PREFABRICATED STEEL TRUSS SPECIFICATIONS

1. GENERAL

1.1 Scope
All engineering design and related detailing of the bridge(s) shall be provided by the supplier. The design and detailing shall conform to the Applicable Codes and Standards listed in the Section 2 of this document.

Bridge(s) and its attachments shall be fully fabricated by a qualified supplier as outlined in this document. Please provide a list of qualified contractors that the vendor has worked with which demonstrate the ability to construct the bridge(s) as proposed.

Supplier shall be responsible for the delivery of all bridge(s) materials.

These specifications are for a fully engineered clear span bridge(s) and shall be regarded as minimum standards for design and construction. The vendor shall provide material certifications for all material used in the bridge(s).

1.2 Qualified Suppliers
Cameron Bridge Works, LLC
1051 S. Main Street, Elmira, NY 14904
Tel: (607) 734-9456  Fax: (607) 733-4148
www.cameronbridgeworks.com

Suppliers other than those listed above may be used provided a satisfactory review and approval by the owner’s engineer 10 days prior to bid.

Please submit the following information:
- AISC Certificate
- References
- Welder Qualifications
- Representative Design Calculations
- Representative Design Drawings
- Splicing and Erection Procedures
- Inspection and Maintenance Procedures
- Warranty Information
- Quality Control Sections of Quality Assurance Manual

2. APPLICABLE CODES AND STANDARDS

2.1 AASHTO
Unless indicated otherwise, the pedestrian bridge(s) design shall be in accordance with all the requirements of the AASHTO (American Association of State Highway and Transportation Officials) “LRFD Guide Specifications for Design of Pedestrian Bridges.”
2.2 **AISC**
American Institute of Steel Construction

2.3 **AWS**
American Welding Society
All welding shall be flux core arc welding (FCAW) and conform to the requirements of AWS D1.1/D1.1M:2015 Structural Welding Code-Steel and AASHTO/AWS D1.5M/D1.5:2010 Bridge Welding Code. All welding shall be performed by certified welders, qualified in accordance with AWS procedures.

2.4 **AWPB**
All treated lumber used within and/or for the bridge(s) shall conform to the American Wood Preserver Bureau LP-22.

2.5 **ITTO**
All tropical hardwood used within and/or for the bridge(s) shall conform to the requirements of the International Tropical Timber Organization

3. **GENERAL FEATURES OF DESIGN**

3.1 **Span**
The bridge span(s) shall be _____ ft. measured from outside of end post to outside of end post.

3.2 **Width**
The interior clear width of the bridge(s) shall be _____ ft. measured from innermost point of rail to innermost point of rail.

3.3 **System**
The truss design shall be a welded Cameron Bridge Works Truss configuration.

   Select:
   - [] Warren Truss
   - [] Howe Truss
   - [] Horizon (pratt truss)
   - [] Honeoye (x-brace, pratt truss)
   - [] Elliptic (bowstring truss)
   - [] Seneca (modified bowstring)
   - [] Conesus (full-through box truss)
   - [] Keuka (flat top chord, curved bottom chord)
   - [] Custom Design
   - [] Other (description____________________)

The bridge(s) shall be fabricated and delivered as continuous and pre-assembled structures unless mid-span splices are required.
The bridge(s) shall incorporate an enclosed floor system to hide horizontal bracing, floor beams and stringers from view.

The bridge(s) shall be designed utilizing an H-section configuration, where the floor support system intersects the truss verticals above the bottom chord to increase stability.

3.4 Camber
The bridge(s) shall be cambered to offset the dead load.

3.5 Slope
The bridge(s) shall be designed for abutments and/or piers constructed at the same elevation as indicated in the structural drawing plans.

3.6 Deck
The bridge(s) shall have an integrated, slip resistant deck. Deck will be as shown on the plans.

3.7 Bearing Pads
The bridge(s) shall include bearing pads with an integrated teflon/stainless steel surface, which will allow the bridge(s) to expand and contract as needed without binding.

3.8 Railings & Accessories:
The bridge(s) shall incorporate a rail system of vertical pickets, horizontal rails, cable rail, rub rail, mesh fencing, or a combination rail system. The top of the top rail shall not be less than 42” above the finished deck.

Select:
- Vertical Pickets
- Horizontal Rail
- Cable Rail
- Hand Rail
- Rub Rail
- Mesh Fencing
- Combination Rail (description____________________)

3.9 Toe Plate
A steel toe plate shall be included and placed 2 inches above the floor deck.

Select:
- Toe Plate

4. MATERIALS

4.1 Structural Steel
All structural steel for weathering bridges shall be ASTM A588, A847, A242, A606, and A709. Structural steel for painted and/or galvanized bridges shall
also include A500 C, A992 and A572. Structural members shall be minimum yield strength of 50,000 psi. All structural members made of weathering steel shall have a ¼ thickness of material.

Select:
- Weathering (A588, A847, A242, A606, A709)
- Non-Weathering (A500, A992)
- Painted
- Galvanized
- Duplex (Painted & Galvanized)

All structural steel shall receive ¼” diameter drain holes to prevent build-up of condensation. Location of drain holes shall be shown on the shop drawings.

Structural fasteners shall be ASTM A325 Type 3 bolts, A563 Nuts, and F436 flat washers.

4.2 Deck
Factory installed concrete deck.

Other various deck options, Select:
- Hardwood
- Southern Yellow Pine
- Douglas Fir
- Glulam
- Stay in Place (SIP) Form for your concrete
- Composite

4.3 Bearings
All bearing pads shall be 3/4” thick CDP with a 1/32” adequately dimensioned to provide support to the structure over the full travel resulting from expansion and contraction.

Bridge(s) bearings shall consist of a steel setting or slide plate placed on the abutment or grout pad. The bridge(s) bearing plate, which is welded to the bridge structure, shall bear on and elastomeric pad. One end of the bridge shall be fixed by fully tightening the nuts on the anchor bolts at that end. The opposite shall have finger tight only nuts to allow movement under thermal expansion or contraction.

Bridge(s) in excess of 100 feet in length or bridge(s) with dead load reactions of 15,000 pounds or more (at each bearing location) shall have Teflon on Teflon or stainless steel on Teflon slide bearings placed between the bridge bearing plate and the setting plate. The top slide plate shall be large enough to cover the lower Teflon slide surface at both temperature extremes.

5. FINISHES
All exposed surfaces of weathering steel bridge(s) shall be sand blasted in accordance with the Steel Structures Painting Council (SSPC) Surface Preparation Specification No. 7 (SSPC 7), latest edition.

Painted bridge(s) shall be sand blasted in accordance with the paint manufacturer’s specifications. Bridge(s) shall be provided with paint for touch up after erection.

Galvanized bridge(s) shall not be sand blasted in accordance with the galvanizer’s specifications.

Select:
- Paint
- Galvanized

6. ENGINEERING

5.1 Design Loads

Dead Load
The bridge(s) shall be designed considering its own dead load including structure and originally designed decking only. Future wearing surfaces shall be included as modified by the customer.

Pedestrian Live Load
Main supporting members, including trusses, primary beams, and arches shall be designed for a uniformly distributed load of 90 pounds per square foot. Secondary members, including deck and supporting floor system shall be designed for a live load of 90 pounds per square foot, with no reduction allowed.

Vehicular Load
The pedestrian bridge(s) shall be designed for the maintenance vehicular loadings of an H-5 truck from 7 – 10 feet wide and an H-10 vehicular loading for bridges wider than 10 feet. Customer specifications that modify the maintenance vehicle shall be used in lieu of the above vehicular loadings.

Wind Load
The pedestrian bridge(s) shall be designed for a wind load using the AASHTO Signs, Articles 3.8 and 3.9 unless specifically directed wind loadings are provided by the customer.

Deflection
The pedestrian trusses shall be designed to not exceed a vertical live load deflection of L/360 or a horizontal wind load deflection of L/360 unless modified by the customer. The live load used for the deflection check shall be a minimum of 600 pounds per linear foot width of the bridge(s).
5.2 Frame Stability
The buckling load factor for the bridge(s) structure shall be no less than 4 for any combination of applied loads, to ensure adequate overall stability and stiffness.

5.3 Vibration
The bridge shall be designed for a minimum fundamental frequency of 3.0 hertz in the vertical direction and 1.3 Hertz in the horizontal direction. If the frequency limitations cannot be achieved, the bridge shall be proportioned so that the fundamental frequency is greater than:

$$f \geq 2.86\ln\left(\frac{180}{W}\right)$$

If the bridge is heavier than 180 kips, an analysis of the walking excitation shall be performed using the criteria in Chapter 4 of the AISC Design Guide 11. The peak acceleration as a function of the acceleration of gravity shall be less than 5% unless otherwise adjusted by the customer.

5.4 Analysis
A full structural analyses for the primary bridge(s) structure shall be completed using a 3-D finite element analysis. All member end conditions are to be considered free to rotate. All analysis and results necessary to determine the structural adequacy of the bridge(s) shall be reported. The following analyses are required:
- Strength I
- Strength III
- Load Combination III – Dead Load + Wind Loads
- Load Combination IV – Dead Load + Vehicular Loads
- Load Combination V – Top Chord/Rail Load

5.6 Frequency
Frequency analysis shall be completed to determine that the bridge(s) frame is sufficient to avoid resonance due to frequencies likely encountered under normal use for the following load combinations and in accordance with section 4.2 of this specification.
- Load Combination I – Dead Load Only

7. FABRICATION & ASSEMBLY

6.1 Welding
All welding shall be flux core arc welding (FCAW) and conform to the requirements of AWS D1.1/D1.1M:2015 Structural Welding Code-Steel and AASHTO/AWS D1.5M/D1.5:2010 Bridge Welding Code. All welding will be performed by certified welders, qualified in accordance with AWS procedures. *ALL WELDS ARE TO BE 100% VISUALLY INSPECTED
6.2 AISC
Bridge(s) are to be fabricated in accordance to AISC Certified Bridge Fabrication – Intermediate (Major Bridge). All fabricators shall be endorsed AISC – Fracture Critical. When bridge(s) are painted, fabricators shall be endorsed AISC – Sophisticated Paint.

Quality Conformance Manual shall be made available for viewing and inspection.

6.3 Submittals
Fabrication drawings and calculations shall be prepared and submitted for review after receipt of order. Submittal drawings shall be unique drawings to the project, prepared to illustrate the specific portion of the bridge(s) being fabricated. All calculations and drawings shall be reviewed and sealed by a Professional Engineer registered in the State of ________.

8. DELIVERY AND ERECTION

Delivery is made to a location nearest the site, which is easily accessible to normal, over the road tractor/ trailer equipment. All trucks delivering bridge(s) materials will need to be unloaded at the time of arrival.

Erection of the bridge(s) structure to be done by manufacturer or AISC Certified Erector. The manufacturer will provide detailed, written instruction on the proper lifting procedures and splicing procedure (if required). The method and sequence of erection shall be the responsibility of the Manufacturer of the supplied bridge(s) or an AISC Certified Erector.

The bridge manufacturer shall provide written inspection and maintenance procedures to be followed by the bridge owner.

9. WARRANTY

The bridge manufacturer shall warrant their steel structure(s) to be free of design, material and workmanship defects for a period of ten years from the date of delivery.

This warranty does not cover defects in the bridge(s) caused by abuse, misuse, overloading, accident, improper maintenance, alteration or any other cause not the result of defective materials or workmanship.

This warranty shall be void unless owner's records can be supplied which shall indicate compliance with minimum guidelines specified in the inspection and maintenance procedures.

Repair or replacement shall be the exclusive remedy for defects under this warranty. The bridge manufacturer shall not be liable for any consequential or
incidental damages for breach of any express or implied warranty on the structures.