REVISION OF SECTION 614

BUTTERFLY STRUCTURE

**Section 614 of the Standard Specifications is hereby revised for this project to include the following:**

**Subsection 614.01 is hereby revised to include the following:**

This work consists of the design, fabrication, and construction of a butterfly sign structure at the location shown on the plans and as described herein. The Contractor shall furnish a complete design, including drawings and design calculations, and all materials, labor, and equipment required for construction of the butterfly sign structure in accordance with this Specification and the Standard Specifications.

**Subsection 614.011 is hereby added as follows:**

The Contractor’s designer shall contact the CDOT Staff Bridge office to obtain the Butterfly Design Guideline Detail. The butterfly sign structure shall be designed by a Registered Professional Engineer registered in the State of Colorado with experience in the design of at least 3 successfully completed overhead sign structures in the past 3 years. The Engineer may be an employee of the Contractor or a hired consultant fulfilling the stated experience requirements.

**Subsection 614.012 is hereby added as follows:**

Design of the butterfly structure and its foundation shall be in conformance with the AASHTO “Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th Edition” (2001, with 2002 and 2006 Interims). The design shall include a fatigue analysis in accordance with Section 11 of the AASHTO Specification. The sign shall be designed for a design life of 50 years using a fatigue category of II, and a base wind speed of 90mph. Material and detailing requirements shall meet the requirements

A 42” diameter drilled shaft (caisson) has been assumed for the sign foundation. The Contractor’s designer shall provide a design fulfilling the geometric requirements in the drawings to avoid impacts to the roadway design. Any modifications to the sign geometry presented in the drawings shall be reported to the Engineer for approval. Final design of the sign structure and the foundation, however, remains the responsibility of the Contractor’s Professional Engineer. Geotechnical boring information and design recommendations for the project site will be made available by the Resident Engineer. Additional geological exploration by the Contractor may be conducted, but at no expense to the project.

The required safety factors and allowable strength factors shall be in accordance with the AASHTO manual, unless specified otherwise. Structural design of any individual structure elements not covered in the AASHTO manual shall be by the service load or load factor design methods in conformance with Article 3.22 and other appropriate articles of the 17th Edition of the AASHTO Standard Specifications for Highway Bridges including current interim specifications.

*(a) Butterfly Structure Design Submittals.* At least 60 calendar days before the planned start of sign erection, submit complete design calculations and shop drawings to the Engineer for review. Include all details, dimensions, quantities, and cross-sections necessary to construct the sign.

*(b) Design Calculations*. Design calculations shall include, but not be limited to, the following items:

1. A written summary report which describes the overall butterfly sign design.
2. Applicable code requirements and design references.

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BUTTERFLY STRUCTURE

1. Butterfly sign critical design cross-section(s) geometry including member sizes and dimensions.
2. Design criteria including all assumptions used in the design and all applicable load cases.
3. Safety factors and allowable strength factors used in the design.
4. Design calculation sheets with the project number, sign designation, date of preparation, initials of designer and checker, and page number at the top of each page. Provide an index page with the design calculations.
5. Design notes including an explanation of any symbols and computer programs used in the design.
6. Other design calculations.

*(c) Shop Drawings.* Shop drawings shall include, but not be limited to, the following items:

1. An elevation view of the sign(s) identifying:

(a) The elevation at the top and bottom of sign structure

(b) Structure dimensions

(c) Sign Dimensions

1. Sections and details identifying:

(a) Member dimensions and designations

(b) Hardware dimensions and specifications

(c) Anchor bolt patterns and dimensions

(d) Sign Panel assembly, in accordance with CDOT Standard Plan No. S-614-50, and its attachment to the sign structure

1. Design parameters and applicable codes.
2. Details, dimensions, and schedules for all hardware, base plates, anchors, etc.
3. Finishes and special handling instructions (if required) for all materials.
4. Step-by-step installation instructions, as needed, to ensure proper construction of the sign structure.

The drawings and calculations shall be signed and sealed by the Contractor’s Professional Engineer registered in the State of Colorado, previously approved by the Engineer. If the Contractor uses a Consultant to prepare the design, the Contractor shall still have overall contract responsibility for both the design and the construction.

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Submit 3 sets of the sign structure drawings with the initial submission. One set will be returned with any indicated corrections. The Engineer will approve or reject the Contractor’s submittals within 15 calendar days after receipt of a completed submission. If revisions are necessary, make the necessary corrections and resubmit 3 revised sets. When the drawings are approved, furnish 5 sets of the drawings. The Contractor shall not begin sign fabrication until the submittal requirements are satisfied and found acceptable to the Engineer. Changes or deviations from the approved submittals must be resubmitted for approval. No adjustments in contract time will be allowed due to incomplete submittals.

**Subsection 614.13 is hereby revised to include the following:**

Payment will be full compensation for design (butterfly structure and caisson), labor, equipment, materials and incidentals necessary to acceptably construct the Butterfly Sign Structure.

**Subsection 614.14 is hereby revised to include the following:**

Pay Item Pay Unit

Butterfly Structure Each

The caisson foundation will be paid for in accordance with Section 503.

The Sign Panel will be paid for in accordance with Section 614.