Figure 1.
Overview Map of Major Erosion Control Infrastructure
Figure 2.
Project Site Topographic Survey and Location of Major Erosion Control Infrastructure
Figure 3.
Longitudinal Profile of Project Site
Figure 4.
Vegetated Rip-Rap Schematic
1) Integrate bent pole willow branches during rock placement to ensure contact with native ground:
   (A) The willow branches shall be placed in contact with the ground every 10' along the length of the area to be protected. The length of the willow branch shall be such that when bent it will stick up above the finished surface of the rip-rap by 6"-36".
   (B) Cover the portion of the willows that will be in contact with the ground surface with loose native soil 3"-6".
   (C) Place a course of rip-rap over the bottom 2 to 3 feet of the willows (the portion in contact with the ground surface).
   (D) Bend the upper portion of each willow branch around the previously placed rock to a relatively vertical orientation. Any branch deemed too thick to bend should be bent around the next course of rip-rap.
   (E) Place a course of rip-rap to hold the branch in place.
   (F) Repeat in several lifts starting from the bottom until the armor installation is complete.

2) Choose plant material adapted to the site conditions. When choosing live willow material for biotechnical erosion control applications, remember that young (less than 1 year old) wood or succors will often sprout the easiest. However, older wood (4 to 5 years old) has greater vegetative (energy) reserves necessary to consistently sprout and older wood is much stronger. If possible, mix younger wood with older wood for the biotechnical erosion control application such that a majority of the material is 2 to 5 years old. Cuttings should be procured locally, as close to the project location as possible.

3) Willow poles should be procured locally and be 3/4" in diameter and 6-15 feet in length. Trim all side branches from stakes and poles to less than 1 foot in length. Trim the terminal bud (the bud at the growing tip) so the plant energy will be redirected to the lateral buds and adventitious tissue.

4) Construction timing should be in the late summer or early fall. Allow the willows to have time to root prior to the next summers dry conditions.

5) Willow cuttings can be collected any time during the dormant season, from leaf fall to just before the buds begin to break in the spring if they are stored in wet cold conditions. Cuttings can also be collected during the growing season if most of the leaves are removed from the stem prior to planting, although establishment success will be lower. Never collect during “bud break” in spring.

6) Willow cuttings should be soaked a minimum of 24 hours but preferably they are soaked between 12-14 days in a deep pool with cold flowing water. NEVER let the cuttings dry out. Do not leave them exposed to direct sunlight.

Note: The interface between the rock armor and native ground should be constructed such that water on the meadow surface can flow uninterrupted onto the rock without being impounded or deflected along the rock armor.
Figure 5.
Section Views of Vegetated Rock Armor Structure
Figure 6.
Schematic of Rootwad Revetment and Live Fascines
Figure 7.
Detailed Location Map of Rootwad Revetment and Live Fascines
Figure 8.
Detailed Schematic of Log Cored Willow Baffle Infrastructure
Figure 9.
Location of Proposed Log Cored Willow Baffle Infrastructure
Proposed log cored willow baffles to mitigate potential flanking of the headcut control project.