
Fairfax County Incentive Program

Lily Whitesell
Northern Virginia Soil and Water Conservation District



City of Falls Church

Stormwater Utility Fee Credits Manual



Department of Public Works
Engineering Division
300 Park Avenue, Suite 100 West
Falls Church, VA 22046
(703) 248-5350 (TTY 711)
www.fallschurchva.gov/Stormwater

Version 1.0 — February 5, 2014

The City of Falls Church is committed to the letter and spirit of the Americans with Disability Act. To request a reasonable accommodation for any type of disability call 703-248-5030. (TTY 711)

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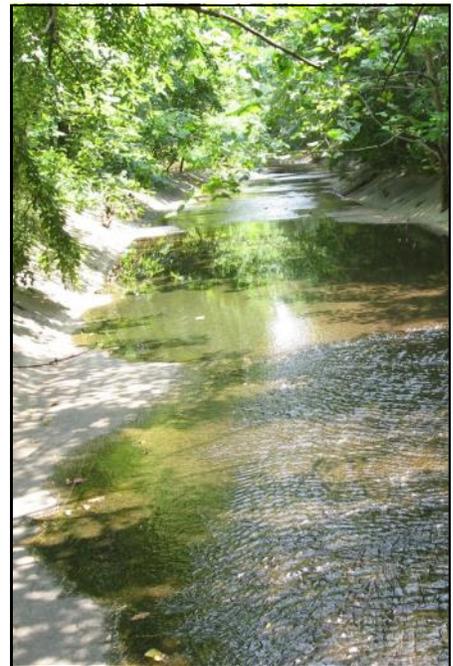
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Falls Church's Tripp's Run

Stormwater Overview

Stormwater is rainwater that does not soak into the ground but instead, runs off buildings, streets, parking lots, and other surfaces. Stormwater is collected in gutters, storm drain inlets, and pipes and into the City's storm drain system. This water is untreated before flowing into either Tripp's Run or Four Mile Run—tributaries of the Potomac River. The City's stormwater runoff eventually reaches the Chesapeake Bay.

The Falls Church Department of Public Works (DPW) manages, maintains, and repairs the City's stormwater system, which includes 140,000 linear feet of storm drain, 1,400 appurtenances, and 8,100 feet of stream channel in the Four Mile Run and Tripp's Run watersheds.

Much of the City's stormwater system was installed as the City grew during the 1930s through the 1960s, which was prior to any flood and stormwater regulations. As the City increased in density, the stormwater infrastructure became overwhelmed with additional runoff from impervious surfaces. Today, many of these stormwater pipes are beyond their expected life span and in some locations have failed or are near failing. As we see with some regularity, flooding occurs in areas due to undersized or broken stormwater pipes. City staff estimates roughly \$20 million will be needed in the next 10 years to solve drainage problems and replace aging stormwater infrastructure.



Example of damaged corrugated metal pipe

Polluted runoff is the number one cause of water pollution in Northern Virginia. The same rain that washes streets, yards, and parking lots clean is sending chemicals, germs, and trash down the drain. All of the storm drains in the City of Falls Church lead directly to streams and rivers.

The Chesapeake Bay watershed remains on the EPA's impaired waters list, therefore, Falls Church, like every jurisdiction in Virginia, is now facing a state/federal mandate aimed at restoring the Chesapeake Bay called the Chesapeake Bay Total Maximum Daily Load (TMDL). A TMDL is also commonly referred to as a pollution diet. In this case, the Chesapeake Bay TMDL sets a limit on the amount of phosphorus, nitrogen, and sediment (measured in pounds) that enters our streams on an annual basis. In 2012, the City was given numerical targets it must achieve by 2028 with specific milestones along the way.



Flooding on Sherrow Avenue at Tripp's Run

Stormwater Utility Fee

What is the purpose of the fee?

The Stormwater Utility Fund was created in order to give the stormwater management program a stable and dedicated source of revenue. The revenue generated by the utility fee can only be used for the stormwater management program—both operating and capital budget. It will fund such things as construction materials and equipment, contracted services, state stormwater permit fees, and city staff who will clean, repair, design, and oversee capital improvement projects.

How is the fee calculated?

The Stormwater Utility Fee is a fee for service, therefore all properties are charged regardless of their tax status. The fee is based on how much impervious surface (roof, driveway, walkway, patio, etc.) your site has. It is determined by 200 square feet increments to account for variability and minor inaccuracies in mapping. Each increment is called a “billing unit” and fractions are rounded up to the next whole unit. The number of billing units are then multiplied by the rate set by City Council, which is \$18.00 per 200 sq.ft. The infographic on the next page provides an example of the fee calculation.



Collapsing streambank in Pearson Branch, which will be repaired as a part of the stream restoration project

Is there anything I can do to reduce my fee?

Yes, there are two ways. First, you can remove impervious surface from your property resulting in a direct reduction of your fee if it results in a reduction of billing units. Second, you can participate in the Stormwater Utility Credit Program by installing and maintaining a stormwater management facility on your property and/or performing activities outlined in the Stormwater Pollution Prevention Plan included in this document.



Kent Street Drainage Project



Douglas Avenue Drainage Project

Calculating stormwater fees

An example house in Falls Church has a total impervious surface of 2,250 square feet (e.g. roof area, driveway, sidewalks and patio). To calculate the corresponding stormwater fee:

- Impervious area:**
- 1,100 sq. ft. for roof
 - 750 sq. ft. for driveway
 - 300 sq. ft. for patio
 - 100 sq. ft. for sidewalk
-
- 2,250 sq. ft. total impervious area

Divide the impervious area by 200
(2,250 ÷ 200 = 11.25)

Round the result to the next highest whole number
(round 11.25 up to 12)

Multiply by \$18 to calculate the total annual fee
(12 x \$18 = \$216)

Planting a tree could help earn a 10% credit.



Roof: 1,100 sq. ft.

Cistern: An underground tank that collects runoff from impervious areas could earn up to a 70% reduction in impervious area.

Patio: 300 sq. ft.
Reduction: Using permeable pavers rather than concrete earns a 120 sq. ft. reduction (40%) in impervious area.

Installing a rain barrel could help earn a 10% credit.

Sidewalk: 100 sq. ft.

Reduction: Using permeable pavers rather than concrete earns a 40 sq. ft. reduction (40%) in impervious area.

Driveway: 750 sq. ft.
Rain garden reduction: Collects runoff from the driveway, for a 300 sq. ft. reduction (40%) in impervious area.

Off-site reduction: Adding a rain garden or other stormwater facility that collects and treats off-site stormwater can earn up to a 70% reduction in impervious area.

Stormwater credits

The City's stormwater credit policy provides up to 95% off the stormwater utility fee by adding property improvements, such as cisterns, rain gardens, and permeable surfaces. Credits are cumulative.

Voluntary water quality improvements can earn up to a 40% reduction in impervious area while improvements required as a condition of development can earn up to 20% reduction in impervious area.

An additional 10% to 30% percent can be earned by providing water quantity improvements that store stormwater runoff.

A 10% credit can be earned by performing stormwater quality improvement activities like planting trees and installing rain barrels.

Visit the City's website at

www.fallschurchva.gov/Stormwater for more details about the Stormwater Utility Fee Credits Manual.

To calculate fee reduction:

- **Add** the impervious area draining to a facility, or multiple facilities
(100 sq. ft. + 750 sq. ft. + 300 sq. ft. = 1,150 sq. ft.)
- **Multiply** the impervious area by reduction percentage (voluntary, 40%)
(1,150 sq. ft. x 0.40 = 460 sq. ft.)
- **Subtract** the result from the original impervious surface
(2,250 sq. ft. - 460 sq. ft. = 1,790 sq. ft.)
- **Divide** by 200 and round to the highest number
(1,790 sq. ft. / 200 = 8.9, rounded up to 9)
- **Multiply** by \$18 to find the modified fee (\$18 x 9 = \$162)
- **Annual stormwater fee with credits reduced to \$162**

Credit Program

What is a credit?

A credit is a reduction in impervious area due to implementation of a stormwater management facility or a Stormwater Pollution Prevention Plan. A credited area is subtracted from a property's total impervious area prior to calculating the fee for the stormwater utility. Stormwater management facilities are given credits because, when operated and maintained properly, they reduce the quantity and improve the quality of stormwater runoff. This in turn reduces the need for capital investment in new infrastructure. In order to participate in the program an application must be submitted to the City and renewed on a yearly basis using the Credit Renewal Form. Credits are calculated by summing impervious areas draining to the facility and then multiplying by an assigned percentage. That total is then deducted from the original square feet of impervious surface. If billing units are decreased then it will result in a reduced fee. See page 16 for an example calculation.

What are the eligibility requirements?

For a new or existing facility to be eligible for credit, the following requirements must be met:

- For facilities built before July 1, 2014, they need to have been designed, installed, and accepted by the City in accordance with the technical standards required by the City at the time of construction. For facilities built July 1, 2014, and after, the technical standards are those contained in the Virginia Stormwater BMP Clearinghouse (<http://vwrrc.vt.edu/swc/>) or other state-approved design guidance documents.
- The facility needs to have a signed and recorded maintenance agreement with the City. The city may require an existing maintenance agreement to be updated to meet current standards for maintenance and inspections.
- The facility needs to currently function as designed. Functionality will be verified through periodic City inspections and through any reporting requirements contained in the maintenance agreement.
- If a facility fails a City inspection or the owner fails to submit maintenance documents as required in the maintenance agreement, the City will withdraw the credit if corrective actions are not taken within the time specified by the City.

To be eligible for an Individual Residential or General SWPPP credit, the following requirements must be met:

- The credit can only be applied to on-site areas.
- Choose from a “toolbox” of options and follow the requirements for each practice.

How much credit can I get?

There are multiple practices available to receive a credit toward the utility fee. The maximum a site can achieve is 95%. The amount of credit given depends on several factors—the type of facility, area treated and/or captured, and if a facility was built voluntarily or requirement as part of a development. The impervious area treated by the facility is the only area that is eligible for the discount, not the entire impervious surface of the property.

Stormwater Utility Fee Credit Opportunities

Stormwater Management Facility Credit

For a facility that was a condition of development the maximum credit that can be received is 20%. For a facility that was voluntarily installed the maximum credit that can be received is 40%. The policy of the City Council is to maintain the percent credit for a voluntary stormwater management facility for a minimum of 15 years. For a facility that provides detention for off-site stormwater and/or on-site stormwater in excess of City of Falls Church code requirements the maximum credit is 30%.

Credit for Off-site Impervious Surfaces

Credit may be applied to off-site impervious areas that are not currently served by a structural stormwater management facility that are within the public right-of-way (e.g., City streets) provided that the facility has been approved by the Director of Public Works. The Director of Public Works will only approve a facility for off-site treatment credit if at his discretion it is determined that the stormwater management benefits achieved are in the best interest of the City. If you are interested in this opportunity please contact Public Works in advance.

Stormwater Detention Credit

The City will provide up to 30% credit against the stormwater utility fee for stormwater detention above that required in Chapter 35 “Stormwater” of the City Code. The credit applies only to the impervious areas draining to the stormwater detention facility. Once the Director of Public Works has determined that any statutory requirements have been met, the following credits will be available:

- 10% credit for detention of stormwater resulting from a once inch rainfall or greater and less than two inches.
- 20% credit for detention of stormwater resulting from two inches of rainfall or greater and less than three inches.
- 30% credit for detention of stormwater resulting from rainfall of three inches or greater.

The policy of City Council is to maintain the percent credit for a detention facility installed in accordance with this section for a minimum of 15 years.

Stormwater Pollution Prevention Practices

The City will provide a 10% credit against the stormwater utility fee for a property owner who implements a Stormwater Pollution Prevention Plan (SWPPP) that meets the requirements of this section. SWPPP credits may not be applied to off-site areas. Two categories of SWPPP credits are available:

- Individual Residential SWPPP Credit - This credit is available to any individual residential property owner, including single family detached homes, townhomes, duplexes, and condominium owners if they are separately billed the utility fee.
- General SWPPP Credit - This credit is available to all property owners, regardless of land use.

To receive the SWPPP credit, the property owner may choose from the “tool-box” of potential practices described below (see page with each practice worth a designated number of points). A property owner achieving 10 points or more will receive the SWPPP credit of 10% off the annual stormwater fee.

Can credits be combined?

The Stormwater Management Facility Credit and the Stormwater Detention Credit are cumulative if a facility or combination of facilities provides treatment to stormwater from the same area of impervious cover. The 10% credit for an approved SWPPP is applied to the whole stormwater utility fee prior to the application of the credit for structural stormwater management facilities. The maximum amount of credit that can be achieved for stormwater generated on-site is 70% (e.g. 30% for water quality, 30% for water quantity, and 10% for SWPPP).

In addition, a property owner may, in accordance with the requirements of the credit policy, apply credits for structural stormwater management facilities that control stormwater from impervious areas within the public right-of-way (e.g. City streets) to achieve effective credit of greater than 70%.

However, in all cases the maximum credit that can be achieved for any one property shall be 95%.

Definitions

BMP - Best Management Practice; refers to structural and non-structural practices that are employed to reduce the adverse impact of development on stormwater run-off quality

detention facility - a system which provides temporary storage of stormwater runoff with a designed release of the stored runoff over time to manage the discharge volume, rate, pollutant loading and/or velocity.

drainage map - a to-scale map showing property lines, impervious areas, stormwater management facility drainage area boundaries, and the total impervious cover draining to the facility

maintenance agreement - a document that allows the City access to the site and establishes enforceable maintenance and reporting requirements

nutrient management plan - a set of conservation practices designed to use fertilizer and/or manure to effectively provide needed nutrients while protecting water quality

stormwater management facility - a structural or non-structural practice intended to manage the volume, rate, and quality of stormwater runoff; e.g. rain garden, detention facility, pervious pavers, etc.

Stormwater Pollution Prevention Plan (SWPPP) - a plan that utilizes Best Management Practices (BMPs) to minimize stormwater pollution

How do I apply?

An application form must be submitted by the owner of the stormwater management facility or his/her legal agent and approved by the City to receive a credit. The form must be received prior to January 1 of any given year to be considered for credit in the upcoming stormwater utility billing cycle. Credits will not be pro-rated. Special exceptions may be made by the Director of Public Works for the first year of credit implementation. The following documentation will be required:

On-Site Stormwater Management Facility: Form SW1 and Documents Listed Below

Off-site Stormwater Management Facility: Form SW1 and Documents Listed Below

Stormwater Detention Facility: Form SW1 and Documents Listed Below

Individual Residential SWPPP - Form SW2 and Toolbox

General SWPPP - Form SW3 and Toolbox

Stormwater Structural Facility Requirements:

Application Form	This form is provided at the end of this packet and on the City's website.
Drainage Area Map	This is a to-scale map showing property lines, impervious areas, stormwater management facility drainage area boundaries, and the total impervious cover draining to the facility. The property owner should check with the Department of Public Works to determine whether this information is already on file with the City.
Stormwater Management Facility Description	This should reference type, date of installation, and any other details to be considered with respect to pollutant removal.
Narrative of Maintenance and Repairs	This is a history of facility maintenance and repair activities. Include an annual routine maintenance schedule. Include any modifications or repairs that have occurred from installation to the time of application.
Photos	Provide at least two date-stamped images showing the facility within one month of the application date.
Stormwater Facility Management Agreement	Include a copy of the agreement that allows the City access to the site and establishes enforceable maintenance and reporting requirements.

Mail application and all applicable documents to:

City of Falls Church
 Department of Public Works
 Attn: Stormwater Utility
 300 Park Avenue, Suite 100W
 Falls Church, VA 22046

Credit Calculation Form

Billable Area & Initial Fee

A _____ Enter (on-site) Total Billable Impervious Area

B _____ $B = A \div 200$ Round to next highest whole number. Enter Billing Units

C _____ $C = B \times \$18$ Enter Initial Annual Stormwater Utility Fee

Reduction for Condition of Development SWM Facility

D _____ Enter Impervious Area Draining to Condition of Development SWM Facility

E _____ $E = D \times 0.20$ Enter Impervious Area Reduction for Condition of Development SWM Facility

Reduction for Voluntary SWM Facility

F _____ Enter (on-site & off-site) Impervious Area Draining to Voluntary SWM Facility

G _____ $G = F \times 0.40$ Enter Impervious Area Reduction for Voluntary SWM Facility

Reduction for Detention Facility

H _____ Enter (on-site & off-site) Impervious Area Draining to Detention Facility

I _____ $I = H \times 0.10$ for stormwater detention volume of 1.00-1.99 inches
 $H \times 0.20$ for stormwater detention volume of 2.00-2.99 inches
 $H \times 0.30$ for stormwater detention volume of 3.0 inches or greater
Enter Impervious Area Reduction for Detention Facility

SWPPP Adjustment

J _____ $J = (A) \times 0.10$

Calculating your Final Adjusted Annual Stormwater Utility Fee

K _____ $K = E+G+I+J$ Enter the Total Impervious Area Reduction

L _____ $L = A-K$ Enter the Adjusted Billable Impervious Area

M _____ $M = L \div 200$ Round to next highest whole number. Enter the Adjusted Billing Units

N _____ $N = M \times \$18$ Enter the Adjusted Annual Stormwater Fee

O _____ $(C) \times 0.05 =$ Minimum Stormwater Fee

P _____ Final Adjusted Annual Stormwater Utility Fee = **(N) or (O), whichever is greater**

Example Calculation Form

Billable Area & Initial Fee

A 2250 Enter (on-site) Total Billable Impervious Area

B 12 **$B = A \div 200$** Enter Billing Units

C 216 **$C = B \times \$18$** Enter Initial Annual Stormwater Utility Fee

Reduction for Condition of Development SWM Facility

D _____ Enter Impervious Area Draining to Condition of Development SWM Facility

E _____ **$E = D \times 0.20$** Enter Impervious Area Reduction for Condition of Development SWM Facility

Reduction for Voluntary SWM Facility

F 1150 Enter (on-site & off-site) Impervious Area Draining to Voluntary SWM Facility

G 460 **$G = F \times 0.40$** Enter Impervious Area Reduction for Voluntary SWM Facility

Reduction for Detention Facility

H _____ Enter (on-site & off-site) Impervious Area Draining to Detention Facility

I _____ **$I = H \times 0.10$** for stormwater detention volume of 1.00-1.99 inches
 $H \times 0.20$ for stormwater detention volume of 2.00-2.99 inches
 $H \times 0.30$ for stormwater detention volume of 3.0 inches or greater
Enter Impervious Area Reduction for Detention Facility

SWPPP Adjustment

J _____ **$J = (A) \times 0.10$**

Calculating your Final Adjusted Annual Stormwater Utility Fee

K 460 **$K = E+G+I+J$** Enter the Total Impervious Area Reduction

L 1790 **$L = A-K$** Enter the Adjusted Billable Impervious Area

M 9 **$M = L \div 200$** Round to next highest whole number. Enter the Adjusted Billing Units

N 162 **$N = M \times \$18$** Enter the Adjusted Annual Stormwater Fee

O 11 **$(C) \times 0.05$** = Minimum Stormwater Fee

P 162 Final Adjusted Annual Stormwater Utility Fee = **(N) or (O), whichever is greater**

Important Resources

- Chesapeake Stormwater Network
<http://chesapeakestormwater.net/be-bay-friendly/>
- City of Falls Church Department of Public Works
www.fallschurchva.gov/Stormwater
- City of Falls Church Neighborhood Tree Program
www.fallschurchva.gov/content/government/departments/publicworks/urbanforestry/programs/neighborhoodtree.aspx
- EnviroScape Program, NVSWCD
www.fairfaxcounty.gov/nvswcd/enviroscape.htm
- Northern Virginia Soil & Water Conservation District (NVSWCD)
<http://www.fairfaxcounty.gov/nvswcd/>
- Permeable Pavement state standards
<http://vwrrc.vt.edu/swc/NonProprietaryBMPs.html>
- Rain Gardens Technical Guide, Virginia Department of Forestry
www.dof.virginia.gov/mgt/riparian/rain-gardens.htm
- Virginia Department of Environmental Quality
www.deq.virginia.gov/
- Virginia Stormwater BMP Clearinghouse
<http://vwrrc.vt.edu/swc>

City of Falls Church CREDIT APPLICATION FORM

(Form SW1)

Applicant Name:

Date:

Email:

Phone #:

Property Information:

Owner:

Street:

City, State, ZIP Code:

Mailing Address (If different from property address):

Street:

City, State, ZIP Code:

Stormwater Management Facility Description:

Include type of facility, date(s) of installation and pollutant removal efficiency from the Virginia BMP Clearinghouse, Recommendations of the Expert Panel to Define Nutrient Removal Rates for Urban Stormwater Retrofits Projects, or other state-approved design guidance (provide documentation to support the determined pollutant removal efficiency). Attach additional information if necessary.

- Voluntary Stormwater Management Facility
- Condition of Development Stormwater Management Facility
- Off-site Stormwater Management Facility
- Stormwater Detention (circle one): 1-1.99 inches 2-2.99 inches 3 inches or greater

Total Amount of Credit: _____

Final Adjusted Annual Stormwater Utility Fee: _____

(Use Credit Calculation Form)

Credit Application Form cont.

- I certify that the above information, to the best of my knowledge and belief, is true, accurate and complete.

- I certify that practices installed on my property for which I am taking credit are functioning as intended and are being maintained in accordance with guidance provided by the City.

- I certify that I have received proper authorization from my homeowners or condominium association for the practices installed, if applicable.

- I agree that City staff may have access to my site for the sole purpose of verifying these practices. Should City staff find a deficiency, I also understand that I must correct the deficiency in the time frame provided by the City and that if corrective action is not taken in a timely manner, that I will no longer be able to take credit for the practice.

Signature _____

Date _____

Official Use Only:

Facility ID # _____ Review Date: _____

Reviewer: _____ Approval Date: _____

Comments:

City of Falls Church RESIDENTIAL SWPPP APPLICATION FORM (Form SW2)

Applicant Name: _____ Date: _____

Email: _____ Phone #: _____

Property Information:

Owner: _____
 Street: _____
 City, State, ZIP Code: _____

Mailing Address (If different from property address):

Street: _____
 City, State, ZIP Code: _____

<i>Watershed Stewardship</i>	<u>Activity</u>	<u>Date</u>	<u>Hours</u>
------------------------------	-----------------	-------------	--------------

(1 hour = 1 point)

Total Points:

Total Hours:

<i>Rain Barrels</i> - include a picture of new barrels installed this year	<u>Year Installed</u>	<u>Capacity</u>	<u># Installed</u>
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(1 rain barrel = 2 points)

(1 rain barrel = 2 points)

Total Points:

Total Barrels:

<i>Rain Garden</i>	<u>Area</u>	<u>City Approval Date</u>
--------------------	-------------	---------------------------

(5 points for ≥ 50 SF,
 10 points for ≥ 100 SF)

Total Points:

Total Area:

<i>Tree Planting</i>	<u># of Trees</u>	<u>City Approval Date</u>
----------------------	-------------------	---------------------------

(1 tree = 2 points)

Total Points:

Total Trees:

<i>Conservation Landscaping</i>	<u>Area</u>	<u>City Approval Date</u>
---------------------------------	-------------	---------------------------

(Each 100 SF = 3 points)

Total Points:

Total Area:

Residential SWPPP Application Form cont.

Downspout Disconnection
(1 disconnection = 1 points;
No credit for disconnection
> 5 years)

Year Disconnected

City Approval Date

Total Points:

Permeable Pavers
(5 points for ≥ 250 SF,
10 points for ≥ 500 SF)

Area

City Approval Date

Total Points:

Total Area:

No Fertilizer Pledge
(Yes = 1 point)

I pledge that I will not apply commercial fertilizer on my property during the credit year.

Total Points:

Green Streetscape

City Approval Date

Total Points (Provided by City):

Total Residential SWPPP Points: _____ (minimum of 10 points needed)

- I certify that the above information, to the best of my knowledge and belief, is true, accurate and complete.
- I certify that practices installed on my property for which I am taking credit are functioning as intended and are being maintained in accordance with guidance provided by the City.
- I certify that I have received proper authorization from my homeowners or condominium association for the practices installed, if applicable.
- I agree that City staff may have access to my site for the sole purpose of verifying these practices. Should City staff find a deficiency, I also understand that I must correct the deficiency in the time frame provided by the City and that if corrective action is not taken in a timely manner, that I will no longer be able to take credit for the practice.

Signature _____

Date _____

Official Use Only:

Comments:

Facility ID # _____ Review Date: _____

Reviewer: _____ Approval Date: _____

Individual Residential SWPPP Credit Toolbox

A property owner achieving 10 points or more will receive the SWPPP credit of 10% off the annual storm-water fee. The following table presents practices and requirements for obtaining points toward the individual residential SWPPP credit. Refer to *Important Resources* for cited technical manuals and specifications. All credits, except where noted, are ongoing provided that the property owner maintains the practice and submits an annual Residential SWPPP Application Form.

Practice	Description	Points	Requirements
Watershed Stewardship	Participate in a City-sanctioned volunteer event, including but not limited to stream clean-ups, storm drain stenciling projects, adopt-a-highway, and tree planting. Refer to the City’s webpage for a list of sanctioned events.	1 point per hour volunteered. Multiple members of a household may participate and accumulate points.	Indicate hours worked on Residential SWPPP Application Form.
Rain Barrels	Install a rain barrel with a capacity of at least 50 gallons to capture stormwater from a downspout. Construction and installation guidance provided on the Northern Virginia Soil and Water Conservation District web page.	2 points for each rain barrel that captures stormwater from a separate downspout.	Verify size and number of barrels on the Residential SWPPP Application Form. Include picture(s) with the initial application. Verify continued maintenance using the Residential SWPPP Application Form.
Rain Garden	Install a rain garden that meets the requirements of the Virginia Department of Forestry Rain Gardens Technical Guide or the Northern Virginia Soil and Water Conservation District Rain Garden Design and Construction Guide.	5 points for a rain garden covering 50 square feet or more. 10 points for a rain garden covering 100 square feet or more.	Verify continued maintenance using the Residential SWPPP Application Form.
Tree Planting	Plant a tree through the City’s Neighborhood Tree Program or privately plant a tree with approval from the City Arborist.	2 points per tree	The City Arborist must review and approve the type of tree and placement prior to planting. Verify continued maintenance using the Residential SWPPP Application Form.

Individual Residential SWPPP Credit cont.

Conservation Landscaping	Convert turf grass to conservation landscaping in accordance with requirements of the Homeowner Guide for a More Bay-Friendly Property published by the Chesapeake Stormwater Network.	3 points for every 100 square feet of conservation landscaping that replaces turf.	City staff must be contacted to approve the design and inspect the final result. Verify continued maintenance using the Residential SWPPP Application Form.
Downspout Disconnection	Disconnect downspouts that currently drain to a public street or other impervious area. The downspout must be redirected to a pervious area that will not cause erosion or flooding problems.	1 point per disconnected downspout. Credit available for 5 years after disconnection.	City staff must be contacted to approve the disconnection and ensure that it will not cause erosion or flooding. Verify continued disconnection using the Residential SWPPP Application Form.
Permeable Pavers and Porous Pavement	Replace traditional driveway, patio, or other impervious areas with permeable pavers or porous pavement in accordance with state standards .	5 points for 250 square feet or greater; 10 points for 500 square feet or greater.	City staff must be contacted to approve the design and inspect the final result. Verify continued maintenance using the Residential SWPPP Application Form.
No Fertilizer Pledge	Sign a pledge to not apply fertilizer to your lawn or landscaped areas.	1 point	Sign statement using the Residential SWPPP Application Form.
Green Streetscape	Allow the City to install stormwater management techniques as part of the streetscape in front of your home.	Number of points at the discretion of the DPW Director.	Requirements at the discretion of the DPW Director.

City of Falls Church GENERAL SWPPP APPLICATION FORM

(Form SW3)

Applicant Name:

Date:

Email:

Phone #:

Property Information:

Owner:

Street:

City, State, ZIP Code:

Mailing Address (If different from property address):

Street:

City, State, ZIP Code:

Watershed Stewardship

Activity

Date

Hours

(1 hour per employee
= 0.5 point)

Total Points:

Total Hours:

Rain Barrels - include a picture of new
barrels installed this year

Year Installed

Capacity

Installed

(Divide 5 by total number of downspouts.
The resulting fraction is the number of
points per rain barrel)

Total Points:

Total Barrels:

Tree Planting

of Trees

City Approval Date

(1 tree = 2 points)

Total Points:

Total Trees:

Conservation Landscaping

Area

City Approval Date

(Each 100 SF = 3 points)

Total Points:

Total Area:

Street Sweeping

Total Times Swept

Total Materials Swept (tons)

(≤ 26x a year = 10 points)

Total Points:

General SWPPP Application Form cont.

<i>Pet Waste Stations</i> (5-10 points; determined by DPW Director)	<u># Installed</u>	<u>City Approval Date</u>
<u>Total Points</u> (provided by City staff):		

<i>Certified Nutrient Management Plan</i> (10 points)	<u>Year Created</u>
<u>Total Points:</u>	

<i>SWPPP for High Risk Facilities</i> (10 points)	<u>Year Implemented</u>
<u>Total Points:</u>	

<i>Watershed Education Credit</i> (All students participate at least once a year = 8 points)	<u>Year Implemented</u>	<u># of Participating Students</u>
<u>Total Points:</u>		

Total General SWPPP Points: _____ (minimum of 10 points needed)

- I certify that the above information, to the best of my knowledge and belief, is true, accurate and complete.
- I certify that practices installed on my property for which I am taking credit are functioning as intended and are being maintained in accordance with guidance provided by the City.
- I certify that I have received proper authorization from my homeowners or condominium association for the practices installed, if applicable.
- I agree that City staff may have access to my site for the sole purpose of verifying these practices. Should City staff find a deficiency, I also understand that I must correct the deficiency in the time frame provided by the City and that if corrective action is not taken in a timely manner, that I will no longer be able to take credit for the practice.

Signature _____

Date _____

Official Use Only:

Comments:

Facility ID # _____ Review Date: _____

Reviewer: _____ Approval Date: _____

General SWPPP Credit Toolbox

A property owner achieving 10 points or more will receive the SWPPP credit of 10% off the annual storm-water fee. The following table presents practices and requirements for obtaining points toward the general SWPPP credit. Refer to *Important Resources* for cited technical manuals and specifications. All credits, except where noted, are ongoing provided that the property owner maintains the practice and submits an annual General SWPPP Application Form.

Practice	Description	Points	Requirements
Watershed Stewardship	Participate in a City-sanctioned volunteer event, including but not limited to stream clean-ups, storm drain stenciling projects, adopt-a-highway, and tree planting. Refer to the City’s webpage for a list of sanctioned events.	0.5 point per employee hour volunteered.	Indicate hours worked on General SWPPP Application Form.
Rain Barrels	Install a rain barrel with a capacity of at least 50 gallons to capture stormwater from a downspout. Construction and installation guidance provided on the Northern Virginia Soil and Water Conservation District web page.	Divide 5 by total of number downspouts. The resulting fraction is the number of points per rain barrel that captures stormwater from a separate downspout.	City staff must approve the placement and maintenance plan for the rain barrels. Verify size and number of barrels on the General SWPPP Application Form. Include picture(s) with the initial application. Verify continued maintenance using the General SWPPP Application Form.
Tree Planting	Plant a tree through the City’s Neighborhood Tree Program or privately plant a tree with approval from the City Arborist.	2 points per tree.	The City Arborist must review and approve the type of tree and placement prior to planting. Verify continued maintenance using the General SWPPP Application Form.
Conservation Landscaping	Convert turf grass to conservation landscaping in accordance with requirements of the Homeowner Guide for a More Bay-Friendly Property published by the Chesapeake Stormwater Network.	3 points for every 100 square feet of conservation landscaping that replaces turf.	City staff must be contacted to approve the design and inspect the final result. Verify continued maintenance using the General SWPPP Application Form.

General SWPPP Credit cont.

Street Sweeping	Sweep all surface parking areas using a vacuum sweeper at least 26 times per year.	10 points.	Verify frequency of sweeping and total materials swept using the General SWPPP Application Form.
Pet Waste Stations	Install pet waste stations, including bags, a receptacle, and the waste collection schedule.	5 to 10 points	Credit at the discretion of the Director of DPW based on an evaluation of the area to be considered and the severity of pet waste as a localized water quality problem. Number and placement of stations to be determined collaboratively with final approval by City staff. Verify continued maintenance using the General SWPPP Application Form.
Certified Nutrient Management Plan	Nutrient management plan developed by a state-certified nutrient management planner.	10 points.	Provide the City with a copy of the certified nutrient management plan. Verify continued application of the plan using the General SWPPP Application Form.
Stormwater Pollution Prevention Plan for High Risk Facilities	Adopt and implement a SWPPP in accordance with the requirements established in 9VAC25-151-80 (industrial stormwater permits). The facility must meet the definition of a “high risk facility” in the City’s Municipal Separate Storm Sewer System (MS4) permit.	10 points.	Provide the City with a copy of the adopted SWPPP. Verify continued implementation using the General SWPPP Application Form.
Watershed Education Credit (available to non-governmental pre-school or elementary schools)	Incorporate watershed education into pre-school or elementary school curriculum. Eligible programs include the Northern Virginia Soil and Water Conservation District EnviroScape model and other City-approved programs.	8 points if the program is designed to ensure that each student participates in the watershed education program at least once during a typical tenure at the school.	City staff must be contacted to approve the curriculum. Verify continued implementation using the General SWPPP Application Form.



Department of Public Works
300 Park Avenue, Suite 100W Falls Church, VA 22046
Phone: 703-248-5350 (TTY 711) Fax: 703-248-5336
dpw@fallschurchva.gov www.fallschurchva.gov

RPC # _____ Property Address: _____

STORM WATER DETENTION AND BMP MAINTENANCE AGREEMENT

THIS AGREEMENT made and entered into this ____ day of _____, 20____, by and between _____, hereinafter called the “Landowner(s),” or “GRANTOR(S),” and the CITY OF FALLS CHURCH, Virginia, hereinafter called the “City,” or “GRANTEE”;

WITNESSETH, that

WHEREAS, the Landowner(s) is/are the owner of certain real property, more particularly described as _____ as recorded by deed in the land records of _____, Virginia, in Deed Book _____, Page _____, hereinafter called the “Property”; and

WHEREAS, the Landowner(s) is/are proceeding to build on and develop the Property; and

WHEREAS, Grading Plan/Site Plan # _____, by _____, dated _____, hereinafter called the “Plan,” which is expressly made a part hereof, as approved or to be approved by the City, provides for detention of storm water and/or mitigation of polluted storm water run-off (BMP¹) within the confines of the property; and

WHEREAS, the City and the Landowner(s) agree that the health, safety, and welfare of the residents of the City of Falls Church, Virginia, require that on-site storm water detention and/or BMP facilities, including but not limited to infiltration trenches, rain gardens, porous pavers, sand filters vortexes, and check dams, be constructed and maintained on the property; and

WHEREAS, the City requires that on-site storm water detention and/or BMP facilities, as shown on the Plan, be constructed and adequately maintained by the Landowner(s);

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The on-site storm water detention and/or BMP facilities shall be constructed by the Landowner(s) in accordance with the plans and specification identified in the Plan or issued by the manufacturer, as applicable.
2. The Landowner(s) shall maintain the storm water detention and/or BMP facilities as shown on the Plan in good working order per manufacturer’s specification and acceptable to the City.

¹BMP—Best Management Practice; refers to structural and non-structural practices that are employed to reduce the adverse impact of development on storm water run-off quality.

Maintenance Agreement cont.

3. The Landowner(s) hereby grants permission to the City, its authorized agents and employees, to enter upon the Property and to inspect the storm water detention and/or BMP facilities whenever it deems necessary. Whenever possible, the City shall notify the Landowner(s) prior to entering the Property.
4. In the event the Landowner(s) fails to maintain the storm water detention and/or BMP facilities, as shown on the Plan, in good working order per manufacturer's specification and acceptable to the City, the City may enter upon the Property and take whatever steps it deems necessary to maintain said storm water detention and BMP facilities. This provision shall not be construed to allow the City to erect any structure of a permanent nature on the land of the Landowner(s). It is expressly understood and agreed that the City is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the City.
5. In the event the City, pursuant to this Agreement, performs work of any nature, or expends any fund in performance of said work for labor, use of equipment, supplies, material, and the like, the Landowner(s) shall reimburse the City upon demand, within ten (10) days of receipt thereof for all costs incurred by the City hereunder.
6. It is the intent of this Agreement to insure the proper maintenance of on-site storm water detention and/or BMP facilities by the Landowner(s); provided, however, that this Agreement shall not be deemed to create or effect any additional liability of any party for damage alleged to result from or be caused by storm water drainage.
7. The Landowner(s), its executors, administrators, assigns, and any other successors, in interest, shall indemnify and hold harmless the City and its agents and employees for any and all damages, accidents, casualties, occurrences or claims which might arise or be asserted against the City from the construction, presence, existence or maintenance of the storm water detention and/or BMP facilities by the Landowner(s) or the City.
8. In the event a claim is asserted against the City, its agents or employees, the City shall promptly notify the Landowner(s), and the Landowner(s) shall defend, at his/her own expense, any suit based on such claim. If any judgment or claims against the City, its agents or employees, shall be allowed, the Landowner(s) shall pay all costs and expenses in connection herewith.
9. This agreement shall be recorded among the land records of Arlington County, Virginia, and shall constitute a covenant running with the land, and shall be binding on the Landowner(s), its administrators, executors, assigns, heirs and any other successors in interest.

Maintenance Agreement cont.

WITNESS, the following signatures and seals:

GRANTOR #1: _____ (Seal) _____
(Signature) *(Name of Corporation, if applicable)*

(Print name) *(State or place of Incorporation, if applicable)*

(Title, if applicable)

COMMONWEALTH OF VIRGINIA
CITY OF FALLS CHURCH

NOTARY PUBLIC:

The foregoing instrument was acknowledged before me Notary # _____

this _____ day of _____, 20 _____

My Commission expires:

[NOTARY SEAL]

(Signature of Notary) *(Date)*

GRANTOR #2: _____ (Seal) _____
(Signature) *(Name of Corporation, if applicable)*

(Print name) *(State or place of Incorporation, if applicable)*

(Title, if applicable)

COMMONWEALTH OF VIRGINIA
CITY OF FALLS CHURCH

NOTARY PUBLIC:

The foregoing instrument was acknowledged before me Notary # _____

this _____ day of _____, 20 _____

My Commission expires:

[NOTARY SEAL]

(Signature of Notary) *(Date)*

City of Falls Church FACILITY INSPECTION FORM

(Form SW4)

Applicant Name: _____

Date: _____

Property Information:

Owner: _____

Street: _____

City, State, ZIP Code: _____

Stormwater Management Facility Type: _____

Impervious Area Draining to the Facility: _____

Year Built: _____ City ID: _____

General Condition	Yes	No	N/A
Is the primary outfall pipe/ditch clear and functioning?			
Are the inflow pipes/ditches clear and functioning?			
Is the water quality pool at the correct height (if present)?			
Are water quality pool control weirs, pipes, etc. working properly (if present)?			
Are emergency overflow devices clear and functioning (if present)?			
Is the structure clear of sediment?			
Is the structure clear of trash?			
Is vegetation being managed in a manner appropriate to the facility?			

Certification

This certification must be made by a licensed professional engineer, landscape architect, or other professional accepted by the City.

- Based on a visual survey of the above facility conducted on _____, I certify that the facility is currently functioning as designed.
- I certify that the total impervious cover served by the facility and the accompanying Drainage Area Map are true and accurate.

Printed Name

Date

Signature

Qualification

Address

Phone

Email

City of Falls Church CREDIT RENEWAL FORM

(Form SW5)

Applicant Name:

Date:

Email:

Phone #:

Property Information:

Owner:

Street:

City, State, ZIP Code:

Mailing Address (If different from property address):

Street:

City, State, ZIP Code:

I certify that my _____
(type of facility)

is in good working order and has been maintained.

Printed Name

Date

Signature

Official Use Only:

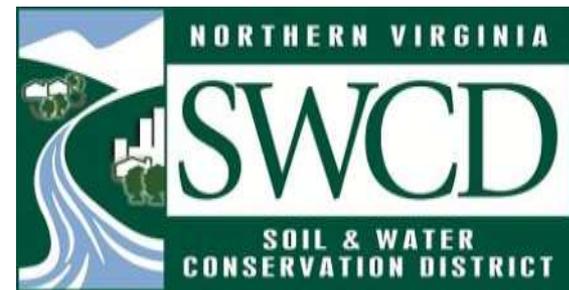
Facility ID # _____

Review Date: _____

Reviewer: _____

Approval Date: _____

Comments:



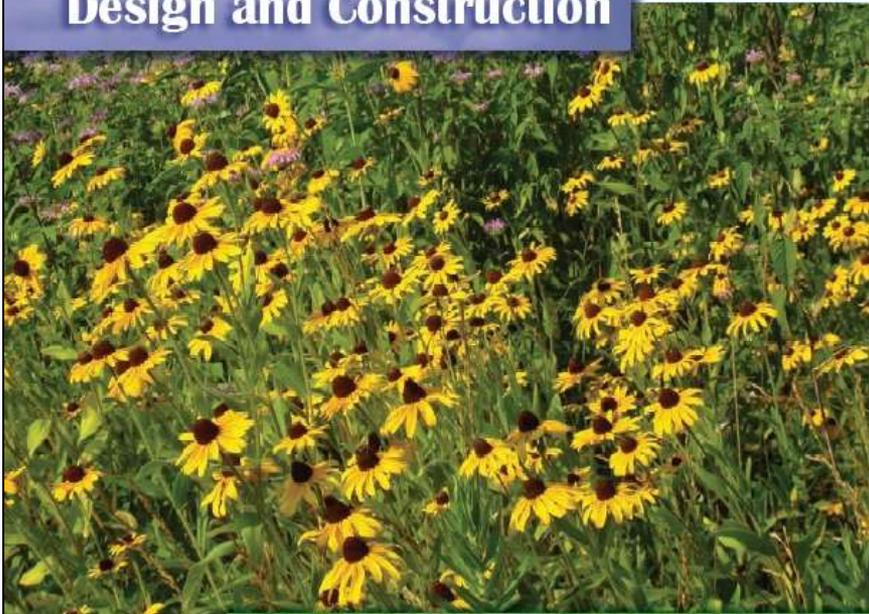
Northern Virginia Soil & Water Conservation District

- * SWCDs are local, independent public agencies
- * Work with landowners to implement conservation practices
- * Offer technical assistance, workshops, environmental education
- * Partner and work with County government, businesses, residents, volunteers, students

Helpful Resources

Rain Garden

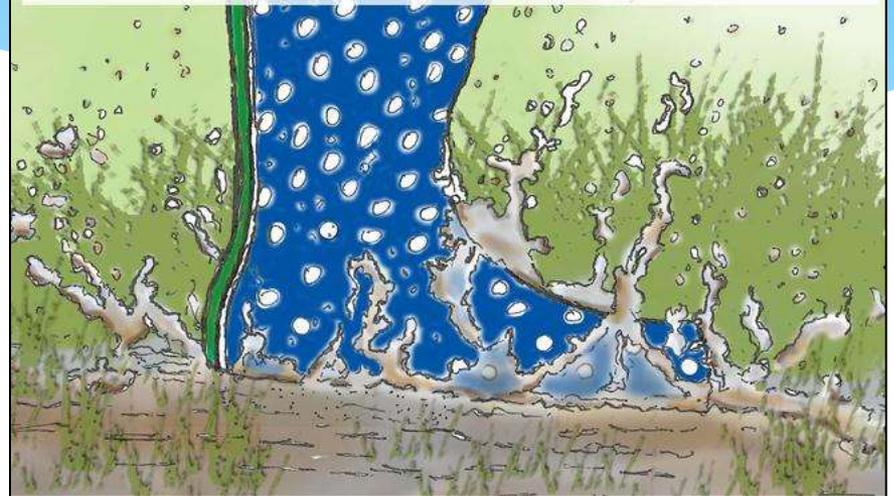
Design and Construction



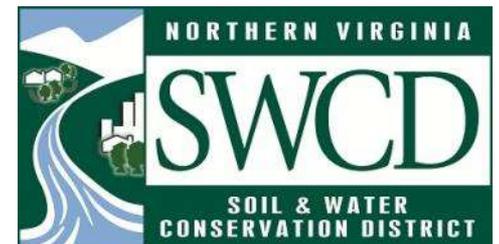
A Northern Virginia Homeowner's Guide



Solving Drainage and Erosion Problems A Guide for Homeowners



Residential Low Impact Landscaping



Northern Virginia Soil and Water Conservation District (NVSWCD)

Working for clean streams and protected natural resources in Fairfax County

Announcements

- **2014 Native Seedling Sale - Order Now.** Winterberry, persimmon and indigobush are among this year's bee-friendly seedlings.
- **Scholarship and Youth Conservation Camp applications available for high school students.**
- **Plant Northern Virginia Natives.** New campaign and resources to help you find beautiful and hardy native plants for your home.
- **Get the Latest on the Lake Rehabilitation and Dredging Projects** at Lake Barton, Huntsman Lake, Woodglen Lake and Royal Lake.
- **Where Does Drinking Water Come From?** Learn more about how local drinking water is handled - from the Potomac and Occoquan Rivers to your faucet.
- **Rain Barrel Workshop** and **Volunteer Stream Monitoring** events will help you get ready for spring.
- **Additional Announcements**



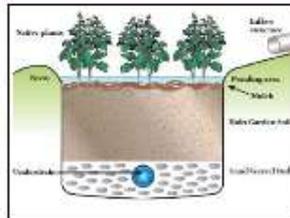
Technical Information/Services



Drainage & Erosion on Private Property



Pond Management



Rain Gardens & LID Practices



Soils Information



Stream Restoration & Stabilization



Suburban Horse Farm Mgmt

Stewardship & Education Opportunities

NVSWCD offers many stewardship and education opportunities. We encourage you to get involved.

Conservation in the Community



For Students & Teachers



Volunteer



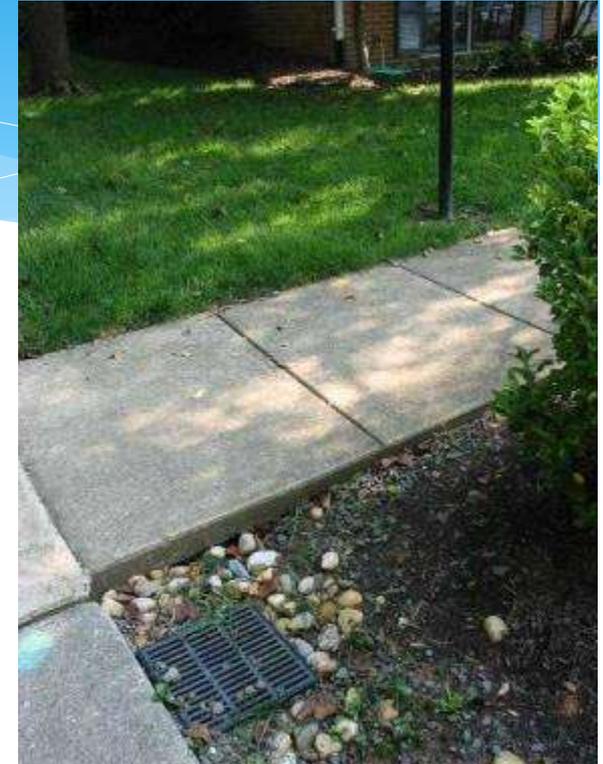
Drainage and Erosion Problems Are Common in Urban and Suburban Communities



Common Solutions

Problems:

- * Concentrate the flow
- * No quality, quantity benefit
- * Ineffective in dealing with large volumes
- * Maintenance intensive
- * Outfall limitations
- * Can be very expensive



Compare and Contrast

**Demand for aesthetic,
effective way to
address drainage and
erosion problems on
private property**



Upcoming Fairfax County Incentive Program

- * **Pilot program to work with homeowners associations in 2014-2015**
- * **Expand to work with homeowners**
- * **Details forthcoming, but similar to other programs**

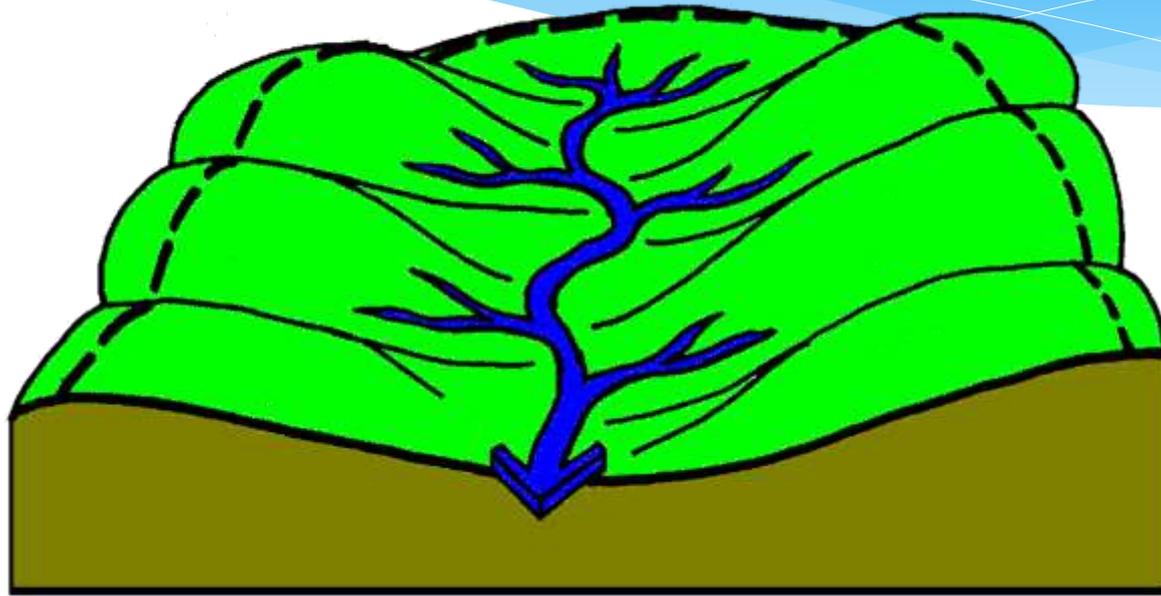


Streamside Riparian Buffers (Specialized Conservation Landscaping)

Lily Whitesell
Northern Virginia Soil and Water Conservation District



Where Are You In the Watershed?



At a high point, near a watershed divide?

At a low point, near the stream, pond, or lake?

Somewhere in the middle?

Drainage to Floodplain

STORM DRAIN MAP: West Springfield Village (Tax Map 89-1, 89-2, 89-3, 89-4)



Riparian Buffer Considerations

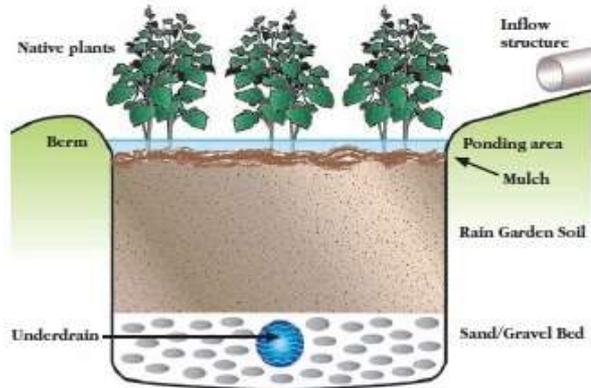
Is a floodplain a good place for a rain garden?

NO!

Floodplains typically have high water table and are not suitable for infiltration practices.

Infiltration

**Standing water is usually
NOT a good location
for a rain garden**



Infiltration

Rain gardens often fail if the soil inside the rain garden does not have infiltration capacity



Examples of failed rain gardens

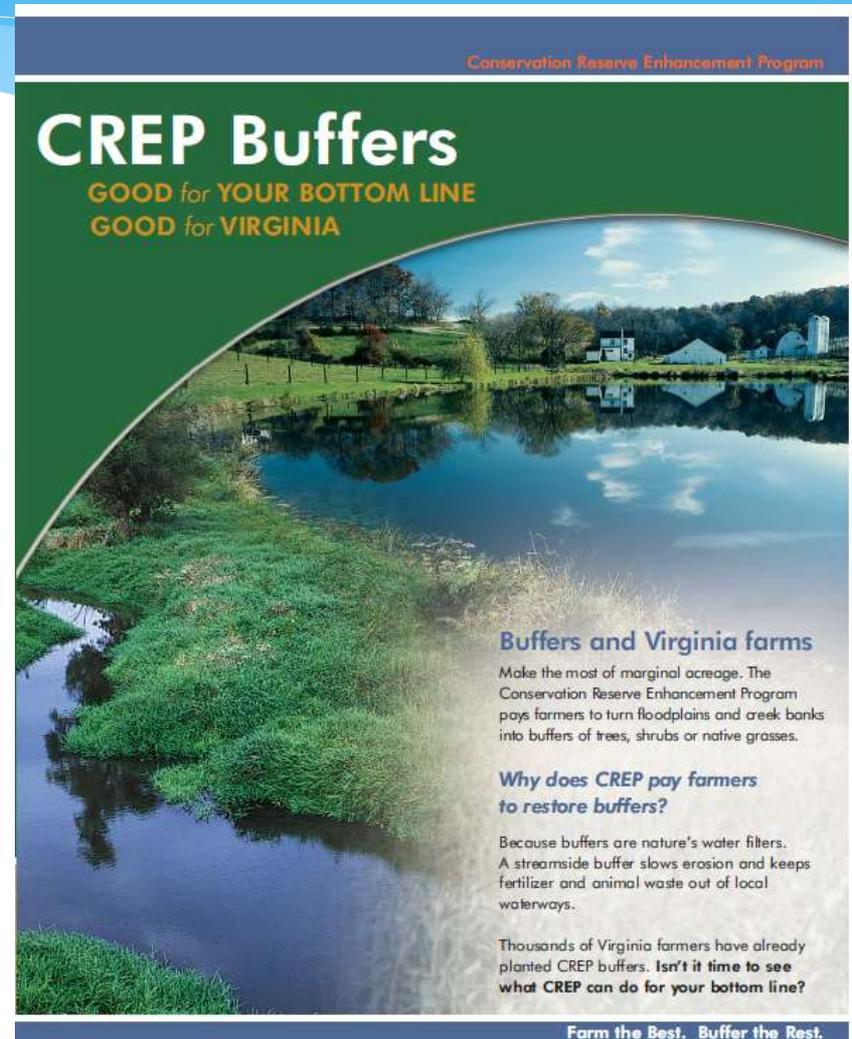
Riparian Buffer Considerations

Alternative: Riparian Buffer Planting

- * Use Conservation Landscaping Principles
- * Trees, shrubs and herbaceous plants slow runoff, uptake water and nutrients, prevent erosion
- * Provides water quality and habitat benefit along sensitive ecological corridors

Riparian Buffers in Agriculture

- * Riparian buffer planting already encouraged in agriculture
- * Targets for protecting areas along streams included in Bay program
- * Minimum width 35 feet in CREP program



Conservation Reserve Enhancement Program

CREP Buffers

GOOD for YOUR BOTTOM LINE
GOOD for VIRGINIA

Buffers and Virginia farms

Make the most of marginal acreage. The Conservation Reserve Enhancement Program pays farmers to turn floodplains and creek banks into buffers of trees, shrubs or native grasses.

Why does CREP pay farmers to restore buffers?

Because buffers are nature's water filters. A streamside buffer slows erosion and keeps fertilizer and animal waste out of local waterways.

Thousands of Virginia farmers have already planted CREP buffers. Isn't it time to see what CREP can do for your bottom line?

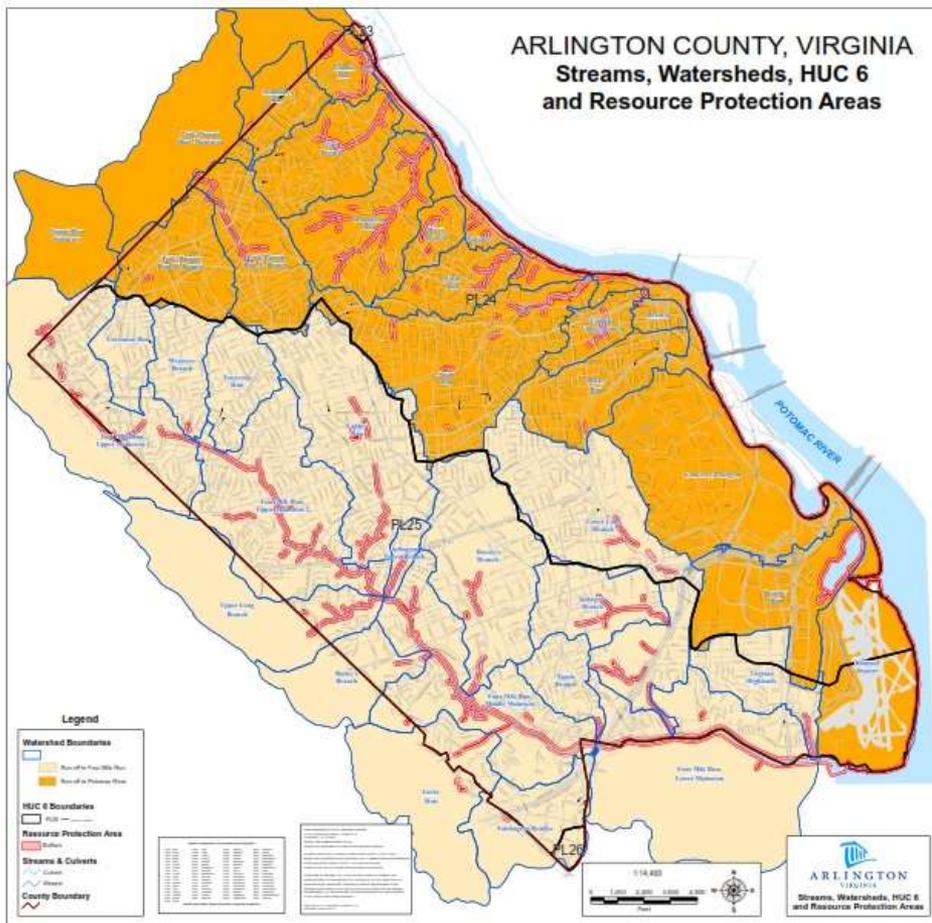
Farm the Best. Buffer the Rest.

Riparian Buffer Considerations

Do You Have a Resource Protection Area (RPA)?

- * Land disturbance and vegetative disturbance is restricted in streamside buffer areas
- * Typically 100 feet around streams, ponds, lakes, wetlands and other water bodies
- * Before removing vegetation, you will need permission.
- * Chesapeake Bay Preservation Ordinance

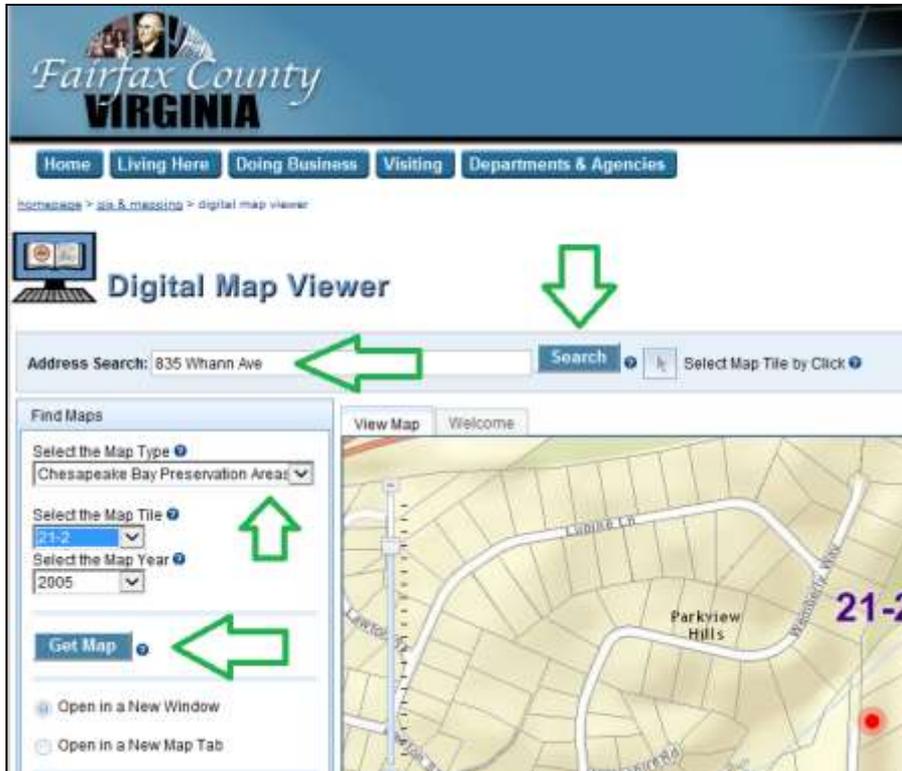
Resource Protection Areas: Arlington County



Search Online:

- * Arlington County Resource Protection Area
- * Arlington County – Chesapeake Bay Preservation Ordinance

Resource Protection Areas: Fairfax County



Search Online:

- * Fairfax County Digital Map Viewer
- * Fairfax County – Chesapeake Bay Preservation Ordinance

Resource Protection Areas: Fairfax County



CHESAPEAKE BAY PRESERVATION AREAS

LEGEND

Resource Protection Areas (RPAs)

1993 RPAs

2003 RPAs

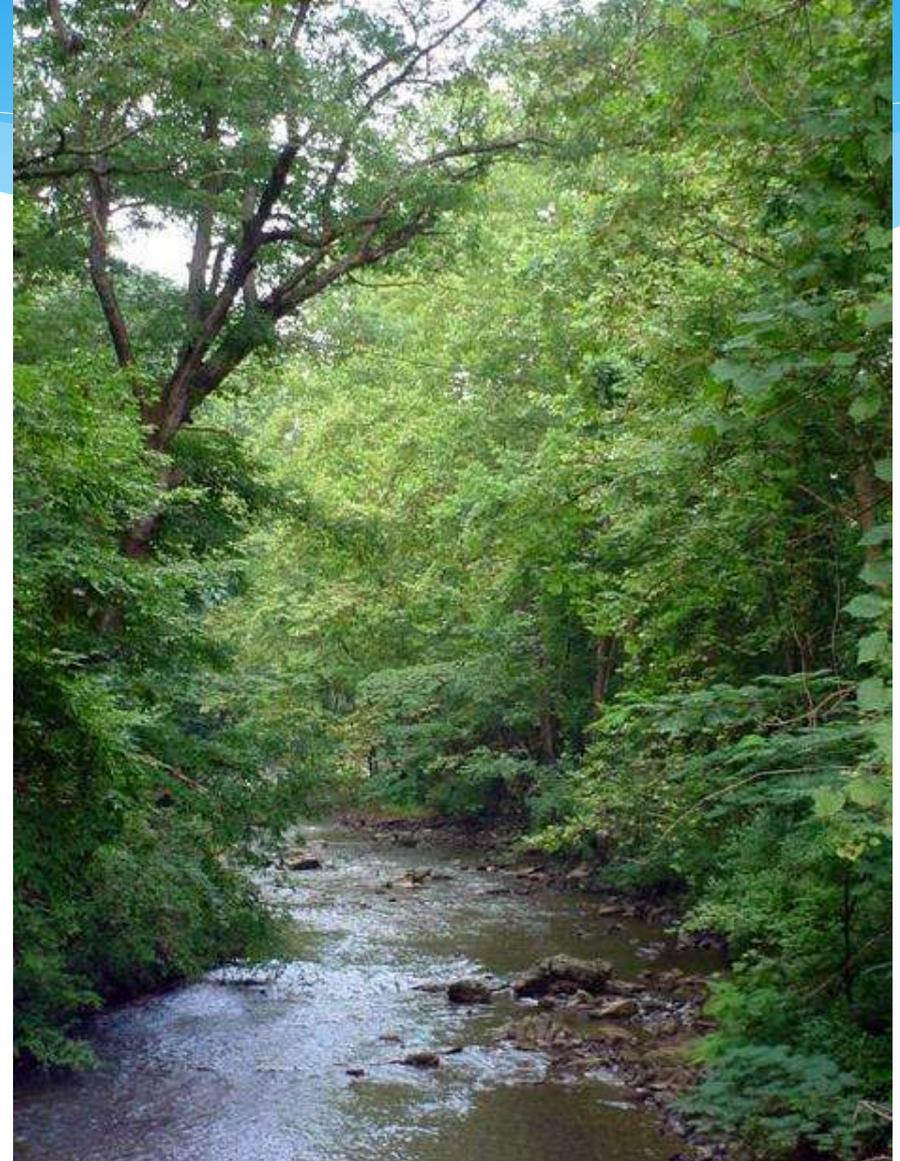
2003 (Rev) RPAs

Resource Management Areas (RMAs)



Healthy Streams

- * Native, woody vegetation
- * Tree canopy to cool water
- * Stable vegetated banks, floodplains free of encroachment
- * Clear water
- * Native flora and fauna -- abundant and diverse
- * Lack of pollutants



Benefits

Provide a healthy habitat



Benefits



Enhance the beauty
of your property

Questions?

Contact:

Lily Whitesell
Watershed Specialist
Northern Virginia Soil and Water Conservation District

703-324-1423, TTY 711
lily.whitesell@fairfaxcounty.gov

www.fairfaxcounty.gov/nvswcd



Creating a Bay-Friendly Property

Tom Schueler & Cecilia Lane
Chesapeake Stormwater Network



Chesapeake Bay Stormwater Training Partnership

Thanks to Many Partners !

- Alliance for Chesapeake Bay, National Fish and Wildlife Foundation, Center for Watershed Protection, University of MD Extension, MDE, Howard County, MD, EPA CBPO staff, Watershed Stewards Academy, and a dozen watershed groups



Chesapeake Bay Stormwater Training Partnership

Visit:

www.chesapeakestormwater.net

To learn how you can have access to:

Discounted Webcasts

Free One-day design workshops

Intensive master stormwater design seminars

Direct On-site technical assistance

Self guided web-based learning modules



Practices for a “Bay-Friendly” Property



Agenda

- Designing, constructing, installing and maintaining your Rain Garden
- Conservation Landscaping
- Tree Planting
- Cisterns and Rain Barrels
- Permeable Hardscapes
- Bay-Friendly Lawn Care

Rain Gardens

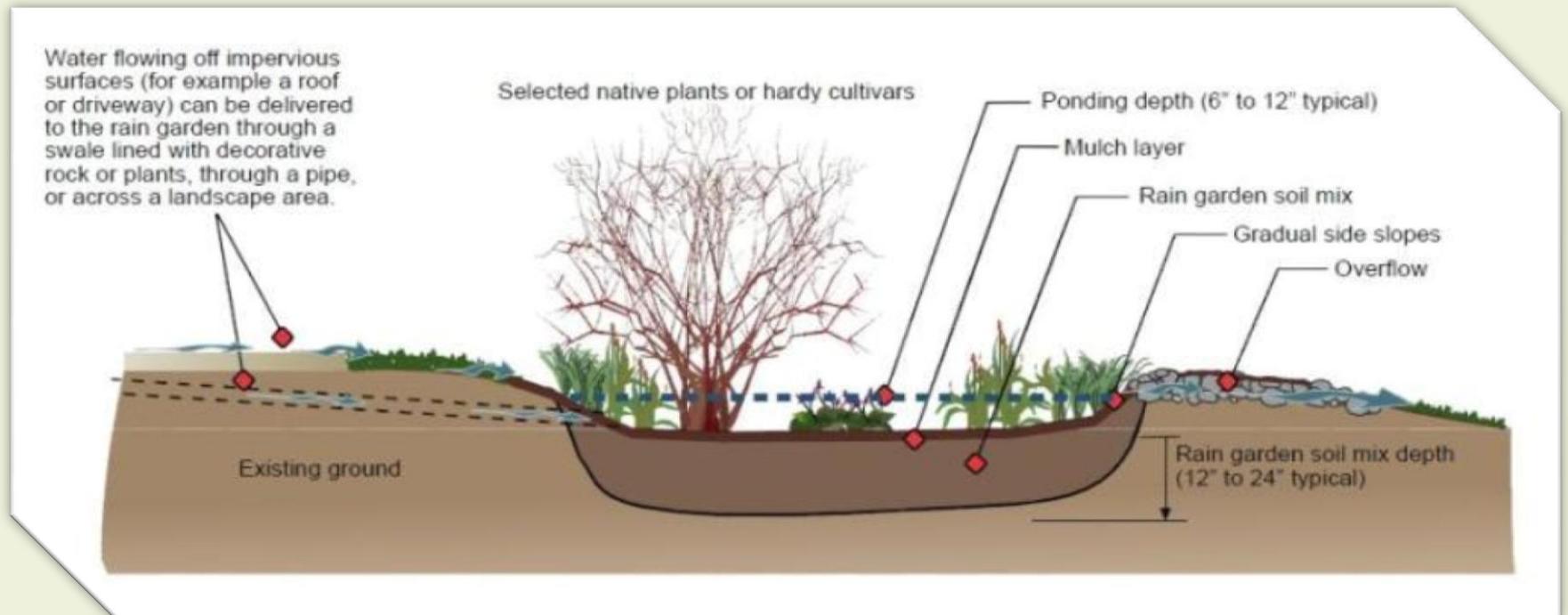
- Feasibility
- Design
- Construction
- Planting
- Up-Keep



Photo Credit: John Dawson

Rain Garden Basics

Rain gardens accept runoff from a roof, driveway, or parking lot that would otherwise go to the street or storm drain. The garden has a shallow depression that allows stormwater to collect and pool. Natural soils are replaced with sandier ones to allow the water to soak into the ground instead of running “off” into the storm sewer system or stream. The garden is planted with a mix of native plants that filter out pollutants and attract wildlife.



Assessing Your Property

Step 1. Map Your Lot

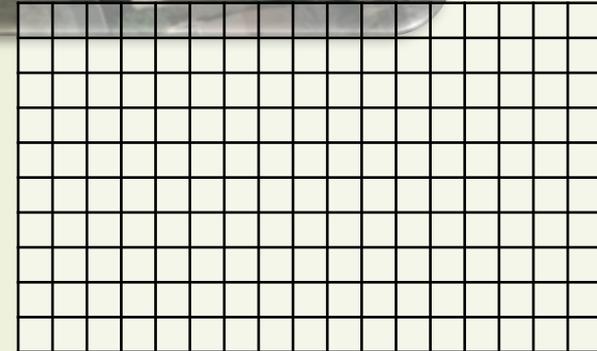
- Google Earth
- <http://landserver.org/>
- Local online resources



Basic Data on Lot Cover for My Home

LOT COVERAGE	Area: Square Feet	% of Lot
Hard Surfaces		0%
Roof-tops		
Driveway/Sidewalk		
Pervious Cover		100%
Trees/Landscaping		
Lawn		
TOTAL	0	

Note: 43,560 square feet = one acre



Let's do an example!

Tom has a 1/2 acre lot in a Bay County he wants to make a difference in the Bay so he assess his property for potential stormwater management opportunities

Tom makes some measurements of the land cover on his property and fills in the following table:

Basic Data on Lot Cover for My Home

LOT COVERAGE	Area: Square Feet	% of Lot
Hard Surfaces		28%
Roof-tops	2,650	
Driveway/Sidewalk	3,500	
Pervious Cover		72%
Trees/Landscaping	5,500	
Lawn	10,130	
TOTAL	21780	

Note: 43,560 square feet = one acre

1/2 acres lot = 21,780 ft²

2,650 ft² of rooftop

3,500 ft² of driveway

5,500 ft² of existing trees

10,130 ft² of lawn

Step 2. Figure Out Your Natural Plumbing

Be a Downspout Detective - Find each of your downspouts and look down slope to see where the water goes.



Downspouts discharging near driveways are usually connected to the street, and are prime candidates for locating a rain garden.

More on Your Rain Garden potential



This downspout is plumbed directly to the street, and would be quite easy to retrofit with a rain garden.



This downspout is too far away from any pervious areas for a rain garden, but a rain barrel might work.

Some of your downspouts may already be disconnected



Runoff from these downspouts travels more than 40' over grass which usually disconnects them unless your lawn is very steep. Disconnected downspouts are often poor candidates for a rain garden.

Step 3. Figure Out Your Other Plumbing



Water Lines



Natural Gas Lines



Sewer Lines



Underground Cable

Most states have “call before you dig” rules and provide a hotline to help you locate your underground utilities

State	Resource	Contact Information
MD	Miss Utility of Maryland*	811 or 1-800-257-7777**
DE	Miss Utility of Delmarva	811 or 1-800-282-8555
DC	District One Call	811 or 1-800-257-7777
PA	Pennsylvania One Call System, Inc.	811 or 1-800-242-1776
VA	Virginia 811	811 or 1-800-552-7001
WV	WV811	811 or 1-800-245-4848

* For the Eastern Shore of MD call Miss Utility of Delmarva

** or use website link <http://www.missutility.net/homeowners/>



Storm Drain

Other Things to Look at on Your Property



Sewage Pipe
Cleanout

Basement



Sump Pump
Discharge

Street
Right of Way



Step 4. Assess Soil Quality in Your Yard

Take a soil test in the areas of your lawn where grass doesn't grow very well.



[Click here for a list of testing labs in the Bay watershed](#)

Do a Test Dig to See if a Rain Garden Will Work



Figure out your maximum digging depth using a post hole digger. You need a depth of 18" to 24".



Determine the break between your topsoil layer and the underlying sub soils.

Simple Soil Infiltration Test



Soil Infiltration Rate

EXAMPLE

Depth of Hole (inches)	24 inches	
Start Time	8:15 am	
End Time	8:15 pm	
# Hours to Drain	12 hours	
Infiltration Rate (inches/hour)	24 inches / 12 hours = 2 inches / hour	

*Note: If your infiltration rate is less than 0.5 inches/hour, you will need to increase the surface area of the rain garden by 50%.

Let's do an example!

Tom tests his soils to see what their natural infiltration rate is. He digs a hole 24" deep and fills it with water. He notes the time he started when he filled the hole and the time at which the hole is empty.

He then fills in the yellow areas in the following table:

Soil Infiltration Rate

EXAMPLE

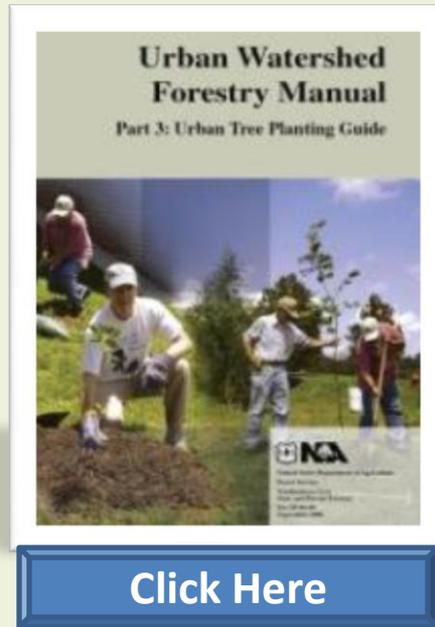
Depth of Hole (inches)	24 inches	24
Start Time	8:15 am	8:15 am
End Time	8:15 pm	8:15 pm
# Hours to Drain	12 hours	12
Infiltration Rate (inches/hour)	24 inches / 12 hours = 2 inches / hour	2.0

*Note: If your infiltration rate is less than 0.5 inches/hour, you will need to increase the surface area of the rain garden by 50%.

In this example, the soil infiltration rate is 2" per hour

Step 5. Check Your Overhead Conditions

This guide can help you quickly figure out which tree species you want and where to plant them.



[Click Here](#)

Quick shade analysis to add to your property sketch.



Step 6. Pull it all Together in a Plan

Now that you have all the basic data from your property assessment, you are ready to design and install your rain garden. Grab your calculator and tape measure, and get cracking!

Rain Garden Killers



Cannot dig to a depth of at least 18”

When a Rain Garden is not Feasible



Utility conflicts cannot be avoided



Infiltration test hole fills with water



Designing Your Rain Garden

Step 1: Estimate rooftop area draining to each of your most promising downspout(s). Simply, take the total rooftop area you entered in your basic data on lot cover form, and divide by the total number of downspouts at your home:

Total Roof Area: Square Feet	No. of Downspouts	Area Draining to Rain Garden: Square Feet
	1	0
Note: For the most accurate estimate, you can measure the actual roof area draining to each downspout.		

Step 2: Determine minimum surface area for your rain garden. Assume that the ponding area of your garden will be at least 6 inches deep, and will capture the first inch of rainfall that lands on your roof. The minimum surface area for your rain garden is computed using the following equation:

Surface Area Draining to the Rain Garden: Square Feet	"Engineering Factor" (multiply by 0.12)	Minimum Surface Area for Rain Garden: Square Feet
0	0.12	0
Note that one 4 by 8 tarp would be 32 square feet.		
The engineering factor computes how much surface area is needed in your rain garden to capture one inch of rainfall that falls on your roof.		

Let's do an example!

Designing Your Rain Garden

Step 1: Estimate rooftop area draining to each of your most promising downspout(s). Simply, take the total rooftop area you entered in your basic data on lot cover form, and divide by the total number of downspouts at your home:

Total Roof Area: Square Feet	No. of Downspouts	Area Draining to Rain Garden: Square Feet
2,650	5	530
Note: For the most accurate estimate, you can measure the actual roof area draining to each downspout.		

Step 2: Determine minimum surface area for your rain garden. Assume that the ponding area of your garden will be at least 6 inches deep, and will capture the first inch of rainfall that lands on your roof. The minimum surface area for your rain garden is computed using the following equation:

Surface Area Draining to the Rain Garden: Square Feet	"Engineering Factor" (multiply by 0.12)	Minimum Surface Area for Rain Garden: Square Feet
530	0.12	64
Note that one 4 by 8 tarp would be 32 square feet.		
The engineering factor computes how much surface area is needed in your rain garden to capture one inch of rainfall that falls on your roof.		

Designing Your Rain Garden

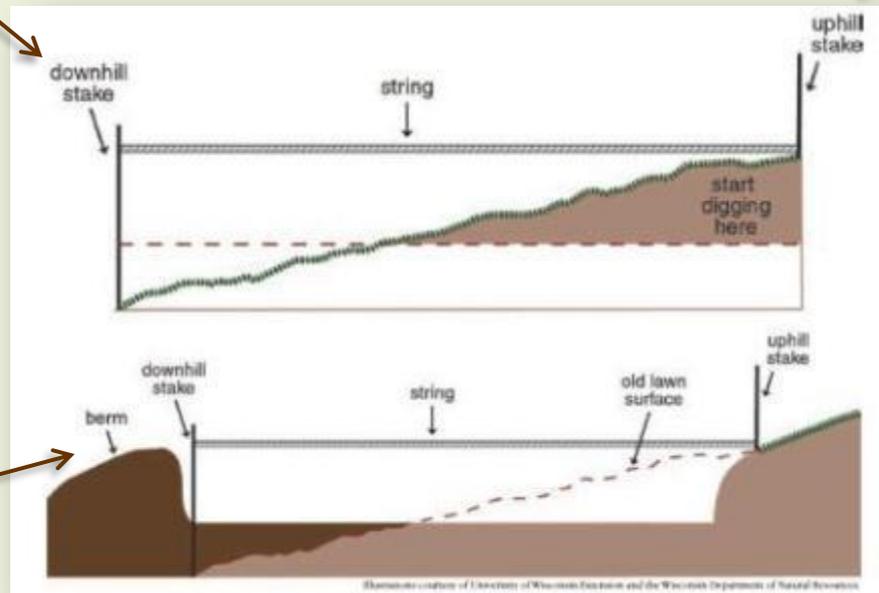
Step 3. Mark out the potential surface area available for your rain garden

Bottom of hill (or property boundary)

5' away from the downspout (if you don't have a basement) or 10' (if you do)

Stake out lateral boundaries, avoiding trees, hard surfaces, and areas going uphill

Construct a soil berm if you have more than 6" of drop



Measure your staked out area and make sure you have a minimum of 64ft² available

Illustration Credit: University of Wisconsin – Extension and the Wisconsin Department of Natural Resources

Designing Your Rain Garden

Step 4. Figure out how much excess fill needs to be disposed of and how much sand and mulch to order

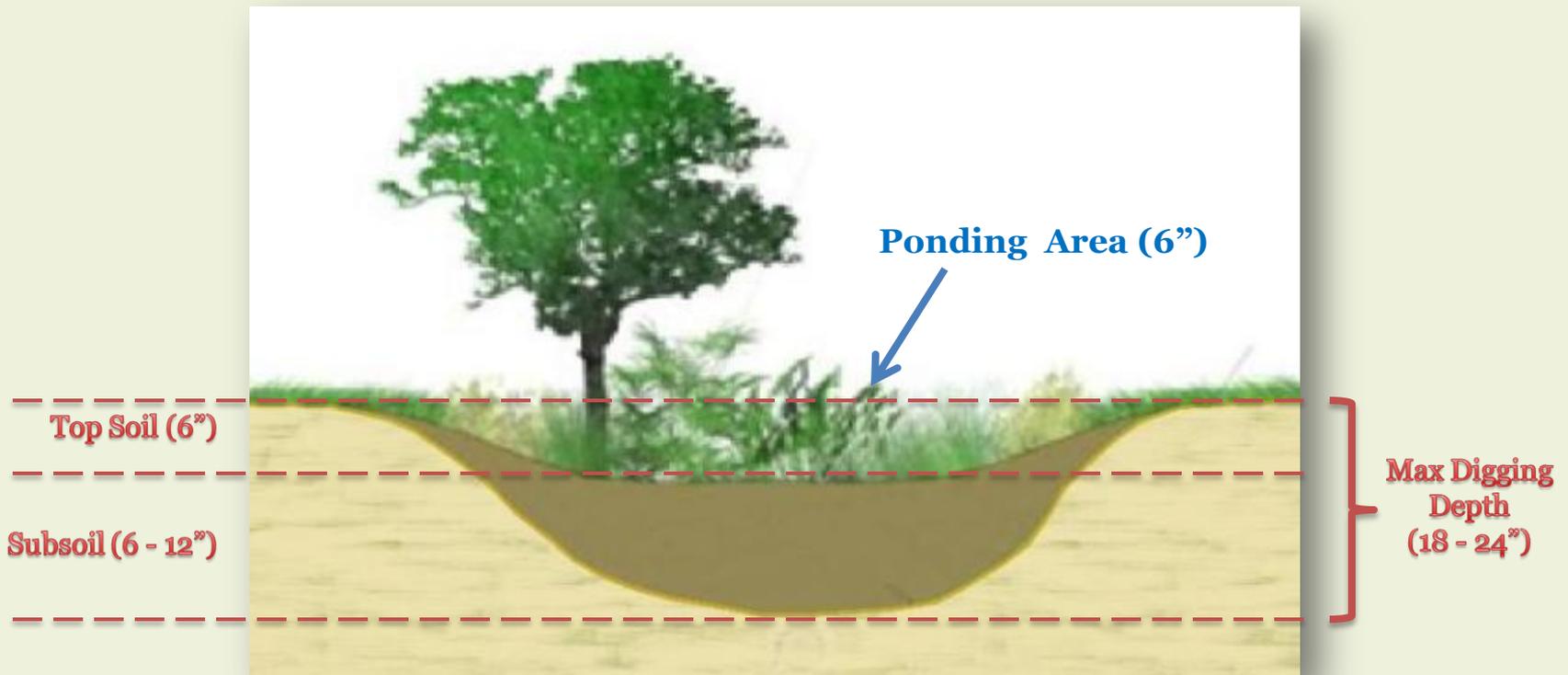


Photo Credit: Abbey Associates, Inc.

Rain Garden Calculator

Calculator to Estimate Excess Fill and Materials to Buy

Enter the following information:

- Max Digging Depth
- Ponding Depth
- Top Soil Depth
- Subsoil Depth
- # of Inlets

And the rain garden calculator will figure out the rest for you!

Design Factor	Example	Your Calculation
EXCESS FILL		
Max Digging Depth	24 inches	
Ponding Depth	6 inches	
Top Soil Depth	6 inches	
Subsoil Depth	12 inches	
Divide Subsoil Depth by 2, and then divide this by 12	$[12 \text{ inches}/2]/12$ X=0.5 feet	0.00
Garden Surface Area	64 square feet = Y	
Z = Multiply X and Y and divide the product by 27	$[(64)(0.5)]/27 =$ 1.2 cubic yards	0.0
Note: About 6 Wheelbarrow loads per cubic yard	About 7 loads of subsoil to dispose of elsewhere on your lawn	0.0
MULCH CALCULATOR		
Garden Surface Area	64 square feet	64
1 cubic yard for each 64 square feet of garden area	1 cubic yard of mulch to order ¹	1.0
SAND CALCULATOR		
Take Z and multiply by 1.4	1.7 tons of sand to order (round up to 2 tons)	0.0
RIVER STONE CALCULATOR		
Assume 0.2 tons per inlet	0.2 tons (400 pounds) ¹	# Inlets 0.0 tons
¹ Most bulk orders must be done in one cubic yard or ton increments. Last time I checked, the delivered price of sand is about \$45, double shredded hardwood mulch costs around \$35 a cubic yard and river stone runs \$100/ton. You may want to budget about \$250 for plants, the connector pipe and other stuff.		

Design Example

Calculator to Estimate Excess Fill and Materials to Buy

Design Factor	Example	Your Calculation
EXCESS FILL		
Max Digging Depth	24 inches	24
Ponding Depth	6 inches	6
Top Soil Depth	6 inches	6
Subsoil Depth	12 inches	18
Divide Subsoil Depth by 2, and then divide this by 12	$[12 \text{ inches}/2]/12$ $X=0.5 \text{ feet}$	0.75
Garden Surface Area	64 square feet = Y	64
Z = Multiply X and Y and divide the product by 27	$[(64)(0.5)]/27 =$ 1.2 cubic yards	1.8
Note: About 6 Wheelbarrow loads per cubic yard	About 7 loads of subsoil to dispose of elsewhere on your lawn	10.7
MULCH CALCULATOR		
Garden Surface Area	64 square feet	64
1 cubic yard for each 64 square feet of garden area	1 cubic yard of mulch to order ¹	1.0
SAND CALCULATOR		
Take Z and multiply by 1.4	1.7 tons of sand to order (round up to 2 tons)	2.5
RIVER STONE CALCULATOR		
Assume 0.2 tons per inlet	0.2 tons (400 pounds) ¹	2 # Inlets 0.4 tons
¹ Most bulk orders must be done in one cubic yard or ton increments. Last time I checked, the delivered price of sand is about \$45, double shredded hardwood mulch costs around \$35 a cubic yard and river stone runs \$100/ton. You may want to budget about \$250 for plants, the connector pipe and other stuff.		

The calculator tells Tom the following:

- He will have about 11 wheelbarrow loads of soil to get rid of
- He will need 1 cubic yard of mulch for the bed of his garden
- He will need to order 3 tons of sand for backfilling the garden and 0.4 tons of river stone for the gardens two inlets.

Tools of the Trade



Flexible connector pipe
attached to downspout



Construct Your Rain Garden

Step 1. Delineate where you plan to dig.



Step 2. Dig a shallow trench at least 1' wide and 6" deep.

Step 3. Line the trench with plastic sheeting.

Step 4. Either bury the connector pipe in the trench or create a river stone channel.



The Two Tarp Method

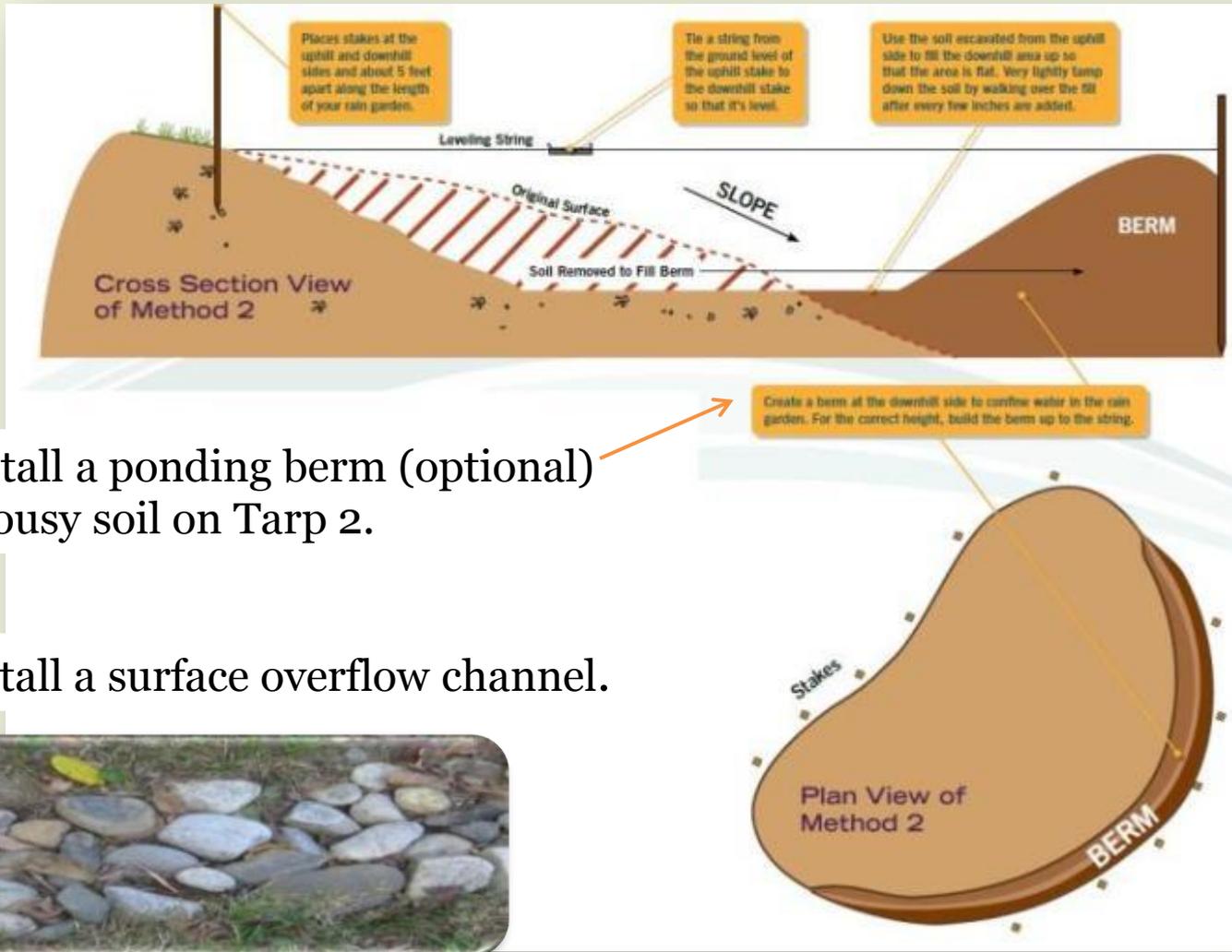
Step 5. Time for serious digging. Separate turf from topsoil and put each onto Tarp 1.

Step 6. Break up compacted soil. Put the lousy soils onto Tarp 2. Keep digging to the maximum possible digging depth.

Step 7. Loosen the subsoil at the bottom of the rain garden to improve infiltration.



Install Berm and Overflow



Step 8. Install a ponding berm (optional) from your lousy soil on Tarp 2.

Step 9. Install a surface overflow channel.



Illustration Credit: Washington State University Extension

Finishing Touches

Step 10. Backfill with a 50: 50 mix of sand and your good Tarp 1 topsoil until you are 6” below the grade of your lawn.

Step 11. Spread 2” to 3” of mulch over the surface of the bed.

Step 12. Dispose of fill soils elsewhere on your yard to fill holes, depressions or gullies.



Photo Credit: Anne Guillette, Low Impact Design Studio

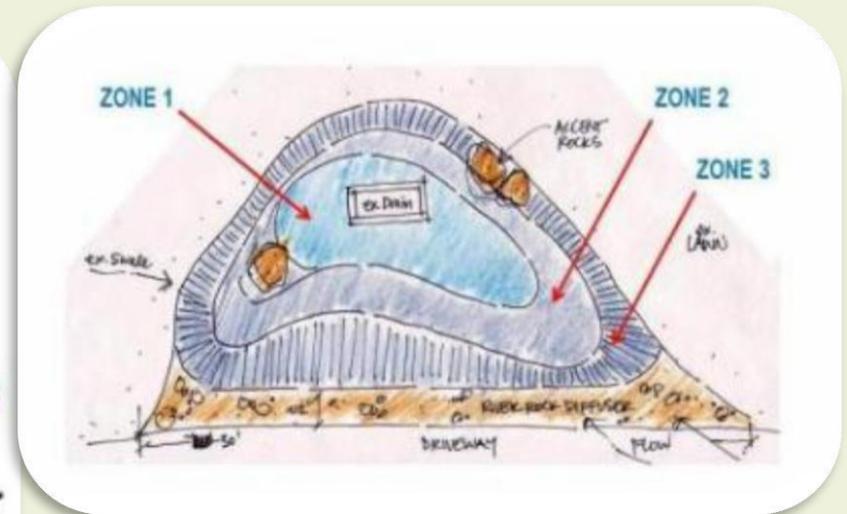
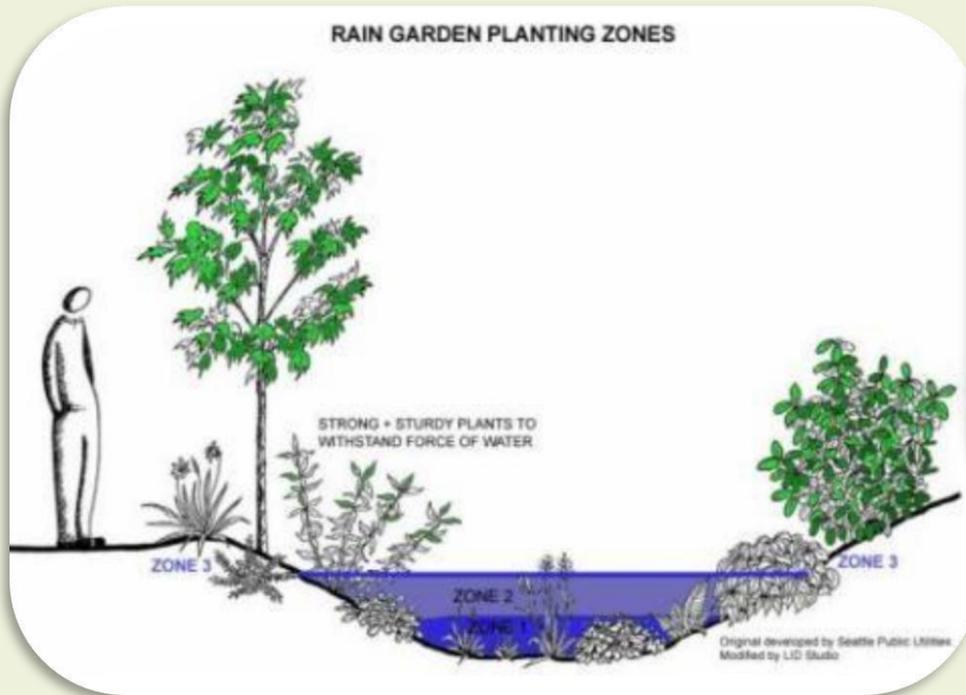
Planting Your Rain Garden

Types of Rain Garden Plants:

Zone 1 - tolerate sitting in water for an extended time

Zone 2 - tolerate sitting in water for a shorter time

Zone 3 - do not like sitting in water at all



*Illustration Credit: Anne Guillette,
Low Impact Design Studio*

Rain Garden Resources

“**Appendix C**” of the Bay-Friendly Property Guide has a bunch of helpful resources within the Bay watershed for planting your rain garden. Resources such as:

- Native plant vendors (retail and wholesale) in the Bay watershed
- Information for finding seeds of native plants and grasses
- Plant guides: regional, state, county and national !
- Invasive/non-native plant resources
- And more!

[Click here for a list of resources on rain garden plants](#)

Planting Design Tips



Group plants together in a series as they will have more visual impact.

Your design is a “composition” – like a painting or a group of objects on a shelf.



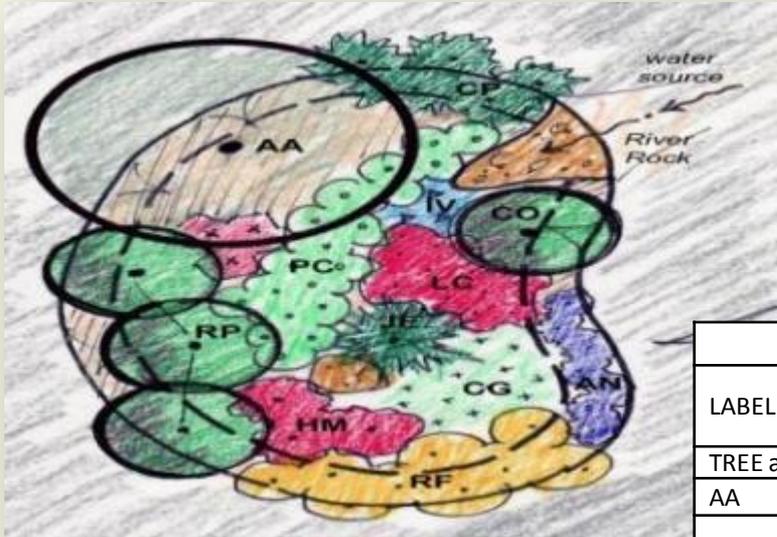
Vary plant heights, textures, colors, shapes, and sizes throughout the garden. Consider the bloom time of the plants.



Sample Planting Plan



AN: Aster novae-angliae
(Zone 3)



Part Shade / Part Sun Rain Garden

Plant List for a Partially Shaded Rain Garden with Perennials, Shrubs and Trees							
LABEL	LATIN NAME	COMMON NAME	SIZE ¹	QTY	PLANTING ZONE		
					1	2	3
TREE and SHRUBS							
AA	Amelanchier arborea	Downy Serviceberry	8-10'	1	◆	◆	◆
CO	Cephalanthus occidentalis	Buttonbush	5 gal	1	◆	◆	◆
RP	Rhododendron periclymenoides	Pinxterbloom Azalea	5 gal	3	◆	◆	◆
PERENNIALS, SEDGES + GRASSES							
AC	Aquilegia Canadensis	Columbine	QT	3	◆	◆	◆
AN	Aster novae-angliae	New England Aster	QT	7			◆
CG	Chelone glabra	White Turtlehead	QT	12	◆	◆	
CP	Comptonia peregrina	Sweet Fern	#1	5		◆	
HM	Hibiscus coccineus	Rose Mallow	#1	3	◆	◆	
IV	Iris versicolor	Blue Flag Iris	#1	3	◆	◆	
JE	Juncus effuses	Soft Rush	#1	1	◆	◆	
LC	Lobelia cardinalis	Cardinal Flower	QT	12	◆	◆	
PC	Polygonatum commutatum	Solomon's Seal	#1	18	◆	◆	
RF	Rudbeckia fulgida	Black Eyed Susan	#1	9	◆	◆	◆

¹ Refers to the size of the container: gallon (#1) or quart

Photo Credit: Anne Guillette, Low Impact Design Studio



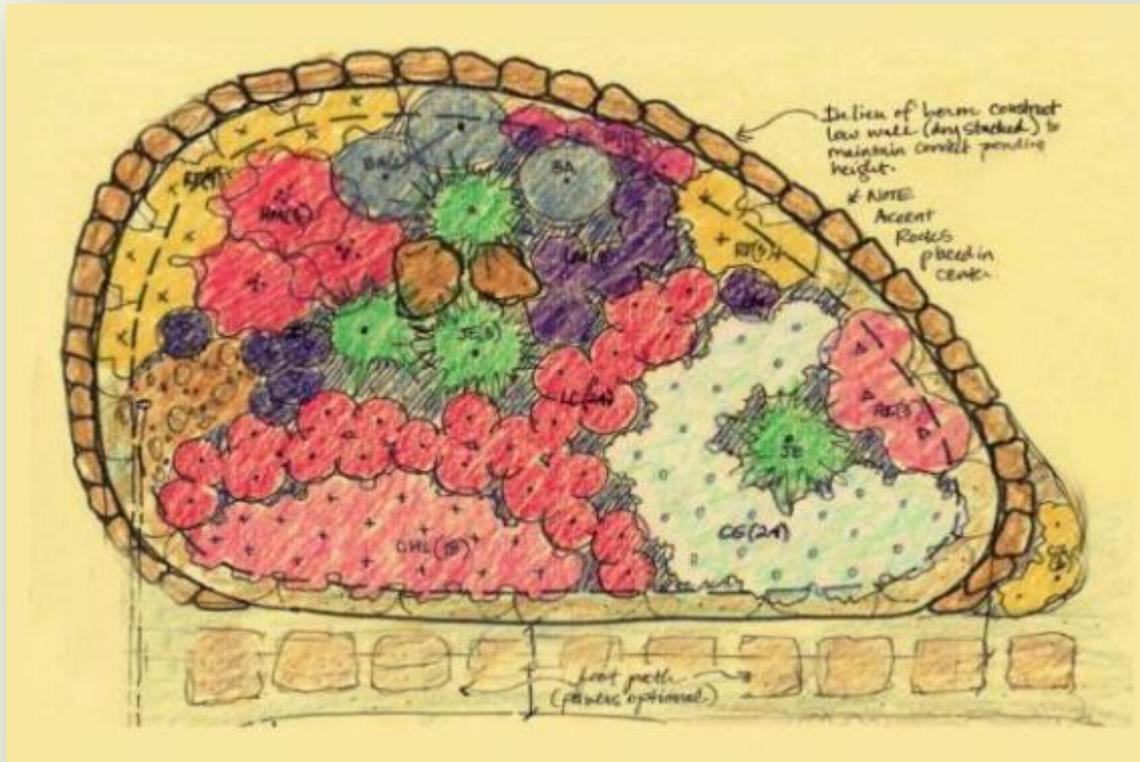
JE: Juncus effuses
(Zones 1 & 2)



HM: Hibiscus coccineus
(Zones 1 & 2)

Other Planting Plans

Sunny Rain Garden with Perennials



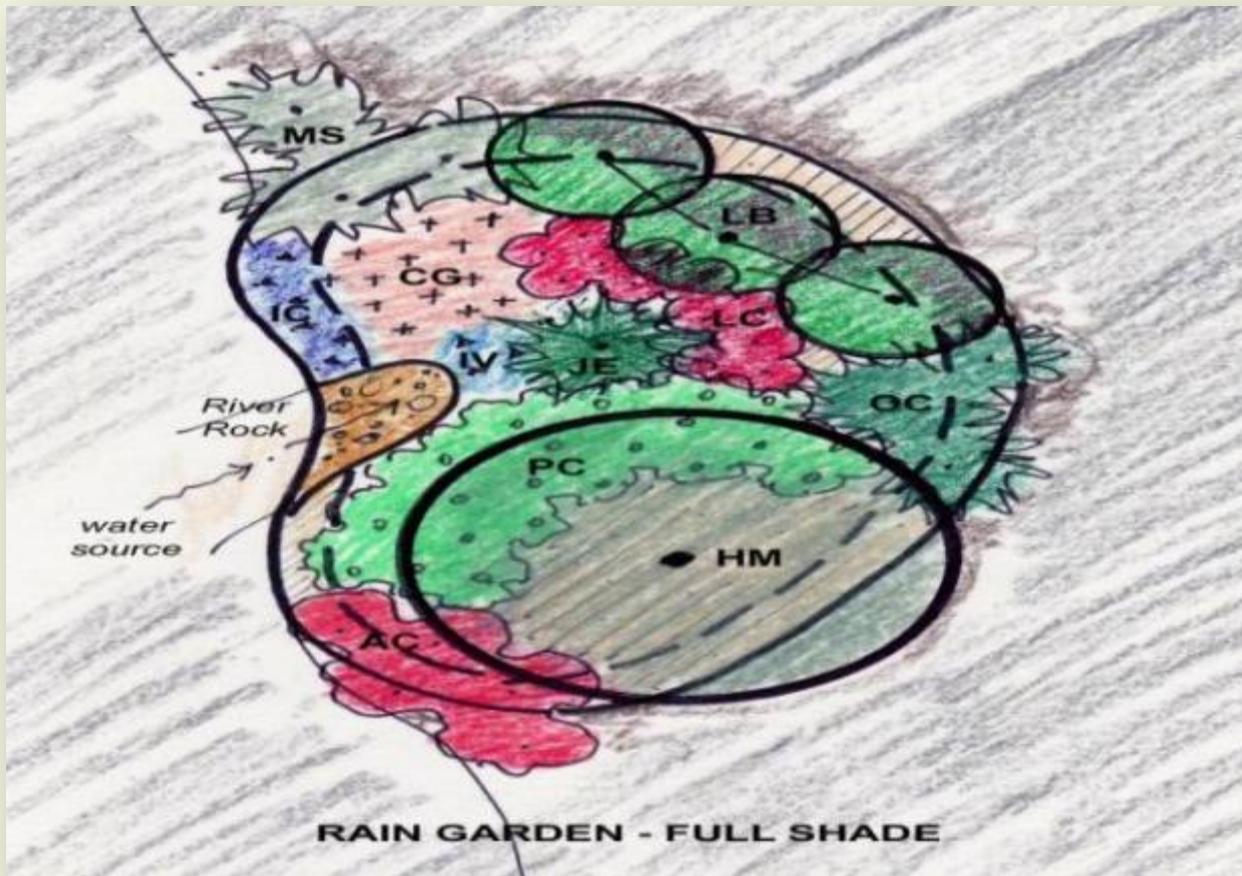
CHL: Chelone
'Hot Lips'
(Zones 1 & 2)



LM: Liatris
microcephala
(Zone 2)

Photo Credit: Anne Guillette, Low Impact Design Studio

Full Shade Rain Garden



IV: Iris
versicolor
(Zones 1 & 2)



SL: Sisyrinchium
ang. 'Lucerne'
(Zones 1, 2, & 3)

Photo Credit: Anne Guillette, Low Impact Design Studio

Rain Garden Upkeep

First Growing Season

Water your rain garden if it has been more than a week since it last rained or after very hot conditions. Give it a good soaking in the early morning or late afternoon and avoid watering in the heat of the day or too late at night.

Expect to do a bit of spot weeding in the first year.



Photo Credit: Kara Crissey, Good Earth Gardeners

Rain Garden Upkeep

First Winter and Start of Second Growing Season

Cut back your perennials (or wait until later in the winter so the birds can eat the seeds).

In early Spring, rake the existing mulch over the bed and make sure mulch or debris is removed from the inlet and outlet.

Possibly add more plants to fill out the rain garden.

Mulch should still be good for the year, but you may have to do a bit more weeding.

Check your gutters and downspouts to make sure they are not clogged.

Check inlet and overflow for sediment deposits.



Photo Credit: Kara Crissey, Good Earth Gardeners

Rain Garden Upkeep

Start of Third Growing Season and Thereafter

The mulch layer may be getting thin and need to be replaced.

Continue normal rain garden upkeep during the spring and the rest of the growing season.

Many rain gardens become a bit bushy as the years go by. Expect to do more weeding, thinning and pruning.



Photo Credit: Kara Crissey, Good Earth Gardeners

Troubleshooting

Too bushy or overgrown



Trim and prune the trees and shrubs or learn to love it as a privacy barrier and source of habitat.

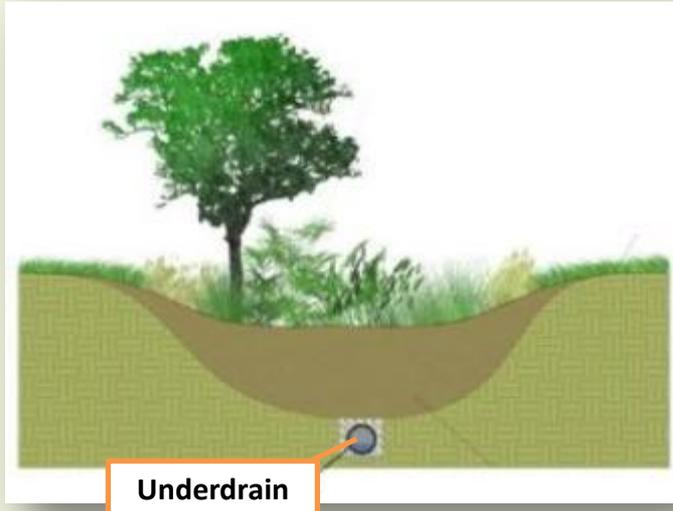
Wetter conditions than anticipated so plants don't grow



Re-plant with more wet-footed plants like ferns, sedges and rushes (Zone 1 plants). If surface ponding persists for more than a day, you should construct a surface overflow so the rain garden can drain faster.

More Troubleshooting

Standing water or really soggy soils present several days after a storm



Install a perforated underdrain if soils are saturated all the way to the bottom.

Photo Credit: Abbey Associates, Inc.

Plants die: drier conditions than anticipated



First, check rain gutters and downspout to make sure water is getting to the rain garden. Re-plant with more drought tolerant plant species.

Troubleshooting

Over-mulching



Remove excess mulch so that the rain garden has a mulch layer no deeper than 2 inches. Spread excess mulch elsewhere on your yard.

Mulch shifts or floats away after a big storm



Simply rake the mulch back to the original depth of two inches. Place more river-stone near the inlet to reduce flow velocity into the rain garden.

Troubleshooting

Sediment caking or erosion



Rake or shovel out the surface sediment layer and dispose of in a planting bed. Back-fill any gullies with top-soil, re-mulch and provide some stone protection near the downspout to reduce flows.

Deer and wildlife eating your plants



Buy deer repellent or install guard flamingos.

Troubleshooting

Overflow channel is plugged or obstructed



Clean out the sediment, debris and mulch that are blocking the overflow channel.

Questions and Answers



Photo Credit: Jacob Bauckman, Alliance for the Chesapeake Bay

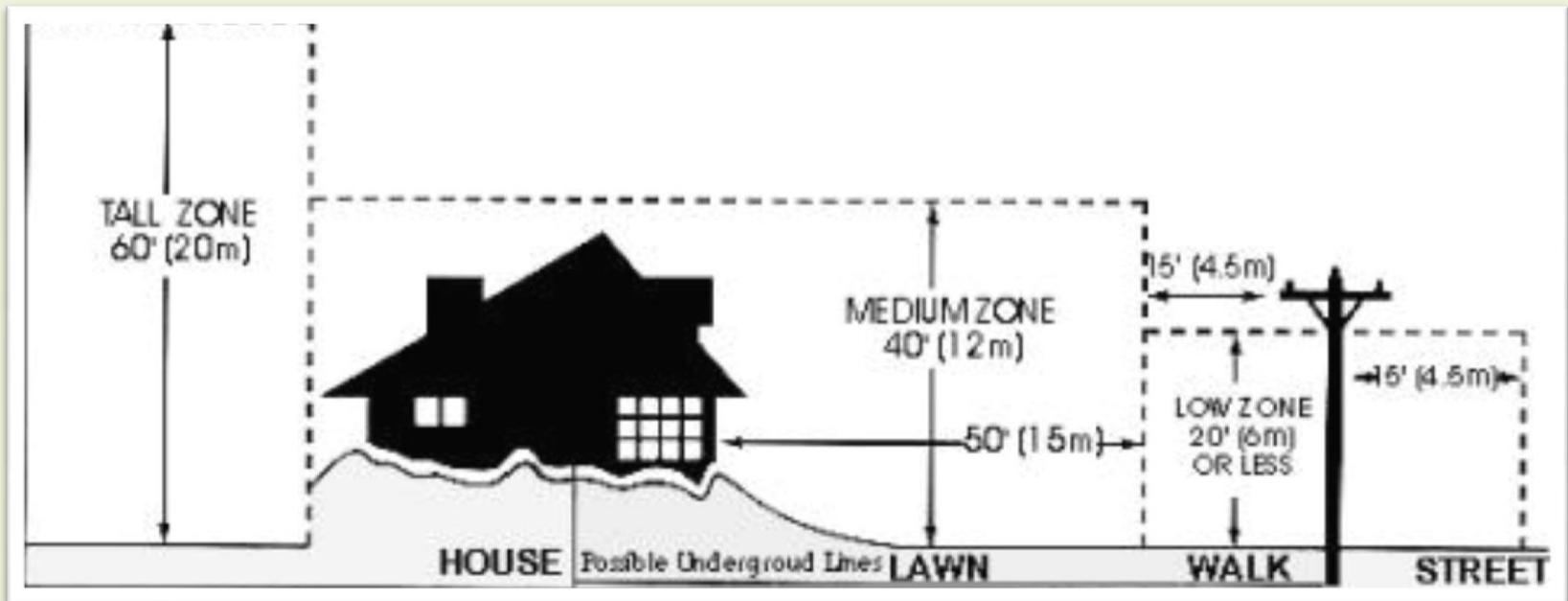
Tree Planting



Planting native trees and shrubs to restore a portion of your property to forested conditions is good for your property values, good for native wildlife, good for your local watershed, and good for the Bay.

Where Should I Plant My Trees?

- Choose an area with adequate space for future growth
- Consider the soil conditions – wet/dry, pH, and texture
- Choose native plant material when possible
- Select tree size
- Determine sun and wind conditions
- Avoid underground utilities



How Do I Plant My Trees?

Step 1: Mark where trees will be planted

Step 2: Planting:

- For larger trees, dig a hole several inches wider than root ball
- Backfill with native soil
- Apply 2-3 inches of mulch, but keep away from trunk
- Do not stomp on soil to pack it down
- Use stakes and wire for support, if necessary
- Use tree shelters or fencing to protect young trees
- Water generously



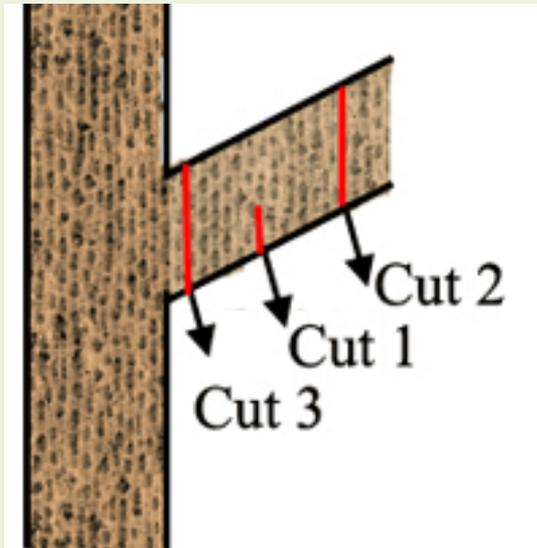
How Do I Care For My Trees?

- Deep water regularly, 1 – 2 x per week, throughout the first growing season (May to October)
- Keep lawnmowers and string trimmers away from tree
- Do not plant flowers or cultivate soil under tree
- Remove stakes and strapping after one year



How Do I Care For My Trees?

- Start annual tree inspection program
- Replace mulch as needed
- Prune trees in late winter, beginning in the 2nd growing season
- Continue watering in times of drought for 5 years after planting



Prune dead or injured branches immediately. The image above demonstrates the proper way to prune a heavy branch.

Q & A



Photo Credit: Rupert Rossetti, Octoraro Watershed Association

Rainwater Harvesting (Rain Barrels, Cisterns, Tanks)



A rain barrel/cistern is a water-holding device used to collect runoff from roof downspout(s) for a specific water use such as irrigation or vehicle washing.

Rainwater Harvesting

- **Active Reuse:** The reuse of harvested rainwater for either non-potable or potable uses.
- **Passive Reuse:** Water plants in the landscape utilizing natural slope and/or gravity. Typically designed to release rainwater slowly into a landscape bed or the landscape via a soaker hose.



Sizing Your Rainwater Harvesting Device

Size according to the area of your roof: One downspout on a typical 1,000 sf house will yield approximately 75 gallons of rainfall in a 1/2 inch rain.

If your community has a stormwater utility fee, check to see if you are required to collect a certain amount of roof runoff to get credit for your rain barrel.



A 55-gallon rain barrel fills up fast! However you can “daisy chain” barrels together or purchase a larger rain barrel or cistern.

Placing Your Rainwater Harvesting Device

- Above ground rain barrels/cisterns are placed at the base of the downspout, around the corner, or under a deck.
- Tanks or cisterns should not be installed over utilities, easements, or other infrastructure.
- Device must be 12-18 inches above ground if utilizing gravity to drain.
- Below ground cisterns/tanks are buried below the ground.
- *You will typically want to hire a rainwater harvesting professional if you are burying a cistern or tank.*



Installing Your Above-Ground Rainwater Harvesting Device

1. Shorten the downspout and direct into opening of barrel with an elbow piece
2. Ensure that the device is level and stabilize the base
3. Make sure the screen or other filter is in place
4. Secure the downspout to the device
5. Attach overflow pipe and spigot

Materials:

- Extra gutter
- Wire mesh screen
- Lid for safety
- Overflow hose
- Metal saw
- Screws
- Level

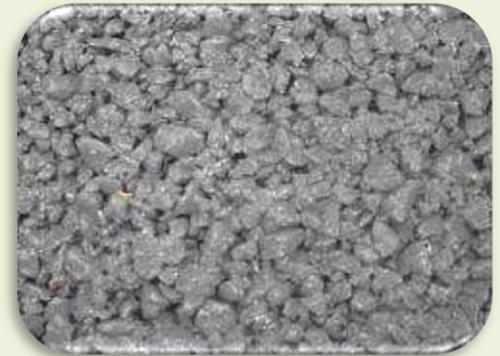


Caring for Your Above-Ground Rainwater Harvesting Device

- Empty your device during the winter
- Keep the faucet open during times of year you don't use rainwater
- Raise the height of the barrel so there is sufficient water pressure
- Always have the overflow going to a safe place
- Use a screen to prevent organic debris from going in the barrel
- Put a brick or rock in the bottom of the barrel to prevent it from blowing around
- Make sure your device is level and stable before it gets full and heavy



Permeable Hard-Scapes



Permeable hard-scapes are paving surfaces that capture and temporarily store stormwater by filtering runoff through holes in the pavement surface into an underlying stone reservoir. They include *pervious concrete*, *porous asphalt*, *concrete grid pavers*, *permeable interlocking concrete pavers*, and others.

Time to Replace Your Driveway?



Source: <http://www.uni.edu/elukens/images/driveway1.jpg>

Try permeable pavement!

Where Should I Put My Permeable Hard-Scape?

DO install where:

- Area is flat
- Drainage area onto the hard-scape is less than 2x the area of the hard-scape
- Soil has good natural infiltration (if not, use an underdrain)



Where Should I Put My Permeable Hard-Scape?

DO NOT install where:

- Slopes are greater than 5%
- Drainage area onto the hard-scape is more than 2x the area of the hard-scape
- Water table is high (must be deeper than 2 ft. below permeable hard-scape)
- Area is in 100-year floodplain
- There are many underground utilities (unless approved by utility agencies)
- There are adjacent buildings with basements and foundations

Installing Your Permeable Hard-Scape

It is strongly recommended that homeowners work with a trained and certified contractor!

Step 1: Check for existing utilities and stabilize the site

Step 2: Temporary erosion and sediment controls are needed



Installing Your Permeable Hard-Scape

Step 3: Avoid compaction of the bottom surface

Step 4: Scarify or till the native soil at the bottom to a depth of 3 to 4 inches

Step 5: Place filter fabric only as required by the design

Step 6: Moisten and spread the appropriate clean, washed stone aggregate



Source: Chris Sonne, Civil & Environmental Services LLC

Installing Your Permeable Hard-Scape

Step 7: Install paving materials in accordance with manufacturer or industry specifications

Step 8: Inspect the area for settlement

Step 9: Top the paver joints with stones (if applicable)



Above, a professional crew installs permeable concrete in a small parking lot in Crozet, VA.

Source: Chris Sonne, Civil & Environmental Services LLC

Caring for Your Permeable Hard-Scape

Avoid the following tasks on ALL permeable hard-scapes:

- Sanding
- Re-sealing
- Re-surfacing
- Power washing
- Storage of snow piles containing sand
- Storage of mulch or soil materials



Maintenance Frequency of Permeable Hard-scapes Based on Type of Application and Maintenance Method		
<i>Maintenance Task</i>	<i>Type of Application</i>	<i>Frequency</i>
Dry Sweeping	Patio	Seasonally (4 X per year)
Dry Sweeping	Driveway	Monthly
Vacuum	Patio	Every 2 years
Vacuum	Driveway	Once per year
*This table is intended as guidance only; the frequency should be adjusted based on conditions and the surrounding land cover (e.g. pavement, turf, trees) and level of detritus and sediment on the pavement surface.		

Bay-Friendly Lawn Care



Lawns make up a significant portion of many properties and have been shown to produce more runoff than their forested counterparts. Following are **10 tips** that can make your lawn more Bay-friendly.

[Click here for a report on Bay-friendly nutrient management](#)

Do you have a high risk lawn ?

Some urban lawns are more likely to export nutrients.

So what constitutes a “high-risk lawn”?? (UNM EP Report, 2013)

1. Over-fertilizing beyond state or extension recommendations
2. P-saturated soils as determined by a soil analysis
3. Newly established turf
4. Steep slopes (> 15%)
5. Exposed soil (more than 5 % for managed turf and 15% for unmanaged turf)
6. High water table (within three feet of surface)
7. Over-irrigated lawns
8. Soils that are shallow, compacted or low water holding capacity
9. High use areas (e.g., athletic fields, golf courses)
10. Sandy soils (infiltration rate more than 2 inches per hour)
11. Adjacent to stream, river or Bay (within 300 feet)
12. Karst terrain

Tip 1. Maintain Dense Grass Cover

Dense grass or plant cover helps to reduce surface runoff. Lawns with poor turf cover have a high risk for nutrient loss, especially if soils are compacted or slopes are steep.



Re-seed bare spots, add soil amendments, and spot fertilize as needed. In extreme cases, stabilize with a biodegradable erosion control cover.

Tip 2. Reduce or Eliminate Fertilizer

If You Do Fertilize:

- Apply 1/3 to 1/2 of application rate on the fertilizer bag label. Monitor how your lawn responds over next couple of months. You can always re-apply fertilizer at the smaller dose. **OR...**
- Split it into 3 or 4 small doses throughout the growing season. Apply no more than 0.9 pound of nitrogen per 1000 sq. ft. of lawn ***per application !***



More is not always better: your lawn may look just as healthy as it does at the full application rate!

Tip 3.

Apply Fertilizer Only During Growing Season

Never apply fertilizers before spring green up or after the grass becomes dormant.



Highest fertilizer loss occurs in winter when grass is dormant (after ~ November).

Tip 4. Use Slow-Release Nitrogen Fertilizer

Buy slow-release fertilizer with at least 20 to 50% of water insoluble nitrogen.



Photo Credit: Delaware Livable Lawns

Tip 5. Sweep Up Fertilizer from Paved Surfaces

Rotary spreaders can broadcast fertilizer granules onto the street or driveway where they can be washed away in the next storm.

Tip 6. Never Apply Fertilizer Within 15 Feet of Streams, Ditches or Water Feature

Tip 7. Leave clippings and mulched leaves on lawn. Keep them out of streets and storm drains



Strive to keep grass and leaves on your lawn, and out of the street or storm drain system. And never dispose of yard waste in a ravine or near a stream.

If you rake leaves in Fall, run over them with your mower to mulch them, then add them to your compost pile to decompose.

Tip 8. Set Mower Height at 3” or Taller



Taller grass grows deeper roots, which allows for better nutrient uptake and less lawn runoff. Deeper roots also reduce need for irrigation during times of drought, suppress weeds, and increase turf density.

Tip 9. Use Your Lawn to Absorb Stormwater.



If you can, use a flexible pipe to direct your roof downspouts toward your lawn away from your driveway or other hard surface.



Photo Credit: Kara Crissey, Good Earth Gardeners

Convert your turf into a rain garden on conservation landscape to absorb water from your roof

Tip 10. Consult With Your Local Extension Service Office



Many lawn care professionals can help you achieve an attractive and Bay-friendly lawn, given your type of grass, soil conditions, shading, and your landscape preferences.

[Click here for a list of Bay-Friendly Lawn Care Experts](#)

Conservation Landscapes



*Photo Credit: Anne Guillette,
Low Impact Design Studio*



*Photo Credit: Kara Crissey,
Good Earth Gardeners*

Conservation Landscaping (i.e., ***Bayscaping***):

Replacing turf grass with plants native to the Chesapeake Bay region. This can increase rainwater infiltration on your property and provide habitat for pollinators, birds, and other wildlife.

Where Should I Put Conservation Landscaping?

Conservation landscapes are especially good for:

- “Fertilizer-free” buffers around water features or shorelines
- Areas that capture runoff from small areas of hard surfaces (e.g., sidewalks)
- Areas next to roof downspouts

Native plant species are preferred, but ornamental or garden plants are acceptable.



Photo Credit: WSA

Other Factors to Consider

Some Key Planning Factors

- Conflicts with other uses of your property
- Solar exposure
- Windy areas
- View-sheds on your property
- Wildlife that visit your property
- Infrastructure (light poles, pipes, etc.)
- Right-of-way access
- Accessible water source
- Existing trees (stay out of the “drip line”)



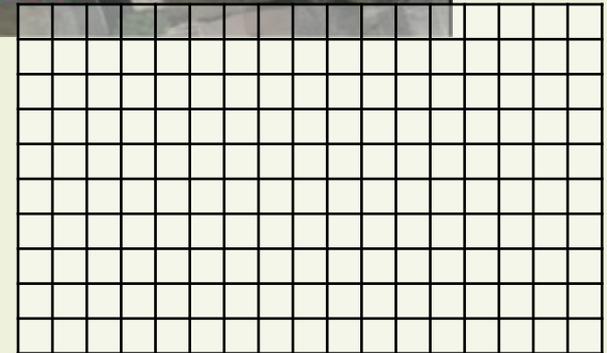
Photo Credit: Suzanne Etgen, WSA

How Do I Install My Conservation Landscaping?

Choose whether you want to handle the design or hire a professional landscape engineer or landscape architect.

If you hire a designer or contractor, make sure they utilize eco-practices.

If you do the design yourself, start with the base map of your property and consider which plants will do well in different conditions of sunlight, soil, moisture, etc.

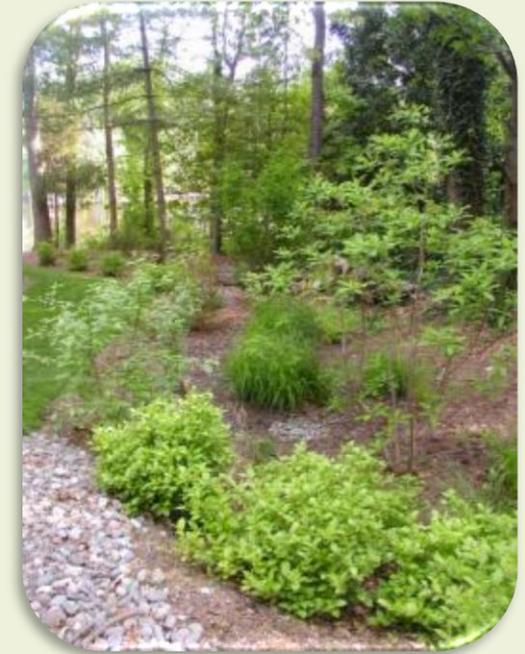


How Do I Install My Conservation Landscaping?

Visit your local nursery to see what vegetation is available. In addition to trees and shrubs, consider perennials to provide ground cover (ferns, forbs, grasses, etc.).

Consider planting a mix of:

- **Perennials:** a plant that comes back every year
- **Annuals:** a plant that lives only one year and so will have to be replanted every year
- **Deciduous Trees:** a shrub or tree that loses its leaves
- **Evergreen Trees:** a tree or shrub that holds its leaves all year



Avoid “invasive plants” that can spread and crowd out your native vegetation!

[Click here for a guide on how to identify and remove these invasive spreaders](#)

Caring for Your Conservation Landscape

Watering: Water plants regularly in the first 2 – 3 months, then in times of drought.

Weeding: Several times throughout the year especially spring. Once your plants fill in the beds, fewer weeds will grow.

No Pesticides: Use only natural pest control methods (praying mantis, lady bugs, bat houses, organic chemicals).



Caring for Your Conservation Landscape

Mulch: Use *aged* leaf compost, straw, and/or wood mulch. Apply 3” or less to retain moisture and prevent weeds and erosion. Mulch around trees should be flush with the landscape and not piled high in “volcanoes”.

Fall Maintenance: Add leaf mulch around plants as fertilizer and ground cover.



Q & A



Resources

- Homeowner Guide for a More Bay-Friendly Property
- Crediting Homeowner BMPs in the Bay Model
- Verification Resources:
 - Bioretention Illustrated App
 - SMART Tool Website
- UMD Extension Bulletin: Adoption of Household Stormwater BMPs
- And lots' more!

www.chesapeakestormwater.net



Northern Virginia Regional Commission

Landscape Workshop

“Bringing it all Together”

Site Design and Planning

Aimee Long Vosper

Director, Planning and Environmental Services

Northern Virginia Regional Commission

July 16, 2014



What have you heard?

- Why local governments are investing in residential landscapes
- You are essential to help meet the goals of local government
- Understanding the initiatives, the incentives, the possibilities to include BMP's
- Understanding the importance of native plants and conservation landscapes

Next Steps- Bringing it all together

- In the next hour :
 - Refresh our memories on the Principles of Landscape Design and Site Analysis & Planning
 - Look at Site Design in an overall context
 - Break out into groups to develop a design
 - Come back together to review the Concepts
 - Discuss next steps and the October workshop /demonstration project

The Principles of Landscape Design

Landscape Architecture

- Designing in whole, not in part
- Unity
- Simplicity
- Balance
- Color
- Natural Transition
- Line
- Proportion
- Sequence / Repetition

The Elements of Art in a work of Art

- Balance
- Emphasis
- Movement
- Pattern
- Repetition
- Proportion
- Rhythm
- Variety
- Unity

The Principles of Ecological Design

- Solutions Grow from Place
- Ecological Accounting Informs Design
- Design with Nature, not against
- Make Nature Visible



Understanding the Site

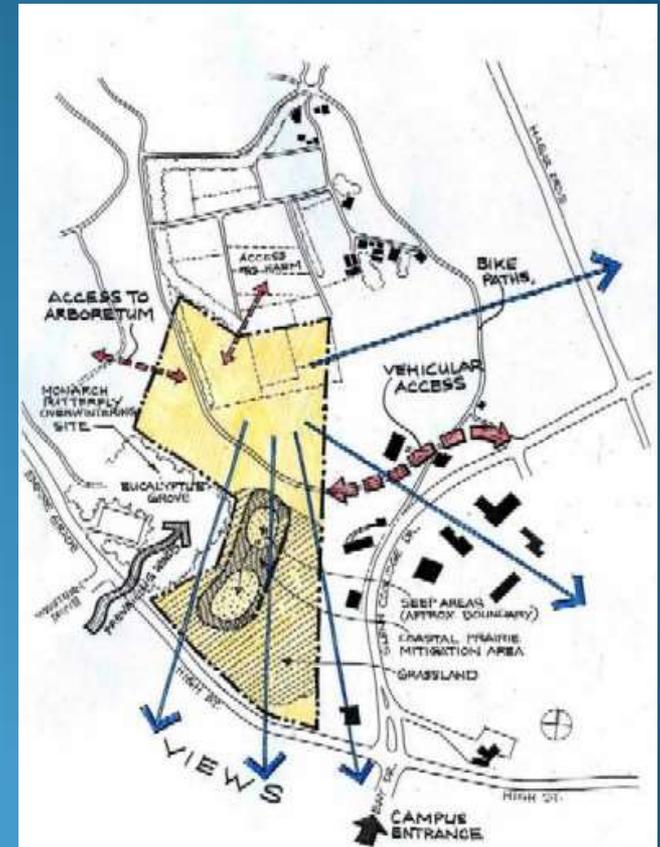
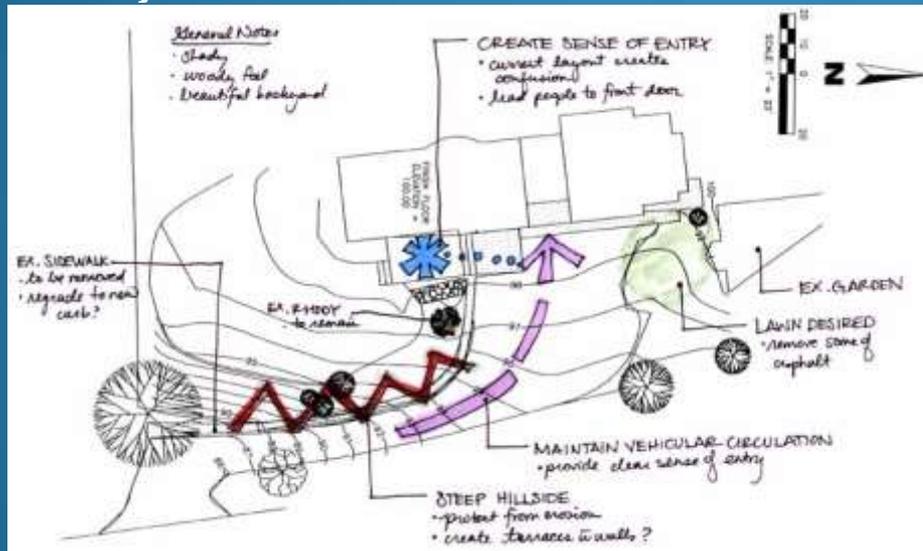
Areas of Elements

- Soil
- Microclimates
- Drainage
- Topographical features
- Existing Plant Material /Vegetation
- Existing Historical elements
- Hard features and Structures
- Walks, Paths, & Trails
- Wildlife/Ecology
- Environmental features/ factors- Sun Wind Water Sources
- Precipitation/rainfall
- Hydrology/water table elevations
- Prominent Visual lines/Viewsheds & Visual Linkages
- Locally Available Resources
- Regulations
- Aesthetics

Understanding the Site

Review and Catalogue

- Site Analysis of complete area
 - Inventory the Site
 - Analyze the Site



Scale

- Plant Selection

- Right plant, right place, right purpose
- Sustainability
- Select based on Elements of Design
- Size, Form, Texture
- Seasonal Interest



The Conceptual Design

- Evolves from shapes & movement developed in the site analysis
- Form follows function



Examples

Rain Gardens in Playgrounds



Determine the suite of practices that can be used on the site to make it stormwater friendly i.e. rain garden, riparian buffer planting, permeable pavement

Educational outreach? Signage?

Determine the location(s) and rough designs for the practices

How will you bring runoff to the site?

How much credit will you get in Falls Church?

How much TN and TP will be prevented from entering Tripps Run?



Time to Design!

avosper@novaregion.org

703-642-4623

www.novaregion.org



Evaluation Form

Residential Bmp Training For The Landscape Professional

Part 1

1. How would you rate today's seminar? *Circle your response.*
 - a. Excellent
 - b. Good
 - c. Fair
 - d. Poor

2. Which session(s) was most informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
More sales focused. Why would the Home owner
want to spend the money for improvements?

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

Feel free to continue on the back of this page

*Your comments are important to us.
Please leave the evaluation form, on the registration table as you leave.
Thank you!*

Evaluation Form

Residential Bmp Training For The Landscape Professional

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 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

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 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
Don't use appreciation

5. What other environmental-related topics would you like workshops for?

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8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?
Thank you

Feel free to continue on the back of this page

*Your comments are important to us.
Please leave the evaluation form, on the registration table as you leave.
Thank you!*

Evaluation Form

Residential Bmp Training For The Landscape Professional

Part 1

1. How would you rate today's seminar? *Circle your response.*
 - a. Excellent
 - b. Good
 - c. Fair
 - d. Poor

2. Which session(s) was most informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
ASSUME THAT THE GROUP HAS A GREATER LEVEL OF KNOWLEDGE AND EXPERIENCE AND TEACH TO THAT LEVEL.

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

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 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs *→ not uninformative, just had to choose 1*
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise *→ no real time for this exercise*

4. Please describe how today's seminar could be improved.
reference for specification for each
type of stormwater project

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

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 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

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 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
For the design exercise, split up engineers and designers so the groups are well balanced.

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

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 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.

stay on schedule

5. What other environmental-related topics would you like workshops for?

calculating storm water BMPS

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

Love the Site Design/Planning Exercise component!

Feel free to continue on the back of this page

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Thank you!*

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Residential Bmp Training For The Landscape Professional

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 - c. Selecting Plants and Landscape Design
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3. Which session was least informative and useful? *Circle your answer.*
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 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
pretty good

5. What other environmental-related topics would you like workshops for?
INSP + MAINTENANCE

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?
chairs in the room still need replaced

Feel free to continue on the back of this page

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Thank you!*

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Residential Bmp Training For The Landscape Professional

Part 1

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- b. Residential Best Management Practices for Stormwater
- c. Selecting Plants and Landscape Design
- d. Site Design and Planning Exercise

3. Which session was least informative and useful? *Circle your answer.*

- a. Overview of local government incentive programs
- b. Residential Best Management Practices for Stormwater
- c. Selecting Plants and Landscape Design
- d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.

more specific details for professional audience

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

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Part 1

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- b. Residential Best Management Practices for Stormwater
- c. Selecting Plants and Landscape Design
- d. Site Design and Planning Exercise

3. Which session was least informative and useful? *Circle your answer.*

- a. Overview of local government incentive programs
- b. Residential Best Management Practices for Stormwater
- c. Selecting Plants and Landscape Design
- d. Site Design and Planning Exercise

Just because I'm not from N/A.

4. Please describe how today's seminar could be improved.

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No N/A

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

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 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
Just wish we were able to complete
exercise, time permitting

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? Design yes, build-no. don't have
technical experience

9. Other Comments?

Feel free to continue on the back of this page

Your comments are important to us.
Please leave the evaluation form, on the registration table as you leave.

Thank you!

Thank You!!

Evaluation Form

Residential Bmp Training For The Landscape Professional

Part 1

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 - d. Site Design and Planning Exercise

3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
Better coordinators to prevent repetition of information

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

Feel free to continue on the back of this page

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3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.

This could be improved by relating new stormwater management program and MS4 requirements.

5. What other environmental-related topics would you like workshops for?

Nutrient credit calculation
Stormwater runoff reduction method

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
 If not, why? Not enough knowledge and fund

9. Other Comments?

Feel free to continue on the back of this page

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Thank you!

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 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
more space for the site design & exercise

5. What other environmental-related topics would you like workshops for?
Stormwater management

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? Maybe

9. Other Comments?

Feel free to continue on the back of this page

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3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
Maybe make it just a little longer

5. What other environmental-related topics would you like workshops for?
Could continue the "systems" related topics to include stream and wetland restoration.

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

Feel free to continue on the back of this page

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3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.

more time at the end

5. What other environmental-related topics would you like workshops for?

swales - sprinklers

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

Feel free to continue on the back of this page

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3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
NO CAN GET OUT OF TIME TO FINISH

5. What other environmental-related topics would you like workshops for?

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

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- a. Overview of local government incentive programs
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- c. Selecting Plants and Landscape Design
- d. Site Design and Planning Exercise

3. Which session was least informative and useful? *Circle your answer.*

all were informative

- a. Overview of local government incentive programs
- b. Residential Best Management Practices for Stormwater
- c. Selecting Plants and Landscape Design
- d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.

5. What other environmental-related topics would you like workshops for?

Restoration

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

Thank you.

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3. Which session was least informative and useful? *Circle your answer.*
 - a. Overview of local government incentive programs
 - b. Residential Best Management Practices for Stormwater
 - c. Selecting Plants and Landscape Design
 - d. Site Design and Planning Exercise

4. Please describe how today's seminar could be improved.
Add more engineering principles and methods of designing
— too focused on aesthetics

5. What other environmental-related topics would you like workshops for?
Stormwater management; erosion control

6. Do you have clients that are interested in installing a stormwater best management practice on their property? Yes No N/A

7. Do you plan to make your clients aware of the local government incentive programs? Yes No

8. Will you design and/or build a residential stormwater best management practice after attending today's workshop? Yes No
If not, why? _____

9. Other Comments?

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Thank you!*

Appendix C

306A Documentation



CITY OF FALLS CHURCH

July 25, 2014

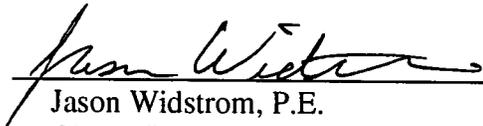
RE: Joint Stormwater Project with Northern Virginia Regional Commission

I solemnly affirm upon personal knowledge that the following statements are true:

I Jason Widstrom being first and duly sworn state that:

1. I am a civil engineer employed by the City of Falls Church, Virginia and in that capacity perform research and survey of properties that are publicly owned for the purposes of construction projects.
2. The land identified for the proposed project under this CZM grant is a combination of City right-of-way, titled "Cavalier Trail," and a parcel, with Real Property Code (RPC) 52-309-032, are owned by the City of Falls Church, Virginia and there are no encumbrances on said properties that will interfere with the proposed section 306A project.

Signed



Jason Widstrom, P.E.
City Engineer

Subscribed and affirmed before me this 25 day

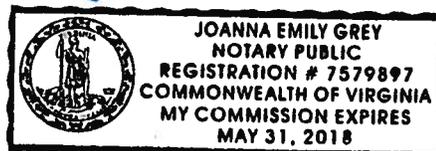
of July, 2014.

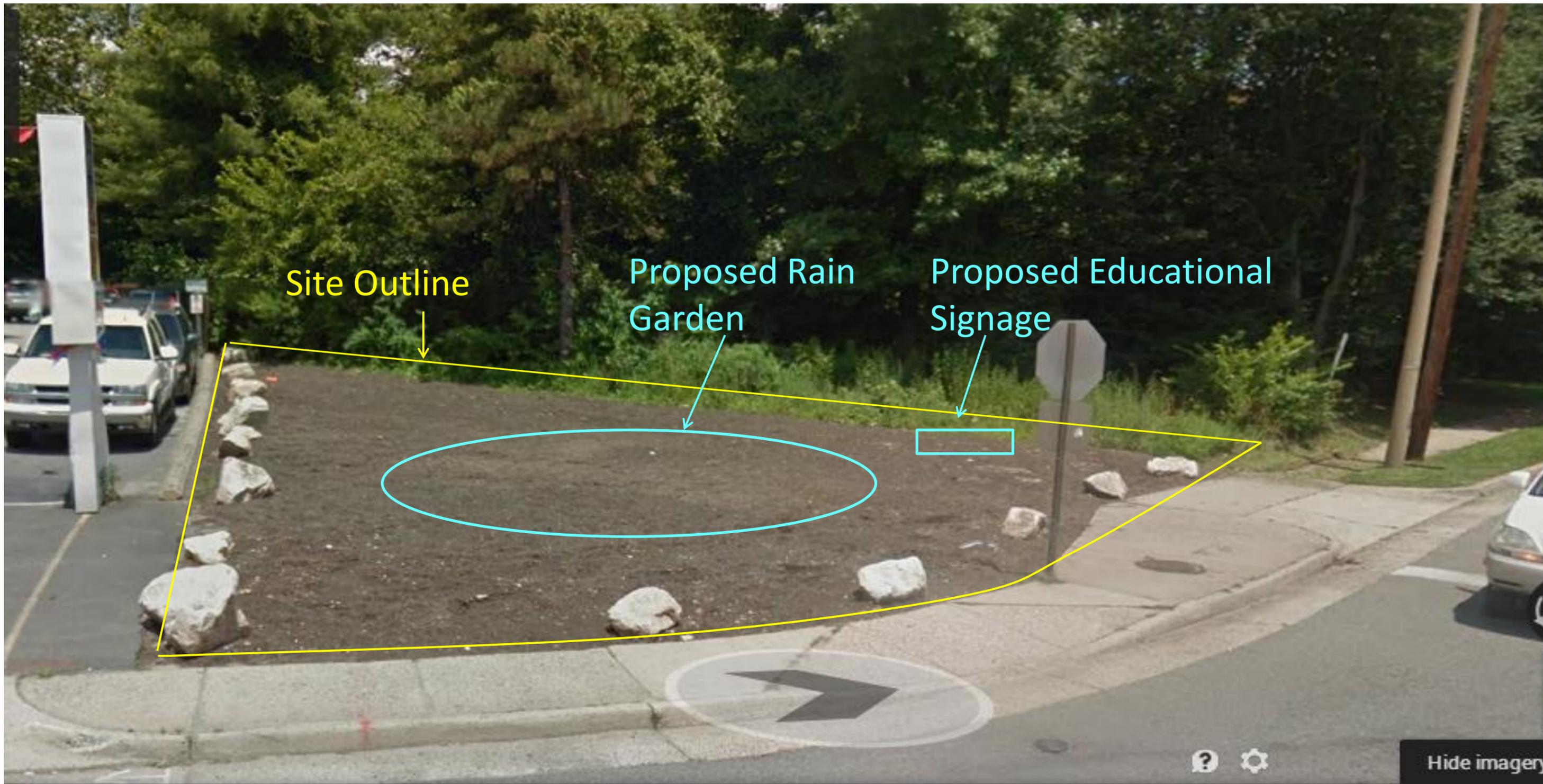
Notary Public



My Commission expires:

My Commission expires:





Google

CAVALIER TR.
CITY OF FAL...
RPC 52-

(40' WIDE

APPA

306

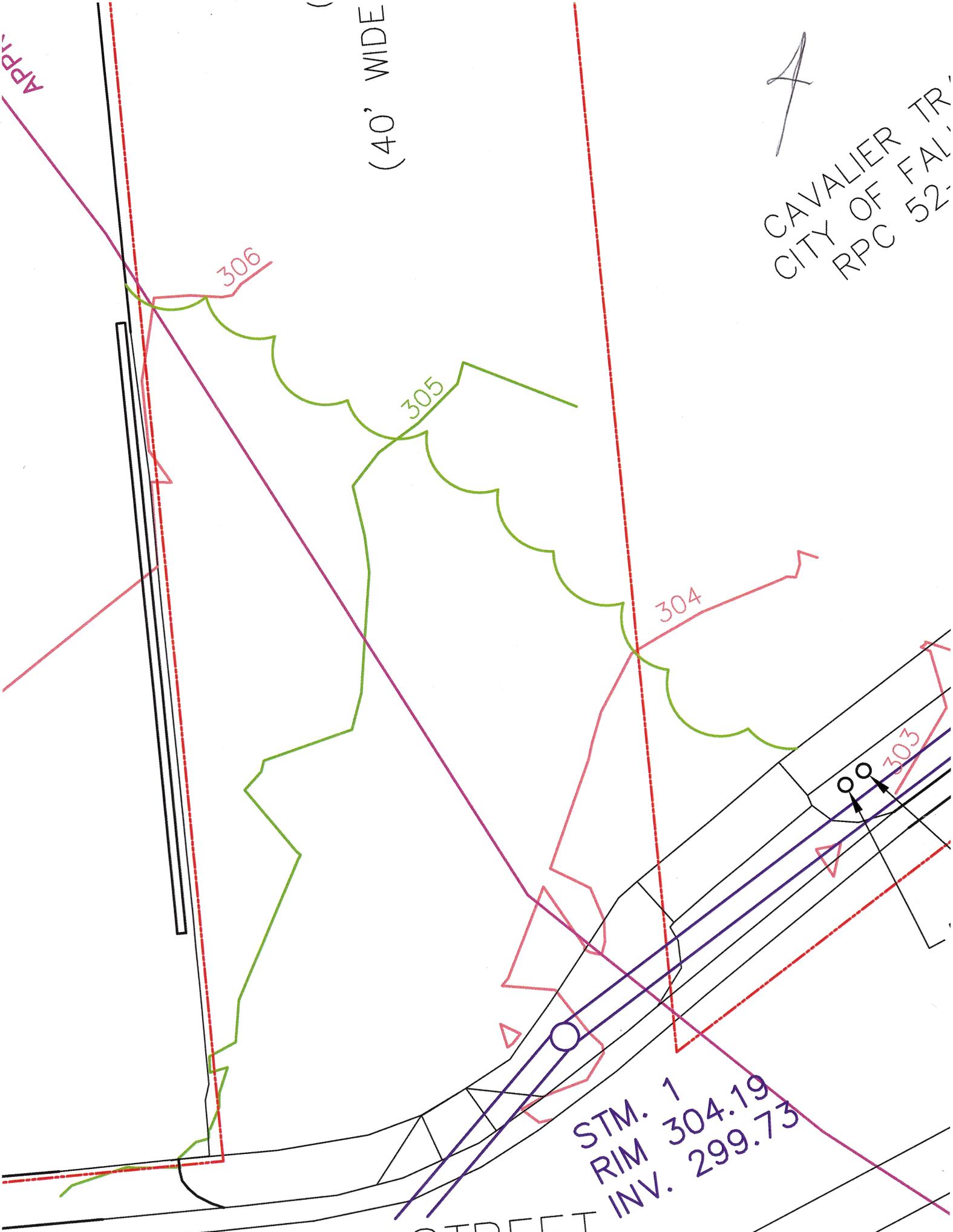
305

304

303

STM. 1
RIM 304.19
INV. 299.73

STREET





Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

Web Project ID: WEB0000002462

Client Project Number: NA13NOS4190135

PROJECT INFORMATION

TITLE: Proposed Rain Garden

DESCRIPTION: Design and install a rain garden to intercept stormwater runoff and help to prevent polluted runoff from entering Tripps Run. The rain garden will be excavated to a depth of approximately 24 inches and subsoil will be replaced with a mixture of sand and loam. The garden will be regraded and replanted with a diverse mix of native shrubs, perennials, and grasses to allow for runoff to pool in the depression and slowly infiltrate into the ground. A sign will be installed for public education and communication. The site is owned by City of Falls Church and the City will maintain the garden in accordance with their standards.

EXISTING SITE CONDITIONS: The site is currently mulch and grass

QUADRANGLES: Falls Church

COUNTIES: City of Falls Church

Latitude/Longitude (DMS): 38°52'46.1022"N / 77°10'45.9135"W

Acreage: 0 acres

Comments:

REQUESTOR INFORMATION

Priority: N

Tier Level: Tier II

Tax ID:

Contact Name: Corey Miles

Company Name: Northern Virginia Regional Commission

Address: 3060 Williams Drive

City: Fairfax

State: VA

Zip: 22031

Phone: 703-642-4625

Fax: 703-642-5077

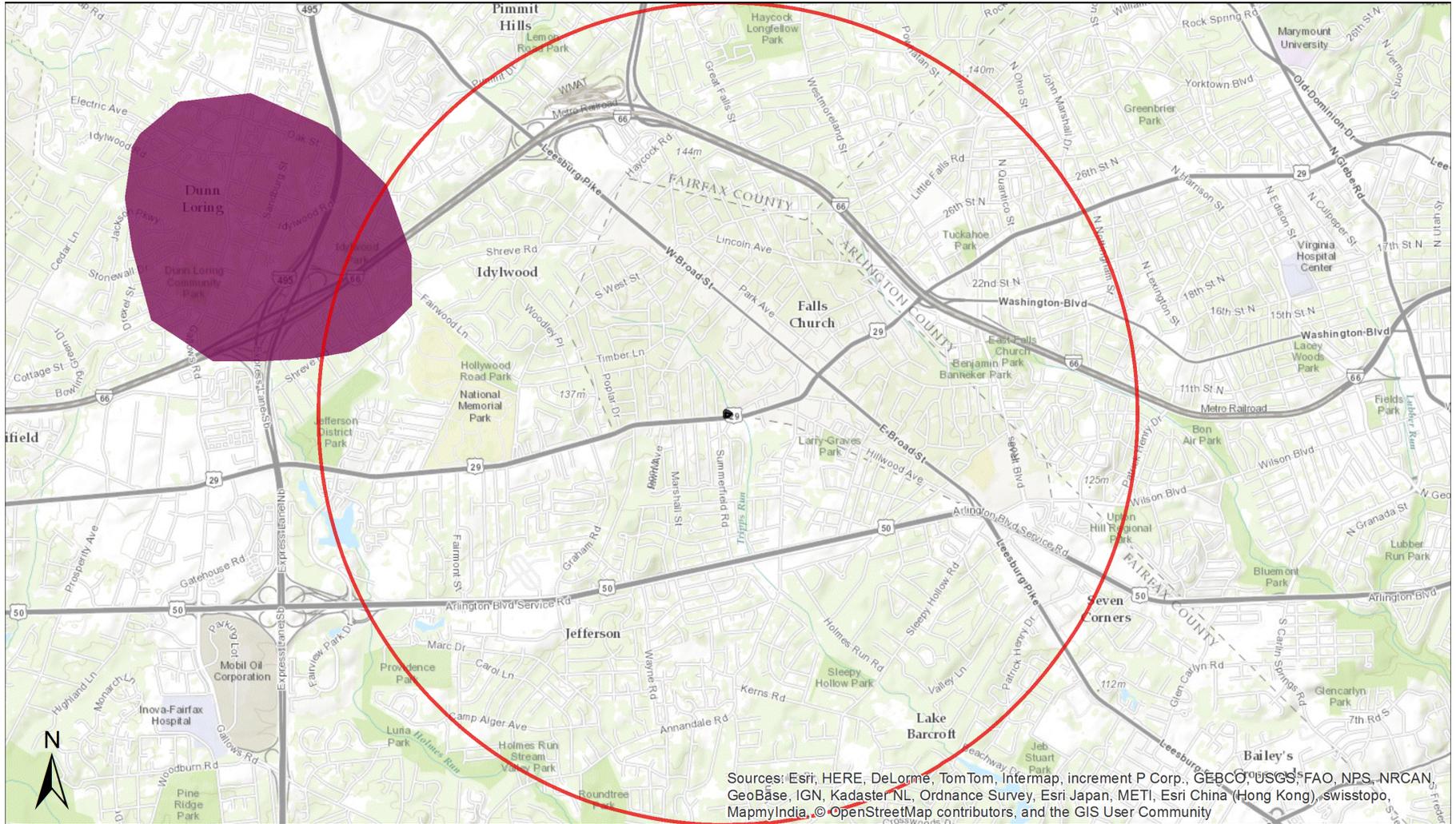
Email: cmiles@novaregion.org

Conservation Site	Site Type	Brank	Acreage	Listed Species Presence
	GLNHR	NA	0	NL
Natural Heritage Screening Features within Search Radius				

Site Name	Group Name	Common Name	Scientific Name	GRANK	SRANK	Fed Status	State Status	EO Rank	Last Obs Date	Precision
	Vascular Plant	American bluehearts	Buchnera americana	G5?	S1S2			H		M
Natural Heritage Resources within Search Radius										

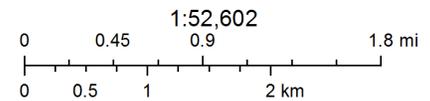
Intersecting Predictive Models
 Predictive Model Results

Proposed Rain Garden



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

- Project Area
- Buffered Project Area
- Conservation Site
- GLNHR
- SCU
- NH Screening Features



Quads: Falls Church

Counties: City of Falls Church

Company: Northern Virginia Regional Commission

Lat/Long: 385246 / -771045



COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources from the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics files, NATURAL HERITAGE RESOURCES HAVE BEEN DOCUMENTED within two miles of the indicated project boundaries and/or POTENTIAL HABITAT FOR NATURAL HERITAGE RESOURCES intersect the project area.

You have submitted this project to DCR for a more detailed review for potential impacts to natural heritage resources. DCR will review the submitted project to identify the specific natural heritage resources in the vicinity of the proposed project. Using the expertise of our biologists, DCR will evaluate whether your specific project is likely to impact these resources, and if so how. DCR's response will indicate whether any negative impacts are likely and, if so, make recommendations to avoid, minimize and/or mitigate these impacts. If the potential negative impacts are to species that are state- or federally-listed as threatened or endangered, DCR will also recommend coordination with the appropriate regulatory agencies: the Virginia Department of Game and Inland Fisheries for state-listed animals, the Virginia Department of Agriculture and Consumer Services for state-listed plants and insects, and the United States Fish and Wildlife Service for federally listed plants and animals. If your project is expected to have positive impacts we will report those to you with recommendations for enhancing these benefits.

There will be a charge for this service for "for profit companies": \$60, plus an additional charge of \$35 for 1-5 occurrences and \$60 for 6 or more occurrences.

Please allow up to 30 days for a response, unless you requested a priority response (in 5 business days) at an additional surcharge of \$500. An invoice will be provided with your response.

We will review the project based on the information you included in the Project Info submittal form, which is included in this report. Also any additional information including photographs, survey documents, etc. attached during the project submittal process and/or sent via email referencing the project title (from the first page of this report).

Thank you for submitting your project for review to the Virginia Natural Heritage Program through the NH Data Explorer. Should you have any questions or concerns about DCR, the Data Explorer, or this report, please contact the Natural Heritage Project Review Unit at 804-371-2708.

Section 306A Project Checklist

State Coastal Management Programs (CMPs) shall complete a Section 306A Project Checklist for each Coastal Zone Management Act (CZMA) section 306A project and submit it to the Coastal Programs Division (CPD), Office of Ocean and Coastal Resource Management (OCRM), National Oceanic and Atmospheric Administration (NOAA) for approval. Approval of a 306A project requires a completed checklist, signed by the CMP Program Manager and CPD Chief; title documentation and appraisal (if applicable); and other information that may be required by this checklist. These are the only documents required for CPD approval, unless otherwise notified by CPD. See CPD, Coastal Zone Management Act Section 306A Guidance (February 1999) for further information.

1. **Award Number:** NA13NOS4190135 **State:** VA
2. **A. Name of Project:** Site Selection and Design of a Conservation Landscaping Workshop
B. Address or coordinates for project or, if not available, location description:
38°52'45.74"N 77°10'45.86"W
3. **Project Proponent** (must be a public entity):
Northern Virginia Regional Commission
4. **Total Cost:** \$22,031 **Federal:** \$12,177 **State/Local Match:** \$9,854

I ATTEST TO THE FOLLOWING: (1) THE STATEMENTS MADE AND OTHER INFORMATION PROVIDED IN THIS CHECKLIST ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE; (2) THE PROJECT DESCRIBED IN THIS CHECKLIST IS CONSISTENT WITH CZMA SECTION 306A AND CPD'S SECTION 306A GUIDANCE; (3) THE STATE HAS ON FILE THE DOCUMENTS IDENTIFIED IN THIS CHECKLIST; AND (4) I UNDERSTAND THE CONSEQUENCES, AS DESCRIBED IN CPD'S SECTION 306A GUIDANCE, IF THE PROJECT DESCRIBED IN THIS CHECKLIST DOES NOT COMPLY WITH CZMA SECTION 306A AND CPD'S SECTION 306A GUIDANCE.

Signature of State Coastal Management Program Manager

Date

Name of Signatory (please print or type): _____

Title: _____

Address: _____

Phone Number: _____

The signature below by the Chief, Coastal Programs Division, OCRM/NOAA, is NOAA's approval that the applicable special award condition is satisfied and releases the federal CZMA section 306A funds for the project described in this Checklist.

Joelle Gore
Acting Chief, CPD

Date

5. Project Eligibility:

a. 306A Objectives (Check all that apply):

- 306A(b)(1)(A) (preservation or restoration of areas designated in the state CMP)
Identify APC or APR: waterfront development
- 306A(b)(1)(B) (preservation or restoration of coastal resource of national significance or restoring or enhancing shellfish production/clutch)
Identify coastal resource: _____
- 306A(b)(2) (redevelopment of deteriorating or underused urban waterfronts designated as APCs in the state's CMP)
Identify APC or APR: _____
- 306A(b)(3) (providing public access to coastal areas)
- 306A(b)(4) (development of process for aquaculture)

b. 306A Uses (Check all that apply):

- 306A(c)(2)(A) (fee simple or other interest in land)
- 306A(c)(2)(B) (low-cost construction projects)
- 306A(c)(2)(C)(i) (revitalize urban waterfronts-piers)
- 306A(c)(2)(C)(ii) (revitalize urban waterfronts-shoreline stabilization)
- 306A(c)(2)(C)(iii) (revitalize urban waterfronts-pilings)
- 306A(c)(2)(D) (designs and other 306A reports, including aquaculture process)
- 306A(c)(2)(E) (educational, and other management costs, including aquaculture process)

6. Project Description (briefly describe the project and project location—do not simply reference the task description from the CZM grant application):

An issue that was identified during the Collaborative Summit to Protect Water Quality through Actions on Urban-Suburban Properties held in Williamsburg in February 2013, was the lack of landscape industry professionals that were knowledgeable about native plants and qualified to implement landscaping plans that incorporate Best Management Practices on residential properties. To help fulfill the need for qualified, trained landscape professionals, the Northern Virginia Regional Commission through a grant provided by the VA Coastal Zone Management Program will host a hands-on technical workshop to educate landscape industry professionals and the general public about conservation-based landscaping practices using native plants and stormwater management.

The selection of the site and installation of the demonstration landscape will not only provide a model for maintaining the balance between conservation and development interests in the Northern Virginia coastal region, but also offer an opportunity to educate industry professionals about how environmentally sensitive landscapes can reduce polluted runoff, conserve water and increase wildlife habitat.

Participants will learn about soil amendment, site preparation, native plant identification, proper planting techniques, mulch requirements and maintenance. In addition, participants will gain hands-on experience by installing a rain garden and conservation landscape at the demonstration site. An interpretive sign will be placed at the site to provide information about the plants, the ecological benefits of the garden, and how the garden meets the principles of conservation landscaping.

The demonstration site is located next to the intersection of S Maple Ave. and S Washington St. in the City of Falls Church, VA on City owned property. It is a small parcel that is adjacent to a larger park and a native plant walking trail that follows Tripps Run. The site is located within the 100 foot Resource Protection Area associated with Tripps Run. It is currently maintained as a turf landscape. The demonstration site will not only enhance and enlarge the adjacent park and trail, but will also capture and treat runoff from the neighboring paved parking lot.

The reduction in runoff will benefit water quality in Tripps Run, a Potomac River tributary which is impaired for aquatic life - benthic macroinvertebrates. The benthic impairments are related to a combination of stressors including elevated nitrate and total nitrogen concentrations, flashy flows, channel modifications, and

7. Public Benefit:

- a. The project (or acquisition) will be located on a property that is publicly owned or accessible via a publicly-held easement. Yes No
- b. The project will be for public benefit. Yes No
- c. The project will not improve private property and/or result in private or commercial gain. Yes No

If the answer to any of the above is No, the project is not eligible for section 306A funding.

- d. The state or sub-recipient will need to secure an easement or lease to conduct the project (i.e., because the state or sub-recipient does not own the property). Yes No

If the answer to 7d is Yes, attach a copy of the easement or lease to this checklist; if No, go on to 7e.

What is the term of the easement or lease (provide date of expiration or specify if in perpetuity)? _____

The easement or lease contains a reversionary clause. Yes No

- e. The project will be open to the general public. Yes No N/A

If the answer to 7e is No, the project is not eligible for section 306A funding unless access is to be limited for a legitimate reason, such as public safety, resource protection, or scientific research. Attach an explanation for why the project will not be open to the public and describe the public benefits that would be provided by the project in the absence of public access.

- f. The public will be charged a user fee to access the project. Yes No N/A

If the answer to 7f is Yes, attach an explanation for the user fee, including the amount, whether there will be differential fees (and a justification thereof), the need for the fees, and proposed use of the revenue.

8. Involvement of Non-profit Organizations:

The state CMP or sub-recipient will contract with a non-profit organization to complete part or all of the project.
 Yes No

If the answer to 8 is Yes, the name of the organization is:

9A. Supporting Documentation for Low-Cost Construction Projects (if your project is land acquisition, skip to 9B):

- a. A title opinion, title insurance commitment/certificate, or affidavit showing that the property on which the proposed project will be located is publicly owned, leased, or under easement in perpetuity or for the expected life of the project (at least 20 years) is attached. Yes No
- b. The state CMP has on file a site plan for the project. Yes No
- c. The state CMP has on file a site location map for the project. Yes No

(Go on to 10.)

9B. Supporting Documentation for Land Acquisition Projects:

- a. A title opinion or title insurance commitment/certificate showing that the property to be acquired is owned by the contracted seller and is free of encumbrances that could affect the future viability of the property in its intended use is attached. Yes No N/A
- b. The State or grant sub-recipient has obtained an independent appraisal of the fair market value for the property to be purchased that was developed pursuant to CPD's Section 306A Guidance. Yes No

10. National Historic Preservation Act and State Historic Preservation Office's (SHPO's) Clearance:

- a. The project will affect sites listed or eligible to be listed on the National Register of Historic Places or a similar State registry. Yes No
- b. The state CMP has on file the SHPO's clearance. Yes No

If the answer to 10b is No, the CMP Program Manager certifies that, by signing this checklist, the State will work with NOAA to obtain SHPO/THPO clearance and that work will not begin and/or land will not be purchased until the SHPO clearance is received.

11. Flood Disaster Protection Act, Executive Order 11988 Floodplain Management, and the National Flood Insurance Program:

- a. The project involves construction, improvements, *and/or* land acquisition to support construction or improvements. Yes No (If the answer to 11a is no, go on to 12)
- b. The project will be located in a Special Flood Hazard Area (e.g., Zones A, AE or A1-30, AH, AO, AR, A99, Coastal A, V, VE or V1-30) shown on a National Flood Insurance Program (NFIP) Flood Insurance Rate Map. Yes No

If the answer to 11b is Yes, the zone(s) is AE (If the answer to 11b is No, go on to 12)

Information is generally available from local community planning or building permit departments. Flood Insurance Rate Maps are also available at <https://msc.fema.gov>.

- c. The community in which the project will be located is participating in the NFIP. Yes No

If the answer to 11c is No, the project is not eligible for section 306A funding.

A list of participating communities is available at <http://www.fema.gov/fema/csb.shtm>.

Note: A local floodplain permit may be required if the project meets the NFIP's definition of development, which is "any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials."

12. Coastal Barrier Resources Act:

The project is located on a coastal barrier island designated as a unit of the Coastal Barriers Resources System.

- Yes No

If the answer to 12 is Yes, the unit number is _____

If the answer to 12 is Yes and the unit number does not end in a "P" attach to this checklist a brief analysis as to how the proposed project is consistent with the three CBRA purposes: to minimize (1) the loss of human life, (2) wasteful federal expenditures, and (3) damage to fish, wildlife and other natural resources.

Coastal Barrier Resource System Maps are available at <http://www.fws.gov/cbra/Maps/index.html>.

13. Endangered Species Act:

- a. There are known listed threatened or endangered plant or animal species or their critical habitat (as defined by the Endangered Species Act) that are under the jurisdiction of the National Marine Fisheries Service (NMFS) or U.S. Fish and Wildlife Service (USFWS) on the proposed project site. Yes No

If the answer to 13a is Yes, attach a list of the species and/or their critical habitats as listed on the Endangered Species Webpage at <http://www.fws.gov/endangered/>.

- b. The proposed project may have adverse effects on species listed or proposed for listing as endangered or threatened or on their designated critical habitats. Yes No

If the answer to 13b is Yes, attach a description of the species and/or habitats affected, the adverse effects (minor and significant effects), and any coordination that has occurred between the state and the USFWS or NMFS. CPD will not approve a project that USFWS or NMFS has determined will have significant adverse effects on listed species or their critical habitat.

14. National Environmental Policy Act

- a. The proposed project may significantly affect the quality of the human environment. Yes No
- b. The proposed project involves unresolved conflicts concerning alternative uses of available resources. Yes No
- c. This action may have significant adverse effects on public health and safety. Yes No
- d. This action may have highly controversial effects to the human environment. Yes No
- e. This action may have highly uncertain and potentially significant environmental effects or involve unique or unknown risks. Yes No
- f. The project may have significant adverse impacts on other natural resources not covered elsewhere in this checklist, e.g., beaches and dunes, wetlands, estuarine areas, wildlife habitat, wild or scenic rivers, reefs, or other coastal resources. Yes No
- g. The project's effects may be individually insignificant, but their addition to effects from existing and reasonably foreseeable actions may result in cumulatively significant impacts. Yes No

If the answer to any one subpart of 14 is Yes, then additional NEPA review and documentation may be required. Attach a description of the resource(s) affected, the nature and scope of the effects, and information explaining why the state or sub-recipient believes an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) should not be required. CPD may require additional information in cases where potential impacts are not clearly described or where probable impacts require an EA or EIS.

15. Environmental Justice:

The project will have disproportionately high and adverse human health or environmental effects on minority or low income populations. Yes No

16. Coastal Nonpoint Pollution Control Program:

The project will employ best management practices as appropriate in conformance with the applicable State's Coastal Nonpoint Pollution Control Program. Yes No N/A

17. Americans with Disabilities Act:

The proposed project will be accessible to people with disabilities. Yes No N/A

If the answer to 17 is No, attach an explanation for how the project conforms with ADA requirements as described in CPD's Section 306A Guidance. If the project does not meet the requirements, it will not be approved.

18. State and Local Laws:

The project is consistent with applicable state and local laws. Yes No

If the answer is No, the project will not be approved.

19. Tribal Interests:

a. The project is located on or will affect Tribal lands. Yes No (If No, go on to 20)

b. The project is consistent with applicable tribal laws. Yes No

If No, the project will not be approved.

20. Required permits:

Please list local, state, tribal or federal permits required for this project and the status of the permits. If the permits have not been obtained, then the state CMP Program Manager certifies, by signing this checklist, that the state CMP (or other public entity) is seeking the required local, state and federal permits and that work will not begin or land will not be purchased until the permits have been issued and received by the state CMP.

OMB Control # 0648-0119, expires 11/30/2015. OCRM requires this information in order to adequately assess the eligibility of proposed CZMA section 306A projects. Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Coastal Programs Division, OCRM, 1305 East-West Hwy., 11th Floor, Silver Spring, Maryland 20910. This reporting is required under and is authorized under 16 U.S.C. 1455a. Information submitted will be treated as public records. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection displays a currently valid OMB Control Number.

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director



Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration
and Finance

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804)786-6124

August 29, 2014

Corey Miles
Northern Virginia Regional Commission
3060 Williams Drive
Fairfax, VA 22031

Re: NA13NOS4190135, Proposed Rain Garden

Dear Mr. Miles:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics historically documents the presence of natural heritage resources within two miles of the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

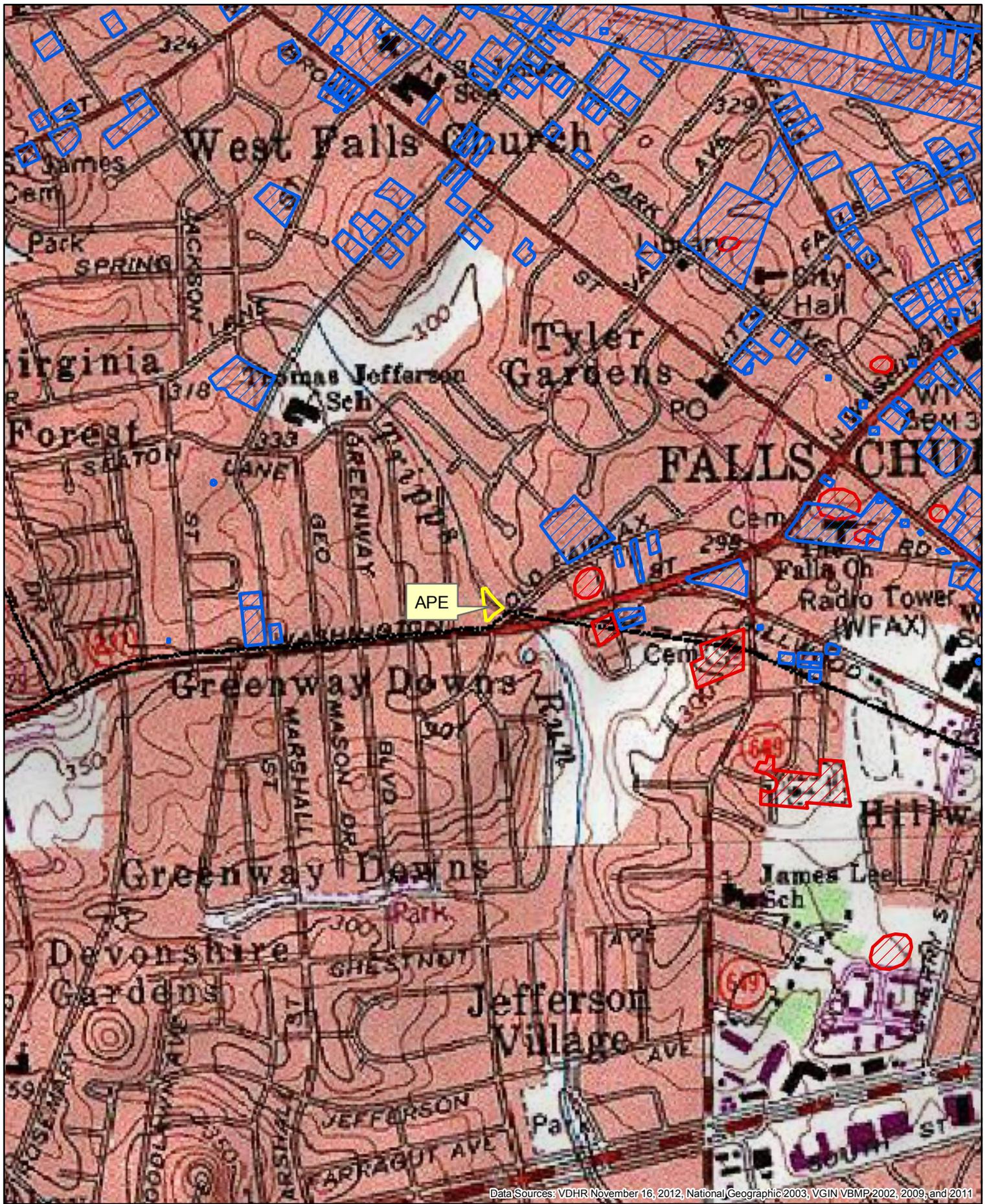
The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

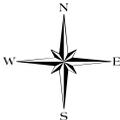
A handwritten signature in cursive script that reads "Alli Baird".

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison



Data Sources: VDHR November 16, 2012, National Geographic 2003, VGIN VBMP 2002, 2009, and 2011

Client: Northern Virginia Regional Commission
 Quad: Falls Church
 Location: Falls Church, Virginia
 Project: Conservation Landscaping
 Search Date: 07/23/2014



1 in = 0.158 miles

Legend

-  Architectural Resources
-  Archaeological Resources