



CHESAPEAKE RIVERWISE COMMUNITIES



Chesapeake Bay Stewardship Fund



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Introduction: Stormwater and Reducing Impact

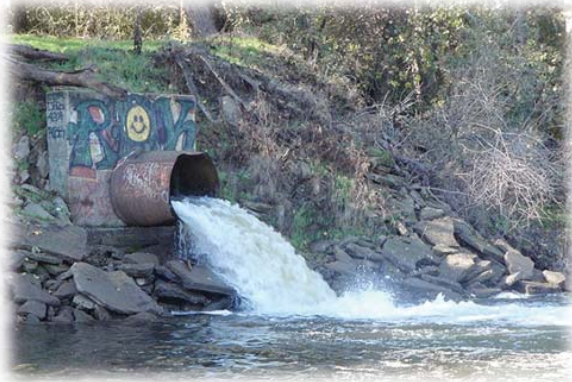


Photo courtesy www.fishbio.com

Aside from runoff from agricultural lands, stormwater runoff is one of the largest sources of nonpoint source pollution in the Chesapeake Bay watershed. As our communities grow and prosper, we develop the land by building beautiful homes, shopping centers, and businesses to accommodate the increasing needs of the public. While this economic growth is positive for our families, it comes at the expense of our natural environment. Removing the cleansing “sponge-like” functionality of our forests and natural spaces and replacing them with concrete or other impervious surfaces speeds up the flow of rainfall over the land.

However, in most communities this rainwater flows over the land or through stormwater pipes directly to the nearest creek, stream, river, bay or ocean. Some older urban areas manage runoff flows through a combined sewer overflow system (CSO) and when heavy rains occur, raw sewage and stormwater mix, overwhelming the pipes in the sewer system. This water then surges into nearby water bodies without ever getting cleaned up. The result is a deluge of toxic chemicals, bacteria, sediment, and nutrients entering our waterways, which consequently results in our waterways changing from beautiful scenic havens to smelly, raging chocolate colored rivers.



James River, Richmond, VA near flood stage 2012

Environmental organizations, state agencies, and localities have worked to reduce our impacts on the environment for decades in response to federal laws that require safe, swimmable, fishable waterways. Over the years, it has become increasingly clear that in addition to installing best management practices on farms and newly developed land, we must also take action at home. Collectively our actions at home can have a significant impact on local streams and rivers. In recent years many organizations have been working to develop various educational and assistance-based programs that help homeowners learn more about what they can do to reduce their harmful impacts on the environment and local water quality. For example, we’ve seen many programs designed to “Reduce Your Carbon Footprint” or “Reduce Your Nitrogen Footprint”. Most of these programs target actions that help reduce energy consumption, reuse rain water, reduce fertilizer use, and prevent pollution from getting into nearby waterways by installing practices that control stormwater runoff. The Alliance has worked with numerous organizations to promote these behaviors, as have other watershed organizations throughout the Chesapeake Bay Watershed. As we’ve all conducted our various programs, we’ve realized we share some common needs.

All our programs need to increase awareness and participation by the general public and those who help them achieve these goals (landscaping professionals, etc.). Furthermore, we all need to add credibility to our work by ensuring that our methods are consistent and the science upon which they are based is accepted by local, state, and federal officials, so the pollution reductions achieved can be counted toward the collective effort of restoring our waterways, from local streams all the way to the Chesapeake Bay.

The Alliance for the Chesapeake Bay has worked with local communities for over forty years, helping them reach their stream cleanup, restoration, and protection goals. Most recently, our efforts have emphasized the implementation of local stormwater best management practices (BMPs) that control and clean up polluted stormwater runoff. We have been implementing project in Maryland, Pennsylvania, Virginia and the District of Columbia that have engaged the public in voluntary actions at home.

As a result of our these projects, we've developed a suite of tools and resources that we've organized and are presenting in the Chesapeake RiverWise Communities program Manual. Our hope is that this manual will explain the various components of the RiverWise Program and how to use them in concert with your own local organization(s) and/or associated efforts.

The RiverWise program was designed as a holistic approach that addresses not just stormwater, but wildlife diversity, habitat, and behavioral habits that support a healthy ecosystem. Success can only be met by installing BMPs that are (1) highly functional, (2) attractive to the eye, (3) beneficial for both stormwater management and wildlife habitat, (4) consistent with applicable BMP design criteria, and (5) reviewed, approved, inspected, and maintained for prolonged functionality. To achieve this, the program has numerous components that are organized and carried out in a logical order:

1. Program management, marketing, and sign-up;
2. Property Assessment;
3. BMP design;
4. BMP installation;
5. BMP inspection;
6. BMP maintenance; and
7. Long-term BMP verification

In this manual, we will explain our entire process for developing a comprehensive watershed protection program. We will discuss appropriate methods to:

- Engage a local community
- Train volunteers and staff
- Conduct property assessments for stormwater, habitat, and wildlife
- Define, install and verify stormwater best management practices
- Establish an incentive program
- Track and report pollution reductions to local and state officials

While there are many detailed layers to this program, we also provide additional resources throughout the manual for your reference. We encourage you to continue to research each topic further on your own, as resources and programs out there continue to evolve and may not be adequately addressed here. This manual will strengthen and complement existing programs, and also act as a framework for organizations to develop similar programs to restore water quality in their regions.

Chapter 1

Chesapeake RiverWise Communities: Getting Started - How to Engage Communities



- Section 1.1: Influencing Behavior
- Section 1.2: Social Media
- Section 1.3: Door to Door and Group Outreach
- Section 1.4: Community Newsletters

Effectively engaging the public is the most crucial element for any program's success. How do we effectively engage people in this day and age of super-technology, when we are all bombarded by messages, media, and the compelling requests to do more with our time than ever before? We found that a variety of approaches are necessary, and some of the most effective methods are traditional, tried, and true approaches. However, taking advantage of new technology has also played a strong role in our success. In this Chapter, we will discuss the different methods we employed.

Section 1.1: Influencing Behavior

Before implementing any type of project or program that relies on engaging the public, it is important to take the time to figure out how to describe and promote your program, to whom you want to promote it, and why you are promoting it to them. Essentially, engaging the public in any effort requires the same process as developing an advertising campaign. You must know your product, make it attractive, and persuade people to accept it by helping them understand why it is beneficial.

In the case of the Alliance's approach to marketing RiverWise Communities, we found that we needed to use a variety of approaches. We used everything from traditional outreach methods (e.g., door-to-door, group presentations, newsletters) to tapping the multitude of social media outlets.

Regardless of the outreach tools selected, RiverWise community initiatives have succeeded in large part because we worked with local partners to understand knowledge and perceptions about yard care and stormwater pollution BEFORE encouraging the adoption of alternative landscaping practices. It is a critical step in a process known as *social marketing*, whereby techniques used to sell products in commercial markets are used to influence behaviors that help solve social problems.

When people are being asked to change their behavior, they need to know the benefits and costs of that change. The key is to find ways to make the benefits of change attractive enough, and the costs of change low enough, that people are willing to do something different and new – that is, form a new set of habits. In other words, you must determine what incentive will have the greatest influence to accomplish long-term behavior change?

For some of your organizations, this effort may already be inherent in what you do. The Alliance has traditionally worked in communities that have requested help in changing behaviors and knowledge levels to positively impact their environment and, more specifically, the water quality in their local watershed. As a result, it was easy to learn how to incentivize behavior change and adoption of the RiverWise practice, because we knew what our audience wanted. In cases where this is not already apparent, it is important to use a more deliberate approach. The following information will provide an overview of the key components to a social marketing campaign, but for more information we recommend checking out the Community Based Social Marketing resources available at the following website:

www.socialmarketingservice.com

Identify the Behavior Change (New Behavior) Desired

What is the goal of your program? What practices need to be implemented to achieve your goals? The Alliance's goal was to help their partners reduce stormwater that was polluting their local stream and reduce localized flooding that caused soil erosion and property damage. It is important to take the time to understand the issues that need to be addressed and the best

methods for solving those problems, so you can clearly promote (“market”) the desired behavior change. As we worked with our partners we asked ourselves the following questions:

What problem needs to be solved?

Flooding and pollution in Reedy Creek

What will help solve the problem?

Controlling stormwater by using methods to absorb or collect it will reduce the volume reaching Reedy Creek.

Are there specific actions that individuals can take to help solve the problem?

Install rain gardens, rain barrels, and conservation landscaping, plant trees, reduce impervious surfaces, and replace impervious surfaces with pervious surfaces.

You will notice in Section 1.2 when using Social Media most people respond to emotional (belief) posts more than fact based (knowledge) posts. These objectives are not necessarily independent of one another, and developing both will motivate the largest portion of your target audience. Your knowledge and belief objectives for your audience will also influence the creation of your talking points in, as outlined in Section 1.3.

Identify Your Target Audience



Graphic courtesy of Slideshare.net

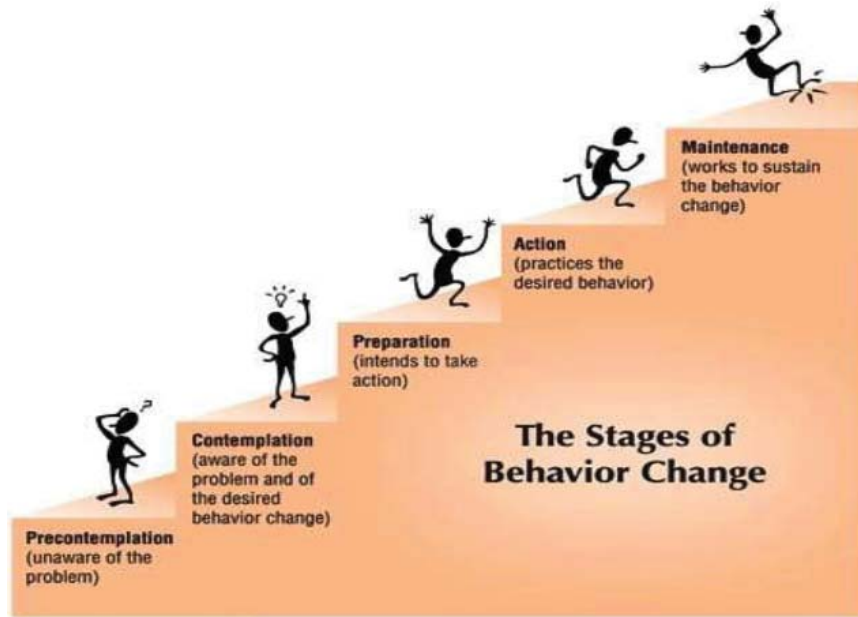
Once the problem is understood and actions are identified, it is important to evaluate who is likely to take action first. The Alliance was partnered with the Reedy Creek Coalition and was able to work with the leaders of the Coalition to better understand the community and how to best engage them. The leaders of the Reedy Creek Coalition agreed to reach out to their neighbors through a door-to-door campaign and by holding community clean up events, stream walks, and watershed bicycle tours. Through these combined efforts, they were able to learn more about those living in the watershed and develop a target audience to engage in the program. Once we

understood who the target audience was, we knew we had a core base of residents who would likely participate in the program. From there, word of mouth tends to increase momentum, as neighbors and friends begin asking what they are doing, why they are doing it, and how to get involved.

The Alliance’s approach has always been to work where there is interest and need. It is fair to say that nearly 100 percent of the community work the Alliance does is done by request. This greatly increases our level of success, and we strongly recommend this approach. Trying to reach out to a community that you do not know and that does not know you is incredibly difficult. It is likely to require at least a year of initial effort just to introduce your organization to the community and build trust between the community and your organization. This will mean asking for opportunities to make presentations at local civic and/or homeowner associations, writing newspaper articles, and canvassing neighborhoods to introduce your organization. This must be done *before* beginning to discuss behavior change objectives relative to your program. Trust and strong relationships are paramount to any successful effort, so the process of building this type of relationship cannot be overlooked. Despite the positive and long-term partnership the Alliance has had with the Reedy Creek Coalition, we still gave local presentations, wrote newsletter articles, and canvassed the neighborhood, along with Coalition members’ support, to ensure that we engaged as many in the community as possible.

Develop Process for Understanding Barriers to Adopting New Behavior

Once you know your target audience, you have a wealth of information available to you and it is important to use that information to shape how you message your program. The best messages can be formed if you first take the time to understand why people are not already doing what your program is asking them to do. This is also referred to as “barriers and competition”.



Sources: Grimley 1997 (75) and Prochaska 1992 (148)

The barriers are defined as anything that keeps someone from voluntarily changing their behavior. The competition is defined as the current counter-productive behavior (or any outside influence supporting it) preferred by your target audience or the general public.

An example of a barrier might be cost, or lack of understanding of why the new behavior is worthwhile, or lack of skill to take on the new behavior. You can begin to understand the barriers by interviewing members of your target audience. This can be done in person at a community meeting, by email, or using online survey tools such as Survey Monkey. In the next section, we'll provide some example questions based on our work.

Ensure Goal for Your Target Audience Will Sustain Behavior Change

While this process of understanding your target audience and the barriers and competition to behavior change may seem complicated or arduous, the effort put into this on the front end of implementing your program can save you time and money on the back end. This process will help you ensure that the behavior change you want to promote is achievable, desired by the community, measurable, and something that can be sustained over time. Our goal is to ensure that we create a lifelong habit, not a one-time trend. In this case, we are asking people to change the way they landscape their yards to reduce the impacts of stormwater runoff and provide habitat for wildlife. This will benefit local water quality and air quality and improve habitat for wildlife as well as their communities. Specifically, the behaviors we want them to change are:

- Having an expansive turf lawn
- Fertilizing an expansive turf lawn in spring and fall
- Watering an expansive turf lawn with potable water
- Allowing stormwater runoff from their rooftops to drain directly to the storm drainage system (e.g., onto the driveway and down to the street) and, ultimately, a nearby stream
- The behaviors we want them to adopt are:
 - Replace portions of the lawn with native plants and trees
 - Consider installing rain gardens to capture stormwater runoff
- Consider installing rain barrels to capture rooftop runoff and water gardens and lawn with this water instead of potable water

To better understand the barriers and competition to these behaviors, we can ask our target audience:

1. What is important to you in your back yard? What do you [want to] use it most for?
2. How do you currently care for your yard?
3. Do you fertilize? How much and when?
4. Do you use a mulching lawn mower?
5. Do you dispose of grass clippings or leave them?
6. Do you water your lawn? How often?

As you ask these questions, depending on the answers you get, you can delve deeper into understanding barriers by asking follow-up questions, depending on their answers to the first questions. Some questions could be:

1. Do you like having trees in your yard? Why or why not?
2. Do you like flowers and shrubs? Why or why not?
3. Are you willing to reduce the size of your lawn?
4. Are you willing to install and use rain barrels to collect water for your garden and yard? Why or why not?
5. Are you willing to install a small rain garden to help remove pollutants from stormwater in your yard? Why or why not?

These questions are very straightforward, but asking why or why not will provide the depth of information you're seeking, in order to understand the barriers to changing their behavior. Often times we learn the motivation is as simple as the homeowner wanting to do the right thing, but not having enough money or time. By understanding this, you can tailor your messages to address the overarching concerns of your audience. Sometimes people won't adopt these behaviors because they truly believe that rain gardens will attract harmful insects or wildlife. This lets you know that you need to provide some sound, science-based facts to address their concerns.

Understanding *why* people are doing something different from what we want them to do is the key to implementing a successful program. In order to provide the best, most relevant and easy to understand messages, you must know there is a group of people who will listen to your messages and understand who they are and what they need to hear in order to change their habits.



Developing Your Implementation Plan and Budget

Based on the established goal(s) of the program and the feedback from the target audience and, perhaps, their local community organization/watershed group, develop an implementation plan for your engagement effort. Start with a 1 year plan that includes activities you believe your organization can achieve within that time. This will provide an opportunity to assess progress and determine if adjustments need to be made before moving on. Then develop a longer-range plan (2-3 years).

It is important to keep in mind what your goal is, who is doing what within the organization, when you plan on completing it, and how much it will cost the organization. It's also important to remember that plans sometimes change due to outside forces. If that happens, be sure to go back through these steps in the light of this additional knowledge.

You will need to identify all costs associated with the strategies and activities related to your program, in order to develop a budget.

For example, if your goal is to implement rain barrels in the community:

- Product related cost: How much will the rain barrels for the workshop cost?
- Price related cost: How much will a homeowner or community save by using rain barrels rather than public water to water flowerbeds?
- Place related cost: How much will it cost to rent the workshop location? Does the homeowner need to hire someone to install the rain barrel?
- Promotion related cost: How much will the handouts and brochures cost? Do we need signage and displays? Can we pay for advertising in local newspapers?
- Evaluation related cost: How many volunteer hours are required to accumulate all of the needed information?
- Staff related cost: How much paid staff time will be involved?

Evaluating Program Success

Every good plan needs a way to measure progress and demonstrate that your program is successful during and following your social marketing campaign. Grant providers love to hear that you have evaluation plans so you can truly assess and report how your program is working. Evaluating your program's success will help you spread your message to an expanded target audience. Understanding the program's shortcomings will also help strengthen it in the future. We suggest that the following may be a useful way to organize the evaluation part of your program:

- Inputs: What resources have been or will be allocated to the social marketing campaign or program effort? Be sure to track volunteer time, any items donated (computers, printers, services), and general office items.
- Outputs: What program activities were or will be conducted to influence the target audience to perform the desired behavior (e.g. rain barrel workshops)?
- Outcomes: How did the target audience respond to the outputs that were carried out (e.g. number of homeowners that came to a rain barrel workshop who later successfully installed their rain barrel)?
- Impact: List quantifiable indicators that show levels of impact as a result of your program (e.g. approximate gallons of stormwater that are now collected in a rain barrel versus running off into the local waterway in a 1-inch storm event).

Return on Investment: List any improvements in social and environmental conditions and assess the value of those improvements versus the money spent to achieve them (e.g. if you helped your target audience install 200 55-gallon rain barrels, your organization has reduced stormwater entering the local waterway by 11,000 gallons, reducing erosion and saving homeowners \$XXX in potable water costs (for irrigation) neighborhood-wide).

We have only scratched the surface of what's involved in successful promotional strategies and social marketing campaigns. While this may seem like a complicated process, more and more funders are seeking programs that have thoughtfully developed this type of strategy. Repeatedly communicating effective messages is a well-known and proven educational tool. The recommended resources in this section will prove invaluable as you embark on your own marketing your own program.

Section 1.2: Social Media

Now that you have learned the process to identify behavior change goals and develop a plan to implement them, we will focus on using social media as an outreach tool to help influence behavior change. Using free social media to promote your behavior change may be a great option if your target audience has access to the internet. If your target audience has little to no internet access or experience, you may be better off going door to door (next section). The

social network statistics from [Pew Research Centers](#) reveal important information about internet users and the social media outlets they choose. Depending on who you are trying to engage, this is important information to know.

Facebook

While Facebook is used more than any other social media application among internet users, you may miss your target audience if you are using Facebook alone to spread your message. According to research, the average Facebook user is a 25-year old woman living in a big city with a college degree and a household income of more than \$75K a year. Facebook tends to work best for an organization by using visual posts (pictures, videos, polls) along with the message to users. Typically, 1-3 posts a day is recommended. Users will typically respond most to emotional messages more than matter-of-fact messages, so remember to make your message compelling. Including photos of places that your audience may recognize or an event they may remember, in conjunction with a message that teaches them something they didn't know in a very succinct way, can be powerful. Another successful method is to use action photos showing people doing the behavior you would like to see.

Twitter

Twitter is still growing and, according to studies, tends to attract more African-American and urban residents between the ages of 18-29, and it also attracts a strong teen following. Tweets are composed in a brief news headline style that must fit within 140 characters. Hashtags (#) are used to link a tweet to a larger conversation. Since space is limited, creating hashtags that are part of your post as opposed to tag-ons at the end is an efficient use of space (e.g. *"#UsingRainbarrels helps conserve water"* instead of *"Install rain barrels to help conserve water! #UsingRainbarrels"*). Like Facebook, most users respond to emotional posts rather than posts that are fact based. It is important to use strong call-to-action language. Including photos and links for the reader to continue researching the topics is an important detail that should not be over-looked. Twitter also has a number of features like Twitter Lists, Twitter Chats, Thunderclap, and Twibbons that can help your organization spread its message.

Pinterest

Women are about five times more likely to be on Pinterest than men. The women are typically under 50 years of age with some college education and of higher income. Pinterest is very visual, allowing users to "pin" or "re-pin" images and other items of interest to their pages. The pinned item allows other users to click on it to learn about the image, and users have the option to follow the original posters, which leads users back to the poster's website or blog.

Instagram

Instagram is another visual medium. Like Pinterest, it's all about the photo. Instagram has a diverse group of users including African-Americans, Latinos, women, and urban residents aged 18-29, along with a strong following of young adults. If you have more photos than you know what to do with, consider opening an Instagram account to highlight them.

Other social media outlets

The above mentioned social media outlets are not the only ones available. Depending on who your target audience is, you can also investigate the use of Tumblr, LinkedIn (professional), Vine, Google+, MySpace or blogs. The important thing to remember is that using social media

is only one component of a successful outreach campaign. This can be effective in increasing awareness and engaging your community, because it allows you to create a lot of “buzz” around your efforts. However, using social media is only as successful as you make it. It should be used consistently and frequently so that people remember your efforts and achievements.

Section 1.3: Door to Door and Group Outreach

If your organization’s primary way of reaching your targeted audience is the “in person” method, it is important to map out some strategies ahead of time. One of the most beneficial internal documents you can provide to your staff and volunteers is a set of talking points. Talking points are an easy way of keeping everyone on track with a consistent message.

Start by developing your story. If you have already completed the Social Marketing steps above, you already have this! Key aspects of developing talking points for your story are as follows:

- Keep them simple, easy to understand, and easy to communicate verbally and in written form.
- Avoid long paragraphs; instead use bullets to communicate the main point.
- Pairing the talking points up with a fact sheet can be very helpful to your members when answering questions from your target audience. On written information and fact sheets, use compelling images to make a statement, and then back it up with factual information and inspiring actions. Discussing both of these resources in a staff meeting before handing them out helps in providing a full explanation of the points and allows for questions to be asked.



Next, develop a list of places to visit. With talking points and fact sheets in hand, your group can now circulate to the various community meetings that already take place. Check to see if any of the following are options in your community:

- Neighborhood Civic Meetings
- Established Environmental Groups, large and small
- Community Centers
- School Clubs and PTA Groups
- Scout Troops
- Churches
- Farmer’s Markets
- Events

Take the time to map your calendar events. By creating an Events Calendar, all members of your group will be aware of upcoming events, and you can ensure assigned individuals are able to attend months in advance.

When attending meetings, be sure your group members bring their talking points, fact sheets, brochures, and a sign-up sheet to collect: name, address, phone number, and email addresses of attendees. Be sure to post on your social media networks that you are attending these meetings.

Any email addresses collected should be added to your master email list. You can create one using an excel spreadsheet. Send the people who gave you their information a quick “thank you” email and let them know they have been added to your email list. You can do this using a standard free Gmail account or free email marketing program for non-profits, such as [Vertical Response](#).

Neighborhood newsletters and blogs are great and offer an inexpensive, often free way of promoting your message. Be sure to review the newsletters or blogs before contacting them to ensure you will be reaching your target audience. Send your article photos and information to the appropriate contact person. This can provide the newsletter editor or blogger with enough information to determine if you are a good fit for them. However, don't be discouraged if you are not a good fit. Ask for recommendations of a better home for your article that you may not be aware of. Neighborhood newsletters are almost always searching for ideas, stories, and events. The text box below lists some typical places to advertise your program locally.

Places to advertise your program

- Facebook
- Neighborhood newsletters
- Neighborhood association meeting
- Neighborhood activities such as street and stream cleanups, walking, hiking, biking tours of the neighborhood or stream
- Community events, such as farmer's markets, festivals, etc.
- Door-to-door
- Other social media like Twitter and Instagram
- Newspaper articles
- Word of mouth

Chapter 2

Chesapeake RiverWise Communities: Best Management Practices



- Section 2.1: Residential Stormwater BMPs
- Section 2.2: Selecting BMPs for your Program
- Section 2.3: Overview of Common Residential BMPs

Section 2.1: Residential Stormwater BMPs

In the years to come, Stormwater Best Management Practices (BMPs) on individual residential lots will become more commonplace and crucial weapons in the arsenals of stormwater practitioners everywhere. These BMPs will be instrumental in achieving water quality goals. They may be just as important as a way to connect the public to their local streams and the Chesapeake Bay, showing them that anyone can make a difference and, if we are to make a difference, it will take action from everyone.

There are many reasons one might install a BMP on an individual residential lot. One reason is that regulatory requirements for new construction often require BMPs to treat stormwater following land development. As time goes by, regulations are focusing more and more on treating stormwater locally, in micro-watersheds, instead of consolidating stormwater and treating it in a massive detention or retention stormwater management pond. A second reason is to one or more retrofit BMPs [i.e., install a BMP(s) on an existing established residential lot where stormwater previously was not addressed]. This may be done to meet Municipal Separate Storm Sewer System (MS4) requirements, improve water quality in a local waterway, or as a volunteer citizen stewardship effort.

The following is a list of stormwater BMPs that are appropriate for residential use.

- Rain barrels (or rainwater harvesting)
- Rain gardens
- Permeable hardscapes
- Downspout disconnection
- Impervious cover removal and conversion to conservation landscaping
- Tree plantings
- Conservation landscaping (i.e. BayScapes)
- Urban nutrient management plan
- Infiltration trench

Section 2.2: Program BMP Selection



Stormwater BMPs can be as simple as planting a tree or as complicated as installing a permeable pavement system. It is crucial to remember that homeowners will be maintaining these BMP's over the years, not contractors who specialize in stormwater management maintenance practices. In order to have a successful residential BMP, it must be correctly located, designed, and installed, and proper maintenance must be conducted over the life of the BMP. The first step in designing an effective non-regulatory BMP program is selecting the BMPs to be included in the program. Variables to consider when selecting the BMPs include the following:

Geographic location

Choose BMPs that meet the site constraints of the residential area where you will be working. For instance, if you are working strictly in urban areas, you will want to consider BMPs that are smaller and can impact impervious surfaces (such as rain gardens and permeable pavers). If your program area includes suburban and rural areas, then larger BMPs such as dry swales and

riparian buffers may be possible. Climate should also be taken into consideration for planning, since conditions will vary greatly within the watershed. For example, while warm coastal regions rarely experience harsh winter conditions, colder mountain regions should account for low temperature, snow, and road salt when selecting BMPs and plant species.

Geologic location

Geologic location may play an even greater role than geographic location. High water tables, karst terrain, variations in soil type, and bedrock depth may become huge challenges, depending on your location. It is highly recommended that you talk to local and state stormwater practitioners about the appropriate BMPs for your area. Just because a certain BMP is getting great results in one area doesn't mean the same thing will happen in another. Remember that BMPs are designed to infiltrate in order to clean stormwater, so this must be geologically feasible.



Incentive structure

If your program offers an incentive for installing BMPs on residential lots, the incentive structure may influence the choice of BMPs for the program. For example, if the incentive is based on a partnership with a local nursery, BMPs that are plant-based would be your best bet. If the incentive structure is a cost-share program, the cap of the cost-share might determine which BMPs will be chosen. If the average cost of the installation of a given BMP is \$5,000+ and the incentive will only cover up to \$500 of that cost, most homeowners will not be willing to bear the remainder of the cost. You may be able to offer design or installation assistance or other technical advice for the project. If you have the resources, you may even offer an additional financial incentive, as long as such assistance is provided equitably among the program's clients (to maintain good will for the program). It will be important to work with BMPs that can be installed within the economic boundaries of the program, rather than doggedly supporting BMPs that are too expensive or difficult to install in the particular area.

Locally accepted BMPs

Many localities and states already have lists of locally accepted BMPs that they know, through previous experience, are the highest functioning BMPs to use in the area. Finding the list of these BMPs and choosing from them will save you resources and keep you from choosing a signature practice not on the local list from which you may never get a pollution reduction credit. To identify these BMPs, you can contact your locality's utility, stormwater, or environmental department.

Section 2.3: Overview of Common Residential BMPs

There are a number of residential BMPs being used throughout the Bay watershed. For the Chesapeake RiverWise Communities program, we have focused on the following: rain gardens, tree plantings, permeable hardscapes, rainwater harvesting, and BayScapes (i.e. conservation landscaping). In this section, we provide an overview of these practices. For details on design, installation, and maintenance, you can refer to the Center for Watershed Protection's "Residential Stormwater BMP Design Manual" at [<insert hyperlink>](#). The Alliance's [Reduce Your Stormwater webpage](#) has additional information and sources on many of these BMPs.



Rain Gardens

A rain garden's appearance is similar to other flower gardens—but under the surface, it collects and treats rainwater. By mimicking the natural treatment of stormwater provided by forests and meadows, these gardens are highly efficient at treating stormwater runoff; removing common pollutants such as pet wastes, fertilizers, and

household chemicals.



An installed rain garden resembles a shallow depression in the landscape, planted with a mix of native plants that attract wildlife, while filtering pollutants. By accepting stormwater runoff from the roof, driveway, and/or parking lot, water is allocated to growing your garden which previously flowed out into the street, and stormwater drainage system.

Contrary to the name, rain gardens are typically dry throughout the year. During installation, soil preparation methods ensure a higher infiltration rate, usually through removal of clay, and soil amendments of sand, as well as a bottom layer of gravel.

Purpose & Benefits

- Highly efficient infiltration of runoff
- Habitat for butterflies and other wildlife
- Can save homeowner money
- Adds significantly to property value and appearance
- Efficient water pollution treatment



Tree Plantings

Planting native trees and shrubs helps restore a portion of your property to its original forested condition, which is good for property value, wildlife, the local watershed and the bay. Additional gardening and mulching around these tree plantings can reduce the area of lawn needed to be mowed.

Native bare root trees and shrubs can be purchased and shipped from the Department of Forestry for under \$3.00 each. These trees are relatively small, but are the best adapted for our region, growing in their native soils and climate.

Purpose & Benefits

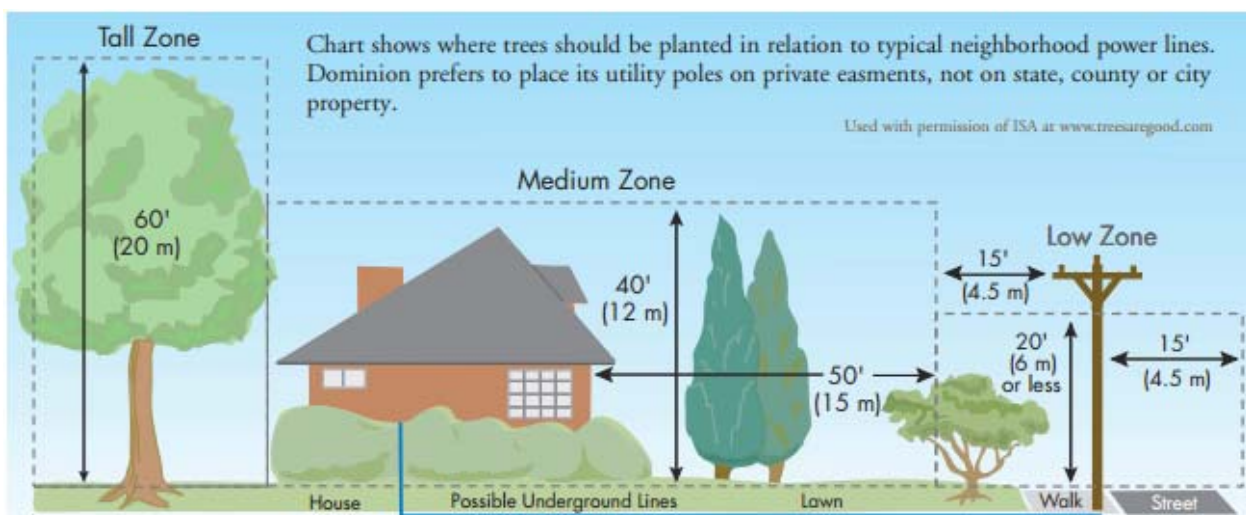
- Increase stormwater infiltration by intercepting rainfall and runoff
- Reduces property erosion with deep structural roots
- Regulate climate changes, such as providing shade and cooling in the summer
- Adds significantly to property values
- Filters air and water pollution
- Can grow fruit or health products for homeowners
- Attractive for home landscaping
- Promotes psychological health

Tree Placement

Consider the size of the tree at maturity when deciding where to plant.

<https://www.dom.com/library/domcom/pdfs/customer-service-shared/tree-trimming-shared/tree-trimming.pdf>

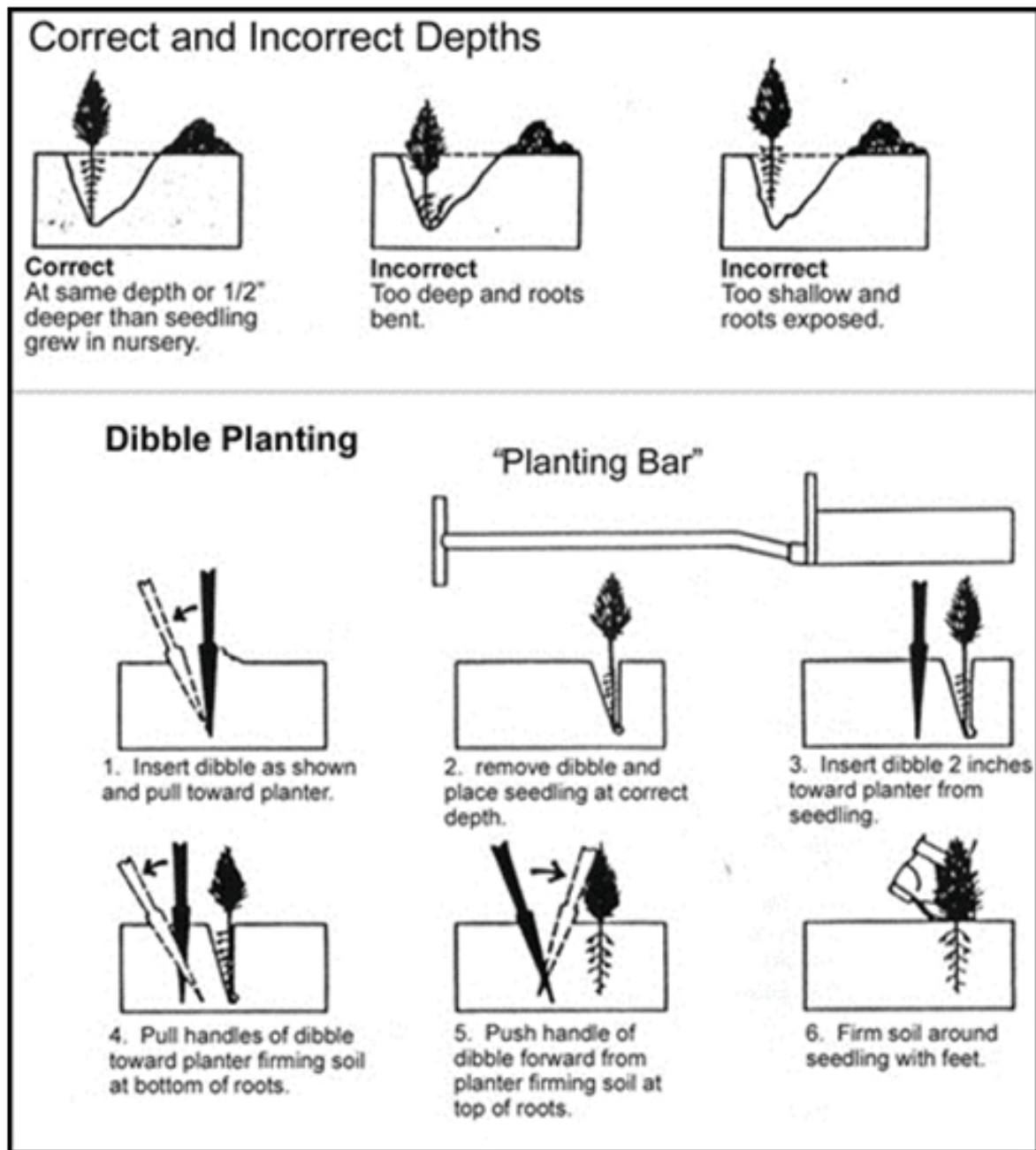
Trees should be located away from all public utilities (above and below ground), with exception to small trees under utility lines. Contact Miss Utility (1-800-552-7001) to have the property marked prior to planning and installation. Contact a local arborist regarding other tree planting questions or concerns.



Tree Planting

- Spring and early fall are generally the best planting seasons, giving the tree time to root and acclimatize before the extreme weather conditions of summer or winter.
- A dibble bar may be used for efficient bare root and tree seedling planting

For more information on how to plant balled and burlapped, container-grown, and bare root trees, go to: dof.virginia.gov/tree/care/how-to-plant.htm



Permeable Hardscapes

Description

Permeable hardscaping is a beneficial alternative to traditional impervious paving materials such as concrete or asphalt. While impervious surfaces promote stormwater runoff that picks up pollutants and debris, permeable hardscapes allow water to immediately percolate through the material, and into the ground. They can be used in a wide range of settings, from a simple pathway or small patio up to a large parking lot. The market for these materials has grown, resulting in some attractive and cost-effective options available for small projects.

Purpose & Benefits

- Reduce stormwater runoff
- Effectively rehydrate adjacent and underlying soils
- Promote even stormwater infiltration, reducing puddling on property
- Very high pollutant removal
- Control localized drainage problems.
- Highly attractive option for walkways and driveways
- Educational opportunity in environmental stewardship



Rainwater Harvesting

Description

Rain barrels or cisterns are advantageous tools for homeowners to use to collect and harvest rainwater. While they can vary in shape, size, and design, they are all easily installed for home catchment systems.

Rainfall from a portion of the roof is directed by the gutter drain system into the cistern. The water can then be used for a number of outdoor uses: watering gardens, landscaping, cleaning streets, washing cars and windows, or bathing a pet. Due to its natural composition, rainwater is generally known to perform better in gardens than municipal tap water. Some household rainwater harvesting systems are even designed to use harvested water for flushing toilets!



Using rainwater in these ways can also help reduce a homeowner's monthly water bill.

Purpose and Benefits

- Reduces home runoff
- Reduces property stormwater fee
- Gardens watered with rainwater perform well
- Stores an emergency water supply in case of a drought

Conservation Landscaping

Description

Conservation landscaping, or "BayScaping," is a landscaping method that cooperates with natural systems to reduce pollution and enhance wildlife habitat. Native plant species, which are adapted to local conditions, are used because they require less water and fertilizer than the average lawn.

A homeowner benefits from using this landscaping method because it reduces the need for external inputs to support their yard: less fertilizer, pesticides, water, and labor. There is no trade-off, since native plants provide both more wildlife habitat and more water infiltration than lawns. In yards with poor soil, compost amendments can enhance stormwater infiltration capacity of Conservation Landscapes.

A native plant guide for Conservation Landscaping is available at:

<http://www.nativeplantcenter.net/guides/chesapeake natives.pdf>



Before

After

Purpose and Benefits

- Native plants will attract native wildlife and butterflies
- Slows down and filters pollution
- Adds beauty to a home landscape
- Native plants will attract beneficial wildlife, helping deter pests
- Less long-term inputs (e.g. mowing, water, fertilizer, etc)
- Requires minimal maintenance

Chapter 3

Chesapeake RiverWise Communities: Assessments



- Section 3.1: Intro to Watershed Protection Assessments
- Section 3.2: Pre-Assessment Questionnaire
- Section 3.3: The Assessment
- Section 3.4: Assessment Report
- Section 3.5: Assessment Follow Up
- Section 3.6: Assessment Progress Tracking

Section 3.1: Introduction to Watershed Protection Assessments

Watershed protection assessments are a key component of the Chesapeake RiverWise Communities program. These assessments take holistic look at residential properties to:

- Gage stormwater runoff, wildlife habitat, and homeowner behaviors
- Provide site-specific recommendations for actions to take to reduce environmental impacts and restore local watersheds.

There are four main goals of the assessment process:

Educating homeowners. Most homeowners either do not realize that their property conditions and landscape habits contribute to polluted stormwater runoff. Others may be aware of this but may not know what they can do to help prevent polluted stormwater runoff. The watershed protection assessment provides an opportunity to educate homeowners through one-on-one interaction and share this information.

Identifying structural BMP implementation opportunities. As part of the assessment process, assessors are looking at all the property's characteristics to determine which BMPs are suitable for the site. The assessors should be trained to make sound recommendations regarding BMP placement. Common structural BMPs include rain gardens, rain barrels, BayScapes (Conservation Landscaping), impervious surface removal, and adding or enhancing pervious surfaces.

Identifying behavior change BMP opportunities. Homeowners make choices regarding their lawn mowing frequency, fertilizer usage, disposal of grass clippings and leaves, and other landscaping habits that can contribute to stormwater pollution. The assessment process helps identify these behaviors and provides recommendations to homeowners about changes they can make to help reduce their stormwater impacts. These recommendations also focus on increasing wildlife habitat and native plant diversity.

Providing entrance into incentive programs, such as cost shares, rebates, or stormwater fee reductions. The RiverWise program is set up so homeowners that participate in the assessment process can then apply for incentives such as cost-share funds or rebates to help lower their cost of implementing the recommended structural BMPs on their property. Sometimes this kind of economic and technical assistance makes the difference between a homeowner choosing whether or not to participate in the program. Potential incentive programs are outlined in Chapter 4 of this manual.

The assessment process provides a chance to communicate the importance of controlling stormwater runoff to homeowners and encourage stormwater BMP implementation. We can also use this opportunity to educate homeowners about the importance of using native plants and increasing wildlife habitat. We collect information from the homeowner twice: first when they sign up for an assessment to learn about their habits, and later when we meet with them on their property to learn about the conditions on the property. The basic assessment process is as follows:



The homeowner signs up to have an assessment conducted and fills out the pre-assessment questionnaire. The sign-up can be through an online form (preferable), email, or telephone. The assessor takes the following steps:

1. Schedules an appointment with homeowner.
2. Gathers information needed for the assessment.
3. Fills out the assessment form during the appointment.
4. Generates a report to give to the homeowner.
5. Follows up with the homeowner to answer any questions about the report recommendations and discusses incentive program opportunities and enrollment.
6. Sends out a follow-up survey a few months later to gather information about BMP implementation, behavior change, and program satisfaction.

To be able to conduct the assessment and make sound recommendations, the assessor should be someone who is trained to identifying appropriate BMPs and their locations and communicate stormwater issues to homeowners. This may be a paid staff person employed by a locality, state government, or a watershed organization. Volunteers and interns can also be trained to be assessors. Using volunteers or interns also helps relieve the burden on permanent staff when there are limited resources. Chapter 6 has tips for providing training to assessors. If using volunteers, it is preferable to provide some oversight by permanent staff, which can include accompanying the volunteer on the first few site visits and/or reviewing the assessment reports before they are sent to the homeowners.

Section 3.2: Pre-Assessment Questionnaire

The purpose of the pre-assessment questionnaire is to gather information about the homeowner's habits, knowledge, and behaviors related to stormwater runoff and environmental impacts. A pre-assessment questionnaire provides a baseline that can then be compared to information gathered later to gauge behavior changes and the effectiveness of the program.

The pre-assessment questionnaire also allows the assessor to gather information about habits and site conditions that may not be easily detected during the on-site assessment (e.g., how often the homeowners water their lawn or garden). Furthermore, the pre-assessment questionnaire can be set up so that it actually educates the homeowners about which landscaping and outdoor yard habits are best for reducing stormwater runoff and improving wildlife habitat. For example, during an online pre-assessment, the homeowner would answer the question and then could be given the "right answer" and a short explanation.

The information gathered should include (but may not be limited to) the following:

Landscaping habits: This includes mowing frequency and blade height setting, lawn and garden watering schedules, fertilizer usage, pesticide and herbicide usage, use of a lawn service, and soil testing.

Outdoor habits: These habits include car washing, oil changes, winter de-icing, household cleaner purchases and disposal, and cleaning up after pets.

Knowledge assessment: This includes asking the homeowner what they consider is the most important environmental issue and what contributes to poor water quality in their neighborhood.

Behavior change: This is a measure of willingness to change behaviors to have a positive impact on water quality and wildlife. You can use a sliding scale to assess how willing the homeowner is to install a certain BMP or change their landscaping practices.

Homeowner's needs and concerns: This seeks out why the homeowners decided to request an assessment and whether there are any particular areas on their property they already know they want addressed. Areas of ponding, unusually dry or bare areas, and areas where there is active erosion should all be noted.

Local Codes and Ordinances: This reveals other useful data, such as homeowner association (HOA) covenants and neighborhood demographics. For example, if a certain HOA covenant prevents rain barrels from being placed in the front yard, the assessor should account for that when providing recommendations.

Site conditions: There may be site conditions that are difficult to identify visibly while on a site. For example, an abandoned underground oil tank may have a significant leaking problem associated with it that can potentially be remedied. Other site conditions may include the site's location within a combined sewer overflow (CSO) area or homeowner knowledge of other environmental concerns on the property.

See Appendix 3A for a sample pre-assessment questionnaire. The easiest way to gather this information is to set up an online questionnaire. An online survey allows the homeowner to quickly answer many of the questions needed to conduct a successful assessment. While online questionnaires speed up the process, they also allow the assessors to import the data into a database such as Access or Excel which, if set up correctly, will help track behavior change when compared to the post-assessment data (see Section 3.5). An online survey form can be created using a number of different programs. The following are some online survey tools that can be used:

- JotForm (www.jotform.com)
- Survey Monkey (www.surveymonkey.com)
- Google Forms (www.google.com/forms/about/)

Useful Websites and Tools

- **Local government websites:** Many local governments will have valuable property information on their websites. Some of these tools include property sketches, critical resource protection information, impervious surface descriptions, and more. This information can be directly entered into the assessment report. This should be done before the visit.
- **GIS databases:** Some local governments have GIS databases on their websites with valuable information such as soils data, topographic information, and high-quality aerial imagery.
- **Google Earth:** Google Earth can provide additional supplemental information such as aerial photography and measuring tools you can use before the site visit. Then you can confirm the mapping measurements during the site visit.
- **Site plans:** Ask the homeowner if they have civil engineering or architectural drawings of the property. These drawings can provide you with hydrologic and site design information, including scaled measurements.
- **USDA Web Soil Survey:** <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Section 3.3: The Assessment

After the homeowner signs up for the assessment and fills out the pre-assessment questionnaire, the assessor should set up an appointment for a site visit. The assessor should schedule a time when the homeowner is available to meet, since the site visit is a good opportunity for one-on-one education. Summer and winter are generally the best seasons to schedule assessments, because this can align the process nicely before fall and spring plantings and lawn maintenance. However, do not delay responding to a homeowner just to align the process in this manner. It is critical to have prompt, frequent communication to keep the homeowner interested.

Before the appointment, the assessor should gather some basic information about the property. Determine the following: lot size, property type, location of impervious surfaces and their area, proximity to local water bodies and other critical areas, general watershed information, an aerial view of the property, and any other characteristics that may influence BMP implementation. Some of this data may be available through parcel information provided on local government websites. Google Earth/Maps and Bing Maps provide free aerial views of the property that can be printed, if GIS software or other local mapping tools are unavailable. The assessor should also review the pre-assessment questionnaire answers and have a list of questions ready for the homeowner, if any of the survey answers need to be clarified during the on site visit.

For the site visit, the assessor fills out the property assessment form (see Appendix 4B). The assessor should bring multiple copies of the aerial photo and/or parcel diagram to notate various kinds of data and observations at a spatial scale. For the RiverWise Program we use an iPad and the PDF Expert app, which helps to streamline the assessment process. The app provides tools to fill in data, takes pictures, and draws recommended BMPs on the property photos and parcel diagrams. The data gathered during the assessment should include the following:



Downspouts. Note the number of downspouts and whether they are connected or disconnected from the storm system (if they drain onto a paved driveway or go into the ground, they are likely connected to the storm system).

Impervious surfaces. Measure the area of each impervious surface, including the house, walkways, driveways, patios, and any other areas where water does not infiltrate into the ground. If using data collected before the site visit, confirm that those numbers correspond with the site conditions. The best way to collect this data on-site is with a measuring tool, such as a measuring wheel. Some surfaces, such as gravel areas, should

be verified as pervious or impervious while on-site. If the assessor is unsure, the general rule of thumb is to mark the area as impervious (because over time, the surface will become more compact and thus, more impervious).

Soil information. The assessor can use a soil probe to determine the soil profile, including of the soil type. This, along with assessing the compaction of the soil, will help identify whether or not stormwater infiltrates through the soil, especially in grassy areas.

Property conditions related to stormwater conveyance. The assessor should note the direction

and severity of any slopes, locations of eroded areas, locations of swales, ditches, drain inlets or outfalls, and the location and types of any existing BMPs.

Information about vegetation. Identify the major invasive, native, and non-native plants on the property and whether there are layers of vegetation (e.g., tall trees with high canopies, understory trees, shrubs, and perennial flowers). The assessor should also note grouping of plants since they, along with multiple layers of vegetation, often provide the best habitat for wildlife.

Solar exposure. The solar exposure on the property is important for identifying which native plants will work best when installing rain gardens and BayScapes.

Utility locations. Note the location of utility lines, both overhead and underground, including power lines, gas lines, cable and telephone lines, water lines and sewer lines. These should be avoided when determining new BMP locations. Not all utilities will be visible during the assessment. BMP locations should be noted as “suggested” until utilities can be located and you can confirm that placement will not interfere with underground lines.

Infiltration Test. If a site has specific locations where infiltration BMPs (e.g., rain gardens, dry wells, or permeable pavers) will be installed, the assessor should try to conduct an infiltration test on the site. This test will take at least an hour with the right tools (e.g., an infiltrometer). If the assessor does not have time to conduct the test during the site visit, the homeowner or a contractor can conduct the test to determine if the recommended location of the BMP will be suitable.

During the site visit, the assessor should also draw a rough sketch of the property, indicating impervious surfaces, slopes, existing vegetation, utility lines, downspout locations, and recommended locations for structural BMPs. Most important, pictures of potential BMP locations should be taken. The pictures can be imported into the report and used to identify which BMPs are most appropriate to recommend. Taking pictures from consistent angles and the exact same perspectives will help the homeowner understand where you are recommending specific BMPs to be placed. As well, when you are monitoring the installation and verifying the function of the BMPs in the future, you can take pictures from the same angles and perspectives, showing the beneficial changes in the environment.



Sample Assessment Drawing

Section 3.4: Assessment Report

Next the assessor will use the information gathered during the site visit to generate a report to provide to the homeowner. The report should include a cover page of recommendations, observations, and a site sketch. For the RiverWise Program, the assessment form that is filled out on-site with the PDF Expert app is set up to also serve as the report (See Appendix 3B). The assessor needs to keep a copy of the report for the organization’s records.

Here is a list of potential recommendations along with tips for making these recommendations:

1. Best Management Practices (BMPs - see Chapter 2 for more details):

a. Rain Barrel:

- Recommend if there is an area to use the water collected by a rain barrel. This practice is only effective when the homeowner has a regular use for the collected rainwater (watering borders and gardens, washing cars, etc.)
- Determine if a single barrel or multiple barrels would be best, considering the size of the areas draining to the rain barrels.

b. Downspout Disconnection:

- Determine if a downspout is connected to an off-site drainage conveyance by pipe or discharge to an impervious surface that flows to the conveyance.
- When disconnecting the downspout, consider the possibility of basement or foundation flooding, yard flooding, and erosion. Always ensure water isn't ponding near the foundation and is directed away from the house.

c. Rain Garden:

- Ask the question: *"Will this fix a ponding or flooding issue or will it act as a practice that collects runoff leaving the property?"* The purpose of a rain garden is to collect runoff for treatment in order to improve water quality, not to fix a flooding issue on the homeowner's property.
- Locate the rain garden to capture the runoff before it enters a nearby ditch, storm sewer inlet, or stream. Determine if the rain garden location will have a feasible outlet location.
- Make sure the location is far enough from adjacent properties, basements and foundations (10 or more feet). Do not direct any runoff onto a neighbor's property.

d. Tree Planting:

- The most important thing to consider when recommending the spot to plant a tree is the mature size of the tree, its impact on overhead and underground utilities, and its potential effect on the aesthetic value of the home when the tree is mature.
- Consider what type of canopy cover would be most appropriate for the area.
- Consider what type of soil conditions are needed for the tree species you are recommending. Trees need specific environments in order to thrive, but they are one of the most cost-effective practices that can be used to reduce stormwater runoff.
- Plant native tree species to provide food and habitat for local wildlife.

e. BayScape:

- BayScapes can act as an excellent buffer to treat and reduce stormwater and provide wildlife habitat. The first location to consider should be one that intercepts stormwater runoff before it reaches an impervious surface that will carry the water to a stream or stormwater inlet.
- Bayscaping is a more appropriate practice for placement in ponding or flooding areas. Usually soggy areas have poor infiltration rates or a high water table and are not suitable for a rain garden. The deep roots of native plants in a BayScape will help absorb this excess water and eliminate ponding issues.
- Consider placement in areas void or lacking wildlife habitat.
- BayScapes are most beneficial when they are used to reduce the size of lawn because this, in turn, reduces chemical fertilizer applications and mowing. Locate BayScapes to complement existing gardens and provide habitat to wildlife rather than replacing an existing garden with a BayScape.

f. *Permeable Pavers:*

- Pavers should be placed where they can collect clean rain water, such as drainage from rooftops, to reduce the chance of the pavers being clogged by sediment or dirt.
- Permeable pavers should be located on relatively flat areas and should be replacing an impervious surface such as a patio, driveway or walkway.
- Do not locate pavers with 10 feet of a home foundation or basement. The stormwater that is collected and stored in these systems could damage the foundation of your home.

g. *Impervious Surface Removal:*

- If the property has any impervious area the homeowner is not using (such as excess parking), recommend the removal of the impervious material to decrease runoff.
- When recommending impervious removal, be sure to also recommend amending the soil and planting a BayScape.

2. Behavior change “BMPs”

a. “Urban nutrient management practices” including:

- Set lawnmower blade height to 2.5 – 4 inches above the ground surface. Taller grass slows the rate of runoff and will produce a deeper, denser root system. This reduces the need for fertilizer applications, creates a healthier lawn faster, and reduces long-term costs.
- Conduct a soil test to determine fertilizer needs
- If using fertilizer, use slow release fertilizer in small amounts, and only fertilize in the fall
- Leave grass clippings and leaves on the lawn or sweep them into vegetative beds. Do not sweep them into streets or storm drains. To reduce the amount of grass clippings, switch to the use of a mulching lawnmower (or add the mulching attachment to the homeowner’s existing lawnmower). Leaves and grass clippings act as mulch, trapping moisture and fertilizing the lawn and plant beds.
- Nutrient management plan: A nutrient management plan provides directions to the homeowner regarding how to maintain a healthy lawn while at the same time minimizing fertilizer and other nutrient inputs and their associated costs. It may be possible for the homeowner to obtain a nutrient management plan or credit toward the cost of obtaining one through an online application in some jurisdictions. This would be a good opportunity to enroll participants or provide resources to the homeowner.



- More practices can be found at www.stormwater.allianceforthebay.org and at <http://chesapeakestormwater.net/bay-stormwater/baywide-stormwater-policy/urban-stormwater-workgroup/urban-fertilizer-management/>
- b. Pick up pet waste on a regular basis, especially before rain events. Pet waste left on the lawn can be washed off into nearby streams, causing pollution of local waterways. Pet waste contains bacteria and other pathogens that can cause illness in humans if they come into contact with contaminated streams.
 - c. Wash your car on your lawn so water is absorbed and does not runoff into storm drains or nearby waterways. Consider using biodegradable detergents.
 - d. Avoid using herbicides and pesticides. Plant beneficial plants and herbs that will attract wildlife that are predators of nuisance pests, such as mosquitos and ticks. For a list of recommendations visit: www.nps.gov/plants/pubs/chesapeake/pdf/chesapeakenatives.pdf.
 - e. Many insects are harmless to people and play an important role in maintaining a healthy lawn or garden ecosystem. However, if there is a problem, then identify the exact pest you have. Consult an expert, since there are many non-chemical alternatives to controlling pests, commonly known as "Integrated Pest Management," or "IPM." Pesticides can infiltrate into groundwater, contaminate drinking water supplies, and severely harm downstream ecosystems if applied incorrectly or unnecessarily. They can also be absorbed into garden vegetable tissue, presenting potential harm when consumed.
 - f. Store all chemicals in a weather proof and leak proof shelter. Do not store paint, gas, oil, fertilizers, etc. on a patio or in your yard. Weathering of containers due to exposure to the elements will cause them to leak, allowing chemicals to get into waterways during storms or filter through the soil into groundwater.
 - g. Better manage outside water usage, including doing the following:
 - Use soaker hoses or drip irrigation to target watering and avoid over-watering.
 - Water early in the morning or late in the evening to reduce water loss from evaporation, which is more likely to happen in the heat of the day.
 - Water thoroughly, making sure plenty of water gets to the plant roots.
 - One longer watering session per week is better than several short sessions during the week.



Identifying High Priority Sites and Practices

When preparing the report and providing recommendations, the assessor should also include notes about positive aspects of the property and acknowledge any positive homeowner habits.

Depending on the needs of the organization or locality performing the assessments, rankings can be used to identify priority sites or practices. These priority rankings could be based on proximity to critical water bodies, amount of runoff leaving property, severity of erosion and

other environmental impacts from the property, and other priorities. One example of a priority ranking system is the Center for Watershed Protection's Pollution Severity Index and Restoration Opportunity Index for their Neighborhood Source Assessment, found in the Urban Subwatershed Restoration Manual Series Manual 11: Unified Subwatershed and Site Reconnaissance: A User's Manual (http://www.cwp.org/online-watershed-library/cat_view/64-manuals-and-plans/80-urban-subwatershed-restoration-manual-series), which could be adapted to the RiverWise assessment format.

Along with the report (and/or during the assessment), the assessor can provide additional educational materials to the homeowner. For example, the Reedy Creek Coalition provides a packet that includes a watershed report card, a BayScapes guide, a rain barrel brochure, information on upcoming events, and additional printed resources. If there is an incentive program, the assessor should provide to the homeowner information regarding eligibility and the enrollment process (See Chapter 4 for Incentive Program information).

The report should be returned to homeowner within a week following the on-site assessment (ideally sooner – within a day or two, if using an iPad). It can be sent via email, if the homeowner's email address is available. If not, the report should be mailed or hand-delivered. It is important to offer to review the report with the homeowner and/or provide your contact information so the homeowner can contact you when questions arise.

Section 3.5: Assessment Follow Up



The assessor should follow up with the homeowner to answer any questions about the report recommendations and incentive program enrollment, if applicable. This can be done in person, by phone, or by email, preferably within a couple of weeks of the assessment (again, the sooner the better, in order to maintain the homeowner's interest). If the assessor assigned to the homeowner is not available to do follow-up, then another staff person or intern should conduct the follow-up, rather than delay it for too long.

A follow-up survey sent a few months later can provide valuable information regarding BMP implementation and behavior change (see Appendix 3C for a sample Post-Assessment survey). The RiverWise Communities follow-up survey focuses on the following:

- **The assessment process:** questions to determine the homeowner's satisfaction with the process, assessors, and information received.
- **The incentive program:** questions to determine the homeowner's satisfaction with the incentive program process as well as the "approved contractors" used to install the practices recommended under this program.
- **Knowledge and behavior change:** a variety of questions are asked to assess whether or not the homeowner's knowledge has increased regarding stormwater runoff issues, how to reduce runoff, and how to contribute to improving local watershed habitat. The homeowner's willingness to implement or continue to implement practices and change habits is also assessed.

Section 3.6: Tracking

It is important to track the assessment process in order to make sure each step is being completed in a timely manner. Gathering all the data into one tracking sheet can also help with managing the assessment assignments, reporting to funders, or publicizing the status of the program.

There are a variety of methods for tracking sign-ups, assessment appointments, report follow-ups, enrollment in incentive programs, etc. The two most commonly used methods are as follows:



1. Tracking cover sheet on every report/assessment copy
2. Excel or Access database (RiverWise example is in Appendix 3D)

Information that should be tracked includes:

- Owner's name, address, and contact information (telephone and email)
- Assessor(s)
- Watershed address
- Locality
- Dates for each step
 - Received sign-up and pre-assessment survey answers
 - Initial contact for appointment
 - On-site assessment date
 - Report sent to homeowner
 - Follow-up call/email
 - Homeowner enrolls in financial incentive program
- Paperwork received
- BMPs to implement
- Implementation date
- Post-assessment survey distributed and completed

Chapter 4

Chesapeake RiverWise Communities: Incentive Programs



Section 4.1: Types of Incentives

Section 4.2: Components of an Incentive Program

Section 4.3: Tips and Lessons Learned

Incentive programs are a great tool for promoting voluntary BMP implementation. These programs can be shaped in a variety of ways, including (but not limited to) the following:

- Providing the public with technical information and advice that's easy to understand
- Recognizing voluntary efforts
- Conducting audits or assessments and providing fr recommended actions
- Offering utility fee credits or partial payments for the installation of various practices

Federal and state governments have found that offering incentives in the form of partial payments to install practices is very effective. For example, the Virginia Agricultural Cost-Share Program is a successful incentive program which leverages resources offered by the federal and state governments to help local Soil and Water Conservation Districts encourage farmers to install practices on their farms that protect water quality, while helping farmers pay the costs of those practices. Virginia, Maryland, and Pennsylvania all have similar programs that leverage federal and state funds and are administered at the state level. For the purposes of the Chesapeake RiverWise Communities program, this chapter will discuss a variety of options for incentive programs that focus on reducing stormwater pollution on suburban-urban residential properties.

Section 4.1: Types of Incentives

This section will cover three main incentive types that can be effectively used in RiverWise communities programs: (1) Financial, (2) Recognition, and (3) Technical Assistance (see Appendix 4A for a list of programs in the Chesapeake Bay watershed). Financial-based programs provide cost-share or credits for implementing BMPs. Recognition-based programs often include providing flags, signs or placards to homeowners identifying their property as environmentally friendly, holding garden/block parties, and awarding discounts at local retailers. Technical assistance incentives include providing residential watershed assessments, landscape design pallets, and other resources. When developing an incentive program, the most important to know your target audience and what they need or what will provide the greatest benefit to them, in order to motivate them to take action.



Photo courtesy wsnnewsublishers.com

Financial Incentives

A cost-share program covers some of the costs of installing certain BMPs while, in most cases, the beneficiary property owner is responsible for the remaining costs. There are several different cost-share structures that can be used to implement a RiverWise Incentive Program, as outlined in Table 4.1 below.

Table 4.1. Incentive Program Cost-Share Options

Structure	Description	Example Program
Percentage	Example: Homeowner pays 75% of the cost, while the funding entity pays 25%.	Arlington Stormwater Wise, Chesapeake RiverWise Communities
Caps	Homeowner pays a nominal enrollment fee. Funding entity pays 100% of the costs associated with a BMP as long as it is under a certain cap. The cap could also be based on a per property basis.	RiverSmart Homes
\$ per sq ft treated	Funding entity pays a certain dollar amount per square foot of impervious surface that is treated. For example, \$1.25 per square foot of impervious treated for a rain garden.	RiverSmart Rebates
Materials only	Homeowner pays design and installation costs or does the design and installation themselves. The funding entity pays for materials via invoice from the contractor or invoice/reimbursement request from the property owner.	

Though this table provides a framework of varying cost-share structures, it is important to remember that any one of these examples may be adjusted to your program's specific needs and circumstances. Some structures can be combined; for example, Chesapeake RiverWise Communities provides a 75% cost-share of up to \$1,500 for installation of a rain garden, combining the percentage and cap structures. Teaming up with local partners, such as watershed groups or interested businesses can significantly drive down the property owner's final costs.

Many localities provide credits against stormwater utility fees for homeowners who implement BMPs to reduce and/or treat stormwater runoff. Check with your local government, Soil and Water Conservation District, or local watershed organization to find similar programs in your region. The following are links to some example programs from across the Chesapeake Bay watershed.

- Lynchburg, VA: <http://www.lyncburgva.gov/stormwater-credit-program>
- Richmond, VA: <http://www.richmondgov.com/PublicUtilities/StormwaterCredits.aspx>
- Charlottesville, VA: <http://www.charlottesville.org/Index.aspx?page=2308>
- DC - RiverSmart Rewards: <http://green.dc.gov/riversmartrewards>
- Montgomery County, MD: <http://www6.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/credits.asp>

Recognition Incentives

Recognizing homeowners for doing their part to restore and protect local waterways is another great incentive. Forms of recognition can be “member cards”, yard flags, and decals. Recognition can also be a way to promote the program and BMP implementation to neighbors and the rest of the community. As part of the recognition, one could provide discounts to local nurseries to encourage continued implementation of practices. Many nurseries will provide discounts on plants and even plant “palettes” if a customer provides information verifying that they are a participant. As you may increase sale by directing traffic to the nursery, they may offer wholesale or discounted prices to program participants.



Example of recognition programs include:

- RiverHero Homes - <http://www.jrava.org/what-we-do/river-hero/>
- Pearl Homes - <http://www.lynnhavenrivernow.org/Pearl-Homes.aspx>
- River Star Homes - <http://www.elizabethriver.org/RiverStars/default.aspx>

Technical Assistance

Some property owners may have the financial resources to implement a practice but do not have the technical expertise, so the process may seem overwhelming to them. Provision of technical assistance can be an incentive for these homeowners to bridge the gap and install BMPs. This type of assistance can come in the form of RiverWise Assessments (see Chapter 3), a service that provides valuable information and can improve the homeowner’s environmental awareness and lead to cost savings. Workshops focused on BMP design and installation and native plant selection are also valuable tools for homeowners. Design and/or construction assistance may be enough to gain a project commitment. Other homeowners may only need help in designing a landscaping feature and choosing a plant palette, so providing the homeowner with a BayScape plan and options for choosing appropriate plants can help as well.

Section 4.2: Components of an Incentive Program

Enrollment

Staying organized regarding homeowner enrollment and progress throughout the project is vital to the success of the program. Many components of enrollment will be covered within this section but, as technology changes, so should your approach.

In Chapter 1 (Engaging Communities), we discuss what form of marketing works well for specific types of people. Getting to know the community where you are working will help you choose the right tools to reach them.

Since location is so important when installing stormwater practices, it is useful to develop a strategic approach to enrollment well in advance. There are many ways to promote your program and increase enrollment, so knowing your constituents is the first step to success. Once you know the target audience you are trying to enroll in the program, you can customize your efforts to meet the audience’s needs.

Identifying BMP Locations – Watershed Protection Assessment *(See Chapter 3)*

For most financial incentive programs, a watershed protection assessment should be completed before enrollment. The assessment educates the homeowners, gives them an understanding of the various practices and where they may be located, and familiarizes them with your program. It will also provide recommendations regarding which BMPs are appropriate for their property. Chapter 3 provides complete guidance regarding assessment protocols.

Enrollment Forms

To enroll in the incentive program, whether it's a financial incentive or recognition program, you should get the homeowner to submit two forms to your organization to show a commitment to installing and maintaining the BMPs on the property. These forms include:

1. **Incentive Form.** For a financial incentive program, the enrollment form would include a list of the practices the program approves and payment information regarding enrollment fees. Consider charging a "buy-in" fee (or deductible) for the homeowner to install the stormwater BMPs on the property. This enrollment fee provides a couple of benefits:
 - It is a way to ensure an "investment" from the participants, which can have a positive impact regarding long term maintenance.
 - It can also generate revenue to support program administration.

For a recognition program, property owners should provide documentation of their BMP implementation (structural or behavioral BMPs). The necessary documentation (photos, site sketch, plans, etc.) is specified by the organization managing the recognition program.

2. **Partnership/maintenance agreement.** To ensure cooperation of the property owner and continued functionality of the structural BMP, a partnership and maintenance intent agreement must be signed by the property owner and submitted to your organization. A maintenance agreement is a contract between the property owner and your organization that spells out the responsibilities of all of the parties involved. Your organization should verify that the homeowner clearly understands all maintenance responsibilities and provides the necessary resources to accomplish them. This agreement should be reviewed carefully with the homeowners to make sure they understand their commitment and responsibilities. See Appendix 4B for an example agreement.

Project Selection

Before you begin marketing your incentive program, you must determine what the goals of your program are, and what resources are available to help reach these goals. Clearly-defined program goals will result in clearly-defined project selection criteria. If you know that you want to control stormwater volume, but have a limited amount of financial resources, then it will be more cost efficient to focus on runoff reduction practices (e.g., rainwater harvesting, bioretention/rain gardens, etc.) than removing impervious pavement and installing pervious paving systems; paving systems are not only expensive to install, but this option would require demolition funds as well and result in higher maintenance costs. Two common approaches to selecting projects are:

1. **First-Come/First-Served:** The easiest method is to allow all property owners with a property assessment to enroll in the financial incentive program on a first-come/first-serve basis. This method is best used where all potential projects are seen as equally beneficial to achieve your environmental goals.

2. **Rank and Prioritize:** This method may be more appropriate where your program values certain project types or geographic locations more than others or there are limited funds and high demand. After conducting the assessments, prioritize each project according to how well each contributes to the overall program goals, and then contact the homeowner to advise them that the property is eligible for the incentive program.

Prioritizing projects is not as easy as the first-come/first-serve method but it offers an approach that will result in the largest water quality improvement impact for your dollar. Suggested prioritization variables include (but are not limited to):

- Proximity to a stormwater conveyance system or surface water body
- Priority watersheds (such as those with impacted waters or identified in local restoration plans)
- Homeowner actions (invasive species removal, signing a pledge, etc.)
- Approximate runoff reduction
- Amount of impervious surface treated
- Slope severity
- Erosion potential
- Habitat improvement
- Neighborhood density

Your organization should choose the variables most important for your program and use them to rank each property. In the RiverWise Program, we take into account the property's contribution to stormwater pollution and wildlife habitat.



Maintenance Agreements

Maintenance of the installed practices is essential for long lasting, functional BMPs. If the BMP is not maintained, there is a strong likelihood that the BMP will fail to function, which can harm local water quality as well as cause other problems for the homeowner. For this reason, you should have the homeowner submit a signed maintenance agreement for the practices involved before any funds are allocated to the project (see enrollment forms). You should also provide a maintenance schedule and associated resource list that clearly explains the property owner's responsibilities. Maintenance agreements are the insurance policy for your water quality investment. Investing thousands of dollars in a permeable paver system that fails within a year is a poor allocation of funds, and could reflect poorly on your organization.

A maintenance agreement also gives the program organizers the legal ability to act if a property owner is negligent in maintaining the BMP(s). It is also important to develop a plan for what will happen if the maintenance agreement is not followed and you must take action. Other issues to address in the plan include how to provide continuity of responsibility when the property changes hands, and how far will your organization go to pursue a breach in the maintenance agreement. These kinds of concerns must be considered before the program becomes operational, and the specific considerations will be unique to each individual program.

The maintenance agreement will most likely be required by local government stormwater management programs, if the BMPs are reported to meet pollution reduction targets required by the states and the USEPA. For example, localities operating under Municipal Separate Storm

Sewer System (MS4) permits may have or be developing Stormwater Utility Programs that charge property owners a fee to cover the costs of cleaning up their stormwater. However, many localities are offering reductions in that fee if the property owner voluntarily reduces impervious surface or otherwise treating stormwater. However, they want evidence that the property owner is correctly maintaining the practices they've installed. These maintenance agreements will, therefore, be useful to the organization running the incentive program, to the homeowner, and to the locality. See Appendix 4B for the RiverWise Maintenance Agreement.

Plan Submission and Review

A plan and an estimated budget prepared by the homeowner or contractor should be submitted for review by the organization before project funding is awarded. The plan should show the BMP specifications and its location. Recommendations of practices covered under the financial incentive program should be provided during the assessment, so the plan preparers can take advantage of incentive opportunities.

To help simplify and streamline plan submission, recommend using a design guide for the BMPs. Design guides help designers and homeowners determine the correct sizing of the BMPs and standardize associated calculations for easier and more efficient review and reporting. The Center for Watershed Protection's "Residential Stormwater BMP Design Manual" ([<insert hyperlink>](#)) provides general design information for residential BMPs. Other sources of design guidance include the Chesapeake Stormwater Network's Homeowner Guide for a Bay-Friendly Property (www.chesapeakestormwater.net/2013/04/homeowner-bmp-guide) and the Virginia Conservation Assistance Program's Implementation and Design Manual (www.tjswcd.org/vcap.php). For our RiverWise program, we have also developed a homeowner rain garden calculation worksheet and standardized BayScapes design templates to help streamline the design process (*See Appendix 4D and Appendix 4E, respectively*).

It is very important to study these plans carefully, since improperly placing BMPs can lead to property damage, basement flooding, right-of-way disruptions, or other unintended consequences. Consider developing a plan review checklist and guidelines to ensure that plans are checked thoroughly, consistently, and efficiently.



When reviewing the plan, make sure all BMPs follow the applicable design guidelines. Most inconsistencies are spotted during the plan review process. Taking the time to review the plan, correct errors and educate the homeowner or contractor before any earthwork is done will avoid costly mistakes and problems during construction. Upon verifying that the plans are consistent with the program guidelines and requirements, your organization should provide written approval to schedule project implementation. This series of checks and confirmations will ensure program success.

Installation

Some incentive programs may require professional or certified contractors to install BMPs, while other programs may offer to finance the cost of materials but not labor.

Other financial incentives reward homeowners who install BMPs themselves. Some combination of these methods may be the winning formula but, in the end, the program requirements should be based on the complexity of the projects, funding available for contractors, installation demands of specific BMP types, and the abilities of the targeted audience. Your financial incentive program will determine which groups are ultimately responsible for installation.



1. Homeowner installation / “DIY”: The long term success of the installed BMPs is directly tied the continual maintenance and care of the practices. Homeowners who install their own practices are more likely to achieve a sense of personal connection to the project, leading to long term behavioral change and commitment to maintenance. Homeowner installation is much cheaper than hiring private contractors, which will save your program money and increase the number of BMPs your program can install. If you elect to incentivize “do-it-yourself” installations, your organization should provide technical assistance throughout the construction process. Some homeowners may opt to hire a contractor at their own expense, at which point your organization should provide recommendations. The downside to this method is a lack of quality control and installation timing and scheduling.

2. Volunteer / organizational installation: Some residential BMP programs are set up so that the sponsoring organization to installs the BMPs. In this case, financial incentives are often directed toward BMP installation materials. Recruiting volunteers and interns will help make this process quicker and provide a multitude of educational opportunities. From an organizations perspective, this method provides the best quality control of both the process and the BMP going in the ground. However, resource availability may be a limiting factor.

3. Professional contractor: Paying for a professional contractor to install the BMP(s) may cost your organization the most money, but it will save your organization time and result in professionally installed BMPs. Some contractors may provide reduced costs with assurance that your organization will be a returning customer for the duration of your program. However, you will want to do a reference check via other watershed/ conservation organizations in your area to determine which contractors have sufficient experience and whether, beyond word-of-mouth, they may have associated certifications to do this kind of work. Soon there will be a Chesapeake Bay Landscaping certification program (www.chesapeake-landscape.org/our-programs/landscape-professional-certificate).

While piloting the RiverWise program, we used two different methods to find and hire contractors, and we found both to be effective. One method requires contacting sources such as landscaper associations for lists of local contractors, and then inviting those contractors to a workshop. The workshop is an opportunity to inform potential contractors of our program’s process expectations. They can then decide if they want to be a “RiverWise contractor.” Those who agree are then placed on a list for assignment to enrolled homeowner properties. See Appendix 4F for the forms we used to enroll contractors in our program.

The second method we used was to issue a request for bids in order to find a qualified contractor who could install BMPs at a low cost. The selected contractor would then be used for all enrolled properties. While both methods worked, this latter method was used for a smaller number of installations, since only one contractor was used.

These three options must be weighed when choosing the financial incentives that are most appropriate. The incentives should reflect your organizational goals and available resources. Regardless of the approach, it is essential to help homeowners form a cognitive connection between their land and their watershed to ensure long term success of the project.

Inspection and Verification

Whether it is a homeowner installing a rain garden for the first time or a contractor for the fiftieth, it is important to check on the project as it is being installed. Confirm that financial incentives have been used appropriately. While installing stormwater BMPs is not overly technical, they do need to be installed according to plans and specifications. One mistake can lead to a failing BMP, resulting in additional costs for the property owner and the program organization, not to mention an unsatisfied homeowner and a tarnished reputation for the program. Once the plan has been approved, a qualified staff member or organization representative should inspect the project during and after installation. Requesting advanced notice of project installation at the time of plan approval is a good way to determine when to schedule these inspections. Once the final inspection has determined that everything was done properly, you can distribute any promised recognition incentives.

Long-term inspection and verification protocols are outlined in Chapter 5. These protocols will help determine the effectiveness of the incentives and success of your program. This follow-through will also provide insight regarding changes needed to improve the program.

Section 4.3: Tips and Lessons Learned

Program Education

The keys to a high functioning program are education, communication, and understanding. Both the homeowner and the contractor must know exactly what the financial incentive will cover and understand the environmental purpose of the project and the overall program. Preparing written guidelines will help educate program participants and provide records for future reference. A strong financial incentive structure and open communication with your participants will help streamline funding administration. Clearly inform homeowners about exactly how much they will contribute to installation costs, before they agree to participate. Please see the RiverWise Financial Incentive Program Guidance provided in Appendix 4C.

Contractor Tips

Installing the stormwater BMPs on a residential property can be very labor and time intensive. A trained contractor has the skills and equipment to design and install the practice correctly and efficiently; however, the cost of the project can go up dramatically, as compared to the cost of the homeowners installing the practice(s) themselves. Here are some tips to working efficiently and effectively with contractors:

- Issue a request for qualifications/bids to see what contractors are qualified and interested in doing the work.
- Contractors with a background in erosion and sediment control and/or stormwater management should be sought out, if affordable.
- Interview prospective contractors and be selective. Program participation is not for all contractors. Ask contractors why they want to be involved in your program. Work with contractors having shared interests with those of your program.
- Work with contractors who have a demonstrated history of doing similar work have a proven track record, and are trained and/or certified designers and installers of the

proposed BMPs.

- As necessary, train contractors on your program requirements and purpose.
- Schedule pre-construction meetings between the property owner and the contractor to explain the construction process, the homeowner responsibilities, and the contractor responsibilities. Someone from your organization should attend, if possible.
- Talk to your contractors frequently during project installations, and make site visits to see their work and ensure it is being done correctly.
- Ensure contractors are doing what the property owners want, consistent with their agreement with your organization, NOT simply what is good for the contractor's bottom-line.

For tips on training contractors, refer to Chapter 6.

Contractor Assignment

If necessary, your organization may assign specific properties and projects to different contractors. This can facilitate scheduling and the flow of the program during an installation-heavy period. If using this approach, project costs must be standardized between contractors so the homeowners are confident they are receiving a fair and equitable price from whichever contractor is providing services to them. It is up to your organization to determine these costs after inquiring among all the contractors you will be working with.

If contractor costs exceed the incentive cap, require the contractor to specify pricing before installation begins. Any difference between the cost and available funding will have to be paid by the homeowner, if they agree to do so. A homeowner should be willing to invest in their project; however, specific costs should be discussed at the very beginning to avoid cancellations late in the process that result in wasted resources for all parties involved.

Project Scheduling: Plantings



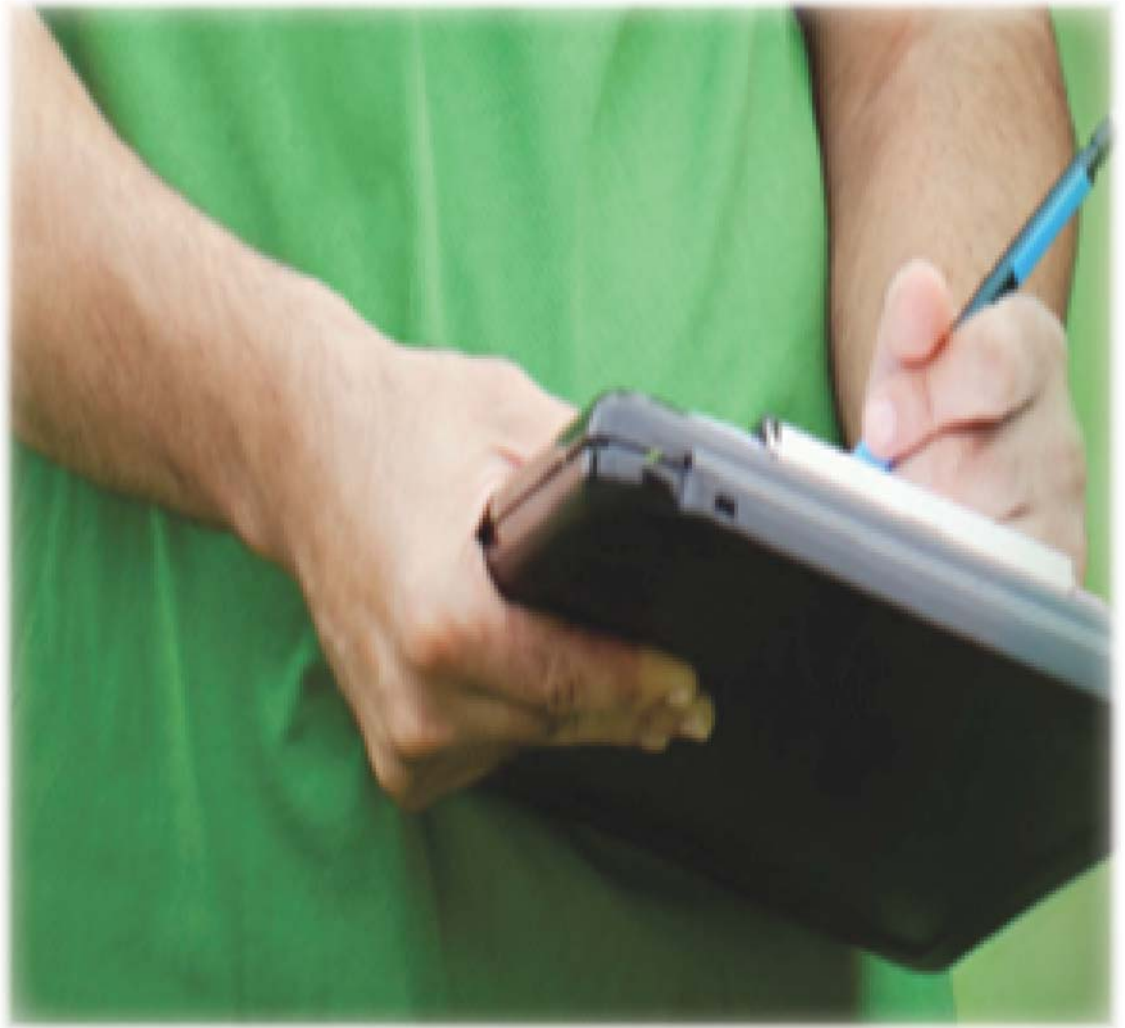
Photo courtesy VDOT

Most of the practices used on residential properties have planting materials as a design component of the BMP. The successful long-term function of the practices is directly related to the condition of these plants. For this reason it is best to schedule your project implementation and assessments seasonally. Although it is possible in the southern end of the Chesapeake Bay Watershed to plant in the winter, the plants have a better chance of survival if implementation occurs in the fall and early spring. Fall planting gives plants time to establish deeper root systems before the heat of their first summer, limiting the stress on the plant. Fall plantings may not provide instantaneous aesthetic value, but they will have a high rate of survival. The spring is also a great time to plant because folks are in

the mood to garden and many plants are flowering, showing the homeowner and neighborhood the beauty of the BMP. Avoid summer planting because the plants are most stressed by drought and heat at that time of year. If your project is funded by a grant, schedule your installation to during seasons that will help plants survive and thrive. Regardless of when plants are installed, it is necessary to water and care for them during the first full year. Be sure homeowners understand the care and watering needed to ensure the survival of their new plants.

Chapter 5

Chesapeake RiverWise Communities: Verification



- Section 5.1: Why Verify?
- Section 5.2: Verification Methods
- Section 5.3: Personnel
- Section 5.4: Frequency
- Section 5.5: Project and Tracking

Section 5.1: Why Verify?

Remember that the ultimate goal behind implementing homeowner BMP programs is to improve local water quality and watershed health. Ensuring that the practices and behavior changes produced as a result of your program are maintained over time will validate your organization's efforts and be useful in securing funding for future efforts. BMP performance verifications confirm that the BMPs have been properly installed and continue to function correctly. There are a number of methods to verify BMPs. The technique used for your program will depend on your organization's available resources and the outcome(s) you desire from the verification process.

There are two verifications associated with the acceptance, long-term functionality, and crediting of residential BMPs. The test is whether or not a BMP passes a list of visual indicators shown in Tables 5.1-5.10. The two types of performance verifications associated with residential stormwater BMPs are:

BMP Initial Verification: This verification is performed to initially verify that the BMP was installed correctly, is in the correct location, meets or exceeds the BMP design standards, and will function hydraulically as designed. Inspection should occur shortly after installation is complete, and ideally during a runoff producing rain event. This method confirms that the BMP functions correctly.



BMP Performance Verification: This verification is performed periodically to ensure that the BMP still exists and is still providing the pollutant reduction it was originally designed to achieve. Although the average frequency for this inspection is 5 years, the frequency can range greatly and is better described in section 5.4 of this chapter.

There are several reasons why a residential stormwater BMP needs to be verified. If a locality or watershed organization offered incentive money for the BMP installation, they need to confirm that the proper practice was installed in the correct location, per the design, and is functioning properly before the incentive reimbursement is provided to the property owner. The entity financing the project needs to verify that their funding was used consistent with the funding agreement.

Verification is also necessary in localities that require a stormwater utility fee but offer credits (fee reductions) for BMP projects. Programs may offer utility fee credits to property owners for reducing and/or treating the stormwater on their property. These projects help localities meet their state and federal stormwater permit requirements. To receive credits, or a reduction in the utility fee, the BMP installed must be verified and reported to the locality to ensure it meets the BMP design and installation specifications and continues to function as designed, as along with any other requirements the locality mandates.

Pollution Reduction Accounting Verification: BMPs are also verified to measure estimated pollution load reductions. The BMPs listed in this chapter have an assigned pollutant reduction. Federal, state, and local governments are interested in getting credit for the amount of pollutant load reduction provided by the practice. To do that, the government entity needs to verify that the BMP installed meets their requirements to receive a reduction credit and that the BMPs are maintained and functioning correctly over time. This verification procedure is shown in figure 5.1 below.

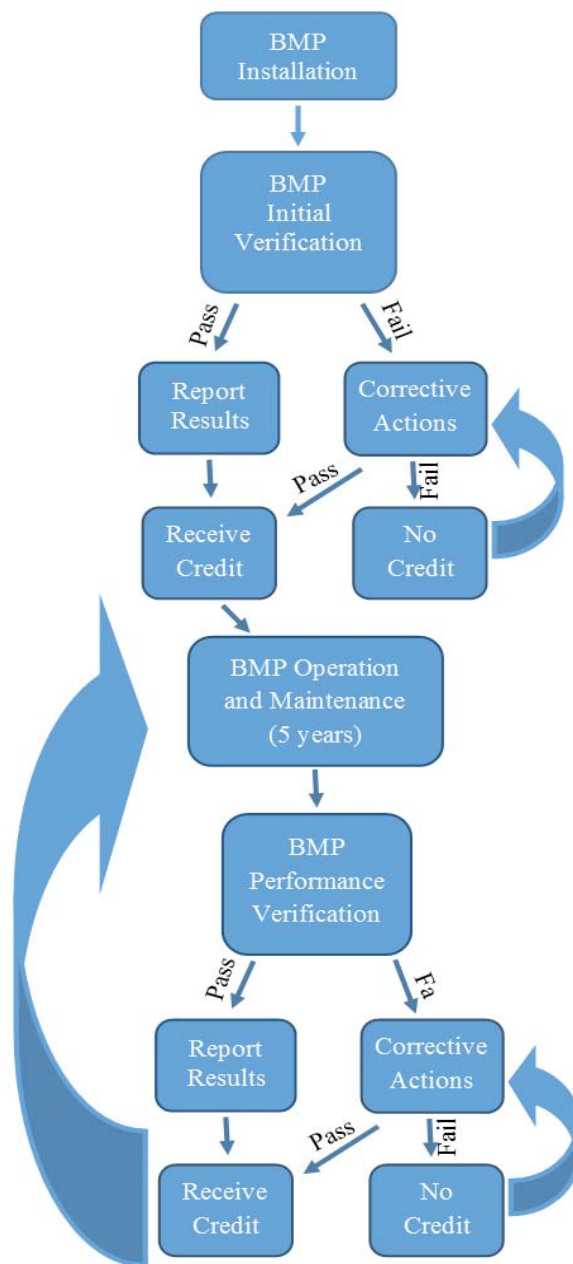


Figure 5.1. Residential Stormwater BMP verification process.

If the practice meets the verification minimum standards during the BMP’s Initial Verification, the locality can report the BMP and its associated pollutant removals for credit toward state/ local Chesapeake Bay TMDL pollution reduction targets and MS4 permit requirements. Some of the information required for reporting may include the BMP classification, geographic location, contributing drainage area, and year of installation. (USWG, “Final Recommended Guidance for Verification of Urban Stormwater BMPs,” January 6, 2014).

After the BMP is reported it assumes a pollutant load reduction and is maintained until the BMP Performance Verification is conducted after 5 years (or perhaps less, depending on the locally established schedule). During the BMP Performance Verification, if the BMP meets the visual indicators showing it is still achieving the prescribed pollutant removal, the information is then documented by the watershed organization or locality and may be transmitted to the state

stormwater BMP reporting entity. This information can then be submitted to the Chesapeake Bay Program for credit toward implementing practices that help the state meet TMDL Phase II Watershed Implementation Plan requirements. For more information on the Chesapeake Bay TMDL and related requirements, visit the following web link:

<http://www.epa.gov/chesapeakebaytmdl/>.

If the BMP Performance Verification determines that the BMP is no longer functioning per design and removing the prescribed pollutant load, the inspector should provide the owner directions for necessary maintenance or rehabilitation of the BMP. A reasonable time-frame should be assigned to accomplish the corrective action. Following the corrective action, an additional BMP Performance Verification will document that the BMP is again functioning per design, and the BMP can continue to receive the load reduction or credit originally assigned. If corrective action is not taken in the given time-frame, the BMP forfeits the assigned pollutant reduction credit the inspection results are reported to the correct reporting entity. Corrective action at a later date may be reported, and the BMP may once again receive the credit.

Section 5.2: Verification Methods

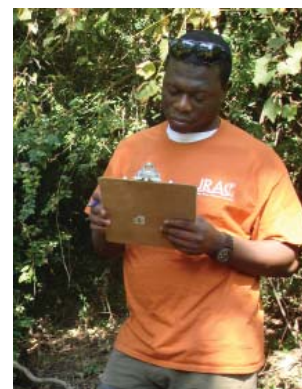


The verification methods used will depend on your program needs. For instance, a locality seeking stormwater reduction credits in the Chesapeake Bay Program Model may desire a more thorough verification process that may include on-site inspections during construction, photo documentation, a BMP Initial Verification, and periodic BMP Performance Verifications over the life of the BMP. Alternatively, a non-profit with fewer resources, simply looking to improve local water quality, may only require post-installation photos with specific quantifiable measurements included. Regardless of your method, it is important to verify that a BMP was installed correctly and that the information gathered/reported is consistent from project to project.

BMP inspection and verification can be done by anyone with proper training. The remainder of this section describes the main criteria to be checked for various homeowner BMPs following installation. It is best to complete the post-construction BMP Initial Verification following a storm event, so any functional problems can be observed with the BMP under operational conditions.

As you verify each practice, record the Initial Verification and Performance Verification processes for reporting and tracking purposes. The criteria for each BMP can be organized as a form to be completed by an inspector or volunteer, enabling a quick and thorough inspection. Chesapeake RiverWise Communities has created a number of verification forms that can be filled out on a tablet computer or as hard copy forms (Appendix 5A provides an example).

There are many examples of BMP Performance Verification forms in the Bay region. In some cases a photograph with visual indicators present will be enough to verify the BMP is still in place and functioning. These photos should be of the visual indicators listed below and should also include a date and location. It can be useful to use a whiteboard within the photograph to document site specifics. It is always helpful to take photos of the given BMP from the same distance and angle over time to give perspective and show BMP transformations.



The verification process should answer the following questions (USWG, "Final Recommended Guidance for Verification of Urban Stormwater BMPs," January 6, 2014):

- Does the practice still exist? If it still exists, does it still capture runoff from the intended drainage area and land condition?
- Does the practice still operate to reduce runoff as originally designed?
- Does the BMP's maintained condition still support its pollutant reduction function?



We recommend that you customize the verification criteria to match your specific program needs. For example, you may need to show proof of soil amendments under the BayScape visual indicator criteria if the information is used by a locality and soil amendments are not required. Alternatively, if your program offers financial incentives like Chesapeake RiverWise Communities, and the program funds soil amendments, then inspection should verify that soil amendments were incorporated correctly.

Programs with sufficient resources may be able to send a volunteer, intern, or paid employee to continually verify functionality. Continued, periodic inspection is the preferred method, since this provides a greater level of trust in the data collected. In doing this, the personnel can follow the verification process described in Section 5.2 above, in addition to verifying in the field that the practices are being properly maintained by caring for vegetation, removing of trash and debris, unclogging infiltration practices, and addressing any other problems that arise.

If the on-site verification method is used, contact the homeowner to request access to the property. Access rights can be inserted into the signed maintenance agreement, but contacting the homeowner before a site visit is always an appropriate courtesy and is strongly recommended.



Verification Tools and Equipment

Survey equipment

Measuring tape or wheel

Ruler and/or yard stick

Shovel

White board and dry erase

Digital camera

Plant ID sheet

Site plan/design and plant list



BMP Initial Verification Visual Indicators

Table 5.1. BMP Initial Verification Visual Indicators: Trees & Shrubs

Trees and Woody Shrubs		
Visual Indicator	Description	
1 Species	Verify the trees and shrubs installed are the same variety shown on the plan.	
2 Quantity	The number of plants should match the design and plant order.	
3 Size	Check the tree or shrub in diameter, height, or pot size (gallons) to determine if the appropriate sizes of trees and shrubs were planted.	
4 Location	Are the plants in the location specified on the plans?	

Tree & Woody Shrub VISUAL INDICATORS #'s 1, 2, 3, and 4 present.



Table 5.2. BMP Initial Verification Visual Indicators: BayScape

BayScape (Conservation Landscaping)		
#	Visual Indicator	Description
1	Plant species	Confirm the variety of plants specified within the planting scheme were planted (many programs may require that native plants are used).
2	Plant quantity	Count the number and variety of plants within the practice. In some instances it may be appropriate to check plant survival at the end of the growing season.
3	Plant size	Determine if the plants used within the BayScape are representative of the size plant specified within the design criteria. Pot size, height, diameter and caliper are all used to determine size.
4	Area(ft ²) of the bed	Measure the square footage of the BayScape.
5	Bed location	Verify the Bayscape is located in the area agreed upon.
6	Mulch layer depth	Confirm a mulch layer of 1"-3" is present.
7	Depth of bed (if applicable)	BayScapes have the capability to remove a significant amount of runoff from overland flow. Sinking a BayScape a few inches can result in increased runoff reduction.
8	Soil amendments present (if applicable)	If soil amendments were specified within a plan, are there signs that amendments were added? It may be easiest to ask for a receipt verifying purchase of the amendments.

BayScape VISUAL INDICATORS #'s 1, 2, 3, 4, 5, and 6 present.

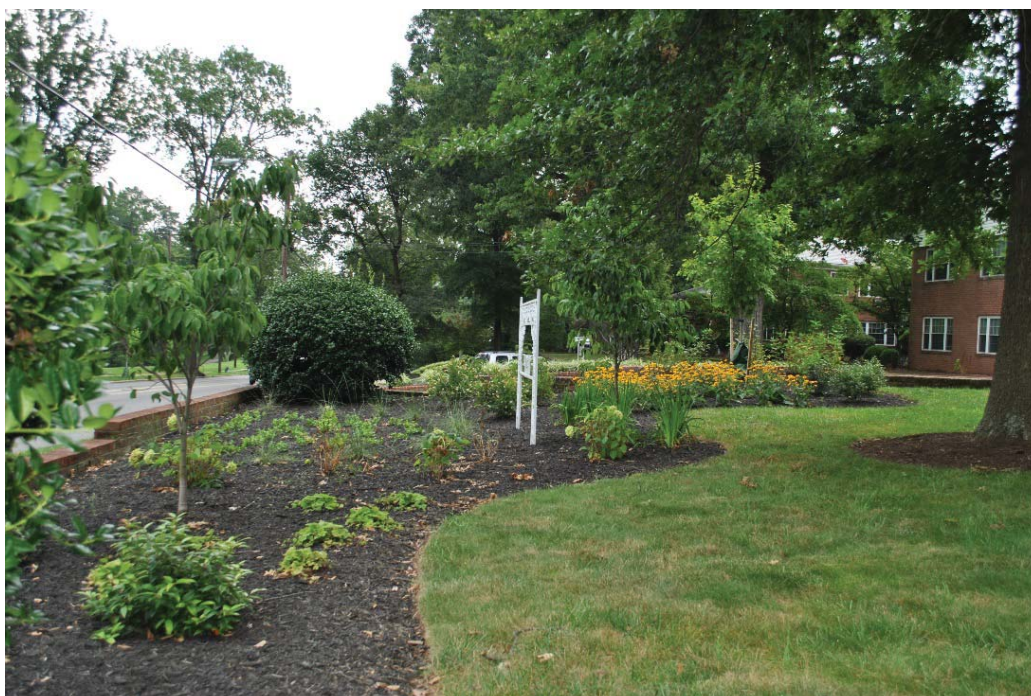


Table 5.3. BMP Initial Verification Visual Indicators: Rain Barrel

Rain Barrels		
#	Visual Indicator	Description
1	Quantity & Location	Verify that the rain barrels specified on the plan are located at the correct downspouts.
2	Connected & Functional	Check the connection to determine if each barrel is connected, includes all of the parts, and is properly functioning.
3	Size	Rain barrels can fill up quickly. This can be determined by the size of the rain barrel and roof drainage area to it. Verify the volume of the system.
4	Functional overflow	Overflow to a vegetated area away from the home's foundation should be in place and functioning.

*Rain barrels should only be verified or inspected during the growing season. In most cases the rain barrel should be disconnected before the first frost to prevent winter damage.

Rain Barrel VISUAL INDICATORS #'s 1, 2, 3, and 4 present.



Source: Montgomery County, Rainscapes <http://www6.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/rainscapes.asp>

**Table 5.4. BMP Initial Verification Visual Indicators:
Permeable Pavement/Pavers**

Permeable Pavement/Pavers (PP)	
Visual Indicator	Description
1 Size and location	Verify that the pre-existing materials at the specified location were removed and the new PP system (ft ²) size is correct.
2 Clean water connection	Determine if downspout(s) specified in the plan are connected correctly to the PP system.
3 Depth of system*	Verify through on-site inspection or photos that the excavated depth of the PP system meets design standards.
4 Base stone depth and *composition	Check the size of washed stone and stone depth for each layer of the stone reservoir.
5 Pavement/Paver material	Check the surface materials used to determine if the correct material was used and installed correctly.
6 Paver gap width (if applicable)	Measure the width between the paver gaps to verify the pavers are spaced correctly.
7 Flow Test	Run a flow test or “flood” the system to verify the PP system infiltrates water effectively.

**If the inspector or volunteer is unable to be available during construction of the permeable pavement/paver system, the buried stone layers and depths may be verified by photo documentation.*

Permeable Pavers VISUAL INDICATORS #'s 1, 3.



Permeable Pavers VISUAL INDICATORS #'s 1, 5, 6. Permeable Pavers VISUAL INDICATORS # 7.



Source: CSN, Bioretention
Illustrated June 30, 2013

Table 5.5. BMP Initial Verification Visual Indicators: Rain Garden

Rain Gardens (RG)		
#	Visual Indicator	Description
1	RG Location	Verify that the RG location is correct as described in the plan and will receive runoff from the intended contributing drainage area.
2	Soil media depth	It is recommended to check the depth of the RG before the soil media is installed. Also check the soil media depth of the RG to ensure it meets the required design criteria.
3	Size (Surface Area or SA)	The SA of the rain garden is determined based on the area draining to the rain garden. It is important to confirm the correct RG SA was installed, as it will determine the treatment volume and pollutant removal of the practice.
4	Ponding Depth	Confirm the ponding area of the RG by measuring the height between the top of the mulch layer or surface of the RG and the lowest point of discharge from the RG.
5	Side slope, mulch, and media erosion	After monitoring the performance of the RG, inspect the side slopes, mulch, and soil media for erosion. If erosion is found initially, it most likely will not stop on its own and no solution to the erosion may be needed.
6	Soil media composition	Verificaton of the RG soil media can be completed in a number of ways, based on the programmatic preference: <ol style="list-style-type: none"> 1. Check receipts of materials used in the soil media. 2. Take a soil sample. 3. Conduct an on-site visual and texture analysis.
7	Mulch layer	Confirm a 1"-3" mulch depth within the RG.
8	Overflow	Verify that an overflow is in place and is constructed per the design.
9	Inlet	Verify the inlet to the RG is stabilized with the planned material (stone, sod, etc.), is in the correct location and is not eroding.
10	Plant species, size, and quantity.	Please use Visual Indicators 1, 2 and 3 in the BayScape table above.
11	Piping size and placement ¹	Confirm the correct type and size pipes are/were installed correctly per the plan.
12	Stone sub-base ²	Verify that the stone sub-base layer was installed with clean stone of the correct size at the required depth.
13	As-built completion	It may be required to complete an as-built plan after completion of the RG. See the RG as-built worksheet in Section 5.5 below
14	Standing Water	Check two days after a large rain event to ensure that no standing water is present in the RG.

¹If the Rain Garden includes an underdrain or piping system bringing water to the rain garden.

²Only applicable if the rain garden is designed to include a stone layer.

NOTES: Either conduct an inundation test, or wait until after the first runoff producing rain event to conduct a final inspection or performance verification. Also, if the inspector or volunteer is unable to visit the-site for verification, photos containing relevant information can be submitted as a substitute.

BMP Initial Verification Visual Indicators
Rain Garden VISUAL INDICATORS # 9 present.
Rain Garden VISUAL INDICATORS #'s 2, 3, and 11 present.



BMP Initial Verification Visual Indicators
Rain Garden VISUAL INDICATORS #'s 1, 3, 4, 5, 7, 8, 9, and 10.
Rain Garden VISUAL INDICATORS # 14.



Source: CSN, Bioretention Illustrated June 30, 2013.

BMP Performance Verification Visual Indicators

Table 5.6. BMP Performance Verification Visual Indicators: Tree and Woody Shrubs

Trees and Woody Shrubs	
Visual Indicator	Description
1 Species	Verify the trees and shrubs installed are the same varieties shown on the plan.
2 Quantity	The number of plants should match the design and plant order.

Trees and Woody Shrubs Visual Indicators #'s 1 and 2 present.



Table 5.7. BMP Performance Verification Visual Indicators: BayScape

BayScape	
Visual Indicator	Description
1 Plant species	Confirm the variety of plants specified within the planting scheme were planted (many programs may require that native plants are used).
2 Condition, Cover and maintenance	Are the plants being maintained, thinned and pruned? Do they provide the cover originally planned for?
3 Area(ft ²) of the bed	Measure the square footage of the BayScape.
4 Bed location	Verify the Bayscape is located in the area agreed upon.
5 Mulch layer depth	Confirm a mulch layer of 1"-3" is present.
6 Depth of bed (if applicable)	Verify that the depth of the bed has not been filled in and still exists.

BayScape VI #'s 1, 2, 3, 4, and 5.



Table 5.8. BMP Performance Verification Visual Indicators: Rain Barrel

Rain Barrel		
Visual Indicator	Description	
1 Quantity & Location	Verify that the correct number of rain barrels is connected at the correct downspouts, as specified.	
2 Connected & Functional	Check the connection to determine if it is installed correctly, includes all of the parts, and is properly functioning.	
3 Size	Verify the volume of the system.	
4 Functional overflow	Verify that an overflow to a vegetated area away from the home's foundation is in place and functioning properly.	

NOTE: Rain barrels should only be verified or inspected during the growing season. The rain barrels should be disconnected before the first frost to prevent winter damage.

Rain Barrel VISUAL INDICATORS #'s 1, 2, 3, and 4.



Table 5.9. BMP Performance Verification Visual Indicators: Permeable Pavement/Pavers

Permeable Pavement/Pavers (PP)		
#	Visual Indicator	Description
1	Size and location	Verify that the installed materials still exist in the specified location and the PP system (ft ²) size is correct.
2	Clean water connection	Determine if the downspout(s) connection is still in place and maintained.
3	Pavement/Paver material replacement	If there is damage to the surface materials, has that damage been repaired?
4	Maintenance	Is the practice being maintained per the maintenance schedule provided?
5	Flow Test	Conduct a flow test or "flood" the system to verify the PP system infiltrates water effectively.
6	Ponding	Check for ponding on the surface of the system (an indication of clogging).

Permeable Pavers VISUAL INDICATORS #'s 1, 2, 3, 4, and 6.



Permeable Pavers VISUAL INDICATORS # 3. # 4.



CSN, Bioretention Illustrated June 30, 2013

Table 5.10. BMP Performance Verification Visual Indicators-Rain Garden

Rain Gardens (RG)		
#	Visual Indicator	Description
1	Size and location	Is the rain garden still in place with the designed surface area?
2	Caking	Is sediment caking on the surface, restricting infiltration?
3	Ponding Depth	Verify that the ponding depth meets the design criteria and has not been filled.
4	Side slope, mulch, and media erosion	Check the RG for erosion and take appropriate measures to stabilize the practice.
5	Mulch layer	Confirm that a 1"-3" mulch depth exists and is not clogged with sediment or subject to sediment "caking"
6	Overflow	Verify that an overflow is in place and is constructed per the design.
7	Inlet	Verify the inlet to the RG is stabilized and the RG is still positioned to collect runoff from the intended contributing drainage area.
8	Condition, Cover and maintenance	Are the plants being maintained, thinned and pruned? Do they provide the cover originally planned for?
9	Downspout connection and piping	Confirm that the downspouts are still directing the intended drainage to the RG and the associated piping, and underdrain are still in place and functional.
10	As-built completion	It may be required to complete an as-built during the periodic verification process.

Rain Garden VISUAL INDICATORS # 2, 8 Rain Garden VISUAL INDICATORS # 2, 5, 8.



CSN, Bioretention Illustrated, July 30, 2013

Section 5.3. Personnel

Another important component of the verification process is the personnel and resources required to conduct the work. Some programs may use volunteers such as Master Gardeners to verify the BMPs, while others may have sufficient staff resources to do the job. Both personnel methods have advantages and disadvantages, and the choice should be determined by organizational resources available.

At this time there is no Chesapeake Bay watershed-wide training certification that qualifies an individual to verify residential BMPs. There are a number of local and watershed training programs that cover what is necessary to conduct the verification. Those training programs include:

- Chesapeake RiverWise Communities, Contractor and Inspector Training
- Watershed Stewards Academy
- Virginia DEQ Stormwater Management Inspector Certification
(<http://www.deq.virginia.gov/ConnectWithDEQ/TrainingCertification.aspx>)

Any of these training programs provide verifiers with the tools and information to take reliable measurements and collect consistent data. Your organization may conduct additional training to be confident that the Performance Verifications will meet both quality assurance and quality control (QA/QC) standards.

Many volunteers are highly skilled, retired engineers, landscape architects, and environmental scientists, or have significant knowledge of natural resources and make excellent candidates to conduct thorough inspections. With quality training and oversight, volunteers can be an excellent resource for a program. Other programs may rely on paid employees to conduct verifications, providing a higher level of accountability, trust, and assurance. Often, the best solution may be a combination of both. One paid employee can oversee and train a workforce of experienced volunteers and, together, they can accomplish much more than working independently.

Section 5.4. Frequency



BMP verification is not a one-time task. Following an initial inspection during construction and the BMP Initial Verification (discussed in Section 5.2 of this chapter) the BMP will need to be monitored and maintained for the life of the practice. After a certain number of years, depending on the purpose of the practice, the BMP will need to be verified routinely. If at some point the BMP is not verified or is observed to be not functioning correctly, the credited pollutant reduction may be nullified (refer to Figure 5.1).

Every 3-10 years (a maximum of 5 is recommended) each BMP should undergo a BMP Performance Verification. The frequency of verification will depend on the program. A Phase 1 MS4 community may be required to report the BMP verification every 5 years. On the other hand, a local watershed group may want to conduct the Performance Verification every year or may be able to do so only every ten years. First determine why you are conducting the verification, and then you can best determine what frequency is most appropriate and allocate your resources accordingly. Make sure to check with your locality for up-to-date approved

methods and guidance for BMP verification. Also, you can visit the Chesapeake Stormwater Network's Urban Stormwater Work Group web page for the latest information about BMP credits and verification (see www.chesapeakestormwater.net/urban-stormwater-workgroup)

Section 5.5. Project Tracking



Stormwater runoff from private properties remains one of the most difficult and expensive sources of Chesapeake Bay pollution to control. Small-scale residential stormwater BMPs are most often voluntarily installed by property owners but are rarely effectively tracked at the local level by county and/or municipal agencies. Under the current Chesapeake Bay TMDL, water quality treatment practices must be counted and tracked to receive a nutrient and sediment reduction credit. However, few incentives have been provided to support investment in these small-scale, non-permitted stormwater BMPs. The ability to count, track, certify and aggregate these BMPs will validate additional quantifiable water quality benefits across the watershed.

In an effort to promote greater engagement in Bay restoration by property owners, the Chesapeake Bay Program's Urban Stormwater Work Group approved a streamlined verification procedure for these non-permitted BMPs. The basic premise is to simplify the property owner's BMP reporting process, while still retaining a high degree of quality assurance regarding the installation of each BMP being certified by a designated third party or a local government following installation. The Stormwater Management and Restoration Tracker (SMART), developed by the University of Maryland Sea Grant Extension Watershed Protection and Restoration Program and the Center for GIS at Towson University, provides the needed mechanisms to track, certify, and report progress on these small-scale, non-permitted BMPs.

SMART is an interactive, web-based mapping, tracking and reporting tool that provides a credible and certifiable way to account for 15 small-scale practices that can be implemented by property owners (see www.extension.umd.edu/watershed/smart-tool). The tool allows individuals to upload their BMP data to a local website, where the data are tracked, checked and certified by trained volunteers. SMART incorporates all approved nutrient and sediment reduction information provided by the Chesapeake Bay Program's Water Quality Goal Implementation Team, in order to calculate and report individual and aggregate reductions for each BMP tracked. This reporting ability allows for the adoption of small-scale BMPs into the formal accounting of nutrient and sediment reductions of local TMDL/Phase II WIP, NPDES and MS4 permit requirements and could potentially result in considerable quantifiable cost-savings for local governments.

While small-scale stormwater BMPs may only have a minimal effects on nitrogen, phosphorus and sediment pollution, total pollution reductions can become substantial when these actions are multiplied over hundreds or thousands of properties. SMART empowers property owners to report stormwater practices and reinforces positive behaviors by providing a forum for their beneficial actions. When accessed, the web-based map depicts the many stormwater BMPs being installed in neighborhoods and across the state. Additionally, it provides images and information about installed stormwater practices, to educate and inspire property owners without stormwater BMPs on their property to take action along with their neighbors.

Chapter 6

Chesapeake RiverWise Communities: Delivering a Successful Program through Training



Section 6.1: Program Roles

Section 6.2: Training Program Components

Subsection 6.2.A: Classroom

Subsection 6.2.B: Field



The key to a successful voluntary stormwater BMP program is having a team of well-trained assessors, designers, inspectors, installers, program managers, and other individuals who work toward the program's objectives. As stormwater BMP retrofitting is becoming more commonplace and nutrient reduction credits are being allocated to BMPs at the residential scale, the demand for a unique kind of training (beyond state level regulatory training) is increasing. Local government officials, landscape designers and contractors, volunteers, non-profit employees and others will all need to be trained for this growing activity.

This chapter will discuss the elements we have found necessary to effectively train those involved in the implementation of your homeowner stormwater BMP program. Every team member must know how the program is structured and the core elements of each component, even though their individual roles and expertise within the program will vary. Each member of the program team should be trained to carry out tasks efficiently and effectively to ensure consistency of program execution.

Section 6.1 Program Roles

The distribution of responsibility for each role within the program will vary from one program to another. Some programs may have different individuals leading each specific component of the program, while other programs may rely on one individual to guide all efforts and delegate when needed. The program workloads can be broken into four specific roles:

Program Administrator

The program administrator (often called the project "lead") is typically a Program Manager for a non-profit, local government, watershed organization, Soil & Water Conservation District, or other interested entity. This person will wear a number of hats within the program, depending on the size of the organization and program team. The program administrator understands the program's structure and carries out (or instructs others to carry out) numerous tasks, including but not limited to the following:

- Managing financial incentive details;
- Delivering payments;
- Scheduling assessments (this responsibility can be shared with the assessor);
- Tracking stormwater nutrient and volume reductions;
- Conducting training sessions; and
- Reviewing plans, etc.

The program administrator must address any new or unfulfilled responsibilities presented while the program is underway, to keep things running smoothly.

Assessor

A volunteer, a non-profit or government employee, or anyone else with sufficient training may serve as an assessor for the program. The assessor's main roles include the following:

- Conducting the on-site assessment;
- Making BMP recommendations;
- Helping to determine BMP sizing requirements;
- Educating property owners; and
- Scheduling assessments, and maintaining the assessment database.

Designer/Installer

The designer/installer group may consist of landscape architects, engineers, landscape contractors, work force training groups, homeowners, watershed organization employees, or other individuals trained in BMP construction and design. This group must know how to conduct a project from concept to a finished, functional stormwater BMP. Provide general program background information to this group, along with specific training on BMP function, placement, design, installation, and maintenance.

Inspector/Verifier

The inspectors/verifiers will most likely be local government or watershed organization employees, but may also be third parties and volunteers. This role focuses on the back end of the project. They need to know exactly how the BMPs function, how they are designed, and how they should be installed and maintained. Experience with the materials used in the BMPs, phasing of construction, and the protocols needed to diagnose BMP failure and recommend solutions are also important for effectively fulfilling this role.

Section 6.2: Training Program Components

Depending on the complexity of your program, several sessions may be needed to train your partners about programmatic needs, processes, and requirements. The audience will vary dramatically when it comes to their levels of experience and their various program roles (as outlined in the previous section). To more effectively train staff and partners, the RiverWise Communities training program is delivered in two components targeting four specific groups, based on the program roles described in the previous sections.

The first training component is “classroom” training, focusing on providing knowledge, skills and tools needed to succeed in the program. The second component is “in the field” training. This should be devoted to showing trainees exactly what it takes to get the job done. The two components are equally important, since some individuals thrive in a “classroom” setting while others learn best through “hands-on” experience in the field.

When conducting training sessions, be sure to consider your audience and the program roles they fill, and adjust the lessons you are conveying for the specific audience at hand. For example, if you are presenting BMP design to an assessor, your objective is to emphasize details that would determine if a BMP is right for a specific area (e.g., sizing, depth requirements, slope, soil type, etc.). Your assessors should be able to recommend proper size and location of BMPs on homeowners’ properties. The same topic, when presented to a group of designers and installers, would be expanded upon to include specific design and construction criteria. Emphasize training topics appropriate for the audience’s program roles to ensure that the audience stays engaged and is not overwhelmed with unnecessary information.

The following training program is consistent in structure, regardless of the audience (assessor, inspector/verifier, and designer/installer). Though subject matter should not change, the level of depth for each topic should be adjusted based on the specific audience.

Classroom Presentations

Computer presentation programs such as PowerPoint and Prezi offer a great way to deliver your message in a concise, organized, and engaging manner. Usually this component of the training can be completed in 4-6 hours. This time is used to give your trainees the knowledge base to be successful in the field. The RiverWise Communities training program focuses on five elements of a successful program, as follows:

1. Organization and Program Background
2. Hydrology
3. BMPs
4. Program Implementation
5. Assessment

1. Organization and Program Background

It is important to communicate your organization's mission. Participants may not fully understand your mission or how the program fits into larger organizational goals, such as watershed nutrient reduction goals identified in the locality's Watershed Implementation Plans (WIP) that address the Chesapeake Bay TMDL.

Trainees should be inspired to participate in the program regardless of their role. Defining why the program exists, why it is important to your organization and the community, and why the attendees are essential to its success will motivate participation in the program. After you have explained the "why" to the attendees, then you can address "how" they will get the job done and "what" they will have to do to be successful.

2. Hydrology

The second presentation segment focuses on hydrology and the importance of stormwater BMPs for water quality and stormwater management. Terminology and definitions that support the BMP section of the training should be provided here. If the community has any regionally-specific hydrological characteristics, such as karst areas or combined sewer overflows, this is an ideal opportunity to explain them. Define all relevant terms and spell out acronyms for your audience, to make sure they fully understand the topic.

Stormwater volume reduction, pollution removal, and other factors contributing to stormwater management issues should be emphasized, so the audience fully understands the purpose of and need for BMPs. Photos and maps of locally impacted or impaired streams should be included to support your message. It is important to provide an introduction to basic hydrologic principles such as peak flow rate and pre-development vs. post-development impacts. Educating your audience about these basic principles strengthens your message about "why" your community needs to better manage stormwater runoff and establishes a solid foundation for the BMP training to follow.

3. Stormwater BMPs

Whereas the Organization/Program Background and Hydrology sections may not change much between audiences, the level of detail provided in the BMP section likely will. Some programs may choose to use the same information for all of the audience groups for consistency, though as previously stated, a customized approach is often a more effective training method. There are five sections covered within the BMP segment of the training, as follows:

- Function;
- Placement;
- Design;

- Installation; and
- Maintenance

BMPs should be presented one at a time, with all of the associated criteria covered. Once the five sections are covered for one BMP (e.g., rain barrel), move onto the next BMP.

BMP Function

Demonstrate what the BMP is, why it is important, and how it functions. Every participant in the program should have this basic knowledge as a foundation for their work. Cover general information, such as how the BMP provides habitat, controls stormwater volume and velocity, and also reduces stormwater pollution.

Key Lessons

Why: Illustrate why the BMP is essential. Does it remove impervious surfaces? Maybe it filters water or even provides habitat.

How: What makes this BMP a good choice, and how does it collect water? Describe how the BMP provides a benefit.

Variations: Show different versions of the BMP and describe what sets them apart. Photos and videos of functioning BMPs will help convey your message.

BMP Placement

BMP placement is one of the most important components of the presentation for the assessor, designer, and installer audiences. Proper placement is critical for the BMP to function properly, achieve a positive environmental impact, and eliminate any potential liability for property damage. Identifying proper BMP placement is perhaps the most important project role for the assessor. Proper BMP placement should be covered in detail for assessors and designers, and this section should address safety considerations, long-term implications, offsets, environmental concerns, and hydrologic effectiveness.

Key Lessons

Planning: Specify how to plan for long-term success and understand the unique restrictions of a BMP. For example, show pictures of the progressive growth of a BayScape and emphasize avoiding practices that will have long-term negative implications (e.g. planting trees under utility lines or installing a rain garden next to a foundation or retaining wall).

Placement: BMPs should be placed where they have the greatest environmental benefit. Focusing on issues such as cost of installation and localized flooding can be emphasized here. Explain why concerns such as high water tables and low infiltration rates can have an impact on BMP placement, and suggest alternative strategies if these problems exist.

Restrictions: BMPs should only be installed in ideal conditions, and there are various placement restrictions for each type of BMP. Make sure to clearly illustrate these restrictions and the reasons for them. This may be the most important section of the entire presentation, since BMPs installed improperly may cause flooding and have safety concerns and legal implications.

BMP Design

The BMP design section of the presentation should be adapted to individual audience groups. While many details should be provided to the design/installer sector, these groups are likely to already have a working knowledge of the terminology and practices. Other audience groups will only need to have a conceptual understanding of BMP design; for them, this topic can be addressed more broadly. All program-acceptable design standards and specifications should be presented to the designer/installer group.

Individual(s) responsible for reviewing the plans and cost estimates (likely the program administrator) must understand all design requirements. The program administrator should know the details of all components of the program and also have in-depth knowledge of the BMP standards and specifications.

For the designers/installers, you may consider presenting a hypothetical project that they need to work through while in the classroom. Provide conceptual site plans and ask the audience to draw designs and call out specifications. If your organization uses design templates or worksheets, they should be provided.

Assessors will need to know general sizing requirements to quickly estimate and recommend BMP placement in the assessment report. They also should be able to explain the concept to property owners and know what standards and specifications apply to specific BMP designs.

Verifiers/inspectors should also be trained about your program's BMP design standards. This group must know the material specifications, general sizing, depth, and shape of the BMPs, because all components of the BMPs will have to be inspected. Therefore, this information will need to be presented in this section. Soils, plants, stone types, mulch, organic media mix and other materials should be described so the inspector can verify correct material use and conditions.

Key Lessons

Origin of design standards/specifications: Identify the source of the standards and specifications used in your presentation.

Sizing: Provide the sizing requirements and walk through an example for every BMP that requires specific sizing.

Materials: Specify the materials that must be used. It may be useful to offer advice about how to obtain certain materials, and specifically identify materials not to be used. Some of the materials you should cover include clean stone, clean fill for embankments, paver/pavement products, and soil media characteristics for rain garden.

BMP sketches and cross-sections: Show the audience what the final product should look like, and show cross-sectional views of the BMPs for better explanation.

Design tips: Since every site is different, not every BMP can be installed in exactly the same manner. Describe design variations that address extenuating circumstances, such as internal storage layers in rain gardens, "piggy backing" rain barrels, and using underdrain systems with permeable pavers.

Plan requirements: When presenting to designers, detail exactly what will be required for plan submission. Provide the plan review checklists.

BMP Installation

Although each of audience groups should have general understanding of installation procedures, the designer/installer and verifier/inspector audiences should be provided detailed information. The program administrator needs to know enough to monitor the general pulse of all activity in the field. The assessor only needs to know enough to describe the installation process to the homeowner. However, the designer/installer and verifier/inspector groups will need to know exactly what it will take to get the practices in ground correctly, safely, and efficiently.

All necessary permits and erosion and sediment control measures must be in place prior to project installation. Provide a description of these requirements to enable installation of the practices without regulatory issues and undesired environmental impacts. Research your

local and state land disturbance thresholds for erosion and sediment control and stormwater management permitting. Although many of the projects will likely fall under the land disturbance thresholds, some may not, and there may be other local requirements for plan review or permits that the project installation team should be aware of.

Key Lessons

Pre-installation checklist: Describe tasks that must be completed before the installation of the practices, such as marking of underground utility lines and delivery of supplies.

Excavation technique: Describe the best techniques for excavation and site work. This can include suggestions regarding equipment selection, berm installation, disposal of excess excavated material, compaction avoidance, soil scarification, and other installation techniques.

Materials installation: Describe the technique used to install the BMP materials, such as permeable pavers, stone reservoirs, trees/shrubs/mulch, rain garden soil media mix, and underdrain systems.

Cleanup: During the cleanup phase, it is essential to test the BMPs, if possible. Newly planted vegetation should be watered, bare areas should be seeded or mulched, soil surfaces should be cleaned of weeds and trash, and erosion and sediment control materials should be removed.

BMP Maintenance

The homeowner will likely be responsible for long-term maintenance of the BMP(s) installed on the property. A maintenance agreement will be signed and Performance Verifications will be conducted to ensure the BMPs continue to function properly. Each of the trainee audiences should emphasize the importance of long-term maintenance to the homeowners. Without long-term maintenance, the individual practices will fail, and that will reflect poorly on your overall program. Trainees should understand BMP maintenance and must be trained in appropriate ways to present this information to the homeowner.

Key Lessons

Responsibilities: Clearly communicate to the homeowners the maintenance responsibilities associated with every practice installed.

Frequency: Provide a monthly or seasonal maintenance checklist detailing when to perform each maintenance task.

Tips: Provide the homeowner with tips for maintaining the BMPs, such as watering techniques and identifying useful tools and equipment and information about how to use them.

Program Implementation

There are certain components of the Chesapeake RiverWise Communities program or other similar programs that should be discussed in further detail at this point. All audience groups should understand these program specifics in order to provide consistent communication to homeowners, expedite project approval and installation, and achieve efficient implementation of the long term vision of the program.

Key Lessons

Incentive structure: Programs incentives will vary in details and may be basic or complex. Provide trainees with all relevant details regarding the incentive structure for the BMPs and the supporting documentation.

Plan Submittal: Describe the requirements for plan submittal and the expected turn-around time. Describe specific plan formatting that you would prefer to receive.

Reimbursement: Describe how the homeowner/contractor will be reimbursed and what documents must be submitted to obtain reimbursement. Indicate the expected turn-around time for reimbursement.

Inspection/Verification: Every project should be inspected on-site or photo-documented at critical stages of construction. Describe when these inspections will take place and, if they will be verified in the future, who will do that and how often will it be done.

5. Property Assessments

The final component of the presentation is the assessment section. This section is most important for the Assessor audience, since the other groups may only need a basic working knowledge of assessment techniques and tools. Assessors will need to be trained to understand nuances of assessments, assessment software and tools, and assessment documentation. Further details about assessments are found in Chapter 3 of this manual.

Key Lessons

Hard copy versus Electronic: There are multiple assessment formats used from program to program, and each format may require specific hardware and software. However, some formats may involve simple printed paper forms. Explain your format and review any hardware and software required to successfully implement the program.

Pre-assessment set-up: Many steps must be taken before the site assessment happens. Scheduling the assessment, downloading aerial photography to insert into the assessment form, completing research about the property conditions, and gathering assessment tools are just some of the pre-assessment items that should be part of your routine.

Tools: Identify and describe the optional tools used during the assessment.

Property assessment: Although the field exercise will be the most informative description of specific site assessment technique, it is useful to present examples of the site characteristics to look for in the field. Show photographic examples of what assessors should look for.

Software example: The Chesapeake RiverWise Communities assessment process uses a tablet computer-based form to be filled out in the field during the assessment. The trainer should describe the software used, explain the forms used, and describe how to fill in information, in order to save time and confusion in the field.

Completion: Explain that the assessment should be completed, reviewed and returned within a short time. Describe your program's expectations.

Follow-up: Describe how you expect the program staff to follow-up after the property owner receives the assessment.

See Appendices 6A & B for the Chesapeake RiverWise Training Powerpoint presentations.

Field Presentations

The second phase of training and is the field component. Field training should be conducted shortly after classroom training, so you may relate the classroom material to on-site practice. Field exercises will likely have the greatest impact on trainees. Providing time to demonstrate certain tools and practices is essential.

The content of the field training will most likely change from one group to another. The assessors should work through the assessment form and techniques while the designers/installers and inspectors/verifiers will review installed BMPs and BMPs currently under construction. Plan a site visit to a BMP installation site if possible, so the trainees can gain real-world perspective and experience. The following is a description of field training content for specific audiences.

The program administrator should have training in all components of field work to assist each group as needed.

Assessor

Conduct a “mock assessment,” just as it would be done on a site. Assign someone to act the role of the homeowner in this exercise.

Key Lessons

Addressing the homeowner: Set an example of courtesy and professionalism. Ask permission to take pictures. Also, explain your concepts simply, assuming the homeowner may be unfamiliar with the terms and concepts of the program. Use the assessment process as an opportunity to educate and engage the homeowner.

Filling in the form(s): If you are using a tablet computer, have the assessor can download the form and supporting application before the training day. Once in the field, the assessor can fill in the form as the assessment progresses. Afterward, have the group compare notes and forms.

Plants: Identify as many plants on the site as possible. Be sure to identify any invasive species to be removed. Identify native plants that are well-established; this will help the designer pick an appropriate plant palette.

Site conditions: Thoroughly describe any site conditions that will impact the project design. It is imperative to show the assessors how to determine drainage areas. This can be accomplished by using measuring tapes, measuring wheels, and other surveying tools. The measuring tape can also be used to measure tree diameters and accomplish a variety of other site measurements, such as impervious surface dimensions. Tools such as infiltrometers, soil probes, and soil penetration testers all help determine soil conditions and infiltration rates. A compass will help you determine site solar exposure conditions.

Homeowner stewardship: The level of existing homeowner stewardship is something can inquire about in a pre-assessment questionnaire and can confirm on-site. Look at tree health, grass height and vigor, garden maintenance, etc.

BMP placement: Describe the steps you would take to determine the proper BMP location and take measurements to establish proper BMP sizing. Demonstrate how you would use a survey tool to identify micro-drainage areas. Discuss strategies and site constraints.

Photos: Photos are a critical component of the assessment report and pre-installation documentation. Many software apps will let you add photos directly to the report. Think about what angle and distance will give the best representation of the project because taking photos from a consistent angle and distance is best for documenting the project over time. Photograph anything that raises concern. Additionally, having photographs of plants that you could not identify in the field allows you to complete the site’s survey of existing vegetation at a later time.

Designer/installer

If time allows, it is important to show designers and installers BMPs under construction and/or previously constructed BMPs.

Key Lessons

It is important to visit the right site for the specific audience being trained. Sometimes it is best to choose a training workshop location based on the proximity of the workshop to interesting BMPs or projects. Visit BMPs that are currently under construction or that were recently constructed. It is also beneficial to visit a site with no BMP, so the trainees understand the entire process and what it takes to complete a project.

If it is possible, show the trainees BMPs that have maintenance problems or were not constructed or installed correctly. Sometimes it is easier to learn from things that did not work out correctly than from things that did.

The more BMPs you can see the better. Choose sites that are closer together or that may have more than one BMP.

Verifiers/inspectors

Verifiers and inspectors will need to see a wide range of BMPs and different stages. They will also need to practices filling the verification forms out and taking corresponding photos.

Key Lessons

Similar to the designer/installed lessons, showing the trainees a variety of BMPs at different stages of construction is important. When choosing a class site, be aware of travel times to sites that will give you access to these BMPs.

If possible, show the attendees examples of construction materials used for the various BMPs within your program. For example, using clean stone rather than unwashed stone is critical to the long term functionality of permeable pavers.

Showing the attendees a variety of failing BMPs of different varieties will expose them to common mistakes that they can watch for in the future.

Have the trainees practice completing an inspection form with associated photos. Make sure to take photos from consistent angles that are not only good at showing the issue but will be a good vantage point for showing the corrective action.

References

Social Networking Resources

Pew Research Center, Section 2.2 (need to add page # when final draft is created): <http://www.pewinternet.org/2013/05/21/teens-social-media-and-privacy/>

Vertical Response, Section 2.3 (need to add page# when final draft is created): <http://www.verticalresponse.com/>

Assessment Resources

Jotform, Section 4.2 (need to add page # when final draft is created): <http://www.jotform.com/>

SurveyMonkey, Section 4.2 (need to add page # when final draft is created): <https://www.surveymonkey.com/>

Google Forms, Section 4.2 (need to add page# when final draft is created): <http://www.google.com/forms/about/>

Web Soil Survey, Section 4.3 (need to add page# when final draft is created): <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Urban Stormwater Verification, Section 4.4 (need to add page # when final draft is created): http://www.chesapeakebay.net/channel_files/18547/attachment_d--uswg_urban_bmp_verification_principle_and_practices_110912.pdf

Native Chesapeake Plants, Section 4.4 (need to add page # when final draft is created) : <http://www.nps.gov/plants/pubs/chesapeake/pdf/chesapeakenatives.pdf>

Center for Watershed Protection's Pollution Severity Index and Restoration Opportunity Index, Urban Subwatershed Restoration Manual 11, Section 4.4 (need to add page# when final draft copy is created): http://cwp.org/online-watershed-library/cat_view64/80-urban-subwatershed-restoration-manual-series

Incentives

Financial Incentives

Lynchburg, VA: <http://www.lynchburgva.gov/stormwater-credit-program>

Richmond, VA: <http://www.richmondgov.com/PublicUtilities/StormwaterCredits.aspx>

Charlottesville, VA: <http://www.charlottesville.org/Index.aspx/?page=2308>

DC- RiverSmart Rewards- <http://green.dc.gov/riversmartrewards>

Montgomery County, MD: <http://www6.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/credits.asp>

Recognition Incentives

RiverHero Homes: <http://www.jrava.org/what-we-do/river-hero/>

Pearl Homes: <http://www.lynnhavenrivernow.org/Pearl-Home.aspx>

River Star Homes: <http://www.elizabethriver.org/RiverStars/default.aspx>

Verification

Chesapeake Bay TMDL: <http://www.epa.gov/chesapeakebaytmdl/>

Residential Stormwater BMPs

Native Plant Guide: <http://www.nativeplantcenter.net/guides/chesapeakenatives.pdf>

Bioretention Illustrated, CSN, 2013: <http://chesapeakestormwater.net/wp-content/uploads/downloads/2013/08/FINAL-VERSION-BIORETENTION-ILLUSTRATED-080113.pdf>

Appendices

- 3A RiverWise Pre-Assessment Questionnaire**
- 3B RiverWise Assessment Form**
- 3C RiverWise Post-Assessment Survey**
- 3D Sample Tracking Sheet**
- 4A Chesapeake Bay Watershed Residential BMP Incentive Programs**
- 4B RiverWise Maintenance Agreement**
- 4C RiverWise Financial Assistance Program Guidance**
- 4D RiverWise Rain Garden Calculation Worksheet**
- 4E RiverWise Planting Templates**
- 4F RiverWise Contractor Enrollment Forms**
- 5A RiverWise Residential BMP Verification Form**
- 6A Assessment Training Powerpoint Presentation**
- 6B Contractor Training PowerPoint Presentation**

Appendix 3A

RiverWise Pre-Assessment Questionnaire



RiverWise Pre-Assessment Questionnaire & Registration Form



Please complete this questionnaire to Sign Up for a RiverWise Watershed Protection Assessment. Questions are related in some way to watershed protection and water quality. This information will help us determine how you can best reduce your impact on your watershed.

Full Name *

Prefix	First Name	Last Name

Address *

Street Address	
Street Address Line 2	
City	State / Province
	Please Select
Postal / Zip Code	Country

Primary Phone Number *

	-	
Area Code		Phone Number

Alt. Phone Number

	-	
Area Code		Phone Number

E-mail *

--

Preferred Method of Contact:

- ☐ Email
☐ Phone

Are you the property owner?

- ☐ Yes
☐ No, I rent.

How did you hear about this program?

- ☐ Neighborhood Meeting
☐ Neighborhood Newsletter
☐ Social Media
☐ Volunteer Event
☐ Word of Mouth

Please choose the answer that most closely describes your practices. You are welcome to provide additional comments or explanations.

If you have a basement, is there flooding during a heavy rain?

- ☐ Yes
- ☐ No
- ☐ N/A

If yes, do you use a sump pump?

- ☐ Yes
- ☐ No
- ☐ N/A

Do you have flooding or channeling of stormwater on your property? If so, where?

Is there an oil tank on your property?

- ☐ Yes
- ☐ No
- ☐ Unsure

If yes, is the oil tank in use?

- ☐ Yes
- ☐ No

Do you use a lawn service for lawn care?

- ☐ Yes
- ☐ No

During the late spring when the grass grows most quickly, the lawn is usually mowed:

- ☐ Once a week
- ☐ Once every two weeks
- ☐ Never

Mower blades are at the:

- ☐ Highest setting
- ☐ Medium setting
- ☐ Lowest setting
- ☐ Unsure

Grass clippings are:

- ☐ Left on the lawn
- ☐ Composted
- ☐ Bagged and Discarded
- ☐ Other

Watering

Please check all that apply.

	Lawn	Garden	Landscaped Areas
I water on a regular schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I water only when the weather is very hot and very dry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I water when it has not rained for a couple of weeks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I water frequently, but for a short time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I water frequently, but for a long time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use a sprinkler to water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use a soaker hose to water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I water by hand with a garden hose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I water by hand with a watering car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have an automatic sprinkler system to water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use tap water to water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use rain water from a rain barrel (other collection device) to water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other

FERTILIZERS, HERBICIDES, PESTICIDES, and FUNGICIDES

Please check all that apply.

	Lawn	Garden	Landscaped Areas
I use chemical fertilizers if indicated by soil testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use chemical fertilizers on a regular basis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use "Weed & Feed" products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use chemical fertilizers for certain plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I do not use fertilizers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use only organic materials (manure, compost, leaves mowed in)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comment/Other:

Please check all that apply.

	Lawn	Garden	Landscaped Areas
I use pesticides/fungicides occasionally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use pesticides/fungicides only when there is a significant problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use pesticides/fungicides to keep plants looking their best	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use pesticides/fungicides only after the problem has been identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use pesticides/fungicides regularly to prevent potential problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use herbicides only to eliminate invasive plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I never use pesticides/fungicides on my...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I never use herbicides on my...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comment/Other:

Do you (or your lawn service) take into account the weather forecast for rain in deciding when to apply fertilizers, pesticides or herbicides?

- ☐ Yes
 ☐ No
 ☐ Unsure

☐ N/A - These products are not used.

Autumn leaves are:

- ☐ Left where they fall

☐ Used as mulch or compost

☐ Bagged and discarded

☐ Mowed and left on the lawn

☐ Raked into the street for pickup by the city

Other:

Washing the car:

- ☐ I go to a commercial car wash

☐ I wash the car in the yard

☐ I wash the car in the street or driveway

☐ I let rain showers wash the car

☐ N/A

Changing the car's oil:

- ☐ I take my car to a business to have it's oil changed.

☐ I change my car's oil myself and take recycle the old oil.

☐ I change my car's oil myself and put the old oil in the trash.

☐ I change my car's oil myself and pour the old oil in yard or street.

☐ N/A

Purchasing Habits

When purchasing household cleaners and chemicals:

- ☐ I choose the product that will have the least environmental impact.
- ☐ I choose the product that will do the job quick and easy.
- ☐ I choose the least expensive product.
- ☐ I make my own cleaning products.
- ☐ I use the products my family used while I was growing up.
- ☐ I buy antibacterial products.

What is important to you when purchasing trees, shrubs, or flowers?

- | | | |
|---|--|---|
| <input type="checkbox"/> Low Maintenance | <input type="checkbox"/> Plants on Sale | <input type="checkbox"/> Should not be an invasive species |
| <input type="checkbox"/> Should not need fungicides or insecticides | <input type="checkbox"/> Curb appeal (Pretty, color, etc.) | <input type="checkbox"/> Tough, easy to grow |
| <input type="checkbox"/> Native species preferred | <input type="checkbox"/> Popularity in the neighborhood | <input type="checkbox"/> Provides food and shelter for wildlife |

Disposing of household cleaners, chemicals, paint, etc.

- ☐ I research to determine appropriate disposal methods and dispose of appropriately
- ☐ I put everything in the trash
- ☐ I pour it down the drain, in the yard or storm drain

Other:

Dog Feces

If you have a dog, how do you clean up their feces....on walks?

- ☐ Bag it and put it in the trash
- ☐ Bury it
- ☐ Put it where it won't get stepped on
- ☐ Leave it where it lands
- ☐ I don't have a dog.

If you have a dog, how do you clean up their feces....in your yard?

- ☐ Bag it and put it in the trash
- ☐ Bury it
- ☐ Put it where it won't get stepped on
- ☐ Leave it where it lands
- ☐ I don't have a dog.

What environmental issue do you consider the most important locally?

- | | |
|---|---|
| <input type="checkbox"/> Pesticides | <input type="checkbox"/> Insecticides |
| <input type="checkbox"/> Fungicides | <input type="checkbox"/> Dog Feces |
| <input type="checkbox"/> Over Fertilization | <input type="checkbox"/> Algal Blooms |
| <input type="checkbox"/> Air Quality | <input type="checkbox"/> Decrease in Native Habitat |
| <input type="checkbox"/> Invasive Species | <input type="checkbox"/> Trash/Litter |

Comment/Other:

Urban landscapes have significant impact on water quality, either positive or negative. How willing are you to put some time and effort into watershed friendly landscaping?

1 2 3 4 5

Not Willing ○ ○ ○ ○ ○ Very Willing

Which practice(s) are you interested in for your property?

- ☐ Rain Garden
- ☐ BayScapes
- ☐ Native Tree Planting
- ☐ Native Shrub Planting
- ☐ Rain Barrel(s)
- ☐ Pervious Pavers

Are you interested in volunteering in any of the following activities/events?

- ☐ Tree Plantings
- ☐ Tree Maintenance
- ☐ Trash Pickups
- ☐ Stream Walks
- ☐ Storm Drain Marking
- ☐ Helping at Workshops
- ☐ Joining the monthly meetings
- ☐ Writing articles for the local papers
- ☐ Writing articles for our blog
- ☐ Taking pictures for articles
- ☐ Videotaping interviews

Other:

An Alliance Team Member will be contacting you to to set up a date and time soon.
Thank you!

Appendix 3B

RiverWise Assessment Form

[Print Form](#)[Submit by Email](#)

Chesapeake RiverWise Communities Property Assessment

Name

Assessment #

Address

Assessment Date

Email

Conducted by

Phone

Watershed

TMDL ☐

The following pages are the results of your **Chesapeake RiverWise Communities Property Assessment**. This report summarizes our observations and explains the recommendations for your property. We have suggested different stormwater Best Management Practices (BMPs), which are drainage techniques and site designs that will substantially reduce stormwater runoff and pollution. Please review this summary and let us know if you have any questions regarding the recommendations.

Recommendations

Rain barrel(s) [RB] (help collect water for later use and reduce runoff from the roof of your house)

Location(s)

Downspout disconnection [DD]

Location(s)

See "Downspout" Section on pg. 3 for specific recommendations for each downspout.

Tree planting [TP] (the most effective stormwater BMP. Plant a native variety to provide habitat and food for wildlife.)

Location(s)

Sun Exposure Full Shade

Species

Mature Size(s): Tall (60ft+) ☐ Med (40-60ft) ☐ Small (20-40ft) ☐

Location(s)

Sun Exposure Full Shade

Species

Mature Size(s): Tall (60ft+) ☐ Med (40-60ft) ☐ Small (20-40ft) ☐

Rain garden [RG] (bowl shaped garden with deep loose soil and native plants that soak up water during rain events)

Location

Sun Exposure Full Shade

Estimated pervious
drainage (sq ft.)

Est. impervious
drainage (sq ft.)

Estimated total
drainage area (sq. ft.)

BayScape [B] (landscaping area that replaces lawn with native plants that help soak up water)

Location

Sun Exposure Full Shade

Approx. size
(sq ft.)

Permeable hardscape [PH] (alternative to impervious surfaces that allows water to seep through and soak into the ground underneath)

Location

Est. drainage
area (sq ft)

Approx. size
(sq ft)

Impervious surface removal [IR] (removal of surfaces such as driveways and walkways)

Location

Approx. size
(sq ft)

Your property contributes stormwater pollution to local waterways: ☐ Significantly ☐ Somewhat ☒ Not at all

Your landscaping habits are "unfriendly" to wildlife: ☐ Significantly ☐ Somewhat ☒ Not at all

Property Information

Property type Single family detached

Basement: ☐ Yes ☐ No

Downspouts:

ID #	Disconnected or Connected	If disconnected, drains to:	Recommendation(s)
	<input type="radio"/> Disconnected		<input type="checkbox"/> Rain barrel <input type="checkbox"/> Rain garden <input type="checkbox"/> BayScaping
	<input checked="" type="radio"/> Connected		<input type="checkbox"/> Other _____
	<input type="radio"/> Disconnected		<input type="checkbox"/> Rain barrel <input type="checkbox"/> Rain garden <input type="checkbox"/> BayScaping
	<input checked="" type="radio"/> Connected		<input type="checkbox"/> Other _____
	<input type="radio"/> Disconnected		<input type="checkbox"/> Rain barrel <input type="checkbox"/> Rain garden <input type="checkbox"/> BayScaping
	<input type="radio"/> Connected		<input type="checkbox"/> Other _____
	<input type="radio"/> Disconnected		<input type="checkbox"/> Rain barrel <input type="checkbox"/> Rain garden <input type="checkbox"/> BayScaping
	<input type="radio"/> Connected		<input type="checkbox"/> Other _____
	<input type="radio"/> Disconnected		<input type="checkbox"/> Rain barrel <input type="checkbox"/> Rain garden <input type="checkbox"/> BayScaping
	<input type="radio"/> Connected		<input type="checkbox"/> Other _____
	<input type="radio"/> Disconnected		<input type="checkbox"/> Rain barrel <input type="checkbox"/> Rain garden <input type="checkbox"/> BayScaping
	<input type="radio"/> Connected		<input type="checkbox"/> Other _____
	<input type="radio"/> Disconnected		<input type="checkbox"/> Rain barrel <input type="checkbox"/> Rain garden <input type="checkbox"/> BayScaping
	<input type="radio"/> Connected		<input type="checkbox"/> Other _____

Soils and Slopes (evidence of poor infiltration and runoff).

Check all that apply:

- ☐ Compacted soils
- ☐ Mostly clay soils
- ☐ Standing water
- ☐ High water table (applicable in coastal areas)
- ☐ Eroded areas
- ☐ Steep slopes (note location & direction on sketch)

Percentage of property that is impervious (approx.)

Notes

Vegetation/Landscaping (check all that apply):

Positive aspects:

- ☐ Mature trees
- ☐ Vegetative layers
- ☐ Larger group plantings
- ☐ Appropriate use of mulch
- ☐ Native plants (list below)
- ☐ Plants that provide food for wildlife

Negative aspects:

- ☐ Invasive species (list below)
- ☐ No layers, little variety
- ☐ Non-native species (list below)
- ☐ Poor mulching practices
- ☐ Evidence of damage to plants

Canopy cover:

- ☐ 0 - 25%
- ☐ 25 - 50%
- ☐ 50 - 75%
- ☐ 75 - 100%

Vegetative Cover (%)

Lawn size (sq ft)

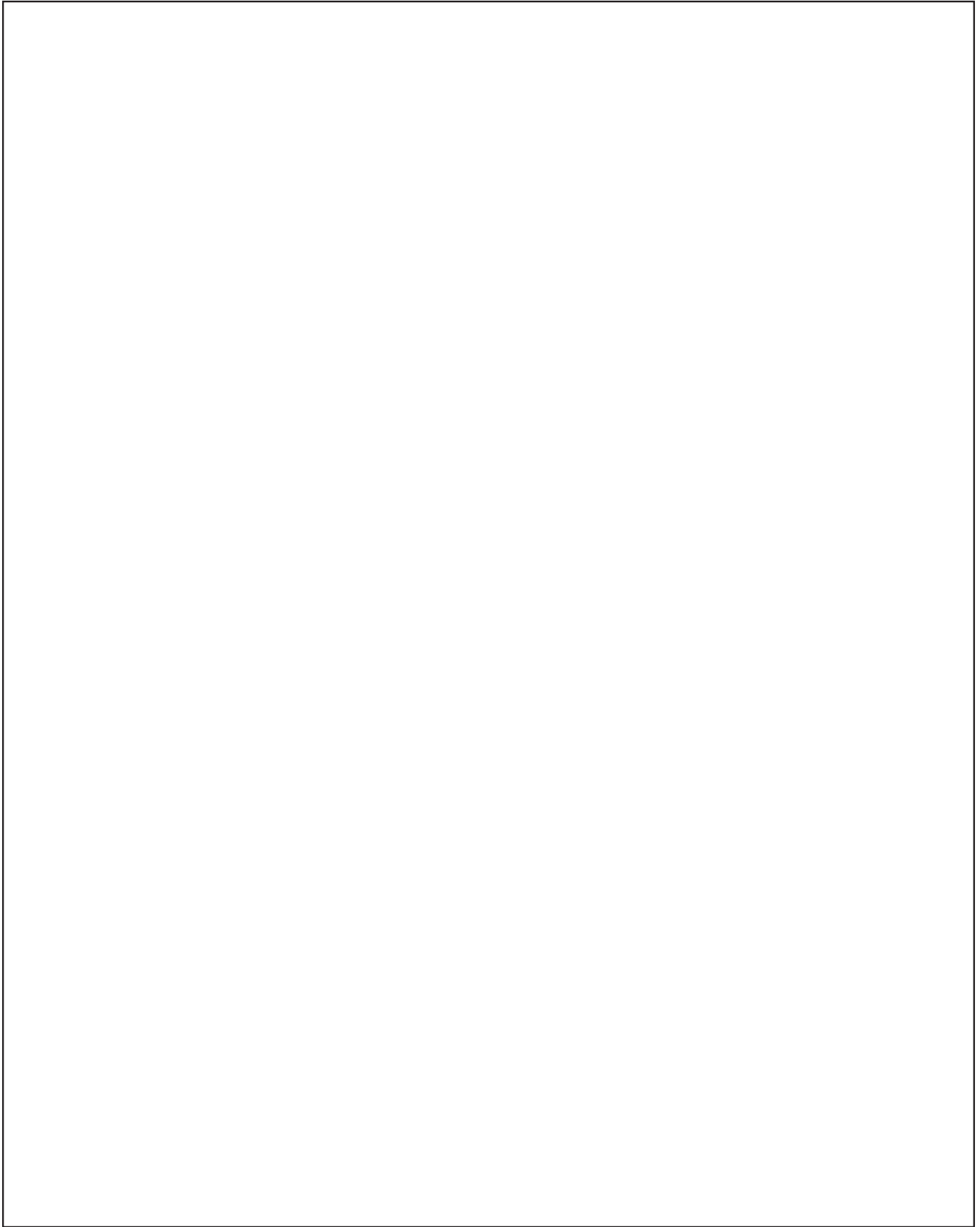
Native

Non-Native

Invasive

Sun exposure Full Shade

Notes



Photos with Recommended Practice Locations

Property Sketch

Indicate existing features such as trees, landscaping, slopes (including direction of slope), impervious surfaces, bare soil, fences, utility locations, and existing BMPs. Denote North.

<u>Label recommended practices:</u>	B - BayScape
RB - rain barrel	RG - rain garden
DD - downspout disconnect	PH - permeable hardscape
TP - tree planting	IR - impervious removal

Thank you for taking time to participate in the Chesapeake RiverWise Communities program.
We truly value your support of the Alliance for the Chesapeake Bay.
Your involvement is important in helping us to engage local communities, connect people, and heal the land.
For any questions and follow-up, please contact us at 804-775-0951.

Appendix 3C

RiverWise Post-Assessment Survey

RiverWise Post-Assessment Questionnaire

Survey Name: ReedyCreek/RiverWise Post-Questionnaire

Response Status:

Filter: None

Briefly state why you decided to sign up for a Reedy Creek Watershed Protection Audit.

Please choose the response that best reflects your experience with the sign-up and pre-audit questionnaire process.

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.

	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	N/A
Signing up for the audit on the Reedy Creek Coalition website was simple.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
I received a timely confirmation email after signing up.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Scheduling of the audit took place in a reasonable timeframe.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
I would prefer an online pre-audit questionnaire over the printed/email questionnaire.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

Were you present for the audit?

	Number of Response(s)	Response Ratio
Yes	0	0%
No	0	0%
Other	0	0%
No Responses	0	0%
Total	0	100%

Please select the responses that best reflect your experience. "Practices" are defined as rain barrels, rain gardens, BayScapes, pervious pavers, native tree and shrub plantings.

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.

	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	N/A
I found the auditors to be professional.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
I found the auditors to be knowledgeable when answering my questions.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
The auditors were able to clearly explain how the program worked.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
I was familiar with the practices promoted in the program before the audit.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
I have a greater understanding of the practices because of the audit.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
The Information Packet I recieved was useful.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
A group workshop would have been helpful in understanding the program and the practices.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
The information presented to me during the audit prompted me to make changes in the	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

If you received an Information Packet from the auditors, which (if any) brochures/handouts were most helpful in the understanding of the program and practices?

Audit ReportPlease select the responses that best reflect your experience regarding the written Audit Report. "Practices" are defined as rain barrels, rain gardens, BayScapes, pervious pavers, native tree and shrub plantings. Comments are welcome but optional.

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.

	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	N/A
Questions I asked were adequately answered in the audit report.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
I received my audit report in a reasonable time frame after the audit.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
The audit report encouraged me to install the recommended practices.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
The audit report provided useful information.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
The report helped me understand the function of the practices.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

The audit and the information provided improved my knowledge regarding:

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.

	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	N/A
The importance of keeping rainwater on my property	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
The impact of storm water runoff on water quality	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Ways to reduce runoff on my property	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Ways I can reduce pollutants	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Environmentally friendly gardening practices	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

For you, what was the most useful part of the audit report (if any)?

Check any appropriate items below if you have made changes or still plan to make changes as a result of your audit.

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.

	Have Done	Plan To Do	Unable To Do	N/A
Reducing impervious surfaces	0 0%	0 0%	0 0%	0 0%
Reducing lawn	0 0%	0 0%	0 0%	0 0%
Installing rain barrels	0 0%	0 0%	0 0%	0 0%
Disconnecting downspouts	0 0%	0 0%	0 0%	0 0%
Creating a rain garden	0 0%	0 0%	0 0%	0 0%

Creating a rain garden	0%	0%	0%	0%
Other methods of retaining storm water on property	0	0	0	0
Reducing pollutants from fertilizers, pesticides, and herbicides from entering stormwater	0%	0%	0%	0%
Planting one or more trees	0	0	0	0
Increasing number of native plants on property (BayScaping)	0%	0%	0%	0%
Removing invasive/alien plants	0	0	0	0
	0%	0%	0%	0%

Please check the practices, if any, that were installed by yourself (via reimbursement).

	Number of Response(s)	Response Ratio
BayScaping	0	0%
Permeable Pavers	0	0.0%
Rain Garden	0	0.0%
Rain Barrel(s)	0	0%
Woody trees/shrubs	0	0%
No practices were installed by myself.	0	0%
Total	0	100%

Please check the practices, if any, that were installed by a contractor.

	Number of Response(s)	Response Ratio
BayScaping	0	0%
Permeable Pavers	0	0%
Rain Garden	0	0%
Rain Barrel(s)	0	0%
Woody Trees/Shrubs	0	0%
No practices were installed by a contractor	0	0%
Total	0	100%

Did you take advantage of the Financial Incentive Program (FIP)?

	Number of Response(s)	Response Ratio
Yes	0	0%
No	0	0%
No Responses	0	0%
Total	0	100%

What were the barriers that prevented you from taking advantage of the program? Select all that apply.

	Number of Response(s)	Response Ratio
I did not understand the program.	0	0.0%
I did not have the time to fill out the forms.	0	0.0%
I did not feel I had the financial resources at this time.	0	0%
I did not feel this was important.	0	0.0%

I never received an audit report.	0	0.0%
Other	0	0%
Total	0	100%

Please choose the answer that represents your opinion regarding your experience with the Financial Incentive Program (FIP).

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
I would have installed the recommended practices if the financial incentive was not	0	0	0	0	0
The structure of the financial incentive was fair (i.e. the cost share amount provided covered	0%	0%	0%	0%	0%
I would have been just as willing to participate in the program if I were required to pay 25% of	0	0	0	0	0
The instructions of how to apply for the financial incentive were easy to follow	0%	0%	0%	0%	0%
The FIP forms were easy to fill out	0	0	0	0	0
A workshop would have been helpful in understanding the financial incentive forms	0%	0%	0%	0%	0%
If the only option provided was to receive a reimbursement for materials, I would you have	0	0	0	0	0
I recieved confirmation of my forms being recieved in a timely manner	0%	0%	0%	0%	0%

Did you work with a contractor?

	Number of Response(s)	Response Ratio
Yes	0	0%
No	0	0%
No Responses	0	0%
Total	0	100%

Which contractor(s) did you work with?

Please answer the following questions concerning the contractor used for the practices.

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
I found the contractor(s) to be professional.	0	0	0	0	0
I found the contractor's estimate to be reasonable.	0%	0%	0%	0%	0%
I found the contractor to be timely in their work.	0	0	0	0	0
I am satisfied with the final projects installed by the contractor.	0%	0%	0%	0%	0%
I would have preferred to choose my own contractor.	0	0	0	0	0
I would recommend my contractor to a friend.	0%	0%	0%	0%	0%

Since you participated in this program, do you feel you have greater knowledge in...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.

	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
Stormwater	0 0%	0 0%	0 0%	0 0%	0 0%
Water Quality	0 0%	0 0%	0 0%	0 0%	0 0%
Native Habitat (plants, wildlife)	0 0%	0 0%	0 0%	0 0%	0 0%
Local Streams, Rivers, and the Chesapeake Bay	0 0%	0 0%	0 0%	0 0%	0 0%
Watershed	0 0%	0 0%	0 0%	0 0%	0 0%
Impervious Surface	0 0%	0 0%	0 0%	0 0%	0 0%
Semi-Impervious Surface	0 0%	0 0%	0 0%	0 0%	0 0%
BayScaping	0 0%	0 0%	0 0%	0 0%	0 0%
Alien and Invasive plants	0 0%	0 0%	0 0%	0 0%	0 0%
RainGardens	0 0%	0 0%	0 0%	0 0%	0 0%

Please choose the answer that represents your opinions concerning your overall experience with the program.

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.

	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
I would recommend this program to a friend.	0 0%	0 0%	0 0%	0 0%	0 0%
The program changed my conservation efforts at home.	0 0%	0 0%	0 0%	0 0%	0 0%
I will share this new information with others.	0 0%	0 0%	0 0%	0 0%	0 0%
I am satisfied with the entire program.	0 0%	0 0%	0 0%	0 0%	0 0%

Additional comments or suggestions concerning any area of the program.

Appendix 3D

Sample Tracking Sheet

[illegible]

Appendix 4A

Chesapeake Bay Watershed Residential BMP Incentive Programs

Chesapeake Bay Watershed Residential BMP Incentive Programs

Organization	Program	Website	BMP	Incentive Program
VIRGINIA				
Alliance for the Chesapeake Bay	Chesapeake RiverWise Communities	https://allianceforthebay.org/our-work/healing-the-land/riverwise-communities/	Rain Barrels	\$1/gallon up to \$250.
			Tree Planting	75% of cost per tree.
			Rain Garden	75% of costs up to \$1,500.
			BayScapes (conservation landscaping)	75% of costs up to \$1,500.
			Impervious Removal	\$2/sq ft.
James River Association	River Hero Homes	http://www.jamesriverhero.org	Pervious Surfaces	75% of costs up to \$3,000.
			Rain Barrels, rain gardens, conservation landscapes, behavior changes, etc.	Recognition program offering discounts at local garden centers, garden flag, and invitation to annual recognition event
			Conservation Landscape	\$3/sq ft up to \$750. Minimum of 150 sq ft.
Arlington, VA	StormwaterWise Landscapes	http://environment.arlingtonva.us/stormwaterwise/	Pervious Pavers	50% of project cost up to \$2,000. Additional \$1,500 if signed maint agreement. Minimum of 150 sq ft.
			Impervious Removal	50% of project cost up to \$1,500. Minimum of 150 sq ft.
Elizabeth River Project	River Star Homes	http://www.elizabethriver.org/#/river-star-homes/czow	Rain Garden	50% of project cost up to \$1,500. Minimum of 150 sq ft.
			Rain Barrels	Offered at discounted rate at workshops.
			Behavior changes, BMPs	Recognition program offering yard flag, packet of information, invitation to special events.
James City County	Clean Water Heritage	http://www.jamescitycountyva.gov/cleanwater/index.html	Neighborhood BMPs such as tree plantings	\$2,000 rebate for installation, repairs, or inspection assistance
			Rain Garden	\$8/sq. ft. rebate through the Turf Love program.
Virginia Soil and Water Conservation Districts	Virginia Conservation Assistance Program	http://tiswcd.org/vcap.php	Impervious Removal	\$2.50/sq. ft. of impervious removed. Maximum of \$15,000.
			Turf to Natives	\$75/1000 sq. ft. for conversion to meadow or forest. \$250/1000 sq ft for conversion to landscaping shrubs/trees.
			Rain Garden	75% of total costs up to \$2,000. Must be maintained for 10 yrs.
			Rain Water Harvesting	\$2.00/gallon of storage up to \$12,000. Must store at least 250 gallons.
			Permeable Pavers	50% up to \$3/sq. ft., max \$12,000. 1/2 acre or less.
MARYLAND				
Blue Water Baltimore	Blue Water Audit	http://www.bluewaterbaltimore.org/take-action/water-audit (NOTE: program is now closed.)	Downspout Disconnection	Free disconnection, materials, and labor
			Green Roof	\$2/sq. ft. of green roof
			Impervious Removal	\$0.75/sq. ft. of hardscape removed
			Rain Barrel	Free installation labor
			Cistern	\$0.50/gallon
			Rain Garden	\$0.50/sq. ft. of impervious area to rain garden
			Conservation Landscape	\$0.50/sq. ft. of landscaping. Minimum of 200 sq ft.
			Tree Planting	Recommendations for species and services
*rebates will not exceed 50% of the total project cost. Limited to \$2,000 per household or \$6,000 per institution.				

Chesapeake Bay Watershed Residential BMP Incentive Programs

Organization	Program	Website	BMP	Incentive Program
Montgomery County	RainScapes Rewards Rebate	http://www.montgomerycountymd.gov/dep/water/rainscapes-rebates.html	Conservation Landscape	\$2.00/sq ft.
			Pervious Pavers	\$4.00/sq ft or \$1,200 (whichever is greater). If roof piped into project, then roof area included in sq ft calculation.
			Rain Barrel	\$1.00/gal. Max \$250. Minimum 200 gallons.
			Rain Garden	\$5.00/sq ft w/ 1' soil depth. \$7.00/sq ft with 2' soil depth. \$9.00/sq ft with 3' soil depth. OR \$1,200 (whichever is greater).
			Tree Canopy	Up to \$200.00 per tree.
			Impervious Removal	\$2.00/sq ft if replacing with sod. \$4.00/sq ft if replacing with conservation landscaping.
PENNSYLVANIA				
Conewago Creek	Conewago Creek Initiative	http://www.conewagoinitiative.net/practices/home/stormwater-incentives-program	Rain gardens, bioswales, riparian buffers, rain barrels, native meadows, etc.	Cost-Share paid upon verification of install with 80% of design and install costs up to \$5,000
Little Conestoga Partnership	Healthy Watershed Stormwater Incentives Cost Share Program	http://www.littleconestoga.org	Rain Gardens	Eligible BMPs are cost shared at 80% of cost up to \$5,000. Forest Riparian Buffers are cost shared at 100%.
			Forest Riparian Buffers	
			Tree Plantings	
			Native Meadows	
			Pervious Pavers	
			Rain Barrels	
			Cisterns	
DISTRICT OF COLUMBIA				
District Department of the Environment (DDOE)	RiverSmart Homes	http://green.dc.gov/riversmarthomes	New enhancements can receive up to \$1,200 for:	With a Copayment of:
			Rain Barrel	\$45
			BayScape	\$100
			Rain Garden	\$75
			Shade Tree	\$50
	RiverSmart Rebates	http://green.dc.gov/service/riversmart-rebates	Rebates for:	Amount back:
			Rain Garden	\$1.25/sq. ft with a maximum of \$1,000
			Permeable Pavers	
			Impervious Removal	
			Rain Barrel	\$1.00/gallon stored up to \$500.

Appendix 4B

RiverWise Maintenance Agreement



CHESAPEAKE RIVERWISE COMMUNITIES FINANCIAL INCENTIVE PROGRAM MAINTENANCE AGREEMENT

The Alliance for the Chesapeake Bay (Alliance) has grant funding to install BayScaping, rain gardens, and trees as a part of their Chesapeake RiverWise Communities.

(Name of Property Owner) at _____
(Address of Property Owner)
has had their property assessed by the Alliance and has voluntarily agreed to participate in this program.

For the purposes of this agreement, the Best Management Practices (BMPs) are defined as follows:

- “BayScaping” is defined as: An area that is landscaped using native plants from the mid-Atlantic region that are suitable to the site conditions. The BayScaped area will be designed to use plants adapted to the site's environmental conditions so that they will require little to no watering, fertilizer, or pesticides once established and, when possible, will provide habitat and food for wildlife. The BayScaped area will include a variety of plants and plant heights, plants with deep roots, and a layer of mulch to encourage storm water retention and uptake.
- “Rain garden” is defined as: An area that is designed to accept storm water from a rooftop or other impervious surface and allow it to infiltrate into the ground. The rain garden is designed to accept rain water from a point and, during large rain events, to accept overflow using sheet flow into the surrounding land without the use of an under drain attached to the sewer system. The rain garden is landscaped with native plants from the mid-Atlantic region that are adapted to be occasionally inundated with water.
- “Tree Planting” is defined as: The installation of trees from an approved native species list that follow the selection and installation guidelines provided.

Responsibilities of the Alliance for the Chesapeake Bay:

1. Educate property owners about the Chesapeake RiverWise Communities program
2. Meet with property owners to ensure they understand the project and the maintenance required with it
3. Ensure the homeowner's proper use and maintenance of rain gardens, BayScape gardens, and trees, and monitor these installations for not less than six months and up to one year.
4. Oversee contractor's work to install the selected BMP.

Responsibilities of the Property Owner:

1. Allow access to the site by Alliance representatives
2. Locate any surface or subsurface property conditions such as pipes, cables or other obstructions or hazards on the property
3. Allow photos to be taken before, during, and after installation of all projects to be used at the discretion of the Alliance
4. Allow Alliance representatives access to the rain gardens, BayScape gardens, rain barrels, and/or tree plantings for up to one year after installation to inspect for proper maintenance
5. Consider allowing access to property for pre-scheduled watershed friendly garden tours or displaying a sign on their property upon completion of installation explaining the landscape feature installed, their benefit to water quality, and that they were funded through grant funding
6. Maintain the BMPs, including adequate watering of any installed plants and weeding at least four times a year (see *Care Instructions*) so the BMPs continue to function properly
7. If unsure of proper maintenance of the installed BMPs request technical assistance from the Alliance
8. Promptly give notice to the Alliance and the contractor of observed installation defects

The responsibilities and obligations of the Owner shall constitute a covenant running with the land, and shall be binding upon all subsequent owners, their administrators, executors, assigns, heirs and any other successors in interest so long as they own the Property or any portion thereof served by the Facilities. Notwithstanding the foregoing, it is understood and agreed that any liability arising during the period of time when any such Owner owns the Property, or any portion thereof, shall remain a personal liability of such Owner.

Financial Obligation of the Property Owner:

The Financial Incentive Program provides you with a cost-savings but is not free-of-charge. So that property owners have some ownership of the landscaping work, the Alliance requires them to pay a \$25 enrollment fee.

Indemnification

The Property Owner agrees to indemnify and hold harmless the Alliance for the Chesapeake Bay and all of its officers, agents and servants against any and all claims of liability or lawsuits arising from or based on, or as a consequence of or result of, any act, omission or default of Alliance employees, in the performance of activities through the Chesapeake RiverWise Communities program.

ALLIANCE FOR THE CHESAPEAKE BAY:

ACCEPTED BY: _____

SIGNATURE: _____

DATE: _____

PROPERTY OWNER:

ACCEPTED BY: _____

SIGNATURE: _____

DATE: _____

Appendix 4C

RiverWise Financial Assistance Program Guidance



Chesapeake RiverWise Communities Financial Incentive Program Rebate Guidelines

Rebate Structure:

- For installation of rain barrels, you will receive \$1 per gallon up to \$250.
- For the installation of trees, you will receive 75% of the cost of the tree.
- For installation of a rain garden, you will receive 75% of costs up to \$1,500 for reimbursement of your material expenses.
- For installation of a BayScape, you will receive 75% of costs up to \$1,500 for reimbursement of your material expenses.

Steps to Complete *Before* Project Construction:

- ☐ Put together a Site Design for project construction and estimated project cost (please see Site Design Guidelines for your project type(s))
- ☐ Submit your Site Design to the Alliance for the Chesapeake Bay.
- ☐ Take *Before* pictures (digital)
- ☐ Sign and submit the *Maintenance Agreement*

You will receive a pre-construction approval form to begin construction (if your project needs revisions you will be notified). **Construction must be completed within 4 months of the date of the Pre-Construction approval notification.** Once the work is completed the Alliance for the Chesapeake Bay at 804-775-0951 and schedule a post construction inspection.

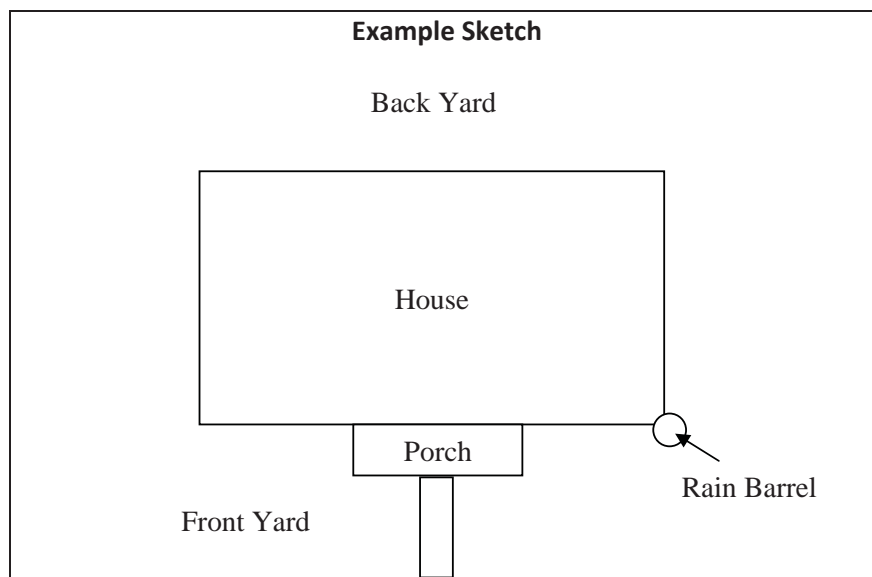
Please note that you may be able to receive a credit on your City of Richmond stormwater utility bill for implementing some of these practices on your property. According to the website (<http://www.richmondgov.com/dpu/StormwaterCredits.aspx>), rain barrels and rain gardens are eligible as long as they meet certain criteria. BayScapes may also be eligible for the “vegetated filter strip” practice credit if they meet the City’s criteria. Please see the Single-Family Residential Manual (<http://www.richmondgov.com/dpu/documents/SWcreditmanual.pdf>) for installation criteria and application guidelines.

Site Design Guidelines Checklist for Rain Barrel Installation

Please use the Alliance's "Rain Barrels: Capturing and Using Roof Runoff" for installation tips. Please email a document that includes the following Site Design Specifications for pre construction approval.

The Site Design Specifications:

- ☐ Square footage of roof going to rain barrel
- ☐ Simple sketch showing placement of rain barrels
- ☐ Estimated project cost



Site Design Guidelines Checklist for Native Tree and Woody Shrubs Plantings

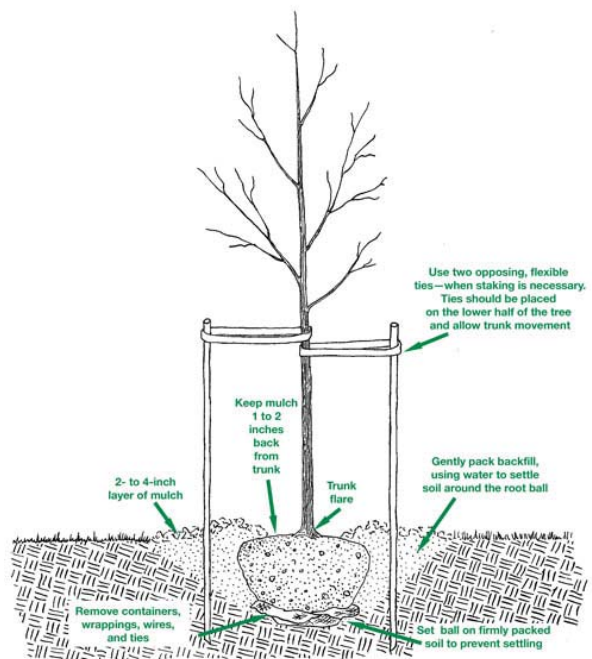
Please email a document that includes the following Site Design Specifications for pre construction approval. Once approved follow the installation tips below for planting.

The Site Design Specifications:

- ☐ Simple sketch showing placement of trees
 - Tree placement:
 - Tall trees (60 ft or more at maturity) should be placed at least 35 feet from buildings
 - Tall trees should be placed at least 65 feet from utility lines
 - Medium trees (40 ft at maturity) should be placed at least 15 feet from utility lines
 - Small trees (20 ft at maturity) may be placed under utility lines
 - Trees should be located away from all public utilities (above and below ground), with exception to small trees under utility lines (see note above). Contact Miss Utility (1-800-552-7001) to have property marked prior to planning and installation.
 - Consider the size of the tree at maturity when deciding where to plant. Please contact local arborists with concerns.
- ☐ Plant list with quantity, size, and species (common & scientific name)
 - Trees and woody shrubs must be native species. You can use the following sites to search for native plant ideas:
 - <http://www.nativeplantcenter.net>
 - http://www.dcr.virginia.gov/natural_heritage/np.shtml
 - Only container trees or bare root seedlings are permitted (no balled and burlapped trees).
- ☐ Estimated cost

Installation Tips:

- Remove grass from the area where the tree is to be planted
- Trees should only be planted from October to March
- Planting:
 - Trees and shrubs in pots should be planted according to the directions at: http://www.treesaregood.com/treecare/tree_planting.aspx
 - Bare root seedlings are planted as follows:
 - Dig a hole wider, but not deeper, than the roots.
 - Place the seedling in the hole so that it is at the same depth it was planted at the nursery; be sure all roots point down.
 - Fill in with the soil that came from the hole and pack it firmly.
- Water thoroughly.
- Mulch with shredded bark or wood chips. The mulch should be 2-3 inches deep and extend to the dripline of trees and never touch the trunk of the tree.
- Do not fertilize and do not use soil amendments when planting the tree.



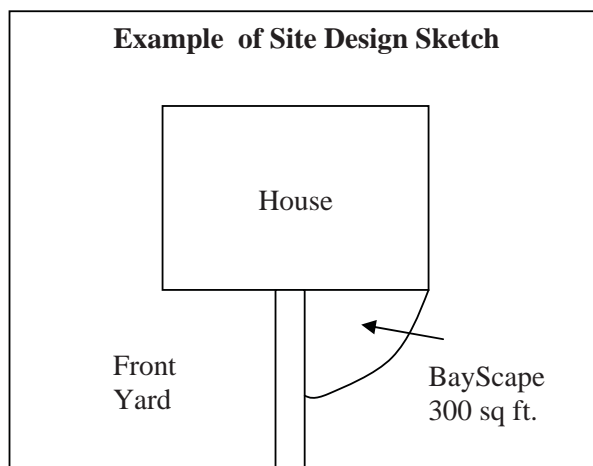
Chesapeake RiverWise Communities Financial Incentive Program Rebate Guidelines

Site Design Guidelines Check list for BayScapes

Please use the Alliance's "BayScapes: Homeowner's Guide to Designing Your Property" publication to help you with placement and design. Please email a document that includes the following Site Design Specifications for pre construction approval.

The Site Design Specifications:

- ☐ Please prepare a simple sketch of the Site Design
 - Include dimensions, rough outline of BayScapes garden, and location descriptors (front, back, side yard)
 - Must replace existing lawn area or bare soil areas and encompass a minimum of 120 square feet (justification for size constraints must have prior approval from the Alliance)
 - Native plant material must total at least 34 gallons for 120 square feet (size of perennials can be substituted at a 2 quart: 1 gallon equivalency)
- ☐ Plant list with quantity, size, and species (common & scientific name)
 - Must be native species. You can use the following to search for native plant ideas:
 - <http://www.nativeplantcenter.net>
 - http://www.dcr.virginia.gov/natural_heritage/np.shtml
 - The plant list on the back of the BayScapes publication.
- ☐ Mulch Source and Type (must be 2"-3" of dense material like wood chips or shredded hard wood)
- ☐ Contact Miss Utility (1-800-552-7001) to have property marked prior to planning and installation.
- ☐ Estimated project cost



Note: You may be able to receive a credit on your stormwater utility bill if your BayScape meets the criteria for vegetative filter strips. To qualify, the following criteria must be met:

- 50% of roof area must drain to vegetated area
- Must be at least 50ft long.
- Runoff from downspouts must be dispersed using a splash block.

For more information, visit: <http://www.richmondgov.com/PublicUtilities/StormwaterCredits.aspx>

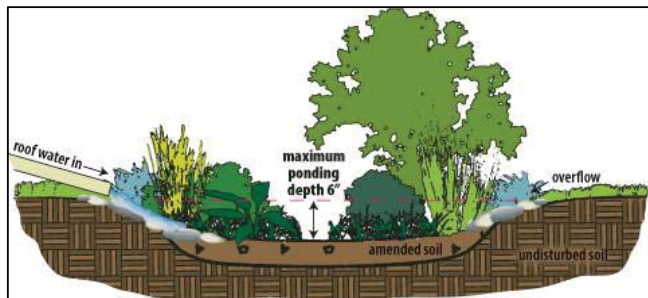
Site Design Guidelines Checklist for Rain Garden Installation

Please use the for design and installation tips. Please email a document that includes the following Site Design Specifications for pre construction approval, including the Rain Garden Calculation worksheet.

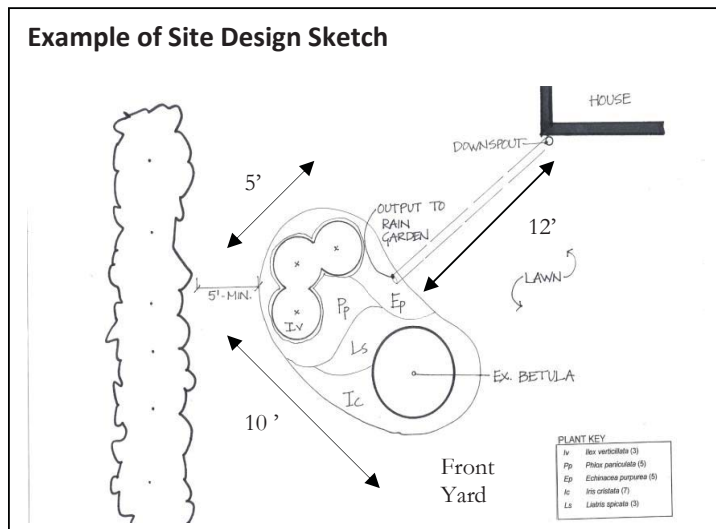
The Site Design Specifications:

- ☐ Use the Rain Garden Calculation Worksheet (on next page) to determine size of rain garden based on amount of runoff treated.
- ☐ Please prepare a simple sketch of the Site Design (use space on Calculation worksheet)
 - o Include dimensions, rough outline of rain garden, distance from any structures, and location descriptors (front, back, side yard), and overflow area
 - o Must be at least 10' from any foundation.
- ☐ Plant list with quantity, size, and species (common & scientific name)
 - o Must be native species. You can use the following to search for native plant ideas:
 - <http://www.nativeplantcenter.net>
 - http://www.dcr.virginia.gov/natural_heritage/np.shtml
 - The plant list from the "Native Plants for Rain Gardens" publication
- ☐ Soil Mix Source (must be 50% sand, 25% topsoil, and 25% compost)
- ☐ Mulch Source and Type (must be 2"-3" of dense material like wood chips or shredded hard wood)
- ☐ Contact Miss Utility (1-800-552-7001) to have property marked prior to planning and installation.
- ☐ Estimated project cost

For installation tips, please see: VA Department of Forestry Rain Garden Technical Guide (http://www.dof.virginia.gov/mgt/resources/pub-Rain-Garden-Tech-Guide_2008-05.pdf)



Example of Site Design Sketch



Rain Garden Calculations Worksheet

Drainage area to Rain Garden:

Roof area= _____ft²

+

Yard area= _____ft²

=

Total area (TA) = _____ft²

Rain Garden surface area:

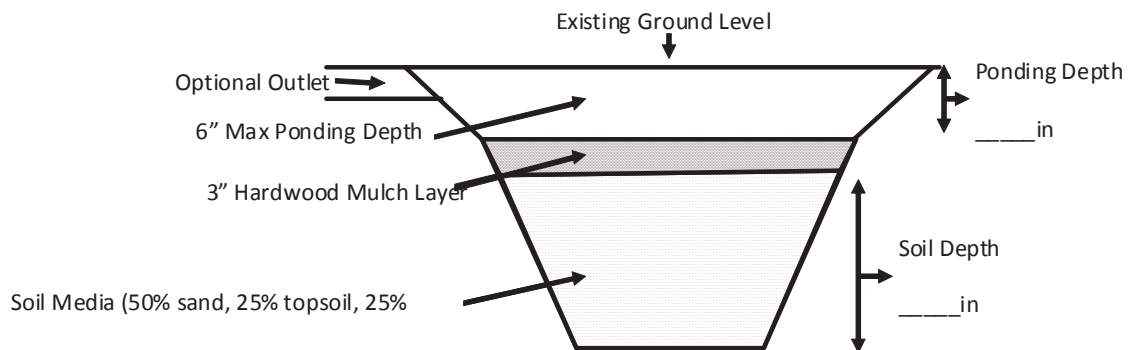
5% of TA

.05 X _____ft² = _____ft²

Site Design Sketch

Design Tips:

- Locate outside the dripline of trees and away from utilities.
- If slope allows, create a stabilized outlet (emergency spillway).
- More clay, less infiltration = deeper soil mix.
- Less clay, more infiltration = shallower soil mix layer.
- Ponding area above the mulch layer should be between 3 to 6".
- If the down spout drains directly into the Rain Garden install 3ft² of fist sized stone.
- No underdrain required.



Appendix 4D

RiverWise Rain Garden Calculation Worksheet

Rain Garden Calculation Worksheet

Address:

Homeowner :

Date:

Drainage area to Rain Garden:

Roof area= _____ ft²

+

Yard area= _____ ft²

$$=$$

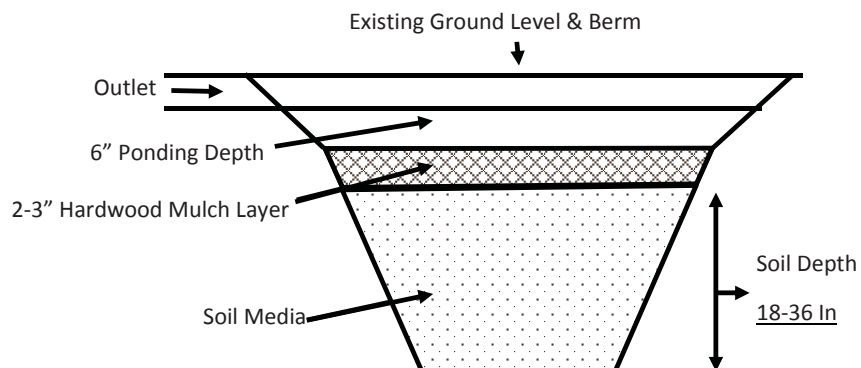
Total area (TA) = _____ ft²

Rain Garden surface area:

5% of TA

$$.05 \times \underline{\hspace{2cm}} \text{ ft}^2 = \underline{\hspace{2cm}} \text{ ft}^2$$

Rain Garden surface area=_____ft²

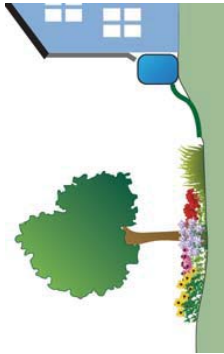
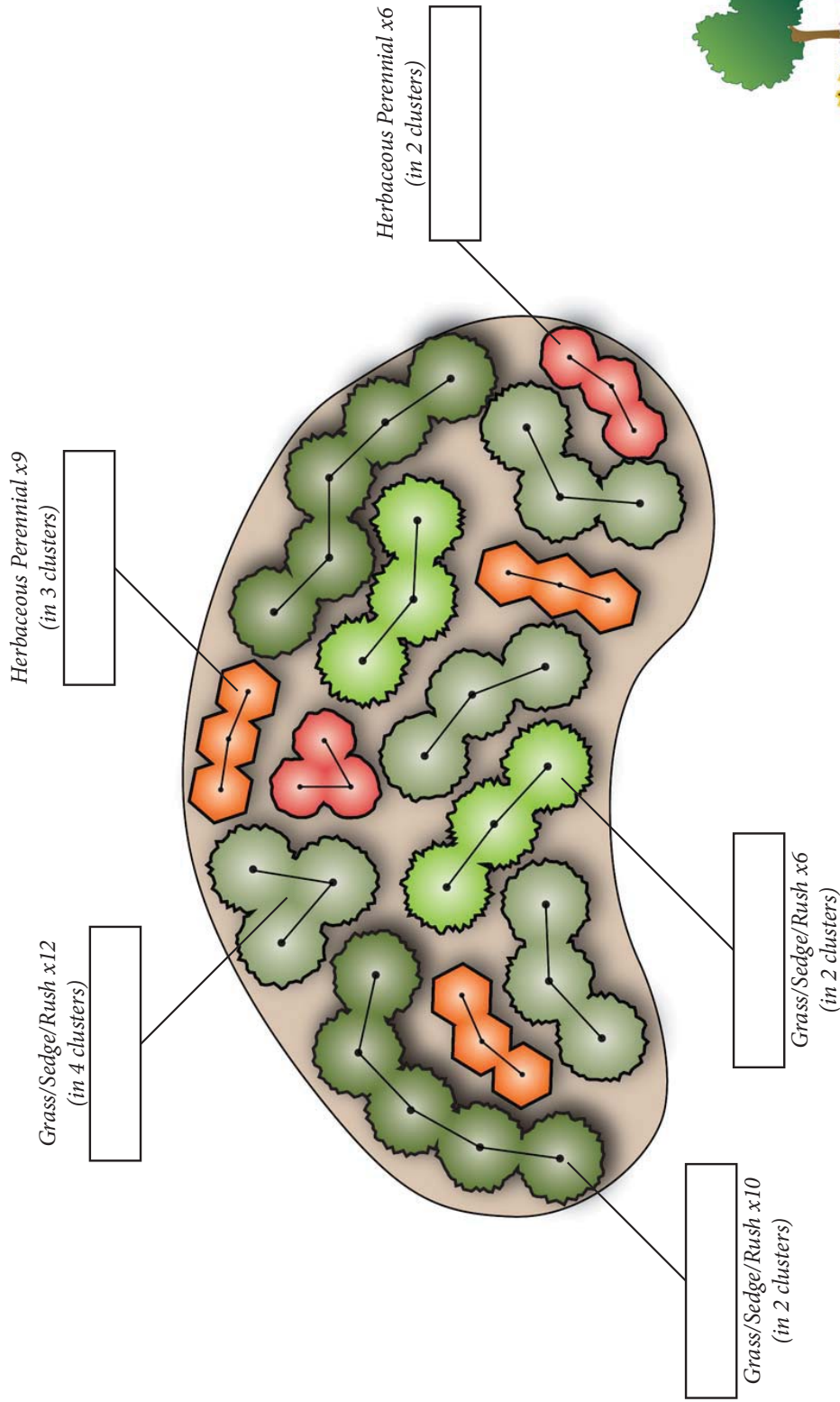
[illegible]

Plan Preparer
Initial

Appendix 4E

RiverWise Planting Templates

Simple Meadow Bayscape - 120 square feet (contained in 17 x 10.5 foot area)



Consider using a rain barrel to save water and water your garden during dry weather!

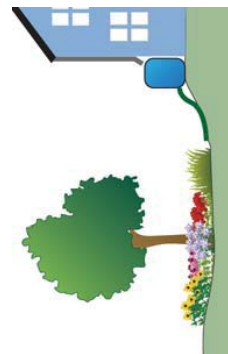
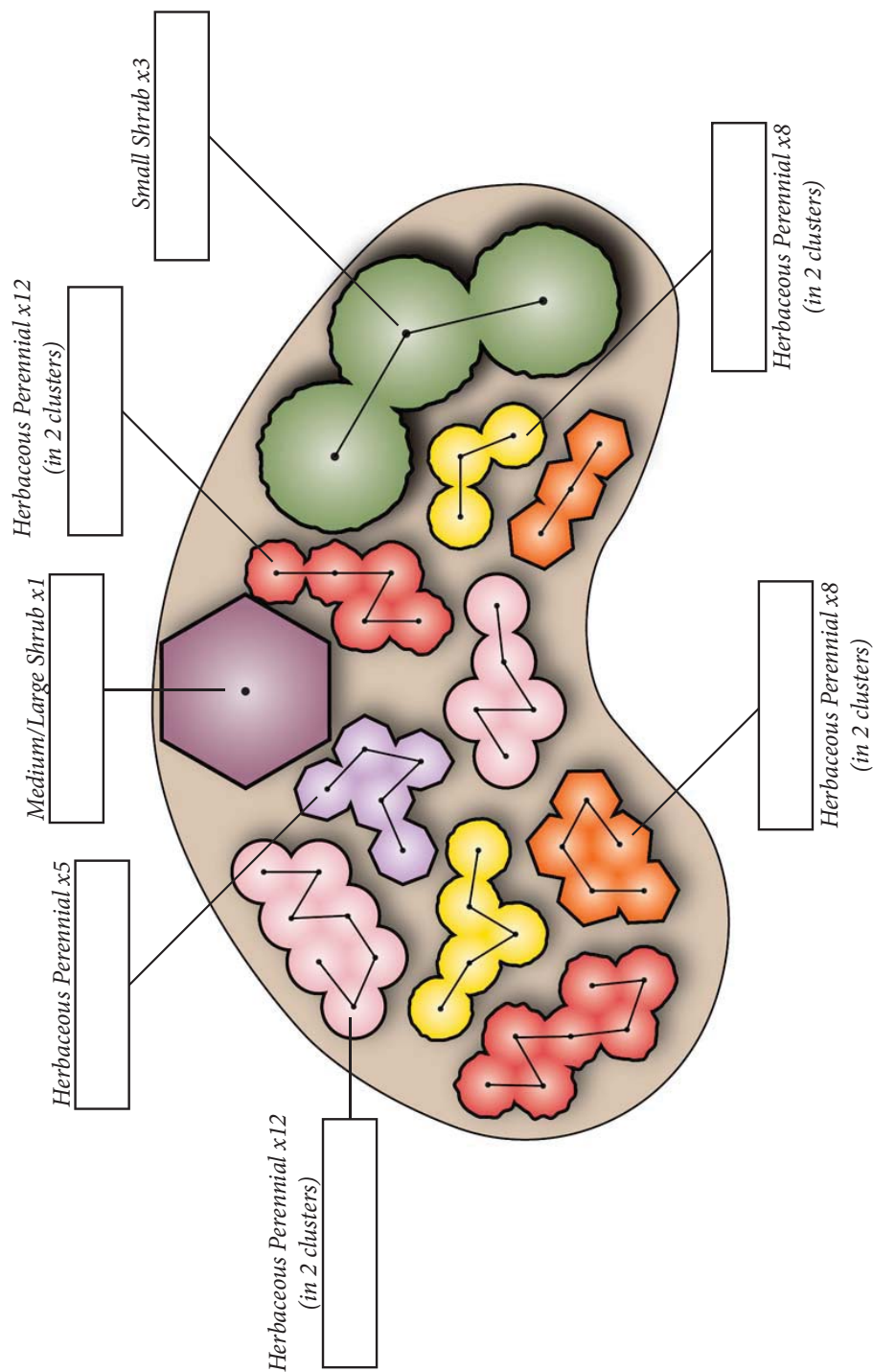


Average Spacing between Plants
Refer to plant nursery tags and adjust as needed

Shrubs = 30"	Grasses = 18"	Perennials = 9-12"
--------------	---------------	--------------------

2 cubic feet of mulch covers ~12 square feet of the garden

Butterfly Garden Bayscape - 120 square feet (contained in 17 x 10.5 foot area)



Consider using a rain barrel to save water and water your garden during dry weather!

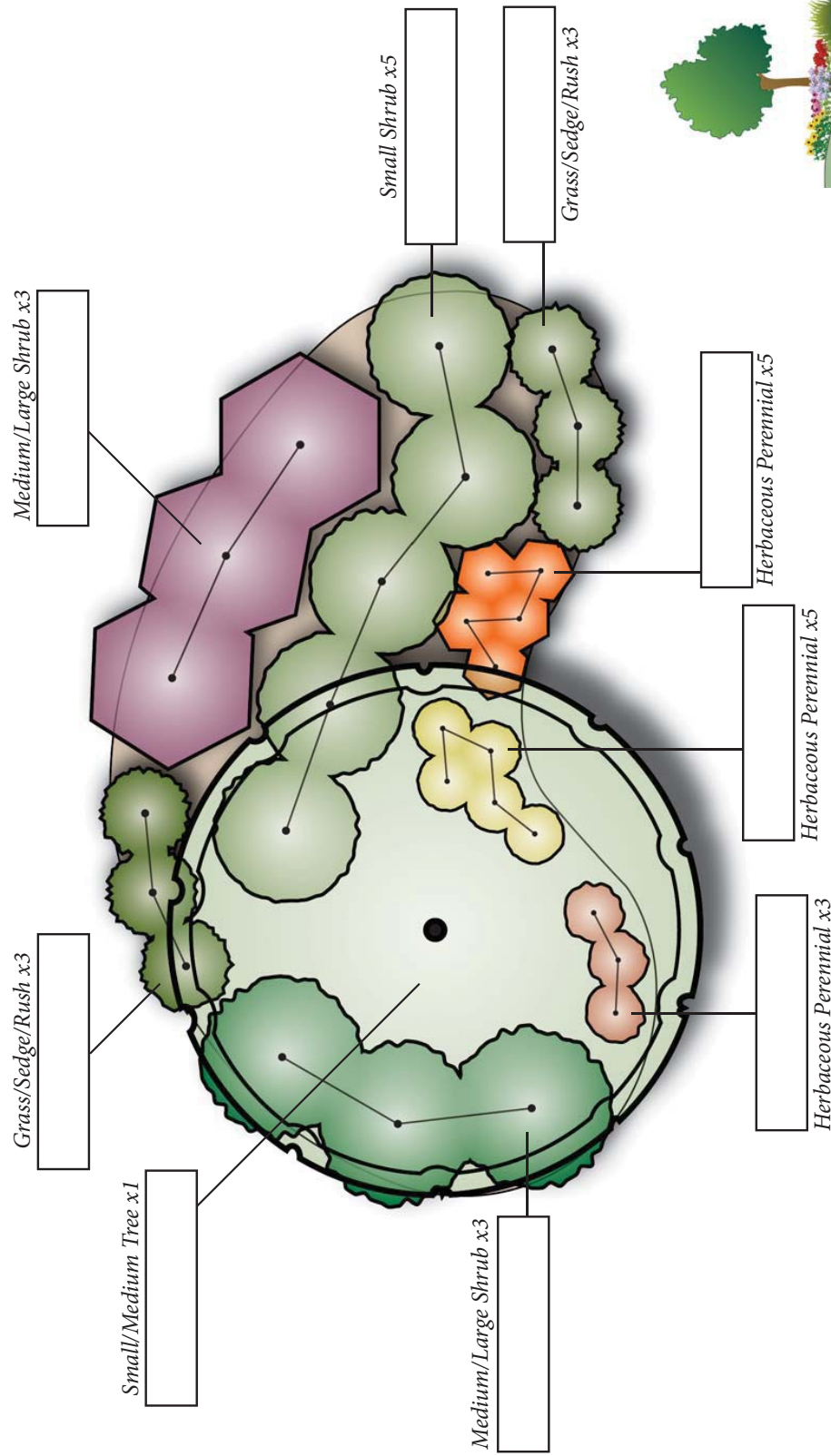


Average Spacing between Plants
Refer to plant nursery tags and adjust as needed

Shrubs = 30"	Grasses = 18"	Perennials = 9-12"
--------------	---------------	--------------------

2 cubic feet of mulch covers ~12 square feet of the garden

Typical Kidney Bayscape - 120 square feet (contained in 17 x 10.5 foot area)



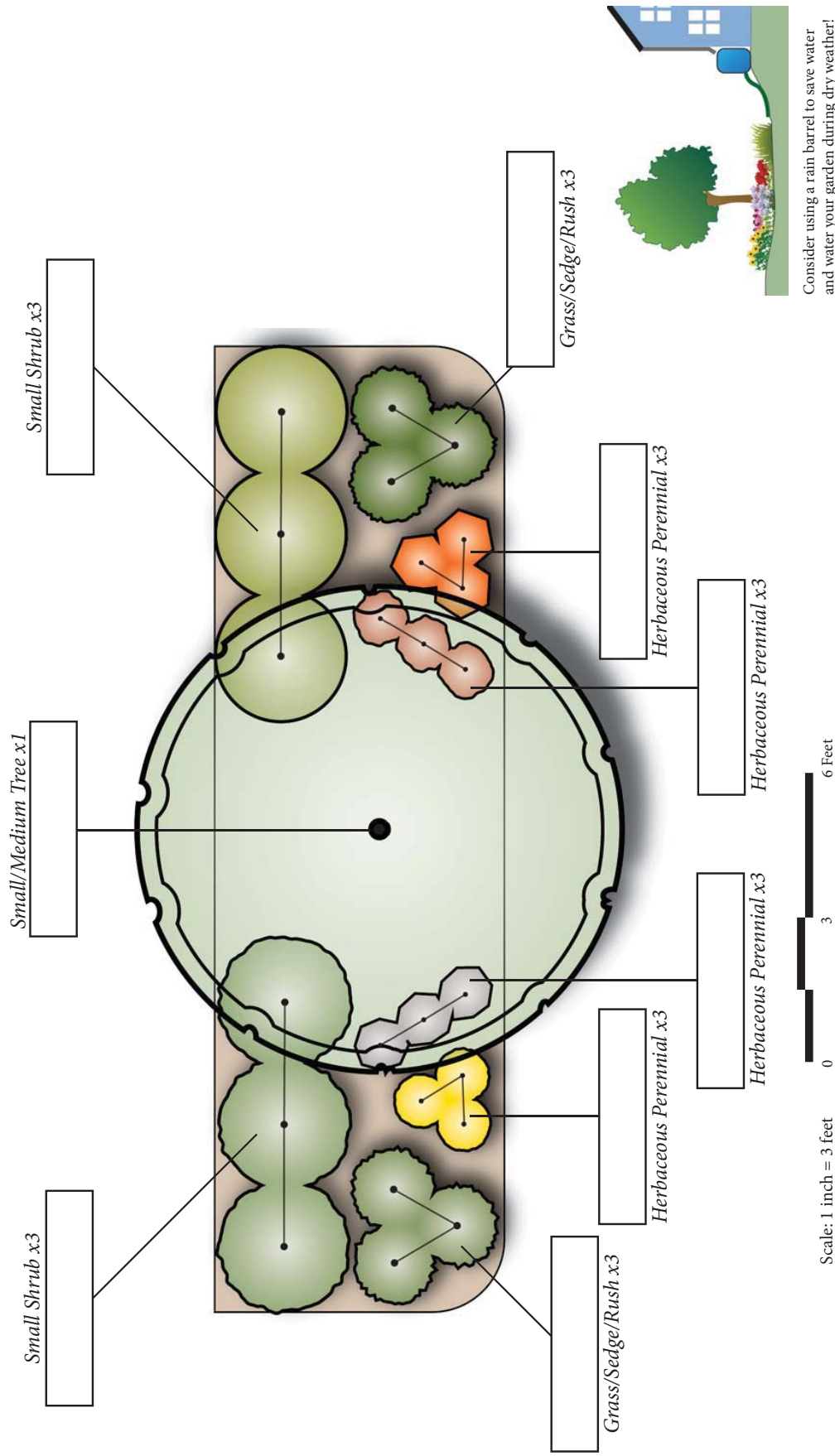
Average Spacing between Plants
Refer to plant nursery tags and adjust as needed

Shrubs = 30"	Grasses = 18"	Perennials = 9-12"
--------------	---------------	--------------------

2 cubic feet of mulch covers ~12 square feet of the garden



Typical Edge Bayscape - 120 square feet (contained in 20 x 6 foot area)



Consider using a rain barrel to save water and water your garden during dry weather!

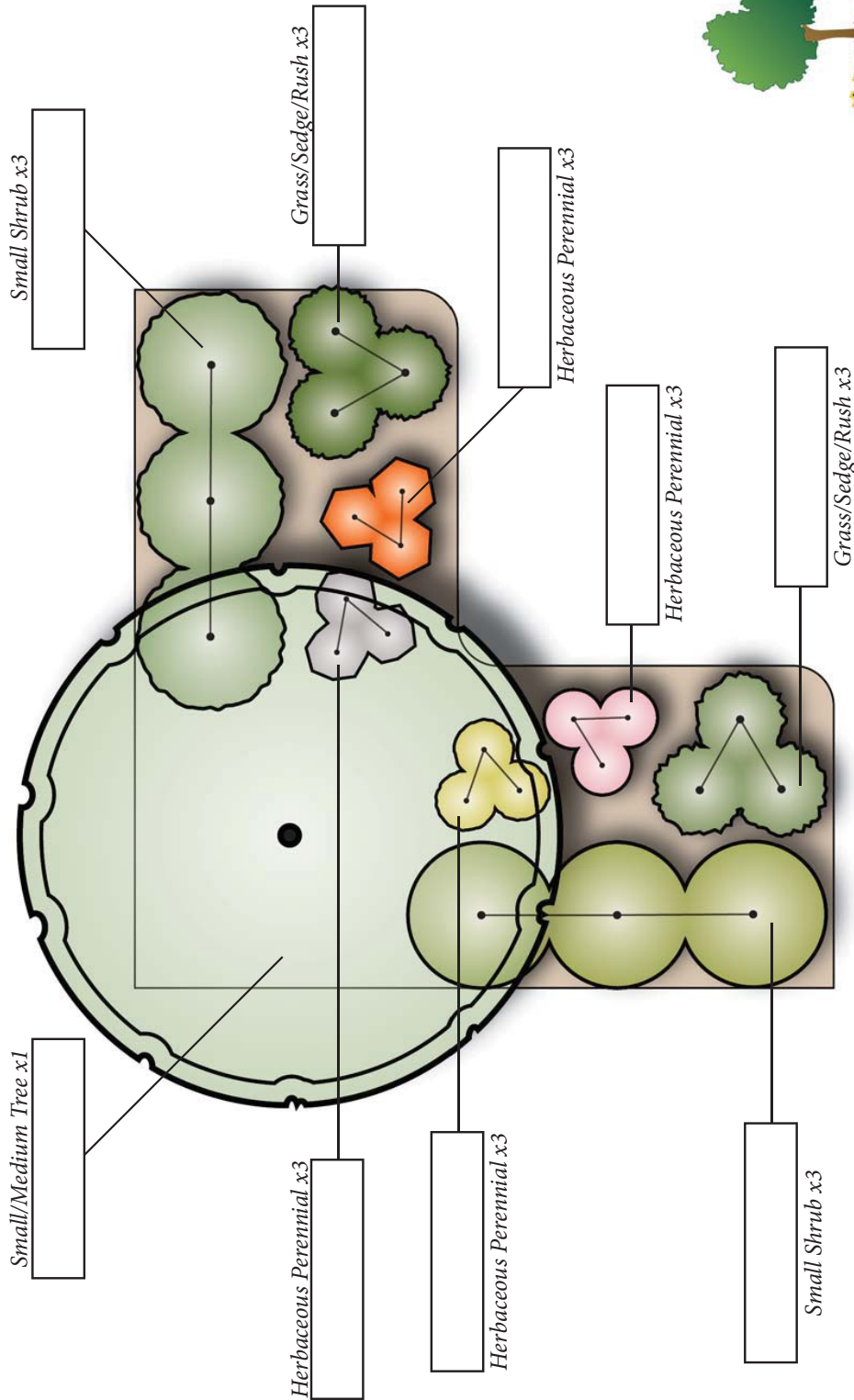


Average Spacing between Plants
Refer to plant nursery tags and adjust as needed

Shrubs = 30"	Grasses = 18"	Perennials = 9-12"
--------------	---------------	--------------------

2 cubic feet of mulch covers ~12 square feet of the garden

Typical Corner Bayscape - 120 square feet (contained in 13 x 13 x 6 foot area)



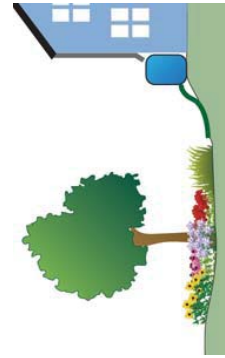
Scale: 1 inch = 3 feet 0 3 6 Feet

Average Spacing between Plants
Refer to plant nursery tags and adjust as needed

Shrubs = 30"	Grasses = 18"	Perennials = 9-12"
--------------	---------------	--------------------

2 cubic feet of mulch covers ~12 square feet of the garden

Consider using a rain barrel to save water and water your garden during dry weather!



Appendix 4F

RiverWise Contractor Enrollment Forms



Chesapeake **RiverWise** Communities
CONTRACTOR QUESTIONNAIRE

Name of company: _____

Contact Person: _____

Address (Street, City, Zip): _____

Phone Number(s): _____

Email(s): _____

Which of the following best management practices (BMPs) are you interested in providing under the Chesapeake **RiverWise** Communities program? *(check all that apply)*

- ☐ Rain gardens ☐ BayScaping ☐ Replacement of impervious surface

To which of the following area(s) are you willing to travel for consultations and installation of Chesapeake **RiverWise** Communities Program BMPs? *(check all that apply)*

- ☐ City of Richmond ☐ Henrico County

From start to finish (initial consultation to completion of installation), how long do you estimate it would generally take you to complete a project?

Rain Gardens: _____ BayScaping: _____ Pervious Surface: _____

What major equipment does your company own?

What months out of the year are you able to install? Can you meet with homeowners year round?

How many total projects do you estimate your company can complete in a year?

Ideally, how many projects would you like to see grouped together for each round of installations?



PARTNERSHIP AGREEMENT FOR THE CHESAPEAKE RIVERWISE COMMUNITIES PROGRAM

Alliance for the Chesapeake Bay &

I. INTRODUCTION

The Alliance for the Chesapeake Bay (“THE ALLIANCE” or “Sub-Recipient”) is overseeing and coordinating the installation of best management practices (“BMPs”) which may include BayScaping, rain gardens, and replacement of impervious surface with pervious surface as a part of their Chesapeake RiverWise Communities Financial Incentive Program. _____ (“Sub-Contractor”) has agreed to participate in the program by installing one or more of the above BMPs at selected properties.

A. DEFINITIONS

For the purposes of this agreement, the BMPs to be installed as part of the Chesapeake RiverWise Communities Financial Incentive Program are defined as follows:

1. “BayScaping” shall be defined as an area of lawn replaced with native plants that are indigenous to the Chesapeake Bay region prior to European settlement;
2. “Rain garden” shall be defined as a small garden landscaped with native plants (as described above) to collect, store and infiltrate stormwater runoff in its loose amended soil and strategically placed to intercept stormwater runoff until it can be fully absorbed into the ground;
3. “Pervious surface” shall be defined as any surface that permits water to soak naturally into the ground. For the purposes of this program, existing impervious surface must be removed and replaced with pervious materials to qualify for grant funding.

II. SCOPE OF SERVICES

A. REIMBURSEMENT ALLOWANCES

The BMPs are eligible for reimbursement in accordance to the following schedule:

1. Up to \$1500 for installation of a rain garden (rain gardens costs shall range from \$1200 - \$1500 dependent upon site difficulties);
2. Up to \$1200 for installation of BayScaping
3. Up to \$3000 for the replacement of impervious surface with a pervious surface.

B. BMP SPECIFICATIONS

1. **Rain garden**
 - a. Review the *Homeowner Audit Report* provided by THE ALLIANCE and the Reedy Creek Coalition (RCC) for recommendations regarding installation location and approximate runoff from impervious surfaces. Contact Anna Mathis at amathis@allianceforthebay.org

for a copy of the audit if necessary.

- b. The rain garden location must be a minimum of 10 feet away from any existing foundation or retaining wall.
- c. During the audit, soil conditions will be evaluated for infiltration with an infiltrometer. If indicated in the audit report or deemed necessary by the contractor's evaluation, existing soil should be removed and replaced with a bioretention soil mix. The bioretention soil mix ratio must be 50% sand, 25% topsoil, 25% compost/leaf mulch.
- d. Permission must be granted by the homeowner for the use of herbicides including Round Up; if permission is not granted then Sub-Contractor can use a sod cutter or hand remove lawn.
- e. To determine the size and depth of the rain garden, fill out the Rain Garden Calculation Worksheet.
- f. The drawdown period for completed installations after any rain event must not surpass 48 hours.
- g. Completed rain gardens should have a 2-3" hardwood mulch layer.
- h. Native plants to the Chesapeake Bay region must be used. Some non-native, non-invasive plant exceptions may be made, but must be approved by THE ALLIANCE prior to use. Refer to the VA DOF Rain Garden Technical Guide or the Alliance's Native Plants for Rain Gardens publication for a list of recommended species.
- i. Plant material must total at least 22 gallons (size of perennials can be substituted at a 2 quart: 1 gallon equivalency). Each rain garden must be a minimum of 50 square feet and have a minimum of 2-3 shrubs at 3 gallons each.
- j. Excavated soil should be used in berm construction. The berm should be constructed from soil or other earthen material. Other materials (i.e. landscaping fabric or burlap) should not be used in the berm construction. The berm must be compact and level to provide sheet overflow.
- k. If the additional excavated soil can stay on site and is placed on a grass or lawn area then the area must be reseeded and straw mulched; if the additional excavated soil is used to create a bed or placed on existing soil then the area must be mulched with 2-3" of hardwood mulch. If there is no suitable location on site for the additional excavated soil, then it must be hauled away.
- l. Provide before, during, and after digital photos of the rain garden site. During construction photos must show depth and layers of rain garden.
- m. The design/proposal must be approved by both the homeowner and THE ALLIANCE before work begins. The calculations worksheet must be submitted with a plant list (common and scientific name), estimate, and before photos.

2. BayScaping

- a. Review the *Homeowner Audit Report* provided by RCC/THE ALLIANCE for recommendations regarding installation location and site information. Contact Anna Mathis at amathis@allianceforthebay.org for a copy of the audit if necessary.
- b. Permission must be granted by the homeowner for the use of herbicides including Round Up; if permission is not granted then Sub-Contractor can use a sod cutter or hand remove lawn.
- c. BayScape gardens must replace existing lawn area or eroded areas and encompass a minimum of 120 square feet. If the area is less than 120 square feet, justification for size constraints must be submitted to THE ALLIANCE. If approved, THE ALLIANCE will reimburse at \$10 per square foot.
- d. Ivy removal is not covered under the grant funding. Homeowners may elect to pay contractor as an additional service or remove themselves prior to installation.
- e. Native plants to the Chesapeake Bay region must be used in creation of BayScape gardens. Some non-native, non-invasive plant exceptions may be made, but must be

approved by THE ALLIANCE prior to use. Refer to <http://www.nativeplantcenter.net> or http://www.dcr.virginia.gov/natural_heritage/np.shtml for a searchable list of native plants.

- f. Plant material must total 34 gallons for 120 square feet (size of perennials can be substituted at a 2 quart: 1 gallon equivalency) with a minimum of 2-3 shrubs at 3 gallons each.
- g. Completed BayScape gardens should have at minimum a 2-3" hardwood mulch layer.
- h. The design/proposal must be approved by both the homeowner and THE ALLIANCE before work begins. A simple sketch showing the rough outline and location descriptors must be submitted with a list of native plants (quantity, size, and species), estimate, and before picture.
- i. Optional items, such as stepping stone pathways, are not eligible for grant funding, but may be added at the homeowner's expense.

3. Replacement of impervious surface

- a. Review the *Homeowner Audit Report* provided by THE ALLIANCE/RCC for recommendations regarding installation location and site information. Contact Anna Mathis at amathis@allianceforthebay.org for a copy of the audit if necessary.
- b. An existing impervious surface, such as cement, asphalt, etc. must be removed. In some cases, bare compact soils may qualify as impervious. This will be noted in audit report, with the results of the infiltration test.
- c. The homeowner may then choose to replace the impervious surface with any type of pervious material, such as gravel, pavers, porous concrete, etc.
- d. Pervious paver projects must follow the City of Richmond Residential BMP pervious paver design standards or manufacturer specifications.
- e. If the project involves concrete removal and no installation of new pervious pavers, the area must then be sodded, seeded and straw mulched, or prepped for a garden installation. The soil underlying the impervious surface removed must be tilled or mixed so that it is no longer compacted.
- f. The design/proposal must be approved by both the homeowner and THE ALLIANCE before work begins. A sketch showing the outline and location descriptors must be submitted with information on type of pervious surface (i.e. interlocking pavers, turfstone).

C. RESPONSIBILITIES OF ALLIANCE FOR THE CHESAPEAKE BAY

- 1. In conjunction with RCC, educate homeowners about the Chesapeake RiverWise Communities program.
- 2. Obtain signed maintenance agreements, co-payments, and any other necessary paperwork from all participating homeowners.
- 3. Provide oversight of Sub-Contractors installing BMPs on private residential properties, including design review.
- 4. Fair share objectives:

Sub-Recipient agrees to comply with the requirements of EPA's Program for Utilization of Minority and Women's Business Enterprises (MBE/WBE) in procurement under assistance agreements, contained in 40 CFR, Part 33. Sub-Recipient will document its efforts to meet the federal fair share objectives for MBE and WBE participation in procurement under this Grant Agreement and submit all documentation available to DDOE.

Sub-Recipient will keep such records as are necessary to determine compliance with the fair share obligations. The records kept by the Sub-Recipient, its Sub-Contractors and Vendors will

be designed to indicate: (1) the number of minority, non-minority, and women owned businesses that applied for the contracts and/or subcontracts, and (2) the number of minority, non-minority, and women owned businesses, employed in each work classification on the project.

Definitions:

Disadvantaged Business Enterprises (DBEs) are entities owned and/or controlled by a socially and economically disadvantaged individuals as described by Title X of the Clean Air Act Amendments of 1990 (42 U.S.C. 7601 note) (10% statute), and Public Law 102-389 (42 U.S.C. 4370d) (8% statute), respectively; a Small Business Enterprise (SBE); a Small Business in a Rural Area (SBRA); a Labor Surplus Area Firm (LSAF); or a Historically Underutilized Business (HUB) Zone Small Business Concern, or a concern under a successor program.

Minority Business Enterprises (MBEs) are entities that are at least 51% owned and/or controlled by a socially and economically disadvantaged individual as described by Title X of the Clean Air Act Amendments of 1990 (42 U.S.C. 7601 note), and Public Law 102-389 (42 U.S.C. 4370d), respectively.

Women's Business Enterprises (WBEs) are entities that are at least 51% owned and/or controlled by women (under the 10% and 8% statutes).

5. Assist Sub-Contractors as necessary in communication with homeowners and RCC to include how the selected BMP installations meet the Chesapeake RiverWise Communities goals.
6. Maintain contact information database of sub-contractor participants and assist homeowners participating through this avenue in selection and oversight of an approved Sub-Contractor.
7. Issue payment to Sub-Contractors for completed installations per property based on above reimbursement allowances, provided that completed projects have met the required BMP specifications.
8. Coordinate inspection of installed BMPs by THE ALLIANCE staff to ensure proper installation and function of each BMP.
9. Provide instructions to homeowner for care and maintenance of installed BMP(s).
10. Complete reporting requirements as indicated by funding sources.

D. RESPONSIBILITIES OF SUB-CONTRACTOR

1. Coordinate with THE ALLIANCE to determine appropriate degree of participation within the Chesapeake RiverWise Communities Program and provide an approximate timetable for project completion.
2. Review audits provided by THE ALLIANCE/RCC to identify approved BMP(s) and location(s) for installation.
3. Meet with homeowners to discuss BMP(s) for their property and provide estimate for each service discussed. Homeowners may elect to hire Sub-Contractor to perform additional services at their own expense.
4. After collection of required paperwork by THE ALLIANCE, provide homeowner and THE ALLIANCE with a design plan for the work to be completed and allow for design changes based on homeowner's suggestions. Sub-Contractor must provide the following information to the homeowner/THE ALLIANCE with the design/proposal:
 - a. Proposal to include written description of work to be performed, list of native plants proposed to be installed, including number and size of each, scientific name, and common name.
 - b. Design plan showing location and size of BMPs (may be sketched or computer generated), including any associated BMP worksheets. (See checklists and worksheets for detailed specifications for each practice.)
 - c. Any optional services, priced separately.

5. Locate any surface or subsurface property conditions such as pipes, cables or other obstructions or hazards on the property by calling Miss Utility before any work begins. If any hidden obstructions or other unexpected conditions arise during the installation, it will be the responsibility of the homeowner to cover any additional costs incurred.
6. Install the BMP(s) selected by the property owner which may include rain gardens, BayScape gardens, and/or replacement of impermeable surfaces with permeable surfaces.
7. Provide instructions to homeowner for care and maintenance of installed BMP(s).
8. Maintain appropriate licenses, workmen compensation, and general liability insurance not less than \$1 million to cover Sub-Contractor activities on the property. Paver Sub-contractors must be ICPI certified. Installers of other pervious materials (such as porous concrete) shall provide one of the following documentation:
 - a. Documentation from an accredited organization certifying the individual/company as knowledgeable and competent with the installation of this material.
 - b. References for three of the most recently completed projects utilizing this material (including client name, phone number, date of installation, and address as well as photos of the completed projects).
9. Submit detailed invoices to THE ALLIANCE according to above reimbursement allowances. Invoices must be itemized to include itemized materials costs, labor rates/hour, design fees, and any other relevant project expenses. Include copies of receipts or other documentation of expenses when possible. Also submit "before" and "after" digital photos of project.
10. Agree to correct any problems identified by THE ALLIANCE staff during inspections before and after completion of project installation at no additional charge to the homeowner or THE ALLIANCE.
11. Agree and acknowledge that you as the Sub-Contractor are solely responsible for any taxes owed, if any, on the payments made payable to it under this Agreement by any taxing authority, whether federal, state or local.
12. Ensure the protection of existing public and private property including but not limited to sidewalks, pavements, landscaping, from damage using methods approved by the City of Richmond such as planking, covering, temporary cement curbs, etc., and shall be responsible for replacement of items that are damaged by work under this Grant. Sub-Contractor shall be responsible for repair or replacement of damages to sidewalks, curbs, streets, public property and public utilities as directed by the City of Richmond in accordance with the standards of the City having jurisdiction over the damaged property. Sub-Contractor shall replace cracked slabs.
13. Sub-Contractor shall clean all sediment and pollutants associated with the project off of any City right-of-way.
14. Sub-Contractor shall be responsible for obtaining any permits associated with this project by the City.
15. Sub-Contractor shall be responsible for personal injury to workmen and the public and/or property damages as a result of any negligent or other wrongful acts or omissions they cause, and shall indemnify and hold THE ALLIANCE harmless for any such injuries that are incurred during the completion of tasked projects.
16. Nothing contained in the drawings and specification shall be interpreted as making THE ALLIANCE a party to, liable for, or relieving Sub-Contractors of:
 - a. Sub-Contractor's responsibility for materials delivered and work performed until completion and final acceptance;
 - b. Sub-Contractor's responsibility to sustain all costs, losses, or damages arising out of the nature of the work to be done, or due to any unforeseen or usual obstructions or difficulties which may be encountered in the accomplishment of the work, or resulting from the work, or resulting from the action of the elements; and
 - c. Sub-Contractor's responsibility to protect existing public and private property.
17. Prior to the start of construction work, Sub-Contractor shall work with THE ALLIANCE to provide a minimum of five (5) site condition digital photographs of adjoining private and public

property and other improvements on and around the perimeter of the project site which may be subject to damage claims.

18. In no event will the Sub-Contractor use grant funds for a purpose other than that of costs allowable for the grant project authorized by this Partnership Agreement. Sub-Contractors will ensure that its Vendors do likewise as set forth herein this paragraph.

E. INDEMNIFICATION

Sub-Contractor agrees to indemnify and hold harmless the Alliance for the Chesapeake Bay and all of its officers, agents and servants against any and all claims of liability or lawsuits arising from or based on, or as a consequence of or result of, any act, omission or default of THE ALLIANCE employees or its Sub-Contractors, in the performance of activities through the Chesapeake RiverWise Communities Financial Incentive program.

ALLIANCE FOR THE CHESAPEAKE BAY:

ACCEPTED BY:

ACCEPTED BY:

SIGNATURE:

SIGNATURE:

DATE:

DATE:

Appendix 5A

**RiverWise
Residential BMP
Verification Form**



Residential BMP Verification Form

Type of Inspection:

- ☐ Initial
☐ Performance

Property Owner

Address or
Coordinates

Inspector Name

Date

Year of Install

Date of last verification

BMP(s) Inspected ☐ BayScape ☐ Rain Garden ☐ Permeable Hardscapes ☐ Trees ☐ Rain Barrels

Drainage Area

BMP(s) in correct location: ☐ Yes ☐ No

Corrective Action(s)

BMP materials are consistent with approved plan: ☐ Yes ☐ No

Corrective Action(s)

BMPs installed per approved plan design and specs: ☐ Yes ☐ No

Corrective Action(s)

Flood test results (only applicable for rain gardens and/or permeable hardscapes):

Results/Comments:

Performance Inspection Only:

Serves intended drainage area: ☐ Yes ☐ No

Functioning per original design: ☐ Yes ☐ No

Maintenance required: ☐ Yes ☐ No

BMPs: ☐ Pass ☐ Fail

Appendix 6A

Assessment Training PowerPoint Presentation

CHESAPEAKE



RiverWise
COMMUNITIES

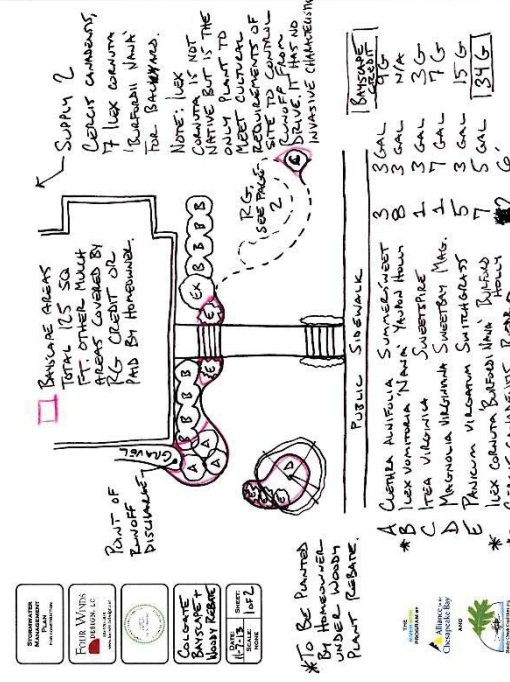
Assessment Training

Anna Mathis and Jacob Bauckman



Assessment Goals

1. Educating homeowners.
2. Identifying structural BMP implementation opportunities.
3. Identifying behavior change “BMP” opportunities.
4. Entrance into incentive programs, such as cost shares, rebates, or stormwater fee reductions.



Assessment Steps

1. Sign-Up:

- Sign up through Alliance.
- Alliance assigns homeowner properties to RMN.
- RMN assessor makes appointment with homeowner and sends out info to homeowner.



2. Pre-assessment

3. Assessment

4. Report

5. Follow-Up

Pre-assessment

Do your Homework

- Download high quality aerial or sketch to form.
 - Google Earth
 - Map.richmondgov.com/parcel
 - <http://viewer.nationalmap.gov/viewer/>
- Existing BMPs
- Watershed impacts
- Stream impacts
- Budget



Assessment

- Walk with owner
- Use this time to educate
- Follow downspouts
- Search out drop inlets
- Look for existing BMPs
- No pre-determined ideas. What sticks out?
- Locate potential BMPs



Retaining Storm Water on Property

Determine the property's contribution to stormwater entering local waterways.

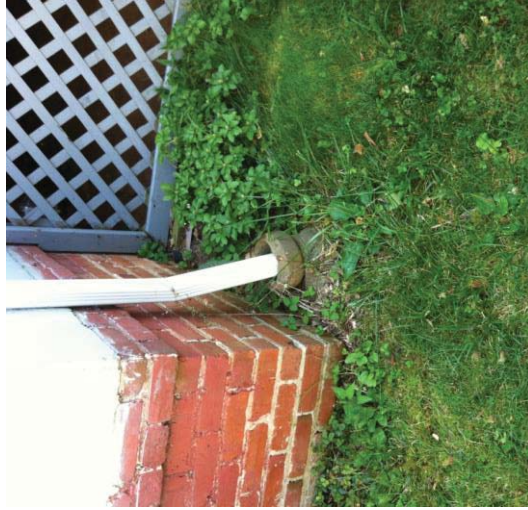
Assessors observe impervious surfaces, erosion, slopes, downspouts, and soils.



Retaining Storm Water on Property

Downspouts

Connected



Disconnected to pervious



Disconnected to impervious



Water Quality Impact



<http://www.ristormwatersolutions.org/docs/DogPoop.jpg>



Identify potential pollution sources:
(most info will come from pre-assessment questionnaire)

- Nutrients/fertilizer
- Sediment
- Pet Waste
- Toxic chemicals
- Organic matter



Watershed and Wildlife Friendly Landscaping



Positive aspects:

- Mature trees
- Vegetative layers
- Larger group plantings
- Appropriate use of mulch
- Native plants



Negative aspects:

- Invasive species
- No layers, little variety
- Non-native species
- Poor mulching practices



What to Look For: Invasive Species

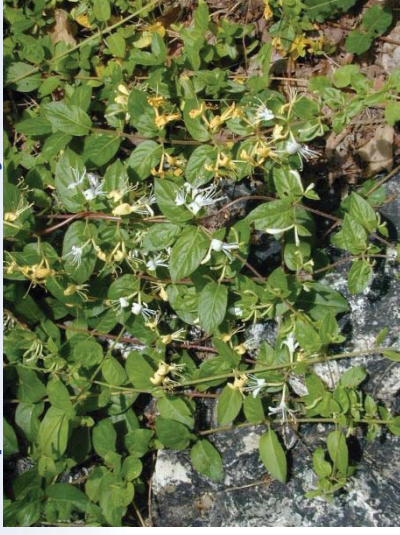
English Ivy



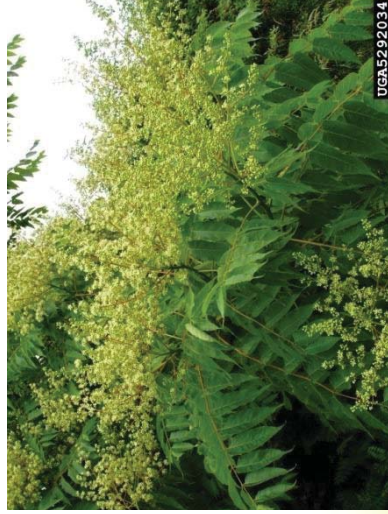
Autumn Olive



Japanese Honeysuckle



Tree of Heaven



Privet



Wisteria





Bittersweet



Assessment

- Visit during or right after a storm event if possible.
- Take pictures from strategic angles.
- Think long term and in stages.
- Note site conditions such as sun exposure, sun direction, vegetative cover, the good things, the bad things, etc.
- Get feed back from property owner on their concerns and needs.

Property Assessment

Name Assessment #
 Address Assessment Date
 Email Phone
 Worked by Conducted by

The following pages are the results of your Chesapeake RiverWise Communities Property Assessment. This report summarizes our observations and explains the recommendations for your property. We have suggested different stormwater Best Management Practices (BMPs), which are drainage techniques and site designs that will substantially reduce stormwater runoff and pollution. Please review this summary and let us know if you have any questions regarding the recommendations.

Recommendations

☐ **Rain barrel(s) [RB]** (help collect water for later use and reduce runoff from the roof of your house)

Location

☐ **Downspout disconnection [DD]**

Location See "Downspout" Section on pg. 3 for specific recommendations for each downspout.

☐ **Tree planting [TP]** (the most effective stormwater BMP. Plant a native variety to provide habitat and food for wildlife.)

Location(s) Sun Exposure Species

Mature Size(s): Tall (60ft+) ☐ Med (40-60ft) ☐ Small (20-40ft) ☐

Location(s) Sun Exposure Species

Mature Size(s): Tall (60ft+) ☐ Med (40-60ft) ☐ Small (20-40ft) ☐

☐ **Rain garden [RG]** (bowl shaped garden with deep loose soil and native plants that soak up water during rain events)

Location Sun Exposure

Previous drainage (sq ft) Impervious drainage (sq ft) Total drainage area (sq ft)

☐ **BayScape [B]** (landscaping area that replaces lawn with native plants that help soak up water)

Location Sun Exposure Approx sq ft

☐ **Permeable pavers [PP]** (alternative to impervious surfaces that allows water to seep through and soak into the ground underneath)

Location Drainage area (sq ft) Approx. size (sq ft)

☐ **Impervious surface removal [IR]** (removal of surfaces such as driveways and walkways)

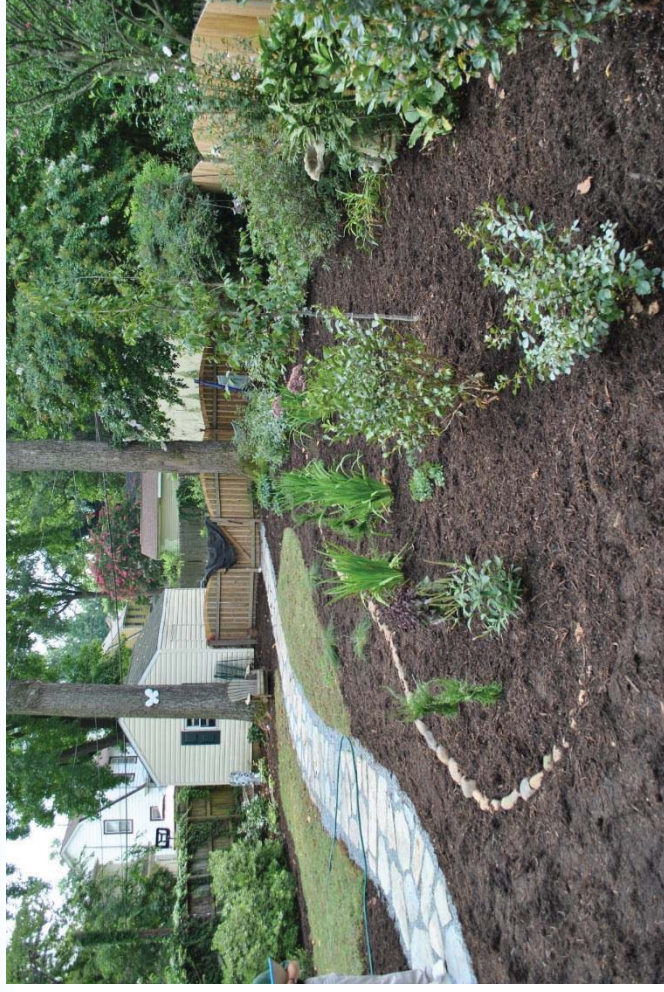
Location Approx. size (sq ft)

Your property contributes to stormwater: ☐ Significantly ☐ Somewhat ☐ Not at all



Recommendations

- Trees
- Rain Barrels
- BayScape
- Permeable Pavers
- Impervious Removal
- Rain Gardens
- Behavioral “BMPs”



Report

- BMP Recommendations
- Include behavioral change BMPs
- Pictures of potential BMP locations
- Indicate practices and other info on aerial view



Follow-up

- Email report to homeowner.
- Send copy to Alliance.
- Follow-up within 2 weeks to answer any questions.

Supplies



- iPad - \$9.99 application PDF Expert – iTunes gift card provided by Alliance if using own iPad.

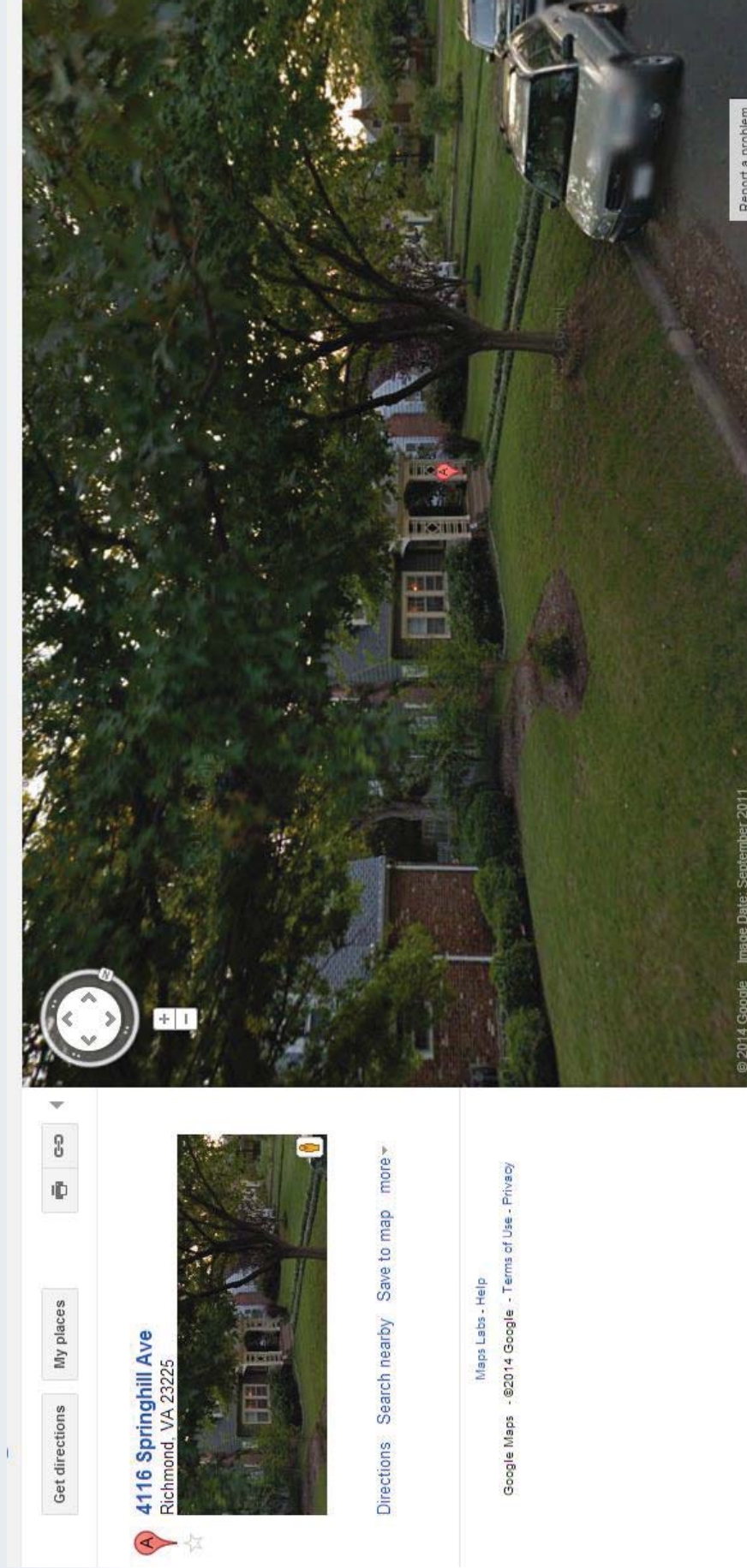


Measuring wheel



Soil probe

Field Assessment



Next Steps

- Assessment “teams”
- Review today’s assessment report
- Assessment assignment w/ trained interns
- Checking out supplies / setting up your iPad

Contact info:

Anna Mathis – amathis@allianceforthebay.org

Jacob Bauckman – jbauckman@allianceforthebay.org

804-775-0951

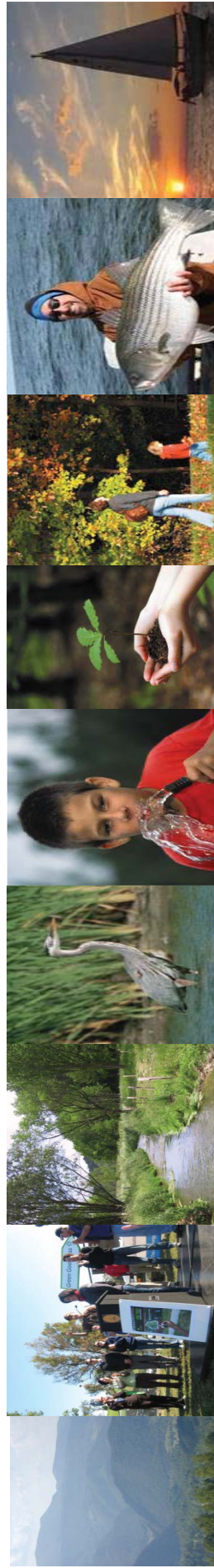
Appendix 6B

Contractor Training PowerPoint Presentation



Contractor Training

Presented by **RiverWise** Program Coordinator



Our mission is...



... to bring together individuals, organizations, businesses, and governments to find collaborative solutions, to build a strong commitment to stewardship, and to deliver innovative, broadly supported programs that benefit the land, waters, and residents of the Chesapeake Bay watershed.

Chesapeake *RiverWise* Communities

- Outreach and Engagement
- Stormwater Assessments
- Financial Incentives
- Installation
- Tracking and Reporting



Altria

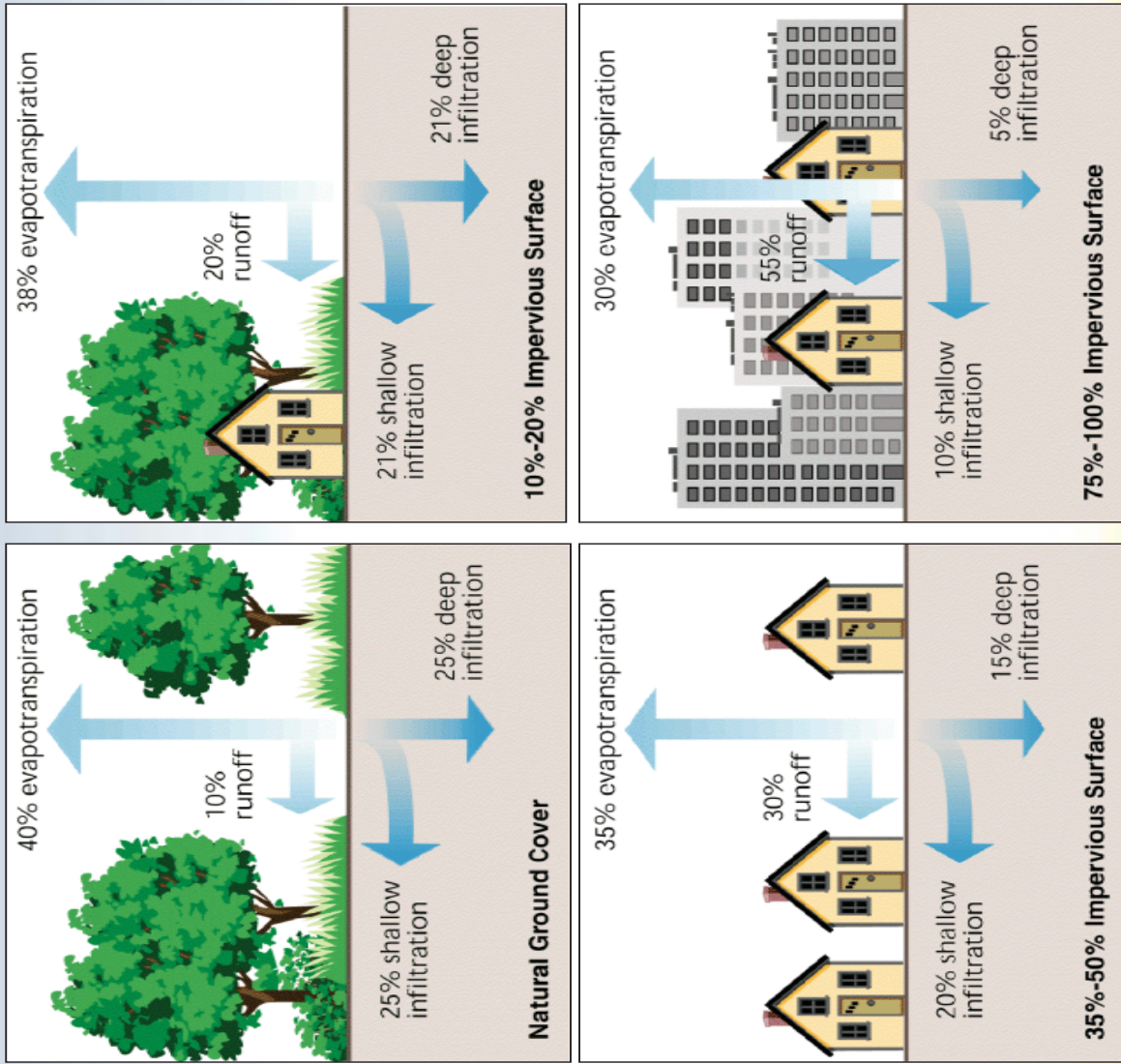


Hydrology

Concepts:

- Stormwater (runoff)
- Pervious vs. Impervious
- CSO
- Water Quality
- Water Quantity
- Stormwater Best Management Practices (BMP's)

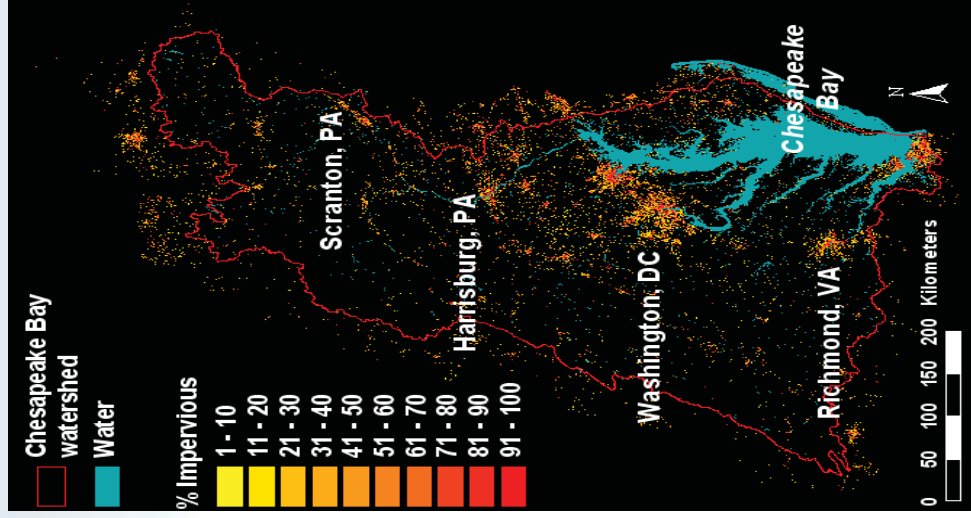




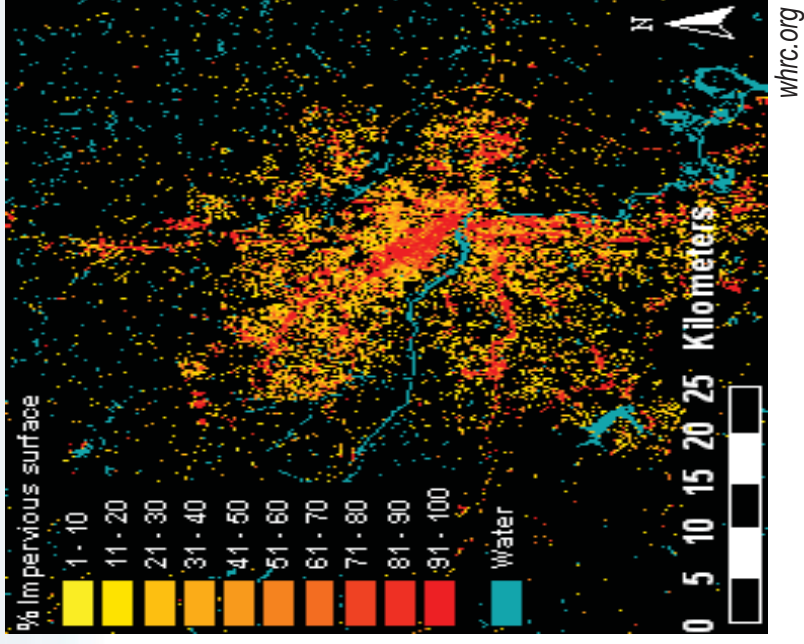
<http://www.fairfaxcounty.gov/parks/accotink/impervious.htm>

Impervious Areas in the

Chesapeake Watershed

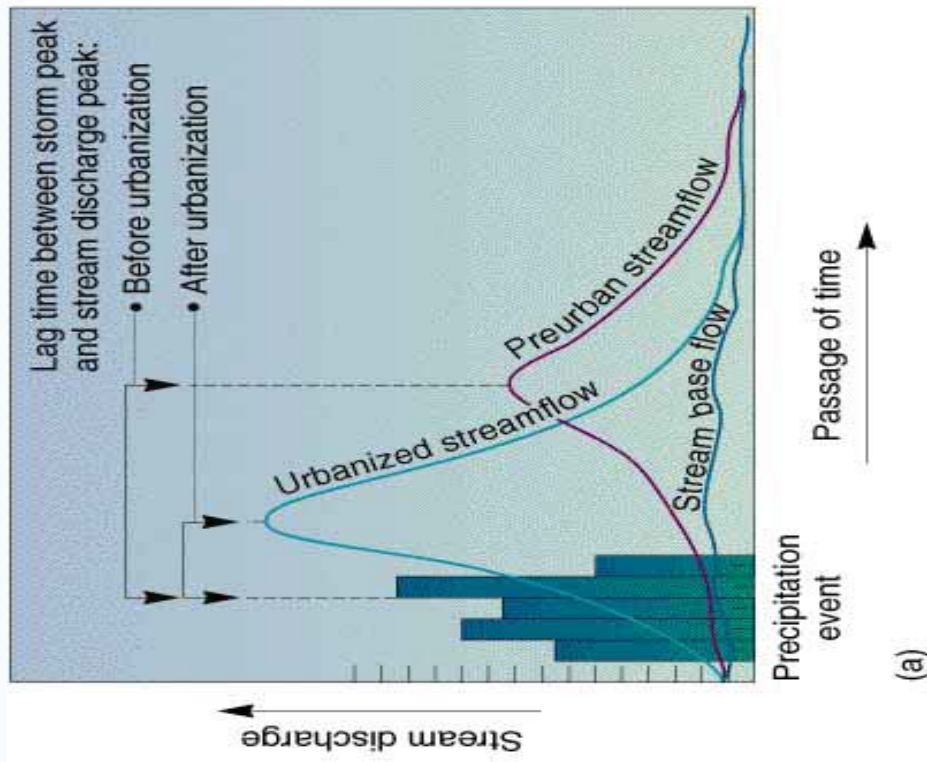


Map of impervious area in
Chesapeake Bay watershed



Map of impervious area in Richmond, VA

Hydrology



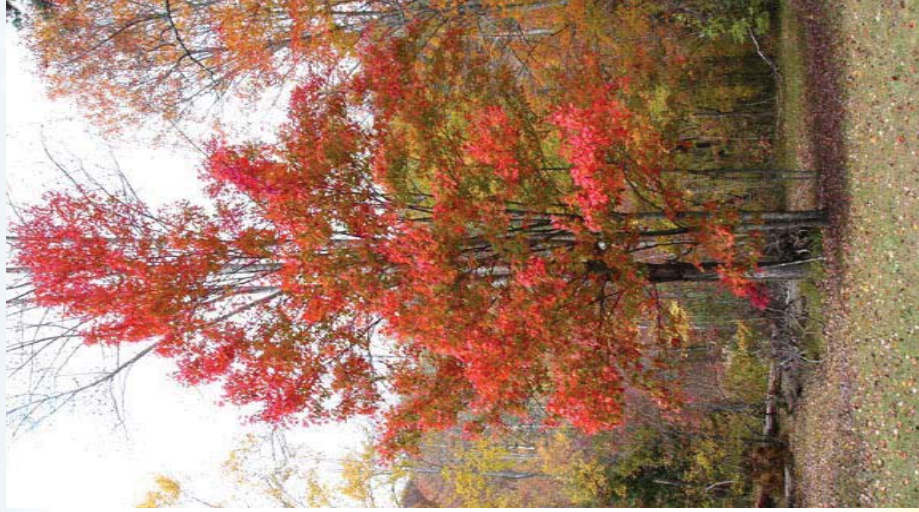
Chesapeake *RiverWise* Communities

Key Practices



- Rain Barrels
- Rain Gardens
- Permeable Hardscapes
- Impervious Removal
- BayScapes
- Tree Planting

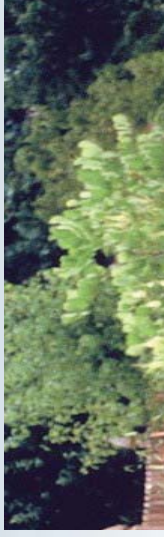
Tree Plantings



- Think long term
- Utilities
- Educate home owners
- Choose right tree for the right place
- Think shade
- Upper Canopy for habitat
- Food Source

Why BayScape?

- Cleaner Water
- Aesthetics
- Wildlife habitat
- Water Quantity
- Conservation Landscaping



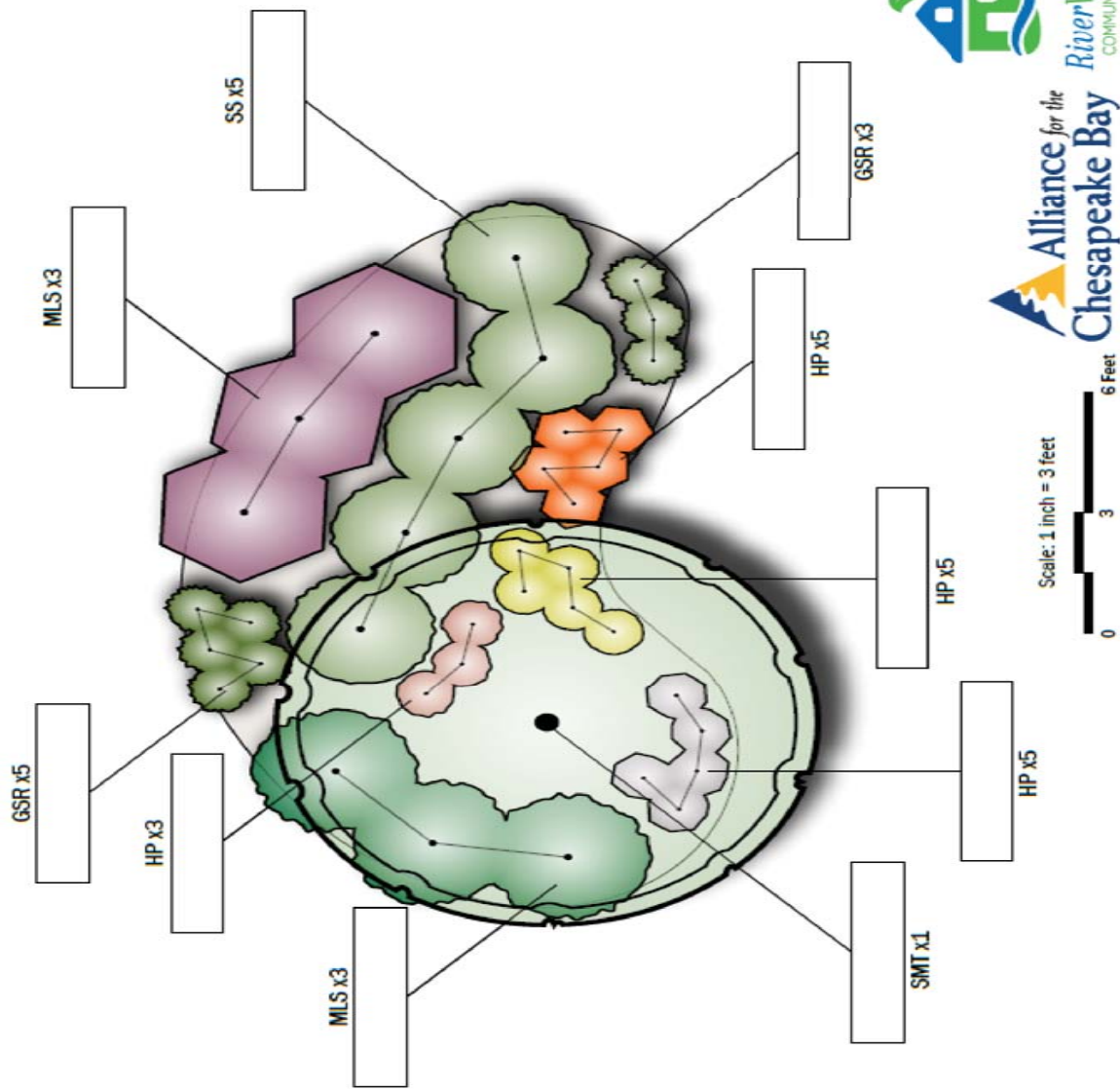
What are BayScapes?

Bayscapes

- Reduce lawn
- Increase infiltration
- Provide food and habitat
- Alternative to rain garden
- Can go almost anywhere
- Large groupings
- Exposure
- Ask about plant preference
- Native plants

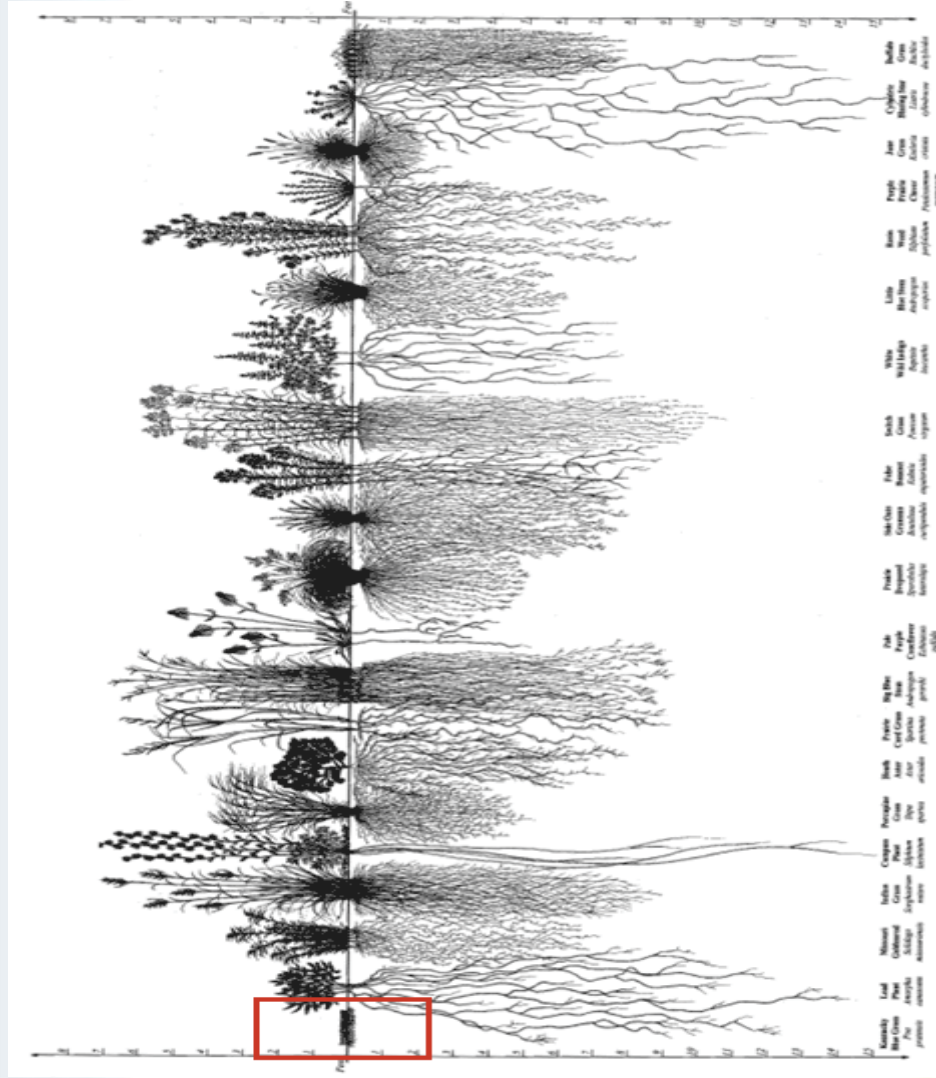


120 sq ft. Bayscape Planting Template



SMT: Small-Medium Trees (2"+ caliper)	
Sweet Gum	Liquidambar styraciflua
Flowering Dogwood	Cornus florida
Eastern Redbud	Cercis canadensis
Red Mulberry	Morus rubra
Black Gum	Nyssa sylvatica
MLS: Medium-Large Shrubs (5+ Gal, 3ft O.C. spacing)	
Winterberry Holly	Ilex verticillata
Shadblow Serviceberry	Amelanchier canadensis
Shining Sumac	Rhus copallina
Red Chokeberry	Photinia pyrifolia
Common Elderberry	Sambucus canadensis
Highbush Blueberry	Vaccinium corymbosum
SS: Small Shrubs (3+ Gal, 3ft O.C. spacing)	
Inkberry Holly	Ilex glabra
Black Chokeberry	Photinia melanocarpa
Maple-leaved Arrowwood	Viburnum acerifolium
New Jersey Tea	Ceanothus americanus
Lowbush Blueberry	Vaccinium angustifolium

Root Systems – Turf vs. Other



What are BayScapes?

Rain Gardens

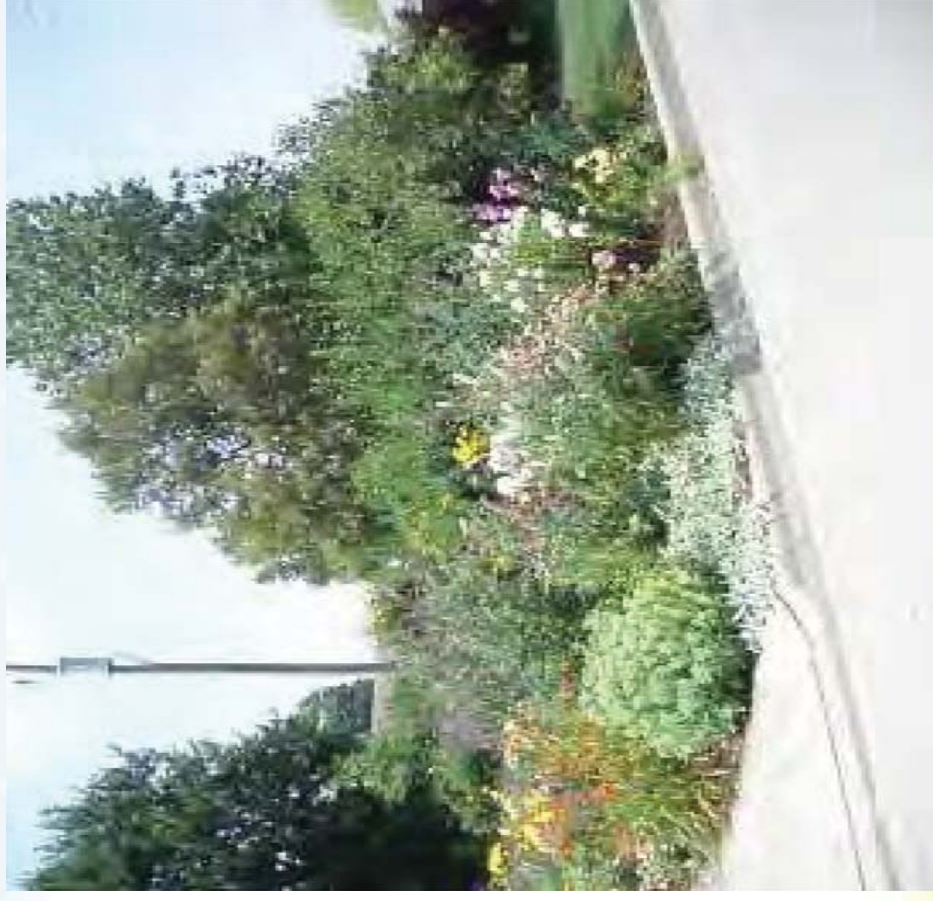
Objectives:

- Function
- Placement
- Design
- Installation
- Maintenance



Rain Gardens

- Reduce quantity and improve quality of stormwater runoff
- Recharge groundwater
- Habitat diversity
- Promote water conservation
- Promote watershed stewardship
- Stormwater rebate



Placement

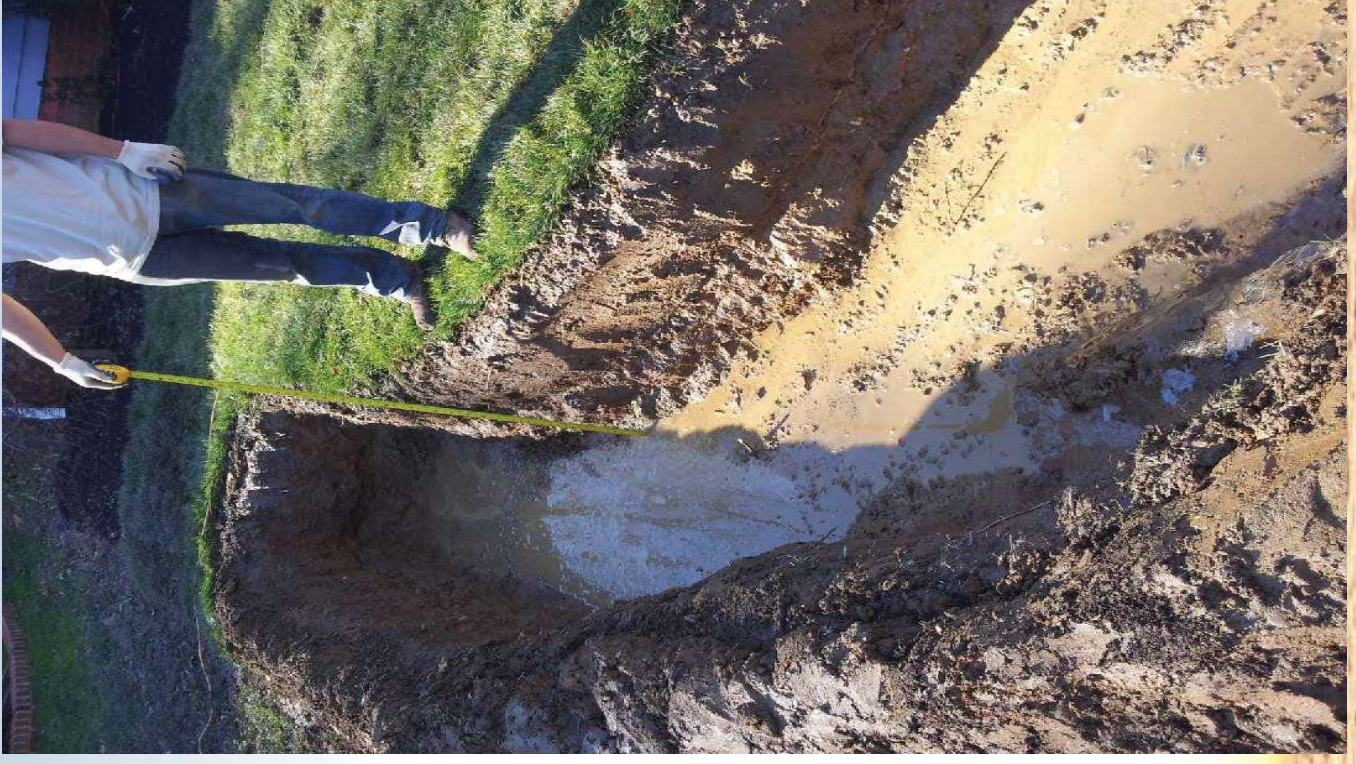
- Observe how water flows naturally
- Extend downspout to capture rooftop runoff or use other concentrated flow of water
- Be sure garden overflows into receiving area in a non-erosive manner





Placement

- 10' from foundations.
- Locate utilities, overhead and underground. (Call Miss Utility)
- Locate so overflow is toward right-of-way, not neighbors.



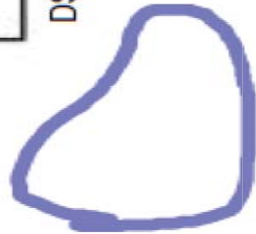
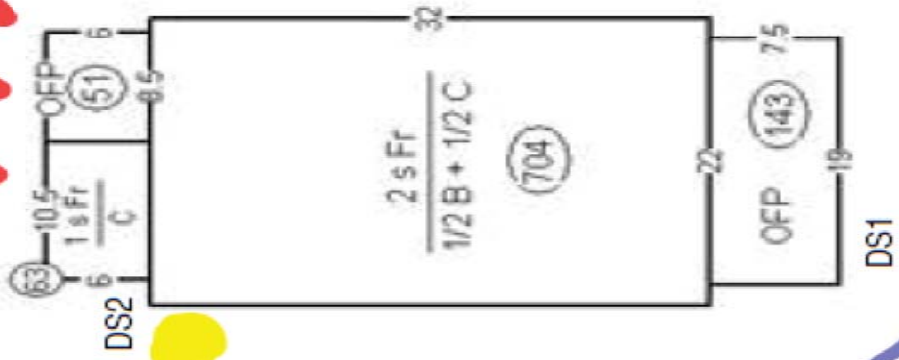
Placement

- 1ft for every inch of tree dia.
- Consider retaining walls.
- If you hit the water table, abort mission. (Coastal, or near stream or river)





Permeable paver suggestion.



Check water lines

during rain events)

drainage area
759 759

ox sq ft.

soak into the ground underneath)
ox. size (sq ft) 231

Calculation Worksheet

Drainage area to Rain Garden:

Roof area= 600 ft²

+

Yard area= 500 ft²

=

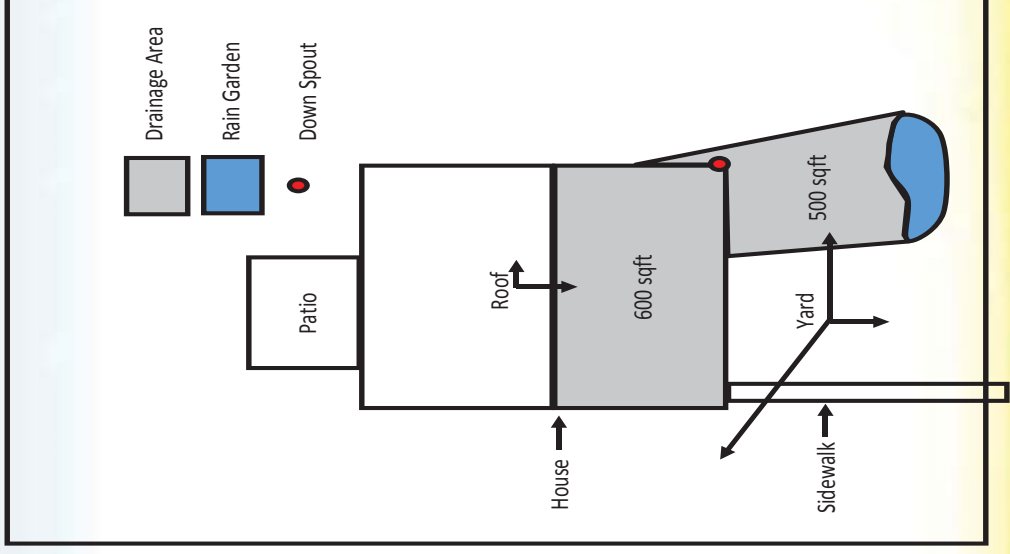
Total area (TA) = 1,100 ft²

Rain Garden surface area:

5% of TA

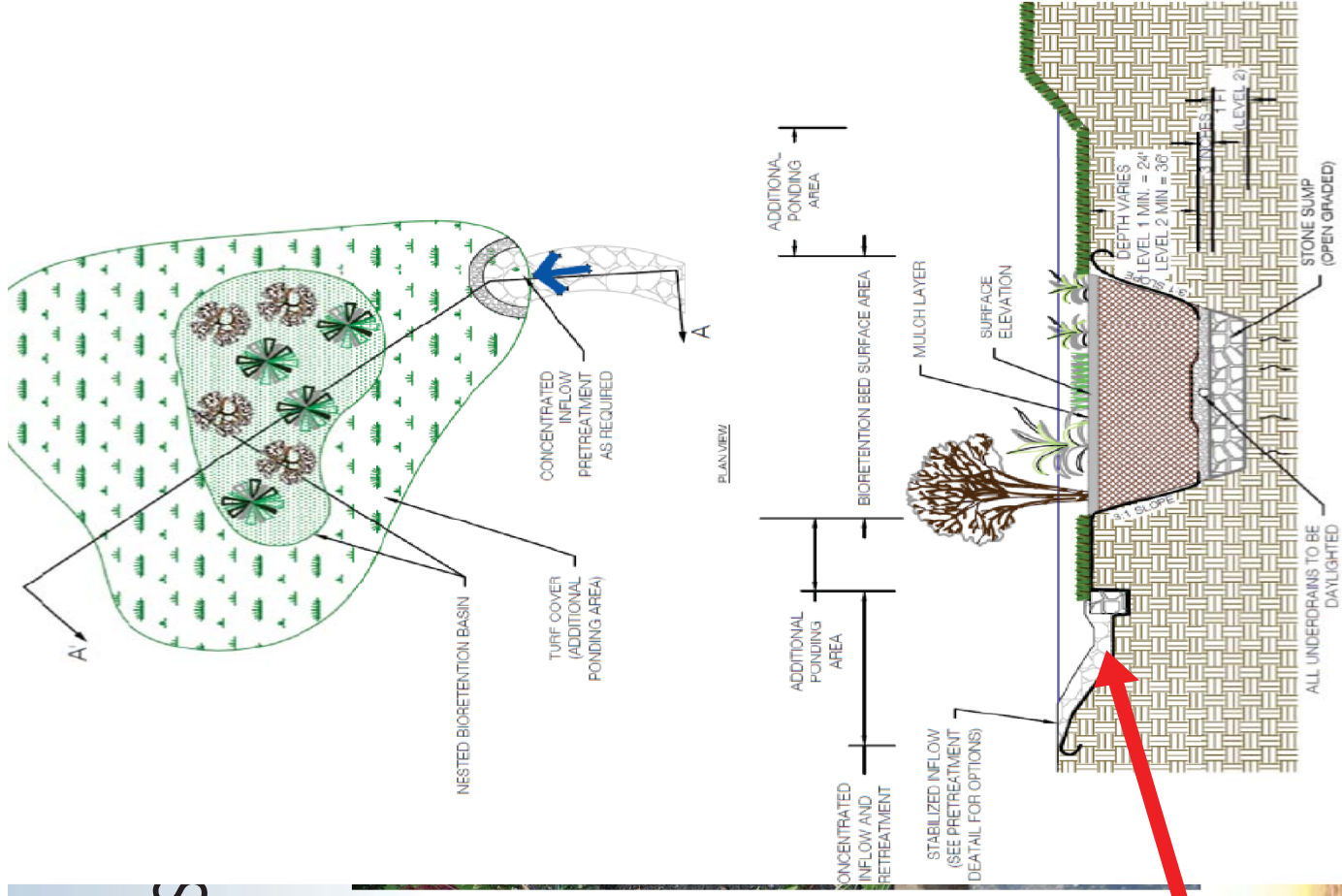
.05 X 1,100 ft²= 55 ft²

Rain Garden surface area= 55 ft²



Des

- Transition point is the most critical point of erosion.
- Clay core embankment.
- No woody shrubs on embankments.
- It will overflow! Where is your outlet?



Plunge pool to level
spreader to filter strip

Alternative design approaches

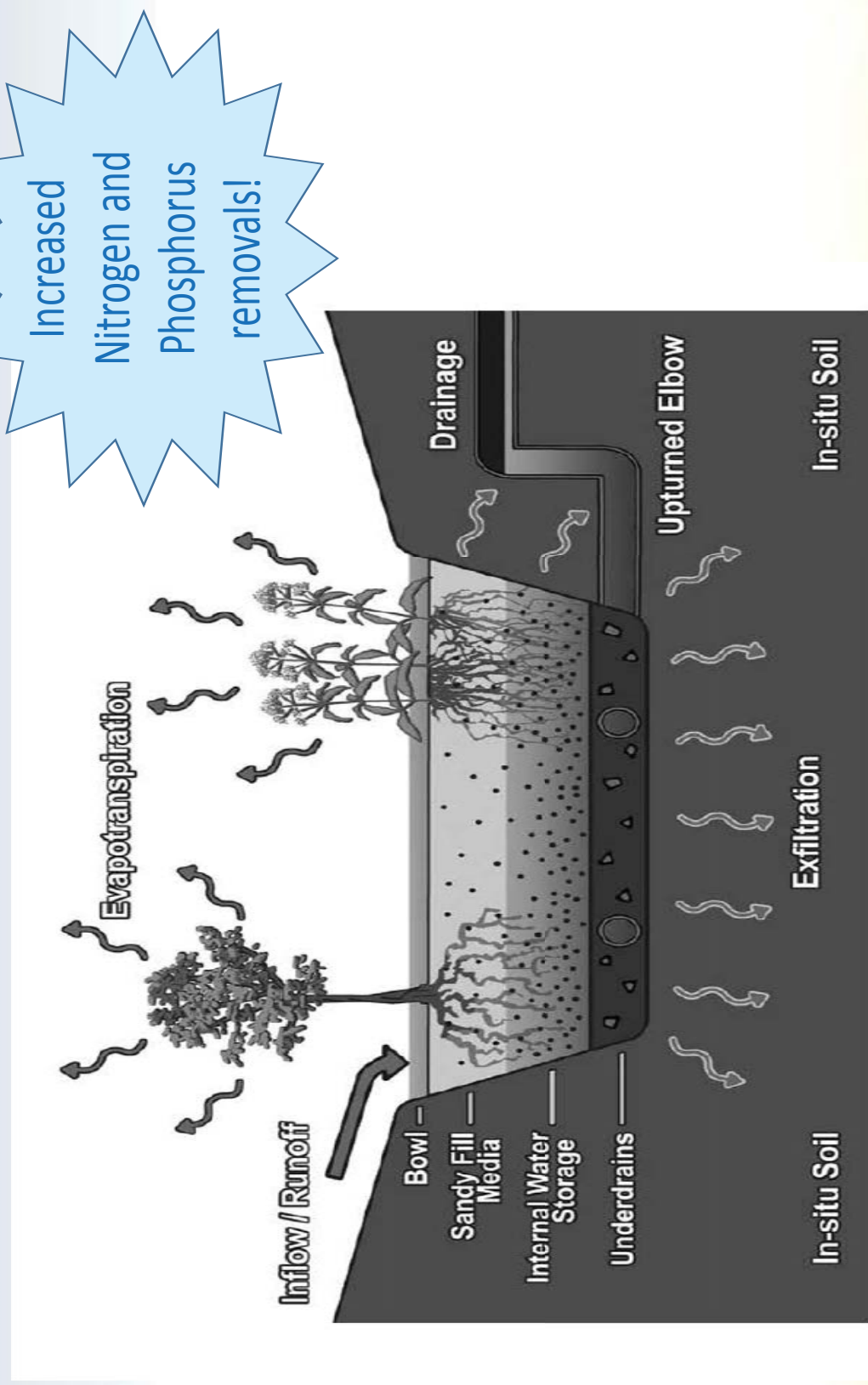
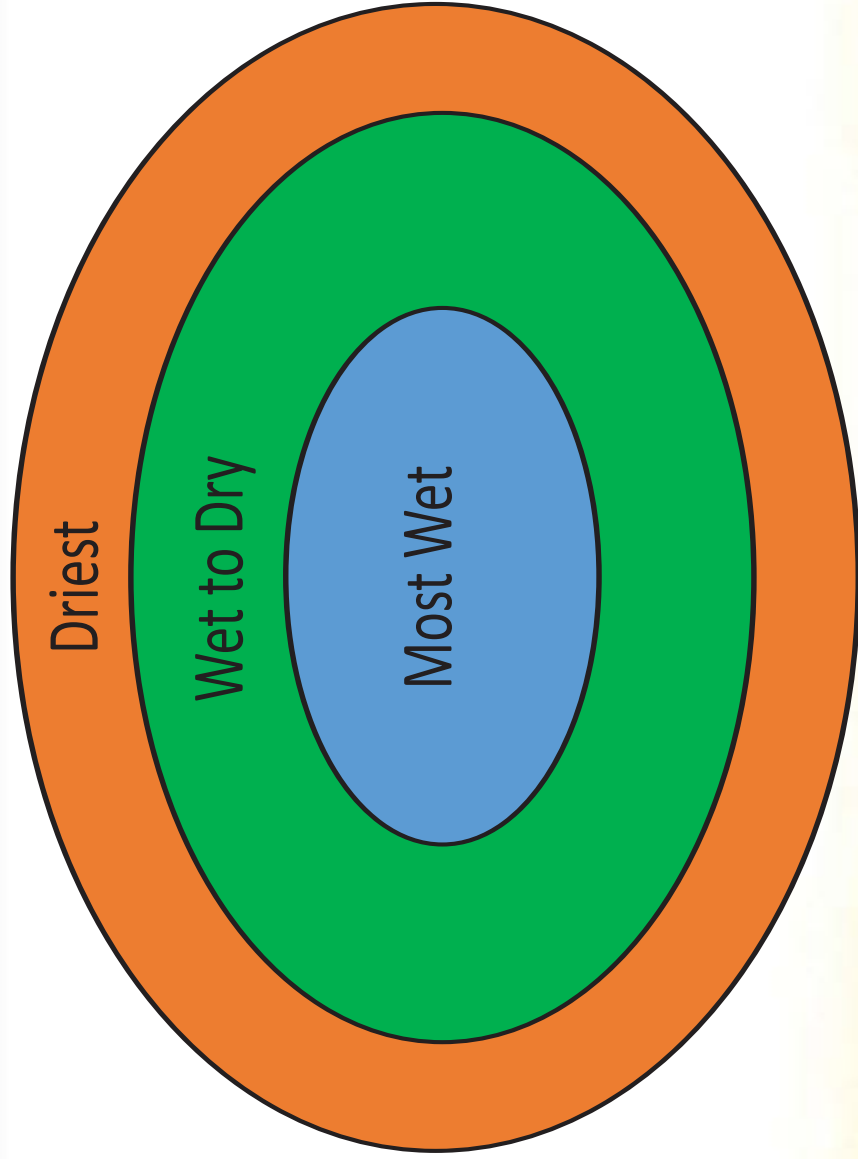


Figure 1. Schematic of a bioretention cell with an internal water storage layer.

North Carolina Extension, Designing bioretention with IWS layer

Rain Garden Plant Selection

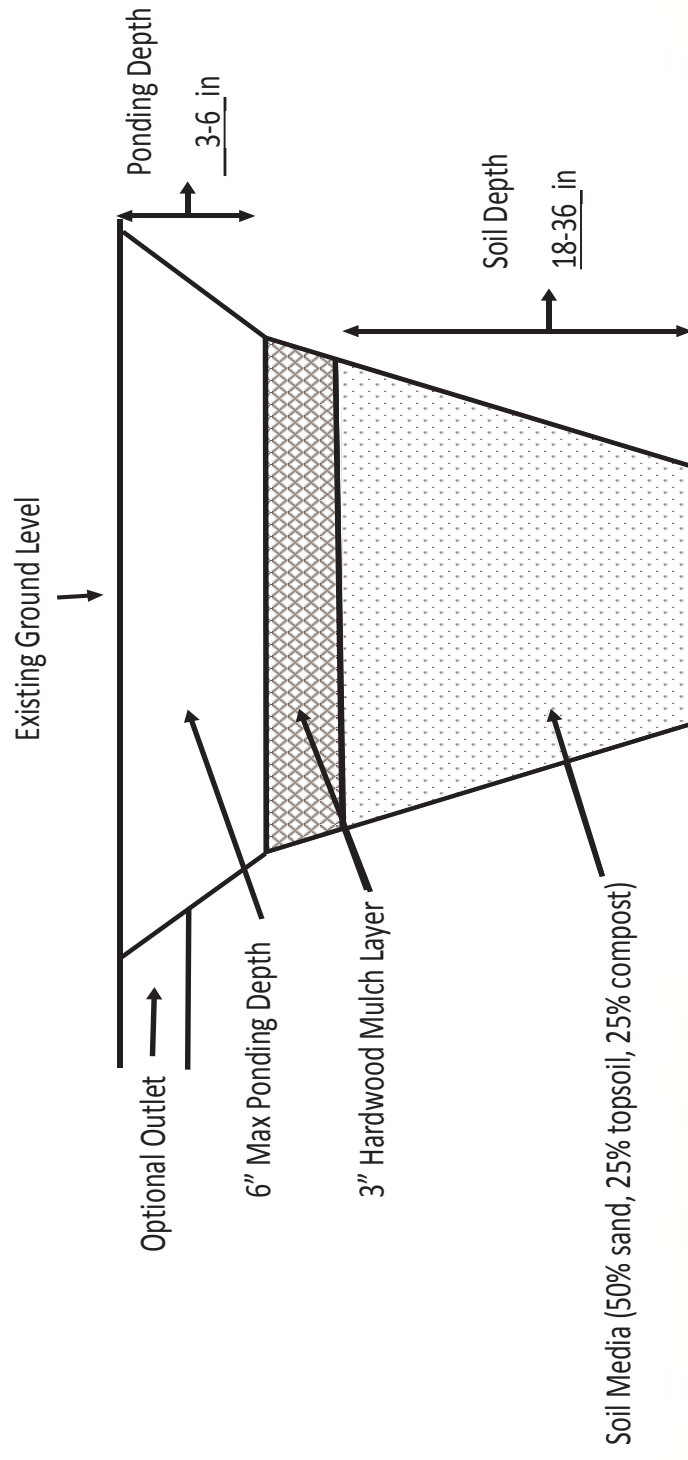


Installation

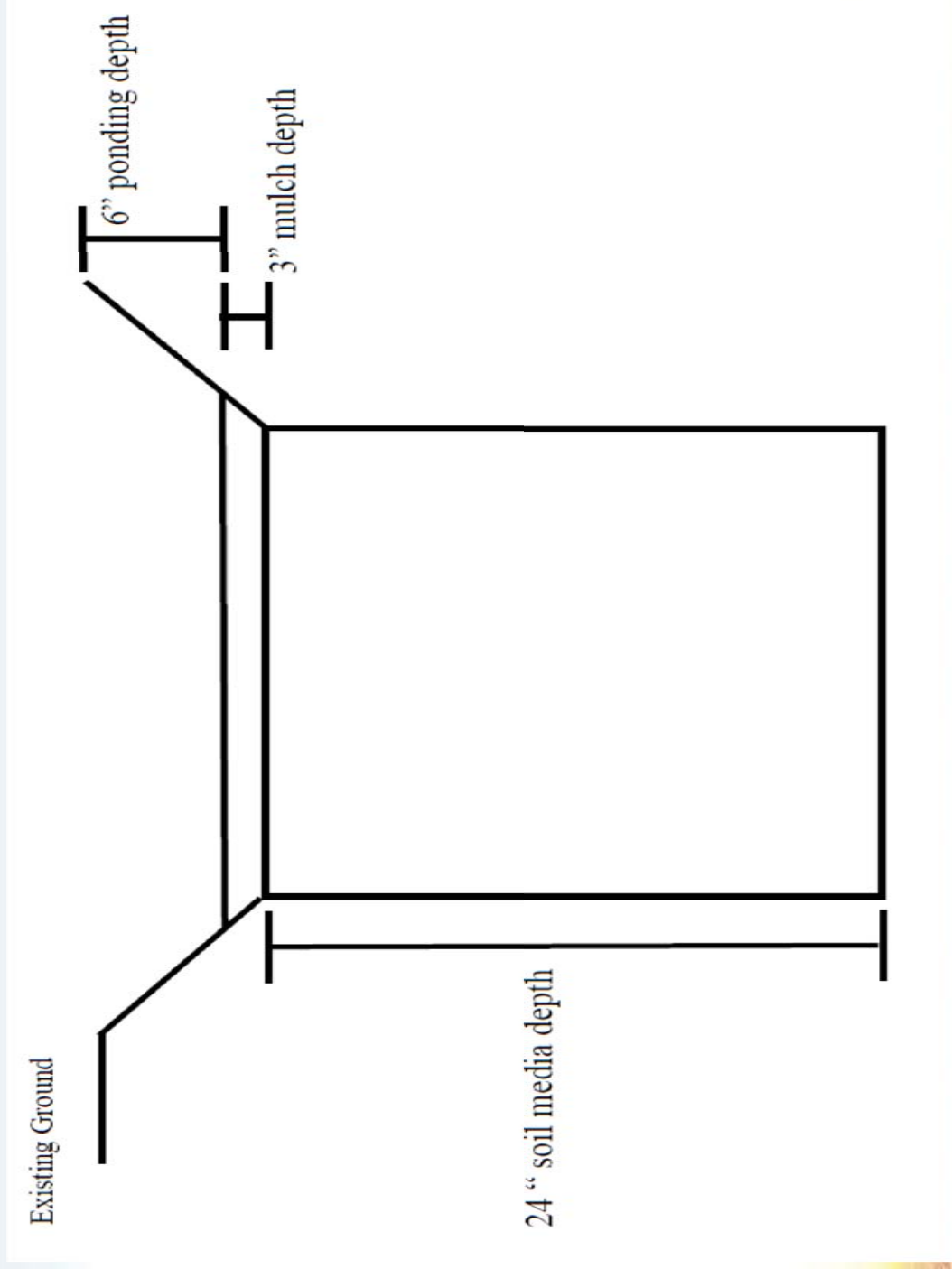
- Rain Garden areas should be fully protected from sediment intrusion.
- Scarify in situ soils on reservoir bottom
- Add filter media in ~ 12 " lifts.
- Flat bottom
- Inspect after first flooding event
- Check for Utilities!
- Work from sides, or center to outer edge.



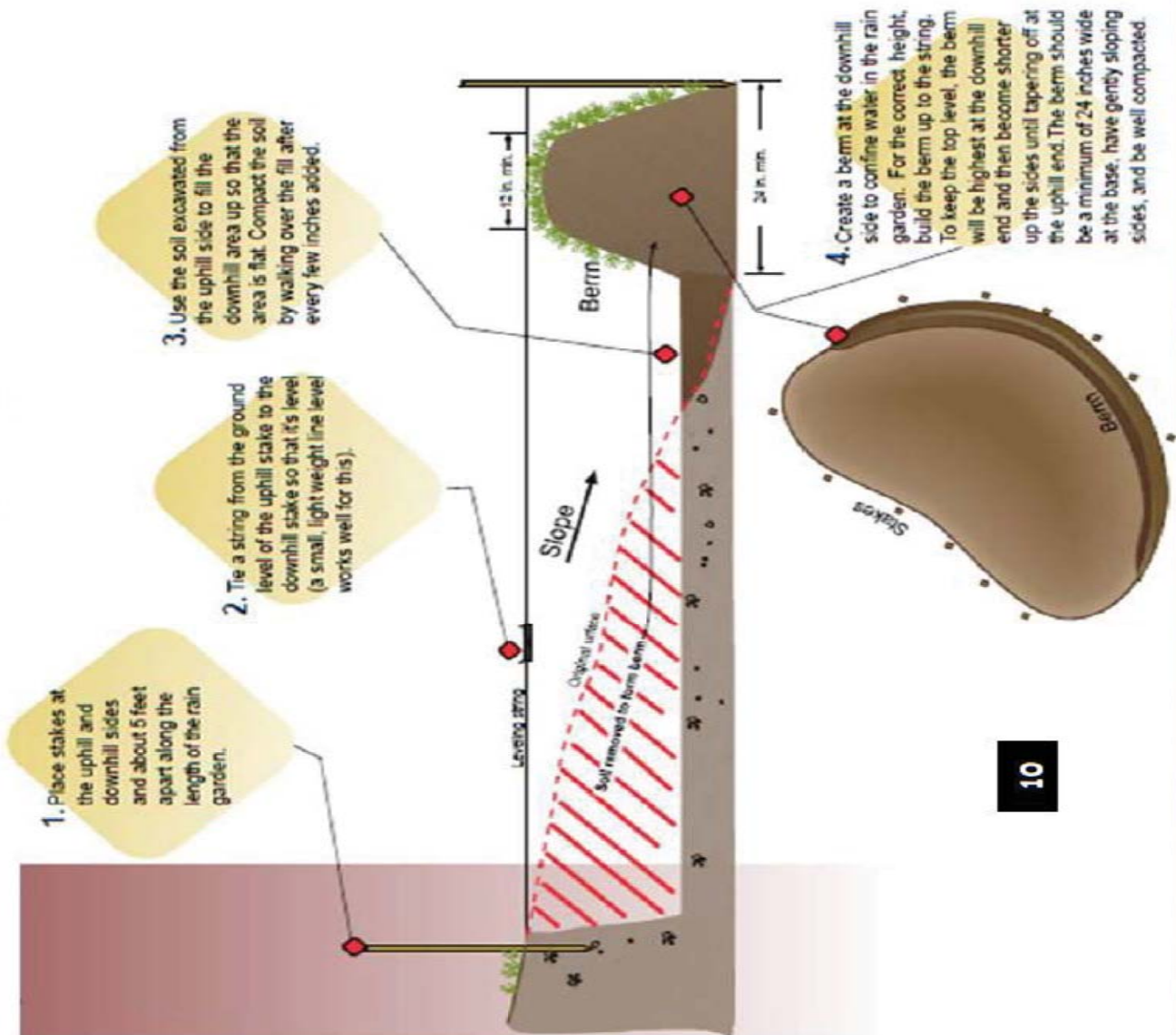
Design



Rain Garden Cross Sectional View



Installing a Ponding Berm



Rain Garden Video

- <https://www.youtube.com/watch?v=NOmh7K5Pygg>
- <https://www.youtube.com/watch?v=yqWdDsQJzCc>

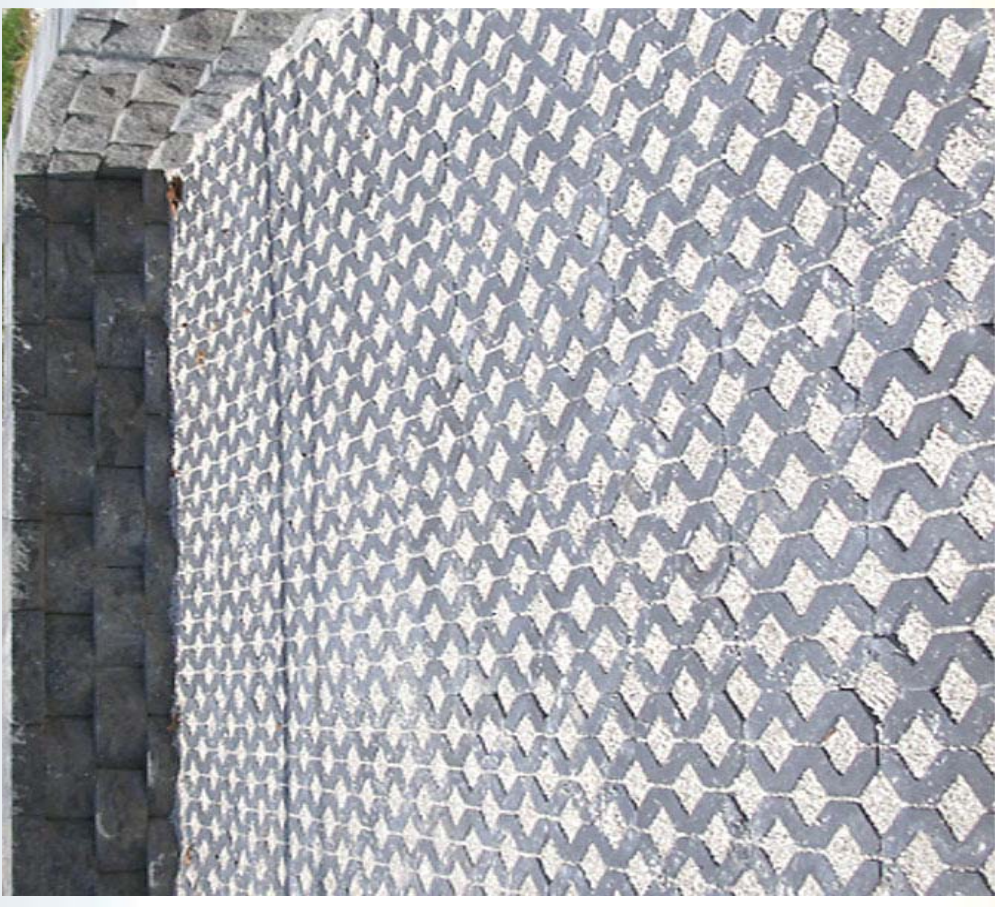


Expectations

- **BayScapes** – 120 sq ft planting area
 - Cut Grass/Sod back from planting area
 - Till in 3” of compost
 - Install Plants
 - Add 2” of mulch
- **Rain Gardens**
 - Review cross-sectional view of Rain Garden
 - Remove 30” of soil for 60, 90, 120 or 180 sq ft planting area
 - Add 24” of soil media
 - Install plants
 - Add 2” of mulch

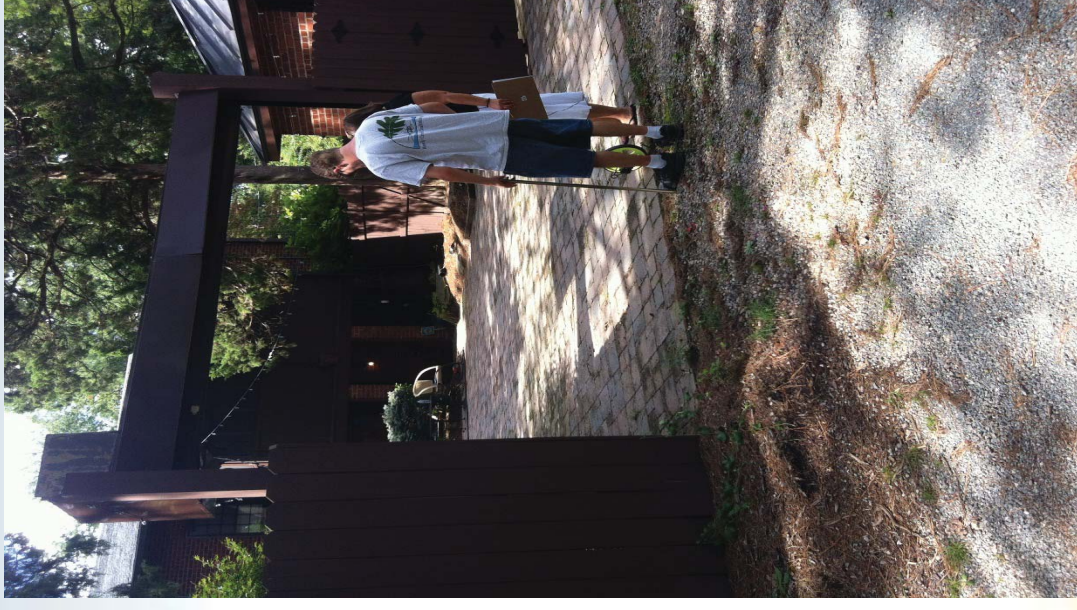
Permeable Hardscapes: Function

- Remove Impervious surfaces.
- Infiltrate Stormwater-reduce stormwater quantity.
- Recharge groundwater.
- 3 Types: Concrete, Asphalt, Pavers. (stone, brick, concrete, plastic grid, etc.)
- <http://www.youtube.com/watch?v=ScsQYHMfabU>



Placement

- Replace existing impervious surfaces.
- Do not place pavers where there will be a possibility of soil or mulch washing over the pavers. This will clog pavers.
- Proximity to home and utilities.



Design

- Review the *Homeowner Audit Report* provided by ALLIANCE/RCC for recommendations regarding installation location and site information.
- Pervious paver projects must follow the City of Richmond Residential BMP pervious paver design standards or manufacturer specifications.
- A sketch showing the outline and location descriptors must be submitted with information on type of pervious surface (i.e. interlocking pavers, turfstone).



Design

- Submit manufacturer's specifications with drawings.
- Either install per the City's design or submit a x-section of your design.
- There are two options to protect the bottom of the reservoir layer from intrusion by underlying soils. (optional)
 1. Sand Layer/choke stone - allows for best infiltration.
 2. Geotextile fabric - may also become clogged.
- Permeable geotextile fabric may also be laid around the walls of the reservoir stone layer to restrict soil leaching into the stone.(optional)
- No underdrain required.

Installation

- Check for Utilities by calling Miss Utilities.
- Remove all impervious area and associated base stone.
- All permeable pavement areas should be fully protected from sediment intrusion. (It is extremely important to keep dirt off surface during Construction.)
- Do not install the system in rain or snow, and do not install frozen bedding materials.
- Where possible, excavators or backhoes should work from the sides to excavate the reservoir layer to its appropriate design depth and dimensions. (Reducing compaction)



Installation

- The native soils along the bottom of the permeable pavement system should be scarified or tilled to a depth of 3 to 4 inches prior to the placement of the filter layer or filter fabric.
- The reservoir below the permeable pavement surface should be composed of clean, washed stone aggregate.
- The bottom of the reservoir layer should be completely flat so that runoff will be able to infiltrate evenly through the entire surface.

Installation

- Do not replace soil in paver grids if it has noticeable clay. Bring soil that meets manufacturer's specs.
- Consider where excess soil will be placed before installation begins.
- Inspect the area for settlement, and after first large rain.



Project Implementation Progress

- Meet with homeowner
- Create design
- Submit to homeowner and Alliance for review/approval
 - Design sketch
 - Before photos
 - Estimate with any additional services priced separately
- Make any homeowner or Alliance requested design modifications or plant substitutions
- Document homeowner approval
- Schedule installation

Meeting with the Homeowner

Communication is KEY

- Before the meeting:
 - Contact homeowner and set meeting time
 - Be knowledgeable with how to manage stormwater on site using rain gardens and BayScaping and sun exposure based on the audit
 - Be confident in native plant options that provide year round, seasonal interest
 - Know prices of plants, availability, where you will buy them, mulch source, and how you will get them to the site



Meeting with the Homeowner

- During the meeting:
 - Introduce your company and show excitement and interest in giving the homeowner a beautiful and *productive* garden
 - Walk the yard and talk with homeowner about their expectations as well as Audit recommendations
 - Ask the homeowner about their budget
 - Ask the homeowner about preferences
 - colors
 - height
 - pollinators
 - any specific plant likes/dislikes

Meeting with the Homeowner

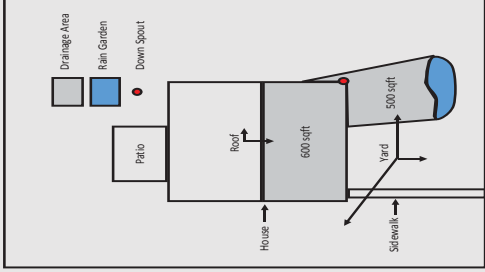
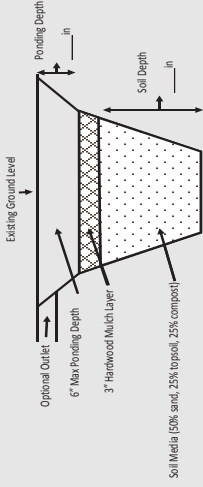
- During the meeting (cont.):
 - Share plant ideas/photos and discuss
 - Clearly identify BMP location
 - Talk about the importance of maintenance
 - Inform client of your scheduling time frame for installation



Project Approval

- Project design and associated worksheets for review
- Digital photographs
 - Before, during, and after
- Itemized invoices
 - Include design, materials, and labor costs
 - Receipts for materials (when possible)

Drainage area to Rain Garden:
 Roof area= _____ ft²
 +
 Yard area= _____ ft²
 =
 Total area (TA) = _____ ft²
 Rain Garden surface area:
 5% of TA
 05 X _____ ft² = _____ ft²
 Rain Garden surface area= _____ ft²

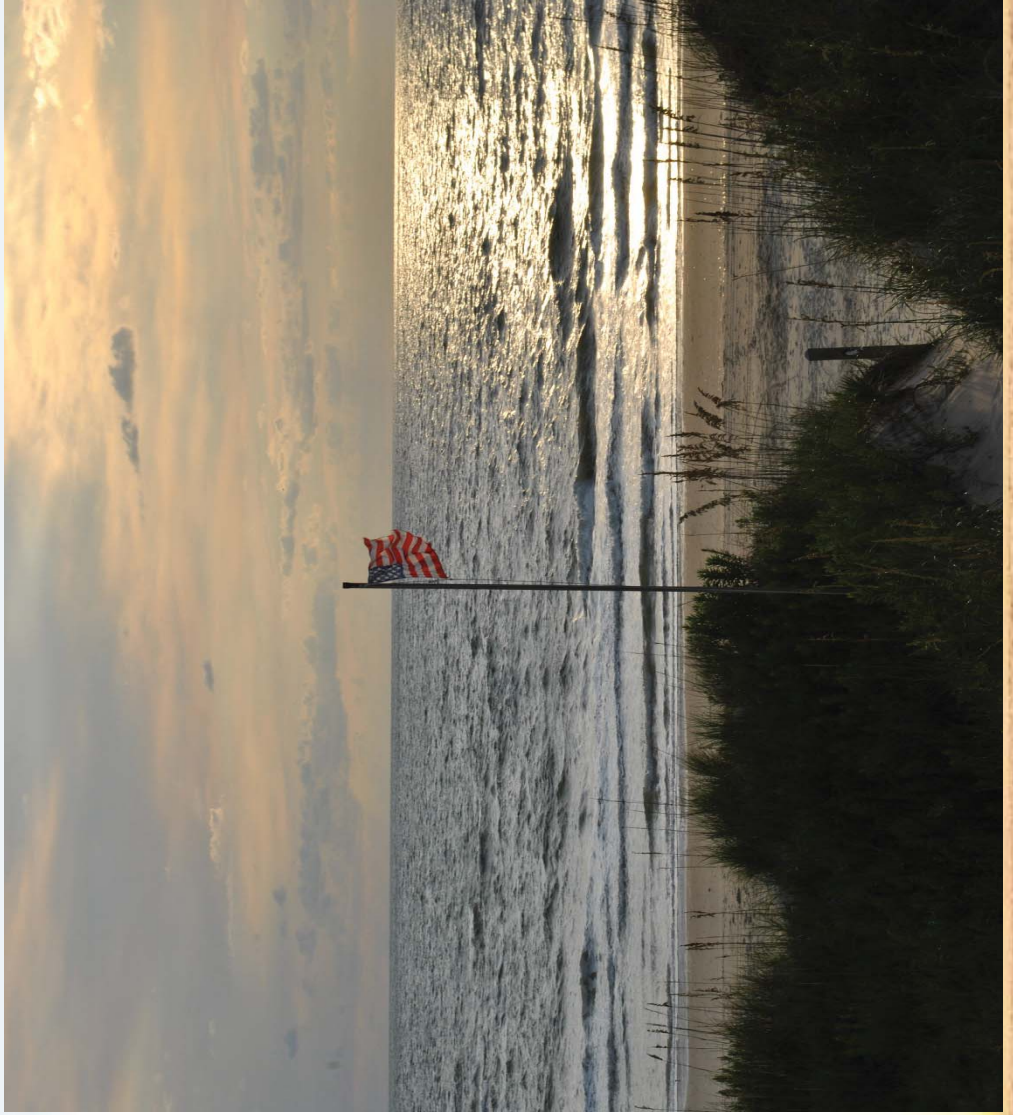



Project Installation & Follow-up

- Clearly communicate with homeowner installation date and any necessary preparations
- Provide clear maintenance instructions
 - Watering
 - Winter care
 - Spring expectations
- Provide Alliance with invoice, photos, and any other paperwork



Questions





Funding provided by:



NFWF



Chesapeake Bay Program
Science. Restoration. Partnership.

Chesapeake Bay Stewardship Fund
