

# What are Swales?

A 'swale' is simply a long, shallow depression in the ground, designed to collect or redirect water. In general, permaculture swales are used to mimic the water-collecting and -holding abilities of a thick forest mulch.

A grassed swale is a graded and engineered landscape feature appearing as a linear, shallow, open channel with trapezoidal or parabolic shape. The swale is vegetated with flood tolerant, erosion resistant plants.



The design of grassed swales promotes the conveyance of storm water at a slower, controlled rate and acts as a filter medium removing pollutants and allowing stormwater infiltration. When properly designed to accommodate a predetermined storm event volume, a grassed swale results in a significant improvement over the traditional drainage ditch in both slowing and cleaning of water. In swales, stormwater is slowed by strategic placement of check-dams that encourage ponding and these ponds in turn facilitates water quality improvements through infiltration, filtration and sedimentary deposition. Collected stormwater is expected to drain away through the soil within several hours or days.

Grassed Swales are an appropriate stormwater management practice for most regions of North America. Swales are a low-cost low maintenance option to remove sediments, nutrients and pollutants. They increase stormwater infiltration and add a visually aesthetic component to a site. Establishment of grassed swales is a potential solution wherever stormwater needs to be transported from impervious surfaces, slowed down and allowed to infiltrate into soils. Exceptions to their use are in desert like areas where irrigation would be required for long-term maintenance and in colder regions with permafrost where infiltration is minimal.

Generally grassed swales are used to treat relatively small drainage areas of five acres or less. In highly urbanized areas or other highly impervious areas grass swales are not recommended unless constructed in series or function as pretreatment for other stormwater management practices. The linear structure of swales favors their use in the treatment of runoff from highways, residential roadways and common areas in residential sub-divisions, along property boundaries and in and around parking lots.

## Limitations

- Grassed swales are not recommended for large drainage areas.
- Grassed swales are a cheap alternative to curbs and gutters; however, their efficacy is dependent on careful design and construction, a thoughtful selection of plants as well as provision of dependable maintenance over time. Badly designed grass swales will not remove significant quantities of pollutants.
- If vegetation is not sufficiently established the swale will not function.
- Given the importance of design and construction, selection of engineering services and a construction company should be based on proven, successful past experience with swales and recommendations from past clients who have had swales installed.
- Wet swales should not be used in high density residential areas because of potential for mosquito generation and smells.
- Grassed swales are not the best management practice for:
  - Ultra-urban areas because the areas of pervious surfaces required for swale development are usually unavailable.
  - Stormwater hot spots where land use will generate stormwater with high levels of contaminants. Good examples of hot spots would be gas stations and convenience stores.
- In cold weather climates, adjustments to design and maintenance must occur to deal with high snow loads and significant frost depths.



But water isn't the only function of swales, and it is, in fact, imperative that they be regarded as a tree growing system. Swales without trees can possibly be even more damaging than the flow of water they have pacified. In some climates, they can potentially oversaturate the landscape, leaving a designer with difficult growing conditions. Trees, however, will moderate the saturation levels, utilizing the water deep into the soil as opposed to having it collect and cause problems. The other reason trees are vital to swale systems is that their roots stabilize the landscape, especially the berm, that loose pile of soil build on the downhill side of the swale, and the backside of the excavation.