

Rain Garden

A rain garden is a low-lying (shallow) area that slows down, soaks up, and filters **precipitation** (rain, snow, sleet, or hail) from downspouts, roofs, streets, driveways, and other **impervious** surfaces.

Designed to mimic the forest floor, rain gardens are planted in layers. These layers begin with a gravel base, a sand bed, planting soil, and mulch, followed by many different kinds of **native** flowers, shrubs, and grasses. These special plants don't mind "getting their feet wet," or getting their roots partially or fully submerged in water for long stretches of time! All of these layers work together to increase the amount of water that **infiltrates** the ground and returns to the atmosphere through the plants (**evapotranspiration**). Like coffee being poured through a coffee filter, the rain garden also acts as an incredible filter by capturing **pollutants** like sediment and chemicals before they soak into the ground and contaminate groundwater.



Benefits and Uses:

- Increases infiltration
- Recharges groundwater
- Reduces runoff
- Filters pollutants
- Reduces flooding (slows velocity *and* volume of water!)
- Prevents erosion
- Provides food and habitat to native wildlife, including pollinators
- Inexpensive to install and maintain



Vegetated Infiltration Basin

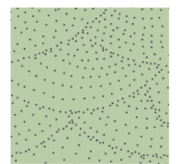
A vegetated infiltration basin is a large constructed depression (sunken land) that captures runoff from storm-drain sewers or directly from **impervious** surfaces like parking lots, roads, or sidewalks. The **runoff** is temporarily stored in the basin until it slowly **infiltrates** into the ground.

Much like a rain garden, a vegetation infiltration basin has vegetation (plants) like grasses that slow down, soak up, and filter **precipitation** (rain, snow, sleet, or hail). This helps filter pollution, reduce flooding, prevent **erosion**, and increase **evapotranspiration**, all while keeping our watersheds healthy! Basins are also specially designed with **infrastructure** to manage much greater amounts of stormwater than rain gardens! Can you spot one in your community?



Benefits and Uses:

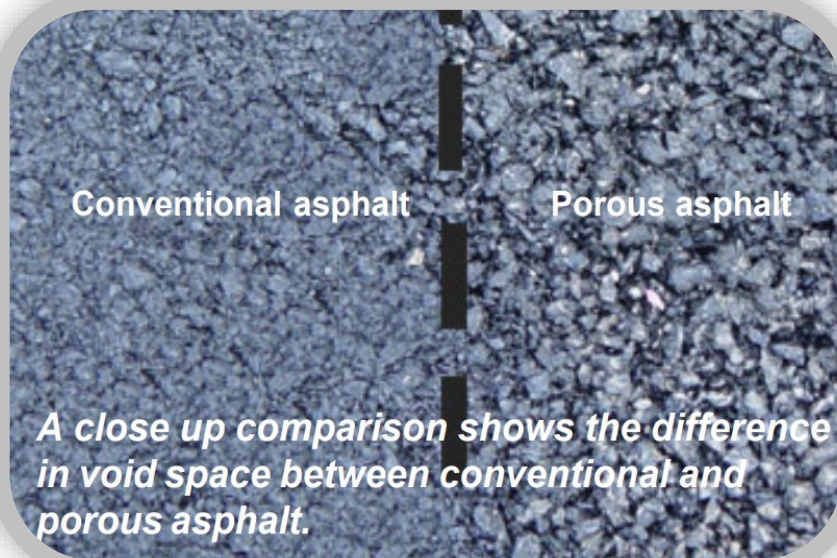
- Increases infiltration
- Recharges groundwater supply
- Reduces runoff
- Filters pollutants
- Reduces flooding (slows velocity *and* volume of water!)
- Can be done at many sites (residential, industrial, or commercial)
- Prevents sewer overflows
- Simple and inexpensive to create



Porous Paving

Porous paving, or stones, bricks, or special mixes of concrete or asphalt used in place of **impervious** paving materials, has pores for water to soak through the paving and infiltrate into the ground below. This helps reduce the pollutants carried by **runoff** into our storm drains and waterways.

There are many types of porous paving. In porous paving like **porous block paving**, blocks of brick, stone, or concrete are placed in a grid with the spaces around each block filled with **permeable** gravel (so surface liquids can pass through). In **porous asphalt** and **porous concrete**, water drains directly through a permeable surface, is stored in a stone bed below, and slowly sinks into the ground.



With the same strength and durability as impervious surfaces, porous paving can be used in parking lots, driveways, sidewalks, playgrounds, and many paved surfaces to keep our footprint small!



Benefits and Uses:

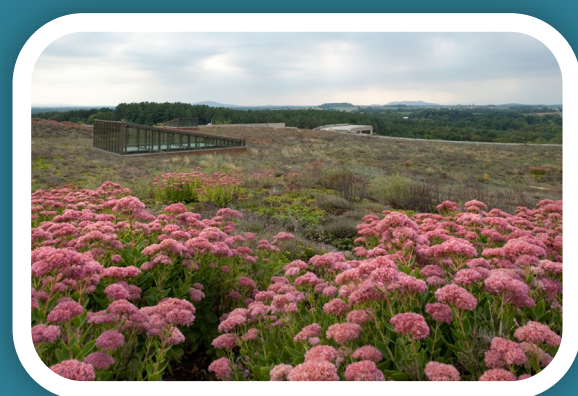
- Reduces amount of impervious surfaces
- Increases infiltration
- Reduces runoff
- Reduces flooding (slows velocity *and* volume of water!)
- Recharges groundwater supply
- Can be used in most paved spaces
- Low cost and low environmental impact
- Can be temporary (e.g., overflow parking lots)



Green Roof

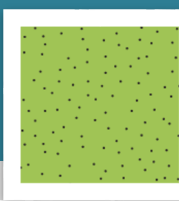
A green roof is a flat or gradually sloped roof that is partially or completely covered with vegetation. Most green roofs have layers of material that keep the interior of the building dry, slow the movement of water off the roof, keep the plants alive, and reduce runoff. These layers include a waterproof liner, drainage materials, and growing media. Green roofs have special plants that are adapted to surviving high temperatures and drought conditions, and many include plant species that absorb pollutants.

Some green roofs act as recreational spaces, rooftop decks, community gardens, and meditation paths. This conservation practice requires special planning and can cost more initially, but it protects the watershed by managing stormwater and also reduces long-term costs of heating and cooling!



Benefits and Uses:

- Reduces runoff
- Reduces heating and cooling costs
- Absorbs pollutants
- Improves air quality
- Provides food and habitat for wildlife
- Reduces greenhouse gases
- Beautifies the view
- Absorbs sound pollution
- Lowers urban air temperatures

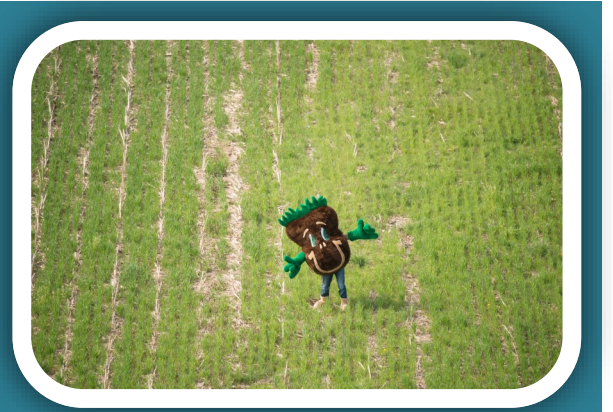


No-Till Agriculture

No-till agriculture is a conservation practice in which farmers plant crops without disturbing the soil or removing the plants that are already there. This improves the **infiltration** rate of the soil, reduces **erosion**, and builds the organic matter and **nutrient cycling** in the soil.

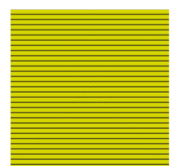
Many farmers used to till their fields every year, meaning they used plows to turn over the soil before planting new seeds. Tilling loosens the soil, causing more erosion from wind and water. However, good soil is full of worms, insects, and micro-organisms (microbes) like fungi, algae, bacteria, and protozoa that need dark, moist habitats to survive. Here, these tiny organisms play important roles in the food web: they help break down dead plants, make nutrients for new plants to grow, and prevent erosion! Tilling the soil disrupts this special ecosystem.

Now, soil scientists are spreading the word to farmers that the best way to keep their fields productive may be to let the organisms and the soil work their magic without tilling their home.



Benefits and Uses:

- Increases infiltration
- Improves soil nutrients
- Reduces erosion
- Increases diversity of microbes
- Reduces costs to farmers

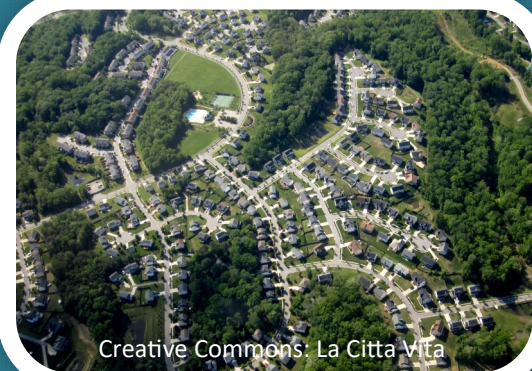


Cluster Housing

Cluster housing is a way of building residential areas where homes are built in groups closer together, which allows for larger open spaces between the buildings. The larger open spaces are often planted with trees and vegetation that enhance **infiltration**, reduce **runoff** and **erosion**, and provide recreational space for the inhabitants.

Building homes closer together makes it easier and less expensive to install the **infrastructure** needed for water supply, sewage, electricity, and roads. This also decreases the amount of impervious paved surfaces and sky-rockets the efficiency of stormwater management structures like rain gardens and vegetation infiltration basins. Cluster housing also helps neighbors develop a sense of community and provides more opportunities for kids to play together!

The large areas of open land can then be used for agriculture and recreation. More forests and native meadows improve infiltration and provide important habitat for wildlife.



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Benefits and Uses:

- Focuses infrastructure
- Reduces human impact on land
- Increases spaces for recreation and/or agriculture
- Reduces impacts on wildlife habitats
- Enhances sense of community
- Conserves resources
- Prevents suburban sprawl



Google Earth

