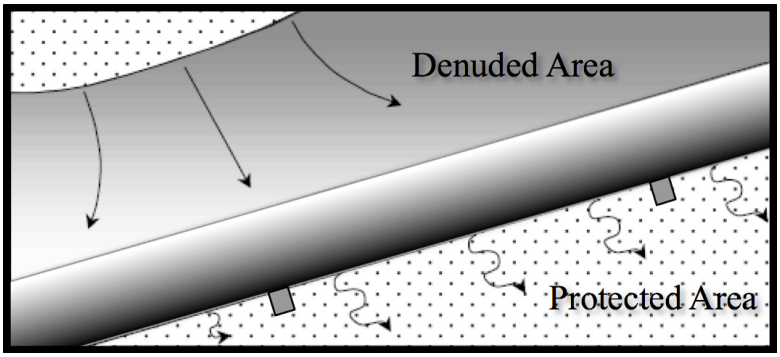
ACTIVITY: Weighted Sediment Tube

TCP – 14



Targeted Constituents				
● Significant Benefit	◗ Partial Benefit	○ Low or Unknown Benefit		
● Sediment	○ Heavy Metals	○ Floatable Materials	○ Oxygen Demanding Substances	
○ Nutrients	○ Toxic Materials	○ Oil & Grease	○ Bacteria & Viruses	○ Construction Wastes

Implementation Requirements				
● High	◗ Medium	○ Low		
● Capital Costs	● O & M Costs	◗ Maintenance	○ Suitability for Slopes >5%	○ Training

Description

A weighted sediment tube (WST) consists of tubular-shaped filter bags with ballast material designed to reduce suspended solids from runoff.

Sand bag barriers and rock filters (especially continuous berms) are preferred over weighted sediment tubes because sediment removal efficiencies, durability, and maintenance requirements are far less desirable in weighted sediment tubes. This management practice is likely to create a significant reduction in sediment.

Suitable Applications

- Along the perimeter of the site.
- Along swales as a temporary erosion control measure (check dams).
- Around temporary spoil areas and other small cleared areas.
- Below the toe of exposed erodible slopes.
- Downslope of exposed soil areas.

Installation/ Application Criteria

Weighted sediment tubes are typically installed with 0.25 acre (0.1 ha) draining to every 100-feet (31.4 m) of barrier. They are designed to function under a 10-year storm event and may be furnished for no longer than three months. The barrier is designed to pond water behind so it is crucial that it is sufficiently anchored and follows contours. Weighted sediment tubes that are not entrenched and do not follow contours can result in worsened erosion.

Generally, weighted sediment tubes are used in conjunction with erosion source controls to provide sufficient control. Weighted sediment tubes are not as effective as silt fences.

- Use primarily in areas where sheet or rill flow occurs.
- No more than 0.25 acre (0.1 ha) per 100 feet (31.4 m) of barrier should drain to the barrier.
- Install along a level contour, turning ends up slope to prevent scour from wash around.
- Tubes should be placed on the contour and in a row with ends tightly abutting the adjacent tube.
- Leave area for runoff to pond upstream of the barrier by locating barrier away from the toe of slopes. This also provides access for maintenance.
- Secure each tube with stakes. Slightly angle stakes with top facing towards direction of flow.
- Tubes should be placed on compacted soils. Hard tamp soft or loose soils.
- Leave enough area (about 1200 sq. ft. (111.5 m2) per acre (0.4 ha)) behind the barrier for runoff to pond (less than 1.5 ft. (0.5 m) depth) and sediment to settle.

Maintenance

- Inspect weekly and within 24 hours after the end of a storm event.
- Replace tubes that have decomposed.
- Repair washouts or other damage as needed.
- Remove sediment when accumulations reach one-half the original height of either a single tube or stacked tubes. Sediments removed shall be disposed of properly.
- Remove tubes when no longer needed. Regrade and stabilize the area.
- Inspect weighted sediment tubes when rain is forecast. Be sure the tubes are overlapped or butted end to end.

Limitations

- Weighted sediment tubes have not been as effective due to improper use. These barriers have been placed in swales and drainageways where runoff volumes and velocities have caused the tubes to wash out. In addition, failure to stake the sediment tube will allow undercutting and end flow.

- Weighted sediment tubes are not to be used for extended periods of time because they tend to rot and fall apart.
- Limit length of any single row of tubes to 500 ft. (157 m).
- Not appropriate for large drainage areas, limit to five acres or less.
- Sediment tubes may lose their effectiveness due to degradation, thus constant maintenance is required.
- Not intended for inlet protection or streams.
- Tube bindings of jute or cotton not recommended as they quickly deteriorate and fail.
- Limit to locations suitable for temporary ponding or deposition of sediment.
- Slopes of 3:1 (H:V) or flatter are preferred. If the slope exceeds 3:1 (H:V), use a different management practice or limit the length of slope upstream of the tube to less than 25 ft (15.7 m).

Additional Information

A weighted sediment tube consists of secured tubes placed to intercept sediment-laden runoff from small drainage areas of disturbed soil. The barrier ponds runoff and allows sediment to settle. Weighted sediment tubes should not be used for extended periods of time because they tend to rot and fall apart.

When installed and maintained according to the guidelines on this fact sheet, sediment tubes can remove some of the sediment transported in construction site runoff. This optimum efficiency can only be achieved through careful maintenance, with special attention to replacing damaged tubes.

Primary References

California Storm Water Best Management Practice Handbooks, CDM et.al. for the California SWQTF, 1993.

Caltrans Storm Water Quality Handbooks, CDM et.al. for the California Department of Transportation, 1997.

Subordinate References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

"Draft – Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

"Environmental Criteria Manual", City of Austin, Texas.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, June 1981.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April, 1992.

Special Specifications, Erosion Eels TM, Civil and Environmental Consultants, Inc.

Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual – February 1992, Publication #91-75.

Water Quality for Construction Businesses, City of Bellevue, Washington.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency – November 1988.

Inspection Checklist

- Does the barrier follow a contour?
- Are the posts secure?
- Has sediment accumulated behind the fence by more than half the original height of either a sigular tube or stacked tubes? If yes, then clear it.
- Is there any indication of wash around or under wash? If yes, then reset the barrier and determine if it is overloaded (i.e. another barrier should be installed upstream or a silt fence or other practice be implemented).

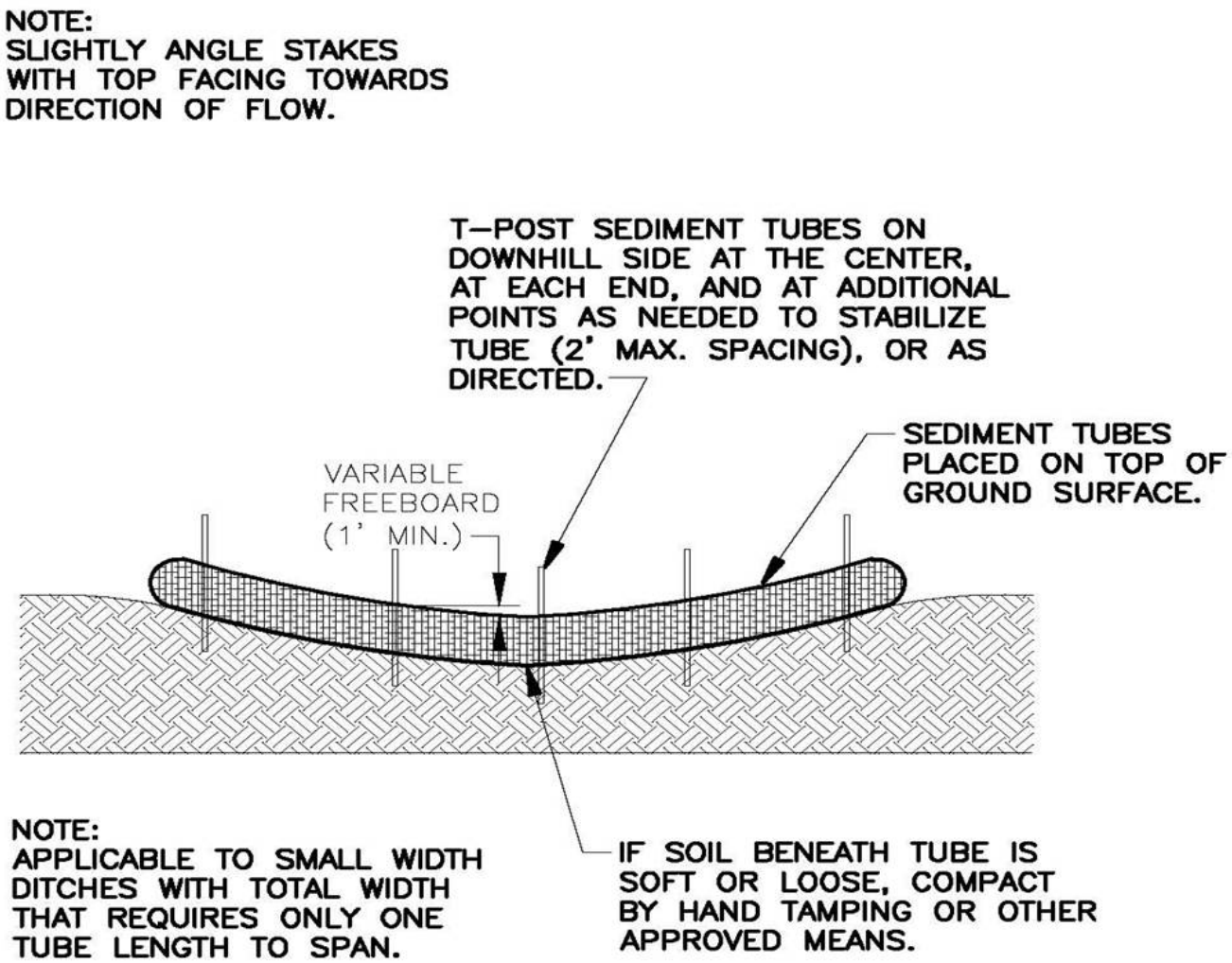


Figure TCP-14-1
Small Ditch Checks for Sediment Tubes

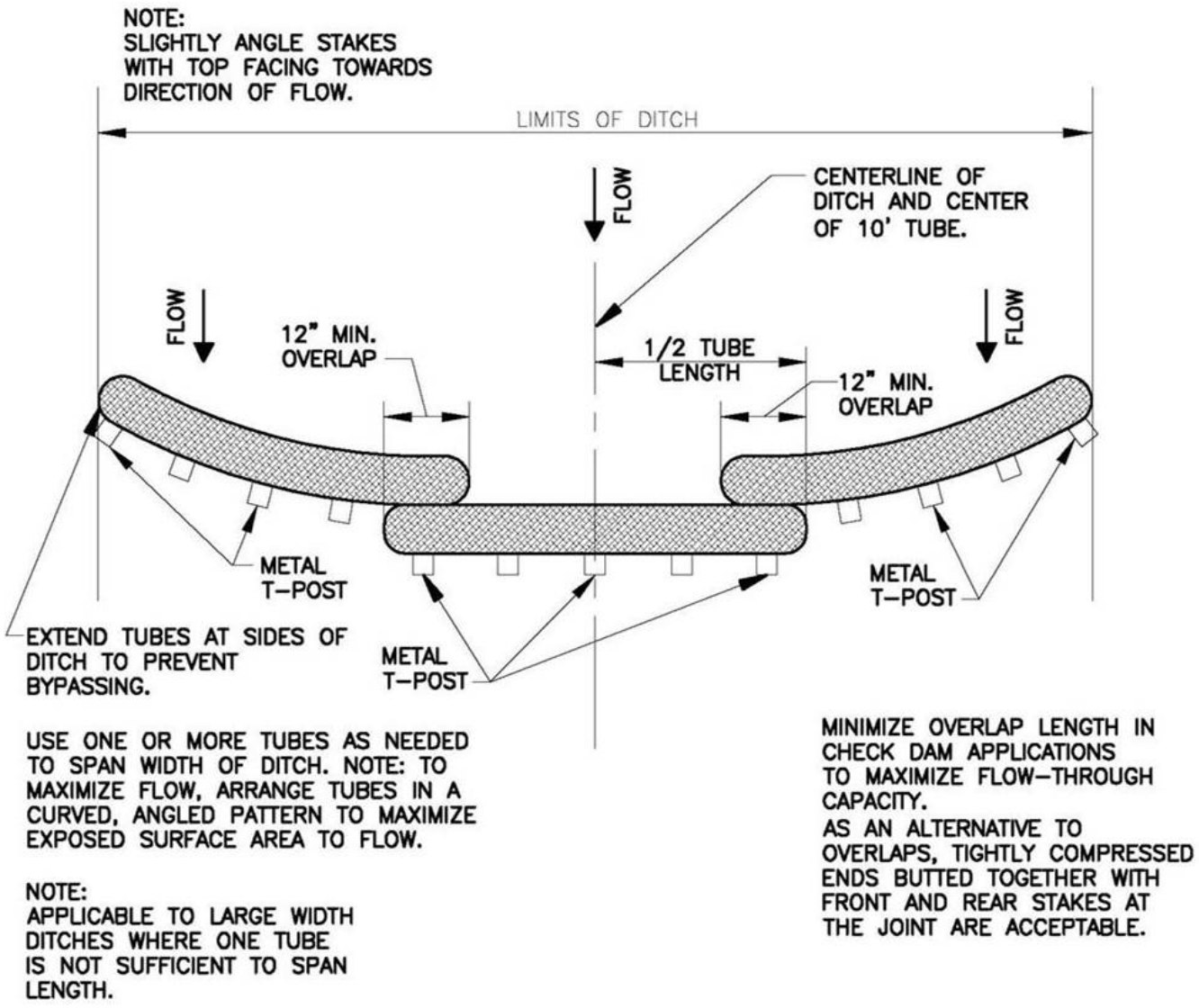


Figure TCP-14-2

Check Dam Arrangement for Larger Width Ditches for Sediment Tubes