

VERMONT CONSTRUCTION SPECIFICATION

56. SOIL BIOENGINEERING PLANTINGS

1. SCOPE

The work shall consist of installing or planting live plant materials on streambanks and eroding slopes to stabilize the areas and control erosion in accordance with the drawings and these specifications.

2. MATERIALS

The Materials furnished shall meet the requirements of Material Specification 221.

3. TIMING OF PREPARATION, INSTALLATION AND PLANTING

All planting of woody vegetation shall be accomplished during the dormant season, October 1 through May 7.

Installation of plant materials should begin concurrently with the earth moving operations and should be completed no later than 10 days after a cut or fill slope has been prepared. When the planting is delayed beyond 10 days, the slope shall be protected from erosion by mulching with straw mulch at a rate of 2 tons/ac. or the installation of erosion control blankets.

4. INSTALLATION

Live Stakes - Live stakes shall be installed in the configuration, spacing and areas shown on the drawings. The cuttings shall be tamped into the ground at right angles to the slope to a firm hold and a minimum depth of 18 inches. Where soils are soft and 24 inch stakes are not solid (i.e., if they can be moved by hand) 36 inch stakes shall be used. Where soils are compacted or frozen and 24 inch stakes cannot be tamped into the ground without splitting, pilot holes may be drilled using an auger or reinforcing rod. Pilot holes shall be narrower in diameter than the live stakes.

Fascines - Trenches shall be dug on the horizontal contour to a depth of 3/4 the diameter of the bundle. Beginning at the bottom of the slope and proceeding upward, the live fascine bundle shall be placed in the prepared trench, with the ends of the bundles overlapping at least 12 inches. Dead stout stakes shall be driven directly through the fascine bundles every three feet along the length. Where bundles overlap, an additional stake shall be used at the midpoint of the overlap. The fascine bundle shall be covered immediately with soil and tamped. Workers are encouraged to walk on the fascine as work

progresses to further work soil into the bundles. It is important to achieve the maximum plant material to soil contact to insure germination success. Ten to twenty percent of the bundle shall be left exposed when all construction is completed. Live stakes shall be tamped into the ground below the live fascine bundle, in between the previously placed dead stout stakes.

Fascine Trench Spacing - Trenches shall be spaced as shown on the drawings.

Brushmattress - The slope face shall be graded smooth to no steeper than 2 to 1 at the specified finished location and contours as shown on the drawings. Beginning at the base of the slope, a trench shall be dug on the horizontal contour to a depth of 3/4 the diameter of the live fascine bundle. The upslope side of the trench shall be graded to provide a smooth transition from the bottom of the trench to the upslope bank. A live fascine shall be placed in the trench in a manner as previously specified in Section 3. Place the basal ends of the brush under the live fascine. The branches should lie smoothly against the bank above, perpendicular to the live fascine. The brush shall be placed as shown on the plans or to a more or less solid layer which shall be 4 to 8 inches thick when compressed and tied down. Live stakes shall be driven to a firm hold on a grid of four foot centers each way encompassing the entire brush layer, extending beyond the sides and from just above the fascine to within 1 foot of the average top of the matting when compressed. Brushmatting shall be securely tied down between the stakes with #16 wire. Ties shall be at right angles to the brush and also diagonally between the stakes. Ties shall be placed in such a manner as to compress the brush matting. This may be accomplished by assuring the wiring is placed tightly, followed by driving the stakes nearly to ground level after tying. The brushmattress shall be partially covered with soil to encourage rooting.

Brush Layering - Hand trenching shall start at the bottom of the slope. Trenches shall be dug 24 to 36 inches into the slope, on contour, sloping downward into the slope from the face of the bank 10 to 20 degrees from the horizontal. Brush shall be placed with basal ends inward and in a crisscrossed manner to the thickness shown on the drawings or be 4 inches thick in cut work and 6 inches thick in fill work. Thickness shall be measured after compression by the fill or covering soil. No less than 6 inches or more than 18 inches of the tips shall extend beyond the fill face. The brush layers shall be backfilled with soil immediately following placement and the soil compacted firmly. Backfilling may be accomplished by hand or with machinery.

Spacing of Brush Layers - Spacing of trenches shall be as shown on the drawings.

Vegetated Geogrid - Vegetated geogrids incorporate brush layers with natural or synthetic geotextile materials wrapped around each soil lift. The bank shall be graded and rock riprap, if called for in the design, placed as shown on the drawings. The bank shall be excavated to a depth of 2 feet. Live brush shall be placed at right angles to the stream flow in a crisscross manner. The brush shall be 5 feet in length and placed at the rate of 5 per linear foot. The basal ends of the cuttings shall be placed against the back of the excavation. No more than 18 inches of plant material shall extend beyond the surface of the proposed finished grade. The brush will then be covered with geotextile. The geotextile will extend from the back of the excavated trench to the surface of the slope. Excavated material shall be placed on the geotextile to a depth of 2 feet and compacted. The geotextile is then wrapped around the soil layer. Live brush shall then be placed on the geotextile at right angles to the stream flow in a crisscrossed manner at the density specified in the first layer. The geotextile is wrapped over the brush. Soil is placed and compacted on the geotextile in the manner specified in the first lift. The above procedure continues until the number of lifts displayed on the plans is accomplished. The final wrap is secured to the bank with dead stout stakes or, if possible, live stakes.

5. PLANTING

Rooted Cuttings, Rooted Seedlings, or Trees - Plant in holes made by planting bar or shovel in the prepared cut or fill slopes. The holes shall be of sufficient size to permit placing the plant without bending the root. Place the plants in the hole to the same depth as they were originally growing before harvest.

Plant rooted cuttings or seedlings on approximately 5 foot centers in rows along the contour of the slope. Install rows of plants approximately 5 feet center to center measured parallel to the slope and stagger the plants from row to row.

All rooted plantings shall be dipped in a root gel just prior to planting.

Holes made with a shovel shall be filled with excavated soil and pressed firm around the roots up to the ground surface. Holes made with a planting bar may be closed with the planting bar firming the soil at the bottom of the hole first and then firming the soil at the top. All spaces within one foot of the planting shall be filled with soil and compacted.

All plant materials damaged during installation or determined to be unsuitable by the technician shall be removed and replaced at the contractor's expense.