DESIGN/BUILD TIMBER PANEL-LAM RECREATION BRIDGE

PART 1 – GENERAL

1.01 SCOPE

A. The Contractor shall be responsible for designing, detailing, fabrication, delivery, construction and erection of the Timber Panel-Lam Recreation Bridge superstructure.
B. Substructures shall be constructed in accordance with the plans and specifications.

1.02 UNIT PRICES

A. Payment for “Design/Build Timber Panel-Lam Recreation Bridge” shall be compensation in full for all costs of design, supply, fabricating, and installation for timber recreation bridge superstructure.

1.03 REFERENCES

A. AASHTO Design Specifications for Highway Bridges – current edition and interims
B. AWPA Standards – current edition
C. NFPA National Design Specifications for Wood Construction
D. AITC Timber Construction Manual

PART 2 - DESIGN

2.01 TIMBER PANEL-LAM RECREATION BRIDGE

A. Timber recreation bridge shall be “Timber Panel-Lam Recreation Bridge” as designed by Wheeler Lumber, LLC, or approved equal.
B. Bridge superstructure shall be designed using longitudinal dowel laminated timber deck panels.
C. Design shall be in accordance with AASHTO specification, all current interims and the following criteria:
    1. Bridge dimensions:
        a. Single span = __’ As measured from end to end of deck.
        b. Clear width = __’ As measured between inside faces of railing.
        c. Total rail height shall measure at least __” above deck surface and meet AASHTO dimensional and structural requirements.
    2. All dead loads, applied dead loads, live loads, and wind loads as specified in the AASHTO specification.
    3. Live loads:
        a. 85 psf pedestrian load.
        b. Applied separate from to pedestrian load, AASHTO Standard H-Truck with a 10,000 LB. GVW positioned to produce the maximum load effect.
    4. Deflection requirements according to AASHTO.
D. Design and materials for connection of superstructure to substructure shall be included with the superstructure and compatible with substructure design.
E. Bearing elevations, structure depth, clearance and profile grade must conform to site conditions.

PART 3 – MATERIALS

3.01 STRUCTURAL TIMBER

A. This section shall include only such lumber and timber, as is part of the completed work. It shall not include falsework, forms, bracing, sheeting or other lumber and timber used for erection purposes.
B. Lumber and timber shall meet the requirements of AASHTO M168. Glue laminated timber shall be manufactured using wet use adhesives.
C. Knotholes and holes from causes other than knots shall be measured and limited as provided for knots. All visible pieces of lumber and timber having knots that are unsightly in appearance shall be rejected. Cluster knots and knots in groups are not permitted.
D. Only pieces consisting of sound wood free from any form of decay shall be accepted. No piece of exceptionally lightweight shall be accepted.
E. Lumber and timber shall conform to the dimensions specified for either rough or surfaced stock.
F. Lumber and timber to be graded as per NFPA National Design Specifications for Wood Construction.

3.02 PRESERVATIVE TREATMENT

A. This section covers the wood preservatives and the preservative treatment of lumber, timber, and posts conforming to the Specifications as referenced or otherwise specified in the plans or special provisions. Temporary bracing shall not require preservative treatment.
B. Preservative treatment of lumber and timber shall be by the pressure process, and unless otherwise provided in the contract special provisions, be in accordance AWPA Standards and AASHTO Designation M 133.
C. Lumber and timber shall be pressure treated with Copper Naphthenate in AWPA P9 Type A Hydrocarbon Solvent.
D. Unless otherwise directed by the Engineer the material shall be graded prior to treatment. Material shall be accepted after treatment on the basis of its condition prior to treatment, on the basis of inspection of the treatment procedure substantiated by plant records, on the condition of the material after treatment and on absorption, penetration and visual inspection.
E. So far as practicable all adazing, boring, chamfering, framing, gaining, mortising, surfacing and general framing, etc., shall be done prior to treatment. If cut after treatment, coat cut surfaces according to AWPA M4.
F. All Douglas Fir and other species that are difficult to penetrate shall be incised prior to treatment.

3.03 HARDWARE

A. All hardware (machine bolts, carriage bolts, drift pins, lag screws, dowels, rods, nails, spikes, washers, connectors, etc.) shall conform to ASTM 307-97.
B. Unless a Dome Head Bolt or approved equal is used, all bolt heads or tightening nuts in contact with Structural Timber and lumber shall have a washer of sufficient thickness and bearing area to ensure a minimum deformation of the contacted surface when tightened to develop not more than the maximum allowable tensile stress of that bolt
C. Bolt heads or tightening nuts in contact with metal surfaces shall have a cut washer or approved equal placed between the bolt head or nut and the metal surface.
D. All hardware shall be hot-dipped galvanized in accordance with AASHTO M111-91.

PART 4 – SUBMITTALS

4.01 SEALED PLAN

A. A detailed bridge plan sealed by a professional engineer registered in the State of _____ and experienced in timber bridge design shall be submitted to the Owner within 2-4 weeks after award of contract. The bridge plan shall include all design details and all details necessary for the fabrication and installation of the timber superstructure. Details of individual fabricated pieces are not required.

B. Materials to be delivered to jobsite 10-14 weeks after approval of plan.

4.02 TIMBER CERTIFICATION

A. Solid sawn timber members shall conform to the requirements of the grading rules agency for the species, type, and grade specified in the plans or special provisions. Glued-Laminated members shall conform to the American Institute of Timber Construction 117-201 for the combination, species, use, and appearance as specified in the plans or special provisions. A Grading Agency Certification is required on all timber material.

B. The manufacture shall be regularly engaged in the production of the specified product or item and be able to furnish independent records or references of competence and satisfaction of this fact upon the request of the Owner.

PART 5 – QUALITY ASSURANCE

5.02 MANUFACTURE

A. All material shall be well manufactured. All lumber and timber shall be straight, well sawed, sawed squared at ends and have opposite surfaces parallel unless otherwise required by the plans and specifications.

B. Deck panels shall be assembled with 3/8” diameter ring shank dowels. All dowels are to be simultaneously driven with equal force using a mechanical press the full length of the deck, ensuring all heads are flush with the surface of the timber plank. Multiple impact tools are not to be used to set dowels because of potential for wood fiber rupture.

C. Deck panels to be delivered to jobsite after being fully assembled at fabrication plant.

D. All plank for deck panels shall be precision end trimmed to length with ¼” underlength and no overlength tolerance permitted.

5.03 WORKMANSHIP

A. Workmanship shall be first class throughout. Nails and spikes shall be driven with sufficient force to set the heads flush with the surface of the wood, thus ensuring the surface shall be free from deep or frequent hammer marks.

B. Proper pre-drilling of holes for screws, nails, spikes, lags or bolts where necessary to avoid splitting of timber will be required.

5.04 HANDLING

A. Lumber and timber shall be handled with sufficient care to avoid breaking through portions penetrated by treatment, and thereby exposing untreated wood. Chains, peavies, cant hooks, pickaroons, timber dogs, pike poles and other pointed tools that would burr, blemish, penetrate or permanently deform the

contacted member shall not be used. Rope, rubber or fabric slings only shall be used.