

## Who We Are

**Pacific Rim Soil & Water, Inc.** has been providing soils and hydrology expertise to private and public sector clients since 1991. The company makes a holistic interpretation of a site soil/plant/water system to address onsite stormwater and wetland issues. This approach is particularly applicable to Low Impact Development projects and design.

**Sound Native Plants** has been designing, installing and monitoring restoration projects throughout south Puget sound for the last fifteen years. We are also a native plant nursery that provides plants of western WA genetic origin. We understand the diversity and intricacy of this region's ecology. We maintain a holistic approach to projects that ensures success.

## Contact Us

Call us to discuss your particular interest in low impact development. We are available to provide consulting and training services as well as to design and install projects.

Contact Pacific Rim Soil & Water, Inc. at (360) 236-1899 or visit us on the web at [www.pacificrimsoilandwater.com](http://www.pacificrimsoilandwater.com).

Contact Sound Native Plants at (360) 352-4122 or visit us on the web at [www.soundnativeplants.com](http://www.soundnativeplants.com).

## Resources and Links

Puget Sound Action Team

[www.psat.wa.gov/Programs/LID](http://www.psat.wa.gov/Programs/LID)

Seattle Public Utilities

[www.seattle.gov/util/NaturalSystems](http://www.seattle.gov/util/NaturalSystems)

Low Impact Development Center

[www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org)

Soils for Salmon

[www.soilsforsalmon.org](http://www.soilsforsalmon.org)

USDA NRCS Soil Quality Institute

[soils.usda.gov/sqi](http://soils.usda.gov/sqi)

Pin Foundations, Inc.

[www.pinfoundations.com](http://www.pinfoundations.com)

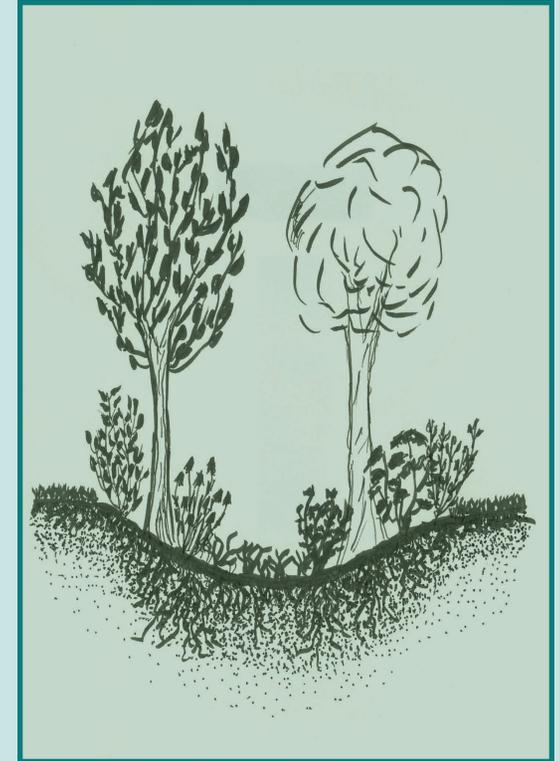
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# Rain Gardens

a sustainable approach to stormwater management



Sound Native Plants  
teaming with  
Pacific Rim Soil & Water, Inc.

# Rain Gardens

Ever increasing stormwater runoff deteriorates water quality, increases erosion and sediment loads, degrades habitat, and decreases summer stream and river flows. While conventional systems have reduced runoff, they are often costly, unsightly and difficult to maintain.

## Low Impact Development

While continued population growth is inevitable, we can take our cues from nature on how to better manage onsite stormwater. Through the use of Low Impact Development (LID) techniques, we can mimic the pre-development hydrology. LID techniques, used in combination, may eliminate the need for a large scale, traditional stormwater facility.



## What is a rain garden?

Rain gardens use the existing native soil and existing and/or supplementary native vegetation in naturally occurring depressions to infiltrate stormwater runoff from a small surrounding area. Rain gardens decrease storm water runoff through interception, evaporation and infiltration, resulting in decreased erosion and improved water quality. Beautiful, as well as functional, a rain garden is an aesthetic addition to any landscape, providing a noise buffer, enhanced privacy and urban wildlife habitat. Rain gardens are inexpensive and easy to install and require a low degree of maintenance once plants have established.

## Soils

Current development practices detrimentally alter the hydrologic function of native soils. Surface layers are cleared or highly compacted; soil biological activity is reduced; and deep-rooted vegetation, which fosters infiltration & aeration, is replaced by a shallow-rooted monoculture of seeded grass.

By using LID techniques such as retaining existing soil and vegetation, minimizing compaction during construction and using less invasive stormwater management techniques such as rain gardens at the onset of the design process, these problems may be avoided altogether.

Important soil characteristics that affect rain garden design include:

- **% Organic matter**—which treats pollutants through adsorption and retention.
- **% Clay**—finer textured soils have low infiltration rates, however too little clay content results in low nutrient availability for plants and decreased pollutant adsorption capacity. Optimum clay percentage is between **five** and **ten** percent.
- **Soil texture**—coarser textured soils infiltrate faster than fine textured soils. Optimum soil texture for infiltration and treatment is loamy sand to sandy loam.
- **Soil structure**—moderate to strong structure provides flow paths for infiltration and aeration.
- **Depth to seasonal high water table**—ground water will limit infiltration function. An onsite assessment of these soil characteristics can determine where to best place rain gardens and how it will function following installation.

## Vegetation

Native vegetation reduces stormwater runoff through interception and evaporation. Plant roots stabilize the soil, decrease erosion and absorb soil moisture. Roots also increase aeration of soil and create flow paths for infiltrating water. Plants physically attenuate flow of stormwater across the soil surface and filter out sediments. Through phytoremediation, plants immobilize metals and assimilate and break down organic pollutants, increasing overall water quality. Native vegetation encourages a healthy and balanced community of soil organisms that aid in decomposition and soil amelioration. Native vegetation provides the highest habitat value for native wildlife. For all of these reasons, retention of existing vegetation at the onset of a development project along with increasing plantings of native plants at any stage during a development's life span are crucial to hydrologic function.

Rain garden plantings require little maintenance following establishment (about three years) because the plants are adapted to our regional pests, climate and moisture regime. Vegetation should be planted in at least three different zones, determined by water availability, within the rain garden.



## Design Considerations

Rain gardens present on a lot-by-lot basis reduces the overall catchment area for each facility, which improves water quality by reducing runoff velocities, sediment load, and exposure to pollutants. Properly designed and installed LID facilities on some sites could reduce the need for conventional stormwater facilities altogether.

Sizing requirements of the rain garden are based on soil type (larger for fine textured soils with low infiltration rates) and contributing area. A minimum of **three** feet vertical separation between the base of the rain garden and the seasonal high water table is optimal. If the contributing area is small, a separation of one foot will provide function through much of the year. If a site does not meet these criteria, rain gardens can be used in conjunction with other LID techniques (i.e. green roofs, permeable pavement, pin foundations).

Monitoring of the rain garden for three years will ensure proper function. Maintenance will include weeding, summer irrigation through the first two years; regular applications of mulch; and periodic sediment removal where necessary.

Rain gardens can be retrofitted to existing developments, dependent upon site conditions, helping reduce overflow and improve water quality. Existing stormwater facilities may still be needed to process overflow from large-scale storm events.

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