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Fry Road Structure Replacement over Murfrees Fork–

Town of Thompson's Station, Tennessee

The purpose of this project is to construct a new culvert or bridge structure on Fry Road over Murfrees Fork in Thompson's Station, Tennessee. The reason for need to construct a new structure is due to the inadequate size, condition, and capacity of the existing structure. The proposed replacement structure has not been determined, however, based upon discussions it will be assumed for this scope of work that it will be one of the following three options:

1. Single Span Concrete Bridge (skew approx. 90-degrees)
2. Twin 18'x10' Concrete Box Bridge (skew approx. 90-degrees)
3. Triple 16'x10' Concrete Box Bridge (skew approx. 60-degrees)

The proposed project site is located within a FEMA designated Zone AE floodplain. A local floodplain permit will be required for this project to demonstrate that the proposed design will not increase the water surface elevation (No Rise) of the Base Flood Event (100-YR flood). The established existing peak flows, Base Flood Elevations, or regulatory floodway boundaries published in the Flood Insurance Study will be used for this location. This scope assumes that the model will be developed from the topographic survey. Given the approximate size of the drainage basin (USGS StreamStats estimate 7.63 sq. mi.), coordination with TDOT's Hydraulic Division will be required.

SERVICES OF THE ENGINEER

The ENGINEER agrees to perform professional engineering services necessary for completion of the PROJECT under the State Bridge Grant Program as follows (collectively the "**BASIC SERVICES**"):

1. Provide topographical design surveys for the new structure and approach roadway. Benesch proposes to utilize a subconsultant for survey services.
2. Provide geotechnical engineering services for the proposed structure design. For this project, Benesch will secure the services of a subconsultant to collect 2 borings at each end of the proposed bridge (4 total). One of the two borings at each end of the proposed bridge (2 total) will also include a 10-foot rock coring should rock be encountered within 20 feet of the ground surface.
3. Provide hydraulic analysis for proposed structures and channel design in accordance with TDOT requirements.
    a. Complete Hydrologic Analysis of Murfrees Fork at the Fry Road crossing on the basis of the "2012 TDOT Design Procedures for Hydraulic Structures".

b. Review existing hydrologic data from TDOT and/or the Town of Thompson's Station or Williamson County

c. Request hydraulic data from FEMA

d. Coordination with TDOT's Hydraulic Division

e. Coordination with the Town's floodplain manager

f. Establish the Existing Condition model using HEC-RAS 5.0.3

g. Analyze a maximum of three (3) bridge or culvert alternatives

h. Provide hydraulic analysis for proposed structure and channel design in accordance with TDOT requirements.

i. Prepare TDOT Hydraulic Report

j. The proposed structure will achieve a no-rise condition and will not change the floodway or floodplain limits of FEMA's effective map. The need for a CLOMR/LOMR is not anticipated

4. Provide design of structures and approach roadways and estimates of construction cost.
    a. Preliminary road and bridge design
        i. Coordination with hydraulic designer and Client to size the structure opening for the structure.
        ii. Coordination with Client to set centerline, profile, bridge width, approach limits, substructure locations, and girder depth requirements.
        iii. Bridge or Box Culvert Design:
            1. Benesch will provide initial concept options to the Client to determine if a multi-barrel box culvert or a single span bridge will be constructed. This concept level review will consist of a concept layout of the proposed structure along with a concept level plan and profile drawing. Benesch will develop an estimate of construction cost.
            2. The Client will provide direction for Benesch regarding which option is selected. If a box culvert is chosen, Benesch will proceed with the development of preliminary plans. Should a single span bridge be chosen, preliminary structure design will be required which will consist of:
                a. Substructures: Abutments, piers, and foundation types
                b. Superstructure: Prestressed concrete girder size and configuration, bridge rail, deck thickness
        iv. Development of preliminary plans including:
            1. Preliminary Layout of Bridge
            2. Preliminary Bridge Cross Section

3. Hydraulic Analysis (see scope above)

v. Development of a preliminary bridge design submittal package including plans and hydraulic design information for submittal to TDOT for review. Scope includes responding to TDOT review comments for resubmittal as required.

b. Final bridge design

i. Develop final design for all structural elements as required

ii. Develop final plans for the structure in accordance with TDOT standards

iii. Tabulation of required quantities and assistance with cost estimates

iv. Submit all CAD files as required

v. Development of a final bridge design submittal package including plans and structural calculations for submittal to TDOT for review. Scope includes responding to TDOT review comments for resubmittal as required.

5. Assist in securing from TDOT all necessary approvals and construction authorization and provide design certifications required by TDOT.
6. Prepare and submit permit applications to the U.S. Army Corps of Engineers, Tennessee Valley Authority, State Department of Environment & Conservation, and State Historical Commission.
7. Assist the CLIENT with coordination of utility adjustments if any are required.
8. Provide bid-ready construction plans and specifications and assist the CLIENT in the bidding process.
9. Provide field reference points for laying out each bridge structure including the following:
   (a) Staking centerline stations at 50' intervals
   (b) Locate offset reference PC and PT centerline points
   (c) Set elevation reference
   (d) Stake centerline location of abutments with offset reference and grade
   (e) Stake centerline location of box culvert faces with offset reference and grade
10. Provide general construction observation and maintain observation reports for visits to the project sites including foundation for structure before placement of steel and reinforcing steel prior to allowing concrete pours.
    a. General observation will also shall include attendance at the pre-construction meeting, and a site visit upon completion of staking.
    b. Visit will also occur for the following items:
       i. One per footing, wall, and bridge rail (if necessary)
       ii. One for either the culvert slab or the bridge deck
       iii. One for paving

11. Maintain project diary showing times and locations of concrete placement. Have contractor deliver concrete cylinders to testing laboratory and provide written results of cylinder breaks.
12. Obtain certifications stating that materials meet the requirements of the plans and specifications.
13. Coordinate geotechnical investigations, if required. (All costs of geotechnical investigations and reporting shall be borne by the CLIENT).

ITEMS NOT INCLUDED IN SCOPE

1. Right-of-way services
2. Coordination with FEMA
3. Design of channel realignment
4. Utility relocation services
5. Preparation of a Conditional Letter of Map Revision (CLOMR)

SERVICES OF THE CLIENT

The CLIENT agrees to perform services necessary for completion of the proposed projects as follows:

1. Furnish all available information to ENGINEER.
2. Accompany ENGINEER on-site inspections to determine scope of work.
3. Arrange for access to public and private property for the purpose of securing field data required for the survey and design phase.
4. Review reports, plans, contract documents, etc., and furnish approval or instructions for change.

COMPENSATION TO THE ENGINEER

For the satisfactory performance of BASIC SERVICES and the assumption of the responsibilities described herein, the COUNTY agrees to compensate the ENGINEER based upon a lump sum amount of **$66,300** with the option to add an additional $21,500.00 should the single span bridge option be chosen. Benesch will invoice the client based upon progress made for items shown in the BASIC SERVICES and based upon the following breakdown:

Fee Summary		
Item	Fee Type	Amount
Survey	Lump Sum	$ 18,000.00
Geotechnical Services	Lump Sum	$ 9,500.00
Hydraulic Modeling	Lump Sum	$ 8,300.00
Preliminary Design	Lump Sum	$ 5,400.00
Final Design	Lump Sum	$ 8,100.00
Permit/Review Fees	Reimbursable	$ 800.00
Construction Phase Services	Lump Sum	$ 16,200.00
Additional Services for Single Span Bridge Design	*Lump Sum*	*$ 21,500.00*

All invoices submitted to the CLIENT by the ENGINEER will include a project status summary and will be based on the completion of BASIC SERVICES at the time thereof. The following is the compensation to be paid to Benesch for the scope items noted above. The only reimbursables that will be included on the project are permit fees, and third-party review fees which will be paid by Benesch and reimbursed at cost by the CLIENT. All other incidental costs (i.e. printing, travel, etc.) shall be included in the lump sum totals.