Stormwater Feature Selection

Completing a site Inventory and Analysis will assist greatly in determining the appropriate BMP options for your property. Stormwater features can be divided into five (5) categories based on their primary function, including retention, infiltration, detention, wetland and filtration devices. The major factors in selecting stormwater features are pollutant treatment needs, physical characteristics of the site, and environmental and neighborhood factors.

THINGS TO CONSIDER:

- Slope

- Pollutants

- Stormwater Quality Volume

- Soils

- Impervious surfaces

- Aesthetics

- Regulations

For more information contact: **RiverLink**

170 Lyman Street
P.O. Box 15488
Asheville, NC 28813-0488

Phone: 828-252-8474
Fax: 828-253-6846
E-mail:
information@riverlink.org

RIVER LINK
WWW.RIVERLINK.ORG

Environmental Factors

The first step in selecting your BMP features is to review the stormwater runoff volume for the specific site to determine the need for runoff rate control and volume control. In residential developments there are not requirements for reducing rate or volume of runoff from a site. Yet, as WaterRICH citizens we are looking to return the hydrology of the site towards its undeveloped natural state. In the BMP selection matrix you will find categorizations for the specific BMPs within this manual.

Secondly, we need to determine water quality control measures. Residents are not required to treat stormwater from a residential lot. Examine the site analysis and determine which pollutants you wish to be treating. In some areas, you may be looking to simply infiltrate stormwater runoff. If you elect simply to have infiltration of stormwater, this runoff should be sourced from natural areas which are relatively free of synthetic chemicals. Water from the roadway, driveways, roof, fertilized vegetation, or areas where pesticides have been used should be treated prior to infiltration.

There are some specific pollutants of concern that we may need to treat in the residential environment. These include fertilizers from lawns, landscapes and vegetable gardens, road or driveway runoff that could carry oils, hydrocarbons and heavy metals, animal waste, sediments, detritus, asphalt grit associated with roof shingles, or heavy metals from metal roof surfaces.

Pollution builds up in various ways and is generally a function of dry period, rainfall event, and runoff volumes. As these factors increase the higher the pollutant content.

Table 1: Pollutants and Sources

Stormwater Pollutant	Sources	Related Impacts
Nutrients: Nitrogen, Phosphorus, various others	Animal waste, fertilizers, failing septic systems	Algal growth, reduced clarity
Sediments: Suspended in the water and deposited	Construction sites, bare soil, road sanding, eroding banks	Increased turbidity, reduced clarity, deposition of sediment, lower dissolved oxygen
Organic Materials	Leaves, grass clippings, compost, brush	Oxygen deficit to receiving waters
Pathogens: Bacteria and Viruses	Animal waste, livestock, failing septic systems	Human health risks
Hydrocarbons: Oil and Grease, PAHs	Automobile wear, waste oil, emissions and fuel leaks	Water toxicity, sediment, and bioaccumulation through the food chain
Metals: Lead, Copper, Cadmium, Zinc, Mercury, Chromium, Aluminum	Wear of automobile brake linings and tires, emissions and fuel leaks, and metal roofs	Water toxicity, sediment, and bioaccumulation in the food chain
Pesticides: PCBs, Synthetic Chemicals	Herbicides, insecticides, fungicides, etc.	Water toxicity, sediment, and bioaccumulation in the food chain
Chlorides	Road salt, uncovered salt storage	Toxicity of water columns and sediment
Trash and Debris	Litter washed through storm drain networks	Degradation of the beauty of surface waters, threat to wildlife

Adopted from Minnesota Urban Small Sites BMP Manual

Factors in Selecting BMPs

Physical Factors

The physical factors which determine the selection of stormwater BMPs include soils, depth to the water table, drainage area, areas of concentrated pollutants, slope of site, and the area required. These are all elements you should have reviewed in the site inventory and analysis section of this chapter. This section will assist you in finding much of this information.

Much of the information above can be located on the Internet, yet it is only specific to a certain scale, specifically when we examine our soils. These are generally mapped at the 1:12,000 scale and therefore, you may find much variability in the soils on your property. It is important to examine your site in detail, through both resources on the web and site observation. Percolation tests are one of the best ways to determine the porosity of soils at specific locations within your property.

Determining your drainage area and therefore the potential volume of runoff onto and off your site is critical in understanding the scale of stormwater features and the available options. Typically the lower you are in the watershed, the more water and pollutants you have to contend with. A referral (to mitigate the failure) resident in Atlanta designed and built a dry streambed to manage the water running from the road onto her property. Within a month of the beautiful feature being completed, much of the stone washed into the neighbor's drainage due to the lack of sizing for the amount and velocity of water flowing from the road. We want to prevent this possible oversight prior to construction.

Community

In any design or modification the environmental, social and community factors need to be assed to assist in selecting an appropriate feature. These factors include existing and future elements such as playground areas, patios or pathways. Many of these you examined in the site Inventory and analysis process. In addition (if you didn't already), weighing the maintenance requirements and community acceptance of a given practice will help in the selection process. In this area we have a mix of acceptance levels of any given feature, these are based on visual appeal and nuisance problems. General market and preference surveys have been drawn upon to build overarching opinions to base of perception.
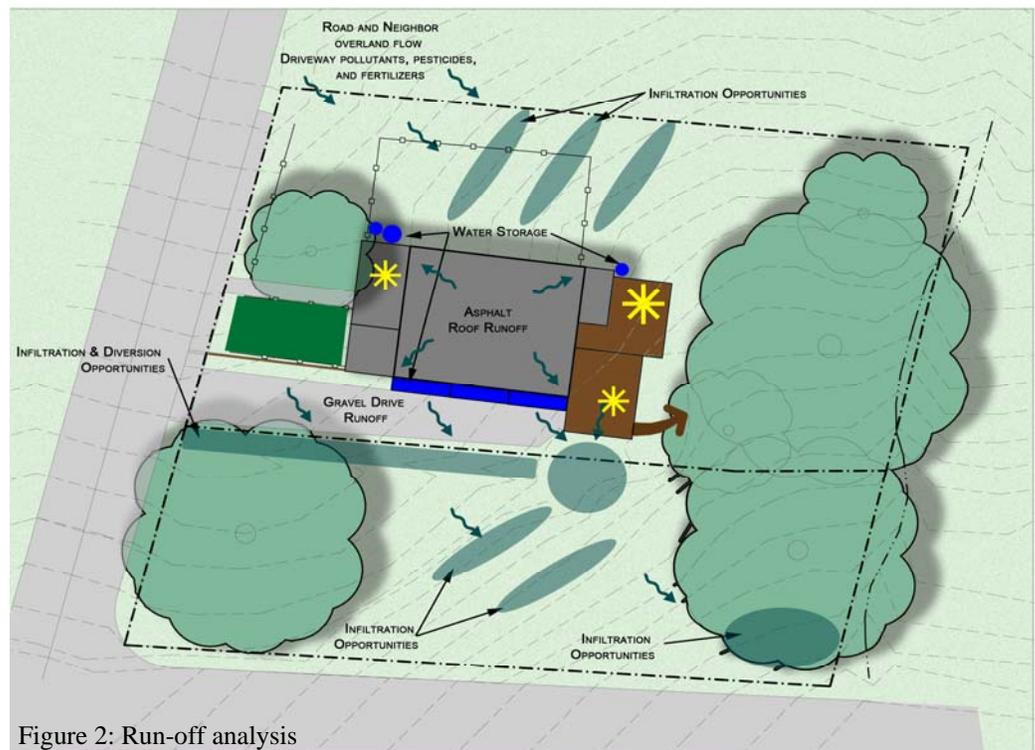

Figure 2: Run-off analysis