



COMMONWEALTH OF KENTUCKY
TRANSPORTATION CABINET

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Andy Beshear
GOVERNOR

Jim Gray
SECRETARY

March 17, 2020

CALL NO. 100
CONTRACT ID NO. 201015
ADDENDUM # 2

Subject: LIVINGSTON COUNTY, STP BRO 0601 (196)
Letting March 20, 2020

- (1) Revised - Special Notes for Structures with Fiber Reinforced Polymer Wrap - Pages 25-27 of 318
- (2) Added - Special Note for Rock Core Viewing - Page 33(a) of 318

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 cursive script that reads "Rachel Mills".

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

RM:mr
Enclosures

SPECIAL NOTE FOR STRUCTURES WITH FIBER REINFORCED POLYMER WRAP

I. DESCRIPTION

Perform all work in accordance with the Department's current Standard Specifications for Roads and Bridges, and applicable Supplemental Specifications, the attached sketches, and these Notes. Section references are to the Standard Specifications.

This work consists of the following:

1. Furnish all labor, materials, tools, equipment, and incidental items necessary to complete the work.
2. Provide safe access to the bridge, in accordance with Section 107.01.01, for the Engineer to sound possible repair areas and for workers to complete the construction.
3. Repair cracks on pier strut as applicable in accordance with the Special Note for Epoxy Injection Crack Repair.
4. Repair delaminated or spalled areas of pier strut as applicable in accordance with the Special Note for Concrete Patching.
5. Design and install a carbon fiber reinforced polymer (CFRP) strengthening and protection system.
6. Any other work as specified as part of this contract.

II. MATERIALS

One manufacturer shall supply all materials required for the CFRP system. The manufacturer shall be one of the two listed below.

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

QuakeWrap
6840 S Tucson Blvd
Tucson, AZ 85756

Polyester or other resins will not be allowed as a substitute to epoxy resins.

III. CONSTRUCTION

A. Design CFRP System. The CFRP system shall be designed for the resistance(s) shown in the attached detail drawings and according to AASHTO FRPS-1 and ACI 440. Design calculations and details must be sealed 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:

- a. Manufacturer's product data sheets and material test data.
- b. Installation and maintenance instructions.
- c. Drawings detailing the type, locations, dimensions, number of layers, and orientations of all FRP materials to be installed.
- d. Calculations to determine the layout of the FRP materials to be installed.
- e. Quality control plan.

B. Surface Preparation – Pier Strut. Concrete sealer is to be removed from the existing surfaces to the installer's satisfaction prior to the concrete cleaning and spall repair. Any deteriorated concrete located on the pier strut is to be patched per the 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 clean and free of fins, depressions, or other conditions that may affect the intended performance of the CFRP system. Corners perpendicular to the strong fiber direction shall be rounded to a minimum radius of 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. Surface Preparation – Pier Column. Concrete sealer is to be removed from the existing surfaces to the installer's satisfaction prior to the concrete cleaning. The surfaces shall be clean and free of fins, depressions, or other conditions that may affect the intended performance of the CFRP system. Corners perpendicular to the strong fiber direction shall be rounded to a minimum radius of 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.

D. Composite Application. The CFRP system shall only be installed by individuals certified in writing by the Manufacturer. 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 installations to ensure the materials are applied according to their design and specific material requirements.

Temperatures of the substrate to receive the composite, ambient temperatures, and the temperature of the CFRP materials shall be between 50°F and 95°F at the time of mixing of epoxy. The CFRP system shall be applied when the relative humidity is less than 85% and the substrate temperature is more than 5°F above the dew point. Applications of the CFRP shall begin within one hour of the mixing of epoxies.

The manufacturer shall designate the proper mixing procedure for the epoxy resins. Apply a primer coating of epoxy to surfaces of the substrate 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 allowed. Apply the CFRP to the prepared and primed substrate using methods that proved a uniform tensile force over the width of the saturated carbon fabric. Strong fibers shall not deviate from the intended fiber direction more than 1/2" per 12" length of composite. Inspection of the installed composite shall be completed prior to the curing of the CFRP to ensure that 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 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.

E. Coating System Application. After the epoxy sets, yet prior to the application of the urethane top coat, all defects (including bubbles, delaminations, and fabric tears) more than 1 square inch of the surface area, or as specified by the Engineer, shall be repaired as such:

- a. Small defects (on the order of 6” diameter) shall be injected or back filled with epoxy.
- b. 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.
- c. Bubbles, delaminations, 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.

The urethane top coat shall then be applied to the final epoxy coat, as determined by manufacturer.

F. Quality Control. Installer must follow the quality control manual for the installation of the CFRP Systems, produced by the manufacturer.

IV. MEASUREMENT

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

V. PAYMENT

Payment at the contract unit price per square feet is full compensation for CFRP design, materials and installation, and all incidental items necessary to complete the work in accordance with this Special Note and as shown on the attached detail drawing(s).

Code
25015EC

Pay Item
FRP Wrap

Pay Unit
Square Feet

SPECIAL NOTE FOR ROCK CORE VIEWING

**Livingston County
Item No. 1-1142
US 60 Bridge over Cumberland River**

Contrary to Section 3.1.2 of the Special Note for Drilled Shafts, For this project, in light of the ongoing COVID-19 pandemic, viewing the sample pictures at the following link is equivalent to viewing the samples in person.

<https://transportation.ky.gov/Construction-Procurement/Project%20Related%20Information/Livingston%20County%20-%20CID%2020-1015%20-%20Core%20Photos.pdf>

If the contractor chooses to view the pictures of the available samples in lieu of an in person visit, the contractor must submit an e-mail to Darrin Beckett (Darrin.Beckett@ky.gov) that states the following:

“I have reviewed all of the supplied pictures of the available rock core samples posted under project related information Livingston County CID 20-1015 and I do not require viewing the samples in person. I understand that if I have additional questions or concerns about the samples that I have until 3:00 pm Eastern Daylight Time on Wednesday March 18, 2020 to request an in-person viewing of the samples or 3:00 pm Eastern Daylight Time on Thursday March 18, 2020 to submit a follow up question.”

If the contractor wishes to view the core in person, the Geotechnical Branch will still accommodate that request.