BMP Stormwater Management Manual

- Guidance for BMPs
- Fact sheets for quick reference
- Sections reflect BMPs applicable to different stages of construction
- Available online at

  http://www.clarkswcd.org/Stormwater/BMP_index.htm

  http://www.floydswcd.org/BMP/BMP_index.htm

BMP Fact Sheets

- Description of BMP
- Design criteria
- Target pollutants
- Applications
- Installation procedures
- Maintenance and inspection procedures

BMP Fact Sheet Layout

Stormwater Best Management Practices (BMPs)
Sediment Management Practices (SMPs)

SMP-13

Activity: Temporary Inlet Protection

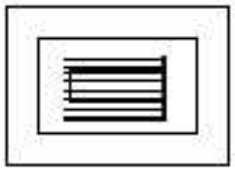
PLANNING CONSIDERATIONS:

Design Life:
1 yr

Acreage Needed:
Minimal

Estimated Unit Cost:
Avg: $100
Range: $50-$150

Annual Maintenance:
60% of Installation



TIP

Target Pollutants

Significant ♦ Partial ◊ Low or Unknown ◊

Sediment ♦ Heavy Metals ◊ Nutrients ◊ Oxygen Demanding Substances ◊ Toxic Materials ◊
Oil& Grease ◊ Bacteria & Viruses ◊ Floatable Materials ◊ Construction Waste ◊

Erosion Prevention Practices

- Minimized Disturbed Area
- Tire Washing Facility
- Construction Road Stabilization
- Stabilized Construction Entrance/Exit
- Vegetated Buffers
- Temporary Seeding
- Permanent Seeding

Erosion Prevention Practices

- Surface Roughening
- Topsoil Stockpiling/Excess Material Mngmt.
- Mulching
- Sodding
- Erosion Control Blankets
- Terracing
- Temporary Slope Drain

Erosion Prevention Practices

Minimize Disturbed Area

- If you do not disturb it, then you do not have to manage for erosion
- Consider phasing a project to reduce the aerial extent and amount of time that soil is disturbed

Erosion Prevention Practices

Tire Washing Facility

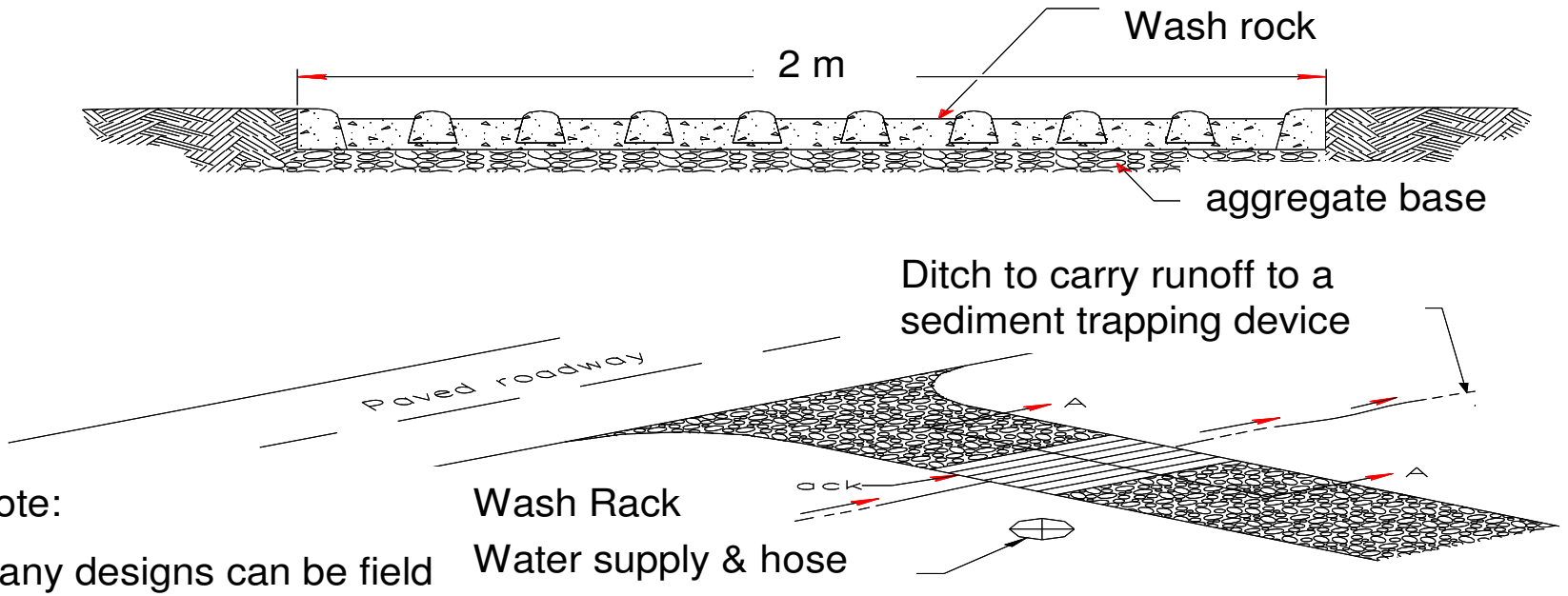
Facility that allows mud and dirt to be washed from vehicle tires and undercarriage to prevent materials from being transported off site. Wash water must be treated with a sediment BMP.

Erosion Prevention Practices

Tire Washing Facility

Design Considerations

- Maintain a stable construction entrance/exit



TYPICAL TIRE WASH

NOT TO SCALE

Note:

Many designs can be field fabricated or fabricated units may be used.

Erosion Prevention Practices

Tire Washing Facility

- All vehicles must use designated entrance/ exit
- Phasing construction can reduce the amount of dirt transfer from vehicles
- Install and maintain BMP to address washwater runoff
  - Typically swale to transport washwater to sediment-trapping devices
  - Remove sediment as needed

Erosion Prevention Practices

Tire Washing Facility

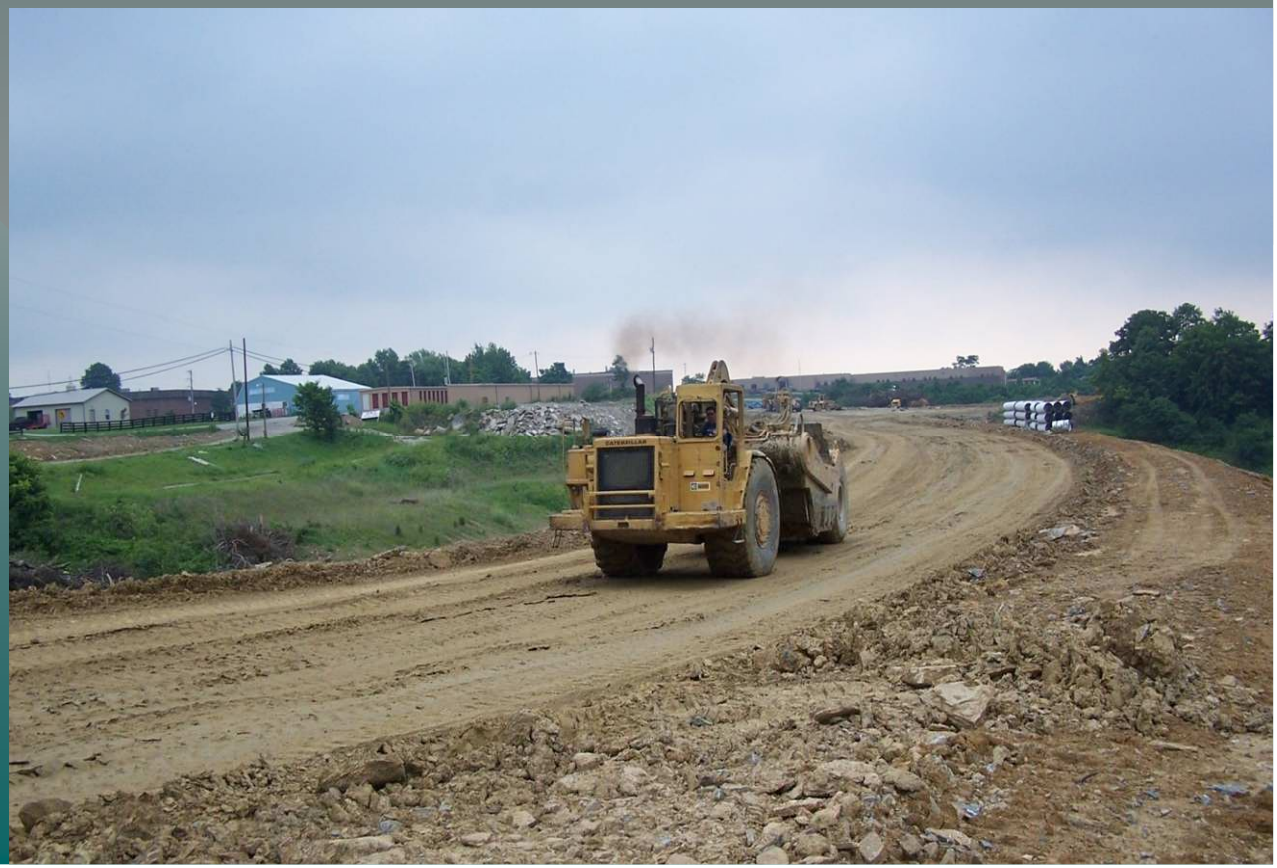
Inspection Considerations

- Vehicles are leaving the site through designated construction exit and tire washing facility
- Mud, dust or dirt is removed prior to exit onto the adjacent road
- The construction exit is sufficiently maintained to prevent mud, dirt, and dust from being tracked off-site

Erosion Prevention Practices

Construction Road Stabilization

Stabilization of construction access road following grading.



Construction Road Stabilization

Suitable Applications

- Minimize access to construction traffic only
- Road should follow topographic contours
- Road should have minimum gradient

Maintenance

- Watering
- Additional gravel

Construction Road Stabilization

Inspection Considerations

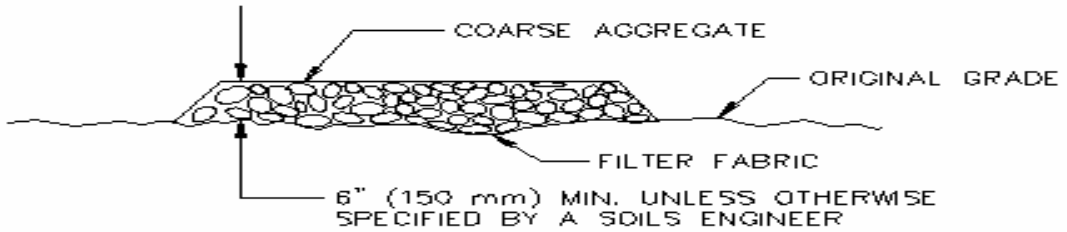
- Gravel roads are preventing mud and dirt from leaving the project site
- Dirt and gravel roads do not shows signs of erosion

Stabilized Construction Exit

A construction exit is a stabilized pad of 2-inch or larger rock at any point where vehicles or equipment leave a construction site and enter a public right-of-way, street, alley, sidewalk, or parking area

Erosion Prevention Practices

Stabilized Construction Exit



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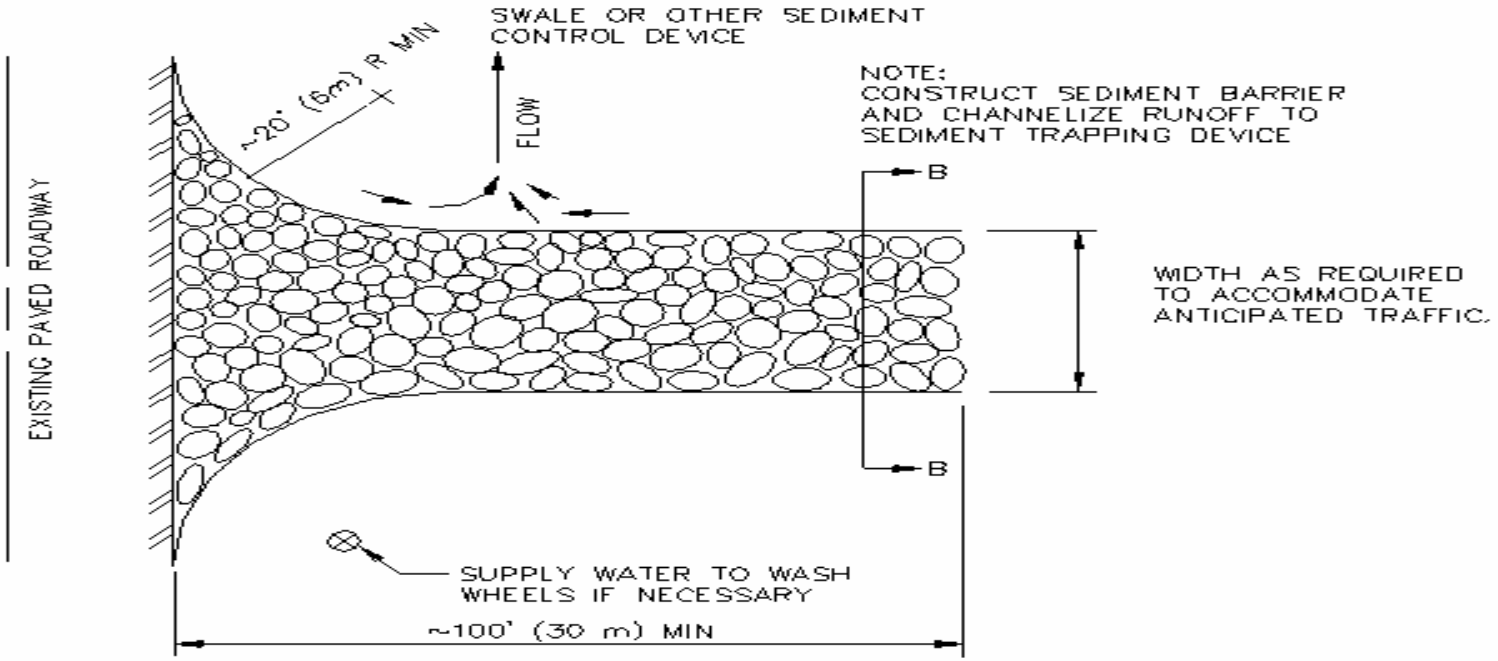


PLAN VIEW

N.T.S.

Erosion Prevention Practices

Stabilized Construction Exit

Proper Installation Considerations

- Construct before clearing, grubbing, and grading the site
- Location shall be as shown on the SWPPP
- Provide drainage to direct muddy runoff from the construction exit toward a sediment trap or other controlled area

Erosion Prevention Practices

Stabilized Construction Exit

Maintenance Requirements

- All sediment spilled, dropped, washed or tracked onto public rights-of-way should be removed immediately
- Exit must be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way
  - Periodic top dressing with additional stone as conditions demand
  - Replace gravel material when surface voids are filled with dirt

Erosion Prevention Practices

Vegetated Buffers

- Vegetated areas above or below land disturbance or along waterways
- Prevent high volume sheet runoff onto site
- Promote infiltration of runoff from site
- Assimilate pollutants and trap sediment

Erosion Prevention Practices

Vegetated Buffers

Design Limitations

- Edge of floodway plus 50’ or 25’ from top of bank
- Buffers, by themselves, are not sufficient where concentrated flows leave a construction site
- Buffers alone should only be used where sheet runoff flow enters the construction site
- The width of vegetated buffers expected to treat runoff from long slopes should be at least one-fourth the length of the slope for slopes up to 20 percent and at least half the slope length for steeper areas.

Erosion Prevention Practices

Vegetated Buffers

Maintenance Requirements

- Should not be mowed
- All traffic and equipment should be kept off
- No herbicides should be applied to buffer
- Any bare areas should be revegetated immediately

Erosion Prevention Practices

Temporary Seeding

- Using rapidly growing grass to stabilize disturbed areas that have not reached final grade
- Used in disturbed areas that will be left inactive for 15 days

Erosion Prevention Practices

Temporary Seeding

Design Limitations

- Use appropriate seed type for time of year, fertilizer, and lime
- Area must be protected from excessive run-on from upgradient areas
- Prepare soil as specified
- Mulch often companion BMP

Maintenance Requirements

- Water

Erosion Prevention Practices

Temporary Seeding

Maintenance Requirements

- Water

Inspection Considerations

- Wash out
- Damage from equipment tracking
- Adequate moisture

Erosion Prevention Practices

Permanent Seeding

- Establishment of permanent, perennial vegetative cover—usually grass—on disturbed areas
- Applied to disturbed areas when reached final grade and correct time of year

Erosion Prevention Practices

Permanent Seeding

Design Limitations

- The area must be protected from excess runoff as necessary with upgradient diversion structures
- Fertilizer, lime, seedbed preparation, seed coverage, mulch, and irrigation must be applied as necessary to promote quick plant growth

Erosion Prevention Practices

Permanent Seeding

Proper Installation Considerations

- Area must be protected from excess runoff
- Soil should be capable of supporting permanent vegetation and have at least 25 percent silt and clay
- Compacted soils should be broken up sufficiently to create a favorable rooting depth of 6–8 inches

Erosion Prevention Practices

Permanent Seeding

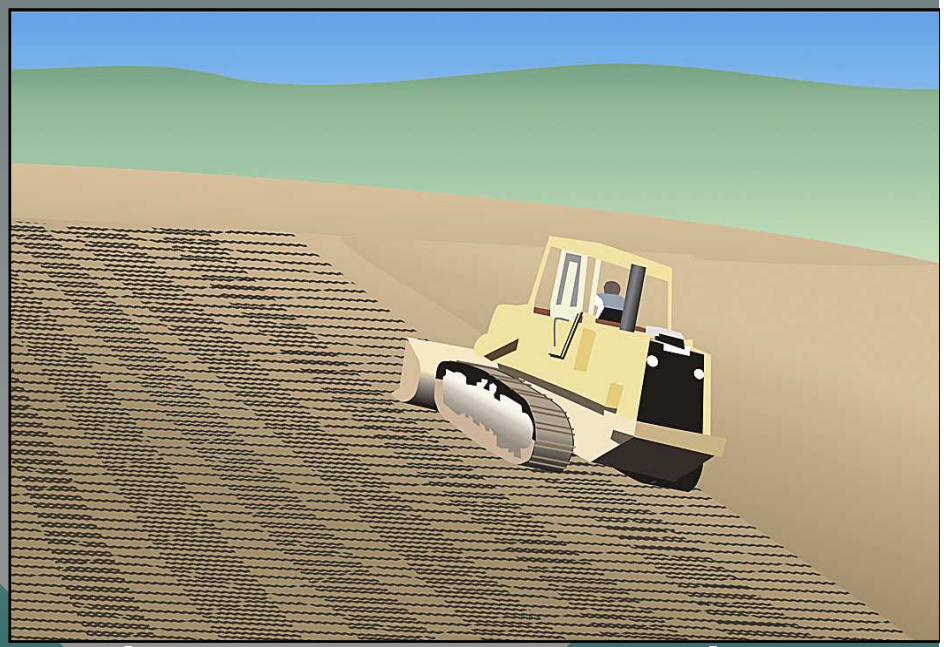
Maintenance Requirements

- Water the soil until the grass is firmly established
- If stand is inadequate (less than 70 percent groundcover).....reseed
- Mow as recommended

Erosion Prevention Practices

Slope Roughening

- Technique for creating horizontal depressions, furrows, or other roughened surfaces on bare ground using tracked or other equipment



- Intended to aid the establishment of vegetative cover from seed, reduce runoff velocity, increase infiltration, reduce erosion, and to provide for sediment trapping

Erosion Prevention Practices

Slope Roughening

Proper Installation Considerations: General

- Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface
- Tracking soils with heavy clay content can cause compaction and *seal* the slope soils, increasing runoff and making seed germination difficult

Erosion Prevention Practices

Topsoil Stockpiling

Stockpiling is the salvaging, storing, protecting, and use of topsoil to enhance final site stabilization and support selected vegetation

Erosion Prevention Practices

Topsoil Stockpiling

Proper Installation Considerations

- Locate to avoid slopes, flood plains, natural channels, and traffic routes
- Do not place on roadway or pavement

Erosion Prevention Practices

Topsoil Stockpiling

Maintenance Requirements

- Use silt fences or other barriers where necessary to retain sediment
- Stockpiles should be temporarily stabilized within 15 days of the stockpiling activities ceasing

Erosion Prevention Practices

Mulching

- Application of a protective layer of straw, cellulose, or other suitable material to stabilize bare soil
- Straw mulch and/or hydromulch are also used in conjunction with seeding and hydroseeding of critical areas for the establishment of temporary or permanent vegetation

Mulching

Design Limitations

- Provides TEMPORARY stabilization of soil, usually until permanent vegetation is established
- On steep slopes, greater than 2H:1V, or where the mulch is susceptible to movement by wind or water, the mulch should be hydraulically applied or the straw mulch should be appropriately anchored

Erosion Prevention Practices

Mulching

Proper Installation

- Straw mulch should not be applied more than 2 inches deep on seeded sites, unless it is incorporated into the soil by tracking, or disking (crimping)

- Mulch must be evenly distributed by hand or machine to desired depth

- Mulch may be anchored to minimize loss by wind or water (tackifier may be used)

Mulching

Maintenance Requirements

- Mulch needs to last until vegetation develops to provide permanent erosion resistant cover
- Replace any bare areas promptly
- After high winds or significant rainstorms, mulched areas should be checked for adequate cover and re-mulched if necessary

Sodding

- Rectangular strips of live turf grass held together by matted roots laced through an organic, growing medium
- Immediately establishes a permanent turf grass cover over bare soil and improves visual aesthetics

- Can be used to stabilize swales, ditches, and channels where concentrated flows will occur and filter runoff into drains

Sodding

Design Limitations

- Sod should not be used on slopes steeper than 2H:1V
- If it is to be mowed, installation should be on slopes no greater than 3H:1V

Sodding

Proper Installation Considerations

- Carefully place and press each piece together so it will be continuous without any voids between the pieces
- Stagger the joints between the ends of strips in a brick-like pattern
- On swale sodding, place the sod on rows or strips at right angles to the centerline of the channel
- On slopes greater than 3:1, stake each strip of sod

Erosion Prevention Practices

Sodding

Maintenance Requirements

- Water, water, water
- Re-install sod that has been displaced
- Replace sod in filter strips if they are covered with sediment

Erosion Control Blankets (ECBs)

- Known generally as rolled erosion control products
- Single or multiple layer sheets composed of natural or synthetic material that is woven, sewn, bonded, or otherwise manufactured for placement on bare soil slopes
- Described as temporary, degradable product bound together to form a continuous matrix to provide erosion control and facilitate vegetation establishment

Erosion Prevention Practices

Erosion Control Blankets (ECBs)

Design Limitations

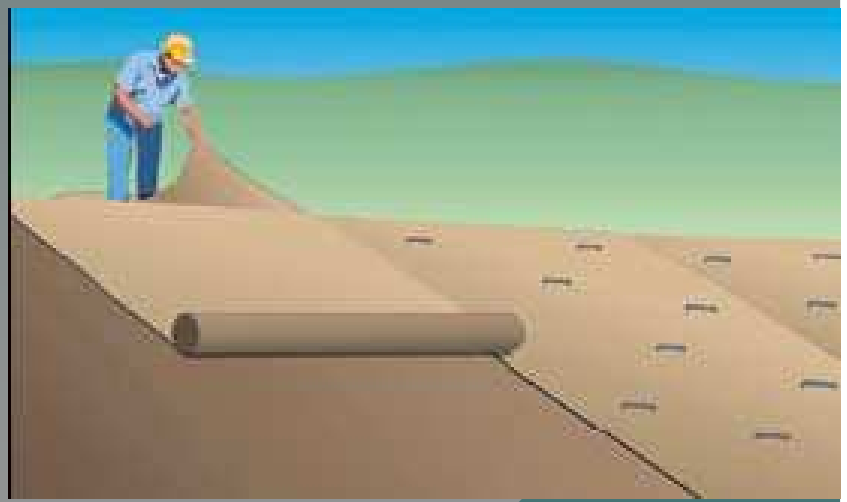
- Final slopes 2H:1V or steeper should be protected with ECB
- Functional longevity of ECBs are variable to accommodate site-specific requirements
- Slopes where erosion hazards are high
- Critical slopes adjacent to sensitive areas such as streams and wetlands

Erosion Prevention Practices

Erosion Control Blankets (ECBs)

Proper Installation Considerations

- Begin at the top of the slope and anchor the blanket in a 6 inch deep by 6 inch wide trench
- Backfill trench and tamp earth firmly
- Unroll blanket down slope in the direction of the water flow



- The edges of adjacent parallel rolls must be overlapped and stapled through the overlapped area per manufacturer's recommendations

Erosion Control Blankets (ECBs)

Proper Installation Considerations

- When blankets must be spliced, place uphill blanket end over downhill blanket (shingle style) with 6-inch overlap
- Ensure good, consistent, direct soil contact
- Anchors should be at least 6 inches long and have sufficient ground penetration to resist pullout

Video

Erosion Prevention Practices

Erosion Control Blankets (ECBs)

Maintenance Requirements

- Check staking/pinning to ensure blanket does not slip down hill
- If washout or breakage occurs, determine reason why BMP failed, then reinstall the material after repairing the damage to the slope to prevent future failure

Erosion Prevention Practices

Terracing

- Terracing reduces sediment by creating small areas to establish vegetation to reduce runoff velocity, increase infiltration and trap sediment.

Terracing

Installation Consideration

- Graded areas steeper than a 3:1 and higher than 5’
- Shortens slope length
- Needs to include drainageways and outlets

Terracing

Inspection

- Horizontal distance is greater than vertical distance on stepped slopes
- Stepped slopes or terraced slopes are cut so that they drain in on themselves

Temporary Slope Drain

- Pipe or lined (TRM, rock, or concrete) ditch or channel extending from the top to the bottom of a cut or fill slope
- Serves to convey concentrated runoff down the face of a cut or fill slope without causing erosion

Erosion Prevention Practices

Temporary Slope Drain

Design Limitations

- Entrance section to the drain should be well entrenched, staked down, and stable so that surface water can enter freely
- Drain should extend down slope beyond the toe of the slope to a stable area or appropriately stabilized outlet
- Use min. 10” diameter pipe to convey runoff

Erosion Prevention Practices

Temporary Stream Crossing

- A temporary structural span installed across a flowing stream for use by construction traffic
- Purpose is to provide a means for construction traffic to cross flowing streams without damaging the channel or banks and to keep sediment out of the stream
- Requires acquiring 401/404 permit

Erosion Prevention Practices

Temporary Stream Crossing

Proper Installation Considerations

- Choose crossing sites at straight channel sections
- Avoid areas where trees will need to be removed
- Place pipe or structure at the crossing location, and stabilize approach pads and crossing pipe/structure

Sediment Management Practices

- Check Dams
- Silt Fence
- Straw Bale Barrier
- Sand Bag Barrier
- Brush or Rock Filters and Berms
- Sediment Traps
- Temporary Sediment/Detention Basins
- Bank Stabilization

Sediment Management Practices

- Rip-rap
- Channel Linings
- Temporary Diversions, Drains and Swales
- Filter Strips
- Temporary Inlet Protection
- Temporary Outlet Protection
- Energy dissipation

Sediment Management Practices

Check Dams

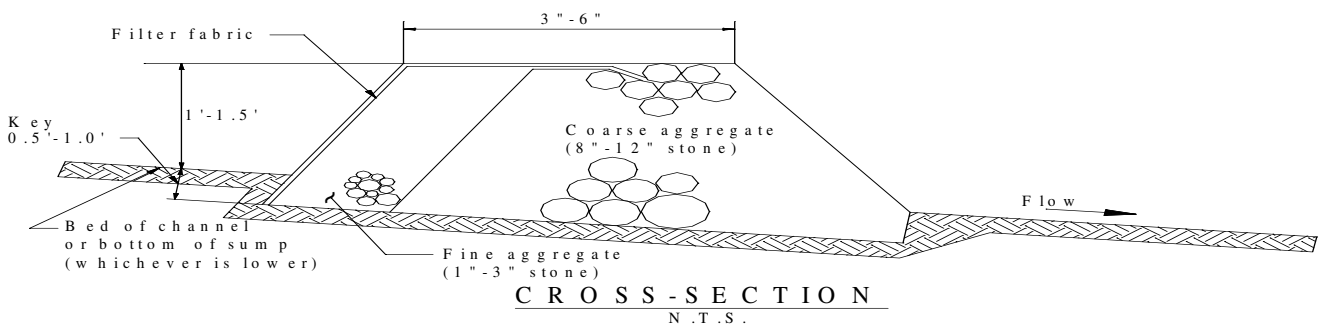
- Also known as ditch check or silt check is a small, temporary, center overflow dam constructed across a ditch, swale, or channel, consisting of rock, gravel filled bags, fiber rolls, or other commercial products
- Reduce velocity of concentrated flows, thereby reducing erosion of swale or channel and settling out sediment

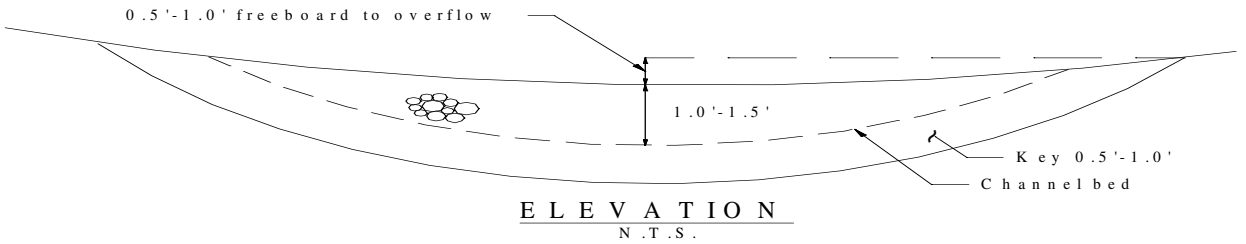
Sediment Management Practices

Check Dams

Design Limitations

- Limited to use in small, open ditches that drain 10 acres or less
- Must not be used in streams, unless have permit



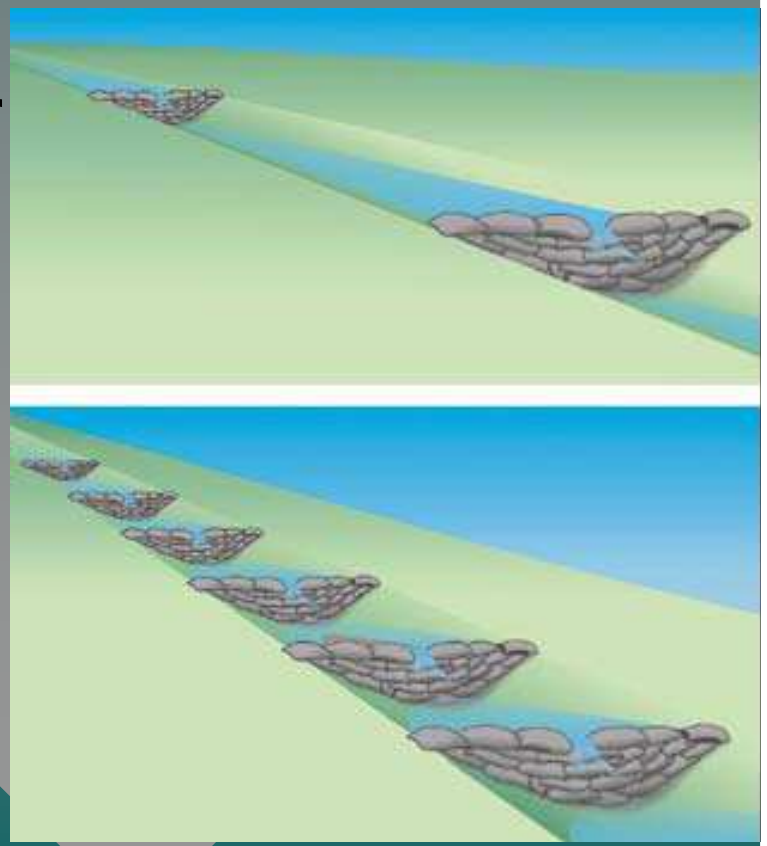


Sediment Management Practice

Check Dams

Proper Installation Considerations

- Center of the check dam above flat portion of channel must be at least 6” lower than outer edges
- Max. spacing between check dams in ditch should be such that toe of upstream dam is at same elevation as top of downstream dam



Sediment Management Practices

Check Dams

Maintenance Requirements

- Sediment must be removed when it reaches one-half of the original height
- Erosion caused by high flows around the edges of the dam must be corrected immediately, and the dam must be extended upward beyond the repaired area

Sediment Management Practices

Check Dams

Inspection Considerations

- Stone is correct size
- Check dam spans entire width of channel
- Filter fabric on upstream face is keyed into bed

Sediment Management Practices

Silt Fence

- Temporary sediment barrier consisting of filter fabric entrenched into the soil and attached to supporting posts
- Downhill from bare soil areas
- Installation by a trencher or by a slicing machine may help prevent common silt fence failures

Sediment Management Practices

Silt Fence

Design Limitations

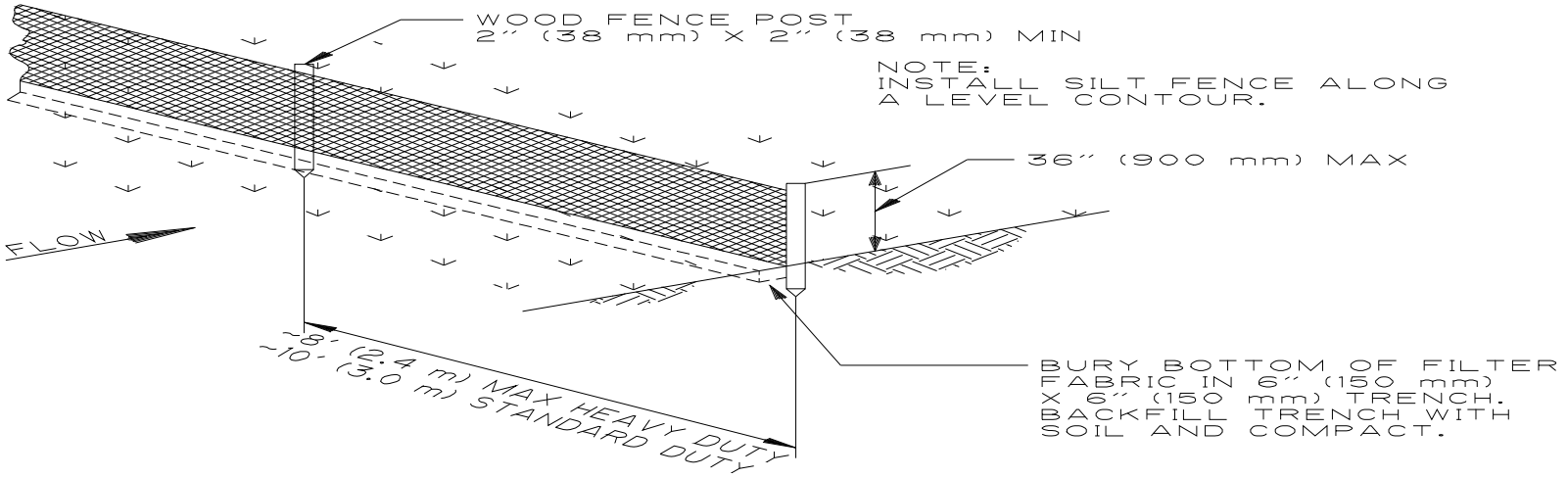
- Can be used where
  - Non-concentrated sheet flow will occur (Drainage area is no more than 1/4 acre per 100 linear feet of silt fence
  - The maximum slope gradient above the barrier is 1H:1V
- Should not be used
  - Around the perimeter of the construction site, unless J-hooks are used (drain no more than 1/3 acre of disturbed area into each J-hook)
  - In ditches, channels, or streams (unless swale has drainage area less than 1 acre)

Sediment Management Practices

Silt Fence

Proper Installation Considerations

- Silt fencing must be installed only where water can pond
- Downgradient from bare soil areas
- Installed on the contour
- Ends turned up to prevent bypassing
- Dig a trench on the contour
  - 6 inches wide and 6 inches deep
- Push fabric into the trench
- Spread fabric along trench bottom and sides
- Backfill the trench and compact the soil



TYPICAL PREFABRICATED SILT FENCE INSTALLATION

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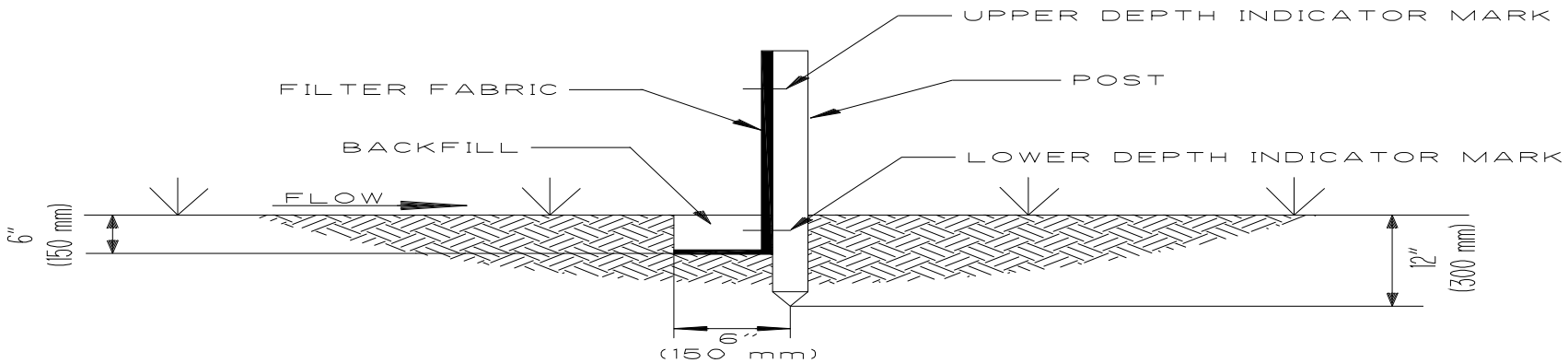

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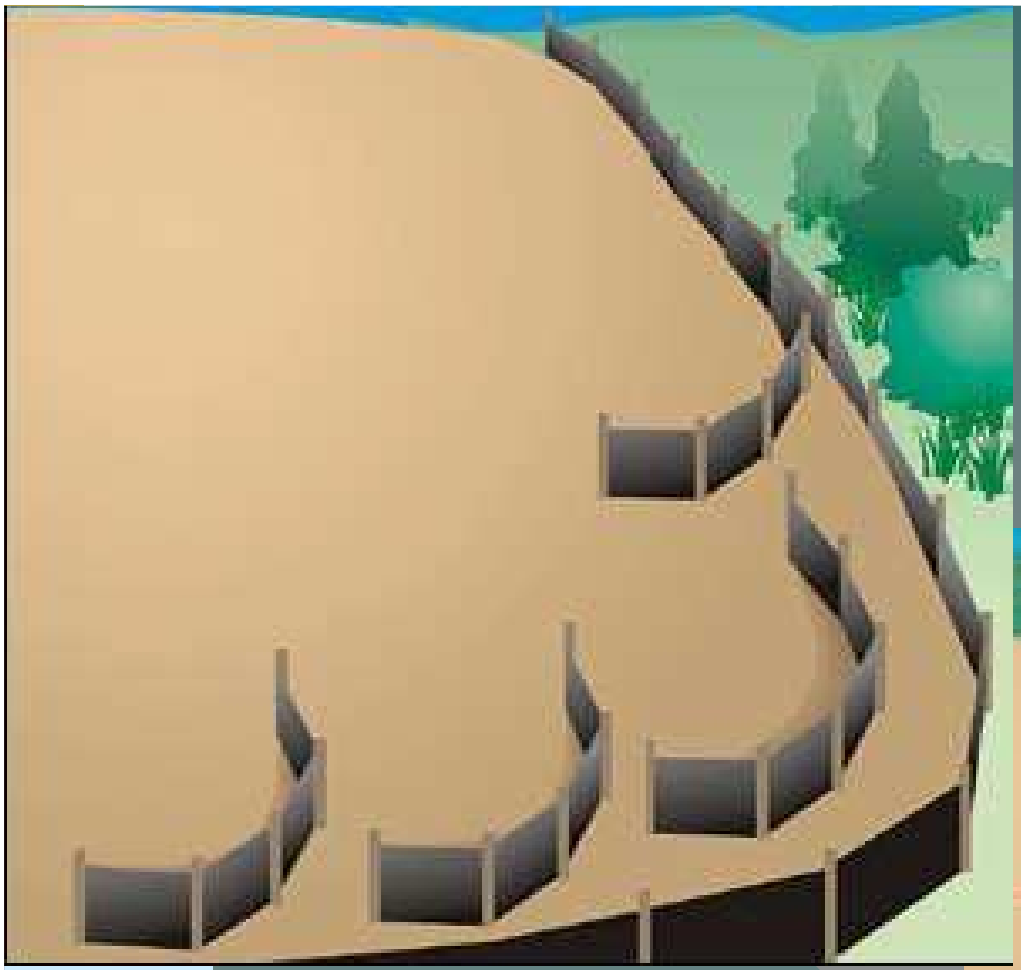
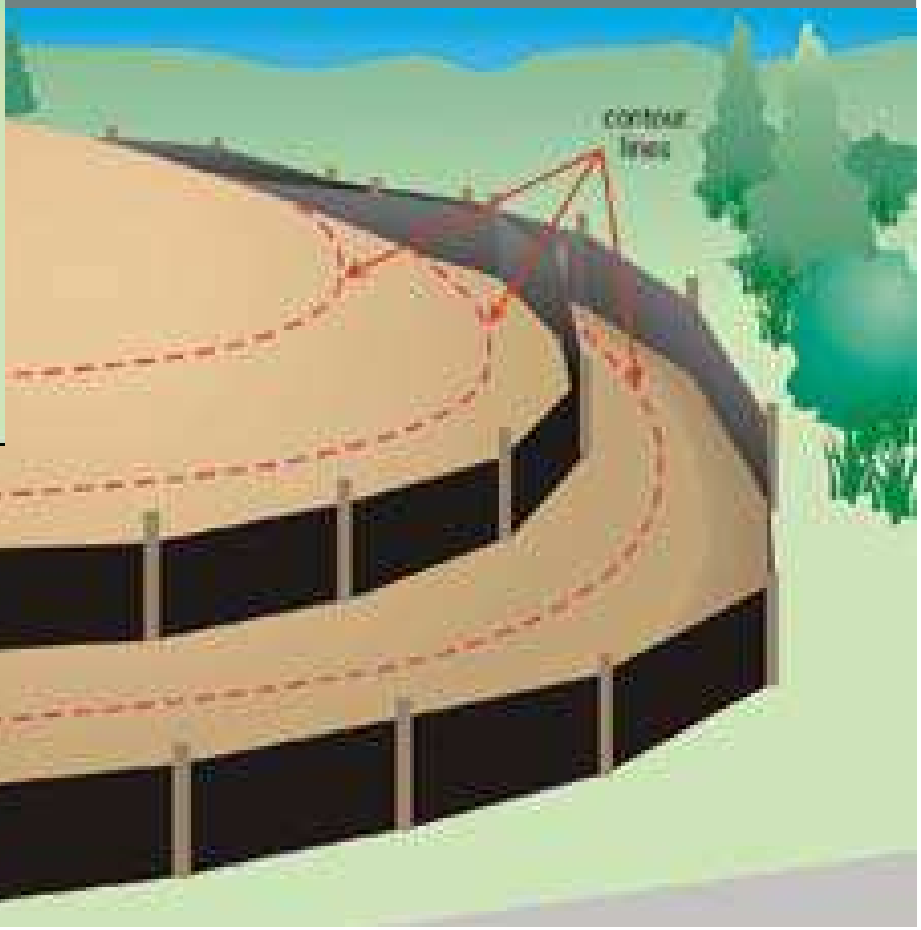



contour
lines

Silt Fence

Maintenance Requirements

- Inspect fence for proper installation (pull up on the fence while kicking the toe of the fabric)
- Sediment should be removed when it reaches 1/3 height of the fence
- Silt fences should be removed when they have served their useful purpose (i.e., the upslope area has been permanently stabilized and any sediment stored behind the silt fence has been removed)

Sediment Management Practices

Straw Bale Barrier

Straw bales placed end to end along a level contour in shallow trench and held in place with stakes

Sediment Management Practices

Straw Bale Barrier

Suitable Applications

- Barrier along the perimeter of the site, streams, and channels.
- Below the toe of exposed and significant erodible slopes
- Downslope of exposed soil areas

Sediment Management Practices

Straw Bale Barrier

Maintenance

- Ensure bales are placed tightly together and trenched in
- Bales breakdown easily and need frequent replacement
- Remove sediment when it has reached ¼ the height of the bale
- Recycle used straw as mulch

Sediment Management Practices

Straw Bale Barrier

Inspections

- Barrier follows contour
- Ends of barrier turn uphill
- Bales are staked in
- Accumulated sediment behind the barrier does not exceed ¼ the height of the bale

Sediment Management Practices

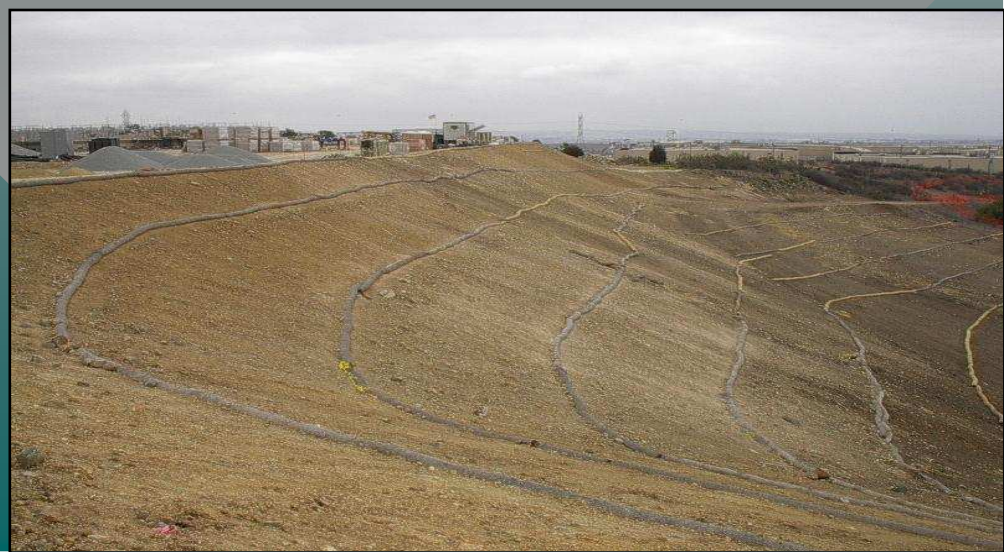
Brush Barrier

- Clearing and grubbing debris or grindings
- Ensure brush makes solid contact with ground to allow pounding

Sediment Management Practices

Fiber

- Fiber rolls are made from coconut fiber, plastic, wood shavings, compost, or other material
- Installed on contour similar to silt fence
- Should only be used on slopes flatter than 10:1
- Follow manufacturer's recommendations



Sediment Management Practices

Temporary Sediment Trap

- Formed by excavation or by constructing a small embankment of stone, stone-filled bags, or other material to retain sediment-laden stormwater runoff
- Are considered temporary structures
- Require protected outlet
- Protect downstream waterways

Sediment Management Practices

Temporary Sediment Trap

Design Limitations

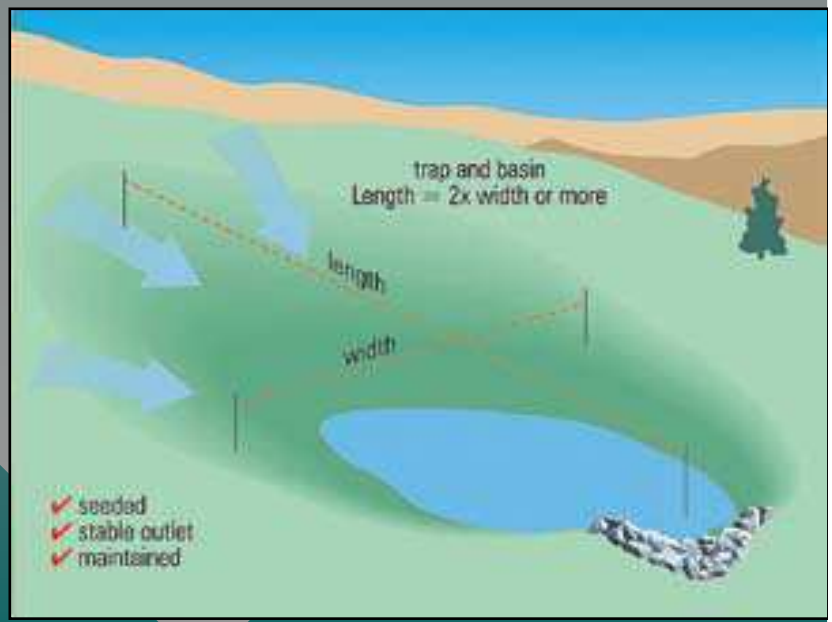
- Min. volume of 134 cubic yards and 45 cubic yards/acre draining to it
- Treat a drainage area of 5 acres or less
- Traps cannot be placed in waters of US unless have USACE and IDEM approval

Sediment Management Practices

Temporary Sediment Trap

Proper Installation Considerations

- Site traps
  - In areas where they can be maintained (i.e., sediment removed)
  - Not at culvert or pipe outlets if possible
- Basin flow length should be at least two times flow width (prefer 3x)
- Construct the trap and stabilize before land disturbance work begins



Sediment Management Practices

Temporary Sediment Trap

Maintenance Requirements

- Sediment must be removed from the trap before it is 1/3 full
- Removed sediment should be spread and stabilized where it will not wash into nearby surface waters

Sediment Management Practices

Temporary Sediment Basin

- Created by excavation and construction of an embankment and designed to retain or detain runoff sufficiently to allow excess sediment to settle out
- Used at sites before permanent vegetation is reestablished or drainage structures are installed

Sediment Management Practices

Temporary Sediment Basin

Design Limitations

- Do not locate dams where a failure would result in severe property damage or danger to human life
- Basin volume should capture at least 2-year/24-hour storm
- Basin flow length should be at least two times the flow width; the longer, the better
- Minimum drainage area is 5 acres

Sediment Management Practices

Temporary Sediment Basin

Maintenance Requirements

- Sediment must be removed from the basin before it is 1/3 full
- Outlet structure is free of debris

Sediment Management Practices

Vegetated Streambank Stabilization

- Use of bioengineering techniques (live stakes, wattles, and/or brush layering) to reduce erosion of stream banks by stabilizing and reducing stream velocity at the bank

Sediment Management Practices

Rip Rap

- Rock used to protect slopes, channels and other areas subject to erosion
- Inspect for displacement

Sediment Management Practices

Channel Lining

- Typically rock-lined channels, but could be concrete or rock/grout
- Purpose is to convey concentrated surface runoff without erosion

Sediment Management Practices

Channel Lining

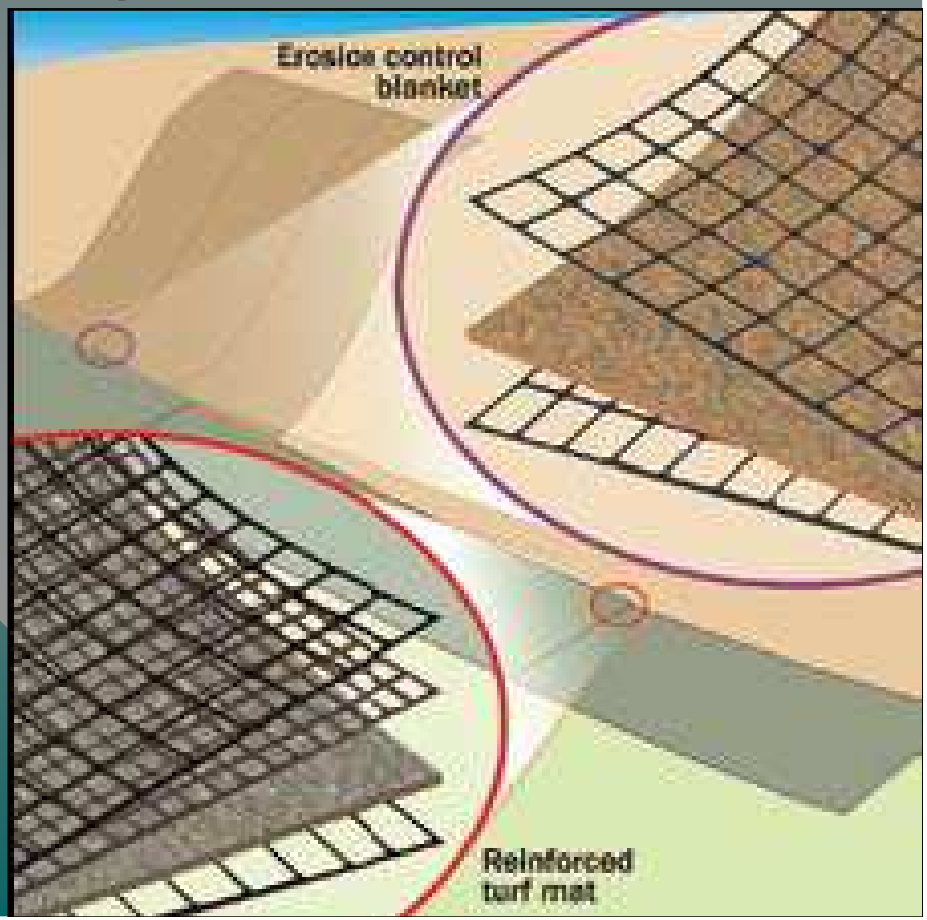
Proper Installation Considerations

- Place non-woven filter fabric or gravel filter layer under lining
- Place rock so it forms a dense, uniform, well-graded mass with few voids

Sediment Management Practices

Turf Reinforcement Mats

- Similar to erosion control blankets but are sturdier to sustain higher sheer stresses on steeper slopes and are permanent
- Stems, roots and rhizomes of the vegetation become intertwined with the mat, reinforcing the vegetation and anchoring the mat



Sediment Management Practices

Turf Reinforcement Mats

Proper Installation Considerations

- Unroll the center strip of matting upstream
- Unroll adjacent mats upstream in similar fashion, maintaining a 3-inch overlap.
- Place edges of outside mats in previously excavated longitudinal slots, anchor them using prescribed staple pattern, then backfill and compact soil
- Secure mat to ground

Video

Sediment Management Practices

Temporary Diversions

- Temporary berm, ditch, or channel constructed above an area of exposed soil
- Purpose is to divert clean upland runoff or drainage away from unprotected disturbed areas to vegetated or stabilized areas

Sediment Management Practices

Temporary Diversions

Design Limitations

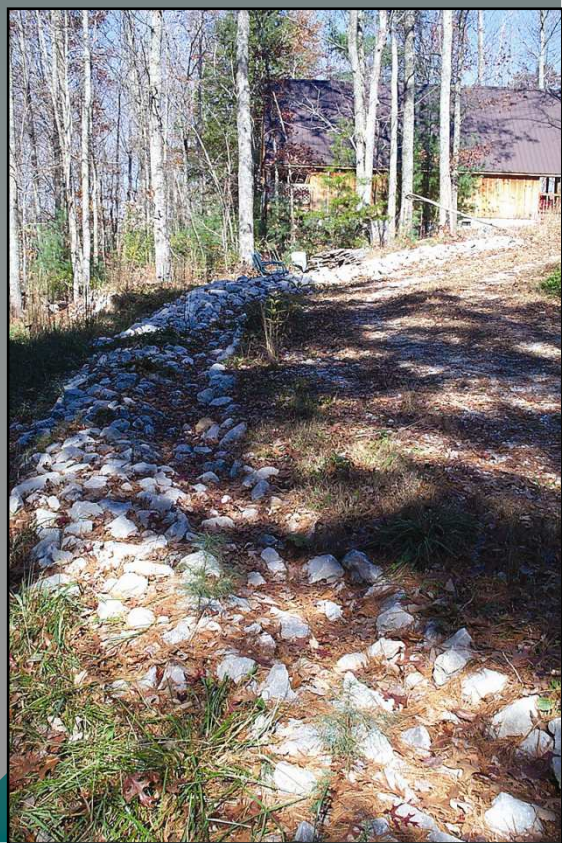
- Locate to minimize damage by construction operations and traffic
- Side slopes should be 2H:1V or flatter
- Berms should be stabilized

Sediment Management Practices

Temporary Diversions

Proper Installation Considerations

- Temporary diversion must be installed as a first step in the land-disturbing activity and must be functional before down slope land disturbance
- Diversion must be adequately compacted to prevent failure
- Diversion must be stabilized

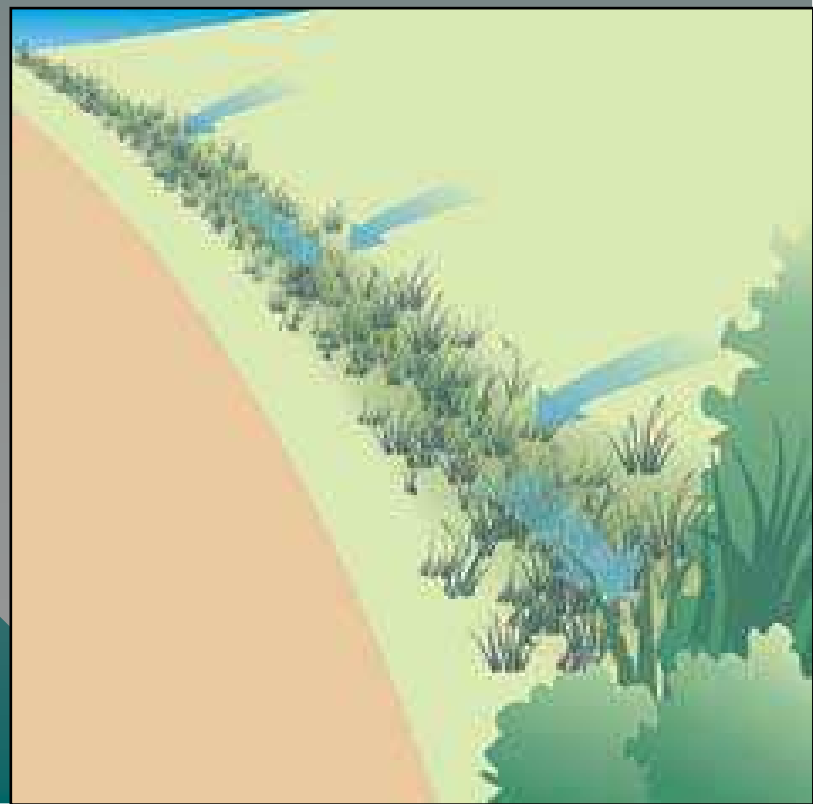


Sediment Management Practices

Temporary Diversions

Maintenance Requirements

- If vegetation has not been established, reseed damaged and sparse areas
- Repair any damage caused by construction traffic or other activity



Sediment Management Practices

Grassed/Sodded Swales

- Consists of vegetation lining a ditch, channel, swale, or diversion berm to protect it from erosion

Sediment Management Practices

Grassed/Sodded Swales

Design Limitations

- Should be used on slopes of less than 3%, or Erosion Control Blankets or Turf Reinforcement Mats are needed
- Channel cross-section should be wide and shallow with relatively flat side slopes (e.g., 3H:1V)

Sediment Management Practices

Grassed/Sodded Swales

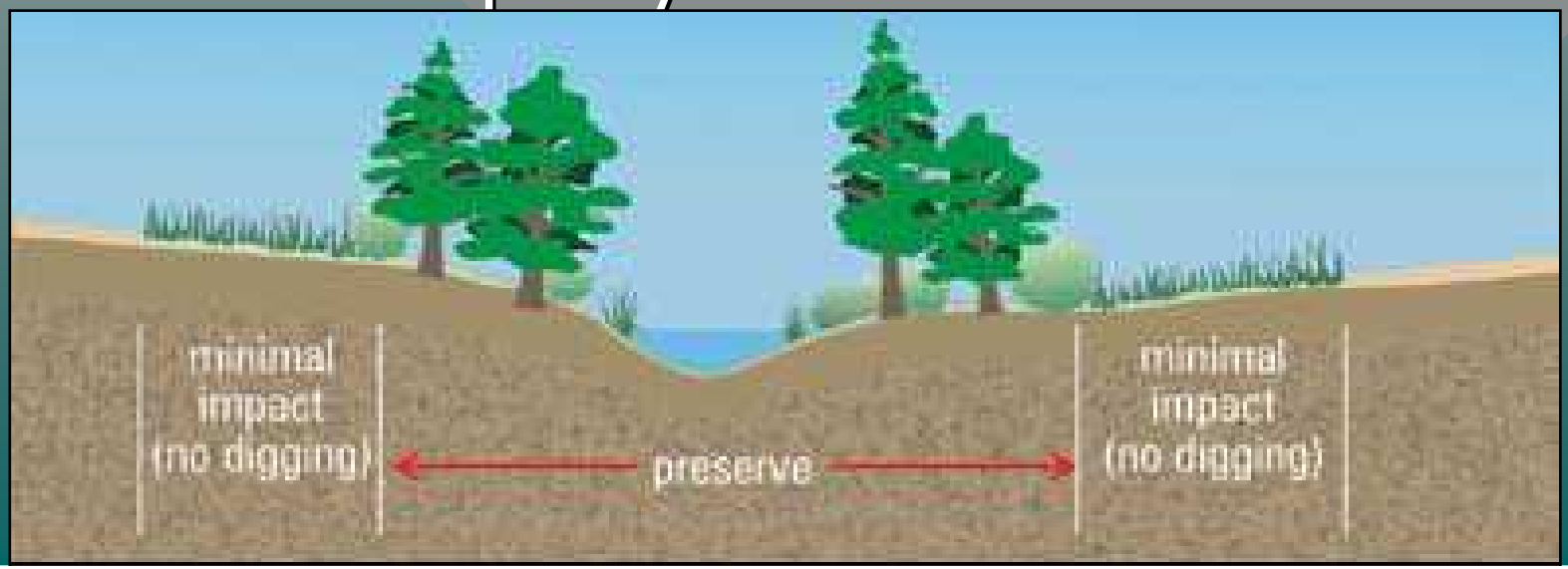
Maintenance Requirements

- Check the channel for debris, scour, or erosion and immediately make repairs
- Remove all significant sediment accumulations to maintain the designed carrying capacity
- Keep the grass in a healthy, vigorous condition at all times, because it is the primary erosion protection for channel
- Permanent grassed waterways should be seasonally maintained by mowing or irrigating

Sediment Management Practices

Riparian Corridor Buffers

- Setback requirements that establish no-disturbance protection zones along and around waterways
- Soil disturbance is avoided and buffer retains natural filtration, structural protection, and infiltration capacity



Sediment Management Protection

Temporary Inlet Protection

- Purpose is to reduce the amount of sediment that enters the inlet/culvert by creating a small ponding area for sediment to settle out

Sediment Management Protection

Temporary Inlet Protection

Design Limitations

- Contributing drainage area should be 1/2 acre maximum
- Ponding area must be relatively flat (less than 1 percent slope)
- Must ensure that no bypasses occur and adjacent property will not be damaged by the ponded water
- Include an overflow notch in middle portion of dam
  - notch should be at least six inches lower than rest of dam
  - downgradient portion of the overflow notch should be protected from spillover scouring

Sediment Management Protection

Temporary Inlet Protection

Proper Installation Considerations

- Surround all sides of the culvert/inlet that receives runoff
- Place a minimum of 4 feet from the culvert/inlet
- Geotextile should be placed between any stone and the soil

Sediment Management Practices

Temporary Inlet Protection

Maintenance Requirements

- Dam must be kept free of trash and debris
- Sediment should be removed when it reaches one-half the height of dam
- If the gravel becomes clogged with sediment, carefully remove it from the inlet and either clean or replace it
- Dam should be removed after the disturbed area has been stabilized

Sediment Management Practices

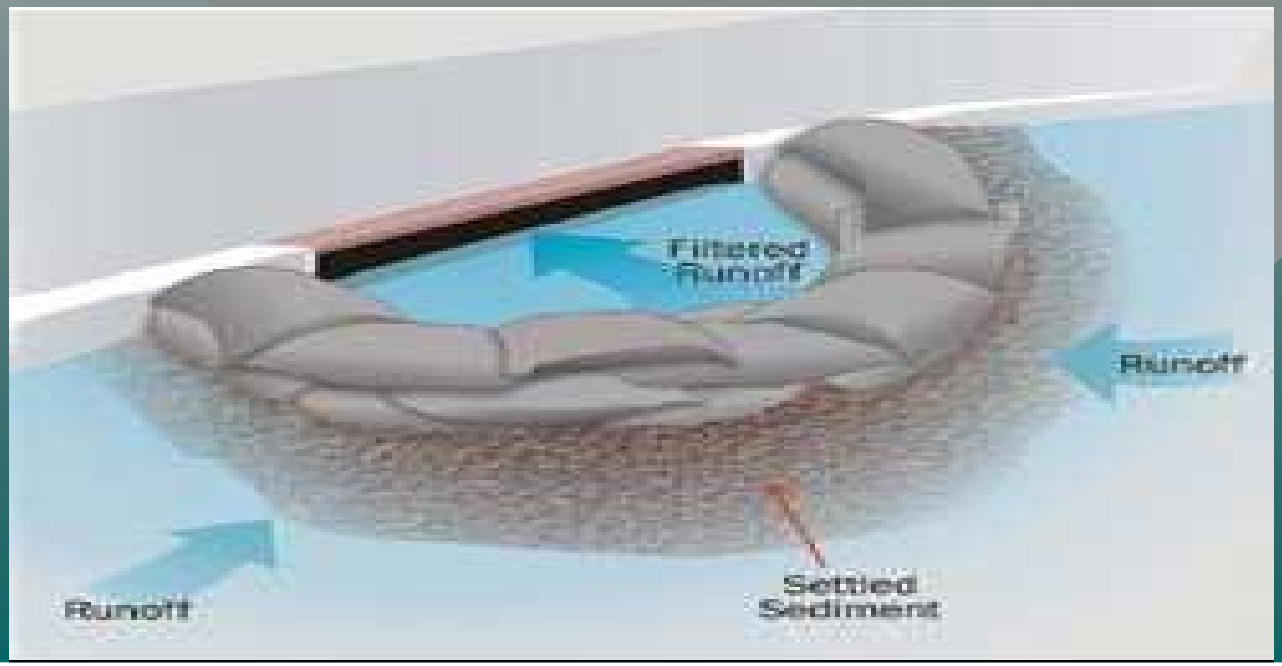
Rock/Block Dam Inlet Protection

- Temporary dam constructed from rock and block to reduce the sediment discharged into storm drains by ponding the runoff and allowing the sediment to settle out

Sediment Management Practices

Stone/ Sand Bag Inlet Protection

- Temporary dam constructed from stone or sand bags to reduce the sediment discharged into storm drains by ponding the runoff and allowing the sediment to settle out



Sediment Management Practices

Stone/ Sand Bag Inlet Protection

Proper Installation Considerations

- Fill bags about half full
- The row should be curved at the ends, pointing uphill, and be tied into the curbing
- Several layers of bags should be overlapped and packed tightly
- Leave a one-bag gap in the top row to act as a spillway

Sediment Management Practices

Silt Fence Inlet Protection

- Temporary barrier placed around or inside a drop inlet that promotes ponding, settling of sediment, or physical filtration of sediment from muddy inflows

Silt Fence Inlet Protection

Proper Installation Considerations

- Support posts for a silt fence must be steel fence posts or 2 by 2 inch wood, length 3- foot minimum, spacing 3-foot maximum, with a top frame X-brace or other support recommended
- Excavate a trench 4 inches wide and at least 8 inches deep to bury the bottom of the silt fence
- Backfill the trench and compact

Sediment Management Practices

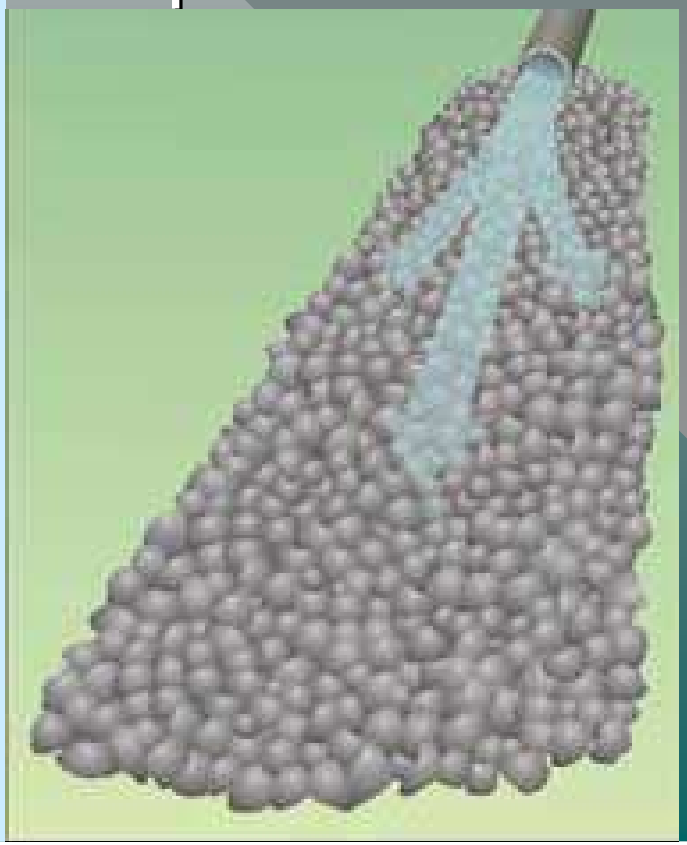
Outlet Protection

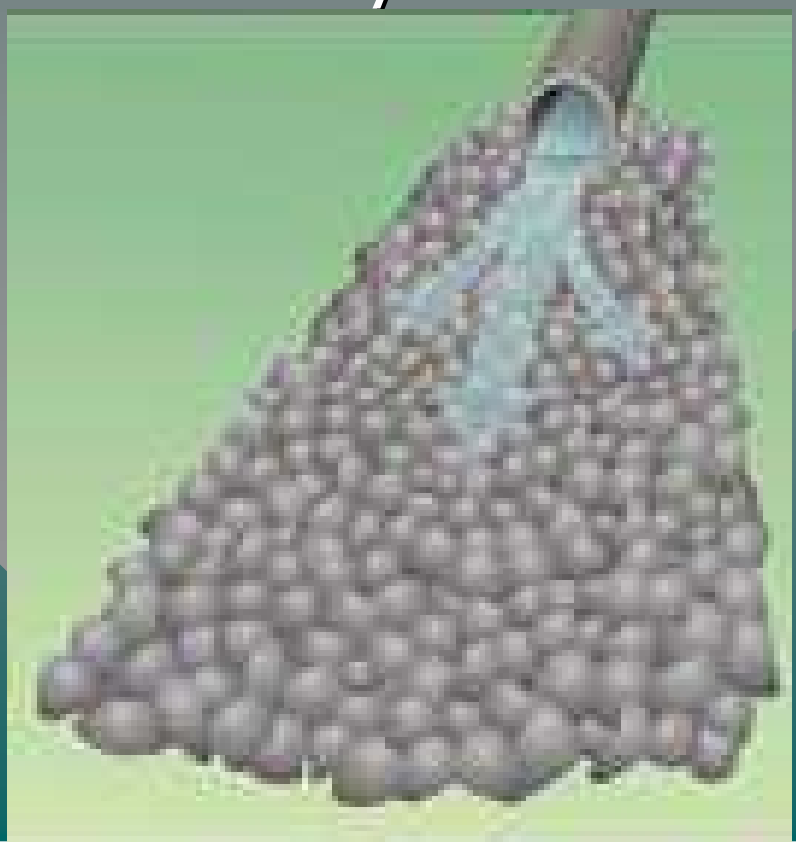
- Structure designed to control erosion at the outlet of a channel or stormwater conveyance pipe

Outlet Protection

Design Limitations

- Apron dimensions and material size depends on volume and velocity of flow

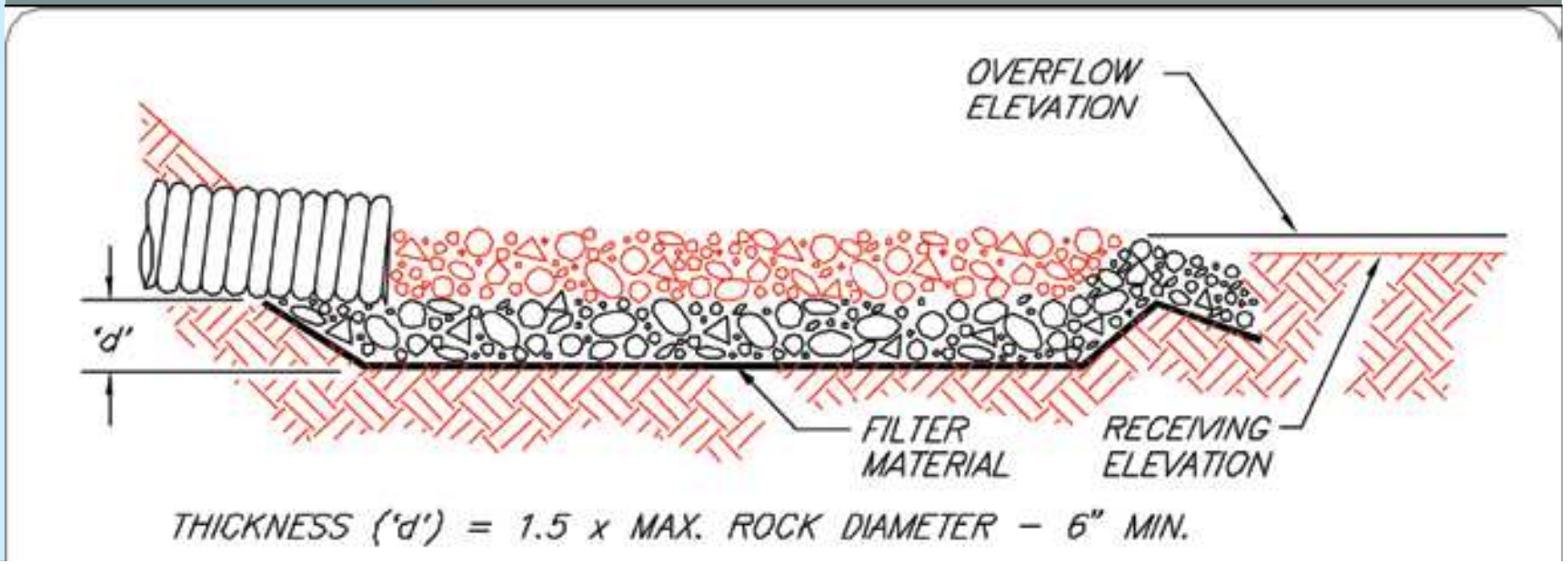




Outlet Protection

Proper Installation Considerations

- Minimum thickness of riprap must be 1.5 times the maximum stone diameter
- Geotextile liner shall be placed under rock



Outlet Protection

Maintenance Requirements

- Make repairs if erosion has occurred under or around structures/rock or if rock has been displaced

Sediment Management Practices

Energy Dissipaters

- A rock, concrete, or other structure designed to slow water down and remove energy
- May include stilling basin

Sediment Management Practices

Energy Dissipaters

Design Limitations

- Usually designed by engineer
- Elevation of outlet of energy dissipater should be same elevation as bottom of receiving channel
- Energy dissipater should flow straight into receiving water

Energy Dissipaters

Proper Installation Considerations

- Geotextile fabric should be placed under rock
- Riprap can be placed by equipment, but take care to avoid damaging the filter
- Construct the apron or the top of the riprap at the downstream end level with receiving area or slightly below it

Sediment Management Practices

Energy Dissipaters

Maintenance Requirements

- Check for any erosion around or below the riprap and structure
- Check for any displacement or dislodging of stones
- Immediately make all needed repairs to prevent further damage