



**Slow it. Spread it. Sink it!**

# Tips for Installing a Rock-Lined Swale

**USES:** INFILTRATION OF ROOF, WALKWAY, DRIVEWAY, OR PARKING AREA RUNOFF

*These general guidelines are for educational purposes only and are not to be used as professional engineering specifications. Prior to installation of ANY project, seek technical assistance from a licensed professional engineer or landscape architect, and/or certified professional in erosion and sediment control for site specific specifications.*

## ROCK-LINED SWALES OR DRY CREEK BEDS

Swales are shallow trenches in a landscape that capture rainwater runoff from roofs, driveways, and other hardened surfaces. They are designed to SLOW water down, SPREAD it out and allow it to SINK into the soil during small to moderate storms. A rock-lined swale (or dry creek bed) uses rock instead of grass or other vegetation to safely infiltrate or direct runoff. Most are designed with rounded rock on the surface for an aesthetically pleasing landscape feature that mimics a creek bed. They can be formed to fit almost all site conditions and landowner interests. Depending on the existing landscape and available space, swales can have a meandering or nearly straight alignment. An advantage to a meandering swale is that its geometry maximizes the time water spends in the swale, thus aiding infiltration and trapping potential pollutants.

## WHY INSTALL A SWALE?

Many of our homes and businesses were designed to pipe runoff to the street where it flows into storm drains and directly into creeks and rivers. The runoff can carry contaminants from our pets, automobiles, fertilizers, pesticides and bare soils to the waterways which are used for our drinking water supply, recreation and wildlife. Our built environment has also minimized the ability of rainwater to soak back into the ground, instead concentrating it in specific locations and contributing to localized flooding. Besides making beautiful landscape features, swales can help mitigate these concerns. They also require little to no irrigation so they are great water conserving elements and are perfect for replacing sections of lawn.

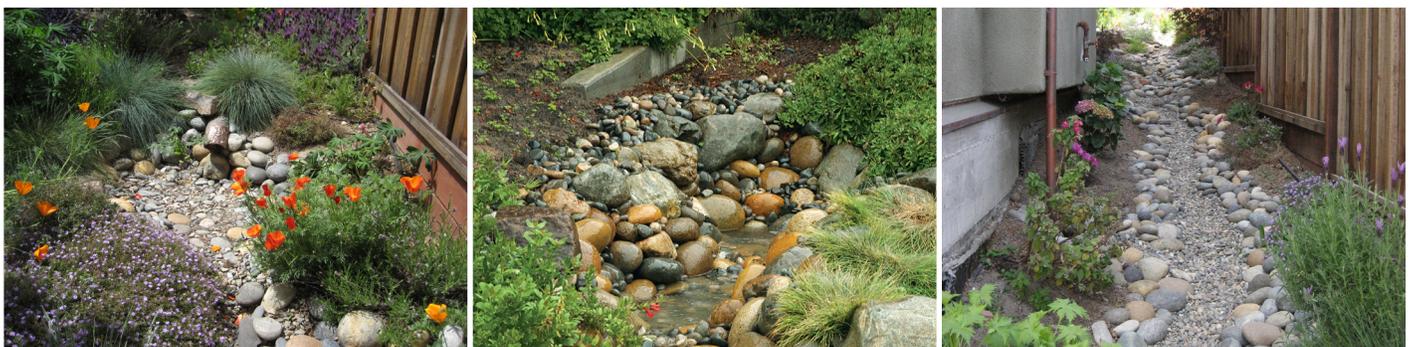
## CHOOSING A LOCATION

Swales can go in most soil types with proper design. The start of the swale will be set so that it captures runoff from a roof downspout or source of runoff from a hardened surface. If your soil infiltrates water at less than two inches per hour you may want to install a drainage system under the swale to avoid standing water for long periods of time. If your soil has good drainage, just make sure the overflow area is routed to a safe location away from buildings and steep hillsides.

### DID YOU KNOW?

In areas with all natural ground cover such as forests, grasslands, and parks, only about 10% of rainwater runs off and about 50% infiltrates back into the ground. In highly urbanized areas runoff jumps to approximately 55% with only 15% soaking back into the ground, resulting in a large deficit of water able to recharge our ground water supplies and increased flooding potential.

Swales are typically set back five feet from property lines and 10 feet from building foundations, but may be closer if precautions are taken to ensure that water flows away from buildings. They should also be constructed away from downstream slopes: a minimum of 100 feet from slopes of 10 percent; add five feet of setback for each additional percent of slope up to 30 percent; infiltration basins shall not be used where slopes exceed 30 percent. Once you have a location in



Rock lined swales can be focal points in a landscape that also have a purpose.

mind, use spray chalk to mark the location for a good visual of where it will go.

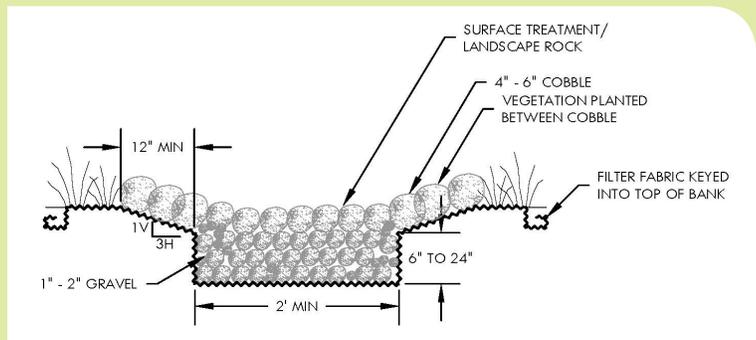
### BUILDING THE SWALE

After marking and confirming the location, you can dig out the swale bed. The depth of the swale may vary from six to 24 inches with a minimum bottom width of about two feet (the deeper and wider the swale, the more infiltration). The bottom of the swale shall be level, or small “check dams,” similar to long steps or shelves, may be used to prevent water from collecting near the downstream end. Make sure the native soil in the swale does NOT get compacted during installation or infiltration will be compromised. Filter fabric should be placed between the drain rock and native soils and cover the perforated drain pipe (if installed) to prevent clogging. The swale and perforated pipe must be installed level and parallel to the contour of the finish grade.

Gravel drain rock is recommended with a cover of decorative surface rock (commonly rounded river rock or cobble). The general specification is one inch washed drain rock. Surface rock should be washed and free of fines that may wash down into the gravel drain rock. Avoid exposed soil or mulch adjacent to the dry swale as these materials may clog the gravel over time. A 12 inch minimum buffer should be kept between the dry swale and exposed soil or mulch areas. Landscape plantings can be placed adjacent to the dry swale if they are covered with rock mulch. If you are planting along the edge of the swale, drain rock and growing medium should be separated by a two to four inch layer of ¼ to one inch washed, crushed rock or filter fabric.

### MAINTENANCE

Always understand the maintenance requirements of whatever landscape features you are planning. There are several key factors involved in maintaining long-lasting dry swales, including cleaning or replacement of rock and gravel to prevent and reduce clogging and ensuring sediment and debris do not accumulate in the swale. The swale should be tested for adequate infiltration and draining immediately after construction and at the beginning and end of the rainy season each year. If the swale is not infiltrating the intended amount of water or water is standing for more than 24 hours, an underdrain or overflow structure should be added that directs the runoff to a safe location away from structures.



Cross section view of a rock-lined swale.

Routine maintenance should include an evaluation of the surrounding trees and shrubs and removal of any dead or diseased vegetation around the swale at least twice a year. This maintenance can be incorporated into regular landscape maintenance. Other potential tasks might include erosion repair at inflow points, surface rock replenishment, unclogging the underdrain, and repairing the overflow structure.

**SAFETY.** Never route stormwater to an unstable or steep hillside or other areas that could pose a safety hazard (see Slow it, Spread it, Sink it! guide for more details on difficult sites). For more information about safety concerns or for a free assessment of your property, contact the Resource Conservation District or other qualified professional.

### DESIGN IDEAS AND ASSISTANCE

The Resource Conservation District ([rcdsantacruz.org](http://rcdsantacruz.org)) or your local water district may offer rebates or financial assistance for these type of landscape projects.

#### For design ideas visit:

- [santacruz.watersavingplants.com](http://santacruz.watersavingplants.com)
- [rcdsantacruz.org/stormwater](http://rcdsantacruz.org/stormwater)

#### Find a “Green Gardener”

- [green-gardener.org](http://green-gardener.org)



#### Get your garden or landscape recognized!

Find out how your garden or landscape can qualify to be Monterey Bay Friendly!

- [green-gardener.org](http://green-gardener.org)

$$\frac{\text{square footage of impervious area}}{\text{square footage of impervious area}} \times \frac{\text{annual rainfall}}{\text{annual rainfall}} \times 0.62 = \text{Gallons of runoff}$$

How much water is coming off your roof or other hardened surface?