Bank Stabilization at a Bridge Site Using Re-Directive and Bioengineering Measures

by

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Abstract: A combination of re-directive and bioengineering methods were employed to protect an over-steepened and eroding riverbank next to a bridge on the Russian River in Northern Calif. These methods were adopted by Caltrans District 4 in the Fall of 2010, to protect the right abutment of a bridge site at SR 128, Sonoma County from extensive channel meander. High velocity flows along an outside bend of the river upstream of the abutment had undermined the bank, created a “hook” like bend, and threatened to cut behind the abutment and isolate the bridge. These adverse bank and flow conditions called for a re-directive approach as opposed to reliance on resistive (riprap) measures.

Accordingly, five rock vanes, a longitudinal stone toe, and live siltation were designed and constructed along the edge of a low flood terrace to re-direct the thalweg away from the actively eroding bank. The flood terrace itself was planted with live willow poles to help minimize scour and encourage sediment deposition. Soon after the end of construction in October 2010, the site was subjected to successive, bank-full floods in December 2010 and again in February 2011. The protective measures resisted the flood waters, and successfully defended the river bank against further erosion. The combination of a re-directive and bio-stabilization defense has proven to be both cost-effective and environmentally superior to conventional rock armor at this site.

Overhead view of bank protection site during low water

****** Everyone is invited – snacks will be available**********