February 2017

REDUCE POLLUTANT LOAD WITH THE

The Monthly Dirt

a monthly newsletter on the California Construction General Permit

by WGR Southwest, Inc.

TREATMENT TRAIN

ON TRACK TO COMPLIANCE

What usually happens when you mix rain with disturbed soil? A nasty sediment problem. And attempting to clean the sediment-laden storm water before it leaves your site can feel like trying to stop a freight train. How do you stop a train? Well, how about with another train? In this month's edition of The Monthly Dirt, we're going to look at how installing a treatment train can help bring your sediment and pH numbers back under control. But before we do, keep in mind that treatment trains are not active treatment systems. There will be situations where this type of treatment train will not work, and an active treatment system will need to be used.

So, we've got a sediment problem on our hands. Let's start off by talking about turbidity and how an effective filtration strategy works. What is turbidity? Turbidity describes the cloudiness or haziness of a fluid, which is typically caused by a large number of suspended particles. For storm water, turbidity is usually tested by a field instrument which shines a beam of light through a glass vial containing a water sample. The results are reported in NTUs (Nephelometric Turbidity Units). Note that turbidity is different than Total Suspended Solids – while they generally measure the same thing, they are fundamentally different analytical tests and are used for different purposes.

Unless the turbidity is caused by a colloidal suspension (e.g., colloidal clay), the sediment particles that cause the water to be turbid will eventually settle out if the water is not disturbed. So, a good way to treat high turbidity is to create an area where storm water runoff can slow down and sediment can settle out. The treatment train accomplishes this by using compost socks to create multiple "pools," and by using layers of sand, mulch, and river rock within the pools to disperse and slow down the water flow, and encourage sediment to settle out. To prevent additional turbidity problems from arising within the treatment train, the ground beneath the treatment train is lined with black visqueen to create a temporary swale.

Treatment trains can also be used to bring rogue pH numbers back under control. Wood mulch – especially redwood or cedar mulch – is very effective at lowering pH numbers. Wood mulch not only helps lower pH, but can also trap sediment particles and help with turbidity issues. However, wood mulch has a limited lifespan for reducing pH, and will need to be occasionally replaced – usually when you start noticing that your pH results are starting to climb back up.

Last but not least, the compost sock check dams in between the "pools" play an important role in treating storm water runoff. Compost is a very versatile and effective filtration media, and is capable of reducing or removing a large number of pollutants – including nutrients, metals, hydrocarbons, and even bacteria. The heavy socks also help slow the water down in between the pools. Though it's not shown in the pictures,

we've found that our treatment trains are more effective when we stack an additional layer of compost socks over each check dam. The extra weight helps ensure that water is flowing through the socks instead of undermining them.

The treatment train can be designed and built to the size of your project, and the amount of sediment you need to remove. The general idea is to isolate the storm water outfall so that all of the storm water has to pass through the treatment train before discharging. Using fiber rolls, compost socks, or hay bales, create a "chute" to direct water into the outfall. Line the chute with black visqueen, making sure to wrap it over the sides of the chute. Section off a number of pools within the chute using compost sock check dams that are two socks wide and two socks high, installed in a backwards U configuration. Finally, add a layer of treatment media to each pool. Our typical treatment media sequence is to start with wood mulch in the first pool, then sand, and end with river rock right before the outfall. Always install sand downstream of the wood mulch to prevent the mulch from causing any sediment problems of its own.

Again, keep in mind that a treatment train will need to be maintained from time to time. After a while, the wood mulch will no longer effectively treat pH, and the compost socks may become clogged with sediment. For the best results, keep an eye on how the treatment train is doing, and replace media as soon as it begins to look worn out, or when your pH levels and turbidity start rising. For reference, we have seen filtration media treat more than 60,000 gallons before needing to be replaced.

A treatment train is not a magic bullet. Depending on your project site, sediment particle size, and sediment loads, it might work great – or it might not work at all. Again, treatment trains are not active treatment systems, and there will be situations where an active treatment system is the only treatment solution that will work. But before you spend the money to rent an active treatment system, it's worth checking out a treatment train. For under $1000 in materials and just a few man hours for installation, you could bring your numbers back under control.

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Upcoming Training

Got SWPPP? Classes coming to Lodi:

- ✓ QSP/QSD Training, **April 25-27, 2017**
  - Sign up at www.gotswppp.com
- ✓ PDU Week, **May 22-26, 2017**
  - Visit www.pduweek.org for more info

(For more information about these classes, please email jteravskis@wgr-sw.com)

Turbidity or TSS?

Though both analytical tests measure the amount of sediment present in a water sample, there is an important difference between turbidity and total suspended solids (TSS). Turbidity is tested in a nepholometric turbidimeter, a device that shines a beam of light through a sample and measures the amount of light loss. This means that a turbidimeter can accurately measure the amount of suspended and colloidal particles, but heavier particles can settle to the bottom of the sample vial and not show up on the test results. The turbidity result is measured in Nephelometric Turbidity Units, or NTUs.

Total Suspended Solids, on the other hand, is determined by passing a measured amount of water through a pre-weighed filter (typically glass-fiber) with a specified pore size. The filter is then dried and weighed. The difference between the two weights is the TSS result – reported in milligrams per liter, or mg/L.

It's easy to see how particles above a certain size would not be measured by a turbidity meter, but would significantly increase TSS results. However, Total Suspended Solids isn't a perfect test either, because small particles (such as those in a colloidal suspension) can pass right through the filter without detection.

Please contact us if you have any questions …

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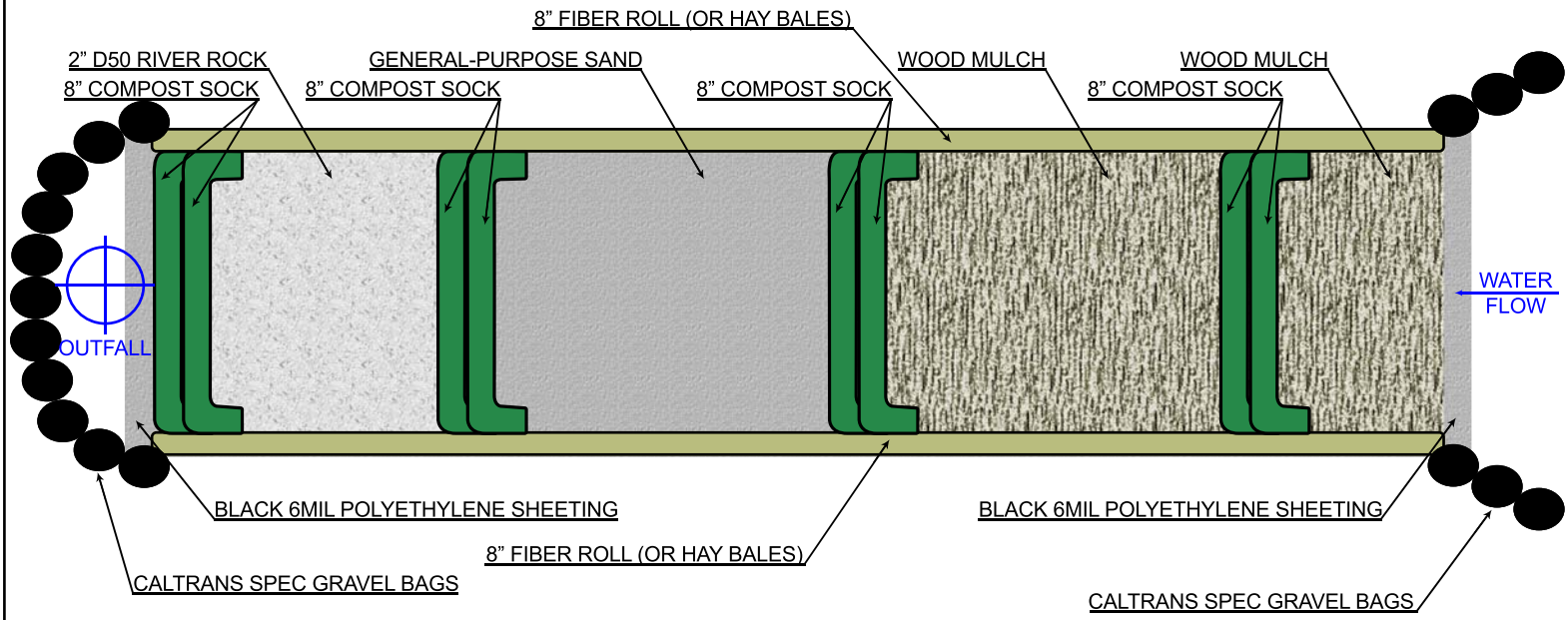
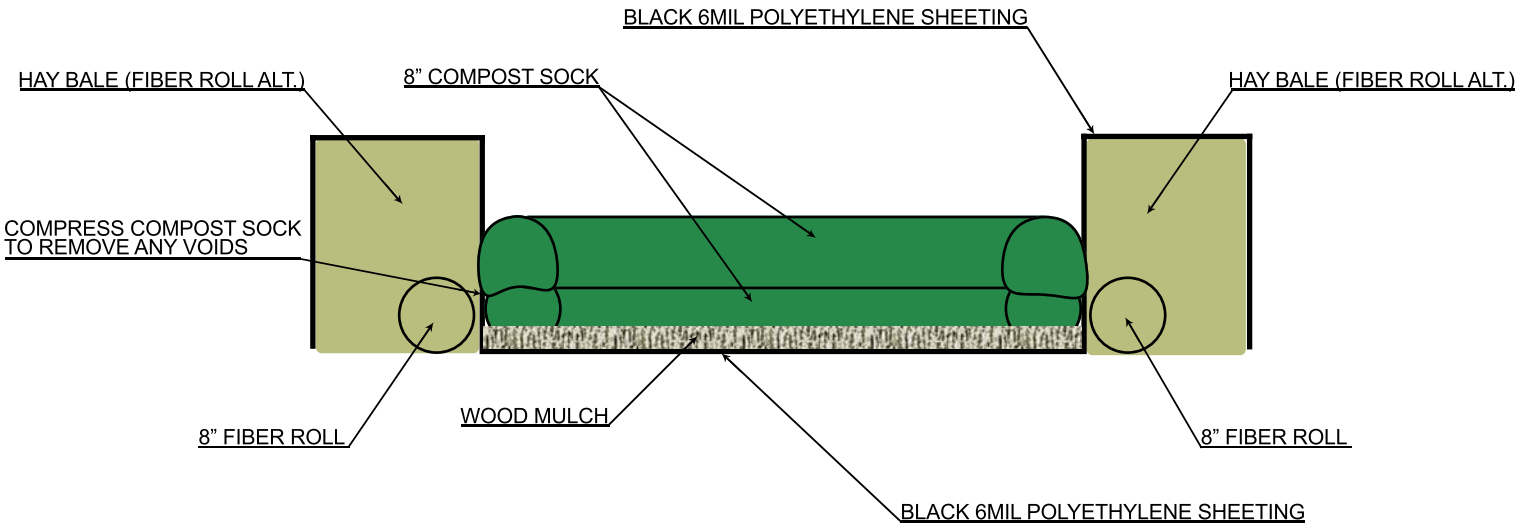


NOTE: POLYETHYLENE SHEETING WRAPS OVER FIBER ROLLS AND UNDER TREATMENT TRAIN. DEPENDING ON ANTICIPATED WATER FLOW, HAY BALES CAN BE USED INSTEAD OF FIBER ROLLS.

TREATMENT TRAIN PLAN	The Monthly Dirt A storm water newsletter by WGR Southwest, Inc.	SCALE 0 2 4 8 feet	FIGURE 1A



NOTE: IF CUTTING MULTIPLE SECTIONS OF POLYETHYLENE SHEETING, GLUE OVERLAPPING EDGES TOGETHER TO PREVENT UNDERMINING.

TREATMENT TRAIN PROFILE	The Monthly Dirt A storm water newsletter by WGR Southwest, Inc.	SCALE 0 1 2 4 feet	FIGURE 1B

EROSION CONTROL
BMP SUMMIT

APRIL 11&12

SHASTA COLLEGE
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8AM-4:30PM

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- **Stormwater Pollution Prevention Plan–SWPPP**
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Treatment Train Pollutant Removal

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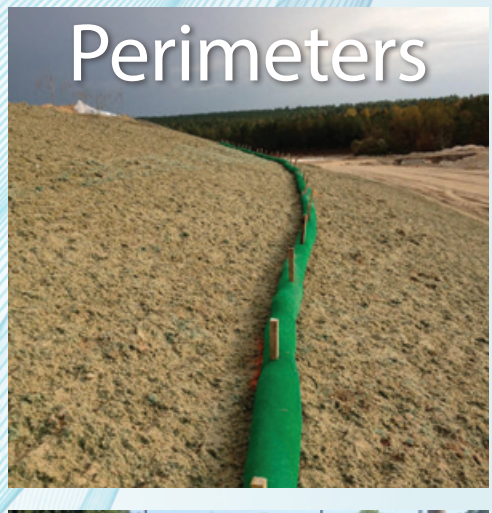

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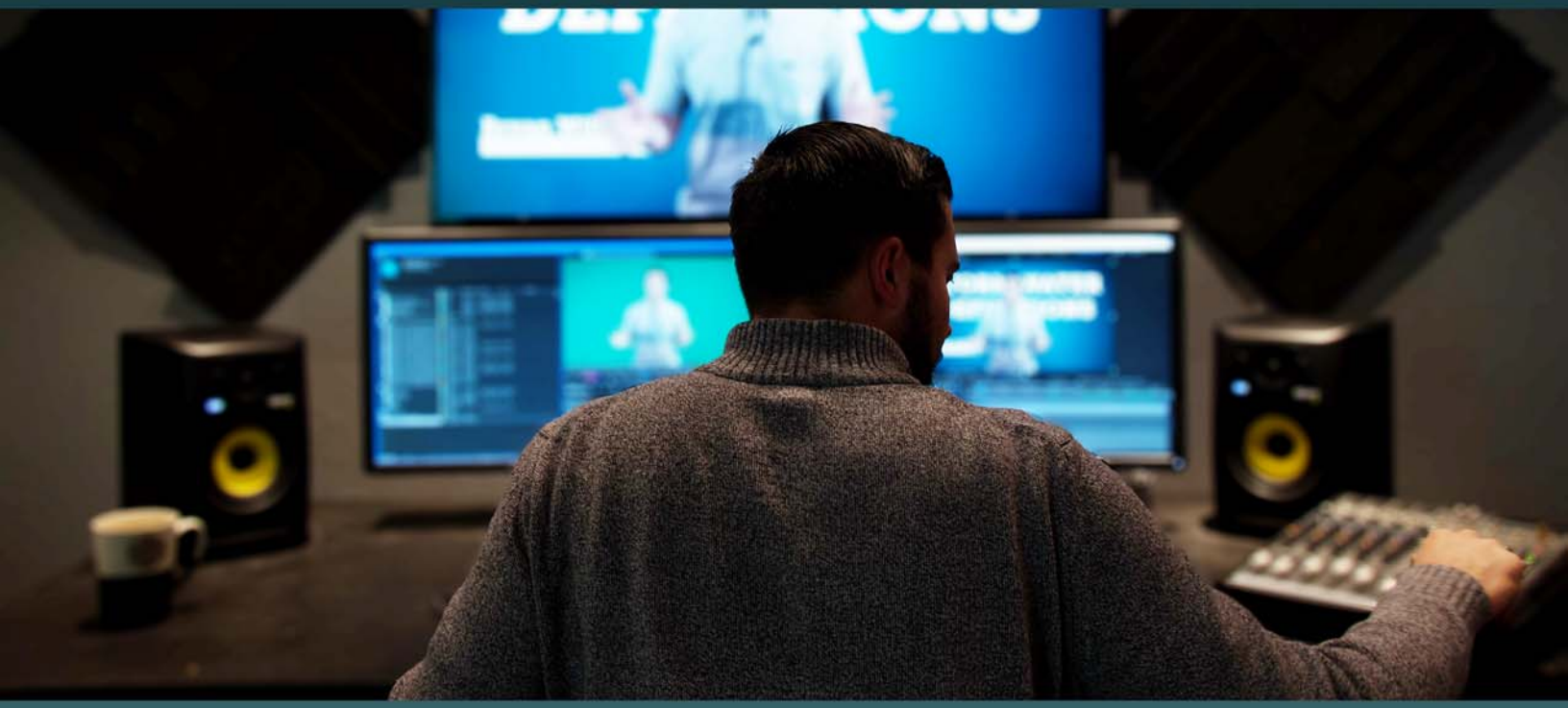

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