

SECTION 30- ORNAMENTAL STREET LIGHTING

30-1 INTENT

It is the intent of these Specifications to describe the minimum acceptable parameters for ornamental streetlight installation in the City of Madera.

30-2 GENERAL

Each project may select a pole, color, luminaire and ornamentation as provided by this standard.

To provide adequate individualization the following variety is provided:

| | |
|---------------------------|-------------------------------|
| Poles | 3 designs (different lengths) |
| Colors | 2 (black, grey) |
| Configurations (mixed) | 2 (single/double-may be) |
| Cross arms | 2 designs |
| Luminaries: | |
| Capitals | 2 designs |
| Globes | 2 designs/2 sizes |
| Wattage | 3 (50, 70 & 150) |
| Ornamentation | Finial and/or Band |

To minimize future costs to the City in view of the wide range of design options, each installer must provide to the City spares of all components in quantities dependent upon the number of poles installed in the project.

| Poles Installed | Spares |
|-----------------|--------|
| 12 or less | 2 |
| 13 to 30 | 3 |
| 31 or more | 4 |

Several pages of drawings have been included in these specifications detailing each component.

A list of pre-approved Vendors has been included as an aid in obtaining the various system components. Alternates may be submitted for approval and will be considered if the basic common design criteria are followed.

30-3 SPECIFICATIONS

Furnishing and installing streetlights shall conform to the provisions of Section 86, "Signals and Lighting," of the State of California, Department of Transportation Standard Specifications and the Standard Plans, most recent version; the City of Madera Public

Works Standard Drawings, E-1 thru E-27 as applicable; these specifications and the streetlight plan(s).

30-4 STREETLIGHT PLAN

The designer shall submit to the City Engineering Division for review a detailed plan of the proposed installation. This plan shall include proposed locations of the streetlights, existing streetlights in or adjacent to the project, location of electrical service, photo electric control, pull boxes and routing of conduit.

After any required changes are made, the plan(s) will be approved and signed. No installation Work shall be undertaken until the plans are signed. Work or equipment not specified or shown on the plan(s) which is necessary for the proper operation of the installation shall be provided and installed at no additional cost to the City.

The locations of foundations, poles, services, pull boxes and other appurtenances shown on the plan(s) are approximate. Exact locations and grades will be established if necessary by either the Project Inspector or the Supervisor of Traffic Signals & Streetlights (TSSL) or his authorized representative.

When the project is complete and all lights are Working, a final inspection has been made and all punch list items are corrected, the Contractor shall provide an "as built" drawing to the City.

30-5 MATERIALS

All materials required to complete the Work under this contract shall be furnished by the Contractor.

The materials furnished and used shall be new, except such used materials as may be specifically provided for on the plans.

All Work and materials shall be in full accordance with the latest rules and regulations of the National Board of Fire Underwriters, and local ordinance or State laws, the State of California Industrial Accident Commission's Safety Orders, and Regulations of the Pacific Gas and Electric Company pertaining to Service equipment and installations thereof. All Work shall comply with Madera City Electrical Ordinances and National Electrical Manufacturer's

Association Standards and all regulations and codes as stated in Section 86-1.02 "Regulations and Codes" of the State of California Standard Specifications (latest ed.).

Nothing in these plans and specifications shall be construed to permit Work not complying with these codes.

30-6 EQUIPMENT LIST

All equipment and materials that the Contractor proposes to install shall conform to these specifications and the plans. A list of substitute equipment and/or materials, along with a written descriptive summary, describing the functions of the components which the Contractor proposes to install shall be submitted along with his streetlight plan. The list shall be complete as to the name of the manufacturer, size and identifying number of each item.

The list shall be supplemented by such other data as may be required. In all cases, the judgment of the Traffic Signal & Streetlight Superintendent (TSSL) shall be final as to whether substitute equipment and/or material recommended by the Contractor conforms to the intent of these specifications and is acceptable for use.

The wattage and spacing of the streetlights shall be such that the appropriate average maintained illuminance is provided per ANSI/IES RP-8, Table 2(b).

30-7 WARRANTIES, GUARANTEES AND INSTRUCTION SHEETS

All equipment furnished shall be guaranteed to the City by the manufacturers for a period of not less than one (1) year, unless otherwise indicated, following the date of acceptance of such equipment. If any part (or parts) is (are) found to be defective in materials or Workmanship within the one-year period, and it is determined by the TSSL Supervisor or by an authorized manufacturer's representative that said part (or parts) cannot be repaired on the site, the manufacturer shall provide a replacement part (or parts) of equal kind and/or type during the repair period and shall be responsible for the removal, handling, repair or replacement and reinstallation of the part (or parts) until such time as the street lighting equipment is functioning as specified and as intended herein; the repair period shall in no event exceed 72 hours, including acquisition of parts.

The one-year guarantee on the repaired or replaced parts shall again commence with the date of reassembly of the system.

All Work done by the Contractor shall be guaranteed in writing to the Engineer for the one-year period from the date of acceptance.

Copies of all operating instructions, parts lists, assembly diagrams, etc., shall be provided to the City with the "As-Built" plans(s).

30-8 FOUNDATIONS

The size of the foundations will be dependent on the pole length. Poles over 12 feet shall have a foundation 48" deep. Poles 12 feet or less in length shall use a 36" deep foundation. The foundations shall be 24" in diameter. The top 8" to 12" shall be formed round or square as appropriate to the individual installation.

The foundation shall be set back 30 inches on center from the face of the curb. Foundation concrete shall contain not less than 470 pounds of cement per cubic yard. It shall be placed in a single pour against undisturbed earth where practicable. The top

portion shall be formed and finished to present a neat appearance. The top of the finished foundation shall be level. The use of leveling nuts to plumb a pole will not be permitted. No utilities shall be permitted to run through a foundation.

Where obstructions or other conditions prevent construction of planned foundations, the Contractor shall construct an effective foundation satisfactory to the Engineer.

The bottom of concrete foundations shall rest on firm ground. When placing the foundations, the Contractor shall place all conduit ends in their proper position and at the correct heights and shall securely hold them in position during the pouring of concrete. The conduits ends shall be capped before any concrete is poured. Both forms and earth to be in contact with foundations shall be thoroughly moistened before placing concrete. Anchor bolts shall be galvanized and shall extend above the finished base as needed to ensure the proper installation of anchoring hardware. The anchor bolts and conduits shall be held in place by means of a template until the concrete sets.

Poles shall not be installed until the foundation concrete has set at least five days.

30-9 POLES

The pole material shall be non-corrosive fiberglass reinforced polyester (FRP), pigmented throughout, formed true to the mold with complete detail. Tenon, anchor base plate and access door shall be cast aluminum. All hardware shall be tamper resistant stainless steel. The color of the poles shall be black or gray. The poles shall be engineered to withstand 100 mph wind forces per the AASHTO standards including a 30% gust factor.

If relocation of utilities is required, immediate notification shall be given to the appropriate utility company by the Contractor. The Contractor may install all underground electrical components, including foundations at the site of the project; however, no streetlight poles shall be installed until underground conduit and wiring are in place. The anchor bolts and associated hardware shall be hot dipped galvanized. The anchor bolts shall be 3/4"x18", "L" type. The top of the pole shall be provided with a 3 inch O.D. tenon to facilitate mounting of the luminaire assembly or cross arm. The two way cross arm assembly, if and where used, shall be cast aluminum. The finish shall be a premium polyurethane coating and shall match the color of the pole.

30-10 CONDUIT

Nonmetallic -type Cable Duct shall be used for all ornamental installations except street crossings which shall be 2" Galvanized Rigid Conduit (GRC). For all driveway crossings, the Cable Duct shall be sleeved into a 2" GRC for the entire width of the driveway.

The Cable Duct shall have a nominal O.D. of 1-1/4" and a minimum wall thickness of 0.125". The duct material shall be cross linked polyethylene. Splicing of the polyethylene duct component of the Cable Duct is not permitted. When the duct enters a pull box or pole base, all burrs and sharp edges shall be removed.

Rigid Conduit shall conform to Article 346 of the National Electrical Code. All conduit and fittings shall be hot dip galvanized. Each length shall bear the UL label. All GRC ends shall be threaded and joined with approved fittings. The use of threadless or set-screw type fittings is not allowed.

Installation of all conduit shall conform to the appropriate Articles of the Code. Conduit threads cut in the field and damaged conduit surfaces on metal conduit shall be thoroughly painted with a cold-galvanizing zinc rich coating.

The ends of all GRC shall have hot dipped malleable iron insulated grounding bushings attached. They will be bonded to the common ground conductor by means of a copper lay-in style lug. It shall be the privilege of the Contractor, at his own expense, to use a larger size conduit if desired, and where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings will be permitted.

All conduit shall be installed to a depth of not less than twenty-four inches nor greater than thirty-six inches below the curb grade in the sidewalk areas and from the finished surface in street areas. Conduits in sidewalk areas and parallel to the curb shall not be installed more than twenty-four inches back of curb unless approved by the Engineer.

Conduit shall be installed under existing pavement by approved jacking or boring methods. The pavement shall not be disturbed without the permission of the Engineer and then only in the event insurmountable obstructions are encountered. Excessive use of water, such that pavement might be undermined or subgrade softened, will not be permitted.

Conduit ends terminating in pole foundations shall extend not more than two inches vertically above the top of the foundation.

Conduit in pull boxes shall not extend more than two inches inside the box wall. The entry of conduit from the bottom of a pull box shall require the approval of the Engineer. No conduit or utility shall pass through a streetlight foundation or pull box except the conduit which terminates within the foundation or pull box.

After the installation of all conductors, the ends of conduits terminating in pull boxes and service pedestals shall be sealed with an approved duct seal material.

In as much as possible, conduit shall be run in a straight line from one pull box or pole to the next maintaining a consistent setback from the curb. Any variation from this requirement shall be approved by the Engineer or TSSL Supervisor.

30-11 PULL BOXES

Pull box components shall be reinforced concrete such as Christy N9 type or approved equal. Pull boxes are required at each end of any conduit crossing a street, at junctions of three (3) or more conduits and all major changes in direction of a conduit run. All pull boxes shall be CALTRANS #3-1/2 unless otherwise noted on the plans. All pull boxes shall be installed with extensions. The pull box lid adjacent to PG&E's service pole shall be marked "PG&E". All others shall be marked "Street Light". Pull box lids shall not be equipped with hold down bolts. All pull boxes shall be wrapped with building paper prior to backfilling. A "french drain" consisting of 1" aggregate, 24" deep and 12" greater than

the diameter of the pull box shall be placed below each pull box. The box shall be grouted at all conduit entrance points and at the junction between the box and extension.

30-12 CONDUCTORS AND WIRING

All wiring and wiring methods shall conform to the appropriate provisions of the applicable Codes. A minimum of three feet of slack in each conductor shall be left at each street lighting standard and in each pull box. The Cable Duct shall contain 3 #6 AWG standard copper conductor's Type THWN (Black, White & Red) and 1 #8 AWG bare stranded copper grounding conductor. Conductors installed in GRC conduit shall match in size, material and color, the Cable Duct conductors to which they are spliced.

All current carrying conductors shall have insulating jacket colors appropriate to their use. The use of colored phase tape is not allowed.

Conductors within the pole shall be #10 AWG Type THWN stranded copper. Splices in single conductor wire shall be limited to the load side of the service and to tap type splices located in pole bases. These splices shall be made using split bolts. The splice shall be insulated as follows: minimum 2 layers of rubber tape, 1 layer-1/2 lapped plastic tape, 1 layer friction tape and then coated with an approved electrical sealing compound (Skotchkote).

30-13 FUSED SPLICE CONNECTORS

Each streetlight shall be fused with a 5 amp KTK type fuse installed in a TRON HEB type fuse holder. The fuse and holder shall be located in the pole adjacent to the hand hole. It shall be installed in the #10 conductor approximately 10 inches above the feeder splice. This will provide sufficient slack to allow easy changing of the fuse as needed. The fuse/holder shall be crimped to the wire and the crimp joints insulated as described above for tap type splices.

30-14 BONDING AND GROUNDING

Ground shall be obtained by installation of a ground rod within the service pedestal. This ground rod shall be bonded to all metallic conduits within the service by means of a bare #8 solid copper conductor.

Ground shall be extended to each pole via the #8 bare stranded conductor in the Cable Duct. At the base of each pole the incoming and outgoing ground conductors shall be spliced using a copper split bolt to a #10 stranded copper conductor, type THWN, with green insulation. This conductor shall be connected to the ground terminal on the luminaire assembly.

30-15 PAINTING

All paint shall be furnished by the Contractor. Minor touch-up painting on all material whose surface has been damaged or not protected from corrosion shall be

accomplished as directed by the Engineer. Cold galvanizing zinc-rich paint shall be used on all damaged galvanized surfaces.

30-16 SERVICE

All services for multiple streetlight circuits shall be 120/240 volt, 3 wire single phase. The service pedestal for Street Light installations shall be as detailed in Public Works Standard Drawing E-16.

If designed to feed from a Combination Traffic Signal and Streetlight service pedestal, it shall be as detailed in Public Works Standard Drawing E-17. The Contractor shall be responsible for any modification necessary to existing pedestals not in conformance with the current standard. The TSSL Supervisor shall be contacted for component information as needed. The underground service from the local utility shall be as detailed in Public Works Standard Drawing E-6. The conductors from the service to the PG&E pull box shall be a minimum #6 AWG.

30-17 LUMINAIRE

The luminaires shall be High Pressure Sodium of the "acorn" type equipped with a UV inhibited polycarbonated globe. An internal glass/borosilicate refractor providing for IES Type III MCO distribution is required. The luminaire ballast shall be designed for 120 volt operation at 50, 70 or 150 watts as shown on the plans and shall have a high power factor. The starting aid shall be of the 3-wire type. The capital portion of the luminaire assembly shall be cast aluminum. The finish shall be a premium polyurethane coating and shall match the color of the pole.

30-18 PHOTOELECTRIC CONTROL

The Photoelectric Control (PEC) shall be installed in the capital portion of the pole nearest the service pedestal. The PEC shall be rated at 1000 watts minimum. It shall be wired back to the service pedestal with 3 #12 AWG stranded copper conductors color coded to match the PEC.

If controlled from a Combination Traffic Signal/Streetlight service pedestal, no PEC is required. The associated safety light PEC will control the lighting contactor.

30-19 ORNAMENTATION

Luminaire globes may be modified using a finial, decorative band or both. The finial is available on either globe option. The band is available only on the 8" neck model.

30-20 TRAFFIC CONTROL

Traffic control shall be provided, as needed, in accordance with the State of California, "Manual of Traffic Controls for Construction and Maintenance Work Zones," latest edition.

30-21 ORNAMENTAL STREETLIGHT PREAPPROVED SOURCES

1. Moldcast, 1251 Doolittle Drive, San Leandro, CA 94577, (415) 562-3500
2. Antique Street Lamps, Inc., 8412 S. Congress, Austin, TX 78745, (512) 282-9780
3. Holophane Co./Unique Solutions Div., 515 McKinley Avenue, Newark, OH 43055, (614) 349-4194
4. Shakespeare/Electronics & Fiberglass Div., PO Box 737, Newberry, SC 29108, (803) 276-5504

| ITEM | AVAILABILITY |
|-----------|--------------|
| Pole | |
| Type I | A, B, C, D |
| Type II | D |
| Type III | D |
| Crossarm | |
| Type A | B, C, D |
| Type B | B, C |
| Luminaire | |
| Type A | B |
| Type B | A, B, C, D |