FHWA REGION NO.	STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
7	KANSAS	97 N-0047-01 STP-N 004(701)		16	21

Red interface adapter to be accessible without lowering or opening access panels.

Provide cable tie down (Richo #CFC C-8) or equivalent to secure red interface adapter cable to the bottom of the output file.

Anchor bolts to be provided with 332B Cabinet.

Additional Model 336A Cabinet Specifications:

The cabinet shall be a weatherproof, outdoor, pole-mounted or pedestal-mounted type with overall dimensions not to exceed 38 inches high by 22 inches wide by 20 inches deep. The cabinet will utilize all the standard plug-in modules that are utilized by the Type 336 Caltrans cabinets.

The bottom of all 336A cabinets shall be solid plate and be reinforced with a 20" x 22" 0.375 aluminum base plate continuously welded to the inside bottom of the cabinet.

Cabinets shall be attached to the pole using two aluminum mounting brackets, mounted top and bottom, for each cabinet. The brackets shall be secured to the cabinets using appropriate stainless steel mounting bolts and washers. The brackets shall be secured to the pole by appropriate banding buckles and couplings.

Door opening flange around the door opening shall be 0.75 inches wide.

Steel rails shall be provided in lieu of the rack cage for mounting of the controller and cabinet assemblies. The rail assembly shall consist of 4 EIA threaded rails bolted to the two sides at the front and rear of the cabinet. The rails shall be threaded in the same manner and pattern as the Model 332 cabinet cage. The rails shall be plated as specified in Caltrans Specifications*, Section 1.2.8.3.2.

The cabinet, if used for school signal control, shall be modified to operate flashing beacons by time-of-day, day-of-week through controller output.

E. Switch Pack

The components of the three solid state switches, enclosed in the load switch, shall be of interchangeable, modular cube design.

Cube to be mounted separate from circuit board for ease of replacement.

Housing and handle to be constructed of metal, suitably protected against corrosion.

F. Flasher Unit

Each of the two load circuits contained in the Flasher Unit shall be of interchangeable cube design.

Cube to be mounted separate from circuit board for ease of replacement.

Housing and handle to be constructed of metal, suitably protected against corrosion.

G. Zonal Master Controllers

The zonal master controller shall conform to the Type 170 specifications.

Insofar as possible, the boards from the master shall be interchangeable with those in the local 170's.

1. The zonal master 170's shall be configured with a second serial port. The second serial port shall be the same type as the primary serial port and address mapped to location 6002 (Hex) for control functions and location 6003 (Hex) for data functions. The second serial port shall be capable of operating at a clock rate of 300, 600, 1200, 2400, 4800, or 9600 baud. This selection shall be independent of the primary ACIA.

   The signals from the second ACIA shall be routed to the rear panel of the 170 chassis and terminated in a 14-position connector identical to the C2 connector. This connector shall be marked C20S.

   A three-foot cable shall be provided to interconnect from the C20S connector to a standard DB25S connector on an auto dial modem.

2. All controllers shall be provided with a Model 409 Modem Module as detailed in Chapter 7 of the Caltrans Specifications*.

3. Each zonal master 170 controller unit shall be supplied with one (1) Model 412B2 System Memory Module. The module shall be provided with MAPITI Micro Systems W70SM, latest revision, software package, on 27256 EPROM.

02. AC SERVICE INPUT

Each service disconnect must be furnished with an installed lightning arrestor on the AC service input which meets or exceeds the following requirements:

A. The unit must be capable of withstanding repeated 20,000 ampere surges (minimum of 20).

B. The unit must have internal follow - current limiters (resistive elements).

C. The unit must contain three active clamping stages minimum.

D. The unit must self-extinguish within 0.3 milliseconds after the trailing edge of the surge.

E. The parallel impedance of limiters must be less than 0.15 OHMS.

F. The unit shall be UL approved.

Each service disconnect to have 70 AMP main lugs with no more than 4 circuits.

*Traffic Signal Control Equipment Specifications, published by the California Business, Transportation and Housing Agency, Department of Transportation (Caltrans), January 1989 edition.

03. VEHICLE DETECTOR LOOP WIRE SEALANT

A. The saw slot filler and encapsulant shall be a one-part polyurethane, moisture curing, elastomeric compound requiring no mixing, measuring or application of heat prior to or during its installation and designed specifically for sealing and protecting vehicle detector loop wires installed in sawcuts 1/4" to 3/8" wide and 3 1/2" deep.

B. The encapsulant is intended to provide compressive yield strength to withstand normal vehicular traffic as well as sufficient flexibility to withstand normal movement in asphaltic and concrete pavements, while protecting the loop wire from moisture penetration, fracture and shear.

C. The encapsulant shall be designed for roadway installation when surface temperature is between 40 and 140 degrees F and enable vehicular traffic to pass over the sawcut immediately after installation without tracking or stringing of the material. The encapsulant shall form a surface skin allowing exposure to vehicular traffic within 30 minutes at 75°F and completely cure to a tough, rubber-like consistency in two (2) to seven (7) days after installation.

D. Cured encapsulant shall exhibit resistance to effects of weather, vehicular abrasion, motor oils, gasoline, antifreeze solution, brake fluid, deicing chemicals and salt normally encountered, in such a manner that the performance of the vehicle detector loop wire is not adversely affected.

E. Filling of the sawcut shall be in accordance with the directions of the manufacturer.

04. PEDESTRIAN PUSHBUTTON ASSEMBLY

This specification is intended to provide minimum requirements for pedestrian pushbuttons that will be acceptable:

1. A one-piece cast aluminum raised sign legend with pushbutton housing.
2. Weatherproof and dustproof pedestrian pushbutton with silver contacts rated a minimum of 35 amps at 12 volts.
3. The legend "Push Button - Wait for Walk Signal" shall be cast into the face of the assembly.
4. Assembly to have 4" radius bracket mount for banding to pole.

05. AERIAL SPLICE BOX

The contractor shall furnish and install aerial enclosures for splicing overhead interconnect cable. Spliced enclosures shall be of polyethylene construction and be capable of accommodating up to a 12-pair cable. The enclosure shall provide easy access to aerial cable, while providing weather protection for the splice. No aerial splice boxes shall be installed at locations that cannot be accessed by a maintenance truck, or that require the climbing of a pole for service.

The enclosure shall have the following overall maximum exterior dimensions: 30 inches long, 10 inches high, and 4 inches wide. Minimum dimensions of 16 inches long, 6 inches high, and 3.5 inches wide shall be provided for the interior compartment.

The enclosure cover shall be capable of easy removal for splicing the interconnect cable and easily stored for typical maintenance activity, such as replacement of interior termination blocks or cable diagnostics.

All communication cable conductors shall be accommodated on termination blocks provided within the enclosure. The aerial enclosure shall be capable of being installed while enclosing the overhead supporting messenger strand. Once installed, the enclosed messenger strand and interconnect cable shall appear as one unit under the splice cover.

Bonding and Grounding of the splice enclosure shall be accomplished through attachment to the messenger support strand.

Cable binding posts shall be configured to allow up to three-wire conductors each.

.06 TRAFFIC SIGNAL LAMPS

Lamps for vehicular and pedestrian signals shall meet the following requirements:

A. 8" and 9" Signals

A nominal 60 watt, 120 volt, A19 clear traffic signal lamp of 8,000 hour life rating guaranteed by the manufacturer to be used in all 8" vehicular and 9" pedestrian indications. Lamps shall be 80% Krypton filled with heat reflection.

B. 12" Signals

A nominal 135 watt, 120 volt, A21 clear traffic signal lamp of 6,000 your life rating guaranteed by the manufacturer, to be used in all 12" vehicular and pedestrian indications. Lamps shall be 80% Krypton filled with heat reflection.

C. Candlepower

All traffic signal lamps must meet beam candlepower specification of ITE-1110(1970).

D. Mass Spectrometry Analysis

Mass Spectrometry Analysis to verify percent Krypton shall be provided with catalog cut sheets.

.07 BRACKET MOUNTING

Bracket-mounted signal heads, as shown on the plan shall be supported by mounting brackets consisting of watertight assemblies of 1-1/2 inch malleable iron or aluminum.

.08 CITYSCAPE TRAFFIC SIGNAL POLES

A. General

The structure's aesthetic style and dimensional requirements shall be as depicted on the drawings. They shall be of a modular design with the traffic signals and signs mounted in such a manner as to appear to be an integral part of the structure and give a built-in appearance.

B. Fabricator

The fabricator shall be certified under Category I, "Conventional Steel Structures" as set forth by the American Institute of Steel Construction Quality Certification Program. ~~Proof of this certification will be required prior to bid opening to assure that the fabricator has the personnel, organization, operational procedures, knowledge, equipment, capability, and commitment to fabricate quality traffic signal pole structures.~~

C. Design

The cityscape traffic signal pole structures and accessories shall be designed in accordance with the requirements of the 1985 AASHTO "Standard Specifications For Structural Supports For Highway Signs, Luminaires and Traffic Signals". Loading shall be based on an Isotach with velocity of 80 MPH. Calculations and detail drawings shall be submitted for verification of compliance to these specifications.

Fabricator must be able to supply documentation of a full scale test simulating the AASHTO applied wind and weight loads on a typical cityscape traffic signal pole structure with a mast arm length of at least 35 feet. This documentation is meant to physically demonstrate the design concepts of all members and connections.

D. Tubular Members

The main vertical and horizontal members shall be non-tapered and have a rectangular cross section. The members shall conform to ASTM A500 Grade B having a guaranteed minimum yield strength of 46,000 PSI.

E. Panels

Base panels (kickplates) shall be made of 7 gauge steel. Pole and arm panels, where the longest dimension does not exceed 51 inches, shall be made of 16 gauge hot rolled steel. Pole and arm panels where the longest dimension exceeds 51 inches, shall be made of 14 gauge hot rolled steel. All panels shall be recessed 0.75 inch deep on all four sides. There shall be a 0.75 inch reveal on the top and bottom of the pole panels and on both vertical edges of the arm panels. All panels shall mount to steel crossbraces by means of 0.25 inch diameter hex head black oxide finished stainless steel screws which shall screw into factory drilled and tapped holes in the structure's crossbraces. All panel fasteners shall be located within the 0.75 inch reveal area so as to minimize fastener visibility. An anti-seize compound shall be used on all bolts, screws, etc.

F. Base Plates and Flange Plates

The base plates and flange plates shall be of steel meeting or exceeding the requirements of ASTM A36.

G. Wiring Access Handholes

A 4 inch by 6 inch reinforced wiring access handhole shall be located on the inner face surface of each structural leg within the wiring access compartment and at all signal locations.

H. Anchor Bolts

Anchor bolt material shall have a minimum yield strength of 55,000 psi and a minimum tensile strength of 75,000 psi. The bolts shall be galvanized to ASTM A153 for a minimum of 12" on the threaded end. Each anchor bolt shall be supplied with two hex nuts and two flat washers. The strength of the nuts shall equal or exceed the proof load of the bolts.

I. Welding

Welding shall be in accordance with AWVA (American Welding Society) Structural Welding Code D1.1, Sections 1 through 8, and shall be performed by welders certified in accordance with the AWS Code. All welds shall be free of cracks and undercutting and visually inspected. Mast arm to flange plate weld shall have 100 percent penetration and be ultrasonically tested. The base plates shall telescope the vertical pole tubes and be circumferentially welded inside and out.

J. Finish

Surface Preparation - The exterior steel surface shall be blasted cleaned to Steel Structures Painting Council Surface Preparation Specification No. 6 (SSPC-SP60) requirements utilizing a dry abrasive, closed cycle, recirculating system with centrifugal wheels and abrasive. The abrasive used is steel shot conforming to the Society of Automotive Engineers (SAE) recommended practice J827 with particle size meeting SAE Shot Number S280.

Interior Coating - All accessible interior surfaces are coated with a lead and chromate free red oxide rust inhibitive alkyd primer to minimum dry film thickness of 1.0 mils. The coating is cured by heating the steel substrate to a minimum of 350 degrees Fahrenheit.

Exterior Coating - All exterior surfaces are coated with a zinc rich epoxy power to a minimum dry film thickness of 2.0 mils. The coating is electrostatically applied and partially cured in a gas fired convection oven by heating the steel substrate to a minimum of 250 degrees Fahrenheit.

The powder primed surface is coated with a intermediate coat of polyester powder to a minimum dry film thickness of 2.0 mils. The coating is electrostatically applied and cured by heating the substrate in a convection oven to minimum of 350 degrees and a maximum of 400 degrees Fahrenheit.

The intermediate coat is top coated with one coat of High-Build Acrylic Polyurethane Enamel to a minimum dry film thickness of 2.0 mils. The coating is electrostatically applied and cured by heating the substrate in a convection oven to minimum of 225 degrees Fahrenheit. Color is to match customer's paint chip sample.

K. Material Certifications

All materials and products shall be produced in the United States of America. They shall be of the ASTM type as called forth in this specification. Mill certifications shall be supplied for proof of compliance to this specification.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

ADDITIONS TO TRAFFIC SIGNAL SPECIFICATIONS

E

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN CK.	TRACE CK.