City of Tempe
P. O. Box 5002
31 East Fifth Street
Tempe, AZ 85280
www.tempe.gov

Tempe

Public Works
Department

November 08, 2007

Re: REVISION to the Tempe Supplement to the MAG Uniform Standard Details and Specifications for Public Works Construction

Engineers, Contractors, Interested Agencies:

The City of Tempe has issued a revision to the July 2007 version of the above referenced document. Detail T-210, Fire Sprinkler Riser Detail Backflow Prevention has been revised. Please insert the attached detail to your copy of the Tempe Supplement to the MAG Uniform Standard Details and Specifications for Public Works Construction book.

The updated detail book can be purchased at the City of Tempe Engineering Division, 31 E. Fifth Street, west wing of the garden level for a fee of $15.00. Click here to view the Standard Details and Tempe Supplement from out web site.

This update also includes copies of the current City of Tempe Supplement to the Maricopa Association of Governments Uniform Specifications for Public Works Construction. The standard detail and specification revisions and additions are effective immediately.
The standard detail revision is effective immediately.

Sincerely,

Andy Goh, P.E.
Deputy PW Manager/City Engineer

cc: Current Standard Detail Holders
Internal Distribution List

City of Tempe Supplement to
the Maricopa Association of Governments
Uniform Standard Specifications
for Public Works Construction

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CITY OF TEMPE

1990 Supplement to the Maricopa Association of Governments
Uniform Standard Specifications for Public Works Construction
(Supersedes all previous City of Tempe Supplements)

SECTION 301.3

Revise compaction table to read:

(A) All Streets . . . . . 95 Percent
(B) Other Traffic Ways . . . . . 90 Percent
(C) Curbs, Gutters, and Sidewalks . . . 95 Percent

SECTION 334.3

Arterial Roadways, apply @ 0.05 gal./S.Y.
All other Roadways, apply @ 0.1 gal./S.Y.

SECTION 345.3

No concrete pipe valve boxes will be permitted. All valve boxes will be in accordance with Maricopa Association of Governments Standard Detail No. 391-1, Type C. In heavy traffic areas, pentagonal bolted lids shall be required.

SECTION 401

Add the following to Section 401.

On City Budget Projects:

When the contractor is to provide law enforcement officers for traffic control, City of Tempe officers shall be used when available. City police officers will remain on the City payroll. The contractor will be responsible for contacting the Tempe Police Department at 350-8296 at least two days (48 working hours) in advance to determine availability of police officers. (In reference to the above, see City of Tempe Traffic Barricade Manual, latest edition.)

Change the phrase "off-duty law enforcement officers" to "law enforcement officers" wherever it appears in Section 401.

SECTION 430

See also the City of Tempe Public Works Department Standard Landscape and Irrigation Details and Specifications.

SECTION 440

See also the City of Tempe Public Works Department Standard Landscape and Irrigation Details and Specifications.

SECTION 610.3

All water lines 6" through 16" shall be ductile iron pipe, class 52.

SECTION 610.5

All waterlines shall be protected from corrosion by encasement in a polyethylene protective wrapping referred to hereafter as polywrap.

SECTION 610.8

Add the following to the last paragraph:

Contractor shall cover all hydrants installed with burlap or similar cover until hydrants are put into use.

SECTION 615.6

All sewer taps are to be made by machine drill tap (factory tap) and all sewer services are to be connected using a proper sewer cup fitting or approved equal.

SECTION 630.3

All valves over 12" in size shall be butterfly valves.

SECTION 631.1

All water service connections from the main to the meter shall be constructed of type K copper pipe only. NO polyethylene pipe will be permitted.

SECTION 631.3.5

Double strap bronze saddles are required on all sizes of ACP pipe for water service sizes through 2".

SECTION 631.7

All taps may be made by contractors or City Forces upon proper application and payment of prevailing fees and upon approval and inspection by the City.

SECTION 631.8

Contractor shall install water services 2” or smaller on existing and new mains upon proper application and payment of prevailing fees and upon approval of inspection by the City.

SECTION 756

All hydrants shall be per City of Tempe Specification, supplemented as follows:

1. Clow F2500, Mueller Centurion, Waterous WB67 Pacer (Improved Model)

2. Hose Nozzles: Number 2, Size 2 1/2"

3. Pumper Nozzles: Number 1, Size 4"

4. Type of Thread: Special Tempe Thread 6 to 1"
   A sample shall be submitted to the Water Superintendent and the Fire Chief for acceptance.

5. Barrel extension length shall be 3' 6" unless otherwise stated.

CITY OF TEMPE, ARIZONA

STREET LIGHTING STANDARDS

T-100.1 General Characteristics

Mounting

Street Type	Luminaire	ANSI/IES Type	Height
Local & Collector	9,500 Lumen (HPS/full cut off)	II	30'
Major (Arterial)	30,000 Lumen (HPS/full cut off)	III	32'

Note: These mounting heights may be changed when approved by the Traffic Engineering Division.

Provision shall be made in the street lighting structure for water, which gathers in the pole, to run out of the pole into the wiring access chamber at the structure bottom. All provisions shall be within the wiring access chamber and shall not be visible or apparent from without the compartment when its covers are in place. Care should be taken that this drain water does not interfere with or affect the wiring terminal block or electrical connections.

The contractor shall secure a pole (street light structure) manufacturer's warranty, in the City's name, which warrants the pole finish against loss of color, significant change in color, rusting or rust creepage, blistering/de-lamination and structural integrity. The warranty shall be for a 5-year period, starting from the date of final acceptance by the City. Upon final acceptance, the contractor will surrender the warranty to the City.

T-100.2 Design Requirements

It is required that the street lighting structures meet the design requirements of the AASHTO. See AASHTO standard specifications for luminaires. It is required that the structures meet all pertinent requirements of the City of Tempe and the State of Arizona.

The site location is Tempe, Arizona. Maximum Steady Wind Speed requirements shall be eighty (80) miles per hour as indicated by the National Wind Speed Map (Isotach) in miles per hour: annual extreme miles per hour thirty (30) feet above the ground, fifty (50) year mean recurrence interval. Calculations shall include a 1.3X wind gust factor.

The manufacturer shall provide the City with installation drawings, foundation and instructions for the street lighting structure. The instructions shall contain assembly and installation drawings and instructions. The installation instructions shall contain complete details regarding torquing of all nuts and bolts.

All component members of the structures shall be marked or labeled in such manner that they can be readily identifiable by the City.

T-100.3 Pole Locations

Street lighting poles shall be located 2 foot back of curb or 2 foot back of sidewalk, when possible.

T-100.4 Subdivision Lighting

All intersections of residential subdivisions shall have street lighting.

Street lighting shall be located on public road rights-of-way, at the side lot line of the property where possible.

T-100.5 Major (Arterial) Street Lighting

When streetlights are to be installed on separate steel poles, the following design levels shall be maintained:

Roadway width - (variable)
Two sided - staggered, opposite side or median (dual mast arm)
Minimum Average Foot Candles - 1.2 f.c.
Uniformity Ratio - 4:1

Where power poles are to remain adjacent to the roadway:

A. Streetlights may be mounted on the power poles when City and utility standards can be met.

- or -

B. Steel poles shall be interset where needed to meet City standards.

Where single family residences abut the major (arterial) street, the street lights shall be located as close as possible to the side property line and still maintain desirable lighting levels.

T.100.6 Conductors

All electrical wiring shall comply with the requirements of the Uniform Building Code (UBC), 1985 edition, as adopted and amended by the City of Tempe, the National Electric Code, and Underwriters' Laboratories, Inc.

All conductors, from the pull box to the lighting structures, shall be at a minimum No. 10 AWG soft-drawn copper and bear the UL label. Insulation shall be type THWN. The following wire color code shall be used:

Black - 120V Power
Black & Red - 240V Power
White - Neutral
Green - Grounding

Conductors shall be connected to luminaire and extended down the pole. Terminate conductors at pull box for connection by the utility.

The power conductor shall be fused, in-line, using Bussman No. HEB-AA (120V luminaires) or No. HEX-AA (240 V luminaires) waterproof fuse holders, or approved equal. Install the fuse holders inside the pull boxes and install Bussman FNM fuse.

T-100.7 Grounding

Street lighting poles shall be grounded in the pull boxes and conductors sizes will be as specified by current NEC standards.

Ground equipment enclosures and devices shall be in complete compliance with the NEC. Furnish and install all the necessary conductors, clamps, fittings, and hardware for a complete system.

Lugs and connectors shall be of the solderless compression type. Splices in grounding conductors and connection made underground or in concrete shall be made by Cadwell or Burndy Ther-O-Weld process. All lugs and connectors shall be suitable for use with all combinations of copper and aluminum conductors.

Provide copper-clad steel ground rods where shown on the plans.

T-100.8 **Pull Boxes** - The pull boxes are to be supplied by the utility company and installed by the contractor.

Install where shown on the plans, record drawings will show actual location by locating data given from readily identifiable points, i.e. poles, property lines, fences, sidewalks, etc. (Contact Traffic Engineering Division for Old Town Special District requirements).

Install pull boxes with locking covers at final grade, and flush with finished surface in sidewalks or other paved areas.

T-100.9 **Conduit**

Conduit shall be 2 1/2", 90 C. Schedule 40 PVC (Polyvinyl chloride).

T-100.10 **Photocells & Lamps**

Photoelectric control shall be A.C. operated, cadmium sulfide cell, controlling a relay specifically designed for photocontrols. They will operate at low power levels and accommodate the conventional load requirements that occur in standard luminaire designs. During the day the relay is energized, holding its contacts open and the lamp load off.

Any component failure shall result in the lamp remaining on continuously.

The photocontrol shall be twist lock, three pole, with a housing fabricated of high impact poly-acrylic with ultra-violet inhibitor, conforming to NEMA Publication #SH18-1957 and proposed revisions. Photocontrol shall be factory set for turn-on at 1fc (footcandle) and turn-off at 3fc and will be installed facing north.

Acceptable manufacturer models:

Fisher Pierce No. 6660 (120V)
General Electric No. C402G600 (120V)
Ripley No. 6146 (120V)
ITT No. 6146 (120V)
Fisher Pierce No. 6690B (240V)
General Electric No. C402G660 (240V)
Other photocells, if equal, could be considered.

Lamps shall be high-pressure sodium type as follows:

Wattage	Lumens	ANSI Designation
100	9,500	S54SB-100
250	30,000	S50VA-250/S

Acceptable manufacturers:

Sylvania, (100-HPS) or (250w-HPS)
General Electric (100-HPS) or (250w-HPS)
Other lamps, if equal, could be considered.

T-100.11 Concrete Pole Foundations

Pole foundations shall be Class A (3000#) and conform to Section 725 of the Uniform Standard Specifications for Public Works Construction (MAG Specifications).

T-100.12 Anchor Bolts

Anchor bolts shall be made of high strength steel material capable of resisting at yield strength stress the bending movement of the street light at its yield strength stress (55,000 psi). The anchor bolt threads shall be galvanized after fabrication and have a minimum of 6" of threading.

CITY OF TEMPE, ARIZONA

STREET LIGHTING SPECIFICATIONS

T-101.1 Standard Street Lighting

Streamline Luminaire - (See Detail T-651) Furnish a street lighting fixture in accordance with the requirements of this specification and designed for roadway lighting with a built-in ballast for use with a high pressure sodium lamp. The luminaire shall bear the UL label. All luminaries shall be mounted with a zero degree tilt from horizontal.

A. Housing - The housing, both upper and lower, shall be die-cast aluminum joined by an integrally cast pin hinge at the mounting end and a one-hand latch at the door enclosing the lamp and/or ballast. The housing will have an integral four bolt slip fitter for 2-inch mast arm mounting and shall provide adjustment for leveling the luminaire. The housing shall be designed for full (90 degree) cut off. Exterior hardware shall be of stainless steel. The finish shall be a baked on ASA70 gray enamel applied by an electrostatic process.

B. Lens - The lens shall be a clear, tempered, high-quality, heat resistant glass with no aberrations and will be secured in the supporting frame.

C. Reflector - The reflector shall be of drawn aluminum and have a highly reflective surface. The reflector edge shall have an elastomer gasket which seats firmly against the lens door to seal the optical system. The optical system will have a filter permitting it to breathe during lamp heat-up and cool-down.

D. Ballast - The ballast shall be securely mounted in the compartment provided in the housing or on the door. The ballast shall be pre-wired at the factory and will be suitable for 115 degrees F. ambient temperature operation. The ballast shall be the lag regulating type, constant wattage, single lamp with a primary power factor of 90 percent or higher. The primary voltage rating shall be 120 volts.

E. Lamp Socket - The socket shall be high-quality, rugged, porcelain, mogul type with corrosion-resistant clamp-type terminals, which will position the lamp properly with respect to the reflector and lens. The socket shall be provided with a heat-resistant gasket for sealing the optical system.

F. Photo Cell Socket - A locking type photo cell receptacle in accordance with EEI-NEMA standards shall be provided in the top of the housing to accept the photo-cells specified in Section II, 9.4 (photocells).

G. Acceptable manufacturer models:

General Electric M-250 Cutoff Series (100 & 150W)
ITT-American Series (100 & 150W) 113-55962-D, 113-55912-D
Other models, if equal, could be considered.

T-101.2 <u>Steel Poles</u>

Sectional Telescope Design - The pole shall be of a sectional telescope design. The number, length and diameter of the sections will be as required for the varying pole heights. The attached details identify the pole and mast arm required for each type of street. The adjoining sections shall overlap as shown on the standard drawings. The pole shall be constructed of cold rolled mild steel of a sufficient gauge having a yield strength of not less than 36,000 PSI. The pole shall be capable of withstanding, without fracture or apparent deformation, a traverse load of 750 pounds applied 1.8 inches below the top.

The pole shall provide a rigid support at the mounting height for a fixture weighing as much as 50 pounds with a projected area of three square feet. The pole shall be capable of withstanding a wind load of 80 mph per American Association of State Highway and Transportation Officials (AASHTO) specifications with the fixture attached to a six or eight foot arm.

The pole shall be manufactured with a hand hole and grounding lug attachment at the elevation shown on the standard drawings.

The pole shall have a cable entry slot sized and located as shown on the standard drawings. The slot will be free of burrs and sharp edges.

Pole Painting - After fabrication, the steel poles shall be sandblasted, primed and painted. Sandblasting will be in accordance with SSPC Specification SP-6-63. This will be followed with a prime coat of paint within 24 hours. The prime coat of paint will be compatible with the finish coat of paint. Do not paint over dirt, rust, scale, grease, moisture or conditions otherwise detrimental to formation of a durable paint film. An approved Polyurethane Enamel (Catalyzed) paint shall be used for the finish coat. Minimum dry coat thickness to be 2.0 mil.

The manufacturer shall provide the engineer with a written copy of the warranty showing that the pole manufacturer warrants the finish for a period of five years from the date of acceptance, against the loss of gloss, change in or loss of color, rusting of the steel or rust creepage (unless coating has been damaged by physical means or vandalism) blistering or delamination.

Base Plate: (See Detail).
Acceptable manufacturers of poles & paint:
Poles: CEM-TEC Corporation
Fab Weld, Inc.
Paint: Sherwin Williams (Polane-B Gray, Polyurethane Enamel)
Pittsburg Paint (Acrylic - urethane enamel #97-806)
Q-Coat - UP 979 (Polyurethane Enamel)
Other poles and/or paint, if equal, could be considered.

T-101.3 Architectural Street Lighting (See Detail T-652)

A. Structures

All metal components shall be first quality and free of gouges, pits or other surface defects. Steel tubes shall be of such quality that welds will be ground smooth or otherwise dressed and not readily available on casual inspection or otherwise objectionable to the engineer.

The gauge of the tubing shall be as required by the design engineer for the manufacturer, as approved by the City.

Poles shall be capped and watertight at the top in such a manner that the steel cap appears to be one with the pole. Only a minimum visible lip or protrusion shall be permitted. All welds shall be ground smooth and flush with adjacent surface.

Each structural pole shall have a reinforced wiring handhold, three (3) inches wide and four (4) inches high located on the street side of the pole. Install grounding connector, I ISCO TA6-S or equivalent with a 1/4" round head allen drive machine screw and nut.

The structure shall consist of the vertical pole, mast arms, caps and covers, screws, bolts and other hardware required for completion of the unit according to the requirements of the specifications and drawings for the project.

All necessary holes for assembly of the structure, mounting of mast arms, installation of the structure or any other purpose required by the specifications and drawings shall be factory made prior to coating. HOLES SHALL BE PUT ON THE STRUCTURE, OR ANY OF ITS COMPONENT PARTS, AFTER THE STRUCTURE IS COATED.

B. Threaded Holes

Where threaded holes are required, those holes shall have threaded filler plugs placed in them prior to coating to avoid filling threads with coating materials. Filler plugs shall have hex heads or other similar type heads for ease of removal. Filler plugs shall not be removed by the coater prior to shipment to the City.

The manufacturer shall provide a means of ventilating the structure poles at the top to allow a flow of air through the poles to keep the interior of the poles dry. Ventilation shall be placed in a location wherein it will not be visible from normal viewing angles.

C. Anchor Base

The anchor base shall consist of a four-bolt plate welded to the structure pole. Each plate shall be a rectangular plate of size, steel thickness and composition sufficient to enable the structure to meet all AASHTO and local codes and shall be designed by a registered professional engineer.

The manufacturer shall submit complete drawings of the anchor base detail indicating all sizes, materials, welding details, anchor bolts to be used, and all other pertinent data.

Provide two anchor bolt templates for the structure. Templates are to be of .250 inch steel and shall have all holes for anchor bolts, wiring conduit, etc.

D. Mast Arms

The mast arm shall be of welded construction so that it is a single unit with regard to its structural members. The corners of the mast arm shall be mitered and welded so that there are no gaps or openings in the joint between the members. The welds shall be ground smooth and flush with surrounding metal so that the adjoining members are continuous.

The mast arm shall accommodate the luminaire. The mast arm shall contain such holes, couplings, etc., as are required for the proper installation.

The mast arm shall be fastened to the structure pole so that it meets the requirements of AASHTO and other applicable codes. The mast arm shall be attached to the structure in the field by mechanical means and no welding shall be allowed between the arm and the vertical structure. The mast arm shall be removable from the vertical structure without burning, cutting or otherwise damaging or defacing the mast are, vertical structure or the finish of either.

All fastening hardware shall be non-corrosive or treated with a corrosion retardant.

It shall be the responsibility of the manufacturer to allow sufficient access to wiring and working area, to assure the City free and easy access to those areas for maintenance.

Submittal drawings shall clearly indicate how wiring of the luminaire is to be accomplished through the structure and its mast arm.

At no time or point shall the top of the arm sag below the horizontal. The mast arm must be physically and visually perpendicular at the top of the arm to the vertical structure. No shims or other devices shall be used to level the arm. Raking or adjusting of the vertical structure will not be allowed.

Should the mast arm fail to meet the requirements herein, the

developer shall replace the arm with another arm that does meet these specifications. NO modification or correction of the mast arm will be allowed other than at the manufacturer's plant unless prior approval of such modification is given by the owner or his representative in writing.

The luminaire shall mount to the mast arm which, in turn, shall bolt to the pole. The last six inches (6") of the luminaire mast arm shall be 2-3/8" O.D. pipe to accept luminaire.

E. Finishing

The coating must be capable of withstanding ultraviolet radiation, blowing sand and debris, atmospheric pollutants, physical abuse, time, heat and cold, moisture, chemical assault (vandalism) and other abuse.

It is required that ALL metal surfaces be treated as follows at the factory or coating facility:

1. Sandblast metal in accordance with Steel Structures Painting Council standard SSPC-10 (white metal).

F. Luminaires

American Electric Series 153/154, G.E. Decashield III, or approved equal.

- 250 W HPS
- Multitap ballast (120/208/240/277)
- Internal slip-fitter

T-101.4 Old Town Special District Lighting

A. General (See Detail T-653)

Construct concrete foundations as shown on drawings.

Assemble poles and fixtures and pre-wire poles on the ground. Lift poles with slings, set on anchor bolts and plumb with adjusting nuts. Site-in line with plumb bob from various angles, and tighten nuts. Grout bases as necessary.

Install fuses in base of pole and complete wiring. Make all connections with compression type fittings.

Ground poles at each location.

B. Service Pedestals

Provide for concrete bases, conduit, power and control wiring required for setting and connecting service pedestals as shown on the plans.

Set pedestals per manufacturers instructions.

C. Concrete Work

Before placing concrete, embedded items shall be properly located, accurately positioned, and maintained securely in place.

Concrete must be protected during curing by a sprayed-on curing compound or by plastic sheet cover secured in place for five (5) days.

Concrete finish shall be smooth, straight and free from marks.

Install concrete pole bases and equipment pads as indicated on the drawing. Concrete shall comply with construction notes on the plans.

D. Decorative Lighting Poles

Moldcast Washington Contra/Cline Pole #C7614JA or approved equal.

- Fiber glass
- Cast iron
- 14' - 6"

E. Luminaires

Moldcast Washington Contra/Cline 84122 or approved equal.

- 150 W HPS
- Single light
- Black polyester
- Multitap ballast

Moldcast Washington Contra/Cline 84123 or approved equal.

- 250 W HPS
- Single light
- Black polyester
- Multitap ballast

F. Paint Specifications

1. Items are to be sandblasted near white with a surface profile of 1.5 to 2 mils depth to remove any surface scale, rust or other surface contaminants.

2. Apply Aliphatic Polyurethane with 73 percent volume solids in accordance with the coating manufacturer's instructions.

3. Application of the finish shall meet specifications issued by the licensed formulator, using approved applicators, and the following:

    a. Coating films shall be uniform and free from flowlines, streaks, sags, blisters or other surface imperfections in dry-film state on all surfaces.
    b. Total dry film thickness of coating shall be 5 mil.
    c. Color to be Medium Bronze.

The City shall consider other coating systems shown to be of equal or greater durability.

* Note: This painting process or approved equal must be used. Technical specifications and/or samples must be submitted within three days upon request.

Contractor shall touch-up any damaged paint after installation with matching color, as directed by the City Traffic Engineer.

CITY OF TEMPE, ARIZONA

MODULAR TRAFFIC SIGNAL SPECIFICATIONS

T-200.1 GENERAL PURPOSE OF THE STRUCTURES:

The Structures and certain other items covered by this section and all pertinent sections hereof, shall be multiple purpose steel structures which serve to integrate various functions such as pedestrian control signals, vehicular control signals, graphics and signs and such other equipment and services as may be required by the City and the engineer, and as indicated on the drawings and these specifications.

All dimensions shall be designed to allow the structure to be modular in nature and to accept any of the items referred to above. The manufacturer shall make provisions for the neat, sturdy, workmanlike and aesthetically pleasing mounting of specified equipment within and/or on the structure legs and/or mast arms. All component parts and accessories shall be mounted in such a manner as to appear to be an integral part of the structure and give a "BUILT-IN" appearance. All fasteners and mounting hardware shall be concealed from the normal line of sight wherever possible and when such concealment is not possible, the fasteners or hardware shall be finished to match the structure finish.

Dimensions of legs, mast arms, etc. are critical due to the modularity and multifunctional purposes of the structures. Said dimensions become part of the final specifications and are not subject to change without prior approval of the engineer.

T-200.2 All structures shall meet the design requirements of the American Association of State Highway Officials (AASHTO). See AASHTO standard specifications for structural supports for highway signs, luminaires and traffic signals. The structures shall also meet all pertinent requirements of the City of Tempe and the State of Arizona.

The structures are to be used in Tempe, Arizona. Maximum Steady Wind requirement shall be eighty (80) miles per hour as indicated by the National Wind Speed Map (Isotach) in miles per hour: Annual Extreme Miles per hour thirty (30) feet above the ground, fifty (50) year mean recurrence interval. Calculations shall include a 1.3X wind gust factor.

Manufacturer shall submit sealed calculations and drawings to the City proving compliance of his product with the above requirements. Calculations shall be furnished and sealed by an Arizona registered professional structural or civil engineer whose license shall be current and active.

All structures shall be built by one manufacturer and shall be finished in the same facility using the same process and material to assure uniformity of finish, color and appearance.

Provisions shall be made in each vertical leg for water, which gathers in the leg to run out of the leg into the wiring access chamber at the structure bottom. All said provisions shall be within the wiring access and shall not be visible or apparent from without the compartment when its covers are in place. Care shall be taken that this drain water does not interfere with or affect the wiring terminal block or electrical connections.

The manufacturer shall provide the City with a mylar reproducible of installation drawings, foundations and instructions for each structure type. The instructions shall contain assembly and installation drawings and instructions. The installation instructions shall contain complete details regarding torquing of all nuts and bolts.

All component members of the structures shall be marked or labeled in such a manner that they can be readily identifiable by the City.

T-200.3 Bidders shall provide the City with proof of the proposed manufacturer's experience and ability at the time of bid opening. Failure to do so can be grounds for rejecting a manufacturer's bid. The required proof shall include the following:

1. Name of manufacturer and location.

2. Names of projects built by the proposed manufacturer wherein demountable, integrated, modular traffic/lighting structures of the type shown on the drawings of equal or greater complexity were supplied by the proposed manufacturer, and photographs of same.

3. Evidence that the proposed manufacturer has at least three (3) years of experience in building such structures.

4. Preliminary drawings showing proposed tube sizes, dimensions, gauges to be used, mast arm connection details for mast arm structures, base plate and anchor bolt sizes and gauges, and leg connection details.

5. Preliminary engineering calculations for the above and the name and location of the engineer who provided them.

Structures shall be shipped to the City fully finished and factory assembled to the extent that the vertical portion of any structure shall be ready for installation on the anchor bolts immediately upon receipt in the City's yard. Panels, sign braces, traffic equipment, etc., shall be supplied for field installation.

Panels, signs and traffic equipment shall be field installed.

Panels, non-structural braces and other "field installed" components shall be crated for shipment in such a manner as to prevent "in-transit" damage, scratching or warping.

T-200.4 STRUCTURES:

All structures (unless otherwise indicated on the drawings or in the specifications) shall consist of two rectangular steel legs, which are mechanically fastened to one another in such a manner that the broad faces of the legs face one another. The legs shall be of the same dimensions with regard to width and length of the tubing. If the legs have visible weld seams, those seams shall be placed so that they are, if possible, on the inner facing surfaces of the tube, facing one another. All metal components shall be first quality and free of gouges, pits or other surface defects.

Steel tubes shall be of such quality that welds shall be ground smooth or otherwise dressed and not be readily available on casual inspection or otherwise objectionable to the engineer.

The leg spacing as shown on the drawings is critical and care shall be taken by the manufacturer to assure that it is maintained to insure correct fit of controllers, litter cans, panels and other equipment which the City may choose to integrate with the structure.

The gauge of the tubing shall be as required by the design engineer for the manufacturer, as approved by the City.

Legs shall be capped and watertight at the top in such a manner that the steel cap appears to be one with the leg. Only a minimum visible lip or protrusion shall be permitted. All welds shall be ground smooth and flush with adjacent surfaces.

Vertical legs shall be joined as often as is required by the design engineer and the requirements of steel cross braces which are mechanically fastened to the legs so that the fasteners are not visible when panels and traffic equipment are in place on the structure. There shall be no less than two (2) structural cross braces on any vertical structure. Cross braces shall be fabricated of steel, and shall be installed so that they are equidistant from the front and rear of the structure containing braces.

One brace shall be located so that its upper surface corresponds to the top of the vertical legs. The structure height shall be as indicated on the drawings.

Each structural leg shall have a wiring handhole, three (3) inches wide and five (5) inches high located on it's inner facing surface and within the wiring access compartment between grade level and the lower-most cross brace (twelve [12] inches above grade prox.). A one-half (1/2) inch by one and one-half (1-1/2) inch long grounding lug shall be welded on the inner-facing surface of each leg within the wire access compartment. A nut and washer shall be provided for each lug.

The structure shall consist of the vertical legs with the anchor base plates welded in place, structural cross braces (welded in place) and all panels, panel braces, caps and covers, screws, bolts and other hardware required for completion of the unit according to the requirements of the specifications and drawings.

All necessary holes for assembly of the structure, mounting of panels or accessories, mounting of component equipment, installation of the structure or any other purpose required by the specifications and drawings shall be factory made prior to coating. NO HOLES SHALL BE PUT IN THE STRUCTURE OR ANY OF Its COMPONENT PARTS AFTER THE STRUCTURE IS COATED (except for holes in panels for graphics, signs, etc.).

T-200.5 Where threaded holes are required, those holes shall have threaded filler plugs placed in them prior to coating so as to avoid filling threads with coating material. Filler plugs shall have hexheads or other similar type heads for ease of removal. Filler plugs shall not be removed by the coater prior to shipment to the City.

The manufacturer shall provide a means of ventilating the structure legs at the top to allow a flow of air through the legs in order to keep the interior of the legs dry. Ventilation shall be placed in a location wherein it will not be visible from normal viewing angles.

T-200.6 ANCHOR BASE DETAILS:

The anchor base shall consist of four bolt plates welded to the structure leg. Each plate shall be a rectangular plate of size, steel thickness and composition sufficient to enable the structure to meet all AASHTO and local codes and shall be designed by an Arizona registered professional engineer. Bolt pattern shall be as indicated on the drawings.

The manufacturer shall submit complete mylar reproducible drawings of the anchor base detail indicating all sizes. materials, welding details, anchor bolts to be used, and all other pertinent data.

Each anchor bolt shall be hot dipped galvanized including the entire threaded area.

Applicable anchor bolts, nuts, and washers shall be supplied with each pole as specified.

Provide two anchor bolt templates for each type of structure. Templates are to be of 0.250-inch steel and shall have all holes for anchor bolts, wiring conduit, etc. A template shall encompass both legs simultaneously.

Pole manufacturer shall be responsible for foundation design details for each type of structure proposed herein. The design shall be based on soils able to develop a lateral bearing pressure of 300#PCF.

T-200.7 PANELS (Graphic, Signage and Enclosure):

All panels shall be of sixteen (16) gauge steel where the panel's longest dimension does not exceed fifty-one (51) inches. Where the longest dimension exceeds fifty-one (51) inches, the panel shall be fourteen (14) gauge steel.

Panels shall have a regress no less than 0.50" deep on all four sides. Panels, which are used between structure legs, shall have a 0.73" reveal at the top and bottom vertical edges. Panels shall be die formed to provide a flat, rigid, precise surface of application of signs and graphics.

Panels shall be cut out, where required, to fit around and enclose vehicular and/or pedestrian signals, call boxes, irrigation controls and such other equipment as called for in the drawings and specifications. All panel edges and cut outs shall be clean and straight and shall have no burrs, irregularities or visible defects.

Panels shall be used on the front and rear of structures, arms and outboard signals, unless otherwise noted on the drawings.

Where panels are cut out to accommodate traffic or pedestrian signals, the edge of the cut out shall be no further than one-half (1/2) inch from the signal edge. This provision shall apply to hinges, locking devices and all other signal appurtenances. It is intended that there shall be a minimum separation between the signal and its surrounding panel.

Panels shall mount to steel cross braces by means of self tapping steel 1/4-20 fasteners that shall screw into pre-drilled holes in the structure or cross braces. All pre-drilled holes shall be coated so as to prevent rusting of the steel cross brace and the consequent weeping of rust (through capillary action) onto the face of the panel.

All panel fasteners shall be located within the 0.750" reveal area to minimize fastener visibility. Fasteners shall be no smaller than 1/4-20.

Base panels (kickplates) shall be of seven (16) gauge steel and enclose the wiring access area from one-half (1/2) inch above grade (nominal and based on grade being straight and level) to the top of the lower most cross brace, twelve and one-half (12-1/2) inches above grade. Each access panel (kickplate) shall be retained by means of six (6) self tapping steel 1/4-20 fasteners.

Panels shall be pre-drilled for mounting to the structure and shall be drilled prior to coating.

Panels shall be dimensioned to fill the area between the legs and cross braces leaving no more than a one-eighth (1/8) inch gap on either edge.

All horizontal panel edges in the vertical structure shall be covered by a sixteen (16) gauge steel sheet metal cap which shall cover the exposed panel edge and fasten to the cross brace using the same screws by which the panel is fastened to the brace. The cap shall completely and neatly cover the panel edge and the cross brace.

Said caps shall be used at the top edge of the kickplates, the bottom edge of the next lowest cross brace and all other edges where an open section meets the panel edges, or the edges shall be incorporated into the panels.

T-200.8 STRUCTURES WITH MAST ARMS:

All provisions of Section T-200.7 are hereby made a part of the specification for Mast Arm Structures.

The structure shall have a rectangular, horizontal mast arm mounted to the street side leg, in the plane through the two legs of the structure. The upper edge of the mast arm shall be level with the top of the leg to which it is mounted and there shall be no visible gap between the leg and the root end of the mast arm. The lower edge of the mast arm shall be located SEVENTEEN (17) feet above the street surface.

The mast arm shall be a rectangle constructed of rectangular welded steel tubing. The mast arm shall be of welded construction so that it is a single unit with regard to its structural members. The corners of the mast arm shall be mitred and welded so that there are no gaps or openings in the joint between members. The welds shall be ground smooth and flush with the surrounding metal so that the adjoining members are contiguous.

The mast arm shall be fabricated of tubing, which is nominally the same size as that of the structure legs, which support it. In every case, the width of the mast arm tubing shall be the same as that of the leg to which the mast arm is attached. For the vertical distance between the horizontal members of the mast arm, refer to the drawings.

The mast arm shall accommodate traffic signals as shown on the drawings. The mast arm shall contain one and one-half inch (1-1/2") threaded holes, couplings, etc., as required for the proper installation of said signals.

All signals that are to be mounted to the horizontal mast arm members shall be positioned midway between the horizontal members so as to be symmetrical with the mast arm and with one another. Signal arrays located in the mast arm shall be positioned between the vertical mast arm members.

Provisions shall be made for mounting steel enclosure panels around the signals per T-200.7. The panels shall be fabricated per T-200.7.

Such other panels and/or illuminated signs as are required by the engineer and as shown on the drawings for this structure shall be provided and provisions for their mounting shall be made.

The mast arm shall be fastened to the structure leg so that it meets the requirements of AASHTO and other applicable codes. The mast arm shall be attached to the structure in the field by mechanical means and no welding shall be allowed between the mast arm and the vertical structure. The mast arm shall be demountable from the vertical structure without burning, cutting or otherwise damaging or defacing the mast arms, vertical structure or finish of either.

All connections shall be concealed from view when the panels are in place. No bolts, nuts, brackets or other fastening hardware or devices shall be visible when the panels are in place. All fastening hardware shall be non-corrosive or treated with a corrosion retardant.

The manufacturer shall provide sufficient access to wiring and working areas, signal mountings, etc., to assure the City free and easy access to those areas for wiring and other maintenance.

There shall be a three (3) inch by five (5) inch reinforced hand hole located immediately adjacent to the lower mast arm member to facilitate wiring of the traffic signals located in the mast arm. This requirement shall apply wherever traffic signals are to be installed.

Submittal drawings shall clearly indicate how wiring of signals and other equipment is to be accomplished through the structure and its mast arm.

Mast arms of a specific length shall be interchangeable with all other modular mast arms of the same length.

The mast arms shall have a factory built-in camber so that the arm maintains a position not more than one inch above or below horizontal. The arm shall be straight and its horizontal members shall be parallel. The mast arm shall be physically and visually perpendicular to the vertical structure. No shims or other devices shall be used to level the arm.

Should the mast arm fail to meet the requirements hereof, the manufacturer shall replace the arm with another arm that does meet these specifications. No modification or correction of the mast arm will be allowed other than at the manufacturer's plant unless prior approval of such modification is given by the engineer.

Where required, the luminaire (by others) shall mount to a three foot six inch (3'-6") long square steel mast arm which in turn shall bolt to the side of the pole as shown in the drawings. The last six (6) inches of the luminaire mast arm shall be 2-3/5" O.D. round pipe to accept the luminaire. The pole shall (if necessary) be reinforced to support the luminaire and arm so that they stand straight out from the pole without sagging.

Connecting bolts shall be internal. (Size to be determined by manufacturers structural calculations).

Provide a wiring access hole between the pole and the luminaire arm.

T-200.9 SIGN MODULES:

Internally illuminated street name sign modules shall be provided as shown on the drawings.

Cabinet shall be constructed of 1/8" thickness mell finish aluminum and painted per the specifications.

Sign faces shall have an aluminum frame for stability, hinged on top for internal access, and 1/4 turn fasteners on the bottom for closing. Sign face shall be .187 lexan non-glare matte finish with green #3630-26 Scotchal translucent film background and 11" upper case, 8" lower case Universe 55 white letters. (Block numbering shall be six inches (6") high).

Internal lighting is to be provided by four (4) 117" H.O. lamps with number 51-861-R, high output, rapid start ballast for any combination of T-12, HO, RS lamps with a total overall footage of 48 feet maximum and 24 feet minimum, for 120 volts, 60 hz.

T-200.10 FINISHING:

The structure and equipment described in the foregoing sections are intended for use in Arizona.

The coating must be capable of withstanding Ultra Violet Radiation, blowing sand, and debris, atmospheric pollutants, physical abuse, time, heat and cold, moisture, chemical assault (vandalism) and other abuse.

It is therefore required that all metal surfaces be treated as follows at the factory or coating facility:

1. Sandblast metal in accordance with Steel Structures Painting Council standard SSPC-10 (white). Remove all oil and grease from the surface by Solvent Cleaning per SSPC-SP1 (do not use hydrocarbon solvents).

2. Primer: Sherwin Williams DTM Primer/Finish B66 W1, One coat at 8.0 mils wet, 3.0 mils dft. Work prime coat by brush into crevices welds and sharp edges.

   Finish: Sherwin Williams DTM Acrylic Gloss Coating B66 TZ104 one coat at 8.0 mils wet, 3.0 mils dft. Finish color is City of Tempe Bronze

3. Application of the finish shall be performed under specifications issued by the licensed formulator using approved applicator and the following:

   1. Coating films shall be uniform and free from flowlines, streaks, sags, blisters or other surface imperfections in dry-film state on all surfaces.

   2. Total dry film thickness of coating shall be 6-Mil.

   3. Color to be Tempe Bronze.

The manufacturer shall provide the engineer with three (3) samples of the cured coating on 12 gauge steel panels, 6" x 6" square in the proper color. Panels shall be tested to determine whether "graffiti" such as cured Rustoleum and/or Krylon spray paint, adhesive tape, magic marker, grape juice and other discolorants can be removed without damage to the coating.

The manufacturer shall agree in writing to repair or replace any failed coating and to repair or replace any steel, which has been damaged as a direct result of the failure of the coating (repair or replacement to be at the option of the manufacturer). The manufacturer shall provide a six-month supply of paint to the City to be used as "touch-up" after installation of the modular poles.

The City will consider other coating systems shown to be equal or greater durability.