

BIOSWALES

For Better Stormwater Management



WHAT ARE BIOSWALES?

A bioswale is a multi-purpose stormwater management practice that provides an alternative to storm sewers. By using a permeable soil bed and perforated subdrain tile, bioswales infiltrate water from frequent, small rains (1.25 inches or less). During heavy rains, bioswales convey runoff in a non-erosive manner.

Above ground, bioswales can be subtle and feature typical turf grass or designed as an attractive flower garden with native plants and grasses. Whatever vegetation is used, it is important that it protects against soil erosion.

Bioswales are considered “green infrastructure” because they offer water quality benefits not provided by storm sewers. This is a relatively new stormwater practice, but there are a number of water quality projects that feature bioswales.



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WHEN IS A BIOSWALE NEEDED?



Bioswales that utilize existing natural drainage swales often provide the best results. Bioswales can be installed where drainage swales are eroding, where low lying areas pond stagnant water, or in lieu of storm sewer pipes.

Pictures on this page show examples of problems to be solved by installing bioswales. Match the number on the picture to the number below:

1. Neighbors were complaining about the smell and mosquitoes generated by this Davenport drainage swale, which was retrofitted to a bioswale (see photo on page 3).
2. Bare soil in a drainageway is never stable. The area will only erode over time, and needs vegetative cover. This drainageway is just beginning to erode. A bioswale is planned to provide stabilization and infiltration of street runoff.
3. An eroding road ditch is threatening the nearby road bed and utility pole. A bioswale will be installed to infiltrate small rains and safely convey large runoff events.
4. Scrap concrete and rocks were placed in this ditch to control erosion. The town of Kingsley has committed to installing a bioswale that will provide a more effective and permanent solution.



BIOSWALES IN ACTION

Below are successful examples of bioswales with many different vegetative preferences and styles. Selection of vegetation is a key decision for bioswale projects. It is critical for bioswale vegetation to provide protection against erosion and be aesthetically pleasing. Native vegetation is

recommended for many bioswales. The deep-rooted native grasses and flowers help build and maintain soil health, which maintains good infiltration and percolation rates. Non-native, cool season grasses are an alternative that may be preferred in certain settings.



This Davenport bioswale is solving the problem shown in Picture 1 on the previous page. A wet, eroding neighborhood drainageway is now an attractive and functional stormwater system with native grasses and flowers.



A newly completed bioswale with rock checks in a road ditch above East Okoboji Lake reduces runoff and sediment that used to be delivered to the lake with each runoff event. Rock checks help hold and infiltrate stormwater.



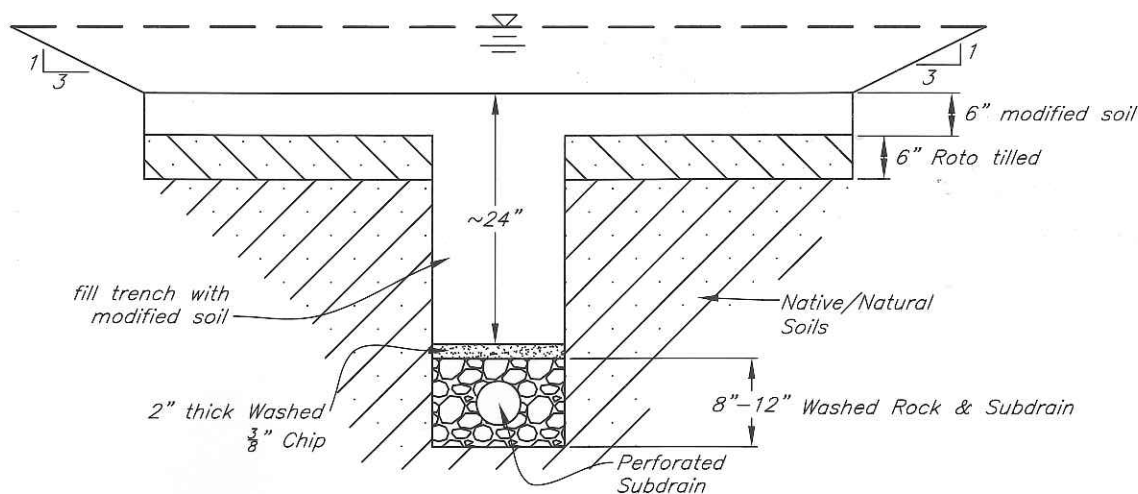
Most people would not realize that a stormwater practice is installed at this site. This Cedar Falls backyard bioswale will ensure a dry, mowable, and usable water management area. Permeable soil, a perforated subdrain and subtle earthen berms help infiltrate most runoff. Mow turf grass as high as possible to maximize vegetative cover.



Stormwater runs off large parking lots very quickly. Bioswales are a great way to capture and infiltrate runoff from small events. Large events are conveyed to a storm sewer intake at the bottom of this swale. This bioswale provides an aesthetically pleasing green space in this Coralville parking lot.

BIOSWALES

Bioswale Cross Section



BIOSWALE COMPONENTS

Plants

Vegetation should provide critical erosion protection and be aesthetically pleasing.

Berms

Berms ensure water is slowed down and infiltrated, helping remove pollutants common to stormwater runoff. Berms can be constructed of earthen material or rocks.

Modified Soil

Amended soils are placed into the bioswale to facilitate infiltration of water during rainfall and runoff events.

Washed Rock

The subdrain tile is bedded in clean washed rock.

Perforated Subdrain Tile

Drainage tile ensures water can percolate down through the soil. If water can't move down through the soil profile, it will move to the subdrain and be conveyed to a stream or other outlet site in a controlled manner.

MAINTENANCE

- » The primary maintenance issue is managing vegetation to maintain a pleasing appearance.
- » Perform weed control as needed.
- » If turf grass is used, maintain a height of no less than 4 inches to filter and capture pollutants and protect against erosion.
- » If native vegetation is used, burn annually if local code allows.
- » If burning is not feasible, mow and remove dormant vegetation annually.
- » Inspect annually for bare soil or scour erosion.
- » Inspect annually for sediment accumulation. Bioswales trap sediment that will periodically need to be removed.
- » Remove accumulated trash and debris.



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United States Department of Agriculture
Natural Resources Conservation Service
ia.nrcs.usda.gov



Low-interest loans available

The State Revolving Fund provides low-interest loans (3 percent) to implement sustainable stormwater management practices. Loans can be made to developers, municipalities, businesses and homeowners. Visit www.iowasrf.com and click on "Topics" - "Stormwater" for more details.