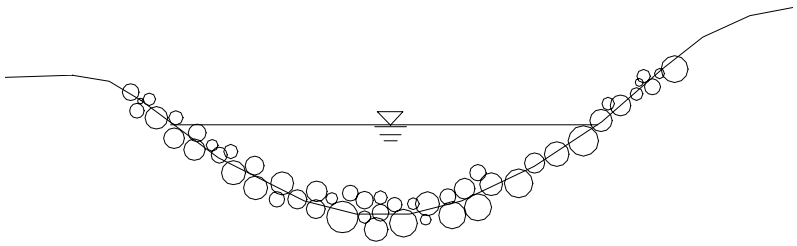
ACTIVITY: Channel Linings

TCP – 21



Targeted Constituents				
● Significant Impact	◗ Partial Impact	○ Low or Unknown Impact		
● 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

Channel lining is the artificial surfacing of bed, banks, shore or embankments to resist erosion or scour. While similar to rip-rap described in TCP-20: Rip-rap, this fact sheet focuses on the application of rip-rap in channels, creeks, streams, ditches or other waterways. This management practice is likely to create a significant reduction in sediment.

Suitable Applications

- Temporary channel lining can be used to promote temporary or permanent vegetative growth in a drainage way or as protection prior to placement of a permanent protective layer.

- Permanent channel lining can be used when an ordinary seeding and mulch application would not be expected to withstand the max shear force of channel flow for 2-year, 24-hour flow.

Approach

- The following materials are applicable for temporary channel linings. Generally, these types of practices are not applied in dry-weather streams (have water flowing most of the year). These practices are most often effective in wet-weather conveyances (only have flow when it rains).

  - Excelsior
  - Jute mats and cells
  - Wood fiber mats and cells
  - Geosynthetic mats or cells
  - Brushlayering

- The following materials are applicable for permanently lining channels.

  - Geosynthetic mats or cells
  - Pre-cast concrete block (“woven” or individually placed)
  - Rip-rap

- Cast-in-place concrete
- Gabions
- Sacked concrete
- Soil cement
- Air blown mortar

Channel linings such as rip-rap, cast-in-place concrete, and pre-cast concrete blocks should only be utilized with expressed permission from the Engineering Department and/or TDEC.

- Application of the net and matting materials above is described in the Nets and Mats (TCP-9), and Geotextiles (TCP-10) BMPs.
- Brushlayering applications are discussed in detail in TCP-16 Brush or Rock Filters and Continuous Berms.
- Rip-rap installation is detailed in TCP-20: Rip-rap.

Maintenance

- Inspect lining before and after rainfall events.
- If net or matting materials are damaged, repair or replace immediately.
- Any spaces left bare in rip-rap or brushlayering applications due to erosion or scouring are to be repaired and replaced with their respective lining materials.

Limitations

- Inadequate coverage results in erosion, washout, and poor plant establishment.
- If the channel grade and liner are not appropriate for the amount of runoff, channel bottom erosion may result.
- If the channel slope is too steep or rip-rap is too small, displacement may occur.
- Rip-rap may block channel resulting in erosion along the edge.

Primary References

Caltrans Highway Design Manual, 1997.

Soil Erosion Prevention and Sediment Control Reducing Nonpoint Source Water Pollution on Construction Sites, University of Tennessee, Knoxville, Department of Civil and Environmental Engineering, August 1998.

Subordinate References

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