

**TECHNICAL SPECIAL PROVISION
FOR
FABRIC FORMED CONCRETE RIPRAP
SR 5 OVER LIGNUM VITAE CHANNEL
BRIDGE NO.: 900096**

FINANCIAL PROJECT ID: 442969-1-52-01

I hereby certify that this Technical Special Provision has been properly prepared by me, or under my responsible charge, in accordance with procedures adopted by the Florida Department of Transportation.

This item has been digitally signed and sealed by Serge J. Stiven on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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Certificate of Authorization: 7503
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FABRIC FORMED CONCRETE RIPRAP

T916-1 Description.

Furnish all materials, equipment, and labor and perform all operations for placing fabric formed concrete riprap as shown on the plans and specified herein. Prepare and grade the slopes or surfaces to be protected to such an extent that they are normally stable in the absence of erosive forces. Obtain the Engineer's approval of fill material required to restore the slopes to original condition. Position a double-layer synthetic fabric envelope in a mat configuration over the surface and fill with a pumpable sand/cement grout in a way that forms a stable mat of suitable weight and configuration.

T916-2 Materials.

The structural grout (for filling the fabric envelope) shall consist of a mixture of Portland cement, fine aggregate, and water so proportioned and mixed as to provide a pumpable slurry. The consistency of the fine aggregate concrete delivered to the concrete pump must be proportioned and mixed as to have an efflux time of 9-12 seconds when passed through the 0.75 inch orifice of the standard flow cone that is described in ASTM C939. Pozzolan or grout fluidifier conforming to this Technical Special Provision shall be used. Submit the proposed mix design for approval with substantiating tests as follows:

- (1) Portland cement conforms to FDOT Specification 921, Type I and Type II.
- (2) Fine aggregate shall meet the requirements of FDOT Specification 902 (and ASTM C33) for concrete aggregate, except as to grading. Aggregate grading is reasonably consistent and well graded from the maximum size which can be conveniently handled with available pumping equipment.
- (3) Water conforms to FDOT Specification 923.
- (4) Pozzolan conforms to FDOT Specification 929 and is used in amounts of 10 to 30% by weight of the cement content.
- (5) Grout fluidifier conforms to FDOT Specification 924 for Water Reducing and Retarding Admixtures. The admixtures may be used to reduce segregation, increase workability and pumpability, and improve strength and water-tightness.
- (6) Air-entraining admixtures conform to FDOT Specification 924. The air content does not exceed 7% of the volume of the grout.
- (7) Use fabric-forming material consisting of specifically woven, double layer, and open selvage fabric jointed in mat configuration. Use fabric consisting of uncoated synthetic yarns with sufficient tensile strength and porosity to withstand the pressure of the grout injection pump without breaking the layers of fabric.

The two fabric layers shall each be no lighter than 18 by 18 count/inch, 0.111 g/m nylon or 0.111 g/m polyester tire cord, of which at least 50% by weight shall be producer-bulked continuous multifilament tire cord nylon. Fabric of equal or greater strength and porosity may be used with the approval of the Engineer. Fabric containing film type polypropylene fiber will not be considered as an acceptable alternate.

Cut individual mill width panels to suitable length and separately join the two layers of

fabric edge to edge using nylon thread or zippering. All factory sewn seams shall be downward facing. All factory installed and field installed seams shall be sewn with two rows of stitches. The tensile strength of stitched joints shall be not less than 100 lbs./in. Use sewn seams and zipper attachments made using a double line of U.S. Federal Standard Type 401 stitch.

Provide hydrostatic uplift relief by installing filter points woven in a way that permits passage of water through the filter points spaced at approximately 8-inch centers.

T916-3 Equipment.

Mixing and pumping equipment used in preparation and handling of the grout shall be approved by the Engineer. Remove all oil or other rust inhibitors from the mixing drums, stirring mechanisms, and other portions of the equipment in contact with the grout before the mixers are used. The pumping equipment shall have a variable flow rate to provide enough pressure for pumping without breaking the fabric.

Accurately measure all materials by volume or weight as they are fed into the mixer. The quantity of water shall be such as to produce a grout having a pumpable consistency. Mix for no less than one minute. If agitated continuously, the grout may be held in the mixer or agitator for a period not exceeding 2.5 hours in temperatures below 70°F, and for a period not exceeding two hours at higher temperatures. If there is a lapse in a pumping operation, recirculate the grout through the pump or through the mixer drum (or agitator) and pump.

T916-4 Construction Methods.

Before injecting grout, position the fabric at its design location. Each panel shall be a continuous or monolithic unit for its full width, including the trench portion.

Each panel shall consist of two or more mill widths of open selvage construction. Join the two upper layers together by field sewing the two bottom layers together at the edges. Where adjacent panels cannot be joined in this manner, lap them a minimum of 2.0 feet. Simple butt joint, either sewn or unsewn, will not be allowed. Place the ends and upper limits of the fabric mat in a trench of suitable width as shown in the plans.

Make small cuts in the fabric to allow for the insertion of the grout hose or grout nozzle. Introduce grout into the space between the layers of fabric and inject in a way that excessive pressure on the fabric envelope is avoided. Starting at the lowest elevation and working up the slope, inject the grout in a way that the distance from the point of injection to the end of the panel is not greater than 30 feet. After grouting has been completed, backfill the void between the trench wall and filled fabric.

Holes in the fabric left by the removal of the grout hose or inserts shall be temporarily closed by inserting a piece of burlap or similar material. Remove the burlap when the mortar is no longer fluid and the surface is firm to hand pressure. Limit foot traffic on the filled fabric formed concrete riprap to an absolute minimum for one hour after pumping in order to reduce indentation. The sequence of fine aggregate concrete injection must be such as to ensure complete filling of the revetment forming fabric to the specified thickness specified by the fabric manufacturer.

T916-5 Control of Quality.

Control of Quality shall be in accordance with FDOT Specification 347-4.

T916-6 Certification and Acceptance.

Certification and Acceptance shall be in accordance with FDOT Specification 347-5.

T916-7 Method of Measurement.

The quantity to be paid will be the quantity actually installed, verified and accepted, in square yards, completed and accepted.

Measurements will include portion of the riprap in trenches and no allowance will be made for overlaps. No additional payment will be made for different depths or overlaps.

T916-8 Basis of Payment.

Price and payment will be full compensation for all work labor, equipment and material required.

Payment will be made under:

Item No. 0916-530-8 Revetment Systems - Fabric Formed Concrete Riprap,
Project 442969-1-52-01 - per square yard.