

**DEPARTMENT OF CONSERVATION and NATURAL RESOURCES SPECIFICATIONS
FOR**

**FURNISHING BRIDGE MATERIALS
ELK STATE FOREST DISTRICT 13**

I. SCOPE OF WORK:

The Department of Conservation and Natural Resources (DCNR), Elk State Forest District 13, requires furnishing of all materials for one (1) fully engineered clear span snowmobile bridge of Fiber Reinforced Polymer (FRP) composite construction...

**Bridge Dimensions:
40'-0" long x 6'-0" wide**

...at Sizerville Maintenance Complex, 97 Forestry Road, Emporium, PA 15834.

Work shall include, but is not limited to, furnishing all materials for assembly of a bridge by others. The design and construction of the bridge abutments, and/or footings shall be by district staff.

Questions regarding the technical aspects of this bid should be directed to Toby Herzing at 814-486-5612, Monday through Friday 7:00 am to 3:00 pm. Questions regarding the bidding or contractual aspects of this bid should be directed to Stephen Brown at 717-783-3309, stevebrown@pa.gov.

II. CONTRACT TASKS:

The pre-fabricated bridge noted below shall be completed in performance of the contract.

This contract will consist of delivery of all materials noted below for one (1) complete fiberglass bridge to Elk State Forest District 13. The project location is at the Sizerville Maintenance Complex, 97 Forestry Road, Emporium, PA 15834.

III. CONTRACTOR REFERENCES:

After bid opening, and prior to awarding of the contract, the Department has the right to request references (names, addresses, and telephone numbers) of similar work performed in the previous two (2) years as proof of qualifications to perform the work involved in this contract.

IV. MATERIALS:

The bridge will include the following:

- Natural Earth tones to blend into surrounding area
- Railings to a height of fifty-four inches (54") on both sides with railings to be designed to meet ASHTO standards
- All hardware for bridge assembly will be included in kits.
Note: All hardware will be corrosion/rust resistant
- Three inches (3") thick x Twelve inches (12") wide #2 SYP with S4S finish pressure treated wood decking
- Directions for easy assembly/disassembly to accompany bridge kits
- Bridge pieces will be labeled to facilitate easy assembly
- Bridge will need to be hand carried to site
- Bridge pieces/sections should be light enough for two (2) average sized people to hand carry a distance not greater than one mile.
Note: Maximum weight distribution approximately 75lbs. per person
- Bridge pieces must be easily assembled on site without the use of electricity (remote sites)
- Common hand tools will be the only tools necessary for assembly of bridges

Additional Details for bridge:

- Foundation/Abutment specifications shall be included with bids, but supplies are not to be included in bid price (DCNR will be responsible for acquiring foundation/abutment supplies locally)

- Bridge will come sealed by a professional engineer registered in the Commonwealth of Pennsylvania
- Supplier will call 814-486-3353 to set-up delivery time, which will be sometime Monday through Thursday 8:00 am to 3:00 pm.
- Bridge will be unloaded at...
 Sizerville Maintenance Complex
 97 Forestry Road
 Emporium, PA 15834
- Delivery date will be no later than November 30, 2012

Bidder shall provide material certifications for wood, bolts, and FRP members.

Allow three (3) weeks for Department review of calculations submission.

The bridge will meet or exceed the following specifications.

PRE-FABRICATED BRIDGE SPECIFICATIONS

1.0 GENERAL

1.1 SCOPE

These specifications are for a fully engineered clear span bridge of Fiber Reinforced Polymer (FRP) composite construction and shall be regarded as minimum standards for design and construction as manufactured.

2.0 GENERAL FEATURES OF DESIGN

2.1 SPAN

Bridge span will be 40'-0" (straight line dimension) and shall be measured from each end of the bridge structure.

2.2 WIDTH

Bridge width shall be 6'-0" and shall be measured from the inside face of structural elements at deck level.

2.3 BRIDGE SYSTEM TYPE

Bridge must be designed as a FRP Composite Truss Span

2.4 MEMBER COMPONENTS

All members shall be fabricated from pultruded FRP composite profiles and structural shapes as required.

2.5 CAMBER

Bridge can be precambered to eliminate initial dead load deflections. Cambers of 1% of the total span length can be provided on request.

3.0 ENGINEERING

Structural design of the bridge structure shall be performed by or under the direct supervision of a Licensed Professional Engineer, licensed in the State of Pennsylvania and done in accordance with recognized engineering practices and principles.

3.1 UNIFORM LIVE LOAD

Bridge shall be designed for 85 psf.

3.2 VEHICLE LOAD

Bridge shall be designed for 85 psf.

3.3 WIND LOAD

The bridge shall be designed for a minimum wind load of 25 psf. The wind is calculated on the entire vertical structure of the bridge as if fully enclosed.

3.4 SEISMIC LOAD

Seismic loads shall be determined according to the criteria specified in the standard building codes (IBC 2002, ASCE 7-02, BOCA, SBC or UBC) unless otherwise requested. Response Spectrum Analysis shall be performed in those designs that require complex seismic investigation. All necessary response spectra information will be provided by the client for evaluation.

3.5 ALLOWABLE STRESS DESIGN APPROACH

An allowable Stress Design (ASD) approach is to be used for the design of structural members, Bidder should comply with the design of FRP bridges are as follows unless otherwise specified: (Based on the Ultimate Strength of the FRP material)

Tension	2.5
Compression	2.5
Shear	2.5
Bending	2.5
End Bending	2.5
Connections	3.0

3.6 SERVICEABILITY CRITERIA

Service loads are used for the design of all structural members when addressing deflection and vibration issues. Criteria used by Bidder in the design of FRP bridges should be as follows:

Deflection:		
Live Load (LL) deflection	=	L/240
Vertical Frequency (fn):	=	5.0 Hz

The fundamental frequency of the pedestrian bridge (in the vertical direction) without live load should be greater than 5.0 hertz (Hz) to avoid any issues with the first and second harmonics.

Horizontal Frequency (fn):	=	3.0 Hz
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The fundamental frequency of the pedestrian bridge (in the horizontal direction) without live load should be greater than 3.0 hertz (Hz) to avoid any issues due to side to side motion involving the first and second harmonics.

3.7 SNOW LOAD

Sustained snow load conditions shall be evaluated for time dependent effects (creep and relaxation) and expected recovery behavior.

4.0 MATERIALS

4.1 FRP COMPOSITES

FRP Bridge shall be fabricated from high-strength E-glass and isophthalic polyester resin unless otherwise specified.

Weathering and ultraviolet light protection shall be provided by addition of a veil to the laminate construction. Minimum material strengths and properties are as follows:

Tension	33,000 psi
Compression	33,000 psi
Shear	4,500 psi
Bending	33,000 psi
Young's Modulus	2,800,000 psi

The minimum thickness of FRP Composite shapes shall be as follows unless otherwise specified: Square tube members (closed type shape) shall be 0.25 in. Wide-flange beams, channel sections, and angles (open type shapes) shall be a minimum thickness of 0.25 in. Standard plate shall be a minimum thickness of 0.25 in.

4.2 DECKING

Wood decking in No. 2 or better Southern Yellow Pine treated according to the American Wood Preservers Bureau. The standard three inches (3") thick x twelve inches (12") wide planks are provided for horses, pedestrian, and bicycle type loading conditions.

4.3 HARDWARE

Bolted connections shall be A307 hot-dipped galvanized steel unless otherwise specified. Mounting devices shall be galvanized or stainless steel.

5.0 SUBMITTALS

5.1 SUBMITTAL DRAWINGS

Schematic drawings and diagrams shall be submitted to DCNR for review after receipt of order. As required, all drawings shall be signed and sealed by a Pennsylvania licensed Professional Engineer.

5.2 SUBMITTAL CALCULATIONS

As required, structural calculations shall be submitted to the DCNR. All calculations will be signed and sealed by a Pennsylvania licensed Professional Engineer.

6.0 FABRICATION

6.1 TOLERANCES

All cutting and drilling fabrication to be done by experienced fiberglass workers using carbide or diamond-tipped tooling to a tolerance of 1/16". No material deviations beyond industry standards are accepted. All cut edges to be cleaned and sealed.

7.0 RAILINGS

Railings for bridges will be a minimum of fifty-four inches (54") above the floor deck.

7.1 SAFETY RAILS

Continuous horizontal midrails shall be located on the inside of the bridge trusses. Maximum opening between the midrails shall be available as required, but should not be greater than nine inches (9").

7.2 TOEPLATES

Toeplates are three inch (3") green channels

8.0 FINISHING

Bridge color shall be Natural Earth Tones (brown, green, gray, etc.). No painting is required as the color is added during the manufacturing process.

9.0 DELIVERY

Delivery is made by truck to the...

**Sizerville Maintenance Complex
97 Forestry Road
Emporium, PA 15834**

Bidder will notify DCNR in advance of the expected time of arrival at the site. Bridge will be shipped to the site in component parts or partially assembled. The spans can be completely assembled using standard hand tools.

9.1 ERECTION DIRECTION

For bridge shipped in component parts or partially assembled, Bidder shall provide assembly drawings and a recommended assembly procedure for building the bridge. Temporary supports or rigging equipment, if needed, is the responsibility of the DCNR.

9.2 SITE ISSUES and FOUNDATION DESIGN

DCNR shall procure all necessary information about the site and soil conditions. The design and construction of the bridge abutments, and/or footings shall be by DCNR.

10.0 WARRANTY

Bidder shall warrant the structural integrity of all FRP materials, design, and workmanship for 15 years.

This warranty shall not cover defects in the bridge caused by foundation failures, abuse, misuse, overloading, accident, faulty construction or alteration, or other cause not the result of defective materials or workmanship.

This warranty shall be limited to the repair or replacement of structural defects, and shall not include liability for consequential or incidental damages.

V. ESTIMATED QUANTITIES:

Quantities are estimated and may increase or decrease, depending on the needs of the Department. Contractor shall be paid for actual quantities delivered.

VI. CONTRACTOR REQUIREMENTS:

The contractor agrees to comply with the provisions of the Reciprocal Limitations Act Requirements and Steel Products Procurement Act as attached.

VII. CONTRACT TERM:

The contract shall commence upon execution and receipt of Purchase Order and Notice to Proceed and terminate November 30, 2012.

VIII. BID AWARD:

Bidder shall complete the electronic Invitation for Bid to be found at www.pasupplierportal.state.pa.us. Complete pages 3 and 4 of the Reciprocal Limitations Act Requirements and

attach to bid. Bid will be awarded based on the lowest unit price. The Department will only accept out two (2) decimal points when entering your "Unit Price" figure on the electronic

Invitation for Bid. Upon issuance of Purchase Order and Notice To Proceed, contractor shall submit design drawings of the bridge to the Department for review /approval.

IX. PAYMENT TERMS:

Payment shall be made upon satisfactory receipt and acceptance of bridge materials as specified.

X. RECEIPT AND OPENING OF BIDS:

Bids will be submitted via the PA Supplier Portal, to be found at www.pasupplierportal.state.pa.us. Faxed bids and mailed bids will not be accepted.

No responsibility will be attached to any employee of the Department for the premature opening of, or the failure to open, a bid for any reason whatsoever.

XI. INVOICES:

All invoices for this contract **MUST** be sent to the following address:

Commonwealth of Pennsylvania – PO Invoice
PO Box 69180
Harrisburg, PA 17106

All invoices **MUST** have the Purchase Order Number, as well as your SAP Vendor Number, on the invoice. Failure to provide this could result in a delay of your payment.

XII. BID RESULTS:

Bidder can obtain bid results by accessing <http://www.emarketplace.state.pa.us>. The bids will be posted the morning following the bid opening. The results are the apparent bidders and all bids are under review until final award of contract.

XIII. VENDOR NUMBER:

In order to be awarded a state contract, interested vendors must be registered with the Commonwealth and must have a registered vendor number. If your company has never been a supplier with The Commonwealth, you can register your business and obtain a vendor number at www.pasupplierportal.state.pa.us.