



Andy Beshear
GOVERNOR

TRANSPORTATION CABINET

200 Mero Street
Frankfort, Kentucky 40601

Jim Gray
SECRETARY

January 17, 2025

CALL NO. 321
CONTRACT ID NO. 252961
ADDENDUM # 1

Subject: Anderson County, FE02 003 1213 B00023N
Letting January 23, 2025

(1) Revised - Special Note - Page 14 of 35

Proposal revisions are available at <http://transportation.ky.gov/Construction-Procurement/>.

If you have any questions, please contact us at 502-564-3500.

Sincerely,

A handwritten signature in black ink that reads "Rachel Mills".

Rachel Mills, P.E.
Director
Division of Construction Procurement

RM:mr
Enclosures

SPECIAL NOTE FOR CARBON FIBER REINFORCE POLYMER WRAP

1. DESCRIPTION.

Perform all work in accordance with the Kentucky Transportation Cabinet, Department of Highway's Standard Specifications for Road and Bridge Construction and applicable Supplemental Specifications, the Standard Drawings (Current Editions), this Note, and the attached detailed drawings for Steel Repairs. Section references are to the Standard Specifications. This work consists of the following: (1) Furnish all labor, materials, tools, and equipment, (2) Fiber Reinforce Polymer Wrap (3) Any other work specified as part of this contract.

2. MATERIALS.

One manufacture shall supply all material required for the Carbon Fiber Reinforced Polymer (CFRP) system. The manufacture shall be one of four listed below or approved equal for the CFRP strengthening and protection system.

Catstrong
Department of Civil Engineering and Kentucky Transportation Center
University of Kentucky
176 Raymond Building
Lexington, KY 40506

Tyfo Fiber Wrap System Fyfe Company, LLC
4995 Murphy Canyon Road Suite 110
San Diego, CA 92123

Master Brace System
BASF Corporation
889 Valley Park Drive
Shakopee, MN 553379

Quake Wrap
6840 S Tucson Blvd.
Tucson, AZ 85756

Polyester or other resins will not be permitted as a substitute to epoxy. Glass composite systems will not be permitted as a substitute to carbon composite systems

3. CONSTRUCTION.

A. Design CRFP System.

The CRFP system shall be designed by a Professional Engineer licensed in the State of Kentucky and must be submitted and approved by the Engineer prior to installation. Submittal information shall include

1. Manufacture's product data sheets and material test data.
2. Installation and maintenance instructions.
3. Drawings detailing the type, locations, dimension, number of layers, and orientations of all CFRP material to be installed.
4. The layout of the CFRP material to be installed.
5. Quality Control Plan.

B. Surface Preparation.

Concrete coatings and/or sealers are to be removed from the existing surfaces to the installer's satisfaction prior to the concrete cleaning and spall repair. Any deteriorated concrete is to be patched per Special Note for Concrete Patching, then cleaned and prepared to the installer's satisfaction prior to the installation of the CFRP system. The repaired concrete surfaces shall be allowed to cure a minimum of 14 days. The surfaces shall be cleaned and free of fins, depression or other conditions that affect the intended performance of the CFRP system. Corners perpendicular to the strong fiber direction shall be rounded to a minimum radius of $\frac{3}{4}$ ". The certified and experienced installer responsible shall verify that all required surface preparation has been completed properly and that the CFRP system is cleared for installation.

C. Composite Application.

The CFRP system shall only be installed by individuals certified in writing by the material supplier. The manufacturer shall be required to provide training to the crew that does the actual installation as well as construction oversight throughout the duration of the CFRP installation to ensure the material is applied according to their design and specific material requirements. The manufacturer must submit the name of the installer's company and provide a certification the installer meets the quality and experience requirements to perform the work with the bid documents. Reference of the installations including descriptions and contact information will be reviewed by the Engineer. Installers without the proper certifications, experience will not be permitted to complete this work.

Temperatures of the substrate to receive the composite, ambient temperatures and the temperature of the CFRP materials shall be between 50 degrees F and 95 degrees F at the time of mixing the epoxy. The CFRP system shall be applied when the relative humidity is less than 85% and the sub-straight temperature is more 5 degrees F above the dew point.

The manufacturer shall designate the proper mixing procedure for the epoxy resins. Apply a primer coating of epoxy to surfaces of the sub-straight to receive the CFRP system. Saturate the carbon fiber in a documented successful manner that ensures full saturation of the carbon fiber prior to the installation of the CFRP. Saturation of the carbon fiber in place is not permitted. Apply the CFRP to the prepared and primed sub-straight using method that proved a uniform tensile force over the width of the saturated carbon fabric. Strong fiber shall not deviate from the intended fiber direction

more the 1/2" per 12" length of composite. Inspection of the installed composite shall be completed prior to the curing of the CFRP to ensure all edges, seams and other areas are properly adhered. During this inspection process, releasing of entrapped air and other identified deficiencies shall be addressed.

After the CFRP system has been installed, use the thickened epoxy to detail all edges and seams to provide a smooth finish. Apply a final layer of thickened epoxy to the installed CFRP system for protection.

D. Coating System Application.

After the epoxy sets, yet prior to the application of the urethane top coat, all defects (including bubble, delamination and fabric tears) more the 1 square inch of the surface area, or as specified by the Engineer shall be repaired as such:

1. Small defects (on the order of 6" diameter) shall be injected of back filled with epoxy.
2. Bubbles less than 12" in diameter shall be repaired by injecting the epoxy. Two holes shall be drilled into the bubble to allow injection of the epoxy and escape of the entrapped air.
3. Bubbles, delamination and fabric tears greater than 12" in diameter shall be repaired by removing and reapplying the required number of layers of the composite and the required finish coatings. All repairs shall be approved by the Engineer.
4. The urethane top coat shall then be applied to the final epoxy coat, as determined by the manufacture.

E. Quality Control.

Installer must follow the quality control manual for the installation of the CFRP systems, produced by the manufacturer.

4. MEASUREMENT.

A. FRP Wrap. The Department will measure the quantity by square footage covered. The number of layers will not be counted.

5. PAYMENT.

A. FRP Wrap (25015EC). Payment at the contract unit price per square feet is full compensation CFRP design, materials, installation and all incidental items necessary to complete the work accordance with this Special Note attached Detail Drawings.