In-Situ Bioretention Fact Sheet

Conventional bioretention retrofit practices often rely on extensive excavation, soil disposal, bioengineered soil media, and underdrain systems. These components increase project costs, carbon footprint, timelines, and long-term maintenance demands while reducing the water quality and water quantity benefits.

In contrast, **in-situ bioretention is a way of working with nature** in the design and construction of bioretention systems to make them **more effective and lower cost.** Most sites can benefit from using this approach over conventional practices.

What are the key differences between in-situ bioretention and conventional bioretention approaches?

- Amends the existing soils rather than bringing in new materials
- Excavates an average of only 2 feet of soils instead of 5 feet
- Reduces construction costs by 50% and operation and maintenance costs by 25 to 40%
- Reduces engineered features such as bioengineered soil media and underdrains
- Can be used with most existing site conditions

What soils are not appropriate for in-situ bioretention?

- Hydric soils with high water tables
- Heavy clays subject to slippage failure (Marlboro, Christiana, and Howell clays)
- Soils with toxic contamination
- Shallow soils underlain by bedrock

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How can this practice be installed?

- Site and size the practice following design guidelines for bioretention systems.
- Ensure the practice is located at least two feet above the seasonal high water table.
- Test soil pH and amend, if needed, to attain pH levels of 5.5 to 7.

For permeable soils (0.52 inches per hour infiltration rate or more) that typically include sandy loams, loamy sands, or loams:

1. Excavate to required ponding depth of six inches or less, allowing for 6 inches of freeboard.
2. Mix in three to four inches of well-aged organic materials such as composted leaf mulch or double shredded pine fines.
3. Deep till organic material 18 to 24 inches below the ponding depth.*
4. Plant native vegetation and add 3 inches of mulch.

**Till soil only in dry conditions*

Low permeable soils and clays will also require a mechanical treatment such as ripping and chiseling to incorporate organic material into existing soil to improve their infiltration value to the required 0.52 inches per hour. A mini-infiltrometer test is inexpensive and provides rapid results for checking the permeability of the soils.

*In-situ bioretention is still an emerging approach to bioretention design. We recommend working closely with your local regulatory agency to collaboratively navigate the approval process.

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