



best management Practices

FOR CONSTRUCTION SITES

By Jenny Boyle, regional editor

Construction sites are common sources of urban runoff pollution. As a contractor, you have the responsibility to prevent stormwater run-off as much as possible while you're on the job. And while there are several best management practices (BMPs) you can put in place to control run-off, they will not serve their purpose if they are improperly installed and/or maintained.

Peter MacDonagh, adjunct faculty in Landscape Architecture at the University of Minnesota and vice

Before construction begins, seed is blown on any open areas. Depending on the site, professionals recommend blowing at least two inches of a compost/grass seed mixture or putting down 1 1/2 inches of cover crop seed and then 1/2 inch of compost on top of that.

president of Kestrel Design Group in Minneapolis, says there are certain steps you must follow to control run-off before and during construction. His firm specializes in the restoration of natural areas and ecological stormwater management plans and though he says erosion control during construction is not easy, there are ways to prevent it. Here are his suggestions.

Cover Crop

"The most important thing during construction is to start growing a cover crop immediately," says MacDonagh. "Put it down right away in any open areas."

“A lack of oxygen tends to kill trees, not a lack of water.”

Though standards are different in every region, and for every municipality, he advises that no part of the site should be left open if it is not actively being worked on for more than two days. According to the *Stormwater Management Manual for Western Washington* (the *Manual*), “seeding is intended to reduce erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.”

MacDonagh suggests using oats, and fast-growing ReGreen annual rye, in combination with certified compost.

“We sow heavily...50 pounds an acre,” he says. “Typically in hot and wet weather, it will germinate in three days. We’re going for a cover crop that is completely filled in and one foot high in less than twenty days.”

The *Manual* recommends that any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows) should be reseeded. If reseeding is ineffective, alternate methods, such as Netlon-advanced turf™ or compost blankets can be used. After adequate cover is achieved, any areas that experience erosion should be reseeded again and protected by mulch. The Netlon-advanced turf system consists of playing-card sized pieces

of plasticized mesh that reinforce soils to withstand heavy loads and maintain grass.

When it comes to steeper slopes, 4H:1V (4 horizontal to 1 vertical) or greater, MacDonagh says two-inch thick, blown-on compost blankets are best, but he warns, “It has to be certified compost so that weeds don’t grow.”

Also, the *Manual* cautions that installation is critical to the effectiveness of these products. If good ground contact is not achieved, runoff can concentrate under the product, resulting in significant erosion.

Tree Care

MacDonagh says another important step in the process is making sure that existing trees on site are protected before any grading happens.

“You can’t park or store materials under trees,” he says. “They’ll die because of compaction of the roots.” Ninety percent of trees’ roots are in the top 12 inches of soil and MacDonagh says that a lack of oxygen tends to kill trees, not a lack of water. He recommends laying six inches of mulch underneath trees and then placing plastic, open-faced fencing at the dripline.

“These fences are reusable...we like it,” he says. “They can be treated as a rental item and at the end of the project you can pull the fence off-site and take it to the next.”

His firm prefers bright orange fencing, which helps the equipment operators see it as they are working.



The Bobcat mini-backhoe is one example of a tracked vehicle that MacDonagh recommends. Unlike wheeled vehicles, tracked equipment won't cause severe soil compaction.



A backhoe is used to install a root wad at the shoreline. Not only do these create a habitat for fish, they are used to dissipate the water on the shoreline.



Before: Biodegradable compost logs (12 inches in diameter) are staked perpendicularly down the slope. It is important to use certified compost to prevent invasive species from growing.

After: Just a year later, the compost logs have biodegraded and the area is covered with dense perennial growth that will help prevent invasive species.



Silt Fences and Compost Logs

Since we are on the topic of fences, MacDonagh says that many industry professionals are actually moving away from silt fences as a BMP because they have proven to be ineffective. An article from Watershed Protection Techniques, entitled, *Construction Practices: The Good, The Bad, and the Ugly*, by Robert G. Paterson, assistant professor at the University of Texas, states that this 'ineffectiveness' is often a result of improper installment and/or poor maintenance. In performed tests, poor performance was attributed to "a failure to install all parts of the measure (e.g., reinforcing wire), failure to anchor the base, failure to cover entire designated area with fence, and damage by construction vehicles that back over devices."

MacDonagh says that the correct installation and removal processes are really what prevents his crews from using silt fences more often.



"There's a lot of work because [silt fences are] installed with a trencher," says MacDonagh. "But when you're done, you have to pull them out."

He also says silt fences are difficult to fix if they are damaged by machinery, which might be the reason so few of them are maintained properly during construction, and why they fail to do an effective job of controlling run-off. Compost logs are much more immediately effective.

"Compost logs are great," says MacDonagh. "They're biodegradable, so you don't have to take them off the site. We can stack them two high at the base and stake them in, or lay them on the grade."

They are much more effective at filtering and cleansing stormwater runoff. They come in eight inch and 12 inch diameter rolls and "you can run machinery over the compost logs," he says. "If you run machinery over a silt fence you have to fix it."

By machinery, MacDonagh means tracked vehicles, which he says are a great way to get the job done with the least amount of compaction to the soil. (Continued on page 56)

Compost logs can be laid on the grade and have proven to be more effective at maintaining a high water quality. Tracked vehicles can also easily maneuver over them without damaging them or making them less effective at run-off control.



Left: Silt fences should be the most temporary of measures taken to prevent runoff. They are put in place, in addition with compost logs, and once the plants have grown in, they should be removed.

Above: Many industry professionals are moving toward plant plugs, which are installed in the compost to speed up plant growth. Here, a mixture of forbs (such as butterfly milkweed, woodland sunflower, and rough blazing star) and grasses (such as little bluestem, blue gramma and side oats gramma) is placed every half-foot on center.

“Tracked vehicles reduce **compaction** dramatically by **spreading** the weight over a **larger surface.**”

—Peter MacDonagh

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“On our projects around water, soils are squishy...they’re not very structurally strong,” he says. “We say ‘move away from wheeled vehicles and use tracked vehicles instead.’ Tracked vehicles reduce compaction dramatically by spreading the weight over a larger surface. Also, if possible, consider working on frozen ground, as freezing further protects soils from compaction.”

Wetland Access

MacDonagh says that wetland access during construction can be made easier with the help of geotextile.

“We’ve found that a good technique to use for crossing a wetland is to create a geotextile ‘pillow,’” he says. “We get a super wide roll of geotextile—something wide enough for tracked vehicles to drive on—first we lay down the geotextile, then we put down 18 inches of utility grade wood chips with another layer of geotextile on top. The ends are sewn together with a large needle, creating a long linear pillow. The wood chips are free, we can reuse the pillow and can run fully loaded dump trucks across them and not compact the wet soil.” These wood chip pillows can be as long as you want and one or two “lanes” wide.

MacDonagh also says you need to make sure that the proper reports—delineations, permits, etc.—are filed with the local governing body before anything happens on a wetland site.

Rules and Regulations

There are several BMPs that can be put in place to prevent erosion on the construction site. But none of those will work effectively if they are not properly installed and maintained.

“It’s a process,” says MacDonagh. “First, you protect the trees, then you start mass grading, seed the cover crop and add compost blankets on slopes greater than 4H:1V. you add more erosion control measures as you create more stockpiles. Remember, using lots of seed is cheaper than paying fines. We use lots of seed where there are bare patches.”

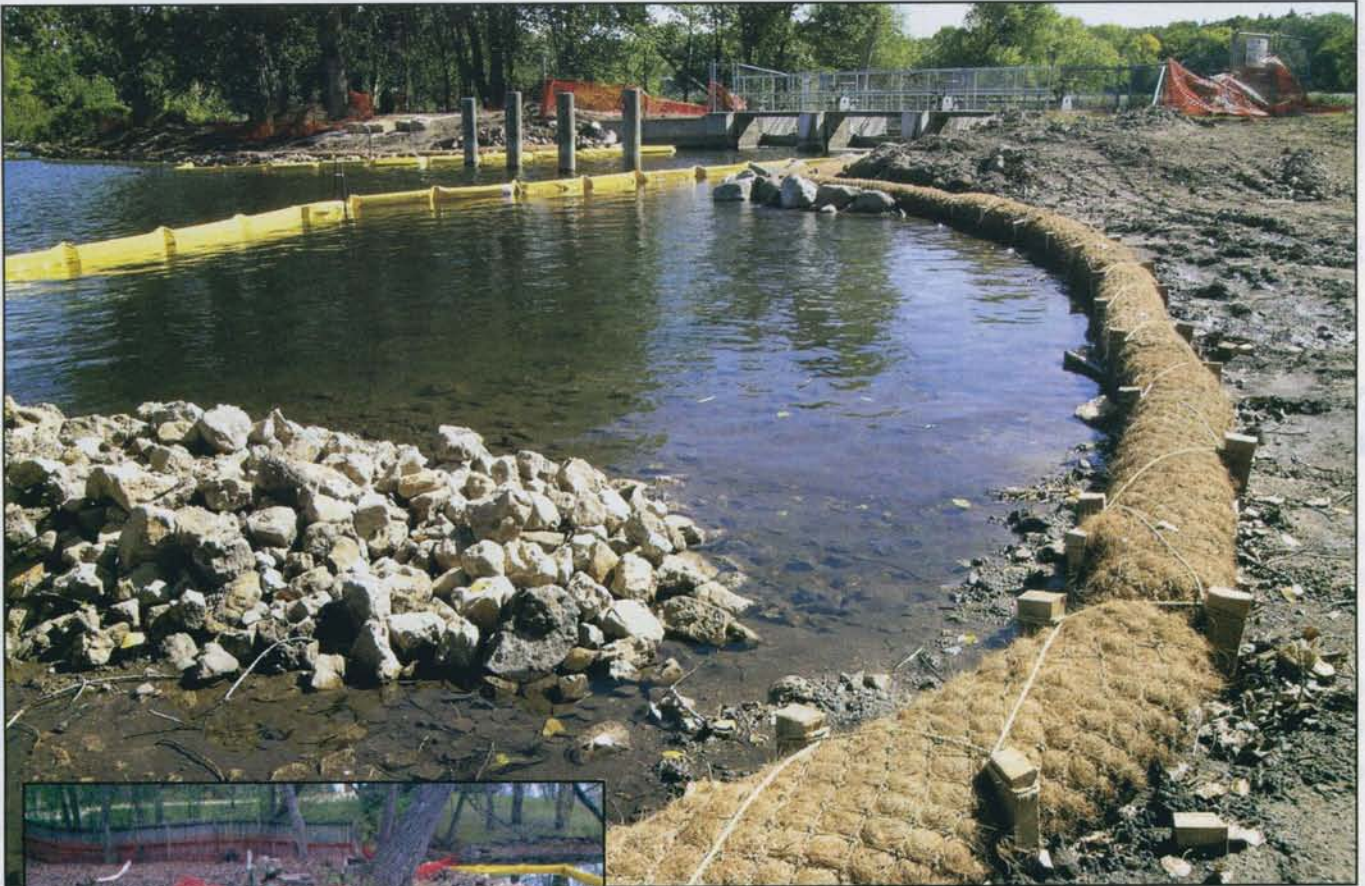
MacDonagh says most discussed BMPs are designed for long-term erosion, but those that deal with construction are usually short-term prevention methods and can have the largest long-term impact on reducing soil erosion.

“Regulations depend on the county, township, etc.,” he says. “They’re very local. You should go to the municipality or local government unit to find out about the erosion control regulations for the area you will be working in.”

He also notes that most departments of transportation have their own regulations as well, while yet other parts of the country have watershed districts with taxing capabilities for water improvement projects.

MacDonagh says that erosion control is hard to manage during construction, especially if you are in an area where those regulations are very strict. He advises that one crewmember should be deemed an erosion control chief. (Continued on page 58)

“Documentation is the key to it all.”—Peter MacDonagh



Top: Core fiber rolls are another effective best management practice that helps stabilize a shoreline and prevent sediment from washing into the water. Like compost logs, they are strong enough for tracked vehicles to run over them without causing damage. **Inset:** The core fiber rolls can be stacked up hill to stabilize a bank. The fibers have a high enough carbon content that they break down slowly, allowing plants to become established.

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“He should do a check before, during and after each day of work to check for things that could become a problem,” says MacDonagh. “Documentation is the key to it all. Have a notebook where you can track changes, and if possible, a digital camera with a date on it. You need a history of your work so if something is called out as a problem, you have a backlog. It’s also a really good way to let everyone on site know that this erosion control stuff is important.”

On that note, MacDonagh says contractors should make an effort to study the effects of erosion control and also make sure they are properly trained to install stormwater BMPs.

“Education is definitely behind,” he says. “Some state Departments of Transportation offer courses in erosion control issues. They’re normally held in the quieter months of the year, and they’re usually free.” **L.C.N.**

About Kestrel Design Group

Current projects include natural areas inventories and restoration plans, and stormwater management plans. Pioneers in conservation development design, the firm also specializes in green roof technologies and sustainable design.

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*Construction Practices:
The Good, the Bad, and the Ugly*

Washington State Department of Ecology

*Stormwater Management Manual for
Western Washington,
Volume II: Construction Stormwater
Pollution Prevention*