PAM and wattle information:

We don't have an Excel spreadsheet with all the cost estimate breakdown information on it but we do have a page or two regarding cost and water storage capacity of the wattles/logs as copied from a DOT research project we worked on in the mountains (see text beginning on page 2). Please note it uses some metric system values but just remember that 1 meter (m) is about 3 feet long.

The following text is general information about where to buy both the wattles/logs and the polyacrylamide (PAM) chemical we highly recommend using in conjunction with them.

By providing this partial list of particular vendors we are NOT meaning to endorse any one supplier, or any group of suppliers, but merely intend to offer a list of vendors known by us to sell the types of products we discuss in our workshops and lectures.

The type of PAM we've used is made by Advanced Polymer Systems (APS) and can be found at their website (www.siltstop.com). We've used the granulated PAM-705 approved for use by the DWQ, though again they do not allow PAM-treated water to be discharged off site. You might find PAM dealers on the APS website but we've purchased it from CFP out of Raleigh 919-250-1980, though they have distribution centers all over the place. You could also try ACF Environmental (www.acfenvironmental.com) 1-800-448-3636 or 919-788-1510 out of Raleigh.

Regarding the straw wattles and coir logs, we've purchased various types from ACF Environmental (www.acfenvironmental.com) 1-800-448-3636 or 919-788-1510 out of Raleigh though I believe they have other offices and distribution centers as well. Or you could try getting them from RoLanka International (www.rolanka.com – from the home page, click 'products' then 'sediment control products' for a range of E&S devices). They'll work with you so you can order the exact length of product you want. He specializes in the coir products, which worked quite well for us and his wattles/logs have 'wings' along the bottom, making installation much easier. He also sells PAM.

Speaking of installation, feel free to check out our wattle installation PowerPoint guide at: http://www.soil.ncsu.edu/lockers/McLaughlin_R/Files_to_Share/ It's the 10Mb file called 'Straw wattle installation guide', though it applies to any of these types of fiber check dam rolls (straw, coir, cotton, etc).

For any of these products feel free to Google the product to try and find a smaller or more local dealer and you can always look up any erosion control supplier and see if they have any of these things. PAM may be fairly new to them but most of those companies offer some sort of E&S rolls as they're becoming more and more popular.

We're currently working on ways to maximize the effectiveness of these wattles if placed in a V-notch ditch, if that's an issue for you.

Let me know if you have any other questions about the fiber check dams or PAM, and if you do end up using them on site, please let us know how they work out for you. We'd love to stop by the project site and take some pictures of these things in action and hear about any problems you encountered or solved.

If you're interested, we have a .pdf file of the E&S section of the construction plans for a local project showing a detail of the wattles being used.

Thanks for your interest,
Scott King
Extension Associate
NC State University – Soil Science Dept
919-513-0968

Cost Estimate Comparison

Estimating the cost of installation for the NC DOT standard BMPs is challenging as the cost per device will vary by site, depending on the number of devices to be installed, how frequently they require maintenance, etc. However, the website for the DOT Contracts Office contains a database of Statewide 2006 bid averages, where it was calculated that the average cost of Class B erosion control stone (installed) was $39.23/ton, while the initial cost to dig a sediment basin (and to periodically maintain it by digging it out when it fills up) was $6.01/yd$^3$. Assuming average conditions on a given site, we can give a general estimate of about $90 per basin and rock check combination, with a clean-out maintenance cost of about $11 per basin. There is also the cost for the mobilization and use of the heavier equipment needed for the installation and clean-outs, estimated by the DOT at about $50 an hour for the backhoe, trailer, and other vehicles (T. Sherrod, NC DOT, personal communication, 2007). For these projects, we're estimating a 30 minute

drive time to and from each site, with about an hour installation or maintenance time required for each sediment basin and rock check combo.

For the Steeltown site, there were 6 of these standard BMPs in the 137 m long DOT section, resulting in an estimated cost of $890 to install and $416 for each maintenance performed. This translates to $6.50 per meter in installation costs.

By comparison, the fiber check dams plus PAM section (204 m long) had 15 straw wattles ($20 each) and 5 coir logs ($55 each), each one requiring about $3 in sod staples and wooden stakes, for a total material cost of $635. At 15 minutes installation time each, assuming $15/hour for labor, the installation labor cost is about $75. The cost of the PAM, estimated to be about $1.67 per 100 gram application, would be $33. The mobilization and equipment cost here is much less, at around $20 an hour, as no backhoe is required for installation. So, including a 30 minute drive time to and from the site, as well as an estimated 6 hours on site, this charge comes to around $120. Maintenance would entail about $33 in PAM, 2 hours of labor (including drive time to/from site), and $8 an hour in vehicle charges. Thus, we estimate a total cost of $854 to install and $79 for maintenance. This translates to $4.19 per meter for installation costs.

The fiber check dams only section (141 m long) had 15 straw wattles ($20 each) and 4 coir logs ($55 each), each with $3 in staples and stakes, for a total material cost of $577 plus $75 of labor for installation, as well as about $120 in vehicle charges. This comes to a total estimated cost of $772 to install with no maintenance costs, or $5.48 per meter for installation. This is more than the other fiber check section simply because the spacing of the checks was closer.

At the Curley Maple site, the fiber checks plus PAM section (149 m long) had 13 straw wattles ($20 each) and 5 coir logs ($55 each), each with about $3 in staples and stakes and $1.67 per 100 gram PAM application, for a total material cost of $749. At 15 minutes installation time each, labor cost should be around $67, with a vehicle charge of about $110, for a total estimated cost of $926 to install and $76 for maintenance. This is $6.22 per meter for installation alone.

For the DOT standard section here (155 m long), there were 6 sediment basin and rock check BMPs. At a cost of $90 each, plus an estimated $350 in equipment charges, this section cost an estimated $890 to install and $416 for maintenance, or $5.74 per meter to install.

Thus the newer fiber check dams appear to be an economically viable alternative as their cost relative to the standard appears very minimal, if not actually cheaper, especially if one considers the maintenance costs over time. Plus, if the rock checks and/or sediment basins have to been removed or filled-in that would sharply increase the overall cost of the standard BMPs, while the fiber checks can simply remain in place to slowly and harmlessly disintegrate over time.

We did not determine if the more expensive coir logs could have been replaced by the straw wattles or other alternatives to bring costs down. The straw wattles did tend to settle and flatten slightly over time as compared to the coir logs, though they still maintained most of their form and still continued to function by backing up water throughout the study period. However, it is possible that the coir logs are important for their ability to pond greater water volumes due to their extra height, perhaps important during larger storm events, or that they might provide a needed “backup” system as the

straw wattles slowly disintegrate. There are many other materials and even types of check dam alternatives. It is likely that many of them would work as well, but our results suggest that straw wattles will perform well for short periods and the inclusion of longer-lasting checks, such as coir logs, perhaps adds some insurance in case projects are open longer than 3-6 months.

Table 6
BMP Cost Estimate Comparisons for Steeltown and Curley Maple Sites.

| Section | Section Length (m) | Installation Cost | Maintenance Cost | Installation cost per linear meter |
|---|---|---|---|---|
| **Steeltown Road** | | | | |
| Standard BMPs | 137 | $890 | $416 | $6.50 |
| Fiber check dams with PAM | 204 | $854 | $79 | $4.19 |
| Fiber check dams only (no PAM) | 141 | $772 | None | $5.48 (BMP spacing closer here) |
| **Curley Maple Road** | | | | |
| Standard BMPs | 155 | $890 | $416 | $5.74 |
| Fiber check dams with PAM | 149 | $926 | $76 | $6.22 |

Water Storage Volume Estimates

The potential water storage volumes were estimated for all sections at each of the two sites. The water storage volumes were estimated for all treatments at each of the two sites. The calculations were done assuming that the ditch width was completely flat-bottomed with perpendicular side walls, so if the ditch is actually rounded or trapezoidal to any degree then the check dams will hold proportionally less water, depending upon the specific ditch design. Note that over time, as any of these BMPs fill in with sediment, their water storage capacity would decrease proportionately.

In calculating the water storage volumes for the Steeltown site, the standard DOT section, with six basins, held roughly 8.2 $m^3$ of water, or 0.06 $m^3$ per linear meter of that section. By comparison, the fiber checks with PAM section, with 15 straw wattles and 5 coir logs at a 7% slope and 1 m wide channel, held roughly 8.2 $m^3$ of water (or 0.04 $m^3$ per linear meter), while the fiber checks alone section, with 15 straw wattles and 4 coir logs at a 6% slope and 1 m wide channel, held roughly 8.8 $m^3$ of water (or 0.06 $m^3$ per linear meter). At the Curley Maple site, the standard DOT section with six basins held roughly 8.16 $m^3$ of water, or 0.05 $m^3$ per linear meter, while the fiber check dams with PAM section with 13 straw wattles and 5 coir logs at a 3% slope and 1 m wide channel held roughly 17.4 $m^3$ of water, or 1.12 $m^3$ per linear meter.

Thus, the new fiber check dams appear to be a reasonable substitute to the standard BMPs with regards to their overall water storage volume capacity.

**Erosion Control Product Contacts**

CFP
(They sell a wide range of E&S blankets, liners, and PAMs)

http://www.cfp-geosynthetics.com/index.html

Charlotte Warehouse
CFP #1417
10039 Industrial Drive
Pineville, NC 28134
Phone: 704-553-0500
Fax: 704-552-2009

Raleigh Warehouse
CFP #1418
1200 Corporation Parkway
Suite 121
Raleigh, NC 27610
Phone: 919-250-1980
FAX: 919-250-7518

Charleston Warehouse
CFP #1419
7387 Peppermill Lane
North Charleston, SC 29418
Phone: 843-760-4540
FAX: 843-760-4546

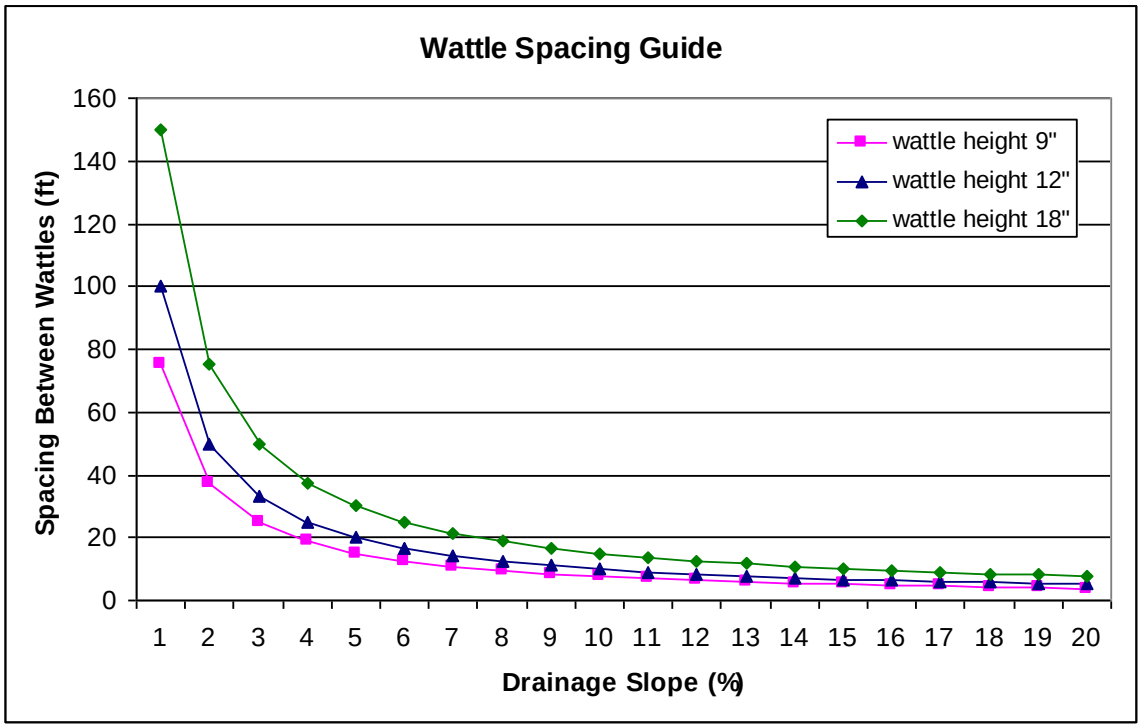
Asheville/Greenville-Spartanburg Sales
Contact: Gregg Sutton
Phone: 828-452-9604

RoLanka International, Inc.

(He sells a wide range of wattles, logs, and some PAM products)

155 Andrew Drive, Stockbridge, GA 30281
1-800-760-3215
rolanka@rolanka.com

http://www.rolanka.com/index.asp?pg=welcome&sid=598876043



Wattle Spacing Guide

| slope (percent) | wattle height 9" | wattle height 12" | wattle height 18" |
|---|---|---|---|
| 1 | 75 | 100 | 150 |
| 2 | 38 | 50 | 75 |
| 3 | 25 | 33 | 50 |
| 4 | 19 | 25 | 38 |
| 5 | 15 | 20 | 30 |
| 6 | 13 | 17 | 25 |
| 7 | 11 | 14 | 21 |
| 8 | 9 | 13 | 19 |
| 9 | 8 | 11 | 17 |
| 10 | 8 | 10 | 15 |
| 11 | 7 | 9 | 14 |
| 12 | 6 | 8 | 13 |
| 13 | 6 | 8 | 12 |
| 14 | 5 | 7 | 11 |
| 15 | 5 | 7 | 10 |
| 16 | 5 | 6 | 9 |
| 17 | 4 | 6 | 9 |
| 18 | 4 | 6 | 8 |
| 19 | 4 | 5 | 8 |
| 20 | 4 | 5 | 8 |