Make the following section a part of the Standard Specifications:

SECTION 660 – ACROW PANEL BRIDGE

660.01 Description. This work shall consist of the design and construction of a fully engineered 90'-0" simple span Acrow Panel Bridge superstructure of modular galvanized steel construction. The work shall include the trusses (panels), the floorbeams, the deck stringers, the bridge railings, the orthotropic steel decks, and all other items required to complete the work according to the contract. The clear travel width of the superstructure shall be as shown on the plans.

660.02 Materials. The superstructure shall be constructed of structural steel. Materials shall be new and shall meet the requirements specified in the applicable sections of Division 700 – Materials and as specified below.

(A) Material Specifications. The materials shall meet or exceed the following:

(1) Panels (comprised of chords, diagonals and verticals), Reinforcing Chords, Truss Braces, Swaybraces, and Raker Braces:

AASHTO M223 Grade 65
Ultimate Tensile Strength 80,000/100,000 psi
Yield 65,000 psi
Elongation 17% of 8-inch Gauge Length

(2) Deck Panels and Floorbeams:

AASHTO M223 Grade 50
Ultimate Tensile Strength 70,000/90,000 psi
Yield 50,000 psi
Elongation 18% of 8-inch Gauge Length

(3) All Other Parts:

AASHTO M183 Grade 36
Ultimate Tensile Strength 63,000/75,000 psi
Yield 36,000 psi
Elongation 20% of 8-inch Gauge Length

(4) Panel Connecting Pins

ASTM A193 Grade B7
Ultimate Tensile Strength (Minimum) 125,000 psi

(5) Bolts – AASHTO M164

(B) Trusses (Panels). The upper and lower chords of a panel shall be fabricated from hot rolled steel channels and the verticals and diagonals shall be fabricated from rectangular hollow sections or channels. The material specifications shall be those listed in 660.02(A). Truss panels shall be 10 feet long from center of pin hole to center of pin hole. The overall width of a truss panel shall not exceed 6.54 inches. Male forgings used for pin connections shall be solid and one piece construction.

(C) Floorbeams. The floorbeams shall be fabricated from wide flanged sections or equivalent and shall utilize material that meets or exceeds those listed in 660.02(A). Vertical X-bracing shall be incorporated between floor beams in every other bay. This bracing shall be at each end of the floorbeams and shall prevent horizontal loads from being transferred from the floorbeam into the truss members.

(D) Orthotropic Steel Decks. The deck system shall be comprised of orthotropic units. Each unit shall be 10 feet long and have a steel deck plate welded to longitudinal stringers. Transversely in each deck panel there are to be four round hollow sections for providing lateral load distribution. Curbs shall be six inches tall and shall be welded integrally to the deck unit. The material specifications shall be those listed in 660.02(A). The deck system shall be capable of supporting 3-inches of asphalt overlay. Prior to placement of asphalt overlay, the holes in the steel plate deck surface which provides access to the hold down bolts shall be covered by some field applied means.

660.03 Design and Construction Requirements.

(A) Design. The Contractor shall prepare and submit a detailed design and structural calculations of the superstructure for the approval of the Engineer. The detailed design and structural calculations shall be stamped by a Structural Engineer licensed in the State of Hawaii. The Contractor shall provide all necessary superstructure load information to the Engineer.

The travel width and bridge alignment shall conform to the plans. The span of the superstructure from centerline bearing to centerline bearing at each abutment shall be 90'-0".

The design and construction shall be in accordance with the AASHTO LRFD Bridge Design Specifications, 2nd Edition, 1998, including subsequent interim specifications, the Hawaii Standard Specifications For Road, Bridge And Public Works Construction, 1994, and these Special

Provisions. The design live load shall be HL-93. The design of the superstructure shall account for all added loads including but not limited to bridge railings and asphalt overlay.

The superstructure shall be designed for seismic loads in accordance with AASHTO LRFD Bridge Design Specifications, 2nd Edition, 1998, including subsequent interim specifications. The seismic loads shall be determined based on the following criteria:

(1) Acceleration Coefficient (A) = 0.09

(2) Seismic Performance Zone = 1

(3) Importance Category = Critical Bridge

(4) Site Coefficient (S) = 1.5 (Soil Profile Type III)

The superstructure shall be provided with FHWA approved NCHRP 350 compliant Test Level Two (TL-2) bridge railings .

The Contractor shall submit working drawings and design calculations for the Acrow Panel Bridge superstructure to the Engineer within 30 days from the date of award of the contract. The Contractor shall also submit manufacturer's certificates to verify his assumptions or design when requested by the Engineer. The Contractor shall provide the Engineer 2 weeks time to review the complete submittal of shop drawings and calculations. The Contractor shall not be relieved of the responsibility for results obtained by the use of such drawings and calculations. The design calculations shall show the stresses and deflections of the load supporting members.

The Contractor shall also submit calculations of the load capacity ratings of the superstructure. The inventory and operating rating shall be calculated in accordance with AASHTO's "Manual for Condition Evaluation of Bridges," 1994, including subsequent interim revisions.

The design calculations and shop drawings shall be stamped by a Structural Engineer licensed in the State of Hawaii.

(B) Fabrication. Workmanship, fabrication and connections shall be in accordance with Section 501.03(D) of the Hawaii Standard Specifications for Road, Bridge, and Public Works Construction, 1994.

Welding shall be performed by properly certified operators.

(C) Finishing. All components of the Acrow Panel Bridge superstructure shall be hot-dipped galvanized to ASTM A123 specification or equivalent.

All bolts, pins, etc. shall be galvanized.

660.04 Method of Measurement. The Engineer will not measure the Acrow Panel Bridge superstructure for payment.

660.05 Basis of Payment. The Engineer will pay for the Acrow Panel Bridge superstructure on a contract lump sum basis.

The price includes full compensation for the design of the superstructure; for furnishing and placing all materials for the superstructure, including but not limited to trusses (panels), floorbeams, deck stringer, bridge railings, bridge bearing plates, and orthotropic steel decks; and for furnishing labor, materials, tools, equipment, and incidentals necessary to complete the work.

The Engineer will make payment under:

Pay Item	Pay Unit
Acrow Panel Bridge	Lump Sum"

END OF SECTION