Wattle Application on Linear Projects

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What is a Wattle?

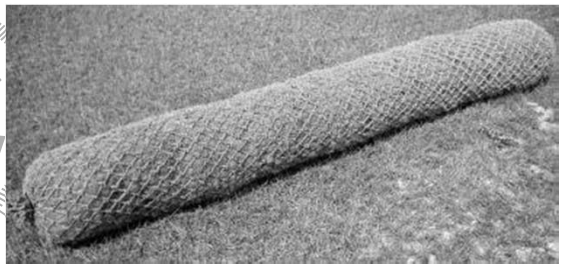
- Anatomical definition* – a fleshy growth hanging from the head or neck of certain animals.

- Construction definition* – woven strips of wood forming panels used for fencing or for walling.

* – definitions from Wikipedia

NCDOT Wattle Definition

- NCDOT definition – tubular product consisting of excelsior or coir (coconut) fibers encased in synthetic netting.



Types of Wattles

- Straw – NCDOT does not use
- Excelsior
- Coir/Coconut Fiber
- Compost – New to NCDOT
- Synthetic – No NCDOT experience

Excelsior vs. Coir Fiber

Excelsior	Coir Fiber
► Inner Material: Curled Wood	► Inner Material: Coconut Fibers
► Diameter: 12 in. – 18 in.	► Diameter: 12 in. – 18 in.
► Length: 10 ft.	► Length: 10 ft.

Excelsior vs. Coir Fiber

Excelsior	Coir Fiber
► Density: 2.5 lb./ft.^{3}	► Density: 3.5 lb./ft.^{3}
► Design Life: 1 year	► Design Life: >2 years
► Average Cost: $5.00 per ft. (Includes material, labor and equipment costs – 2013 NCDOT bid)	► Average Cost: $6.00 per ft. (Includes material, labor and equipment costs – 2013 NCDOT bid)

Linear Project Wattle Applications

- Ditches for Polyacrylamide (PAM) Incorporation
- Drainage Breaks in Silt Fence
- Perimeter Barriers in lieu of Silt Fence
- Slope Breaks and Runoff Diversions
- Inlet Protection

Wattles on Erosion Control Plans

- Ditchline Wattle

Without PAM With PAM

- Excelsior Wattle Break and Barrier

— EW —

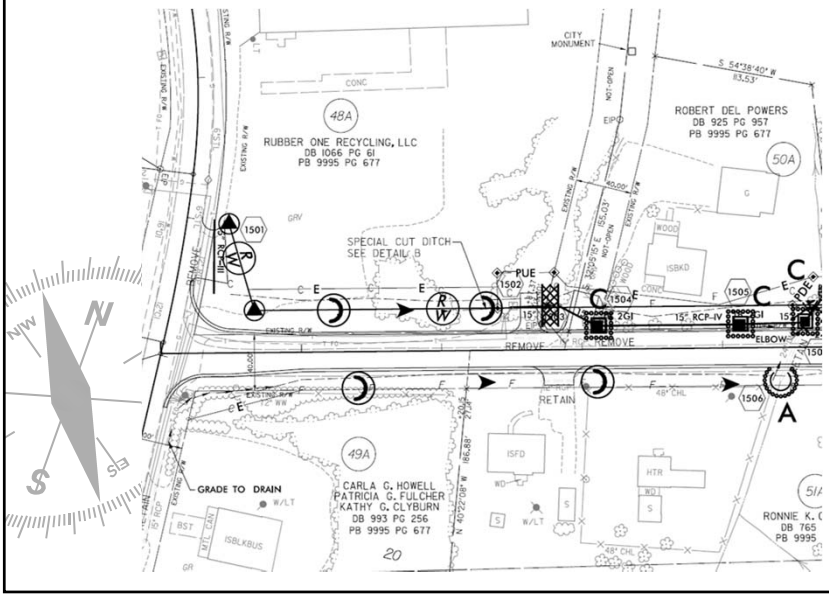
- Coir Fiber Wattle Break and Barrier

—CFW—

Ditch Wattle Design Info

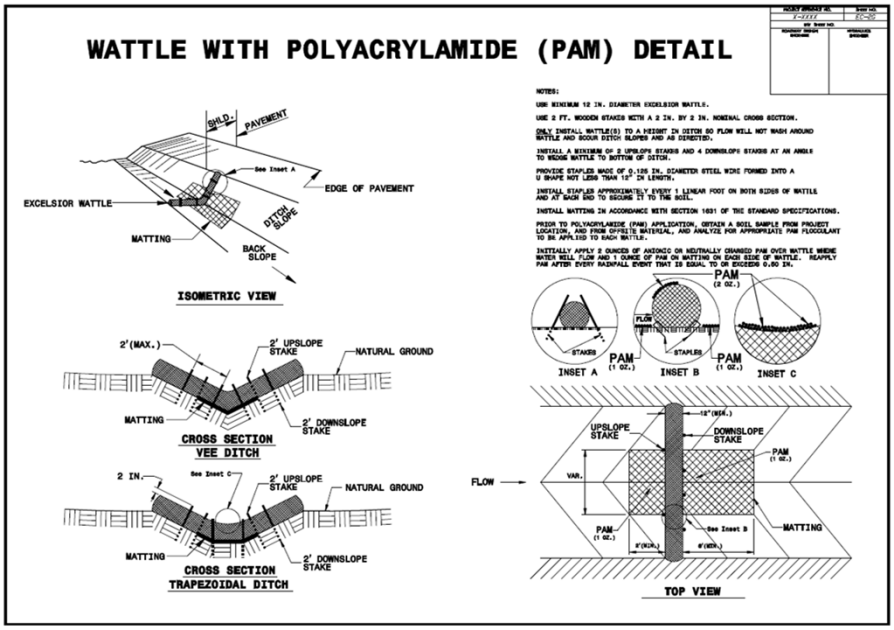
- ► Wattles Primarily Used for PAM(powder) Incorporation
- ► Wattles not designed for:
  - Sediment Storage
  - Velocity Control
  - Vegetation Establishment
- ► Used in Ditch Grades <2.5%
- ► Placed in Temporary and Permanent Ditches

Wattles in Ditchlines on EC Plans



Ditch Installation

1. Place Matting
2. Install Wattle and Staples on Matting
3. Install 2 Upslope Stakes and 4 Downslope Stakes
4. Apply 1 oz. of PAM Downstream and Upstream and 2 oz. on Wattle (Total of 4 oz.)



Excelsior Wattle

- Can be used with <u>or</u> without PAM
- When utilized, place wattles every 50 ft. in temporary and/or permanent ditches
- Use Excelsior Wattles on short term projects (one year project duration or less)

Excelsior Wattle

Excelsior Wattle

Excelsior Wattle in Median

Coir Fiber Wattle

- Can be used with <u>or</u> without PAM
- When utilized, place coir wattles every 50 ft. in temporary and/or permanent ditches
- Use Coir Fiber Wattles on long term projects (project duration of more than a year)

Coir Fiber Wattle

Coir Fiber Wattle

Coir Fiber Wattles in Temporary Diversion

Silt Fence Wattle Breaks

NEW!

Design - Utilized on Clearing & Grubbing and Final Grade Phases of Erosion Control Plans

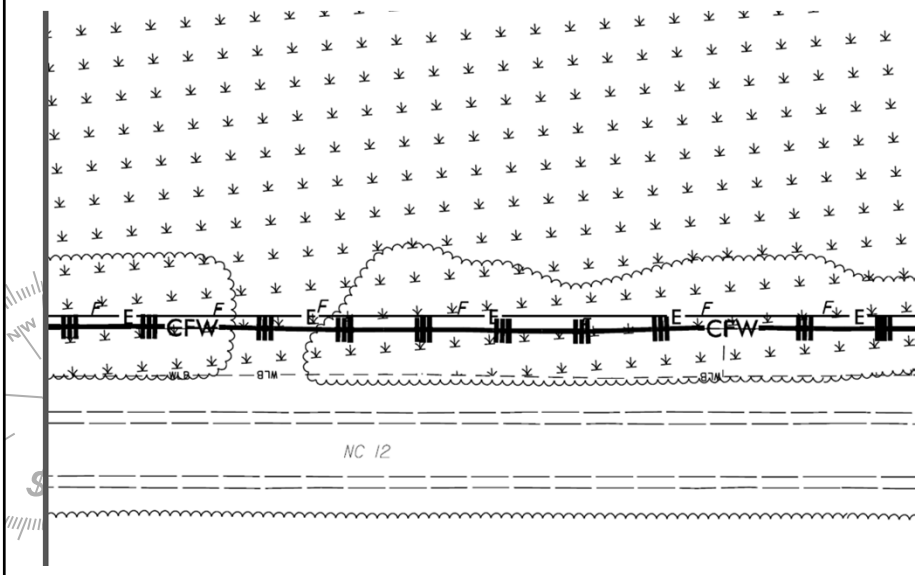
Placement – Between Silt Fence Segments

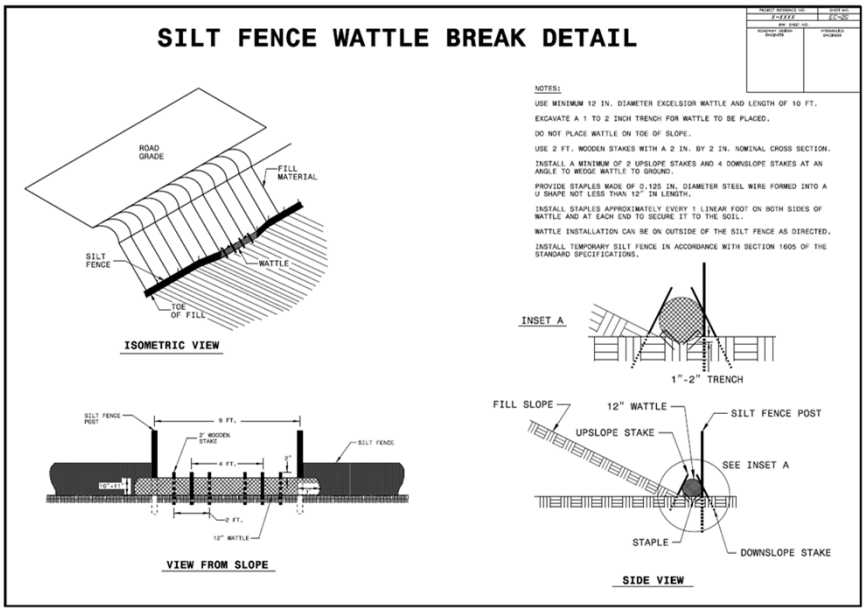
Function – Wattle provides a drainage break for Silt Fence Sections in Low Areas

Wattle Break Design

- Design for Wattle of 10 ft. in length
- Can be used in wetlands, easy to remove (or not!)
- Maximum Spacing of 200 ft.
- Use Coir Fiber Wattles (CFW) for projects > 1 year

Wattle Breaks in Silt Fence on Plans

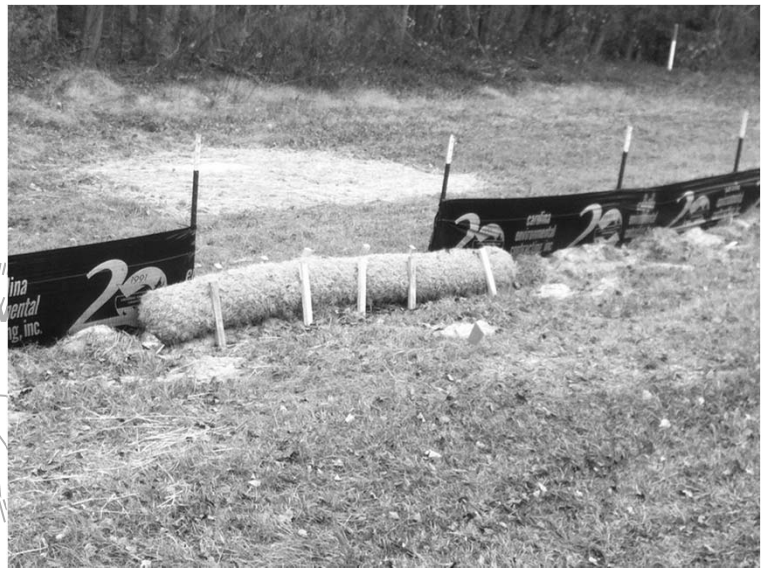




Silt Fence Break Installation

1. Leave 8 ft. gap in Silt Fence
2. Excavate 1” to 2” trench to the inside of Silt Fence
3. Place Wattle and Staples in trench
4. Install 2 Upslope Stakes and 4 Downslope Stakes

Wattle Break in Silt Fence



Wattle Break in Silt Fence

Wattle Barrier

NEW!

Design - Utilized on Clearing & Grubbing and Final Grade Phases of Erosion Control Plans

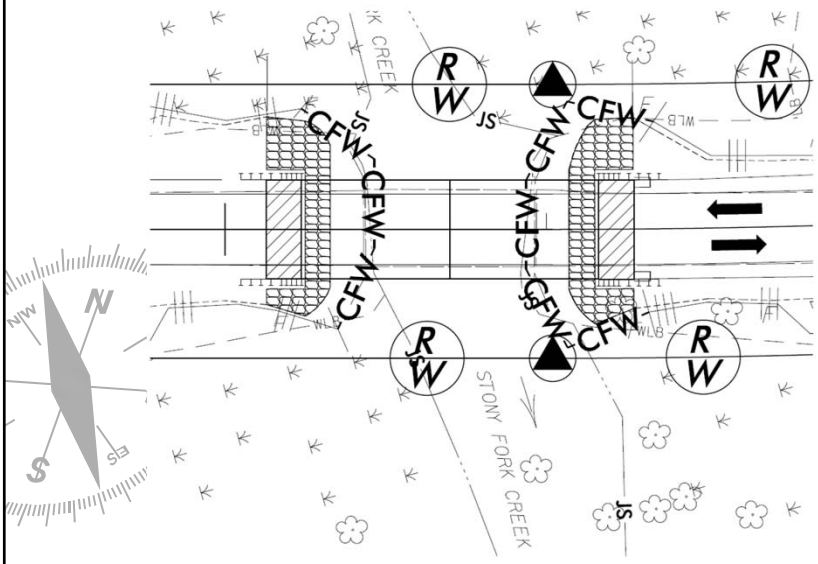
Placement - At the toe of bridge approach fill slopes

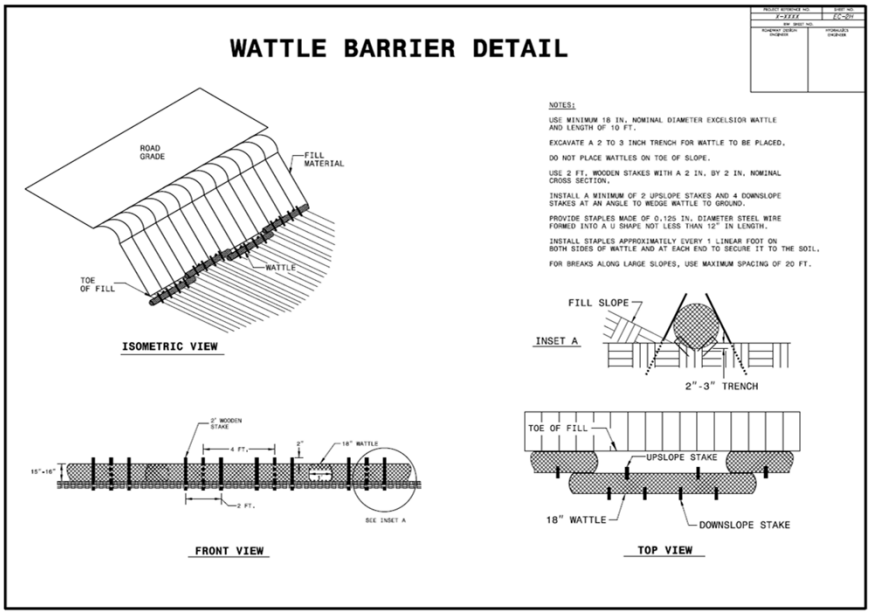
Function - Wattle Barrier temporarily traps sheet flow from disturbed slopes allowing sediment to settle on the flow side

Wattle Barrier Design

- ► Utilize where Silt Fence can't be installed (<4 ft.)
- ► Can be used in wetlands, easy to remove (or not!)
- ► Maximum Spacing of 20 ft. for breaks on slopes
- ► Use Coir Fiber Wattles (CFW) for projects > 1 year
- ► Design for 18 in. diameter Wattle

Wattle Barrier on EC Plans





Wattle Barrier Installation

1. Excavate 2” to 3” trenches in alternating pattern
2. Place Wattles and Staples in trenches
3. Make sure Wattles overlap at least 1 ft.
4. Install 2 Upslope Stakes and 4 Downslope Stakes

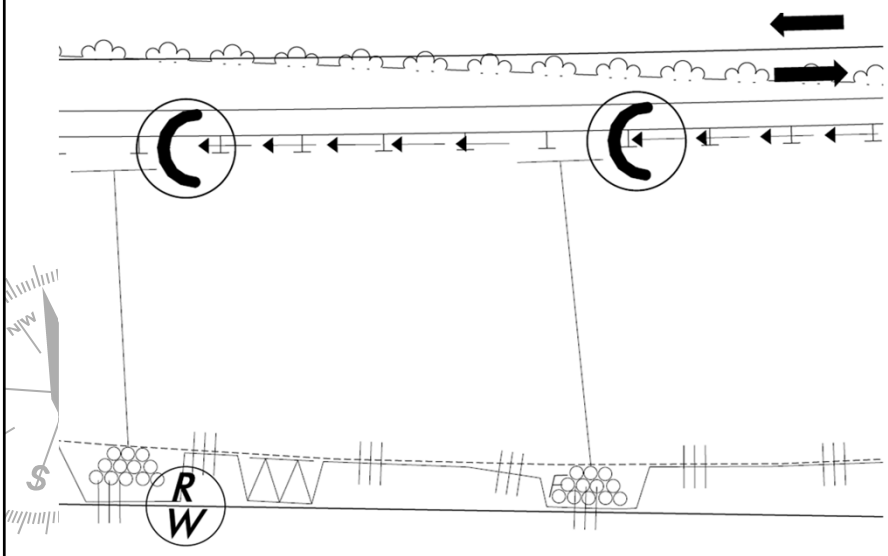
Perimeter Wattle Barrier

Wattle Barrier

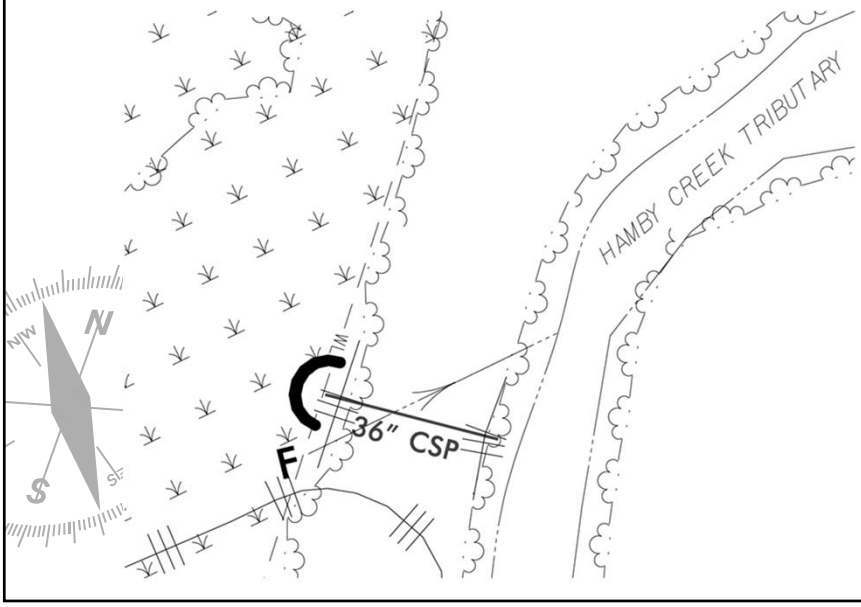
Wattles as Slope Break

Wattles for Runoff Diversion

Wattle w/ PAM at Slope Drains



Wattle as Pipe Inlet Protection



Wattle Inlet Protection

Wattle Inlet Protection

Wattle Locations for PAM

- Upstream locations that drain to:
  - Silt Fence
  - Sediment Basin or Trap
  - Rock Dam or Inlet Protection
- Inlet to Sediment Basins
- Inlets to Slope Drains

Wattle Locations <u>NOT</u> for PAM

- Jurisdictional Areas
  - Streams
  - Wetlands
  - Ponds
- Perimeter Measure
- Outlets of Ditches
- Drainage Inlets Carrying Flow Directly Offsite

Scour Underneath Wattle

Scour Underneath Wattle

Wattle not Stapled Adequately

Wattle Overkill!

Stacked Wattles

Wattle Application Summary

- ► Use Wattles for PAM Incorporation (upstream only!)
- ► Wattles can be used at Perimeter (No PAM!)
- ► Can provide Velocity Control & Sediment Storage
- ► Easier Removal and Disposal than Stone

Wattle Web Resources

- Wattle Construction Specifications:

  http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/special_provisions/

- Wattle Construction Details:

  http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/details/

- NCDOT Erosion Control Pocket Field Guide

  http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/pdf/fieldguide2013_WEB.pdf

Questions?

North Carolina Department of Transportation
Roadside Environmental Unit

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