

# ATTACHMENT A

## PRE-FABRICATED STEEL BRIDGE SPECIFICATION

### SECTION 051233

#### PART 1 GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to furnishing, fabricating and delivering a prefabricated steel bridge complete in place, as described in this section of the specification, as shown on the plans, or reasonably implied therefrom, except as hereinafter specifically excluded.
- B. Work Included:
1. Design of prefabricated steel bridge and approach railing
  2. Coordination with Design Team
  3. Coordination with and submittal of working drawings and calculations to the Department of State Architect (DSA)
  4. Fabrication of prefabricated steel bridge and approach railing, including providing brackets for anchoring hung utilities
  5. Coordination with College and Contractor for preparation of Bridge Delivery Plan and delivery of prefabricated steel bridge and approach railing to jobsite
- C. Definitions:
1. Architect of Record: HMC Architects
  2. Bridge Substructure Designer: Biggs Cardosa Associates, Inc
  3. Civil Designer: Sandis
  4. College: West Valley College/ Gilbane Building Company
  5. Contractor: To be determined by the College
  6. Design Team: The Design team will include as a minimum, the College, Architect of Record, Bridge Substructure Designer, Civil Designer and Geotechnical Engineer of Record
  7. Engineer: Resident Engineer to be retained by the College
  8. Geotechnical Engineer of Record: Cleary Consultants, Inc.
  9. Manufacturer: Prefabricated steel bridge manufacturer

##### 1.02 MEASUREMENT AND PAYMENT

- A. The contract price paid per foot to furnish prefabricated steel bridge shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and

for doing all the work involved in furnishing prefabricated steel bridge, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

- B. Full compensation for coordination with the Design Team, and coordination with the Department of the State Architect (DSA), including submittal of working drawings, calculations and any other data required by DSA for approval, shall be considered as included in the contract unit price paid to furnish the prefabricated steel bridge and no separate payment will be made thereafter.
- C. Full compensation for designing and furnishing approach railings, as shown on the plans, shall be considered as included in the contract unit price paid to furnish the prefabricated steel bridge and no separate payment will be made thereafter.
- D. Full compensation for designing and furnishing anchor brackets to support existing utilities underneath the steel floor beams after erection of the steel bridge, as shown on the plans, shall be considered as included in the contract unit price paid to furnish the prefabricated steel bridge and no separate payment will be made thereafter.

### 1.03 SUBMITTALS

- A. **Prefabricated Steel Bridge Calculations and Shop Drawings:** A maximum of 4 weeks after Notice to proceed, the Manufacturer shall submit complete prefabricated steel bridge design calculations showing all stresses and deflections for dead and live loads shall be furnished along with shop drawings showing all structural members and connections for the bridge and approach railings. Calculations and shop drawings shall be signed by a registered Civil or Structural Engineer of the State of California.
- B. **Metal Decking:** A maximum of 4 weeks after Notice to proceed, the Manufacturer shall submit detailed working drawings for forms to the Engineer for approval. These drawings shall show the grade of steel, the physical and section properties for all deck members, the method of support and grade adjustment, accommodation for skew, methods of sealing against grout leaks, and deck reinforcing required.
- C. **Bridge Delivery Plan:** A minimum of two weeks prior to the delivery and unloading of the prefabricated bridge, the Manufacturer shall submit to the Engineer and receive approval for a "Bridge Delivery Plan". This plan shall detail the proposed delivery route to the site, coordination with and actions required by the Contractor and College and any special safety or handling measures to be taken on the day of delivery.
- E. The Manufacturer shall furnish the Engineer with a copy of all mill orders, certified mill test reports and a certificate of compliance for all fabricated structural steel to be used in the work.

### 1.04 DESIGN CRITERIA

- A. Prefabricated Steel Bridge Calculations and Shop Drawings:

- 1. The bridge design shall be in accordance with "LRFD Guide Specifications for

the Design of Pedestrian Bridges" NCHRP 20-07 Task 244.

2. Welded tubular structure design shall be in accordance with the Structural Welding Code (ANSI/AWS D1.1).
3. The bridge shall be designed for a 90 psf uniform pedestrian live loading on the full deck area, in accordance with Article 3.1 of "LRFD Guide Specifications for the Design of Pedestrian Bridges."
4. The bridge shall be designed for one 20,000 pound vehicle (H10 truck) load, in accordance with Article 3.2 of "LRFD Guide Specifications for the Design of Pedestrian Bridges."
5. The bridge shall also accommodate an occasional emergency vehicle load consisting of one 75,000 pound fire truck (modified HS20) applied as Strength II load combination.
6. A small unobtrusive plaque shall be attached at each end of the structure indicating fabricator, fabricator contact information, fabricator tracking number, and bridge design live loads.
7. The bridge shall be designed for wind loads in accordance with Article 3.4 and fatigue loads in accordance with Article 3.5 of "LRFD Guide Specifications for the Design of Pedestrian Bridges."
8. Deflection due to service live load shall be in accordance with Article 5 of "LRFD Guide Specifications for the Design of Pedestrian Bridges."
9. Vibration design shall be in accordance with Article 6 of "LRFD Guide Specifications for the Design of Pedestrian Bridges."
10. Seismic design of bridge shall be in accordance with Caltrans SDC 1.6, dated November 2010, and the site specific response spectra shown on the project plans.
11. Steel trusses and pedestrian railing for the bridge shall consist of tubular members, diagonal bracing, tubular handrail, steel angle, toe plates and steel cable safety rails on both sides, as shown on the project plans. The top chord of the bridge truss shall consist of a uniform curve as shown on the plans. Safety rails shall have a clear spacing sufficient to prevent passage of a 4" sphere between rails. The top pedestrian rail shall be a steel angle, the top of which is to be a minimum of 3'-6" above finish deck surface. All pedestrian rails and safety rails shall be attached to the interior side of structure posts. A full length steel toe plate shall be provided on each side of the structure, on the interior side of the steel trusses. A full length 1.5-inch diameter tubular steel handrail shall be provided on each side of the structure on the interior side of the steel trusses.

12. The bridge deck shall consist of a 4-inch minimum thick lightweight concrete deck with acid wash finish over a minimum 2-inch deep metal deck, as shown on the project plans. Metal decking shall be supplied and installed by the Manufacturer and the concrete deck, including reinforcing, shall be installed and finished by the Contractor.
13. The design of permanent steel deck forms shall be based on the combined dead load of the forms, reinforcement, and plastic concrete plus an allowance for all anticipated construction loads. The allowance for construction loads shall be not less than 50 psf. The combined dead load shall be assumed to be not less than 130 pcf for lightweight concrete.
14. The bridge shall be cambered to compensate for dead load deflection. The amount of dead load camber shall be determined by the Manufacturer and approved by the Engineer.
15. The bridge shall be shop-fabricated as far as practicable. The Contractor shall field verify all controlling dimensions and existing conditions and coordinate with the Manufacturer prior to fabrication. One field bolted splice will be permitted on the bridge.
16. The approach railing shall be designed and furnished by the bridge Manufacturer of like materials and construction as the bridge. The steel top chord of the erected bridge and approach railings shall form a continuous uniform curve from end to end of the structure as shown on the plans. The Contractor shall field verify all controlling dimensions and existing conditions and coordinate with the Manufacturer prior to fabrication.

B. Coordination and Approvals:

1. The Manufacturer shall coordinate with the Design Team, including but not necessarily limited to the Bridge Substructure Designer, Civil Designer and Architect of Record, during design development. The Manufacturer shall supply the following minimum design data and details:
  - a. Vertical and horizontal load reactions at bridge abutments for each primary load combination.
  - b. Layout and details of proposed abutment bearing/ anchorage
  - c. Layout and details of proposed utility anchor brackets
2. The Manufacturer shall coordinate with and submit working drawings, calculations and other design information to the Department of State Architect (DSA) sufficient for agency approval.

C. The Manufacturer shall coordinate the Bridge Delivery Plan with the Contractor and the College.

## PART 2 PRODUCTS

### 2.01 MATERIAL

#### A. Prefabricated Steel Bridge and Approach Railing:

1. The bridge and railing material shall be high strength, self-weathering, low alloy, atmospheric corrosion-resistant ASTM A847, cold formed, welded square and rectangular tubing using ASTM A588, ASTM A606 or ASTM A242 plate and structural shapes ( $F_y=50,000$  psi).
2. Shop welding shall utilize E80 series electrodes which have the same weathering characteristics as corrosion resistant steel. Welding shall be performed by certified welders per AWS "Standard Qualification Procedure" to perform type of work required. All welding shall be in conformance with the AWS Welding Code.
3. The prefabricated steel truss and approach railing shall be cleaned and painted in accordance with Manufacturer's recommendations. Paint material and color shall be determined by the Architect of Record prior to fabrication.

#### B. Concrete and Metal Decking:

1. Permanent steel deck forms and supports shall be steel conforming to the requirements in ASTM Designation: A653/A653M (Designation SS, Grades 33 through 80) having a coating designation G165. The forms shall be mortar-tight, true to line and grade, and of sufficient strength to support the loads applied.
2. Permanently exposed galvanized form surfaces that are abraded or damaged prior to installation shall be repaired by thoroughly wire brushing the damaged areas and removing all loose and cracked coating, after which the cleaned areas shall be painted with 2 applications of un-thinned zinc-rich primer (organic vehicle type). Zinc-rich primer shall be commercial quality and shall be on the Caltrans Prequalified Product List at:
  - [http://www.dot.ca.gov/hq/esc/approved\\_products\\_list/](http://www.dot.ca.gov/hq/esc/approved_products_list/)
3. Concrete for bridge decks shall be lightweight concrete with a minimum 28-day compressive strength not less than 3,600 pounds per square inch. Lightweight concrete shall have a 110 pound per cubic foot maximum dry density. Concrete decks shall be reinforced per Manufacturer recommendations and installed by the Contractor.

## PART 3 EXECUTION

### 3.01 PREFABRICATED BRIDGE DELIVERY

- A. The Manufacturer shall be responsible for delivery of the prefabricated bridge and approach railing, including anchor brackets for utilities, to the job site.
- B. The Contractor shall be responsible for unloading the prefabricated bridge and approach railing from the delivery truck when it arrives at the job site from the Manufacturer, bolting field splice connections, attaching utilities to the underside of the floor beams and placing and anchoring the prefabricated bridge and approach railing on the bridge foundations.

**END OF SECTION**