BEST MANAGEMENT PRACTICE CATALOG

OKLAHOMA
Transportation

Table of Contents

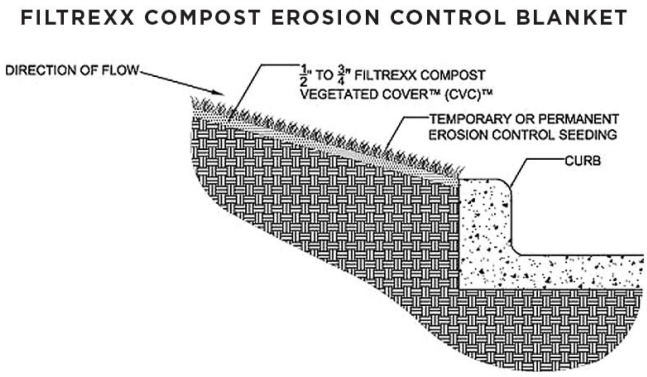
Compost Erosion Control Blanket

Description: Compost erosion control blanket is a practice used on slopes to stabilize soils. The compost medium is applied to slopes by a pneumatic blower truck or other similar equipment. The applied compost medium can be used in combination with erosion control blankets and use of erosion control blankets is recommended for slopes greater than 2:1.

Applications:

- Slope stabilization
- Not suitable for areas of concentrated flow

[Filtrexx Compost Erosion Control Blanket applied to a slope]



[Profile view of Filtrexx Compost Erosion Control Blanket applied to a slope]

Links:

https://www.filtrexx.com/en/applications/stormwater-management/compost-blankets/compost-erosion-control-blankets

Erosion Control Mats*

Description: A protective covering or soil stabilization mat used on a disturbed area. Erosion control mats provide cover for bare soil and support emergent vegetation until vegetation has reached sufficient root density and top growth. Mats offer protection against raindrops and wind erosion. Erosion control mats also increase infiltration. Typically used on sloped areas that would be difficult to stabilize with just seeding. ODOT separates Erosion Control Mats into 4 types:

1. Type 1 is a single net erosion control blanket composed of processed degradable natural or polymer fibers mechanically bound together by a single degradable synthetic or natural fiber netting to form a continuous matrix
2. Type 2 is a double net erosion control blanket composed of processed natural or polymer fibers mechanically bound between two natural fiber or synthetic nettings to form a continuous matrix
3. Type 3 is a medium-weight erosion control blanket composed of processed slow-degrading natural or polymer fibers mechanically bound together between two slow-degrading synthetic or natural fiber nettings to form a continuous matrix
4. Type 4 is a heavy-weight erosion control blanket composed of processed slow-degrading natural or polymer fibers mechanically bound together between two slow-degrading synthetic or natural fiber nettings to from a continuous matrix

Applications:

- Temporary stabilization measure that works well in conjunction with seeding
- Prevents erosion by offering some cover from rainfall, assists in seeding efforts
- Some blankets also offer stormwater velocity mitigation

[Installation of Erosion Control Blanket on a slope]

Links:

American Excelsior (Vendor) Website: https://americanexcelsior.com/erosion-control/

VA DEQ Standards & Specifications:
https://www.deq.virginia.gov/home/showpublisheddocument/2444/637437340594700000

*ODOT Special Provision 228-1

Hydromulch*

Description: A mixture of water, fiber mulch, tackifier, and seed sprayed over an area to prevent erosion and promote vegetation growth. Sometimes referred to as hydroseeding or hydraulic mulch seeding. Mixture is typically sprayed through a hose from a truck.

Applications:

- Protects soils from erosion until vegetation can begin growing
- Ideal for areas prone to severe erosion where other stabilization methods are ineffective

[Hydromulch being applied to a slope]

Links:

NRCS Fact Sheet: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_061752.pdf

OKC BMP Manual: https://www.okc.gov/home/showpublisheddocument/13040/636828021106630000

*ODOT Special Provision 233-2

Nylon Erosion Control Blanket

Description: A type of erosion control mat. A bulky stable mat of entangled nylon monofilaments, melt-bonded at their intersections. Erosion control mats provide cover for bare soil and support emergent vegetation until vegetation has reached sufficient root density and top growth.

Applications:

- Temporary stabilization measure that works well in conjunction with seeding
- Prevents erosion by offering some cover from rainfall, assists in seeding efforts

[Close up of a Futerra Nylon Turf Reinforcement Mat]

Links:

City of Edmond Standard Specifications:

https://www.edmondok.gov/DocumentCenter/View/1845/Section-700---Materials?bidId=

Straw Blanket

Description: Straw blankets are a type of temporary erosion control mat. Like other erosion control mats, they protect the bare soil on a project and support emergent vegetation. Straw blankets consist of straw held with netting.

Applications:

- Temporary stabilization measure that works well in conjunction with seeding
- Prevents erosion by offering some cover from rainfall, assists in seeding efforts

[Straw Blanket in the process of installation]

Links:

Vendor Website: https://www.forestry-suppliers.com/product_pages/products.php?mi=83121&itemnum=43446

Vegetative Mulch

Description: Straw or other vegetation used to cover bare soils. Assists in seed germination by limiting erosion that would wash away the seeds. Mulch provides cover for bare soils from rainfall and slows stormwater runoff travelling along the soils. Mulch also assists in moisture detention which helps vegetation grow.

Applications:

- Temporary stabilization option, applying mulch and seeding is typically the cheapest temporary stabilization method available

[Vegetative Mulch applied to a slope]

Links:

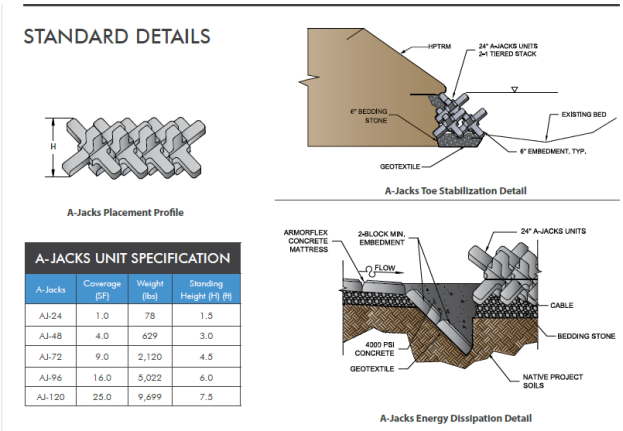
Iowa SUDAS Design Manual: https://intrans.iastate.edu/app/uploads/sites/15/2020/03/7E-17.pdf

A-Jacks Concrete Armoring Units

Description: Concrete armoring units are specially shaped concrete blocks used as protection against flowing water. The concrete structures are designed to interlock into a matrix. The resulting matrix is permeable and offers energy dissipation to mitigate erosion.

Applications:

- Bridge Scour
- Energy Dissipation
- Streambank/Toe Stabilization



[A-Jacks Concrete Armoring Units used for Bridge Scour]

Links:

Product Website: https://www.conteches.com/erosion-control/hard-armor/a-jacks

Installation Manual: https://www.conteches.com/Portals/0/Documents/Installation%20Guides/A-Jacks_Installation%20Guide_gray.pdf?ver=2018-06-15-151430-483

ACF Environmental Articulated Concrete Blocks

Description: Concrete mats made out of a matrix of preformed concrete blocks. The concrete blocks are connected by a series of cables. The block segments allow it to form slightly to the face of the surface they are placed on. Open-cell articulated concrete block mats can be infilled with soil to allow for vegetation growth.

Applications:

- Alternative to rip rap or other permanent erosion control system
- Useful on streambanks or channels, especially in areas where streambank erosion needs to be limited

[Articulated Concrete Block Mat Installation]

Links:

https://acfenvironmental.com/products/erosion-control/hard-armor/articulated-concrete-blocks/

Flexamat

Description: Erosion control mat used for permanent stabilization. The mat consists of concrete blocks embedded into a geogrid. Spacing between blocks allows for vegetation growth. Vendor claims that flexamat is safe for mowers and vehicles to traverse.

Applications:

- Slope, channel and low water crossing stabilization

[Flexamat installed within a channel]

Links:

Product Website: https://www.flexamat.com/

Turf Reinforcement Mats*

Description: Permanent alternative to erosion control blankets. Turf Reinforcement Mats consist of polypropylene fiber between two heavy weight polypropylene nets. Like erosion control blankets, turf reinforcement mats provide cover for bare soils while seed germination begins. Compared to erosion control blankets, turf reinforcement mats are better suited for higher stormflows.

Applications:

- Permanent or temporary stabilization measure that works alongside seeding
- Prevents erosion by offering some cover from rainfall, assists in seeding efforts

[Turf Reinforcement Mat used in an area of heavy flow]

Links:

Vendor Website:
https://acfenvironmental.com/products/erosion-control/permanent-erosion-control/turf-reinforcement-mats/

*ODOT Special Provision 227-1

Compost Filter Sock

Description: Mesh tube filled with composted material. Compost filter socks can use a variety of composted material, such as yard trimmings, food waste, separated municipal solid waste, biosolids, and manure. Used in similar manner to a berm or wattle. Filter socks traps sediment and other pollutants. Compost filter socks have greater surface area contact with soil than typical sediment control devices, better preventing rill erosion underneath the socks. Compost filter socks should be in contact with ground, vegetation should be removed if needed. Compost filter socks are typically fixed to the ground using stakes inserted through the center of the sock at regular intervals. Some compost filter socks can be torn open and spread on the soil once construction is complete.

Applications:

- Alternative to silt fence or regular wattle.
- Suitable for sheet flow along slopes
- Better suited to steep slopes than most alternatives
- Can be used as storm drain inlet protection

[Filtrexx Compost Filter Socks]

[Filtrexx Compost Filter Socks being fixed to the ground using stakes]

Links:

Filtrexx SiltSoxx: https://www.filtrexx.com/en/products/siltsoxx

EPA Fact Sheet: https://www.epa.gov/system/files/documents/2021-11/bmp-compost-filter-socks.pdf

Curb Inlet Sediment Bags

Description: A filter sack placed within a curb inlet or similar structure. Filters out sediment and traps it within the sack. Sack requires maintenance when full. Some types of curb inlet sediment bags will also have a sock/log attached to protect the non-grate portion of the curb drain. Inlet sediment bags and similar inlet protection devices are intended as secondary BMPs to be used in conjunction with primary sediment and erosion control devices used upslope from drain.

Applications:

- Can be installed on curb storm drains when sediment mitigation is desired

[Curb sediment bag installed on curb drain]

Link:

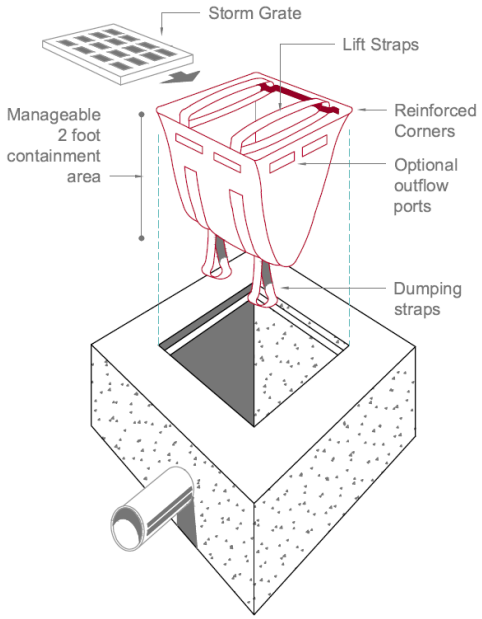
Vendor Page: https://www.dandyproducts.com/improving-sediment-control-via-inlet-filters/

Drop Inlet Sediment Bags

Description: A filter sack placed within a storm drain or similar structure. Filters out sediment and traps it within the sack. Sack requires maintenance when full. Inlet sediment bags and similar inlet protection devices are intended as secondary BMPs to be used in conjunction with primary sediment and erosion control devices used upslope from drain.

Applications:

- Can be installed on rectangular shaped drains when sediment mitigation is desired



[Example of a drop inlet sediment filter sack]

[Inlet Protection being installed on a storm drain]

Links:

EPA Storm Drain Inlet Protection Fact Sheet: https://www.epa.gov/system/files/documents/2021-11/bmp-storm-drain-inlet-protection.pdf

Vendor Brochure: https://www.landscapediscount.net/images/Dandy-Brochure.pdf

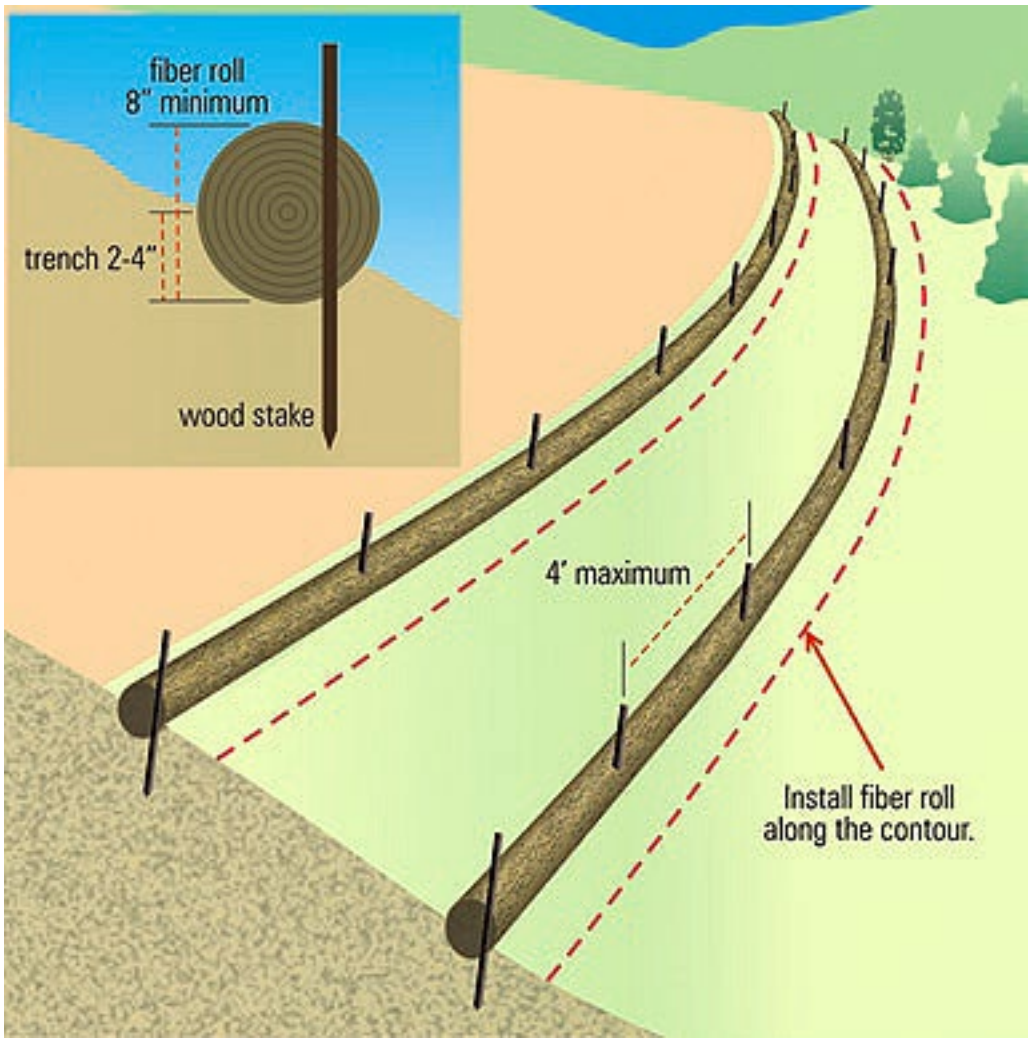
Siltsack Product Description: https://acfenvironmental.com/products/inlet-protection/drop-inlets/siltsack/

Fiber Log*

Description: Tube-shaped erosion control devices that are filled with straw, flax, rice, coconut fiber or compost. Logs are typically wrapped in a UV-degradable polypropylene netting or a biodegradable netting. Fiber logs offer sediment filtration as well as velocity mitigation. Fiber logs typically fixed to ground using stakes.

Applications:

- Placed on slopes for sediment filtration and velocity mitigation
- Alternative to check dams and silt fences
- Can be used for stockpile containment



[EPA Guide on Fiber Logs]

Links:

Massachusetts Clean Water Toolkit: https://megamanual.geosyntec.com/npsmanual/fiberrolls.aspx

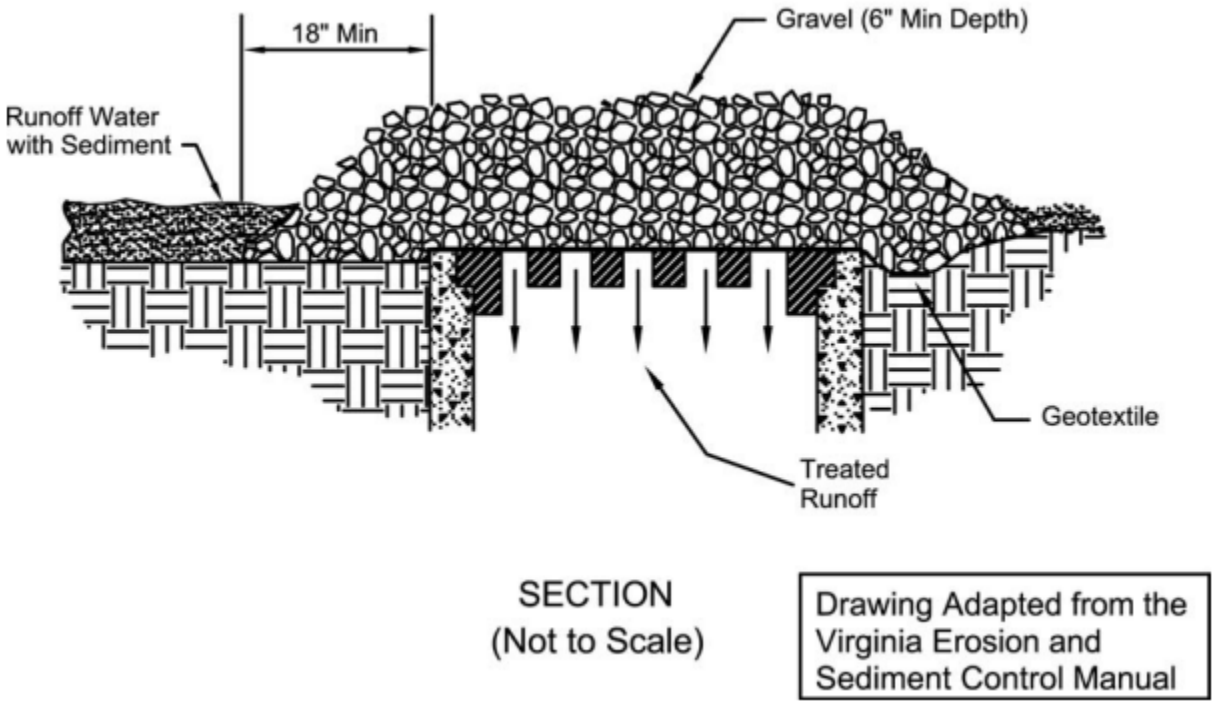
*ODOT Special Provision 221-1

Hardware Cloth & Gravel Inlet Protection

Description: Wire-mesh hardware cloth fastened around a rectangular grid of steel posts arranged around the inlet. Washed stone is placed around the wire-mesh to offer sediment filtration.

Applications:

- Mitigates sediment from entering drop inlets on site, working as a secondary control device
- Suitable for light to moderate flows



[Specifications from Virginia Erosion & Sediment Control Manual]

Links:

Ohio's Rainwater and Land Development Guide, Storm Inlet Chapter:
https://www.franklinswcd.org/data/doc_lib/1272/Inlet%20Protection.pdf

NC DEQ, Section 6.51:
https://files.nc.gov/ncdeq/Energy%20Mineral%20and%20Land%20Resources/Land%20Resources/Land%20Quality/Erosion%20and%20Sediment%20Control%20Planning%20and%20Design%20Manual/Chapter%206/VI.Inlet%20Protection.pdf

Reinforced Silt Fence

Description: Filter fabric supported by a wire mesh, then attached to posts (usually steel) and trenched. Withstands flows better than the wooden stake and non-wire mesh silt fence.

Applications:

- Sturdier alternative to wooden stake silt fence
- Better suited to concentrated flows or higher flow volumes than wooden stake silt fence
- Withstands accumulated sediment better than wooden stake silt fence

[Reinforced Silt Fence, outer view]

Links:

Summary of Different Types of Silt Fences: https://www.winfabusa.com/different-types-of-silt-fence-fabrics/

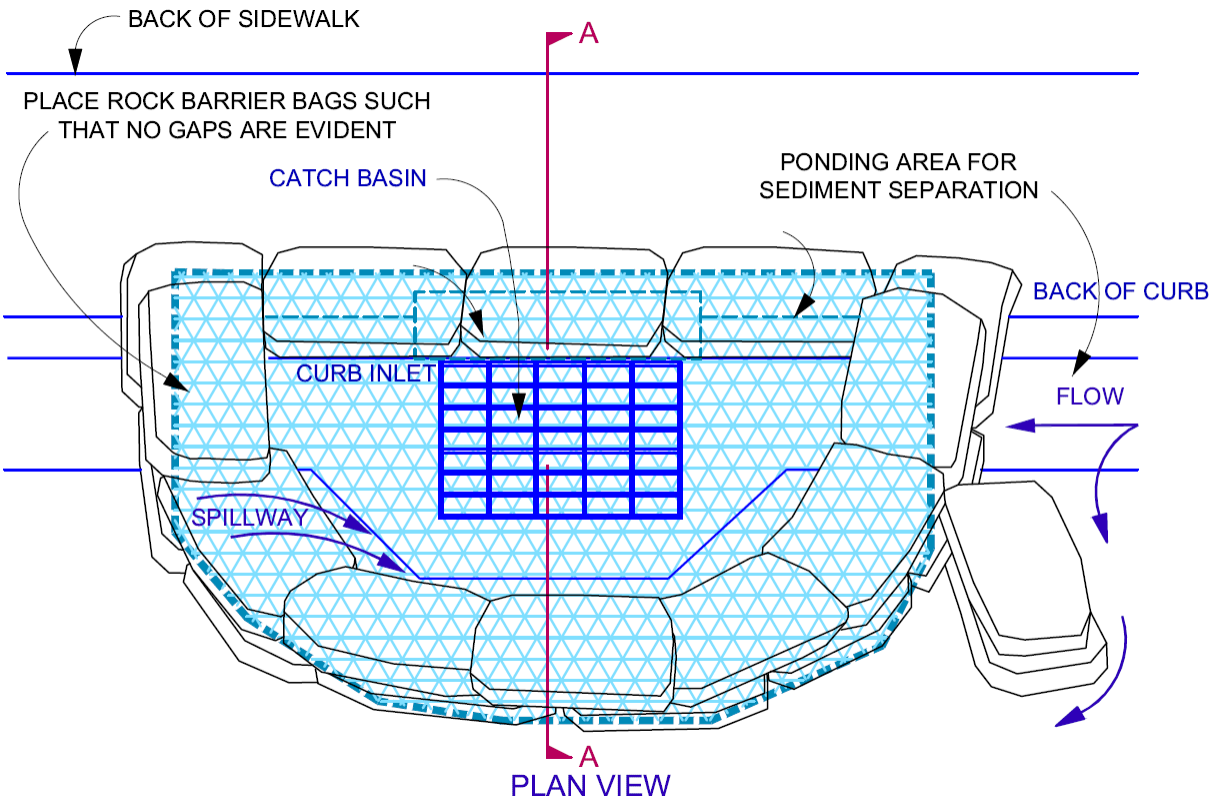
Tips on Silt Fence Selection: https://colonial-materials.com/2020/07/20/select-the-right-silt-fence/

Rock Bag Curb Inlet Protection

Description: Rock bags arranged around in a perimeter around a curb inlet. Rock bags should be stacked 2-3 bags high with no gaps visible between bags. Filter fabric should be placed under the grate of the inlet and held in place beneath the rock bags.

Applications:

- Sediment filtration for curb inlets



[Plan view of a rock bag curb inlet protection]

Links:

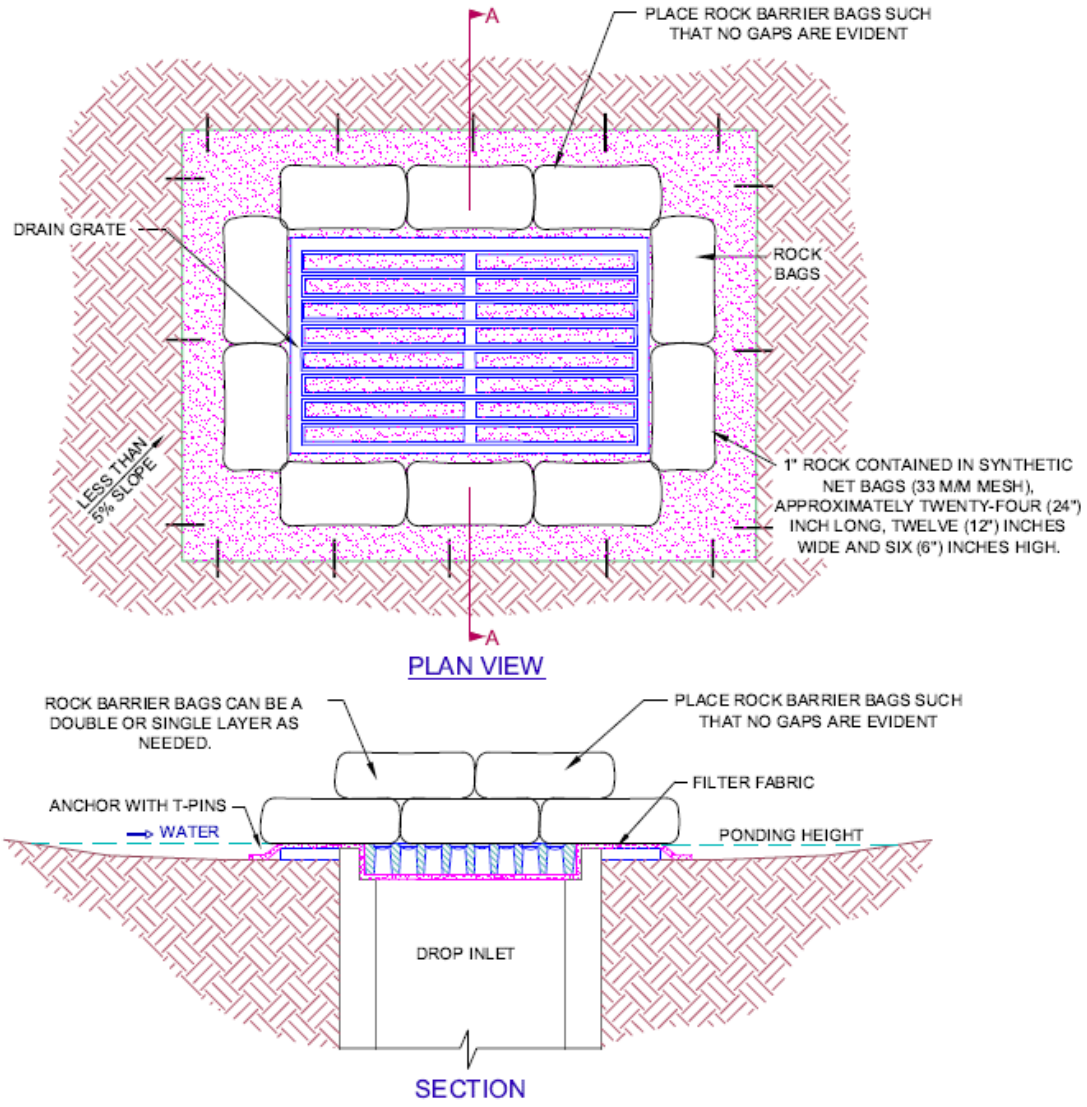
OKC BMP Manual: https://www.okc.gov/home/showpublisheddocument/13040/636828021106630000

Rock Bag Fabric Drop Inlet Protection

Description: Rock bags arranged in a rectangle directly around the perimeter of the drop inlet. Filter fabric is placed beneath the inlet grate and held in place by the rock bags and pins placed beneath the rock bags.

Applications:

- Sediment filtration for drop inlets



[Rock Bag Fabric Drop Inlet Protection]

Links:

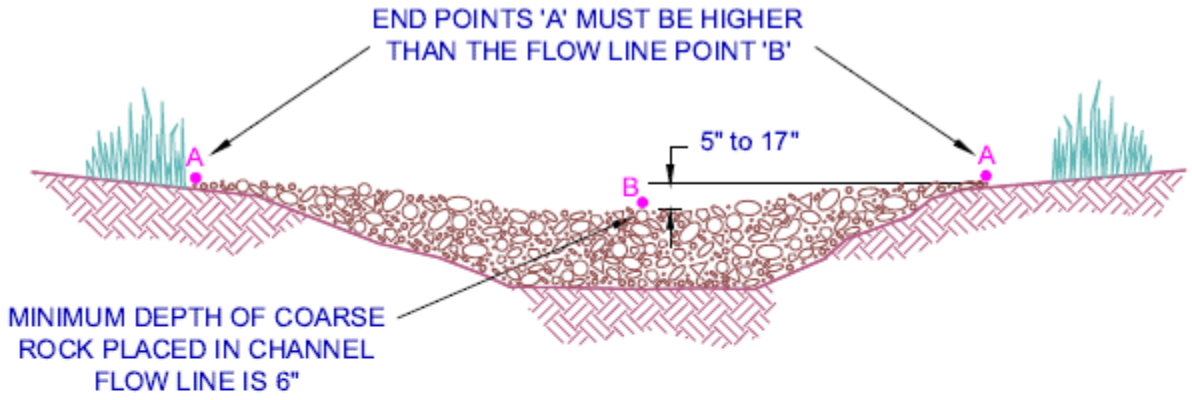
OKC BMP Manual: https://www.okc.gov/home/showpublisheddocument/13040/636828021106630000

Rock Filter Dams

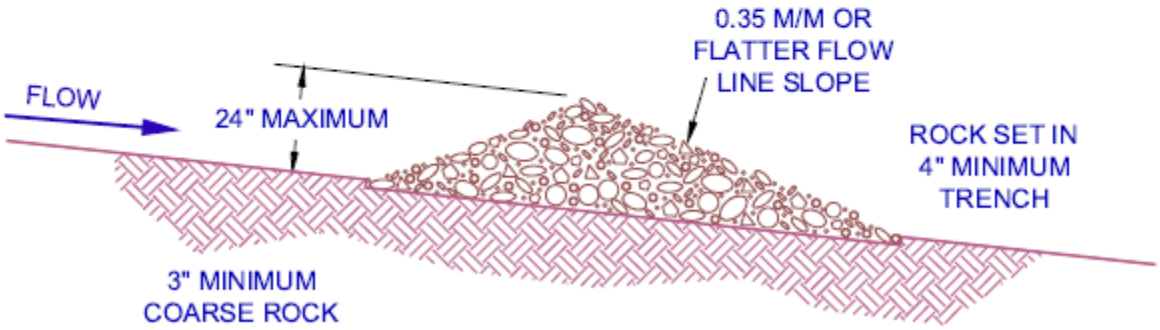
Description: A stone embankment designed to help capture sediment along drainage paths. Rock filter dams can also be used as a forebay to sediment basins. Tiny voids between stones allow water to pass through while capturing some sediment.

Applications:

- Provides sediment filtration and velocity mitigation along drainage paths.



VIEW LOOKING UPSTREAM



SIDE VIEW

[OKC BMP Manual]

Links:

Mississippi DEQ Storm Water Manual:
https://opcgis.deq.state.ms.us/Erosion_Stormwater_Manual_2ndEd/Volume1/Chap_4_Sections/4_6/V1_Chap4_6_Sediment_Control_RD.pdf

Silt Bag (Dewatering Bag)

Description: Prefabricated silt bag attached to a pump. Water is pumped into the bag and slowly filters out, leaving the sediment captured in the bag. Bag is placed on gravel or other similar stone pad.

Applications:

- Alternative to sediment basin where basins are not feasible due to limited area or other restrictions
- Appropriate for relatively small dewatering volumes, maximum water that can be pumped is approximately 1500 gallons per minute

[Silt Bag located on gravel]

Links:

Vendor Page: https://acfenvironmental.com/products/perimeter-and-sediment-control/sediment-control/dewatering-bags/

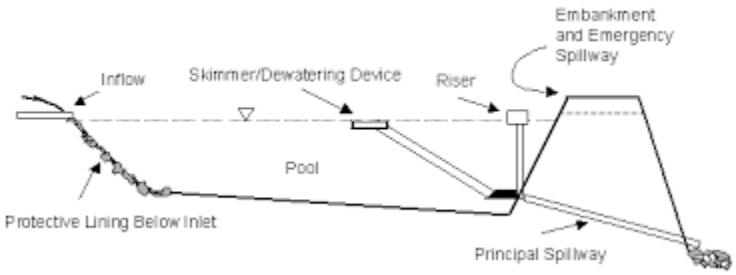
Virginia Silt Bag Filtration Effectiveness Evaluation: https://www.virginiadot.org/vtrc/main/online_reports/pdf/21-R17.pdf

Skimmer Sediment Basins

Description: A sediment skimmer floats on the surface of the water in a sediment basin as it fills and drains. The skimmer will drain water from the top of the basin, which should have lower sediment concentrations than the water at the bottom of the basin. Sediment basins will sometimes utilize baffle netting to increase the flow path within the basin and increase the amount of sediment that settles within the basin.

Applications:

- Increases sediment capture within the basin and decreases the amount of sediment leaving the basin



[Profile view of a sediment basin with a skimmer]

Links:

Town of Apex, NC Temporary Skimmer Sediment Basins Standards: https://www.apexnc.org/DocumentCenter/View/4096/400_13_2?bidId=

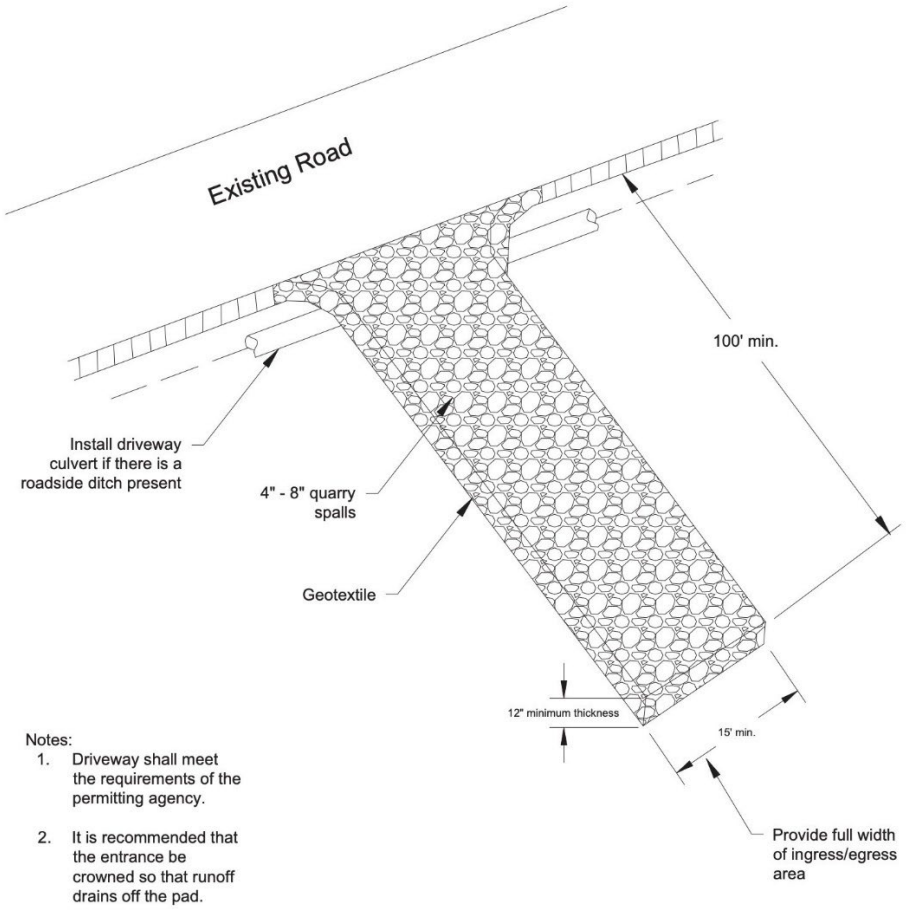
Advantages of Baffle Netting, NCSU: https://content.ces.ncsu.edu/using-baffles-to-improve-sediment-basins

Stabilized Construction Exit*

Description: A point of entrance/exit to a construction site that is stabilized in order to reduce the tracking of mud and dirt onto public roads. A geotextile fabric is placed underneath a thick layer of stone.

Applications:

- Rocks remove some of the sediment on the tires of construction vehicles that pass through it, reducing the amount of sediment leaving the site



[Stabilized Construction Entrance]

Links:

Napa County BMP Guide: https://www.countyofnapa.org/DocumentCenter/View/18759/TC-1---Stabilized-Construction-Entrance#:~:text=A%20stabilized%20construction%20access%20is,public%20roads%20by%20construction%20vehicles.

Vendor Website: https://getfods.com/states/washington-stabilized-construction-entrance-exit

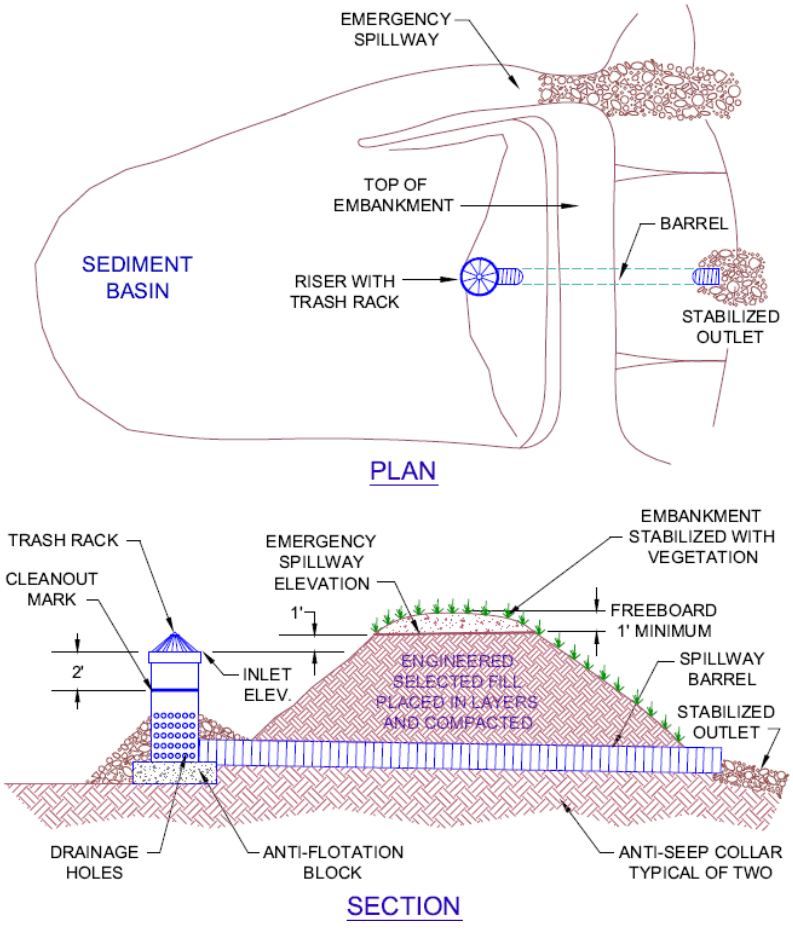
*ODOT Special Provision 242-1

Temporary Sediment Basin

Description: A temporary pond installed to capture sediment on a construction site during rain events. The basin will intercept and detain stormwater runoff giving sediment an opportunity to settle before discharging from the basin. Basins typically discharge to a stabilized area, either a vegetated area or a rip rap pad. Basins are typically located at the perimeter of the site where stormwater flows concentrate. Temporary sediment basins can be converted to permanent structures once construction is complete if desired.

Application:

- Reduces the amount of sediment leaving the site from stormwater discharge
-



[OKC BMP Manual]

Links:

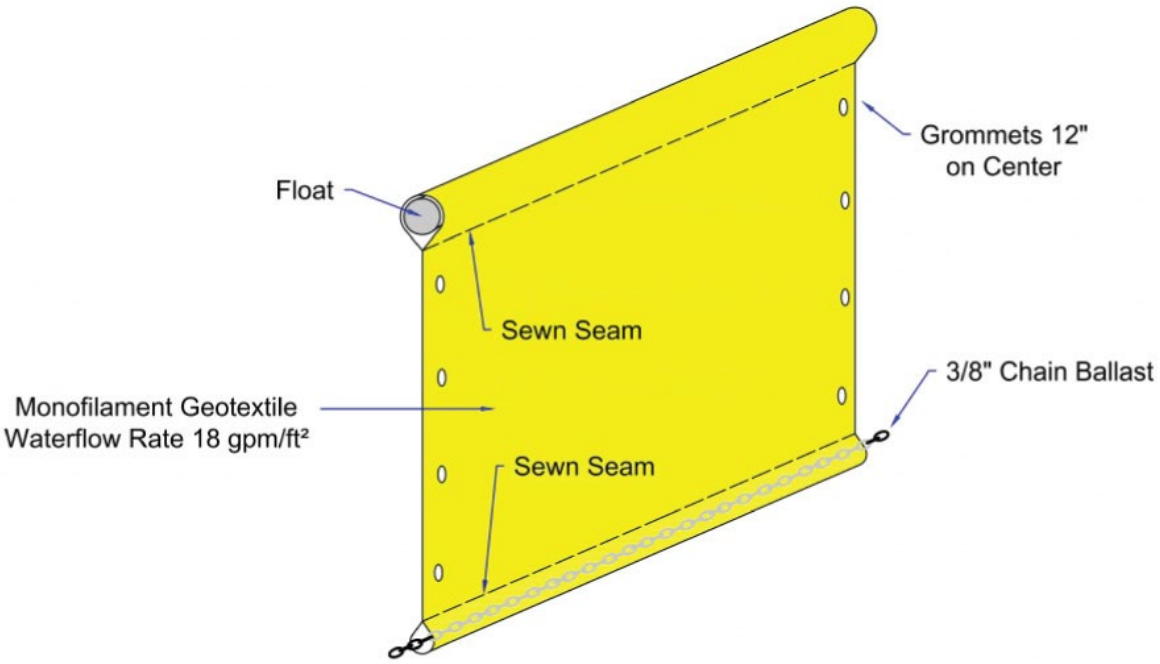
Michigan DEQ Water Resources Division Sediment Basin: https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/WRD/NPS/Tech/BMP/bmp-sediment-basin.pdf?rev=532102c4a3ef4e72abd81fb91d5b1c39

Turbidity Curtains*

Description: A turbidity curtain is a flexible and impermeable barrier used to trap sediment within water bodies. Turbidity curtains are typically weighted at the bottom to keep sediment from travelling under the curtain. The top of turbidity curtains will have some kind of flotation system. Staked curtains can be an option for areas where the flow is slow or does not have much wave action.

Applications:

- Prevents migration of sediment from travelling outside of a water body on site



[Floating Turbidity Curtain]

Links:

Michigan DEQ: https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/WRD/NPS/Tech/BMP/bmp-turbidity-curtain.pdf?rev=dbd537b5a4ae462ea371d1926f873d34

TNDOT Floating Turbidity Curtain Standard: https://www.tn.gov/tdot/roadway-design/standard-drawings-library/standard-roadway-drawings/erosion-prevention-and-sediment-control/ec-str-38.html

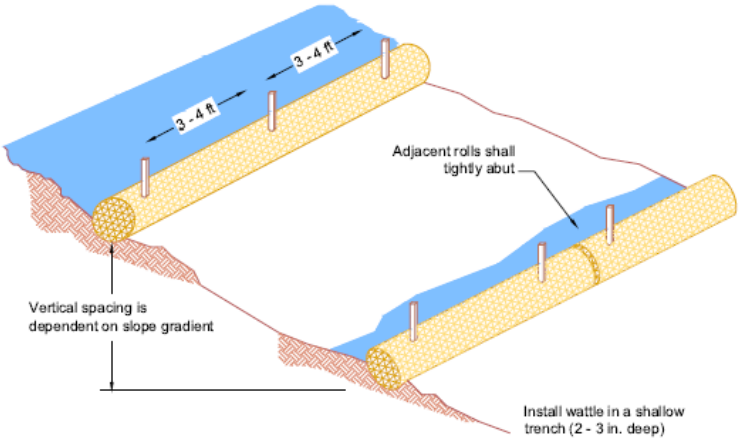
*ODOT Special Provision

Wattle Fence (Straw Wattle)

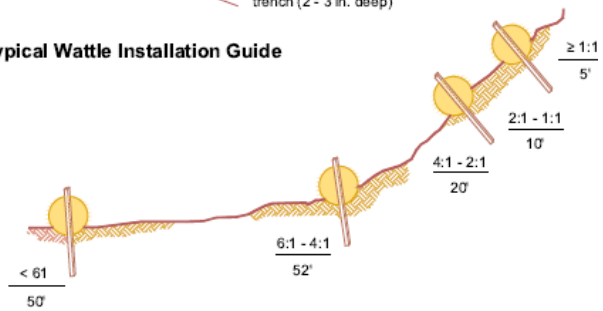
Description: Logs comprised of an outside container fabric with an interior of compressed straw/wheat/fiber. Straw wattles should be placed on the ground and secured with stakes. Recommended for use on slopes that have less than 30% remaining of original ground cover.

Applications:

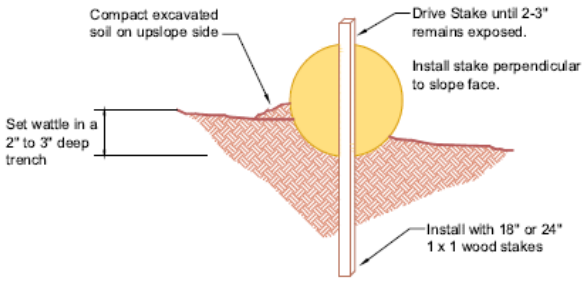
- Can be used as alternative for silt fence at perimeter of project
- Wattles trap sediment, increases infiltration and reduces erosion downslope



Typical Wattle Installation Guide



Typical Wattle Spacing based on Slope Gradient



Enrichment Detail

Links:

USDA Fact Sheet: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/wy/technical/engineering/?cid=nrcs142p2_027274

Informational Blog Post: https://graniteseed.com/blog/straw-wattles-guide/

Paved Ditch

Description: Concrete drainage ditch used to direct storm water flow. Used in combination with ditch liner protection (solid slab sodding, excelsior mat, paper mat, etc.).

Applications:

- Directs storm water flow along ditch, ditch resists erosion better than bare soil

[Concrete drainage ditch]

Links:

ODOT 2009 Specifications: https://www.odot.org/roadway/roadway2009/R-64.pdf

Smart Ditch

Description: Flexible high-density polyethylene ditch lining system. Directs water flow through a plastic ditch to reduce erosion. Polyethylene resists degradation from water flow during period of construction. Vendor claims that Smart Ditch self-scours and reduces sediment discharge within ditch.

Applications:

- Alternative to rip rap or concrete channels

[Smart Ditch installed in ground]

Links:

Vendor website: https://www.smartditch.com/

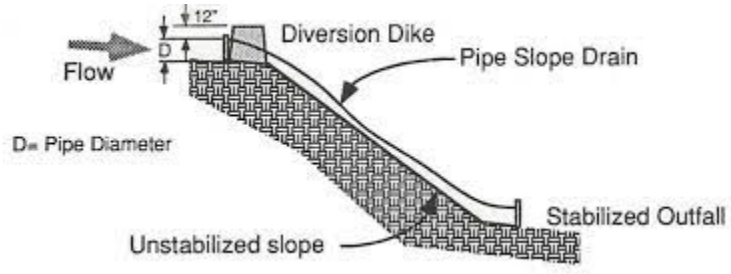
Temporary Slope Drain

Description: Slope drains are designed to collect directed stormwater flow at the top of a slope and transport it downslope through a pipe to discharge at a designed outflow area at the toe of the slope. Slope drains protect bare soils along a slope by allowing stormwater to bypass travelling down the slope as sheet flow. Area where slope drain discharges at toe of the slope should be stabilized, usually with some kind of stone pad.

Applications:

- Used on slopes to protect from erosion

[Temporary Slope Drain]



[Profile view of a Temporary Slope Drain]

Links:

INDOT Storm Water Field Guide:
https://www.in.gov/indot/engineering/files/Indiana_Storm_Water_Field_Guide.pdf

Concrete Washout (Pre-Fabricated)

Description: Prefabricated concrete washout containers offer portable alternatives to self-installed concrete washouts. Vendors that sell prefabricated concrete washouts typically also offer services where they pick up the washout and clean out or replace as needed. Washouts should be kept at least 50 feet from storm drains and water bodies. Washouts should have a cover to use during rain events.

Applications:

- Metal washouts offer more durable alternative to self-installed concrete washouts, less prone to leaks
- Plastic/cardboard washouts are useful on sites with limited space

[Outpak Portable Concrete Washout]

Links:

EPA Fact Sheet: https://www3.epa.gov/npdes/pubs/concretewashout.pdf

Examples: https://www.concretewashout.com/products.html

https://www.cwpm.net/portable-concrete-washout-bin/